APPENDIX 2D Special Studies

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APPENDIX 2D SPECIAL STUDIES

Special investigations were conducted to identify potential sources and refine the conceptual site model (CSM) to support both the Remedial Investigation (RI) and Feasibility Study (FS). A summary of the investigations is listed below:

- Tar samples collected from test pits north of Kite Hill (TP-10) and the eastern shoreline (TP-6) (Figure 2-1) were analyzed by North Creek Analytical in 1997. Results are presented in Appendix J of the focused feasibility study (FFS) (Parametrix and Key 1998).
- As part of an interim action in 1998, two product samples were submitted for extended polycyclic aromatic hydrocarbon (PAH) analysis (META 1999). The sample of product collected from a tank west of Cracking Towers 3 and 4 (GWP-TANK) was used to characterize oil gas tar (OGT) and another sample collected from a well (MLS-4) was used to characterize dense nonaqueous phase liquid (DNAPL) downgradient of the former American Tar Company (ATCO) tar refinery. The tar from the tank was subsequently removed (Attachment 2D-1).
- In 1999, sediment and nonaqueous phase liquid (NAPL) samples from wells were submitted for fingerprinting of monocyclic aromatic hydrocarbons (MAHs) and PAHs (META 1999). The PAH results are included in the RI data set, and the report is included as Attachment 2D-1.
- In 2001, DNAPL samples analyzed in the 1998 and 1999 META studies were reanalyzed for biomarker compounds and gas chromatography isotope ratio mass (GC IRM) (META 2001). Most samples indicated biomarker sources were predominantly biological in origin. When sediment samples were compared with the product samples, stable carbon isotope ratios suggested three source types:
 - Similar to product from the tank,
 - Similar to product in the well (MLS-4), and
 - Unlike either product sample.

The third source, which was not identified, included a mix of petroleum signatures, showed moderate to low total PAH (TPAH) concentrations, unlike typical manufactured gas plant (MGP) DNAPL, and low naphthalene-to-TPAH ratios. These chemical characteristics suggest the third source may be attributable to other origins. Distribution of the third group was concentrated in sediment offshore the Northlake Shipyard and extended to Harbor Patrol. The report is included as Attachment 2D-2.

In 2002, as part of Phase 2 of the eastern study area (ESA) RI/FS investigation, DNAPL well samples,¹ tar samples² and sediment samples (both grab and core) were submitted to Battelle for analysis of extended PAHs, pesticides and polychlorinated biphenyls (PCBs) and for a petrology study (Battelle 2003). Some split samples were submitted to Analytical Resources, Inc. (ARI) for analysis of metals and semivolatile organic compounds (SVOCs). The study indicated multiple pyrogenic³ sources of PAHs in the western sediments. The analytical results are included in the RI data set and the report is included as Attachment 2D-3.

³ Pyrogenic materials are complex mixtures of primarily hydrocarbons formed by incomplete combustion of organic matter.



¹ DNAPL samples included MW-09, DW-5 and MW-5.

² Tar samples included SS-1 from the CWG unit, and the tar mound on the eastern shoreline.

- In 2003, ARI (Analytical Resources 2003) analyzed a NAPL sample collected by RETEC from 20 feet below ground surface (bgs) (MW-09) for PAHs and SVOCs. Tar samples from the carbureted water gas (CWG) unit (SS-4) and northeast corner tar mound (SS-5) were also analyzed; however, tar results were not included in the RI soil data set because there is good data coverage in those areas. See Section 5 for more detail on the RI data set.
- In 2004, as part of Phase 3 of the ESA RI/FS, selected sediment samples were submitted to Stanford University for PAH partitioning aqueous equilibrium testing, petrographic analysis and scanning electron microscopy (SEM) (Hong and Luthy 2005). The aqueous equilibrium testing determined site-specific partitioning coefficients of PAHs. Samples were classified into four categories using petrographic analyses: carbon, organic plant material, diatoms and mineral matter. The non-plant carbon fraction was further separated into carbon black, pitch, cenospheres, coke, tar-like, charcoal, coal, depositional carbon and bug plant residue; the report is included in Attachment 2D-8.
- In 2004 and 2005, Floyd | Snider conducted two sampling events, submitting NAPL samples collected from wells and sediment cores to Zymax for full gas chromatography mass spectroscopy (GCMS) scan (Floyd | Snider 2006). Most of the sediment samples were collected from nearshore areas of the western study area (WSA) and provided supplemental information to characterize the distribution of NAPL and potential upland-to-sediment NAPL migration pathways in this area. The analytical results are included in the RI data set (Attachment 2D-4).
- In 2007, Floyd | Snider collected samples of soil, NAPL and tar from upland locations and submitted them to Battelle for total petroleum hydrocarbon (TPH) and PAH analysis (Battelle 2007). Selected split samples were submitted to ARI and analyzed for volatile organic compounds (VOCs), PAHs, diesel or a combination thereof. The analytical results are included in the RI data set and the report is included as Attachment 2D-5.
- In fall 2007, Floyd | Snider (Floyd | Snider 2008) collected split samples as part of the northeast corner investigation and a NAPL sample from MW-09 for analysis. Analytical results are included in the RI data set (Attachment 2D-6).

REFERENCES

- Analytical Resources, Inc. 2003. Laboratory Report RE: Client Project GWPSS/GJRW1-04403-963. ARI Project FJ19.
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- Battelle. 2007. Data Report, Gas Works Park Soils February 2007.
- Floyd | Snider. 2006. Seattle Law Department, Gas Works Park, Chemical Forensics Sampling Report.
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- Hong, L and RG Luthy. 2005. Draft Final Report II Identification of Black Carbon Material in Sediments from Lake Union. Stanford University, Department of Civil and Environmental Engineering.
- META. 1999. Gas Works Park Hydrocarbon Fingerprinting Results.
- META. 2001. Environmental Laboratory Report, Gas Works Park and Lake Union Sediment.
- Parametrix, Inc. and Key Environmental. 1998. Draft Gas Works Park Environmental Cleanup, Focused Feasibility Study Report Volumes 1 and 2.



ATTACHMENT 2D-1 META 1999 Laboratory Report

TA Environmental, Inc.

19 November 1999

Mr. Dan Baker ThermoRetec Consulting Corporation 1011 S.W. Klickitat Way Suite 207 Seattle, WA 98134

RE: Gas Works Park Hydrocarbon Fingerprinting Results

Dear Mr. Baker:

This package contains the analytical results from seventeen frozen sediment samples received on 15 and 21 October 1999 by META Environmental, Inc. (META) from ThermoRetec Consulting Corporation (ThermoRetec). The analytical data from three non-aqueous phase liquid (NAPL) samples received on 24 February 1998 and 4 June 1998 by META were added to the report as possible source tars collected nearby. Reference materials were selected from the META reference materials archive for comparative purposes.

Methods

The NAPL samples were diluted to 10 mg/mL in dichloromethane (DCM). The sediment samples were packaged in glass jars and wrapped in zip-locked bags. The samples were transferred to new pre-cleaned containers because the original glass containers were received broken. Prior to sample preparation, the samples were thawed and mixed. Two grams of sample were dried with sodium sulfate and extracted with 15 mL of DCM. The sample extracts were dried with sodium sulfate and concentrated to 1 mL. The sample extracts were spiked with internal standard and analyzed by gas chromatography with a flame ionization detector (GC/FID) for monocyclic aromatic hydrocarbons (MAHs), polycyclic aromatic hydrocarbons (PAHs), and GC/FID fingerprints.

Results

The concentrations of MAHs and PAHs and the GC/FID fingerprints are enclosed. No quality control problems were noted during the analysis of the samples or the preparation of the report.

Confidential and priviledged attorney-client work product

Please do not hesitate to contact me if you have any questions about these data or would like META to perform additional analyses.

Sincerely,

2 a.

David M. Mauro President

Confidential and priviledged attorney-client work product

META

ANALYTICAL RESULTS MAHs and PAHs Client: EPRI Project: GW Site

Lab ID Field ID:	RE980604-0 MW-5 Produ		RE980604-0		EL980224-0	
MAHs:	MW-5 Produ	CI	DW-4 Produ	ct	MLS-4-1-29	8
Benzene	563		2,440		1 7 7 7	
Toluene	2,040		6,490		1,760	
Ethylbenzene	1,530	1	3,130		5,540	
m/p-Xylene	3,520		5,880		3,090	
Styrene	177				5,020	
o-Xylene	1,620		2,630 2,520		1,600	
1,2,4-Trimethylbenzene	3,320		5,460		2,140	
Total MAHs:	9,450		23,100		4,780	
PAHs:						
Naphthalene	04.400		444 444			
2-Methylnaphthalene	84,400	D	131,000	D	117,000	E
1-Methylnaphthalene	38,900	D	49,400	D	47,100	E
Acenaphthylene	23,700	D	27,400	D	25,900	
Acenaphthene	2,330		7,310		6,910	
Dibenzofuran	10,600		10,900		9,930	
Fluorene	3,690		6,000		7,480	
Phenanthrene	8,680		10,900		11,300	
Anthracene	25,700	D	31,900	D	27,500	E
Fluoranthene	6,460		7,840		7,490	
New Constant State State State	7,560		10,400		9,710	
^D yrene	9,840		11,600		10,100	
Benz(a)anthracene	3,090		4,320		4,250	
Chrysene	3,290		3,890		3,820	
Benzo(b)fluoranthene	1,260		1,690		1,720	
Benzo(k)fluoranthene	1,720		2,350		2,270	
Benzo(a)pyrene	2,690		3,480		3,330	
ndeno(1,2,3-cd)pyrene	1,180		1,610		1,490	
Dibenz(a,h)anthracene	293		378		384	
Benzo(g,h,i)perylene	1,230		1,570		1,490	
otal PAHs:	233,000		318,000		292,000	
Quantitation Limit:	25.8	1	29.1		33.3	
Detection Limit:	10.3		11.6	3.4	13.3	
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene. Total PAHs does not include Dibenzofuran.

Lab ID	RP991015-01	RP991015-03	RP991015-04
Field ID:	CR-01B	CR-8A	CR-10A
MAHs:			Sec. 15
Benzene	0.23 U	6.18	700
Toluene	0.11 J	2.15	630
Ethylbenzene	1.75 B	0.43 JB	943 B
m/p-Xylene	1.73 B	2.45 B	990 B
Styrene	0.12 J	0.72 J	155
o-Xylene	0.79	0.91 U	442
1,2,4-Trimethylbenzene	2.22	0.41 J	937
Total MAHs:	4.49	11.9	3,860
PAHs:			
Naphthalene	184	36.4	54,200 D
2-Methylnaphthalene	79.1	7.37	7,500
1-Methylnaphthalene	49.9 B	5.72 B	4,210 E
Acenaphthylene	5.08	9.65	2,260
Acenaphthene	51.5	74.6	5,600
Dibenzofuran	13.8	5.77	1,490
Fluorene	30.2	42.6	3,000
Phenanthrene	98.2	658	13,400
Anthracene	21.2	163	3,660
Fluoranthene	43.8	651	7,400
Pyrene	40.3	749	7,840
Benz(a)anthracene	16.9	305	3,600
Chrysene	15.1	240	3,550
Benzo(b)fluoranthene	6.75	165	1,970
Benzo(k)fluoranthene	9.23	149	1,920
Benzo(a)pyrene	13.8	289	3,420
Indeno(1,2,3-cd)pyrene	6.04	196	1,870
Dibenz(a,h)anthracene	1.30	7.26	260
Benzo(g,h,i)perylene	6.47	236	2,040
Total PAHs:	679	3,990	128,000
Quantitation Limit:	0.23	0.91	8.73
Detection Limit:	0.09	0.37	3.49
Fluorobenzene (SS1)	72%	65%	74%
2-Fluorobiphenyl (SS2)	92%	91%	l
Concentration Units:	mg/kg	mg/kg	mg/kg

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

META

Total PAHs does not include Dibenzofuran.

Lab ID	RP991015-05		RP991015-06		RP991015-07	
Field ID:	CR-13C (108)		CR-14A		CR-18A	
MAHs:				(C) 1		
Benzene	11.8		3.63		1.42	
Toluene	5.58		1.59	1.1	2.91	
Ethylbenzene	29.0	B	9.58	В	10.9	В
m/p-Xylene	41.0	в	6.45	B	11.9	В
Styrene	1.54	U	2.68		1.38	
o-Xylene	14.5		1.44		7.70	
1,2,4-Trimethylbenzene	12.6		26.4		13.7	
Total MAHs:	102		25.4		36.3	_
PAHs:				-		
Naphthalene	351		331		636	D
2-Methylnaphthalene	71.2		294	1.10	139	-
1-Methylnaphthalene	46.3	в	173	в	85.4	В
Acenaphthylene	1.54	υ	10.6	-	3.59	
Acenaphthene	3.87	100	93.8		131	
Dibenzofuran	1.54	U	6.00		19.3	
Fluorene	1.70		55.3		52.6	
Phenanthrene	1.54	U	327		146	
Anthracene	1.54	U	85.9		34.6	
Fluoranthene	1.54	U	304		66.9	
Pyrene	1.54	U	374		88.8	
Benz(a)anthracene		1	157		23.9	
Chrysene	1.54	U	124		24.5	
Benzo(b)fluoranthene	1.54	U	78.8	- 10	10.2	
Benzo(k)fluoranthene	1.54	U	79.7		13.2	
Benzo(a)pyrene	1.54	U	149		20.7	
Indeno(1,2,3-cd)pyrene	1.54	U	88.8		10.2	
Dibenz(a,h)anthracene	1.54	U	9.72		2.16	
Benzo(g,h,i)perylene	1.54	U	111		12.4	
Total PAHs:	474		2,850		1,500	
Quantitation Limit:	1.54		0.88		0.22	1
Detection Limit:	0.62	_	0.35		0.09	
Fluorobenzene (SS1)	65%	1.1	61%	11	60%	1
2-Fluorobiphenyl (SS2)	84%		83%		104%	-
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META 🖗

Lab ID	RP991015-08	RP991015-09
Field ID:	CR-19A	CR-21A
MAHs:		
Benzene	6.50	1.37
Toluene	14.2	2.52
Ethylbenzene	37.9 B	2.00 B
m/p-Xylene	31.2 B	4.91 B
Styrene	0.26 U	1.27
o-Xylene	15.6	0.70
1,2,4-Trimethylbenzene	35.8	4.03
Total MAHs:	105	12.8
PAHs:		
Naphthalene	1,160	12.8
2-Methylnaphthalene	616	8.81
1-Methylnaphthalene	334 B	23.8 B
Acenaphthylene	84.1	3.61
Acenaphthene	222	22.7
Dibenzofuran	44.6	4.10
Fluorene	145	23.9
Phenanthrene	418	126
Anthracene	115	38.6
Fluoranthene	186	98.8
Pyrene	225	119
Benz(a)anthracene	105	51.4
Chrysene	91.4	42.4
Benzo(b)fluoranthene	47.8	22.4
Benzo(k)fluoranthene	51.9	26.2
Benzo(a)pyrene	88.3	46.5
Indeno(1,2,3-cd)pyrene	48.3	24.9
Dibenz(a,h)anthracene	3.30	3.30
Benzo(g,h,i)perylene	43.0	30.7
Total PAHs:	3,990	725
Quantitation Limit:	0.26	0.53
Detection Limit:	0.11	0.21
Fluorobenzene (SS1)	68%	63%
2-Fluorobiphenyl (SS2)	83%	107%
Concentration Units:	mg/kg	mg/kg

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META

Lab ID	RP991019-SB	RP991019-SBS
Field ID:	Soil Blank	Soil Blank Spike
MAHs:	2017	61.6
Benzene	0.24 U	72%
Toluene	0.24 U	89%
Ethylbenzene	0.31	90%
m/p-Xylene	0.28	91%
Styrene	0.24 U	90%
o-Xylene	0.24 U	92%
1,2,4-Trimethylbenzene	0.24 U	91%
Total MAHs:	0.59	
PAHs:		
Naphthalene	0.24 U	90%
2-Methylnaphthalene	0.24 U	90%
1-Methylnaphthalene	0.15 J	89%
Acenaphthylene	0.24 U	88%
Acenaphthene	0.24 U	90%
Dibenzofuran	0.24 U	90%
Fluorene	0.24 U	89%
Phenanthrene	0.24 U	89%
Anthracene	0.24 U	90%
Fluoranthene	0.24 U	94%
Pyrene	0.24 U	89%
Benz(a)anthracene	0.24 U	90%
Chrysene	0.24 U	91%
Benzo(b)fluoranthene	0.24 U	90%
Benzo(k)fluoranthene	0.24 U	91%
Benzo(a)pyrene	0.24 U	90%
Indeno(1,2,3-cd)pyrene	0.24 U	91%
Dibenz(a,h)anthracene	0.24 U	96%
Benzo(g,h,i)perylene	0.24 U	97%
Total PAHs:	0.15	
Quantitation Limit:	0.24	
Detection Limit:	0.10	1
Fluorobenzene (SS1)	72%	71%
2-Fluorobiphenyl (SS2)	85%	91%
Concentration Units:	mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META D

Lab ID	RP991015-01	RP991015-01D	Laboratory Duplicate
Field ID:	CR-01B	CR-018	Relative Percent Difference
MAHs:			
Benzene	0.23 U	0.17 U	1.000
Toluene	0.11 J	0.14 J	20%
Ethylbenzene	1.75 B	2.77	45%
m/p-Xylene	1.73 B	2.57	39%
Styrene	0.12 J	0.15 J	23%
o-Xylene	0.79	1.36	54%
1,2,4-Trimethylbenzene	2.22	3.39	41%
Total MAHs:	4.49	6.99	44%
PAHs:			
Naphthalene	184	243	28%
2-Methylnaphthalene	79.1	98.1	21%
1-Methylnaphthalene	49.9 B	61.5	21%
Acenaphthylene	5.08	6.36	22%
Acenaphthene	51.5	62.1	19%
Dibenzofuran	13.8	16.6	18%
Fluorene	30.2	36.2	18%
Phenanthrene	98.2	117	18%
Anthracene	21.2	23.7	11%
Fluoranthene	43.8	51.9	17%
Pyrene	40.3	51.6	25%
Benz(a)anthracene	16.9	19.8	16%
Chrysene	15.1	17.7	16%
Benzo(b)fluoranthene	6.75	8.18	19%
Benzo(k)fluoranthene	9.23	11.0	17%
Benzo(a)pyrene	13.8	15.6	13%
Indeno(1,2,3-cd)pyrene	6.04	7.30	19%
Dibenz(a,h)anthracene	1.30	1.61	21%
Benzo(g,h,i)perylene	6.47	7.56	15%
Total PAHs:	679	840	21%
Quantitation Limit:	0.23	0.17	1
Detection Limit:	0.09	0.07	· · · · · · · · · · · · · · · · · · ·
Fluorobenzene (SS1)	72%	59%	20%
2-Fluorobiphenyl (SS2)	92%	74%	22%
Concentration Units:	mg/kg	mg/L	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META #

Lab ID	RP991021-01		RP991021-03		RP991021-04	
Field ID:	FP-01		FP-03		ST-01	
MAHs:	75	1				
Benzene	0.70	U	8.04		1.19	J
Toluene	1.70		2.11		2.43	
Ethylbenzene	1.06	В	1.15	в	3.38	В
m/p-Xylene	2.86	В	2.15	в	5.12	в
Styrene	0.52	J	0.46	J	2.17	U
o-Xylene	0.52	J	0.43	J	2.17	U
1,2,4-Trimethylbenzene	1.00	в	0.95	B	1.07	JB
Total MAHs:	6.65	-	14.3		12.1	
PAHs:		1				
Naphthalene	16.7	в	100	в	8.65	в
2-Methylnaphthalene	15.8	в	32.6	в	5.03	в
1-Methylnaphthalene	96.1	в	15.8	в	11.7	В
Acenaphthylene	7.11	÷ .	84.9	2	2.87	10
Acenaphthene	36.2		123	- L	14.4	
Dibenzofuran	6.94		19.9		2.83	
Fluorene	22.2		230		12.4	
Phenanthrene	46.4	в	2,360	BD	23.6	В
Anthracene	16.7		1,080	D	8.16	
Fluoranthene	99.5		1,680	D	35.1	
Pyrene	123		1,970	D	38.8	
Benz(a)anthracene	108		578	3	18.4	
Chrysene	46.9		482		20.8	
Benzo(b)fluoranthene	36.0		555		10.6	
Benzo(k)fluoranthene	36.7		264		11.9	
Benzo(a)pyrene	64.0		674		16.1	
Indeno(1,2,3-cd)pyrene	43.9		286		10.5	
Dibenz(a,h)anthracene	4.00		12.0		2.17	U
Benzo(g,h,i)perylene	59.3		295		12.6	
Total PAHs:	878		10,800		262	_
Quantitation Limit:	0.70		0.64		2.17	
Detection Limit:	0.28		0.26		0.87	
Fluorobenzene (SS1)	70%		68%	-	73%	
2-Fluorobiphenyl (SS2)	93%		90%	-	91%	
Concentration Units:	mg/kg	1	mg/kg		mg/kg	-

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META D

Lab ID	RP991021-05		RP991021-06		RP991021-10	-
Field ID:	ST-02	-	ST-03		ST-08	
MAHs:			1		6.5	
Benzene	1.93		1.90	U	1.78	U
Toluene	2.25	1.1	1.22	J	1.06	J
Ethylbenzene	2.11	в	2.15	в	2.58	В
m/p-Xylene	3.55	в	3.17	в	3.30	В
Styrene	1.11	U	1.90	U	1.78	U
o-Xylene	1.11	U	1.90	U	1.78	U
1,2,4-Trimethylbenzene	0.58	JB	1.90	U	1.78	U
Total MAHs:	9.84		6.54		6.94	
PAHs:				171		
Naphthalene	11.0	в	5.88	в	1.69	JB
2-Methylnaphthalene	3.25	B	35.9	в	1.78	U
1-Methylnaphthalene	4.23	в	30.7	в	2.30	в
Acenaphthylene	4.13	-	1.19	J	0.75	J
Acenaphthene	4.84		14.1		0.97	J
Dibenzofuran	1.70		2.83		1.78	Ŭ
Fluorene	3.86		10.9	. I	0.75	Ĵ
Phenanthrene	12.2	в	20.6	в	3.48	В
Anthracene	6.94	2	6.83	- L	1.13	J
Fluoranthene	109		16.4		14.5	- 7
Pyrene	138		20.8		18.0	
Benz(a)anthracene	59.9		10,6		20.8	
Chrysene	54.6		8.06		5.44	
Benzo(b)fluoranthene	30.9		6.27		5.97	
Benzo(k)fluoranthene	35.6		6.15		7.12	
Benzo(a)pyrene	66.1		10.2		9.97	
Indeno(1,2,3-cd)pyrene	37.6		7.25		10.0	
Dibenz(a,h)anthracene	1.13	1.1	1.90	U	1.25	J
Benzo(g,h,i)perylene	51.6	- U.	8.80	191	14.0	2
Total PAHs:	635		221		118	
Quantitation Limit:	1.11		1.90		1.78	-
Detection Limit:	0.45		0.76	1.1	0.71	
Fluorobenzene (SS1)	78%		65%		87%	-
2-Fluorobiphenyl (SS2)	101%		78%		104%	
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene,

Total PAHs does not include Dibenzofuran.

META V

Lab ID	RP991021-15		RP991021-16		RP991021-17	
Field ID:	ST-34		ST-35		ST-37	
MAHs:						
Benzene	0.87	J	0.55	J	0.96	U
Toluene	2.84	12.1	1.64		1.21	
Ethylbenzene	3.12	В	2.21	в	1.93	В
m/p-Xylene	5.25	В	2.66	в	2.94	В
Styrene	1.69	U	0.97	U	0.96	U
o-Xylene	1.69	U	0.97	U	0.96	U
1,2,4-Trimethylbenzene	1.69	U	0.68	JB	0.96	U
Total MAHs:	12.1		7.06		6.08	
PAHs:		01				
Naphthalene	8.73	в	10.6	в	8.46	в
2-Methylnaphthalene	1.21	JB	2.59	в	0.74	JE
1-Methylnaphthalene	2.84	в	4.14	в	1.66	В
Acenaphthylene	1.48	J	4.12	e.	0.82	J
Acenaphthene	1.96		3.43		0.58	J
Dibenzofuran	1.09	J	1.47		0.61	J
Fluorene	2.45	124	3.38		0.56	J
Phenanthrene	6.25	в	7.27	в	1.89	в
Anthracene	2.09	1.17	3.28	C. 1	0.49	J
Fluoranthene	16.4		27.2		3.06	
Pyrene	19.0		32.9		9.71	
Benz(a)anthracene	10.1		23.0		6.42	
Chrysene	7.13		19.0		1.84	
Benzo(b)fluoranthene	6.34	- I	12.3		1.55	
Benzo(k)fluoranthene	6.52		15.3		0.79	J
Benzo(a)pyrene	8.89		24.5		6.38	
Indeno(1,2,3-cd)pyrene	5.26	10.0	15.2		3.93	
Dibenz(a,h)anthracene	1.69	U	1.68	A 11	2.46	
Benzo(g,h,i)perylene	6.72	- 1 I	23.5		5.55	
Total PAHs:	113		233		56.9	
Quantitation Limit:	1.69		0.97		0.96	-
Detection Limit:	0.68		0.39		0.39	
Fluorobenzene (SS1)	88%		76%		72%	-
2-Fluorobiphenyl (SS2)	104%		96%	1	94%	
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

Lab ID	DA991021-SB	DA991021-SBS
Field ID:	Soil Blank	Soil Blank Spike
MAHs:		
Benzene	0.18 U	66%
Toluene	0.18 U	81%
Ethylbenzene	0.30	82%
m/p-Xylene	0.30	82%
Styrene	0.18 U	81%
o-Xylene	0.18 U	83%
1,2,4-Trimethylbenzene	0.07 J	82%
Total MAHs:	0.59	
PAHs:		1000
Naphthalene	0.22	81%
2-Methylnaphthalene	0.10 J	81%
1-Methylnaphthalene	0.18	81%
Acenaphthylene	0.18 U	82%
Acenaphthene	0.18 U	82%
Dibenzofuran	0.18 U	82%
Fluorene	0.18 U	82%
Phenanthrene	0.16 J	81%
Anthracene	0.18 U	80%
Fluoranthene	0.18 U	82%
Pyrene	0.18 U	83%
Benz(a)anthracene	0.18 U	82%
Chrysene	0.18 U	82%
Benzo(b)fluoranthene	0.18 U	81%
Benzo(k)fluoranthene	0.18 U	84%
Benzo(a)pyrene	0.18 U	82%
Indeno(1,2,3-cd)pyrene	0.18 U	80%
Dibenz(a,h)anthracene	0.18 U	85%
Benzo(g,h,i)perylene	0.18 U	83%
Total PAHs:	0.65	
Quantitation Limit:	0.18	
Detection Limit:	0.07	
Fluorobenzene (SS1)	77%	67%
2-Fluorobiphenyl (SS2)	98%	85%
Concentration Units:	mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

META V

Total PAHs does not include Dibenzofuran.

Lab ID	RP991021-16	RP991021-16MS
Field ID:	ST-35	ST-35
MAHs:		.1.5
Benzene	0.55 J	80%
Toluene	1.64	91%
Ethylbenzene	2.21	92%
m/p-Xylene	2.66	93%
Styrene	0.97 U	92%
o-Xylene	0.97 U	94%
1,2,4-Trimethylbenzene	0.68 J	94%
Total MAHs:	7.06	
PAHs:	a second second second	
Naphthalene	10.6	92%
2-Methylnaphthalene	2.59	92%
1-Methylnaphthalene	4.14	95%
Acenaphthylene	4.14	96%
Acenaphthene	3.43	96%
Dibenzofuran	1.47	97%
Fluorene	3.38	98%
Phenanthrene	7.27	95%
Anthracene	3.28	92%
Fluoranthene	27.2	94%
Pyrene	32.9	95%
Benz(a)anthracene	23.0	95%
Chrysene	19.0	94 %
Benzo(b)fluoranthene	12.3	90%
Benzo(k)fluoranthene	15.3	89%
Benzo(a)pyrene	24.5	93%
Indeno(1,2,3-cd)pyrene	15.2	89%
Dibenz(a,h)anthracene	1.68	93%
Benzo(g,h,i)perylene	23.5	93%
Total PAHs:	23.5	90%
Quantitation Limit:	0.97	
Detection Limit:	0.39	
Fluorobenzene (SS1)	76%	83%
2-Fluorobiphenyl (SS2)	96%	103%
Concentration Units:	mg/kg	10576

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

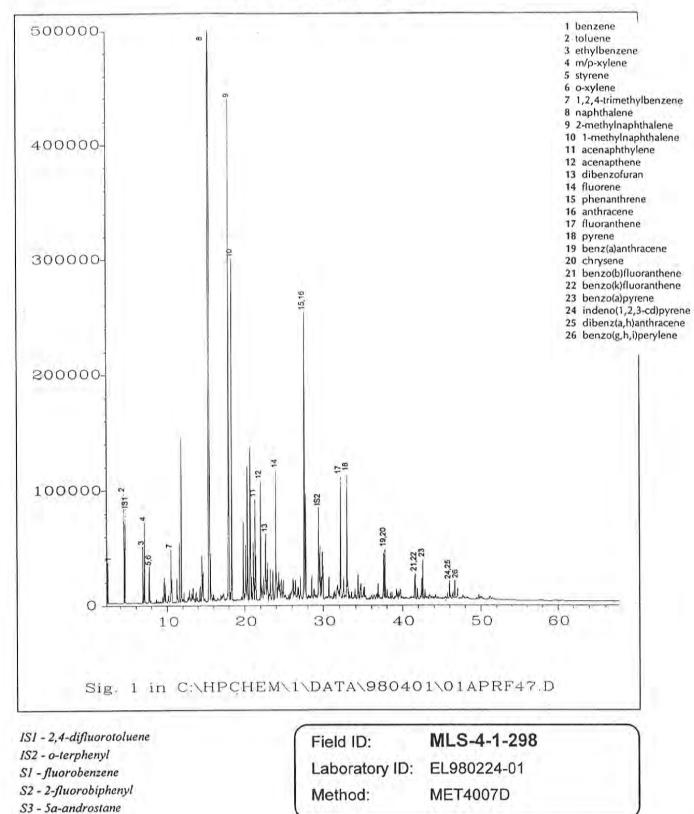
L = Coeluted with compound listed above

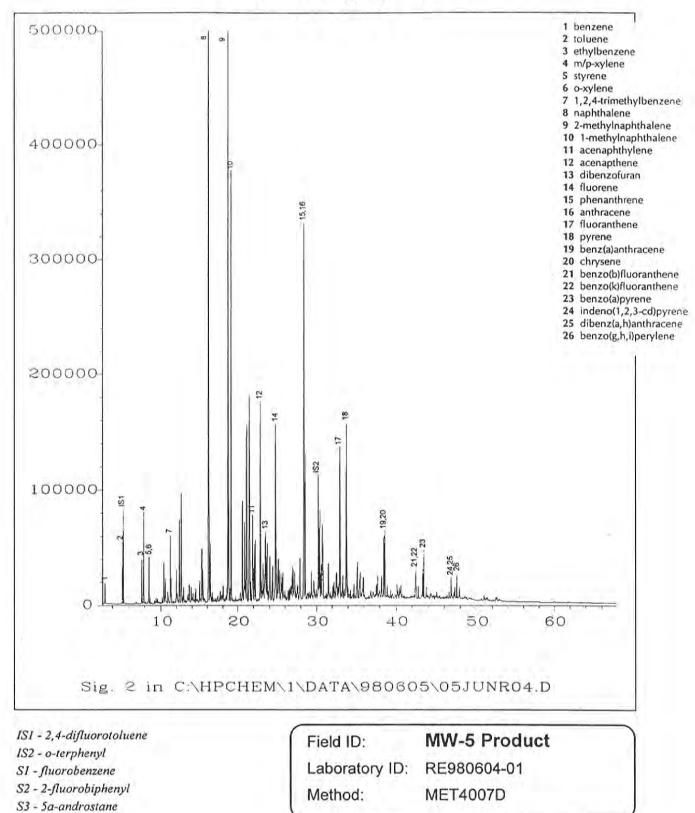
NM = Not measured

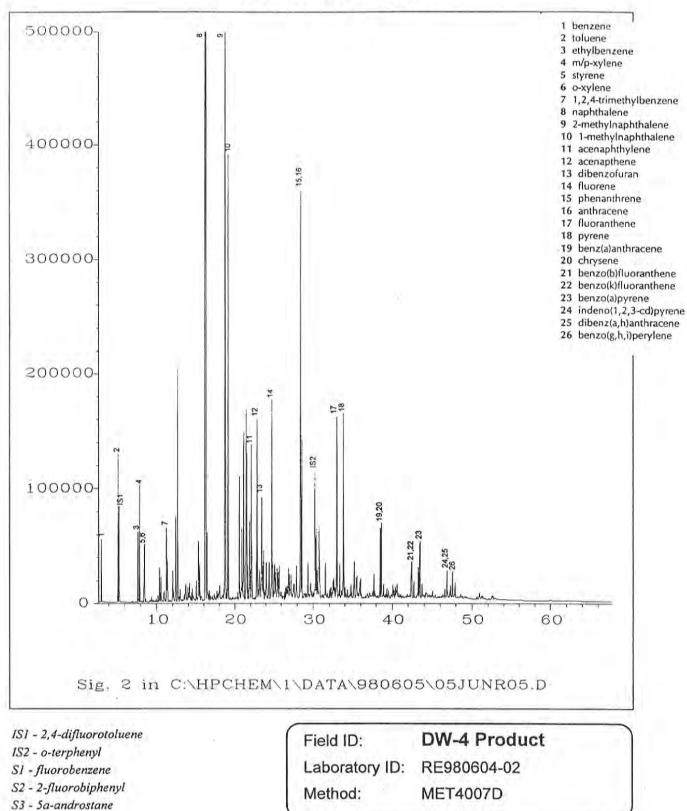
U = Not detected at quantitation limit shown

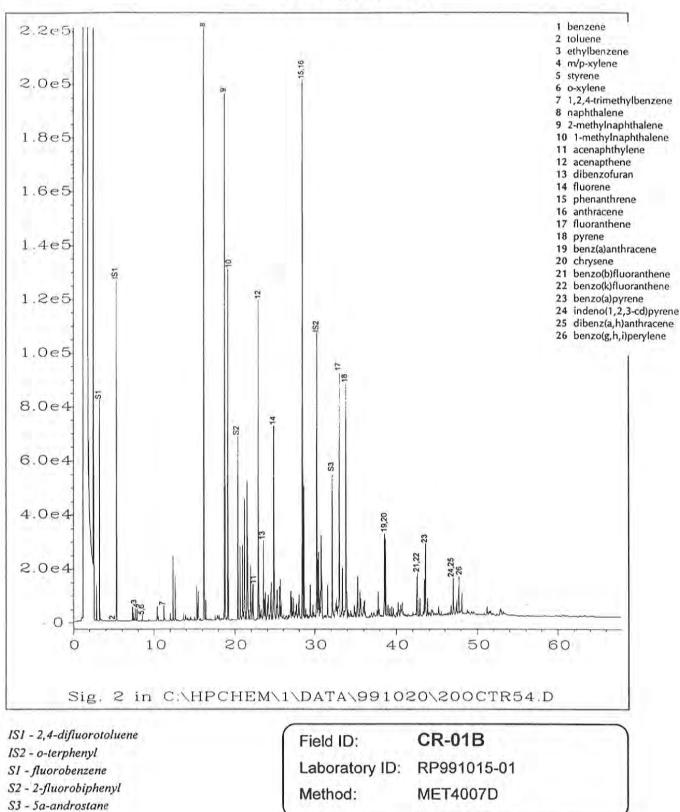
Total MAHs does not include 1,2,4-Trimethylbenzene.

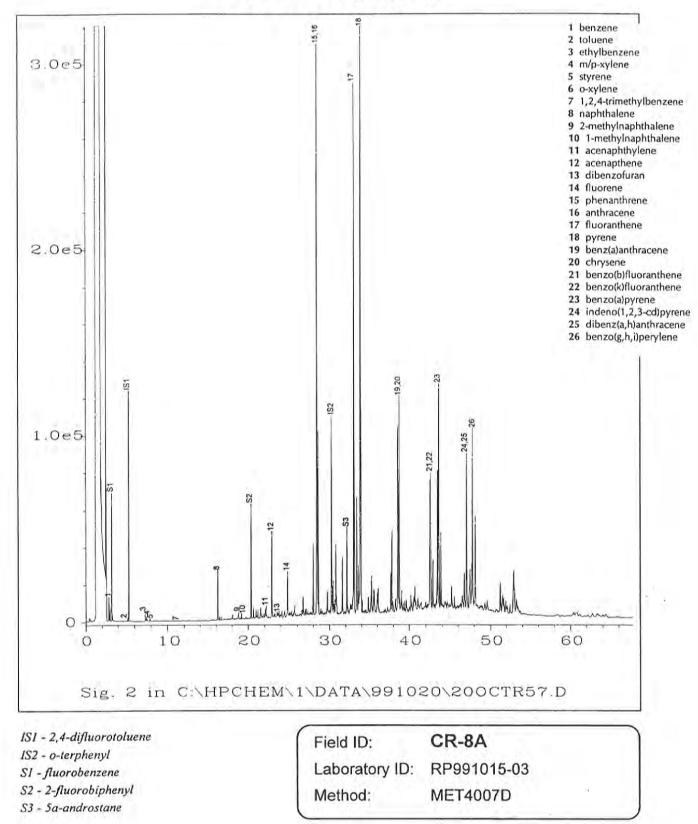
Total PAHs does not include Dibenzofuran.

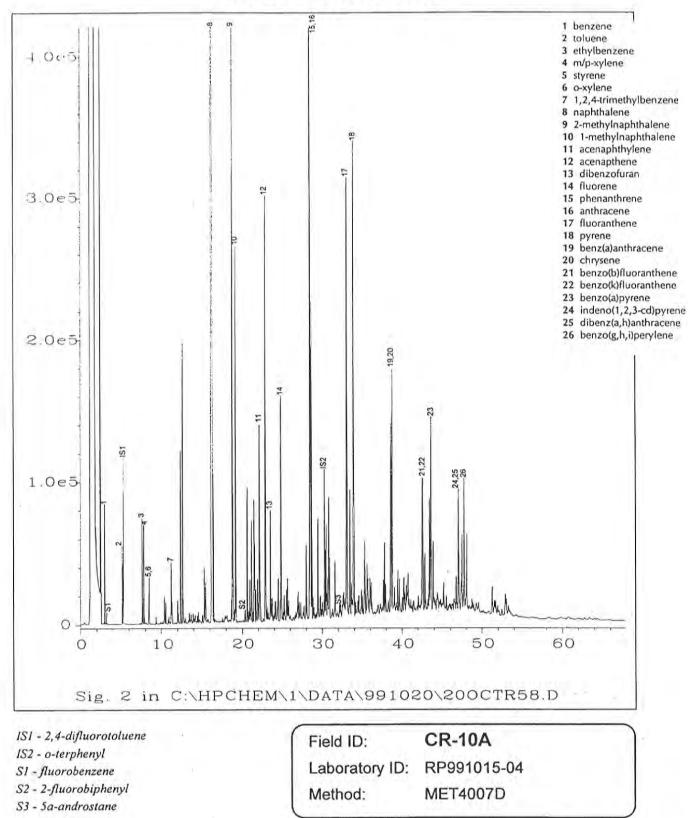


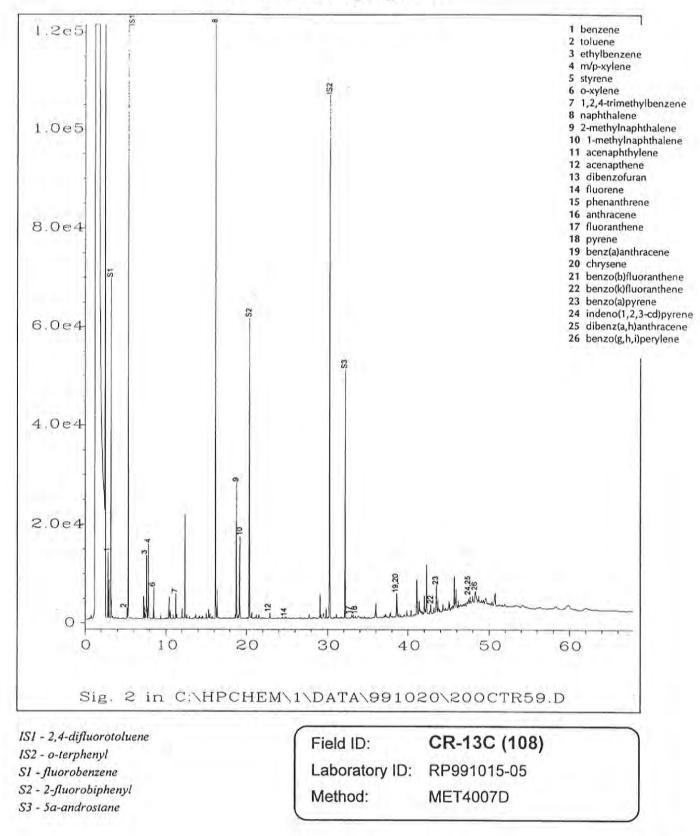








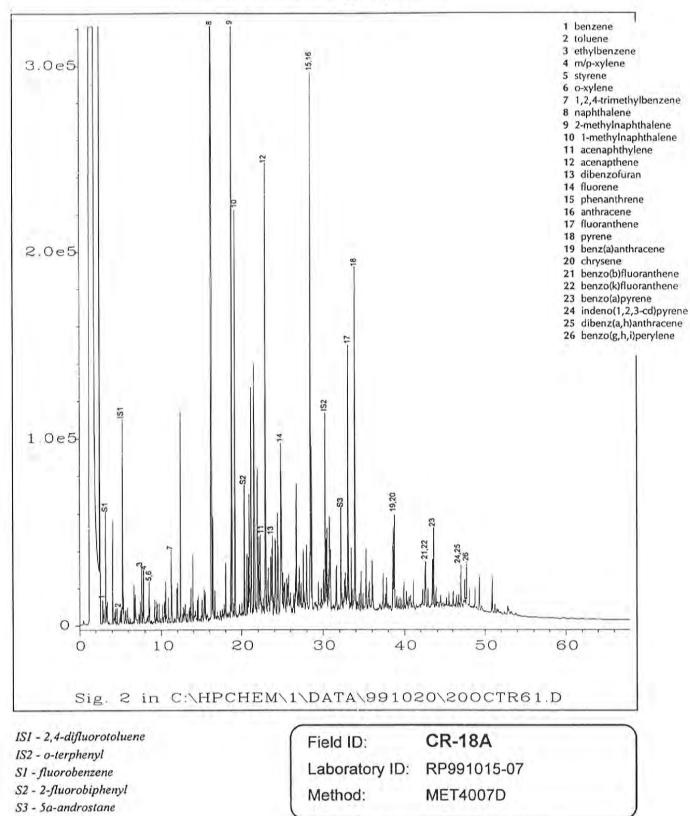


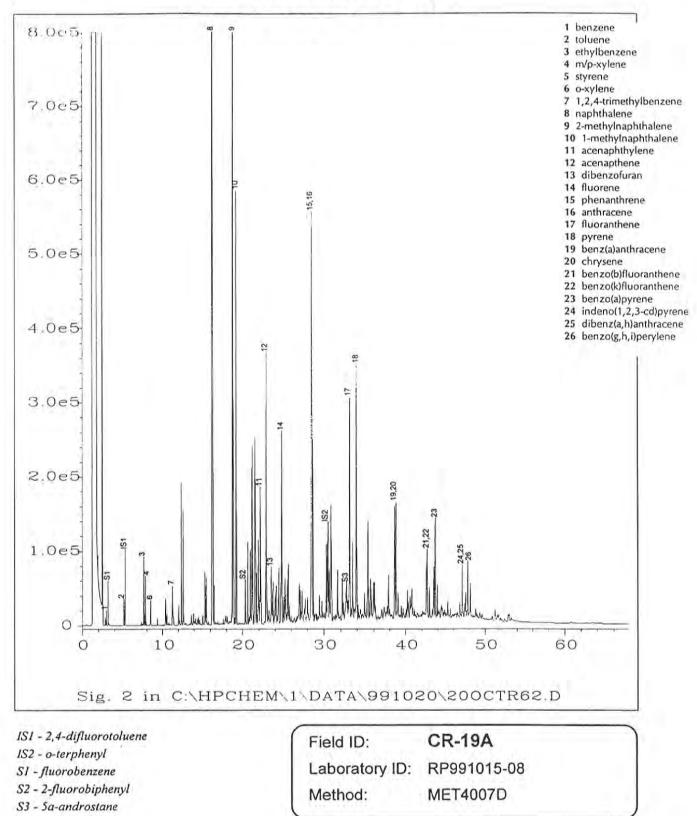


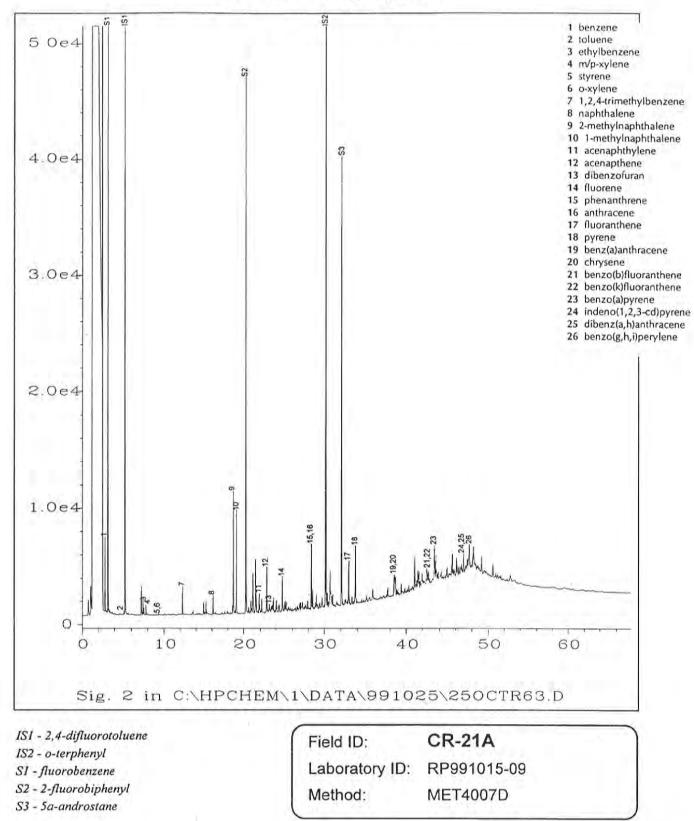
1 benzene 2.005 2 toluene 3 ethylbenzene 4 m/p-xylene 5 styrene 15,16 1.8e5 6 o-xylene 7 1,2,4-trimethylbenzene 8 naphthalene 9 2-methylnaphthalene 10 1-methylnaphthalene 1.6e5 5 11 acenaphthylene 12 acenapthene 13 dibenzofuran 14 fluorene 15 phenanthrene 1.4e5 16 anthracene 17 fluoranthene 18 pyrene 19 benz(a)anthracene 20 chrysene 1.2e5 21 benzo(b)fluoranthene ŝ 22 benzo(k)fluoranthene 23 benzo(a)pyrene 23 24 indeno(1,2,3-cd)pyrene 25 dibenz(a,h)anthracene 1.0e5 26 benzo(g,h,i)perylene 8.0e4 2 9,20 23 6.0e4 24,25 5 N 21,22 3 4.0e4 4 2.0e4 200 Ō 10 20 30 0 40 50 60 Sig. 2 in C:\HPCHEM\1\DATA\991020\200CTR60.D IS1 - 2,4-difluorotoluene **CR-14A** Field ID: IS2 - o-terphenyl Laboratory ID: RP991015-06 S1 - fluorobenzene S2 - 2-fluorobiphenyl Method: MET4007D

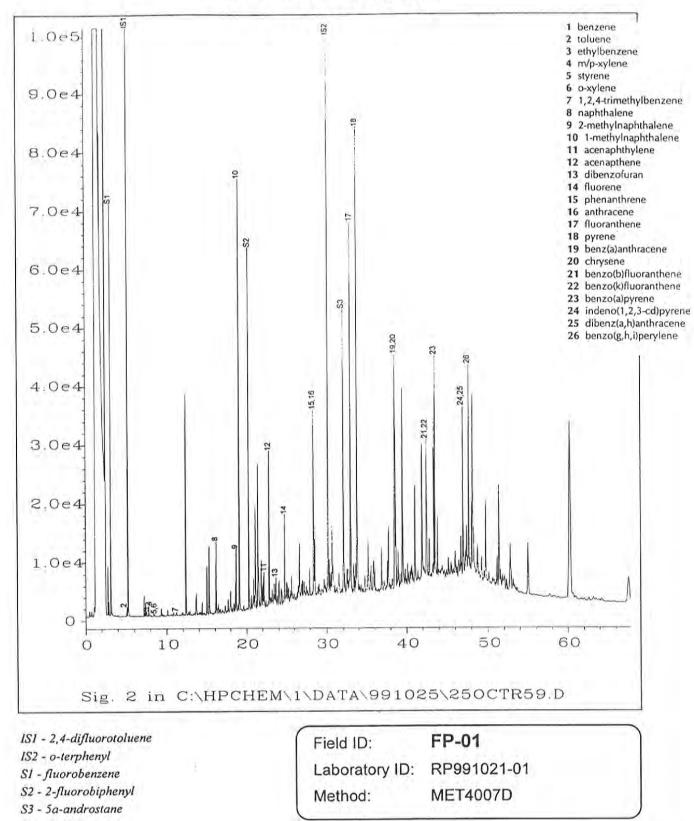
S3 - 5a-androstane

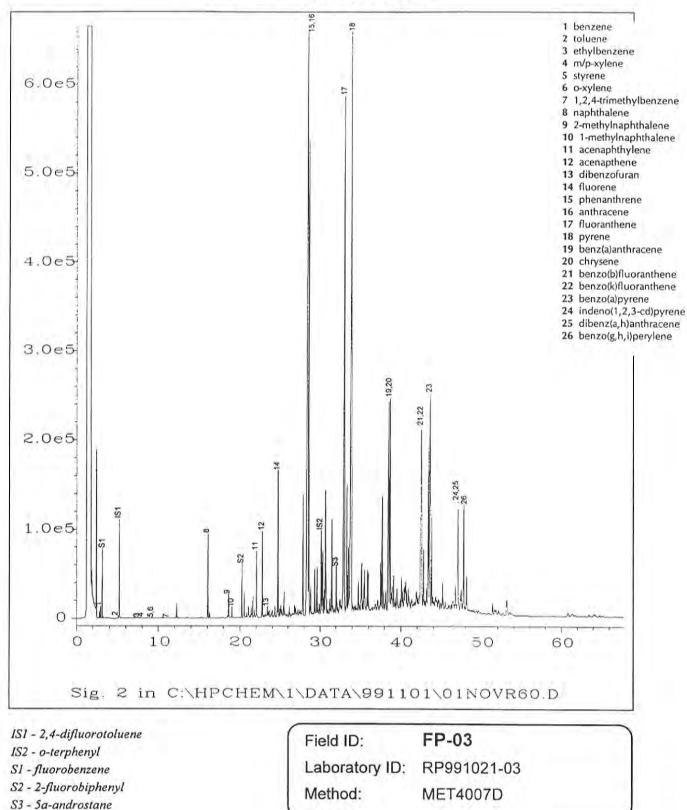
GC/FID Fingerprint

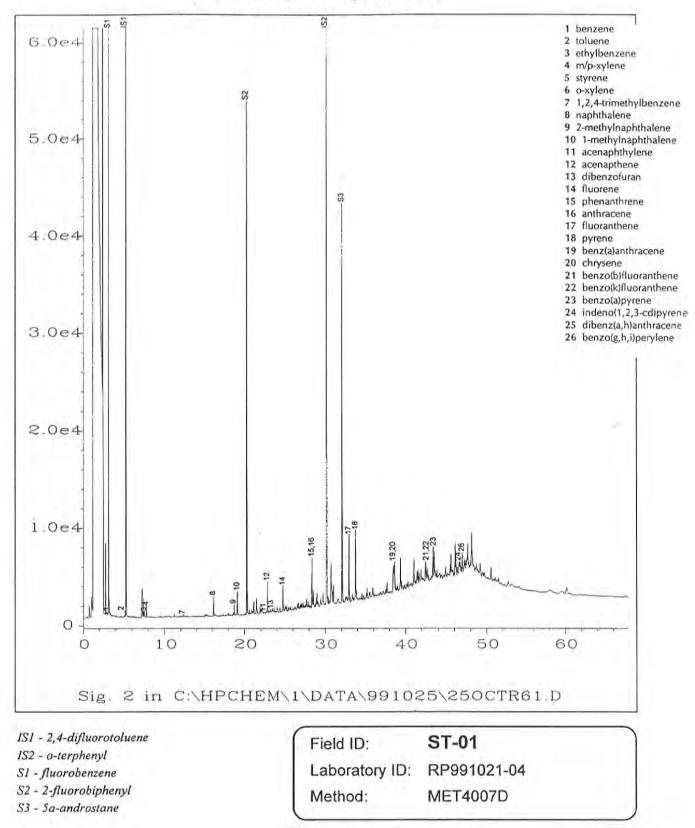


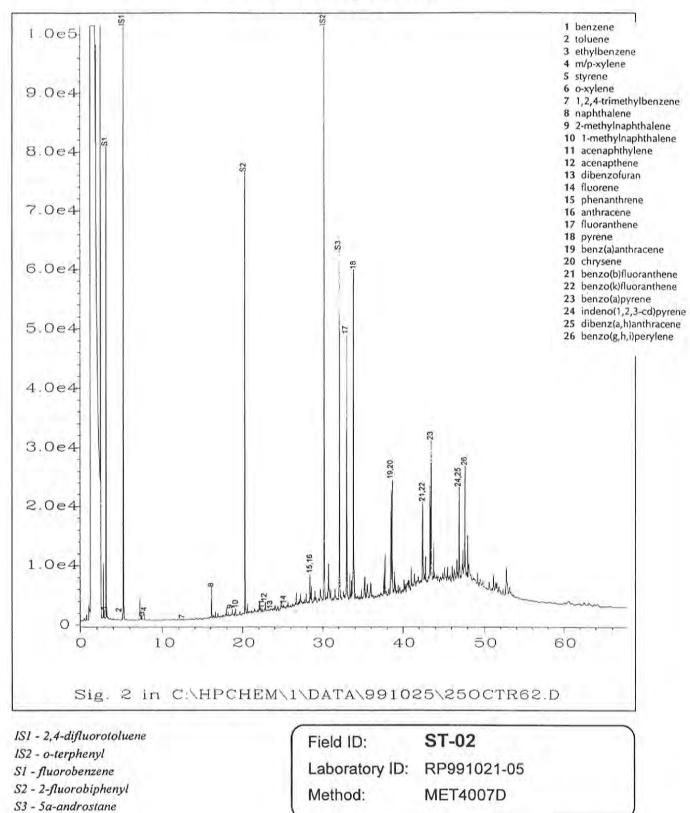


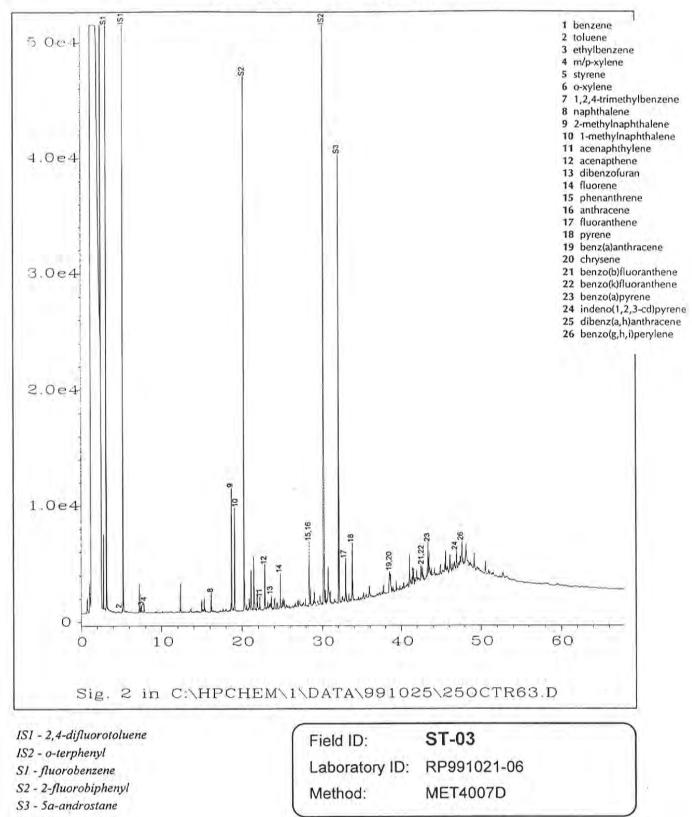


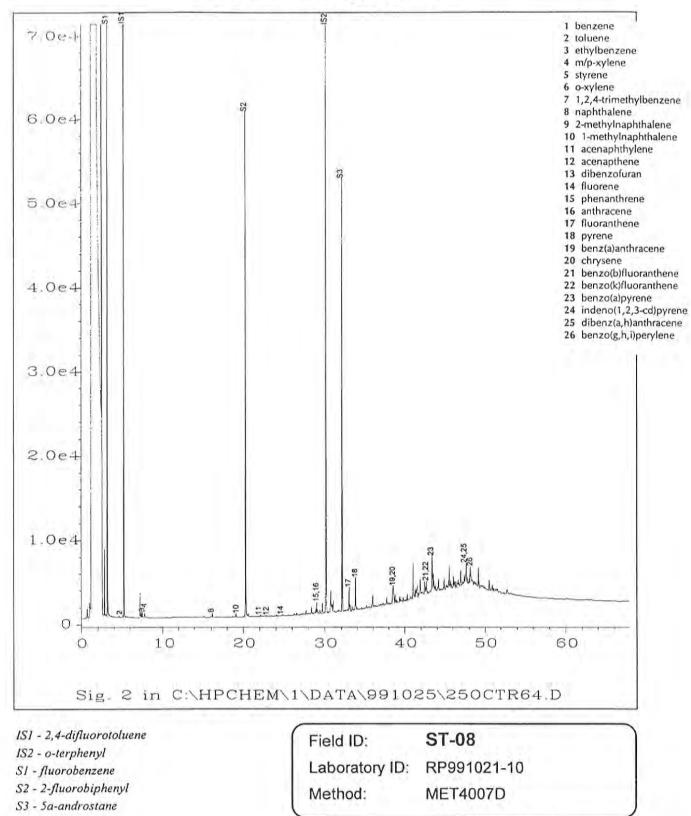












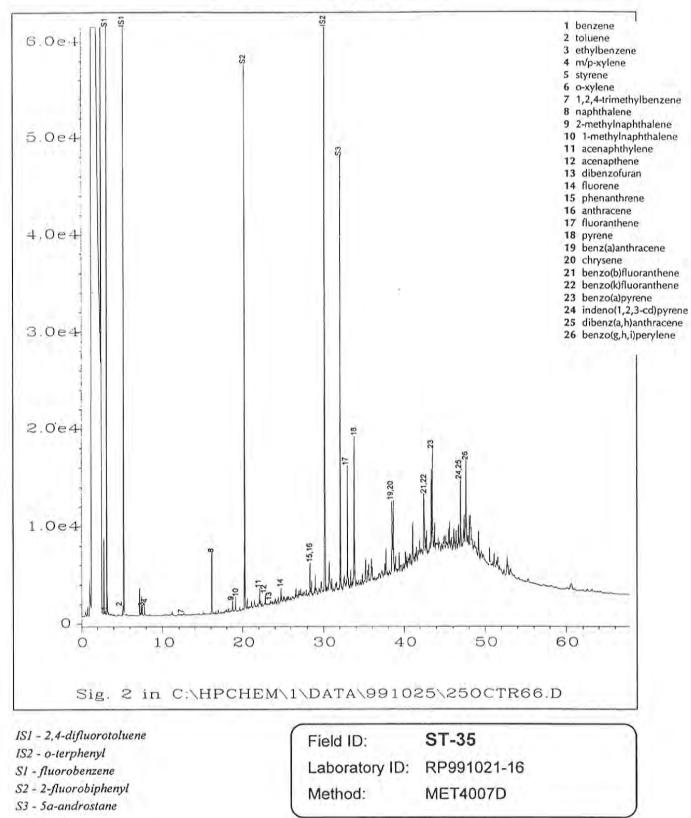
META

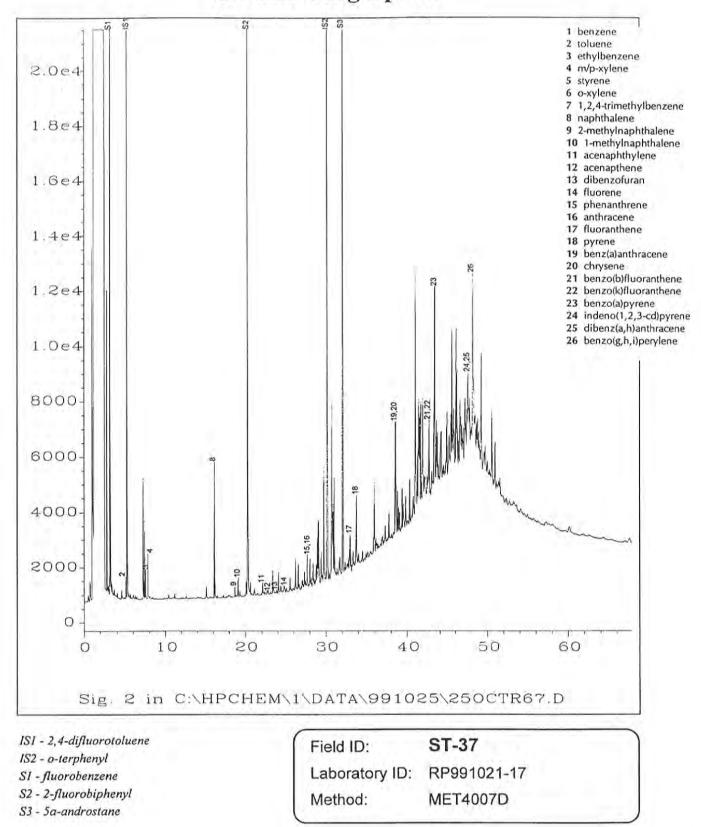
.

S IS2 is S 1 benzene 2 toluene 3 ethylbenzene 4 m/p-xylene 5 styrene 2 0e4 6 o-xylene 7 1,2,4-trimethylbenzene 8 naphthalene 1.8e4 9 2-methylnaphthalene 10 1-methylnaphthalene 11 acenaphthylene 12 acenapthene 13 dibenzofuran 1.6e4 14 fluorene 15 phenanthrene 16 anthracene 17 fluoranthene 1.4e4 18 pyrene 19 benz(a)anthracene 20 chrysene 21 benzo(b)fluoranthene 22 benzo(k)fluoranthene 1.2e4 23 benzo(a)pyrene 24 indeno(1,2,3-cd)pyrene 25 dibenz(a,h)anthracene 26 benzo(g,h,i)perylene 1.0e4 8000 5 6000 4000 2000 11 1312 19 10 0 50 60 10 20 30 40 0 Sig. 2 in C:\HPCHEM\1\DATA\991025\250CTR65.D ISI - 2,4-difluorotoluene ST-34 Field ID: IS2 - o-terphenyl Laboratory ID: RP991021-15 S1 - fluorobenzene S2 - 2-fluorobiphenyl Method: MET4007D

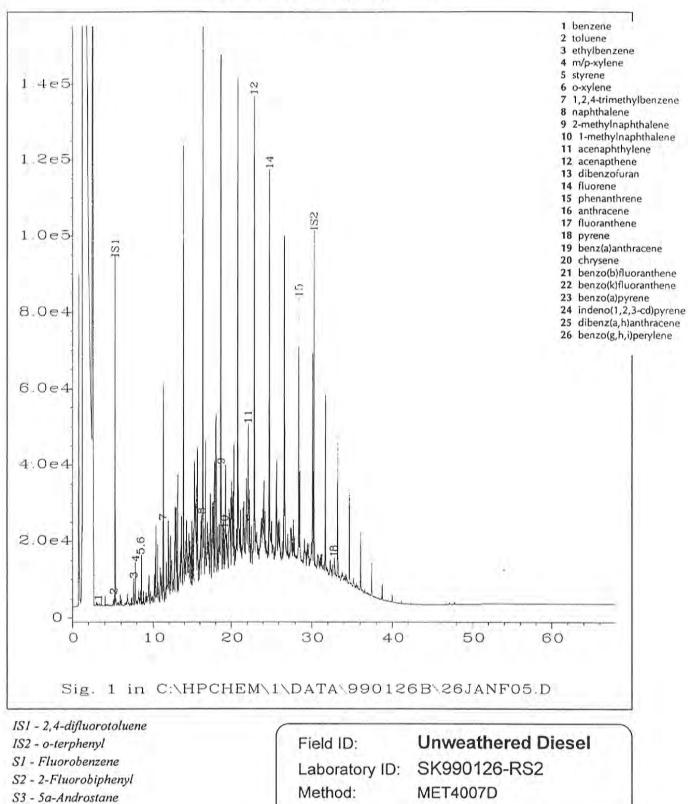
S3 - Sa-androstane

GC/FID Fingerprint

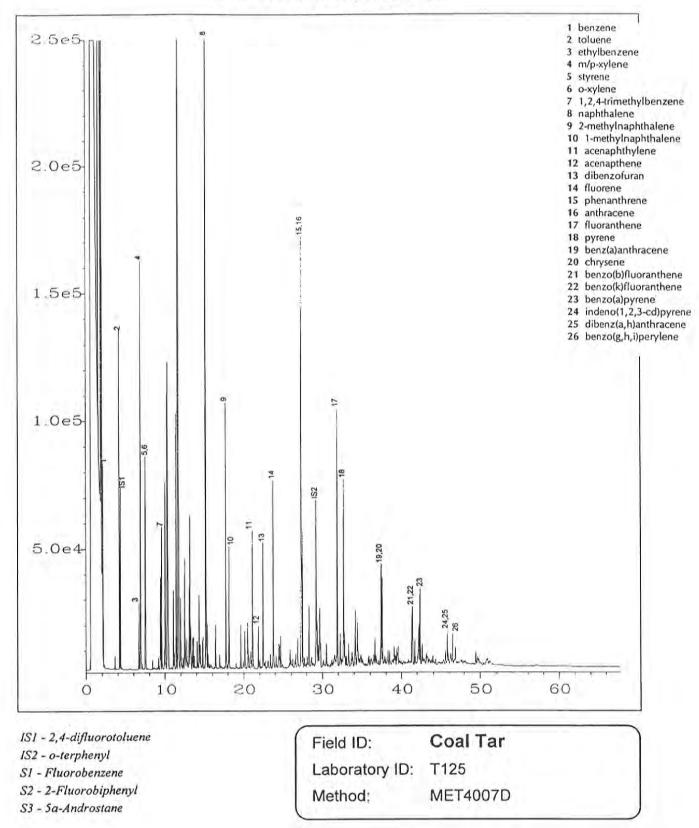




META



META



META

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			SAMPLE NO.	MLS-4-1-298								Date / Time Received by: (Signature)	Date / Time Received for Laboratory by: (Sgmature)	
30 Gasworks Park	D. Kloner	RATORY: META	DATE TIME	OZZU XATUZ								2 1 2	10	
5-3434-230	SAMPLERS:	RECEIVING LABORATORY:	LAB I.D. NO.									elinquished by: (Signature)	elinquished by: (Signature)	hipper Information

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S FARL		SAMPLE NO.	MW-S-PADDUCT	H-MA								Date / Time Received by: (Signature)	Date / Time Received for Laboratory by: (Signature)	<i>d</i>
PROJECT NAME	Z G.SEGA	DATE TIME	6/3 1515	11 1500										ULA FO
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PARCINA		REMARKS					porfirm with	Dan Baker							Time Received by: (Signature)	REMEDIATION TECHNOLOGIES 1011 S.W. Klickitat Way	Suite 207 Seattle, WA 98134 (206) 624-9349	
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ONTRINER:															Relinquished by: (Signature)	Date / Time		
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HS	ARI	TIME	14:40 CQ-	17:20 CR-	11:00 CK-8A		-	11:05 CR-	-	Pizzo CR-	-			-	Date / Time	bate / Time		Samoler
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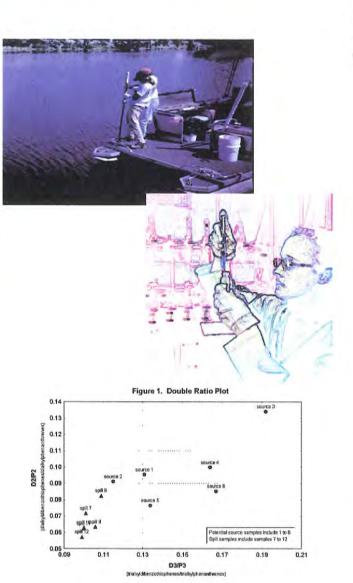
<u>(</u>	(- -			Date		
רשם וה	FIETA IU	Matrix	Analysis	sampleo	Heceived Project	ct 5torage
IP991015-01	CR-01B	Soil	2508/4007	10/06/99	10/15/99 RO1020-60	-60 32 oz. jar
RP991015-02	CR-5A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-03	CR-8A	Soil	2508/4007	10/01/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-04	CR-10A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar
3P991015-05	CR-13C (108)	Soil	2508/4007	10/04/99	10/15/99 R01020-60	.60 32 oz. jar
R991015-06	CR-14A	Soil	2508/4007	10/02/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-07	CR-18A	Soil	2508/4007	10/04/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-08	CR-19A	Soil	2508/4007	10/07/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-09	CR-21A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar

10/15/99

Page 1 of 1

ATTACHMENT 2D-2 META 2001 Laboratory Report

Environmental Laboratory Report



Gas Works Park and Lake Union Sediments, Washington

Report To:

ThermoRetec 1011 S. W. Klickitat Way Suite 207 Seattle, WA 98134

Report By:

META Environmental, Inc. 49 Clarendon Street Watertown, MA 02472

January 10, 2001

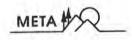
Identifying and allocating sources of pollutants in complex environments.

Privileged and Confidential Prepared Under the Direction of Counsel

META Environmental, Inc. ENGINEERING & CHEMISTRY

Privileged and Confidential Prepared Under the Direction of Counsel

Cover Page



Privileged and Confidential Prepared Under the Direction of Counsel

Final Laboratory Report

META Environmental, Inc. 49 Clarendon Street Watertown, MA 02472

Phone: 617-923-4662 Fax: 617-923-4610 e-Mail: metaenv@aol.com

Certification

This certifies that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed herein. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Director, as verified by the following signature.

David R. Craig Laboratory Director, META Environmental, Inc. Date

David M. Mauro Quality Assurance Officer, META Environmental, Inc.

1/10/01 Date

META

GWPForensics report B 1/10/01 Page 2

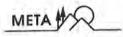
	Sample Delivery Group Narrative
Project:	Gas Works Park Forensics
Client:	ThermoRetec 1011 S.W. Klickitat Way, Suite 207 Seattle, WA 98134
Report Contact:	Mr. Dan Baker
Date of Receipt:	10/21/1999
Sample Summary:	
The samples received for t	his project are summarized in the attached sample login forms.
META Project Number:	R01020-60

Chain of Custody

Samples were received in good condition on October 21, 1999. The internal temperatures of the shipment containers were not recorded. After GC/FID analysis (see report of November 19, 1999) samples were frozen (< -4° C) awaiting further instruction. On January 24, 2000, selected samples were thawed and re-entered into the sample login database

Internal chain of custody procedures were followed after sample receipt. Samples were stored in a locked refrigerator or freezer. A sample custody logbook contains the record of sample removal from the secure sample storage area to the sample preparation laboratory. The custody record for the sample extracts is present on the sample extraction logbook page.

The disposal of samples and extracts will be authorized 1 month after the release of this data report. Sample disposal will be documented.



Methods

A portion of each sediment sample was air dried prior to extraction. Up to 25 grams of each sediment sample was soxhlet extracted with dichloromethane (DCM) and concentrated to a final volume of up to 10 mL (EPA 3540). Two NAPL samples from the site were selected from our sample archive and prepared by waste dilution (EPA 3580). A portion of each extract and dilution was then fractionated with silica gel into aliphatic and aromatic fractions (EPA 3630 mod.). The aliphatic fractions were spiked with internal standard and analyzed by GC/MS/SIM (EPA 8260/8270 mod.) for saturated hydrocarbons, isoprenoid hydrocarbons, and petroleum biomarkers.

The aromatic fractions were sealed and shipped to the University of Oklahoma for analysis of compound-specific stable carbon isotope ratios. The extracts were analyzed using a Varian 3410 GC coupled to a Finnigan MAT 252 isotope ratio mass spectrometer via a combustion furnace heated at 1050 oC and a water trap. A 30 meter by 0.25 mm, 5% phenylmethylsilicone capillary GC column was used so that the GC/IRMS chromatography condititions would be similar to standard GC/MS conditions.

Results

Sample results are presented in the Appendices which follow this narrative.

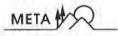
Quality Control

Analyte Flags

The detection limits were determined as the sample equivalent of the lowest linear initial calibration standard. Analytes measured between five times the baseline noise and the lowest standard were reported as "estimated" and flagged with the letter "J." No value was reported above the calibration range. Undetected analytes were flagged with the letter, "U." None of these deviations were thought significant enough to compromise the integrity of the reported values.

Holding Times

The samples were retrieved from archive at META where they had been stored frozen at < -10 °C since receipt. Once prepared, the extracts were stored at 4°C \pm 2°C prior to analysis.



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All extracts were analyzed within 40 days of sample preparation.

There are no set holding times for GC/IRMS analyses since the results of that technique do not depend on analyte concentration. Thus, small losses of individual compounds during storage from dissipation do not effect the results. Because of their stability and low volatility, minimal loss of biomarker compound mass was expected during long-term storage when frozen.

Surrogate Spikes

Extraction surrogates were not added to samples prior to extraction due to the potential for interference with GC/IRMS analysis.

Internal Standards

Internal standards recoveries varied due to changes in instrument response. However, this variability was consistent across the retention time range of the compounds of interest as confirmed by the continuing calibration standards. All analyte concentrations were calculated by internal standard, thereby compensating for instrument variability.

GC/IRMS

There are no standardized methods for GC/IRMS. The accuracy and reproducibility of GC/IRMS data are mainly affected by chromatographic resolution (co-eluting compounds mask the true isotope ratio of a target compound) and background material from column bleed and any UCM of the sample. The accuracy of the data was initially monitored with a set of standard compounds of known isotopic composition. Internal standards (fully deuterated n-alkanes C9, C10, C16, C19, C24, and C32) were added to the samples to provide a second control of data. Each sample was analyzed at least two times and standard deviations (1 σ) of the replicates were calculated for each internal standard and each PAH compound to estimate reproducibility. Analytes that showed unexpectedly high standard deviations (typically greater than 1) were examined for coelutions and their isotopic values determined from a portion of the peak with minimum interference. Also, a mixture of PAHs from a commercial source was analyzed periodically along with the samples. The precision of the internal standards and the internal standard mixture.

References

 Prince, R., Elmendorf, D., Lute, J, Hsu, C., Halth, C., Senlus, J., Decherf, G., Douglas, G., and Butler, E., "17α(H), 21β(H)-Hopane as a Conserved Internal Marker for Estimating the Biodegradation of Crude Oil", Environ. Sci. Technol. Vol. 28: 142-145, 1994

GWPForensics report B 1/10/01

Privileged and Confidential Prepared Under the Direction of Counsel

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- 11 Philp, R., "Geochemistry in the Search for Oil," Chemical & Engineering News, American Chemical Society, February 10, 1986.

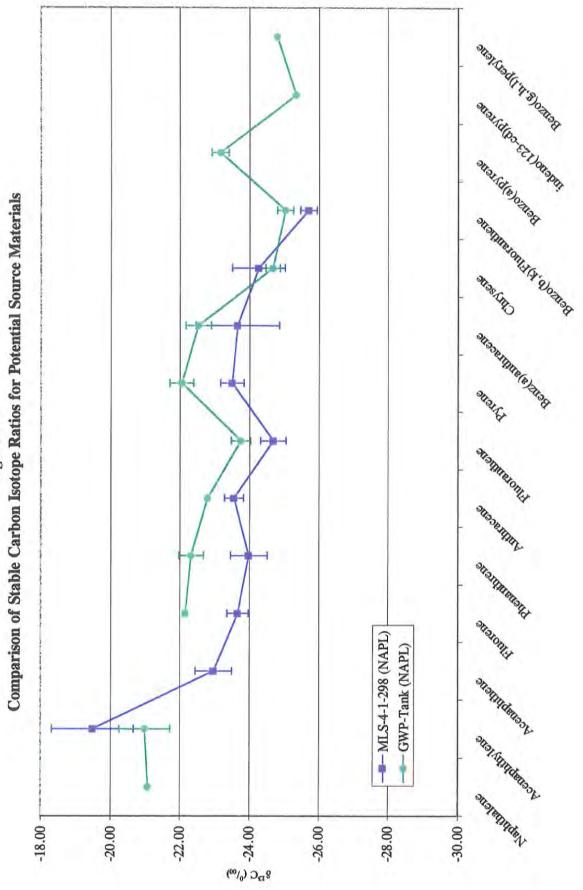


Figure 1.

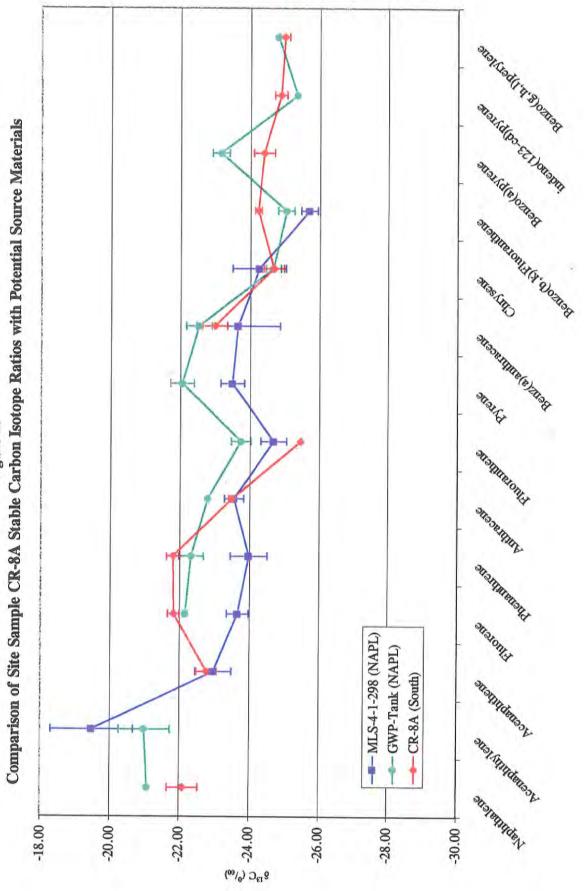


Figure 2.

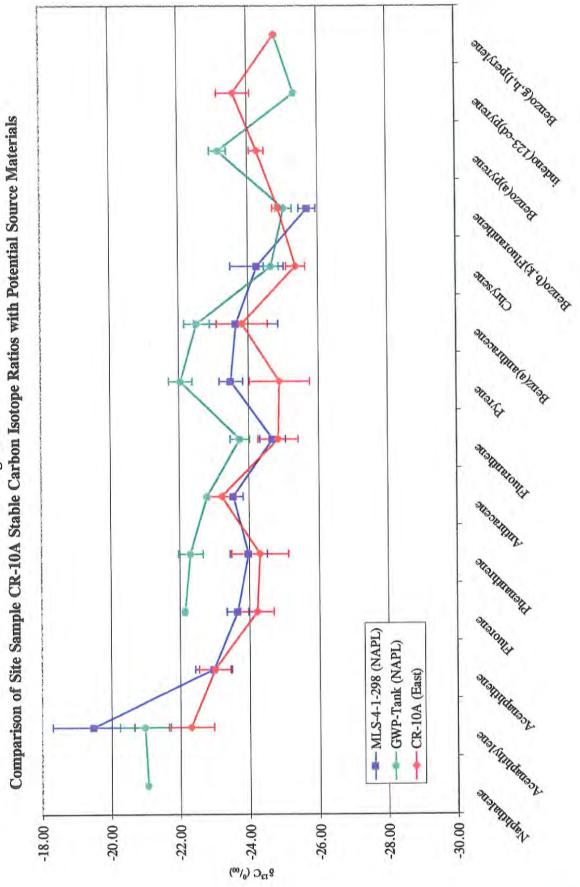


Figure 3.

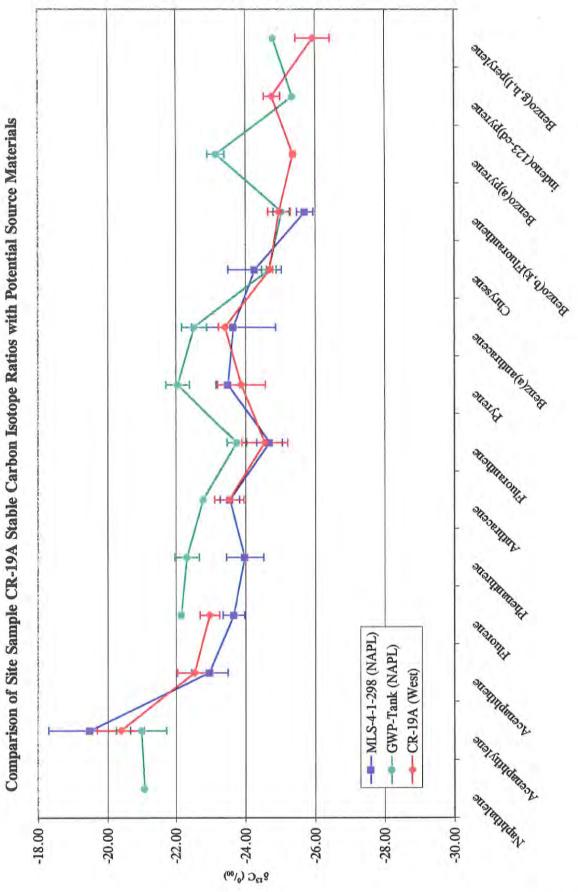


Figure 4.

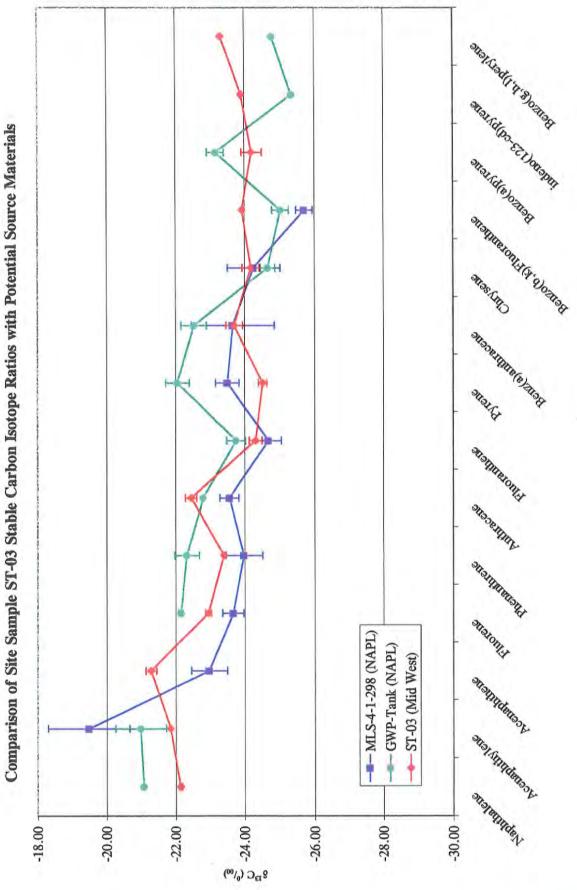


Figure 5.

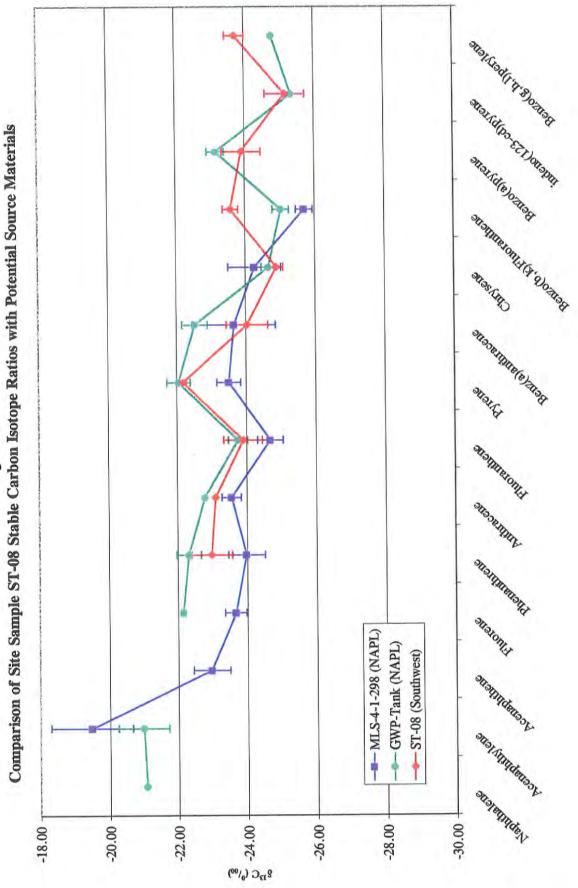


Figure 6.

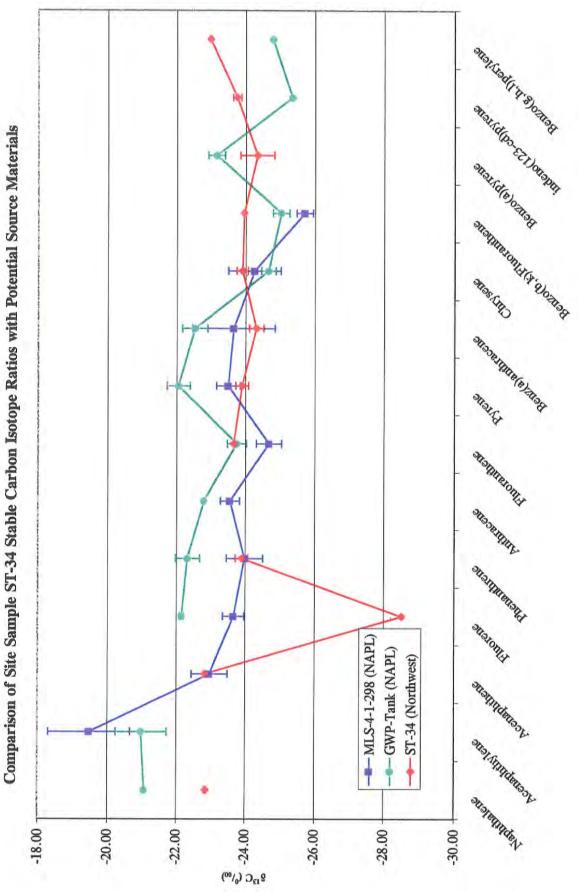
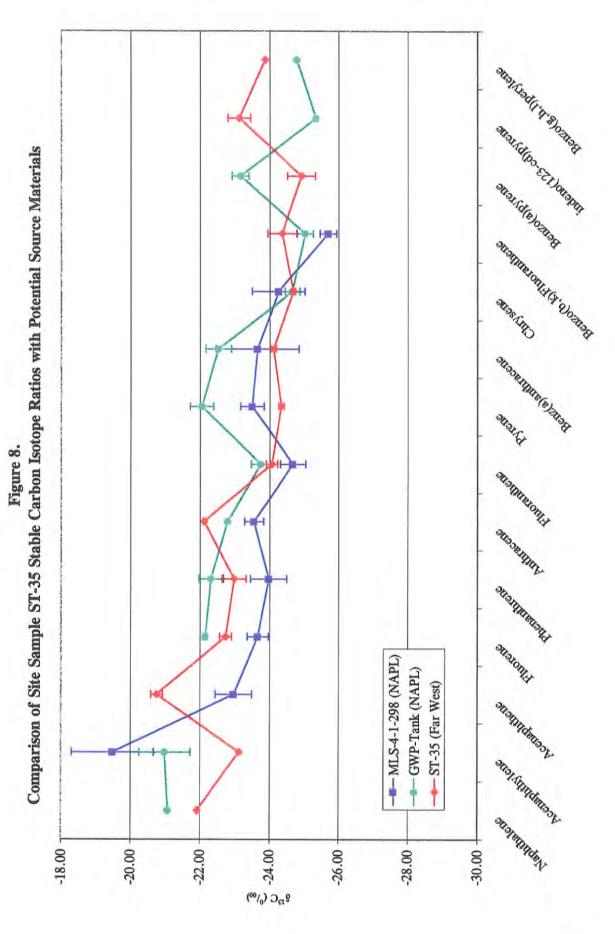


Figure 7. Irison of Site Sample ST-34 Stable Carbon Isotope Ratios with Potential



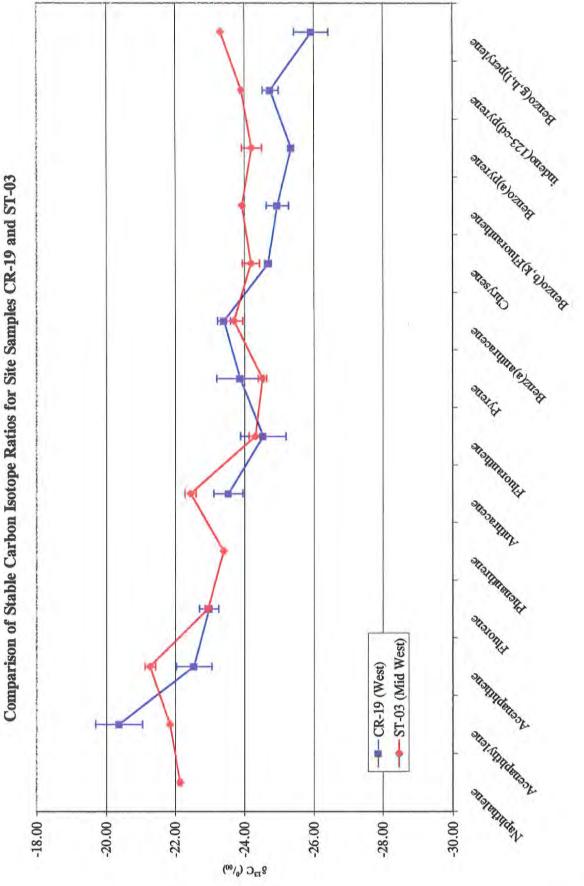
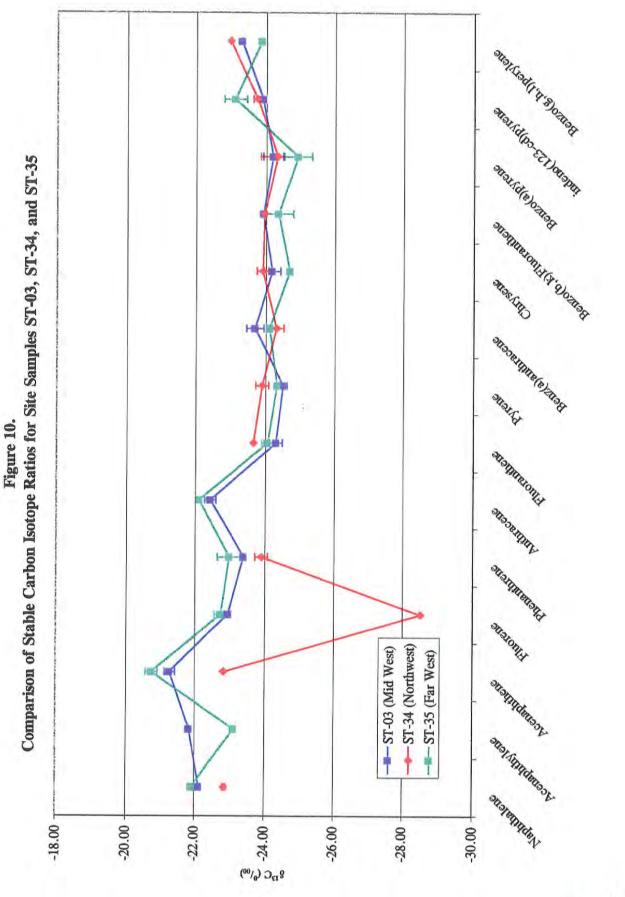


Figure 9.



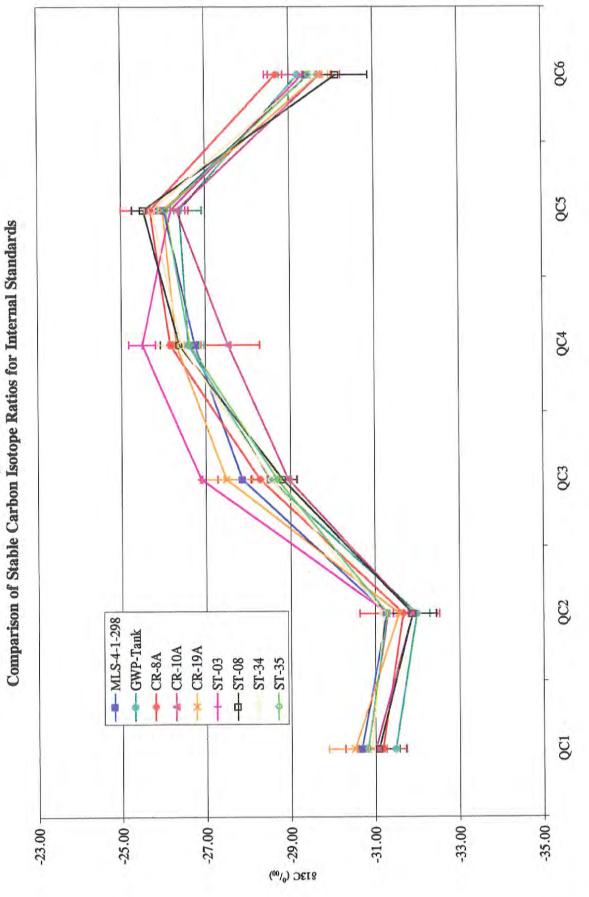
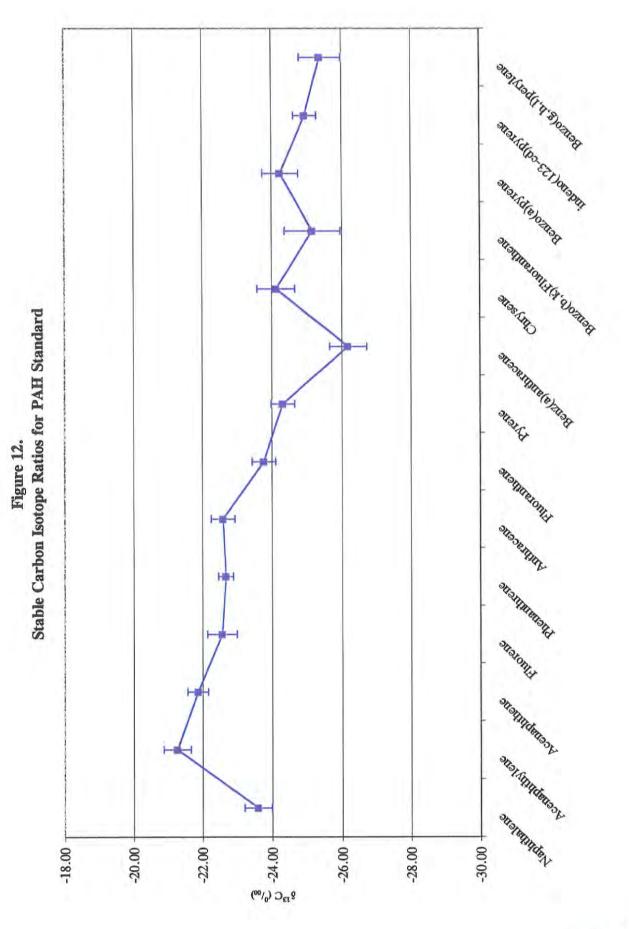


Figure 11.



SUB-ATTACHMENT 2D-2.1 Chains of Custody

			META ENVIRONMEN	TAL SAMPLE REC	EIPT		
Lab ID	Field ID	Matrix	Analysis	Date Sampled	Date Received	Client/ Project	Container/ Storage
RP000124-01	CR-8A RP991015-03	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-02	CR-10A RP991015-04	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-03	CR-19A RP991015-08	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-04	ST-03 RP991021-06	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-05	ST-08 RP991021-10	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-06	ST-34 RP991021-15	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar
RP000124-07	ST-35 RP991021-16	Soil	8270/3009	01/24/00	N/A	R01020-60	16 oz. jar

Dury olleutor

				Date	Date	Client/	Container/	
Lab ID	Field 1D	Matrix	Analysis	Sampled	Received	Project	Storage	Comments/Logger
RP991021-01	FP-01	Soil	2508/4007	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receipt
RP991021-02	FP-02	Soil	Hold	09/16/99	10/21/99	RO1020-60	1 liter jars	Jars broken upon receipt
RP991021-03	FP-03	Soil	2508/4007	09/16/99	10/21/99	RO1020-60	1 liter jars	Jars broken upon receip
RP991021-04	ST-01	Soil	2508/4007	09/14/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-05	ST-02	Soil	2508/4007	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-06	ST-03	Soil	2508/4007	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-07	ST-04	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-08	ST-06	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-09	ST-07	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-10	ST-08	Soil	2508/4007	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-11	ST-10	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-12	ST-19	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-13	ST-20	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-14	ST-21	Soil	Hold	09/15/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-15	ST-34	Soil	2508/4007	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-16	ST-35	Soil	2508/4007	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-17	ST-37	Soil	2508/4007	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receip
RP991021-18	ST-42	Soil	Hold	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receipt
RP991021-19	ST-43	Soil	Hold	09/16/99	10/21/99	R01020-60	1 liter jars	Jars broken upon receipt

SW1 10/21/94

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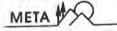
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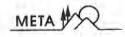
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SUB-ATTACHMENT 2D-2.2 Chemical Concentrations Biomarkers

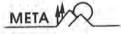
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fatrix:	Soil/Sediment	Soil/Sediment	Soil/Sediment	Soil/Sediment
ate Received:	10/15/1999	10/15/1999	10/15/1999	10/15/1999
ate Prepared:	1/24/2000	1/24/2000	1/24/2000	1/24/2000
ate Cleanup:	1/26/2000	1/26/2000	1/26/2000	1/26/2000
ate Analyzed:	2/2/2000	2/2/2000	2/2/2000	2/2/2000
Solid:	100%	100%	100%	100 %
ample Size:	24.212	8.536	27.507	22.312
xtract Volume:	10.0	10.0	2.0	5.0
nalysis DF:	1.0	1.0	1.0	1.0
reparation Method:	EPA3540	EPA3540	EPA3540	EPA3540
icanup Method:	EPA 3630 mod.	EPA 3630 mod.	EPA 3630 mod.	EPA 3630 mod.
	PA 8260/8270 mod.	EPA 8260/8270 mod.	EPA 8260/8270 mod.	EPA 8260/8270 mod.
nalysis Method:	FA 8200/82/0 mod.	EFA 8200/82/0 mod.	EFA 8200/8270 mod.	EFA 8200/82/0 mou.
۰L	Varies	Varies	Varies	Varies
nits	mg/kg	mg/kg	mg/kg	mg/kg
				100 35
nalyte				
ecane	0.218 .			
eptadecane	2,477	52.394	1.271	1.784
ctadecane	0.703	48.717	0.746	0.982
icosane	1.946	43.064	0.827	0.687
riacontane	1.578	16.509	0.368	2.306
.4,10-Trimethyldodecane (Farnesane)	5.413	42.074	0.558	1.106
4,10-Trimethyltridecane	10.850	58.449	0.879	1.614
orpristane	16.655	62.001	0.693	1.865
ristane	30.429	97.324	1.405	2.538
hytane	20.326	69.925	0.575	2.247
19 - Tricyclic terpane	0.188			
20 - Tricyclic terpane	0.479	1.698	0.446	t state
21 - Tricyclic terpane	0.522	2.962	0.033	
22 - Tricyclic terpane	0.743	5.345	0.030	
23 - Tricyclic terpane	1.589	13.345	0.069	
	1.126	8.581	0.035	
24 - Tricyclic terpane	1.303	11.342	0.068	
25 - Tricyclic terpane			0.045	
26 - Tricyclic terpane	1.227	9.881	0.043	
27 - Tetracyclic terpane	0.848	6.679		
27 - Tetracyclic terpane	0.823	6.688	0.019	
28 - Tetracyclic terpane	0.833	5.384	0.062	
'28 - Tetracyclic terpane	0.890	5.431	0.032	E. S.
8a(H),21b(H)-22,29,30-trisnorhopane(Ts	1.575	9.251	0.048	
7a(H),18a(H),21a(H)-25,28,30-trisnorho	0.571	4.248	0.220	U 0.202 J
7a(H),21b(H)-22,29,30-trisnorhopane(Tm	1.029	5.546	0.091	0.681
7a(H),18a(H),21b(H)-28,30-bisnorhopane	0.147			U 0.217 J
7b(H),21a(H)-30-norhopane(Normoretane)	2.870	13,171	0.153	2.471
8a(H),21b(H)-30norneohopane	0.997	4.006		U 0.499
7a(H),21b(H)-30-norhopane	0.570	2.539	0.075	. 0.402
7a(H),21b(H)-hopane	5.191	26.062	0.259	
7b(H),21a(H)-hopane(Moretane)	0.898	4.331	0.064	J 0.551
2S-17a(H),21b(H)-30-homohopane	1.567	6.628	0.084	1.263
2R-17a(H),21b(H)-30-homohopane	1.762	7.766	0.103	1.343
7b(H),21b(H)-hopane (Hopane)	0.445	1.882	1000	U 0.303
2S-17a(H),21b(H)-30,31-bishomohopane	1.737	3,854	0.093	1.666
			0.045	
	0.734	3.096	1.04.2	1 0.030
2R-17a(H),21b(H)-30,31-bishomohopane 2S-17a(H),21b(H)-30,31,32-trishomohopa	0.734 0.734	3.096 3.808	0.045	



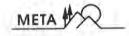
2S-17a(H),21b(H)-30,31,32,33-tetrakish	0.552	2.582	U	0.485
20 5a(H), 14a(H), 17a(H)-sterane	0.408 J	2.726	0.013 J	0.250
'21 5a(H), 14b(H), 17b(H)-sterane	1.008	7.842	0.043 J	0.682
22 5a(H), 14b(H), 17b(H)-sterane	0.454	3.193	0.022 J	0.252
'27 20S-13b(H),17a(H)-diasterane	1.323	9.483	0.041 J	0.677
27 20R-13b(H), 17a(H)-diasterane	0.799	6.344	0.033 J	0.308
27 20S-13a(H), 17b(H)-diasterane	0.389 J	3.226	U	0.334
27 20R-13a(H), 17b(H)-diasterane	2.132	14.613	0.035 J	0.856
28 20S-13b(H), 17a(H)-diasterane	0.649	3.411	0.018 J	0.326
27 20S-5a(H), 14a(H), 17a(H)-cholestane	2.012	11.811	0.057 J	1.006
27 20R-5a(H),14b(H),17b(H)-cholestane	0.652	4.293	0.023 J	0.294
27 20S-5a(H), 14b(H), 17b(H)-cholestane	1.085	6.537	0.029 J	0.533
'27 20R-5a(H),14a(H),17a(H)-cholestane	2.470	16.916	0.072 J	1.032
'29 20S-13b(H), 17a(H)-diasterane	0.319 J	2.089	U	0.181 J
'28 20S-5a(H), 14a(H), 17a(H)-ergostane	1.142	6.238	0.033 J	0.601
'28 20R-5a(H),14b(H),17b(H)-ergostane	1.474	6.932	0.053 J	0.553
28 20S-5a(H), 14b(H), 17b(H)-ergostane	1.001	6.141	0.031 J	0.558
28 20R-13a(H), 17b(H)-diasterane	0.213 J	1.270	U	U
'28 20R-5a(H),14a(H),17a(H)-ergostane	1.825	11.217	0.064 J	0.543
29 20S-5a(H), 14a(H), 17a(H)-stigmastane	1.039	4.773	0.029 J	0.546
29 20R-5a(H),14b(H),17b(H)-stigmastane	0.918	6.387	0.041 J	0.540
'29 20S-5a(H), 14b(H), 17b(H)-stigmastane	0.491	2.586	0.010 J	0.352
'29 20R-5a(H), 14a(H), 17a(H)-stigmastane	1.513	9.522	0.054 J	0.654



eld ID:	ST-08	ST-34	ST-35	GWP-TANK	
ab ID:	RP000124-05PF	RP000124-06PF	RP000124-07PF	RE980604-03PF	
ile ID:	02FEB08.D	02FEB11.D	02FEB12.D	02FEB14.D	
latrix:	Soil/Sediment	Soil/Sediment	Soil/Sediment	Soil/Sediment	
ate Received:	10/15/1999	10/15/1999	10/15/1999	10/15/1999	
ate Prepared:	1/24/2000	1/24/2000	1/24/2000	1/24/2000	
ate Cleanup:	1/26/2000	1/26/2000	1/26/2000	1/26/2000	
ate Analyzed:	2/2/2000	2/2/2000	2/2/2000	2/2/2000	
Solid:	100%	100%	100%	100%	
imple Size:	22.255	20.448	23.761	0.0052	
stract Volume:	5.0	5.0	5.0	1.0	
nalysis DF:	1.0	1.0	1.0	1.0	
reparation Method:	EPA3540	EPA3540	EPA3540	EPA3580	
leanup Method:	EPA 3630 mod.	EPA 3630 mod.	EPA 3630 mod.	EPA 3630 mod.	
nalysis Method:	PA 8260/8270 mod.	EPA 8260/8270 mod.	EPA 8260/8270 mod.	EPA 8260/8270 mod.	
L	Varies	Varies	Varies	Varies	
nits	mg/kg	mg/kg	mg/kg	mg/kg	
into a	116/16	106/16	meree	mgrag	
nalyte					
ecane	0.076	J 0.115	J 0.135		U
eptadecane	1.213	2.800	1.363		U
ctadecane	0.384	0.673	0.490		U
icosane .	0.420	0.994	0.736		U
riacontane	1.125	1.900	2.252		U
4,10-Trimethyldodecane (Farnesane)	0.180	J 0.397	0.915		U
4,10-Trimethyltridecane	0.367	0.922	1.515		U
orpristane	0.542	1.605	1.450		U
tistane	0.771	2.170	2.499		U
nytane	0.690	2.805	2.141		U
19 - Tricyclic terpane	0.121	J 0.202	J 0.173		U
20 - Tricyclic terpane		U	U 0.119	J	U
21 - Tricyclic terpane	0.197	J 0.330	0.400	1.1	U
22 - Tricyclic terpane	0.236	0.560	0.571		U
23 - Tricyclic terpane	0.643	1.465	1.192		U
24 - Tricyclic terpane	0.474	0.844	0.892		U
25 - Tricyclic terpane	0.496	0.999	1.000		U
26 - Tricyclic terpane	0.434	0.829	0.804		U
27 - Tetracyclic terpane	0.228	0.404	0.369		U
27 - Tetracyclic terpane	0.233	0.338	0.435		U
28 - Tetracyclic terpane	0.311	0.483	0.499		Ú
28 - Tetracyclic terpane	0.295	0.452	0.446		U
a(H),21b(H)-22,29,30-trisnorhopane(Ts	0.660	1.088	1.148		u
7a(H), 18a(H), 21a(H)-25, 28, 30-trisnorho	0.170		0.356		U
/a(H),21b(H)-22,29,30-trisnorhopane(Tm	0.530	0.874	0.828		U
7a(H),18a(H),21b(H)-28,30-bisnorhopane	0.188				U
7b(H),21a(H)-30-norhopane(Normoretane)	1.527	2.599	2.069		U
3a(H),21b(H)-30norneohopane	0.497	0.680	0.519		U
7a(H),21b(H)-30-norhopane	0.209		0.411		U
7a(H),21b(H)-hopane	2.392	3.831	3.574		ũ
7b(H),21a(H)-hopane(Moretane)	0.364	0.607	0.484		U
2S-17a(H),21b(H)-30-homohopane	0.800	1.326	1.039		U
2R-17a(H),21b(H)-30-homohopane	1.013	1.257	1.218		U
7b(H),21b(H)-hopane (Hopane)	0.184		0.328		ŭ
2S-17a(H),21b(H)-30,31-bishomohopane	1.217	1.674	1,238		U
2R-17a(H),21b(H)-30,31-bishomohopane	0.405	0.612	0.551		U
2S-17a(H),21b(H)-30,31,32-trishomohopa	0.405	0.840	0.725		U
2R-17a(H),21b(H)-30,31,32-trishomohopa	0.319	0.375			u
six-reality, aroury-50, 51, 52-misnomonopa	0.319	0.375	0.434		9



2S-17a(H),21b(H)-30,31,32,33-tetrakish	0.283	0.508	0.419	U
20 5a(H), 14a(H), 17a(H)-sterane	0.148 J	0.274	0.312	U
21 5a(H), 14b(H), 17b(H)-sterane	0.313	0.685	0.727	U
22 5a(H),14b(H),17b(H)-sterane	0.126 J	0.309	0.305	U
27 20S-13b(H), 17a(H)-diasterane	0.438	0.647	0.755	U
27 20R-13b(H), 17a(H)-diasterane	0.237	0.375	0.427	U
27 20S-13a(H), 17b(H)-diasterane	0.230	0.856	0.225	U
27 20R-13a(H), 17b(H)-diasterane	0.475	1,130	1.238	U
28 20S-13b(H), 17a(H)-diasterane	0.181 J	0.418	0.303	U
27 20S-5a(H), 14a(H), 17a(H)-cholestane	0.734	1.183	1.262	U
27 20R-5a(H), 14b(H), 17b(H)-cholestane	0.196 J	0.327	0.338	U
27 20S-5a(H),14b(H),17b(H)-cholestane	0.352	0.531	0.480	U
27 20R-5a(H), 14a(H), 17a(H)-cholestane	0,653	1.167	1.336	U
29 20S-13b(H), 17a(H)-diasterane	υ	0.203 J	0.180 J	U
28 20S-5a(H), 14a(H), 17a(H)-ergostane	0.355	0.567	0.520	υ
28 20R-5a(H), 14b(H), 17b(H)-ergostane	0.372	0.531	0.551	U
28 20S-5a(H), 14b(H), 17b(H)-ergostane	0.369	0.514	0.509	U
28 20R-13a(H), 17b(H)-diasterane	U	0.104 J	0.190 J	U
28 20R-5a(H), 14a(H), 17a(H)-ergostane	0,404	0.708	0.818	υ
29 20S-5a(H), 14a(H), 17a(H)-stigmastane	0.263	0.554	0.671	U
29 20R-5a(H), 14b(H), 17b(H)-stigmastane	0,467	0.599	0.709	U
29 20S-5a(H),14b(H),17b(H)-stigmastane	0.200	0.329	0.415	U
29 20R-5a(H), 14a(H), 17a(H)-stigmastane	0.456	0.626	0.961	U
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MLS-4-1-298
EL980224-01PF
11APR07.D
Soil/Sediment
10/15/1999
1/24/2000
4/3/2000
4/11/2000
100%
0.0058
1.0
1.0
EPA3580
EPA 3630 mod.
PA 8260/8270 mod.
Madan
Varies
mg/kg
605.978
725,736
632.805
417.458 J
U
685.359
793.646
510.068
889.394
380.222
3.211 J
6.250 J
6.136 J
· U
9.024 J
6.060 J
6.459 J
3.040 J
5.851 J
6.136 J
5.015 J
5.281 J
3.781 J
4.122 J
11.665 J
1.976 J
21,999
3.667 J
7.162 J
40.275
8.454 J
9.442 J
8.986 J
0.900 J U
0
5 224 T
5.224 J 5.642 J
5.224 J 5.642 J 4.331 J

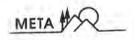


2S-17a(H),21b(H)-30,31,32,33-tetrakish	U
220 5a(H), 14a(H), 17a(H)-sterane	3.382 J
221 5a(H), 14b(H), 17b(H)-sterane	6.630 J
222 5a(H), 14b(H), 17b(H)-sterane	2.812 J
227 20S-13b(H), 17a(H)-diasterane	4.046 J
227 20R-13b(H),17a(H)-diasterane	2.337 J
227 20S-13a(H), 17b(H)-diasterane	2.261 J
27 20R-13a(H), 17b(H)-diasterane	5.433 J
228 20S-13b(H), 17a(H)-diasterane	2.109 J
227 20S-5a(H), 14a(H), 17a(H)-cholestane	9.195 J
27 20R-5a(H),14b(H),17b(H)-cholestane	2.109 J
227 20S-5a(H),14b(H),17b(H)-cholestane	3.952 J
227 20R-5a(H), 14a(H), 17a(H)-cholestane	13.184 J
29 20S-13b(H), 17a(H)-diasterane	U
228 20S-5a(H), 14a(H), 17a(H)-ergostane	5,927 J
228 20R-5a(H), 14b(H), 17b(H)-ergostane	6.497 J
28 20S-5a(H),14b(H),17b(H)-ergostane	4.540 J
28 20R-13a(H), 17b(H)-diasterane	3.002 J
28 20R-5a(H), 14a(H), 17a(H)-ergostane	10.962 J
229 20S-5a(H), 14a(H), 17a(H)-stigmastane	4.274 J
29 20R-5a(H), 14b(H), 17b(H)-stigmastane	U
229 20S-5a(H),14b(H),17b(H)-stigmastane	U
29 20R-5a(H), 14a(H), 17a(H)-stigmastane	8.891 J
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META

SUB-ATTACHMENT 2D-2.3 Stable Carbon Isotope Ratios and Chromatograms

	Field ID ->		CR	-8A		
	Run #>	8212	8230	Ave.	Stdev.	
	Lab ID ->>		RP00013	24-01DF		
1545	Naphthalene	-22.4	-21.78	-22.09	0.44	
2142	Acenaphthylene					
2213	Acenaphthene	-22.56	-22.98	-22.77	0.30	
2406	Fluorene	-21.94	-21.7	-21.82	0.17	
2772	Phenanthrene	-21.94	-21.67	-21.81	0.19	
2790	Anthracene	-23.57	-23.43	-23.50	0.10	
3234	Fluoranthene	-25.46		-25.46		
3320	Pyrene					
3786	Benzo(a)anthracene	-23.24	-22.73	-22.99	0.36	
3803	Chrysene	-24.88	-24.48	-24.68	0.28	
4194	Benzo(b,k)fuoranthene	-24.3	-24.16	-24.23	0.10	
4302	Benzo(a)pyrene	-24.18	-24.61	-24.40	0.30	
4792	indeno(123-cd)pyrene	-25	-24.75	-24.88	0.18	
4927	Benzo(g,h,i)perylene	-25.08	-24.88	-24.98	0.14	
C9D	Internal Std. # 1	-31.12	-31.24	-31.18	0.08	
C10D	Internal Std. # 2	-31.75	-31.59	-31.67	0.11	
C16D	Internal Std. # 3	-28.12	-28.43	-28.28	0.22	
C19D	Internal Std. # 4	-26.13	-26.2	-26.17	0.05	
C24D	Internal Std. # 5	-26.18	-25.2	-25.69	0.69	
C32D	Internal Std. # 6	-28.56	-28.8	-28.68	0.17	



	Field ID ->>			CR-10A			
	Run #>	8104	8213	8231	Ave.	Stdev.	
	Lab ID ->>		R	P000124-021	OF		
	10 M 1						
1545	Naphthalene					0.75	
2142	Acenaphthylene	-22.75	-22.63	-21.57	-22.32	0.65	
2213	Acenaphthene	-23.49	-22.9	-22.6	-23.00	0.45	
2406	Fluorene	-24.56	-23.88		-24.22	0,48	
2772	Phenanthrene	-25.16	-24.22	-23.54	-24.31	0.81	
2790	Anthracene	-23.64	-23.07	-22.95	-23.22	0.37	
3234	Fluoranthene	-25.5	-24.59	-24.44	-24.84	0.57	
3320	Pyrene	-25.83	-24.68	-24.15	-24.89	0.86	
3786	Benzo(a)anthracene	-24.4	-24.07	-23	-23.82	0.73	
3803	Chrysene	-25.57	-25.47	-25.06	-25.37	0.27	
4194	Benzo(b,k)fuoranthene	-24.69	-25	-24.92	-24.87	0.16	
4302	Benzo(a)pyrene	-24.25	-24.49	-24.06	-24.27	0.22	
4792	indeno(123-cd)pyrene	-24.15	-23.37	-23.29	-23.60	0.48	
4927	Benzo(g,h,i)perylene		-24.78		-24.78	1 25.00	
C9D	Internal Std. # 1	-31.3	-31.53	-30.19	-31.01	0.72	
C10D	Internal Std. # 2	-31.98	-32.48	-31.23	-31.90	0.63	
C16D	İnternal Std. # 3	-29.11	-28.72	-29	-28.94	0.20	
C19D	Internal Std. # 4	-28.35	-27.35	-26.88	-27.53	0.75	
	Internal Std. # 5	-26.6	-26.33	-26.05	-26.33	0.28	
	Internal Std. # 6	-29.45	-29.74	-30.01	-29.73	0.28	

META

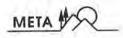
Projec	t: Gas Works Park					
	Field ID ->>			CR-19A		
	Run #>	8090	8218	8233	Ave.	Stdev.
	Lab ID \longrightarrow		RI	P000124-03I	DF	
1545	Naphthalene			-22.98	-22.98	
2142	Acenaphthylene	-19.74	-21.1	-20.29	-20.38	0.68
2213	Acenaphthene	-22.9		-22.18	-22.54	0.51
2406	Fluorene	-22.72	-22.94	-23.27	-22.98	0.28
2772	Phenanthrene			-23.67	-23.67	
2790	Anthracene	-23.77	-23.79	-23.05	-23.54	0.42
3234	Fluoranthene	-25.24	-24.46	-23.94	-24.55	0.65
3320	Pyrene	-24.07	-23.13	-24.45	-23.88	0.68
3786	Benzo(a)anthracene	-23.52	-23.52	-23.2	-23.41	0.18
3803	Chrysene	-24.65	-24.79	-24.62	-24.69	0.09
4194	Benzo(b,k)fuoranthene	-24.99	-24.62	-25.27	-24.96	0.33
4302	Benzo(a)pyrene	-25.31	-29.91	-25.41	-26.88	2.63
4792	indeno(123-cd)pyrene	-24.92	-24.59		-24.76	0.23
4927	Benzo(g,h,i)perylene	-25.59	-26.28		-25.94	0.49
C9D	Internal Std. # 1	-29.81	-31.03	-30.72	-30.52	0.63
C10D	a management of the state of the	-31.17	-31.73	-31.82	-31.57	0.35
	Internal Std. # 3	-26.76	-27.83	-27.85	-27.48	0.62
	Internal Std. # 4	-26.38	-26.1	-26.45	-26.31	0.19
2.00.00	Internal Std. # 5	-25.8	-26.32	-25.87	-26.00	0.28
	Internal Std. # 6	-29.68	-29.54	-29.97	-29.73	0.22

META

	Field ID ->>		ST	-03		
	Run #>	8219	8234	Ave.	Stdev.	
11	Lab ID ->>		RP00012	24-04DF		
1545	Naphthalene	-22.1	-22.17	-22.14	0.05	
2142	Acenaphthylene	-21.84		-21.84		
2213	Acenaphthene	-21.17	-21.38	-21.28	0.15	
2406	Fluorene	-22.88	-23	-22.94	0.08	
2772	Phenanthrene	-23.4	-23.39	-23.40	0.01	
2790	Anthracene	-22.32	-22.55	-22.44	0.16	
3234	Fluoranthene	-24.18	-24.44	-24.31	0.18	
3320	Pyrene	-24.6	-24.43	-24.52	0.12	
3786	Benzo(a)anthracene	-23.87	-23.53	-23.70	0.24	
3803	Chrysene	-24.36	-24.01	-24.19	0.25	
4194	Benzo(b,k)fuoranthene	-23.93		-23.93		
4302	Benzo(a)pyrene	-24	-24.41	-24.21	0.29	
4792	indeno(123-cd)pyrene	-23.89	-23.92	-23.91	0.02	
4927	Benzo(g,h,i)perylene	-23.31	-23.32	-23.32	0.01	
C9D	Internal Std. # 1	-30.84	-30.81	-30.83	0.02	
C10D	Internal Std. # 2	-31.39	-31.22	-31.31	0.12	
C16D	Internal Std. # 3	-26.91	-26.88	-26.90	0.02	
C19D	Internal Std. # 4	-25.27	-25.72	-25.50	0.32	
C24D	Internal Std. # 5	-25.94	-26.43	-26.19	0.35	
C32D	Internal Std. # 6	-29.97	-28.68	-29.33	0.91	

	Field ID ->>			ST-08		
	Run #>	8095	8220	8235	Ave.	Stdev.
	Lab ID \longrightarrow		RI	P000124-05I	OF	
	2 Section of the sect					
1545	Naphthalene					
2142	Acenaphthylene					
2213	Acenaphthene					
2406	Fluorene		1.4	162.34	20.00	44.44
2772	Phenanthrene	-23.16	-22.33	-23.46	-22.98	0.59
2790	Anthracene		-23.1		-23.10	
3234	Fluoranthene	-23.76	-24.51	-23.42	-23.90	0.56
3320	Pyrene	-22.21	-22.25	-22.07	-22.18	0.09
3786	Benzo(a)anthracene	-24.54	-23.38	-24.2	-24.04	0.60
3803	Chrysene	-25.05	-24.95	-24.67	-24.89	0.20
4194	Benzo(b,k)fuoranthene	-23.81	-23.37	-23.55	-23.58	0.22
4302	Benzo(a)pyrene	-24.54	-23.64	-23.52	-23.90	0.56
4792	indeno(123-cd)pyrene	-24.61	-25.75	-25.14	-25.17	0.57
4927	Benzo(g,h,i)perylene	-24	-23.44	-23.74	-23.73	0.28
C9D	Internal Std. # 1	-31.64	-30,87	-30.74	-31.08	0.49
C10D	Internal Std. # 2	-32.51	-31.43	-31.74	-31.89	0.56
C16D	Internal Std. # 3	-29.2	-28.57	-28.66	-28.81	0.34
C19D	Internal Std. # 4	-26.86	-26.3	-25.97	-26.38	0.45
C24D	Internal Std. # 5		-25.71	-25.34	-25.53	0.26
C32D	Internal Std. # 6	-30.96	-29.48	-29.92	-30.12	0.76

	Field ID ->>		ST	-34		
	Run #>	8222	8236	Ave.	Stdev.	
	Lab ID \longrightarrow		RP00012	24-06DF		
1545	Naphthalene	-22.88	-22.82	-22.85	0.04	
2142	Acenaphthylene					
2213	Acenaphthene		-22.82	-22.82		
2406	Fluorene		-28.5	-28.50		
2772	Phenanthrene	-23.77	-24.02	-17.55	0.18	
2790	Anthracene					
3234	Fluoranthene	-23.66	-23.66	-17.66	0.00	
3320	Pyrene	-23.77	-24.03	-17.47	0.18	
3786	Benzo(a)anthracene	-24.17	-24.46	-18.02	0.21	
3803	Chrysene	-23.79	-24.02	-18.13	0.16	
4194	Benzo(b,k)fuoranthene	-23.94	-23.96	-17.81	0.01	
4302	Benzo(a)pyrene	-24.69	-23.99	-18.01	0.49	
4792	indeno(123-cd)pyrene	-23.84	-23.67	-18.03	0.12	
4927	Benzo(g,h,i)perylene	-22.96	-23	-17.35	0.03	
	10000000000000	<u>.</u>				
C9D	Internal Std. # 1	-30,99	-30.83	-23.10	0.11	
	Internal Std. # 2	-31.29	-31.15	-23.44	0.10	
	Internal Std. # 3	-28.4	-28.71	-21.39	0.22	
	Internal Std. # 4	-26.03	-26.81	-19.69	0.55	
C24D	Internal Std. # 5	-25.61	-25.86	-19.18	0.18	
C32D	Internal Std. # 6	-29.71	-29.24	-22.08	0.33	



Client: ThermoRetec Project: Gas Works Park

Proje	ct: Gas Works Park						
	Field ID ->	ST-35					
	Run #>	8223	8237	Ave.	Stdev.		
	Lab ID \longrightarrow		RP0001	24-07DF)7DF		
1545	Naphthalene	-21.93	-21.9	-21.92	0.02		
2142	Acenaphthylene	-23,12		-23.12			
2213	Acenaphthene	-20.63	-20.87	-20.75	0.17		
2406	Fluorene	-22.86	-22.62	-22.74	0.17		
2772	Phenanthrene	-23.22	-22.74	-22.98	0.34		
2790	Anthracene	-22.15	-22.09	-22.12	0.04		
3234	Fluoranthene	-23.95	-24.18	-24.07	0.16		
3320	Pyrene	-24.28	-24.4	-24.34	0.08		
3786	Benzo(a)anthracene	-24.05	-24.17	-24.11	0.08		
3803	Chrysene	-24.74	-24.66	-24.70	0.06		
4194	Benzo(b,k)fuoranthene	-24.07	-24.67	-24.37	0.42		
4302	Benzo(a)pyrene	-24.64	-25.21	-24.93	0.40		
4792	indeno(123-cd)pyrene	-23.35	-22.89	-23.12	0.33		
4927	Benzo(g,h,i)perylene	-23.86	-23.88	-23.87	0.01		
C9D	Internal Std. # 1	-30.79	-30.86	-30.83	0.05		
C101	D Internal Std. # 2	-31.29	-31.31	-31.30	0.01		
C161	D Internal Std. # 3	-28.75	-28.63	-28.69	0.08		
C19I	D Internal Std. # 4	-26.39	-26.87	-26.63	0.34		
C24I	D Internal Std. # 5	-25.94	-26.21	-26.08	0.19		
C32I	D Internal Std. # 6	-29.3	-29.63	-29.47	0.23		

Client: ThermoRetec Project: Gas Works Park

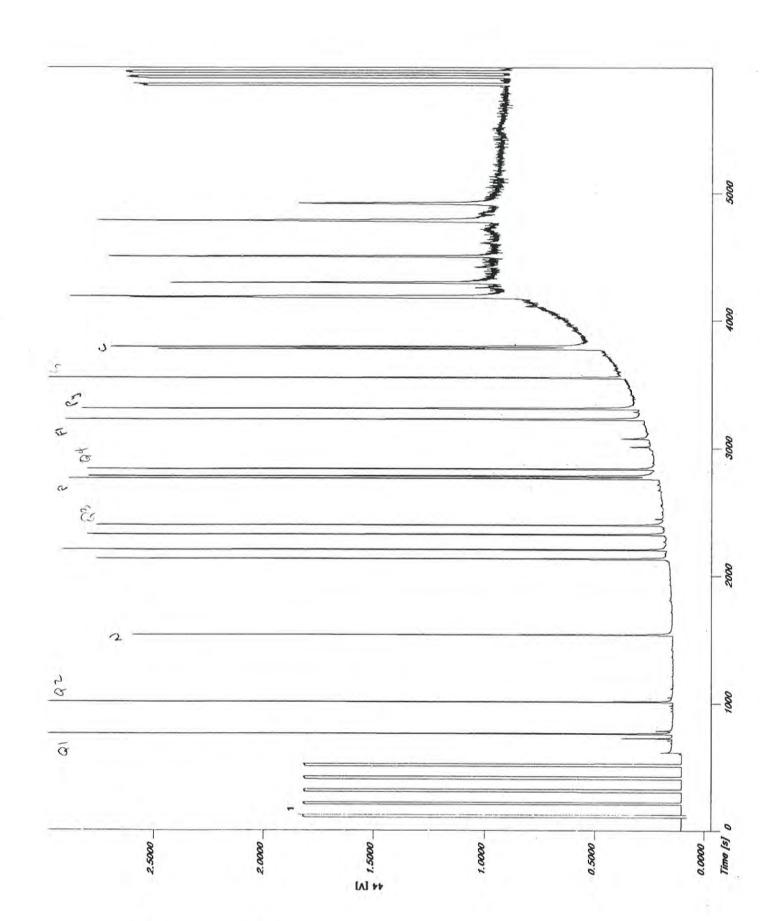
	Field ID ->>	GWP-Tank				
	Run #>	8214	8232	Ave.	Stdev.	
	Lab ID \longrightarrow	RE980604-03DF				
1545	Naphthalene		-21.08	-21.1		
2142	The bar as The second sec	-21.51	-20.47	-21.0	0.7	
	Acenaphthylene	-21.51	-20.47	-21.0	0.7	
2213	Acenaphthene	-22.11	-22.2	-22.2	0.1	
2406	Fluorene					
2772	Phenanthrene	-22.07	-22.57	-22.3	0.4	
2790	Anthracene	-22.8	00.50	-22.8	0.2	
3234	Fluoranthene	-23.95	-23.56	-23.8	0.3	
3320	Pyrene	-21.81	-22.29	-22.1	0.3	
3786	Benzo(a)anthracene	-22.79	-22.27	-22.5	0.4	
3803	Chrysene	-24.52	-24.82	-24.7	0.2	
4194	Benzo(b,k)fuoranthene	-24.87	-25.2	-25.0	0,2	
4302	Benzo(a)pyrene	-23.33	-22.99	-23.2	0.2	
4792	indeno(123-cd)pyrene	-25.35		-25.4		
4927	Benzo(g,h,i)perylene	-24.8		-24.8		
		an an	24.0	a1.6		
C9D	Internal Std. # 1	-31.67	-31.3	-31.5	0.3	
C10D	Internal Std. # 2	-32.21	-31.78	-32.0	0.3	
C16D	Internal Std. # 3	-28.84	-28.2	-28.5	0.5	
C19D	Internal Std. # 4	-26.78	-26.41	-26.6	0.3	
C24D	Internal Std. # 5	-26.77	-26.03	-26.4	0.5	
C32D	Internal Std. # 6	-29.52	-28.9	-29.2	0.4	

META

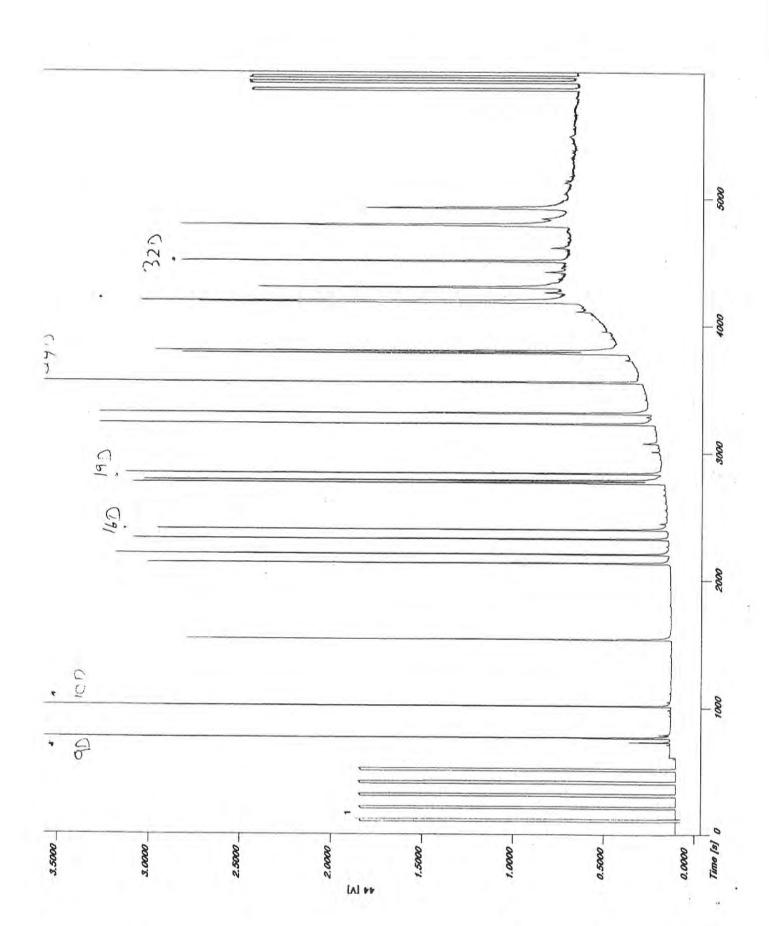
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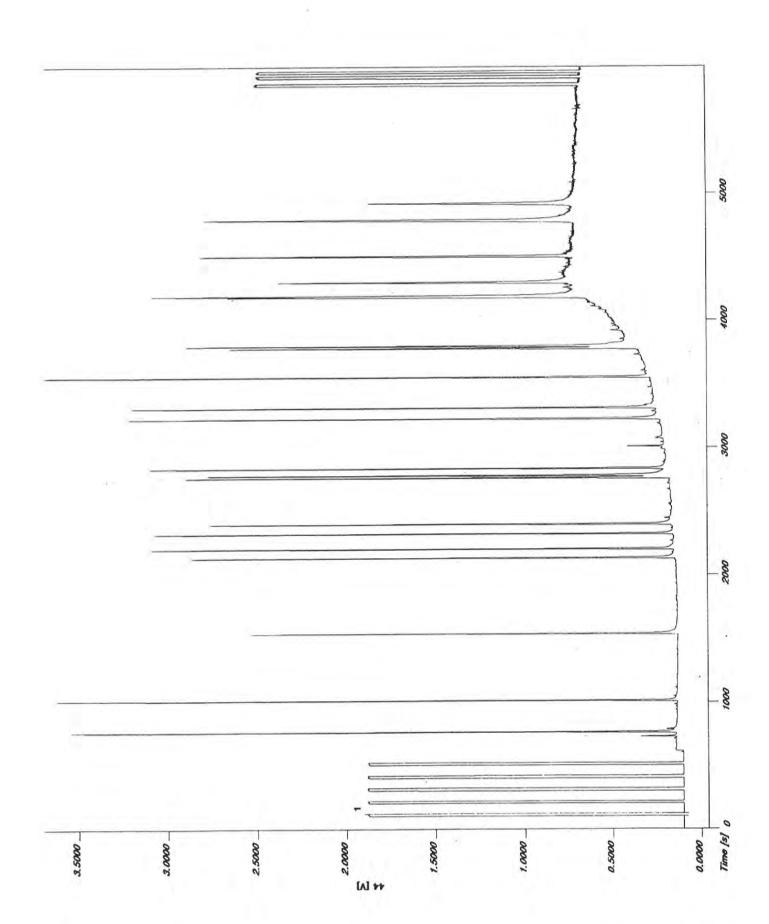
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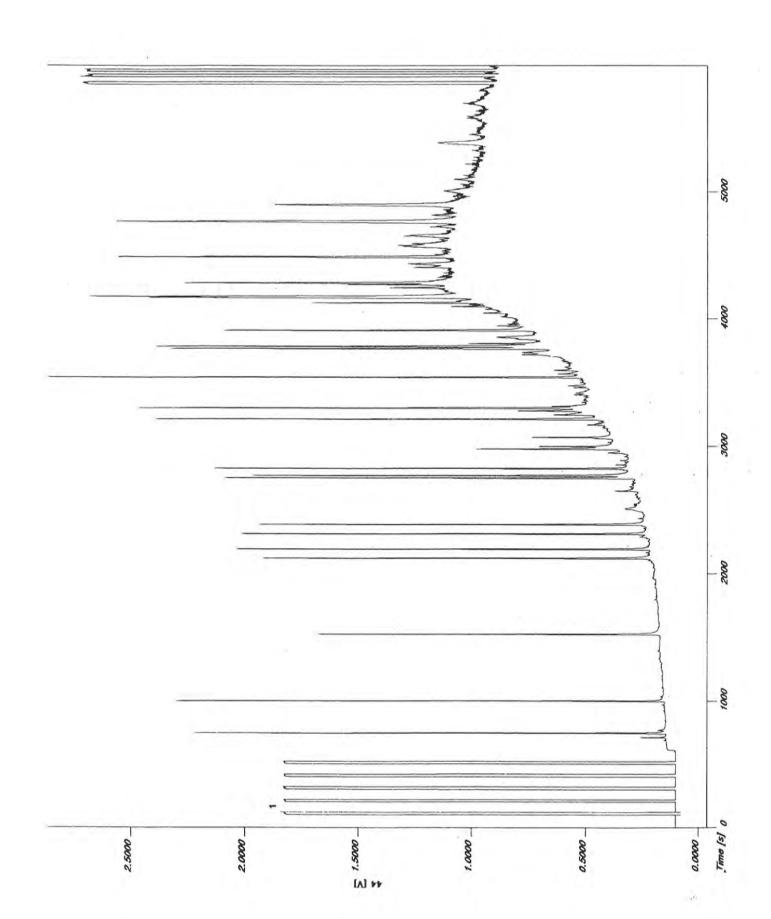
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	Run #>	8211	8228	Ave.	Stdev.		
	Lab ID ->>		EL980224-01DF				
1.552	and a state of the						
1545	Naphthalene	10.00					
2142	Acenaphthylene	-20.32	-18.65	-18.03	8.15		
2213	Acenaphthene	-23.34	-22.6	-17.76	9.26		
2406	Fluorene	-23.88	-23.45	-18.50	9.85		
2772	Phenanthrene	-24.36	-23.61	-18.20	9.67		
2790	Anthracene	-23.75	-23.36	-18.89	9.09		
3234	Fluoranthene	-24.95	-24.43	-19.21	10.00		
3320	Pyrene	-23.74	-23.26	-18.38	9.97		
3786	Benzo(a)anthracene	-24.51	-22.81	-18.28	9.98		
3803	Chrysene	-24.81	-23.73	-19.12	10.34		
4194	Benzo(b,k)fuoranthene	-25.54	-25.88	-19.37	10.01		
4302	Benzo(a)pyrene				1000		
4792	indeno(123-cd)pyrene						
4927	Benzo(g,h,i)perylene						
C9D	Internal Std. # 1	-30.77	-30.6	-23.98	13.00		
C10D	Internal Std. # 2	-31.74	-30.83	-24.50	13.26		
C16D	Internal Std. # 3	-28.27	-27.45	-21.90	11.87		
C19D	Internal Std. #4	-26.85	-26.65	-20.50	11.18		
C24D	Internal Std. # 5	-26.31	-25.74	-19.97	11.07		
C32D	Internal Std. # 6	-29.27	-29.67	-22.84	12.45		

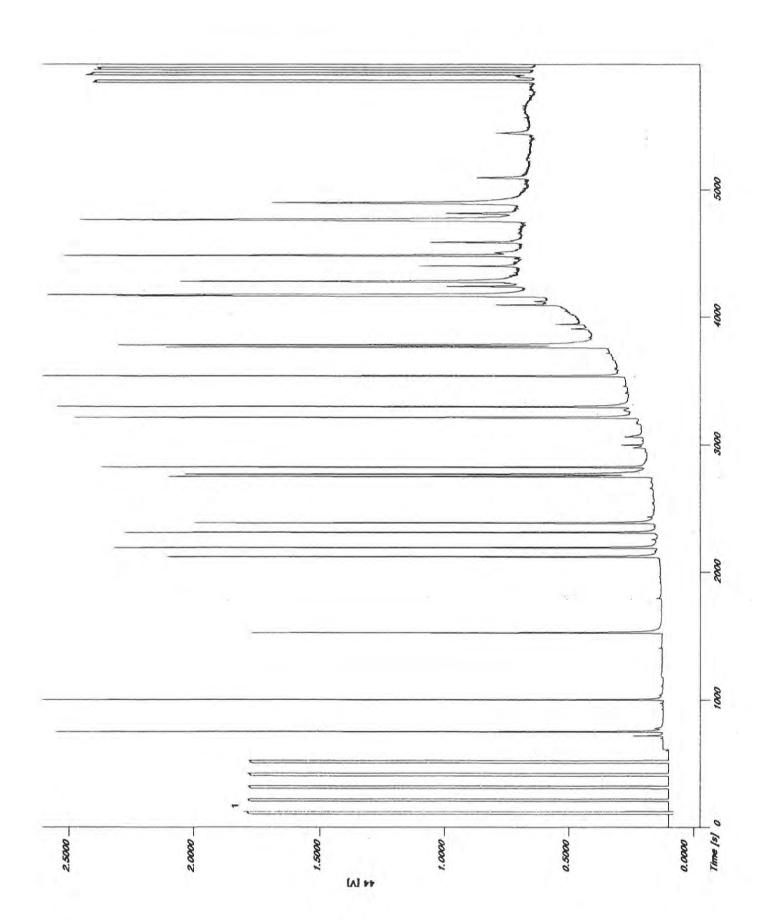


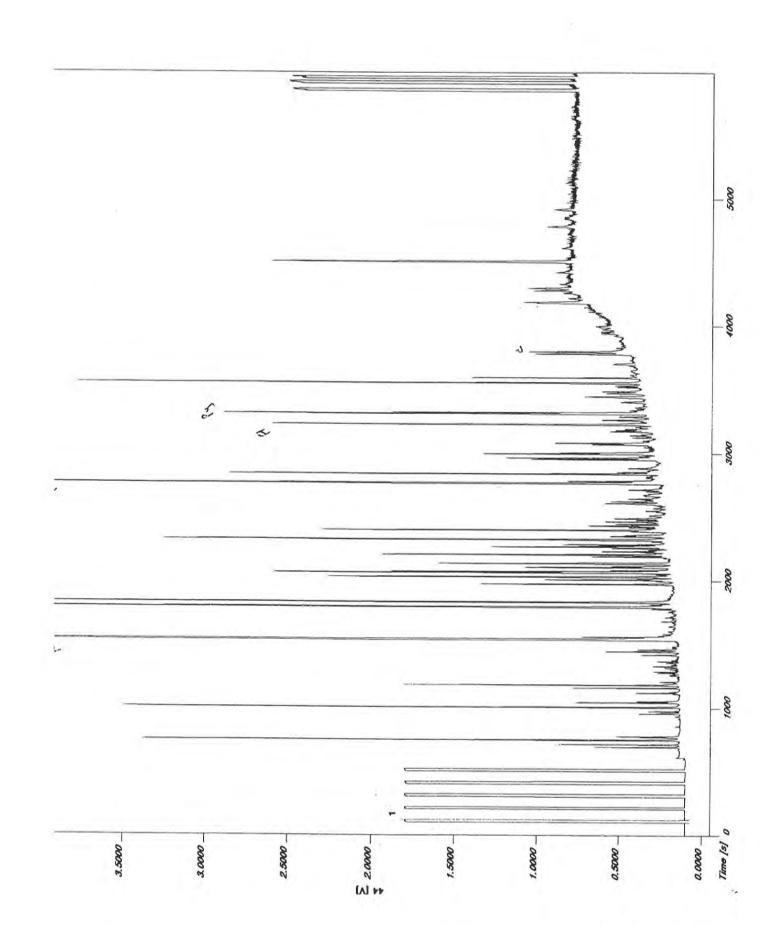
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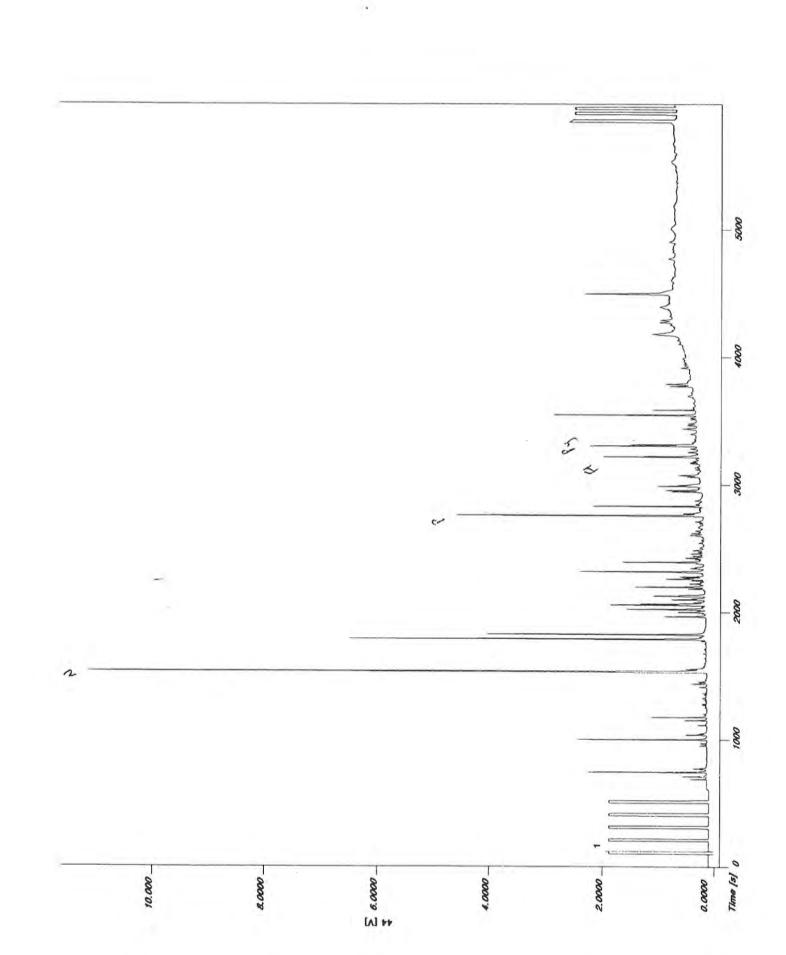


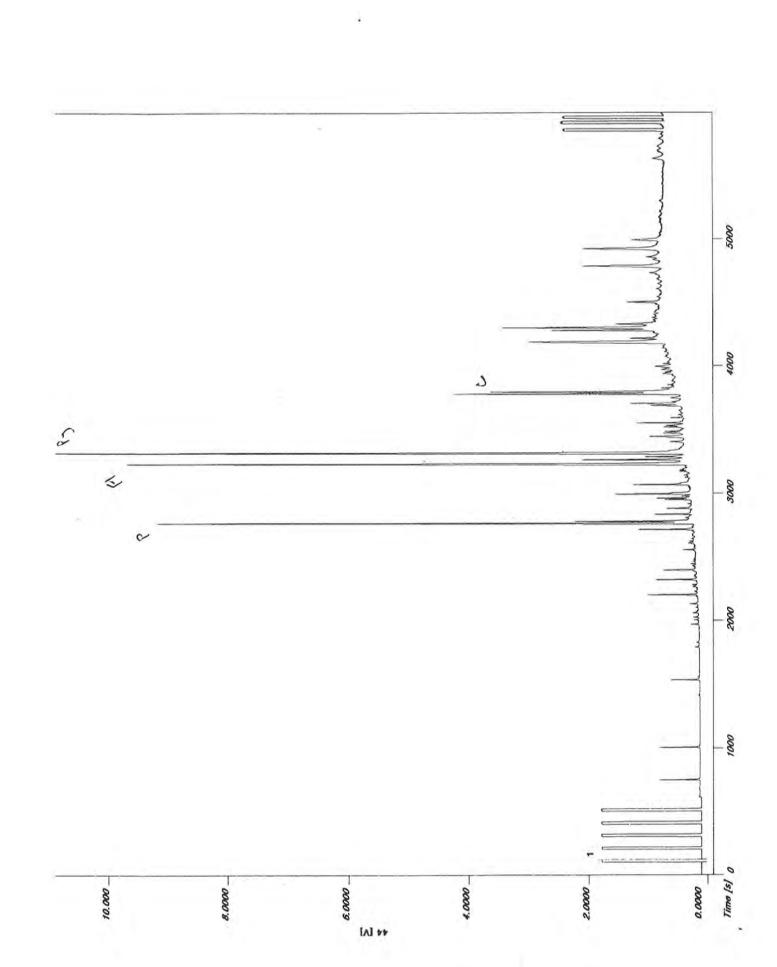


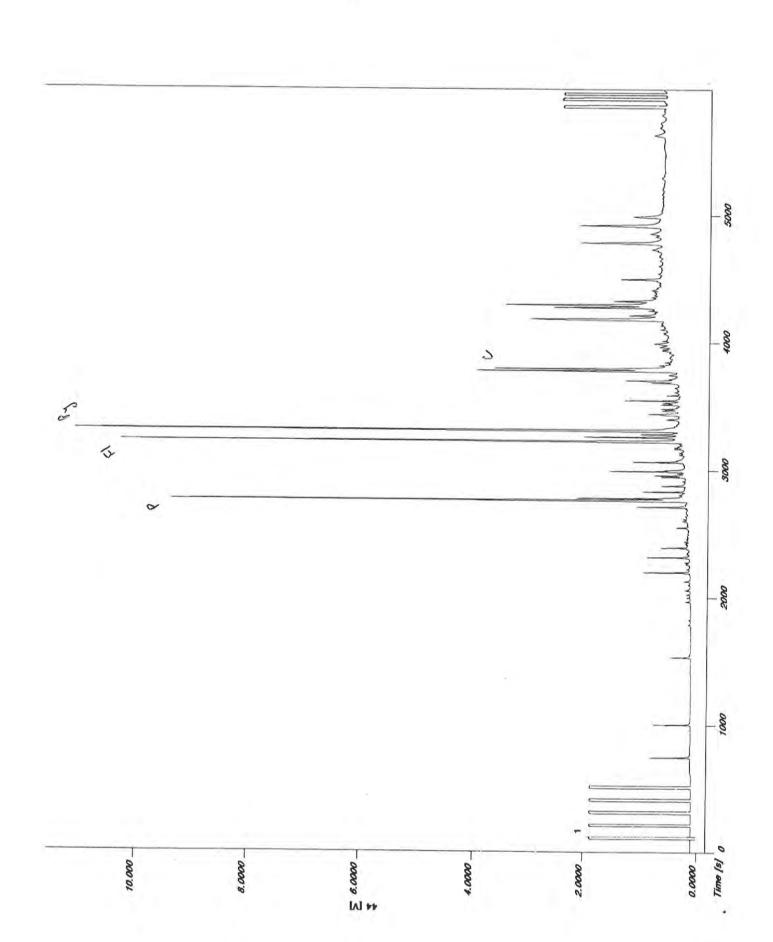




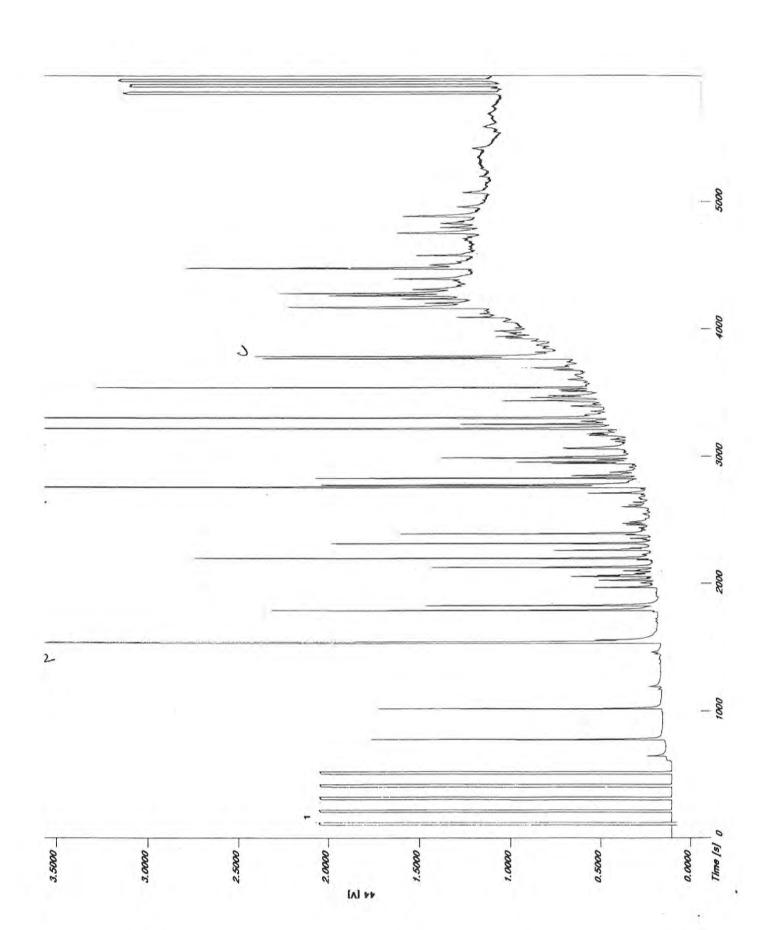


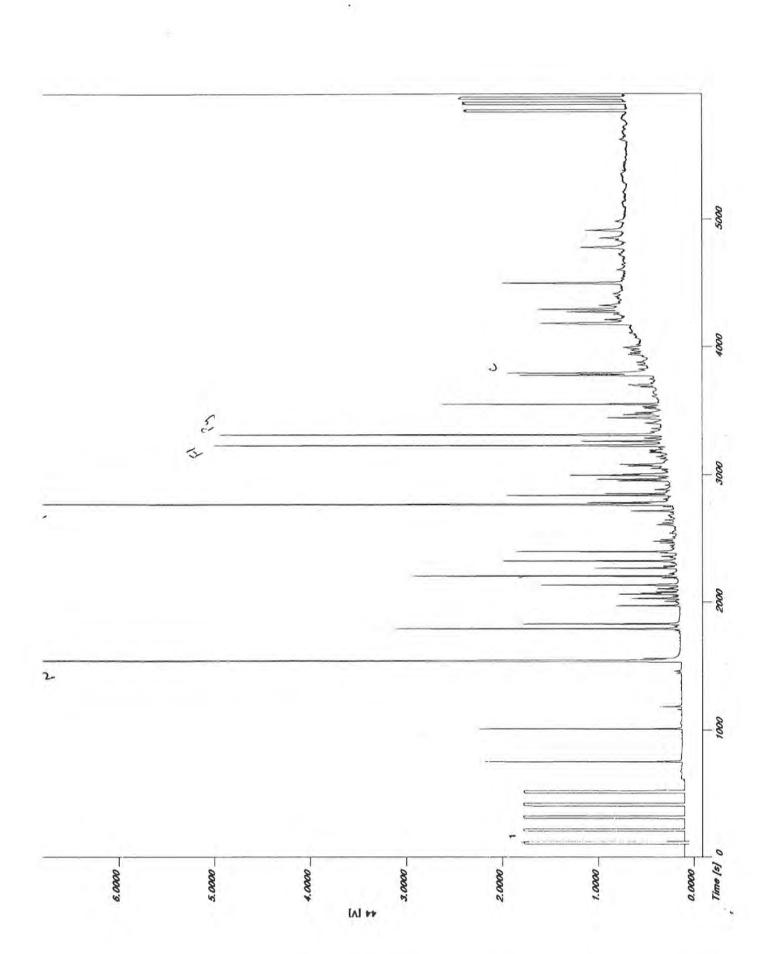


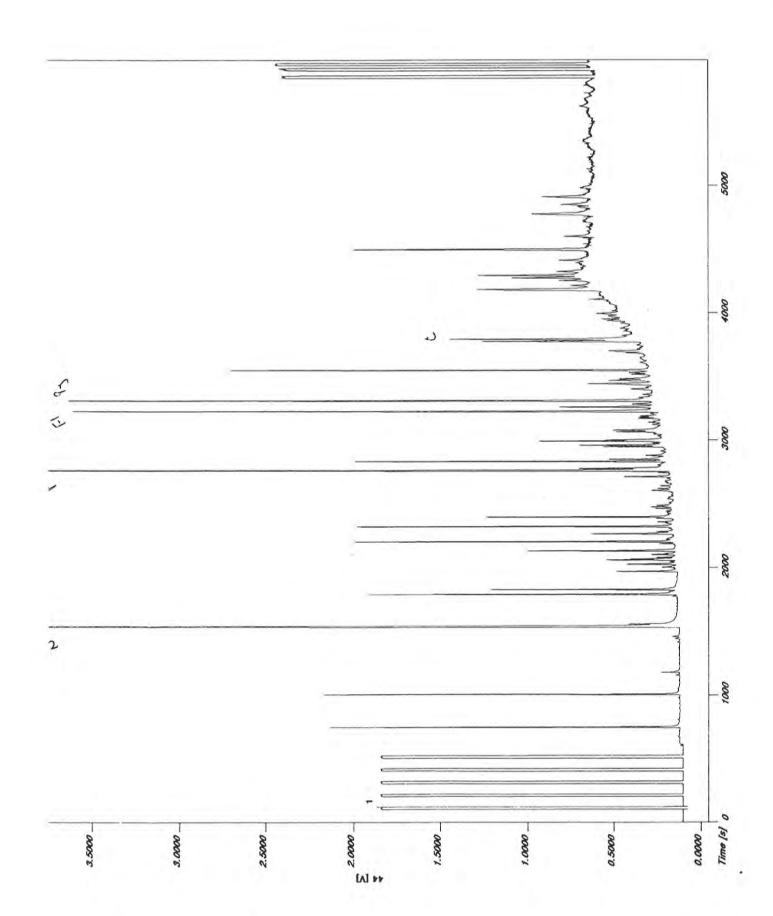


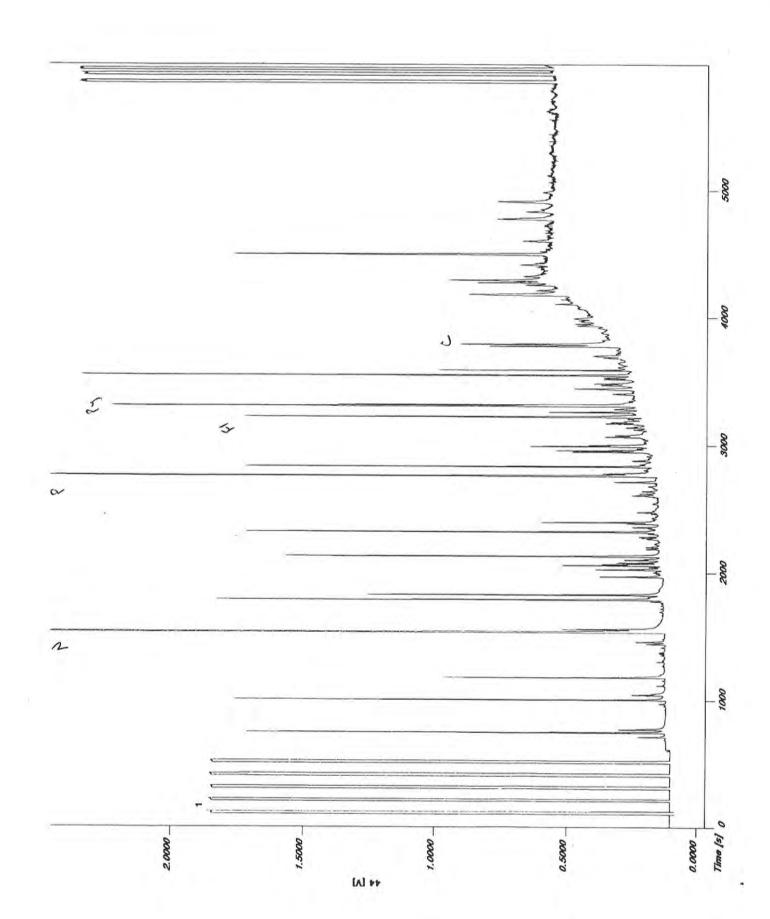


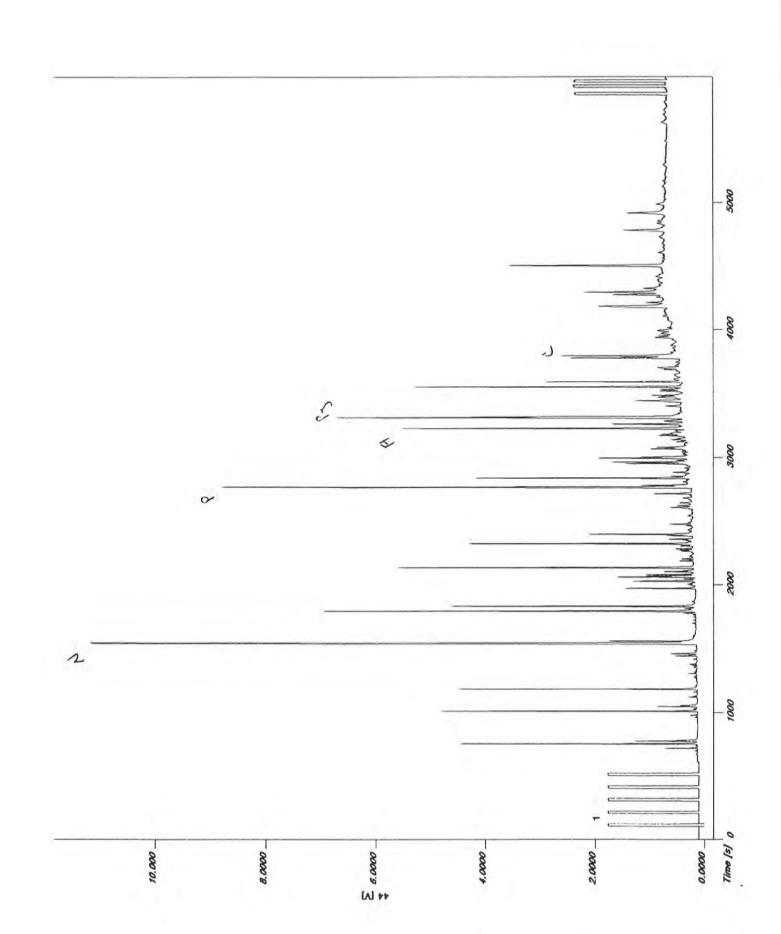
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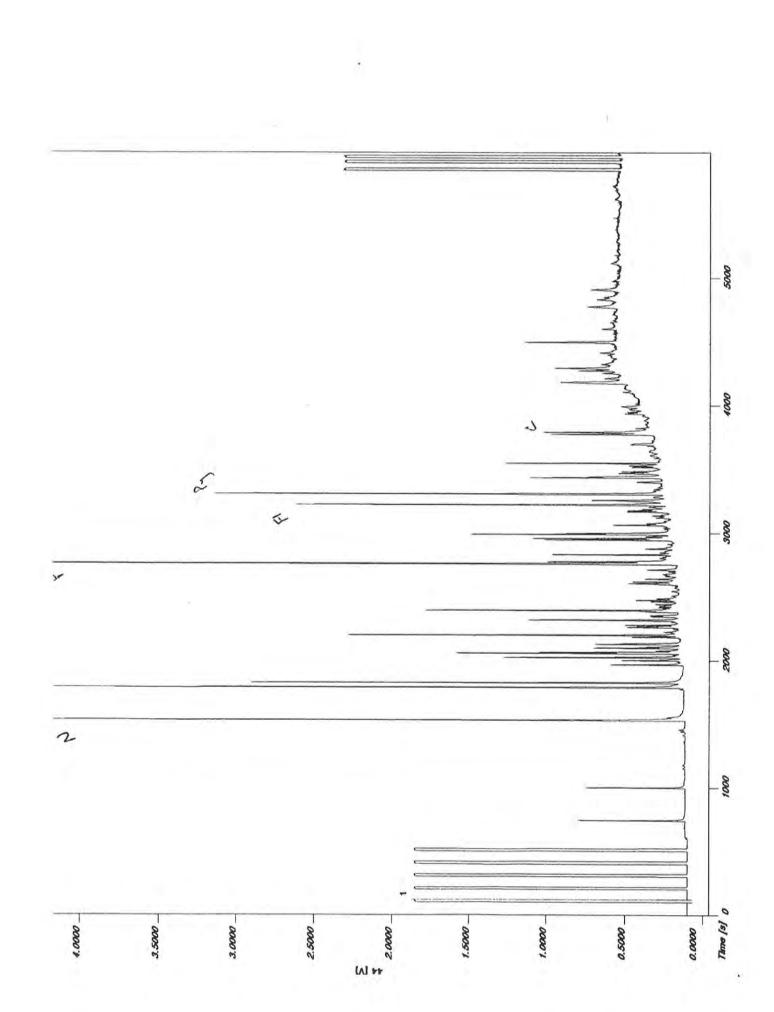


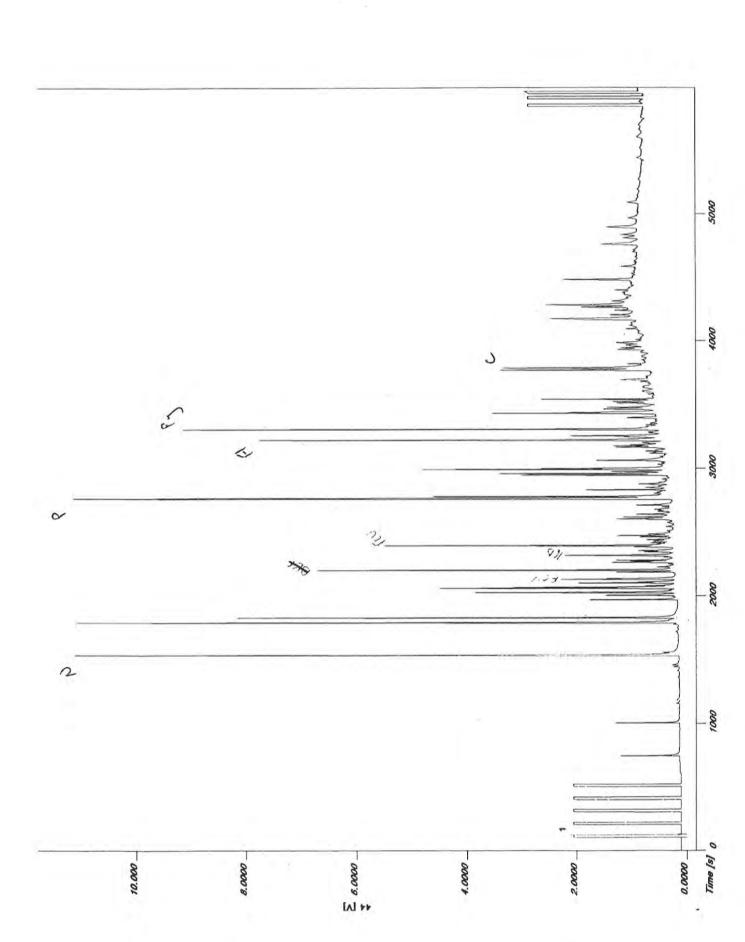




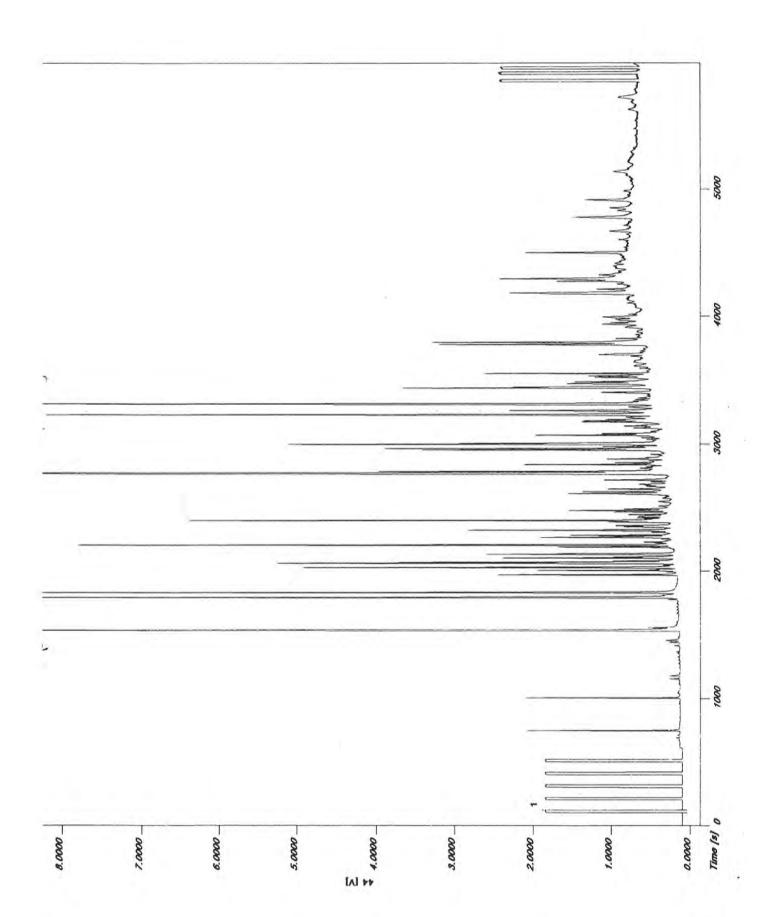


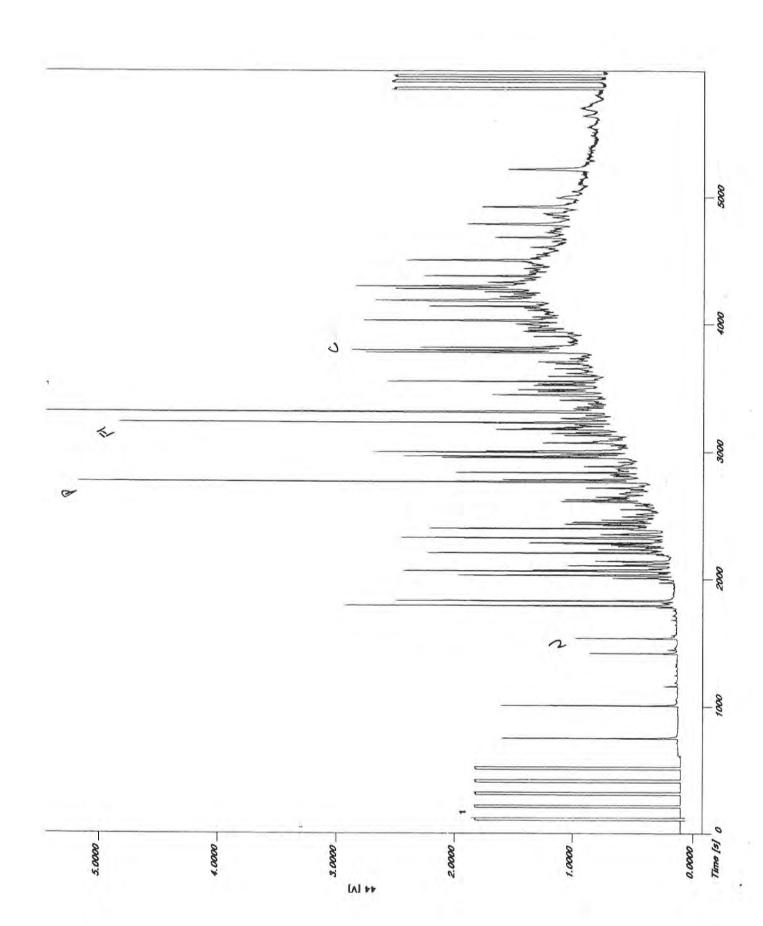
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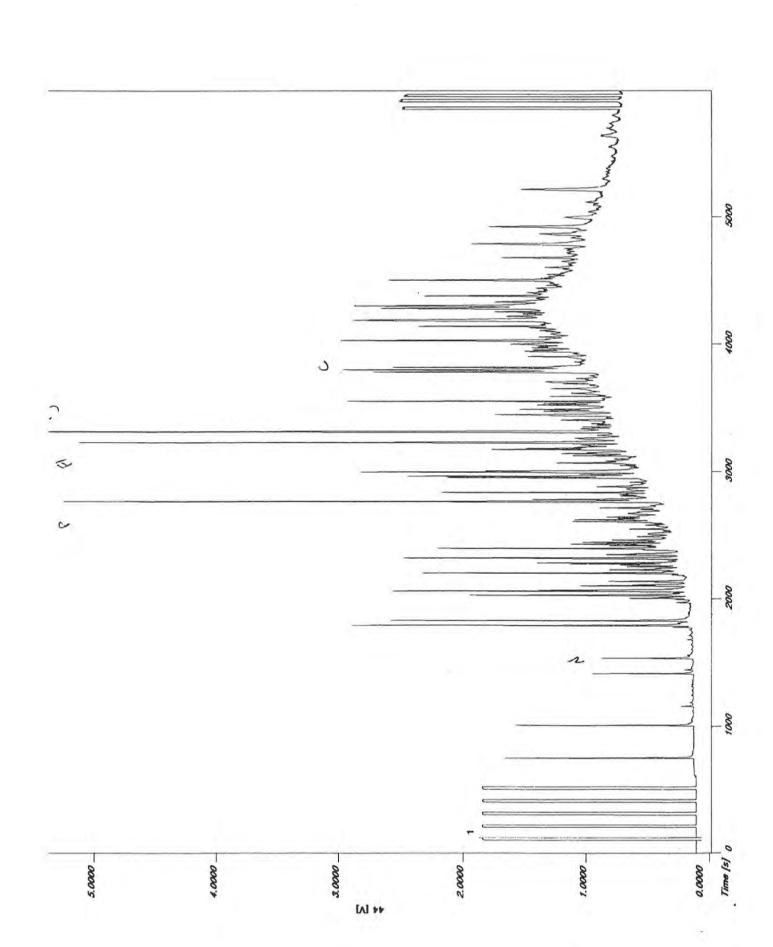


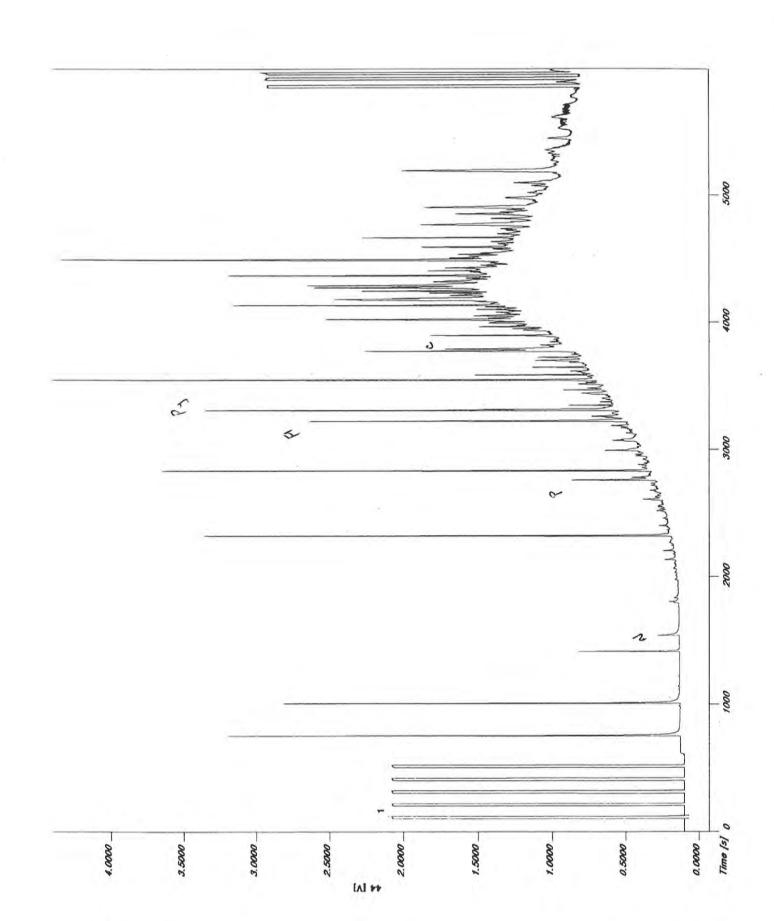
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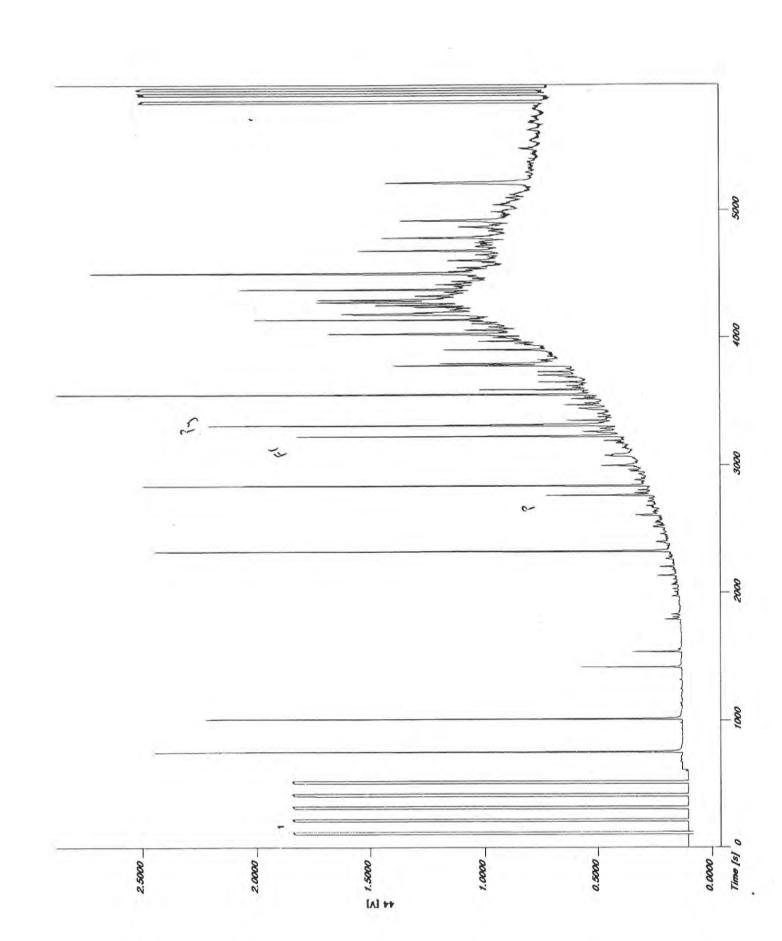


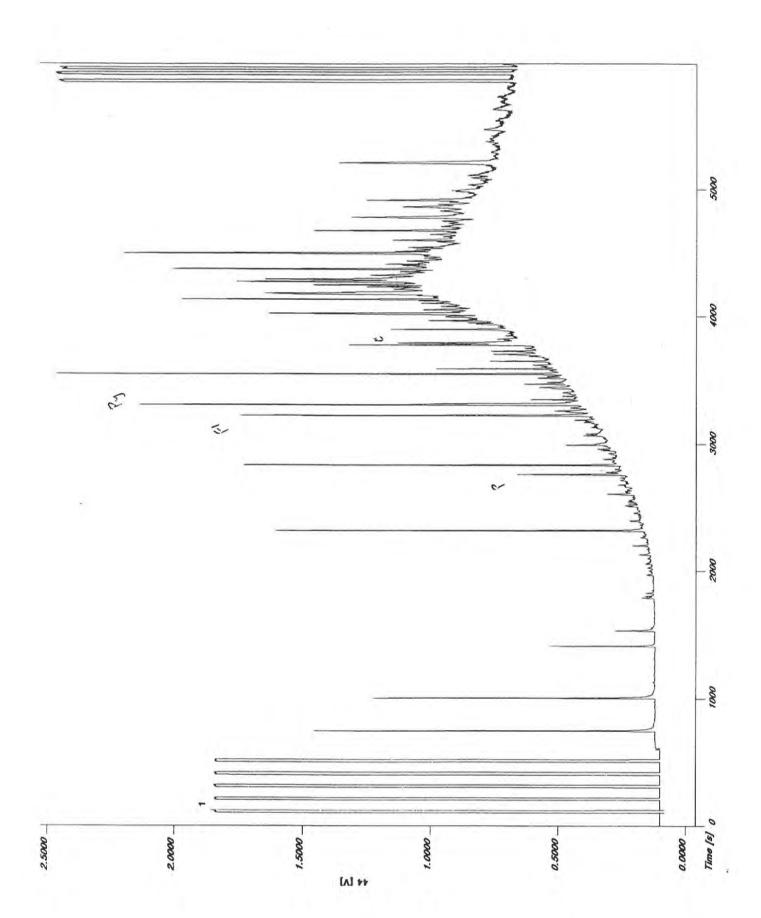
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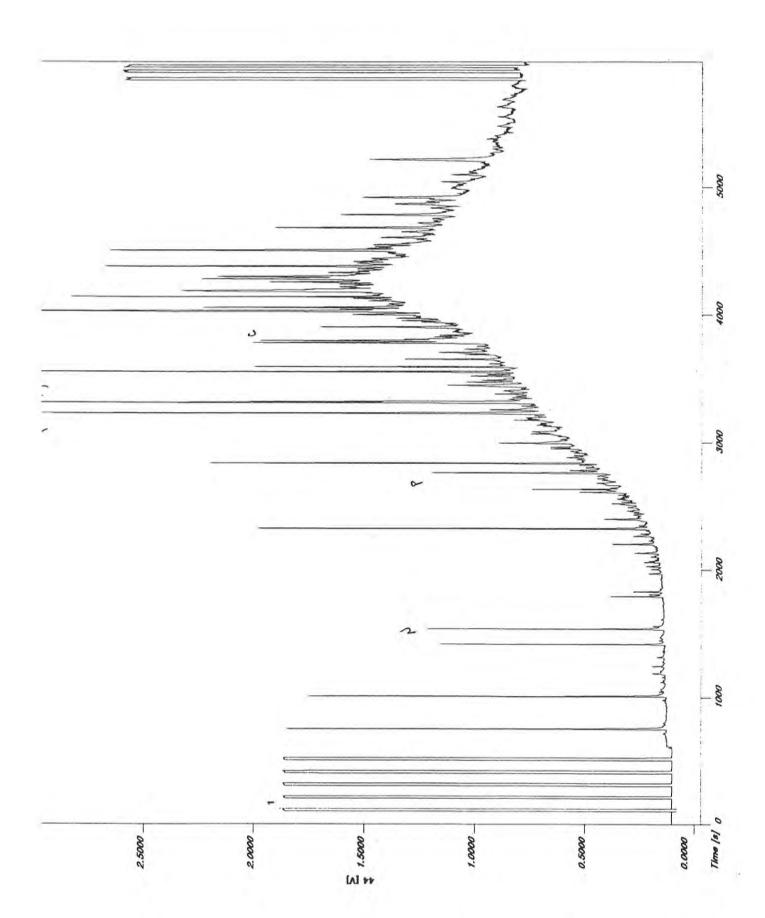


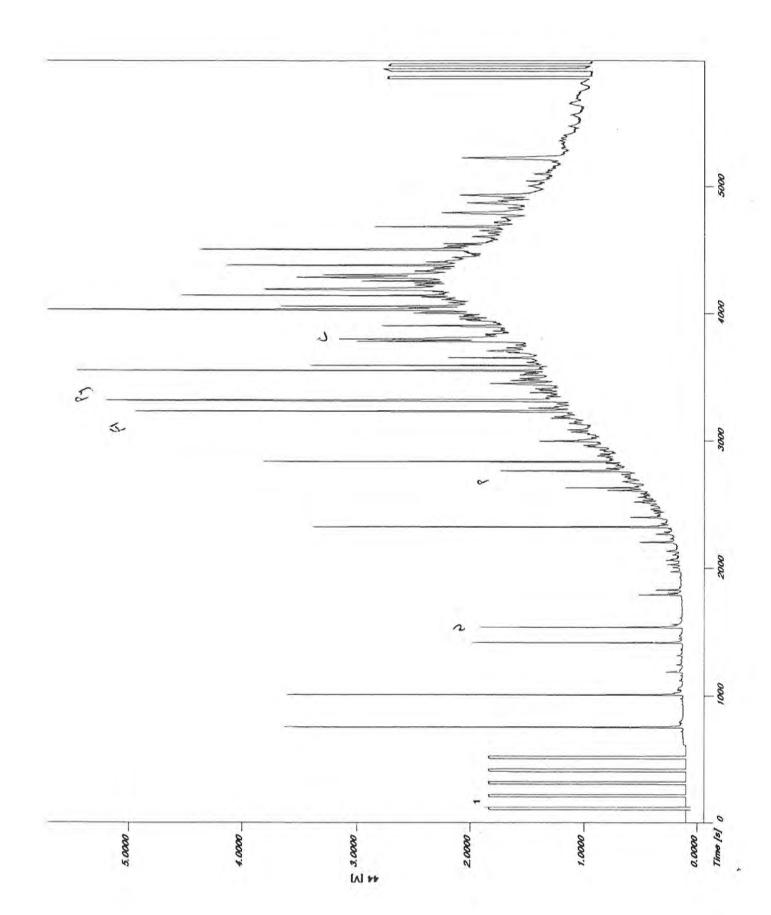


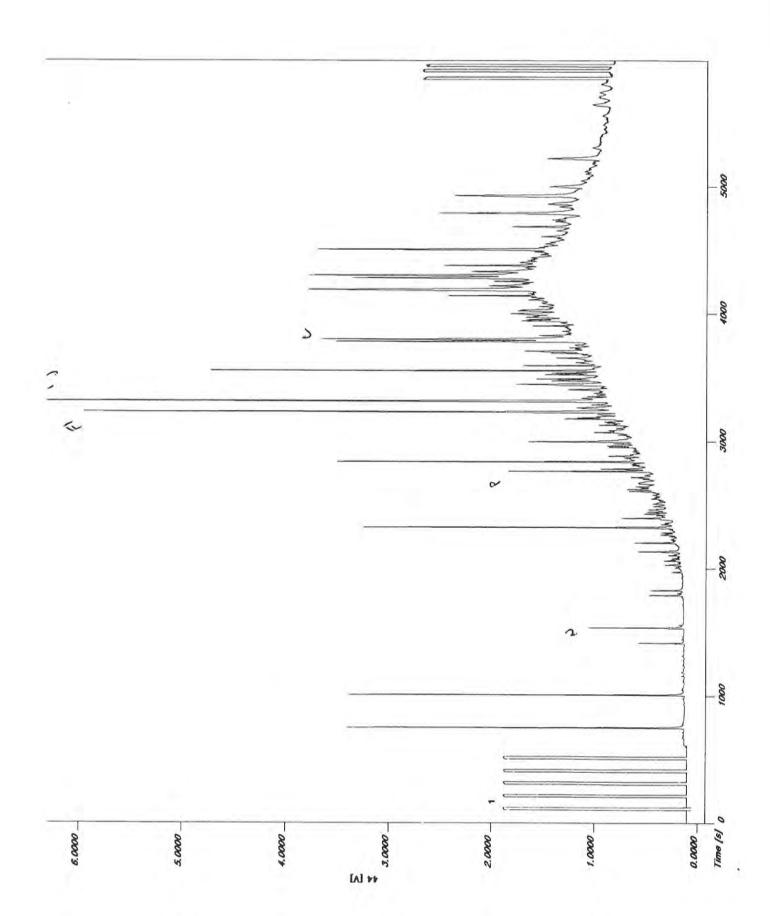
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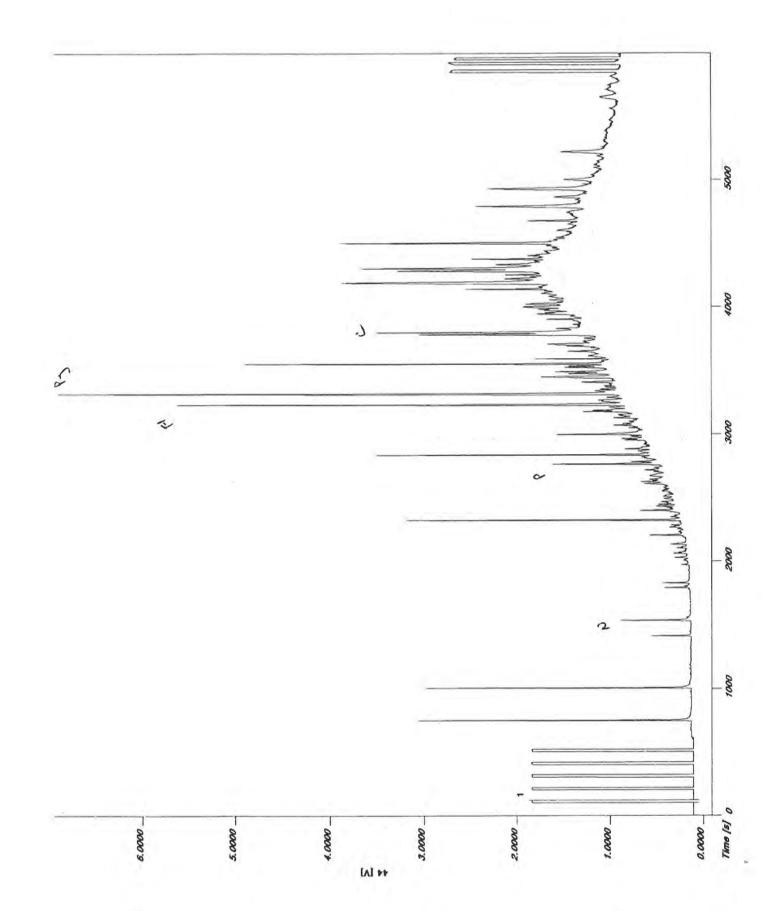




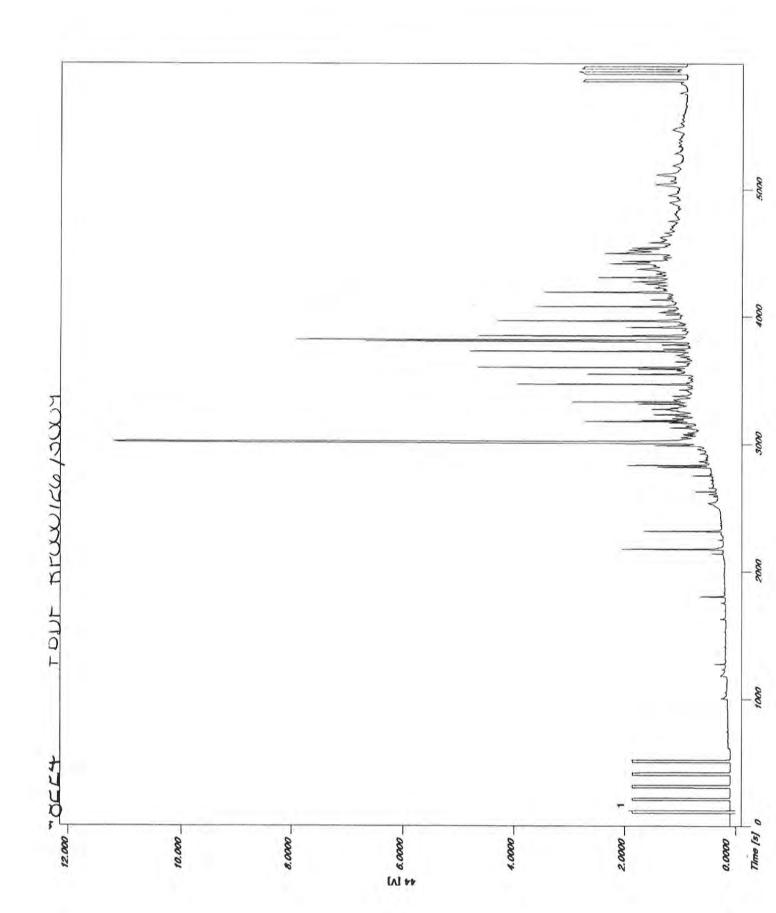




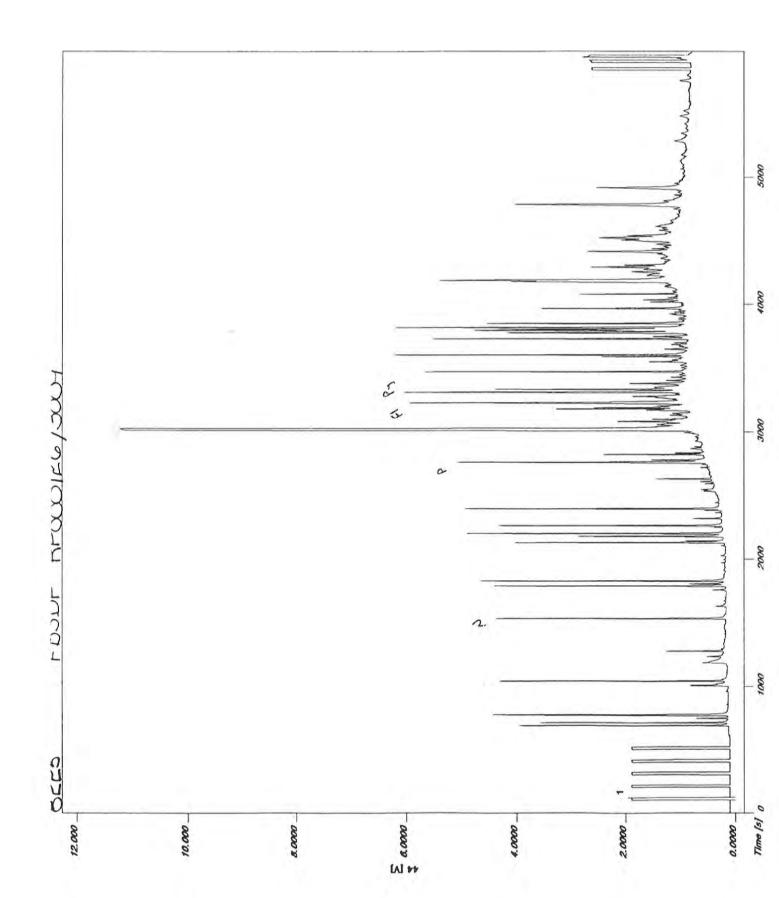




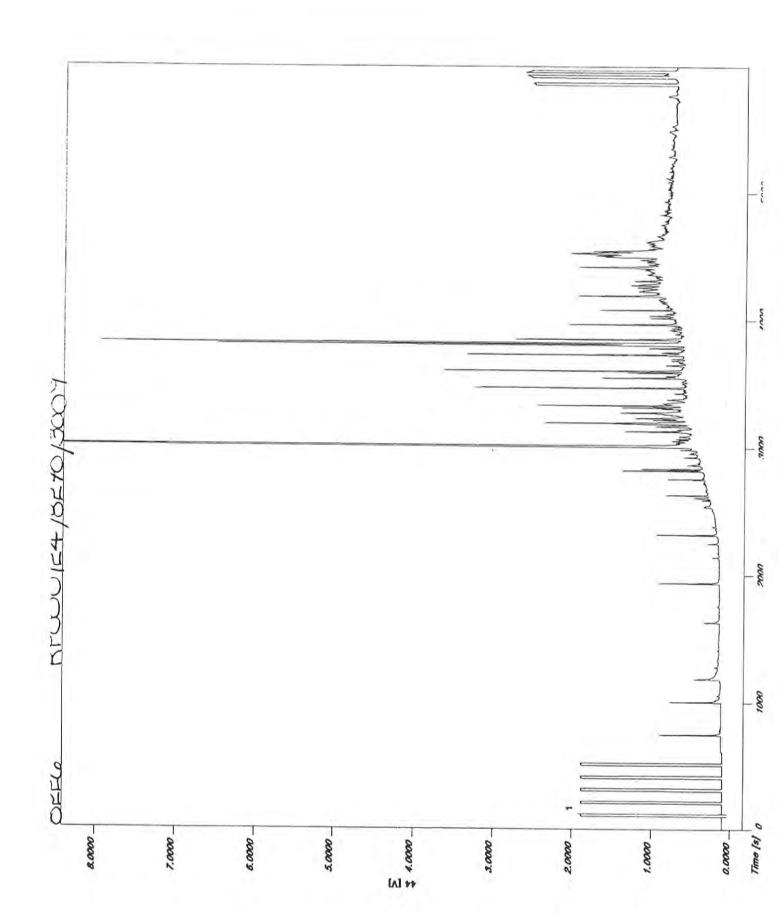
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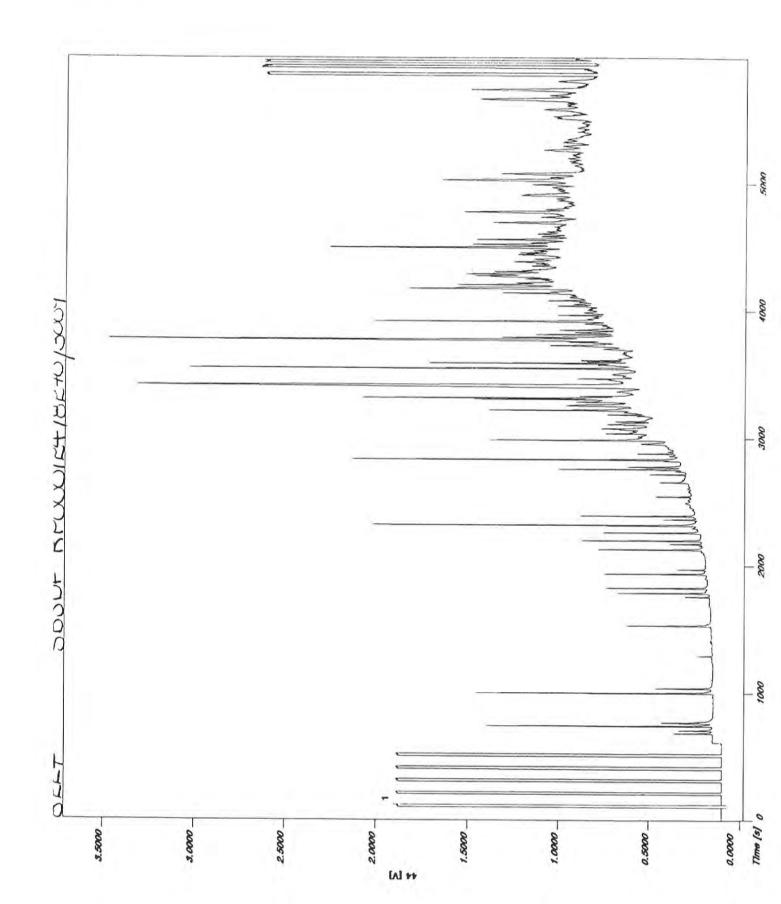
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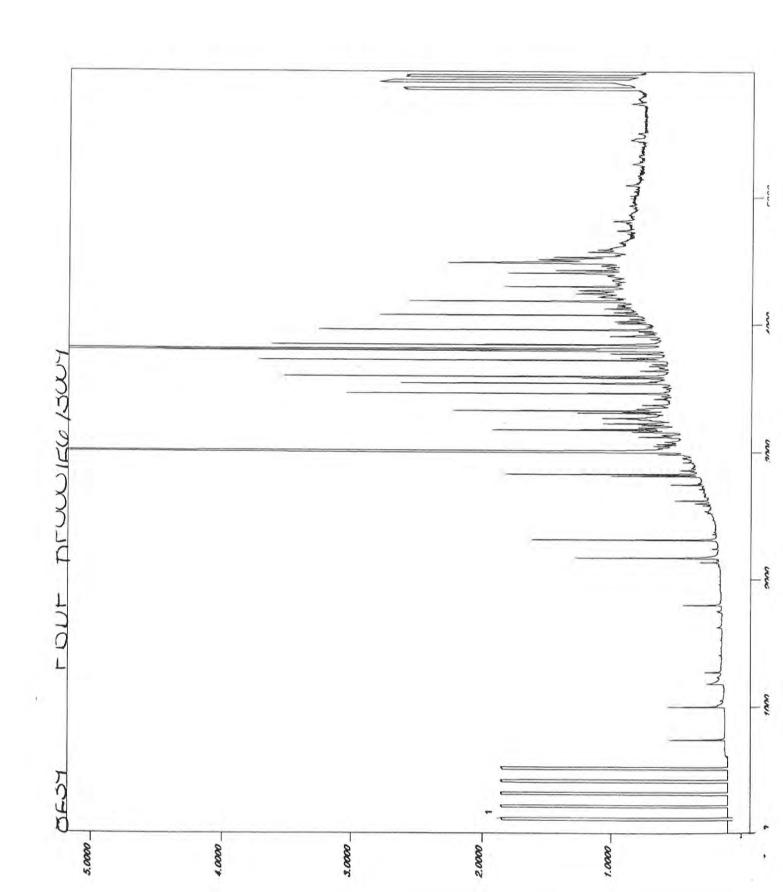


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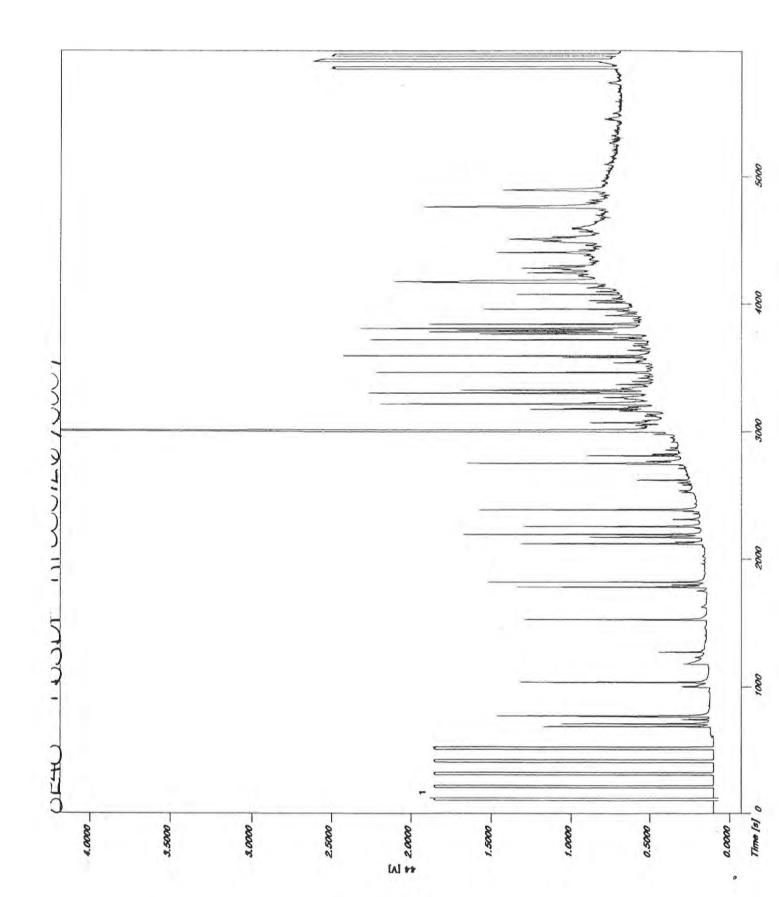


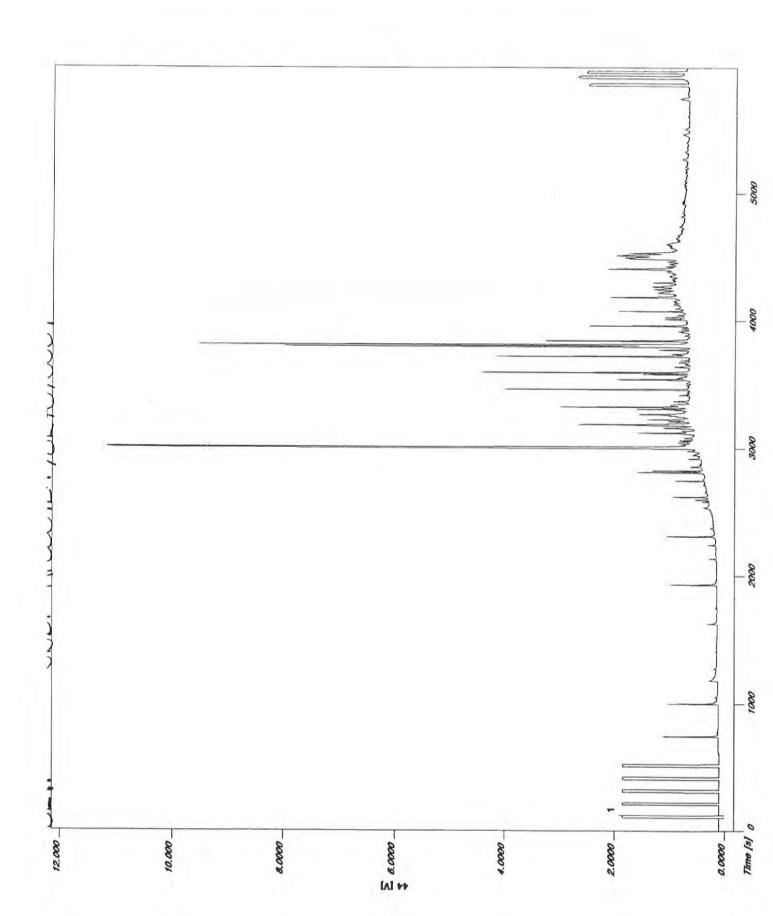
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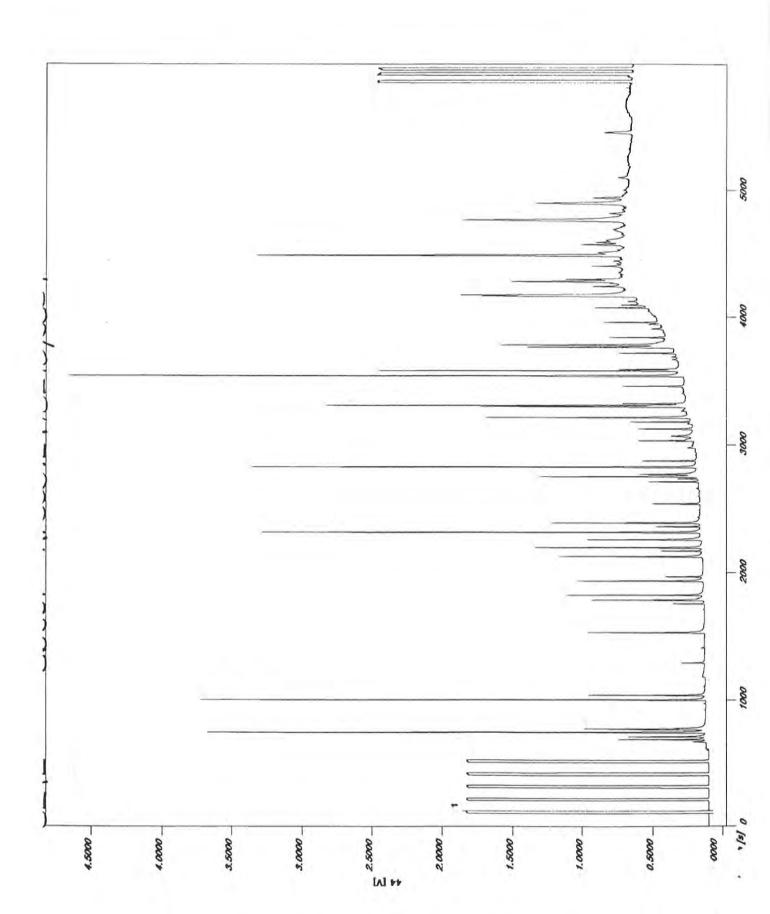


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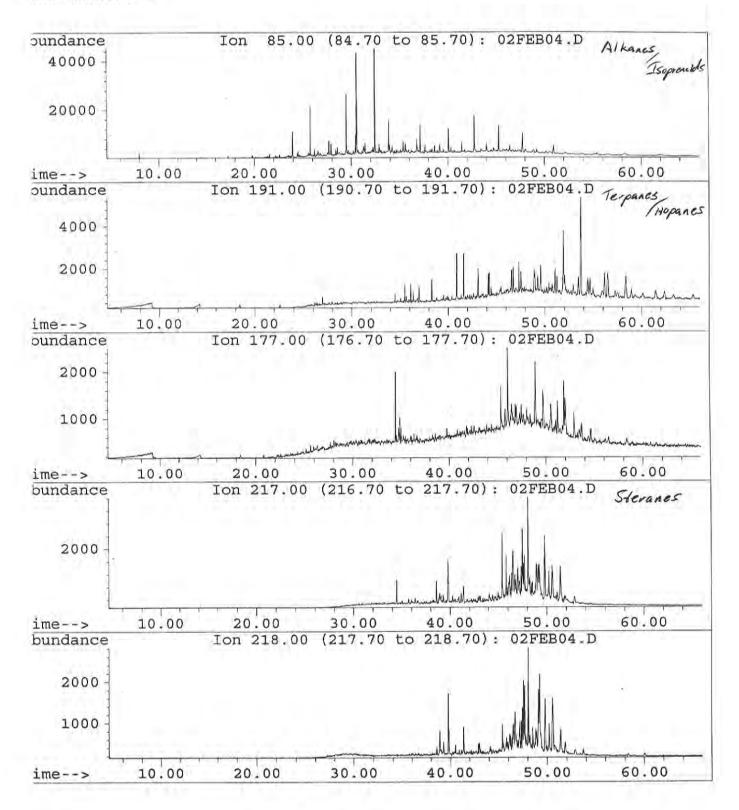


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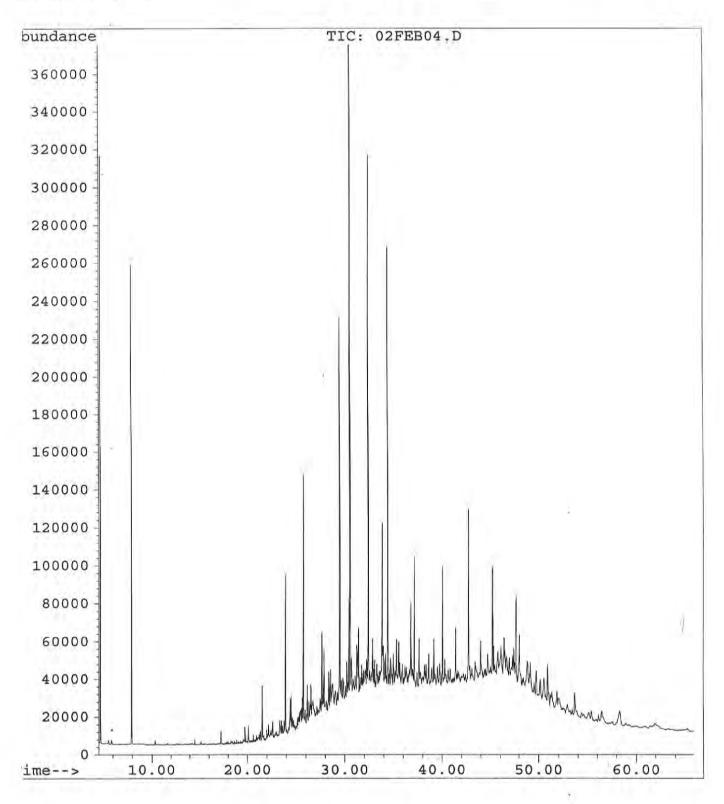


SUB-ATTACHMENT 2D-2.4 Extracted Ion Current Profiles (EICs)

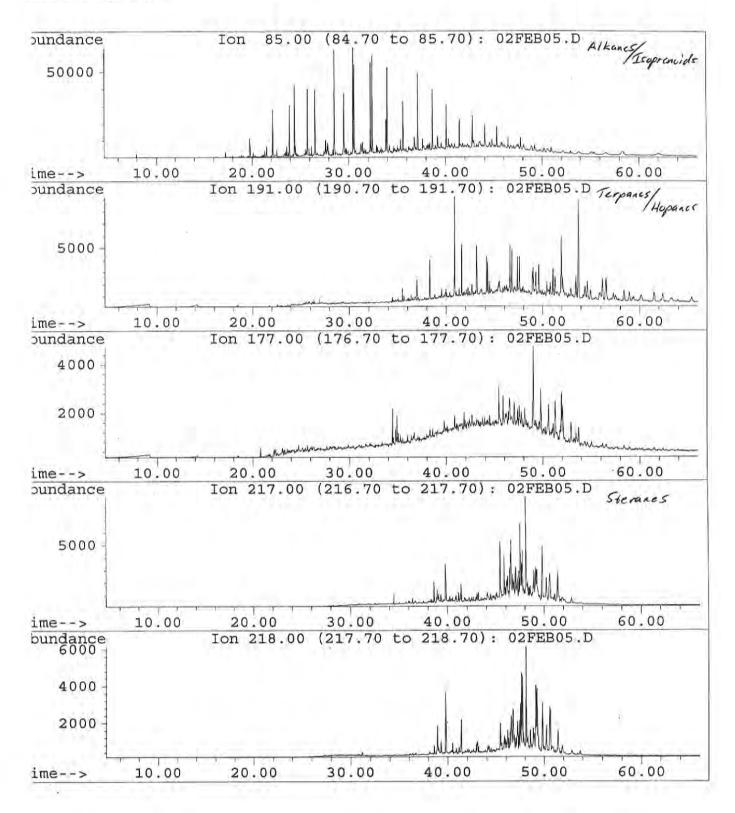
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isc Info :
ial Number: 5
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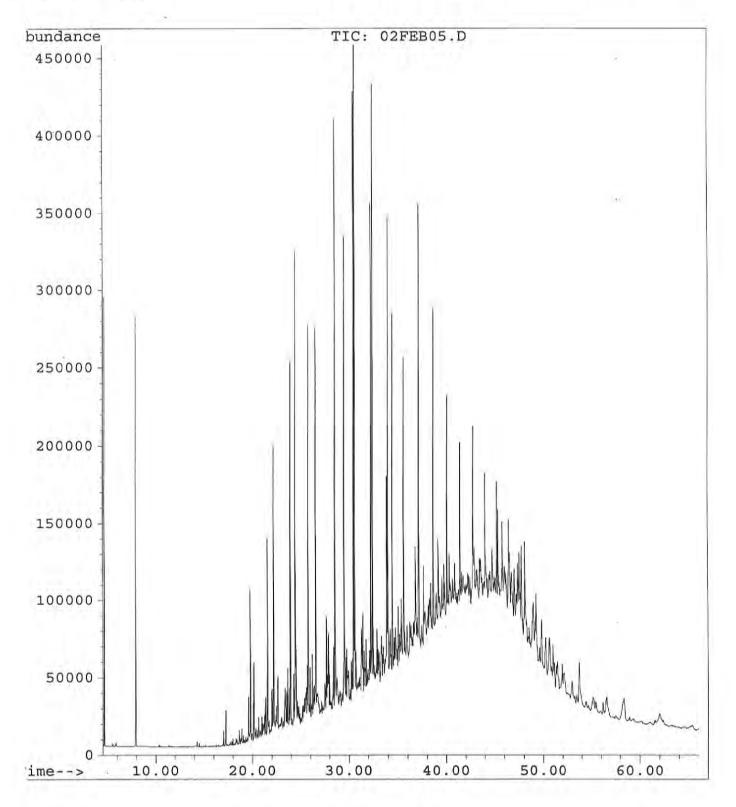
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isc Info :
ial Number: 5
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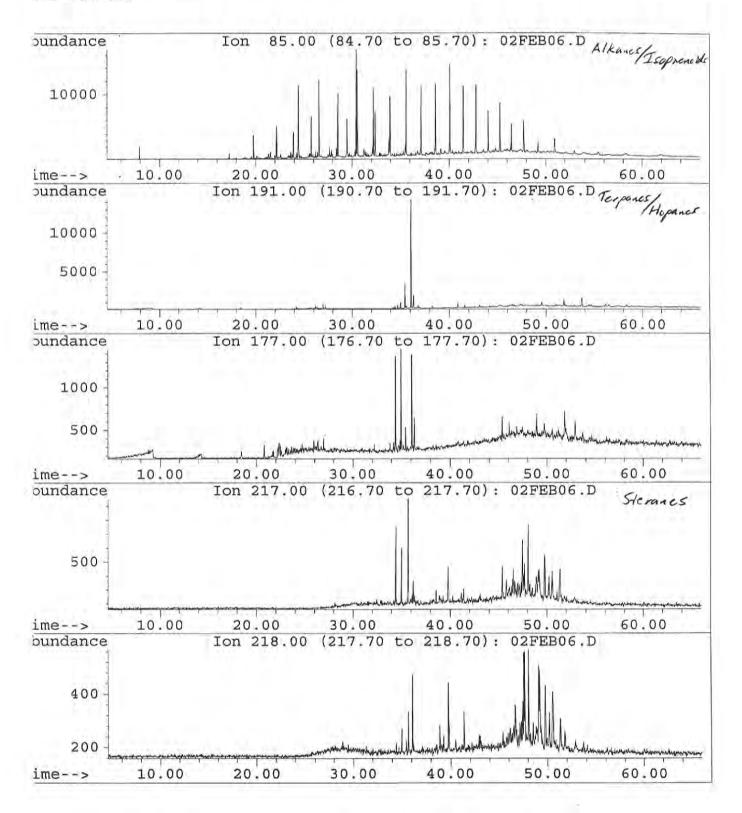
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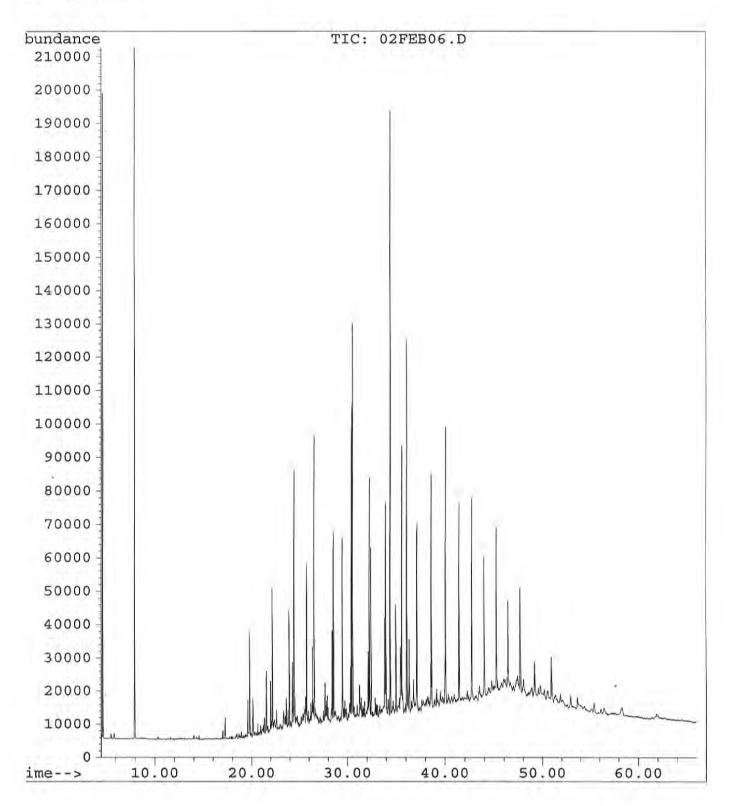
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isc Info :
ial Number: 6
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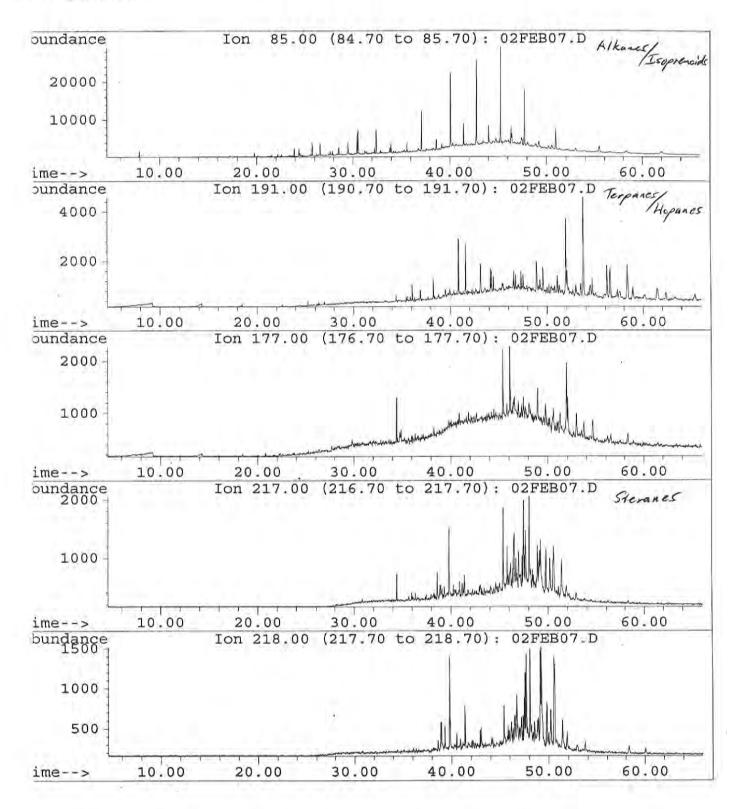
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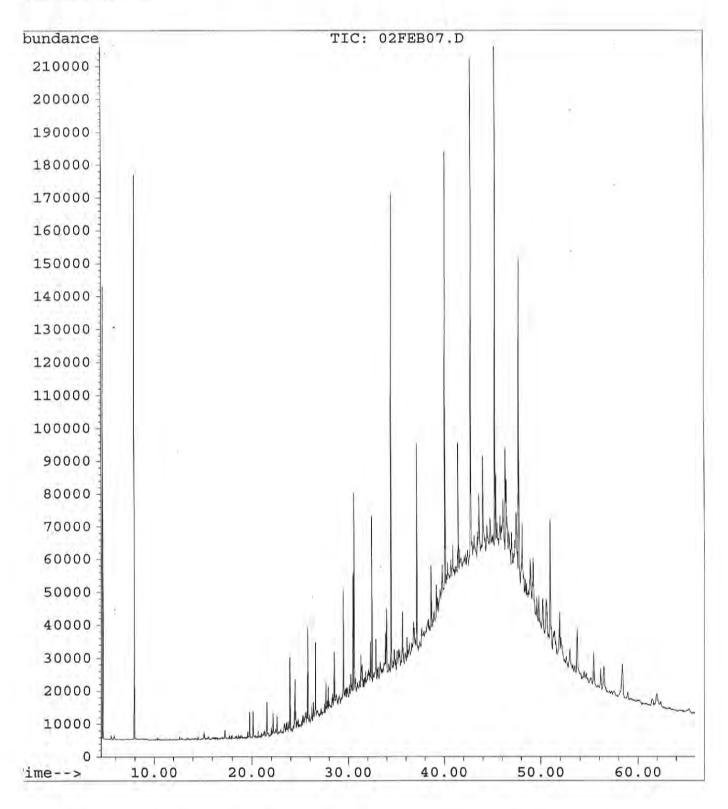
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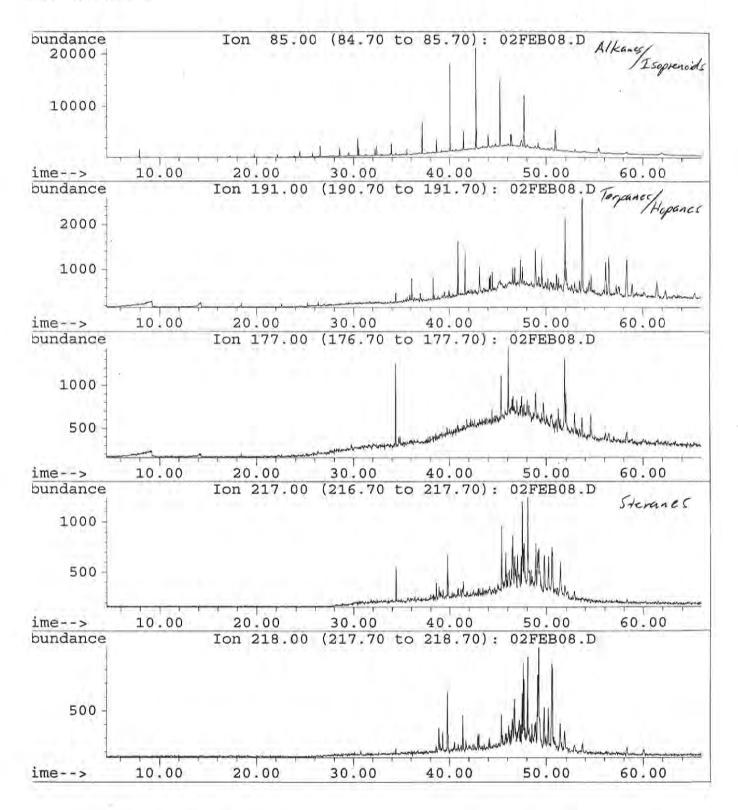
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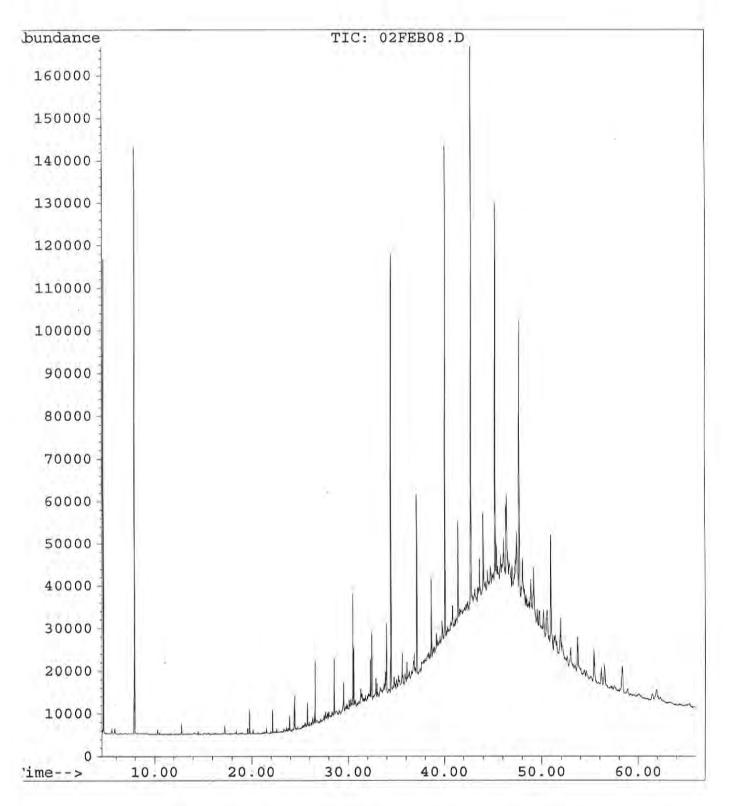
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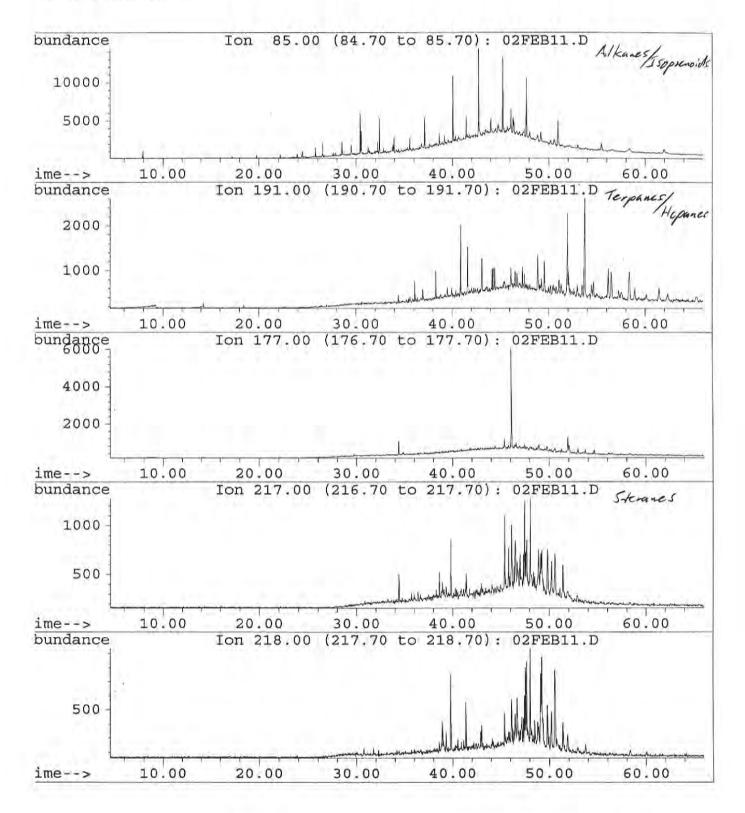
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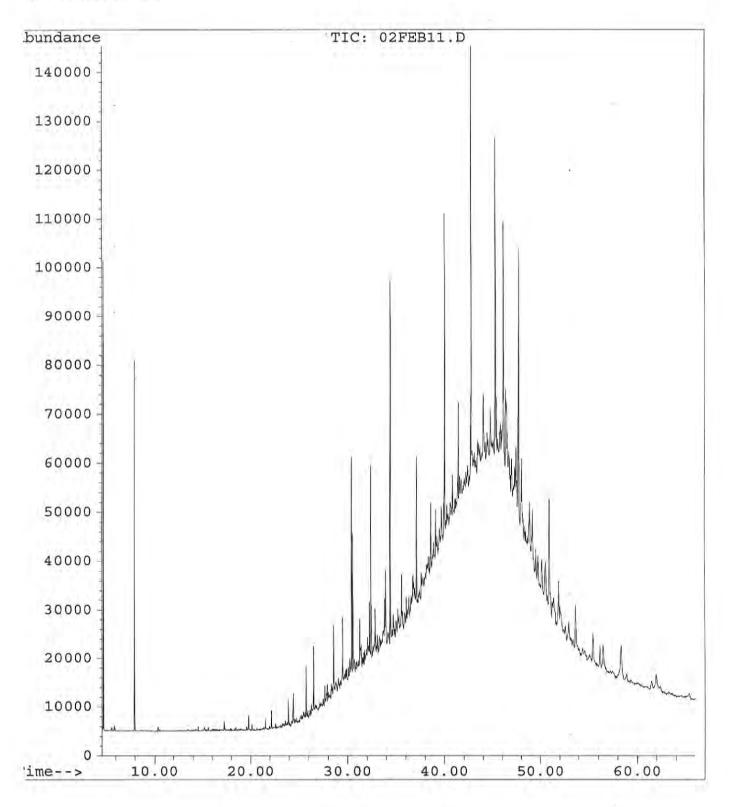
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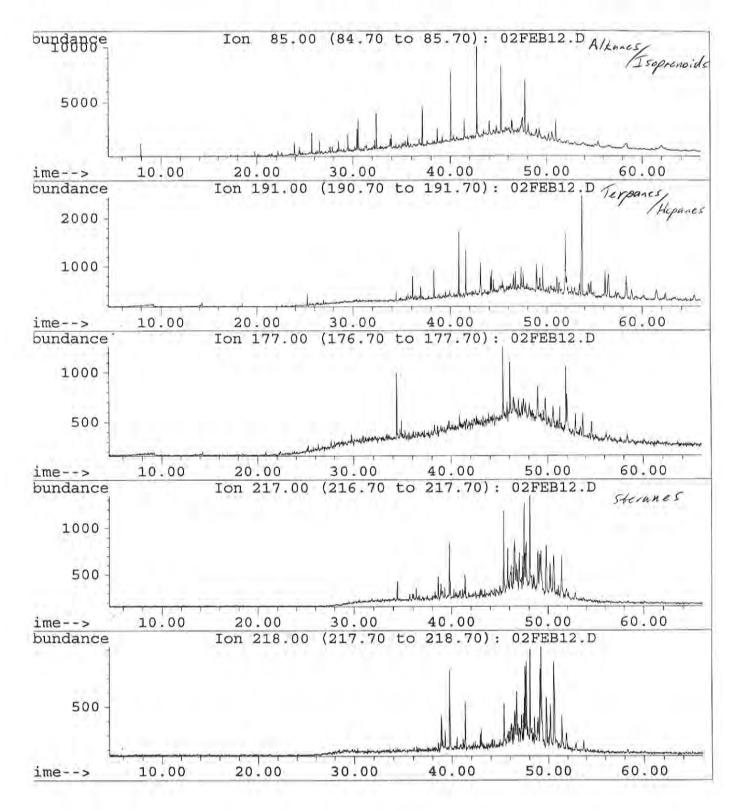
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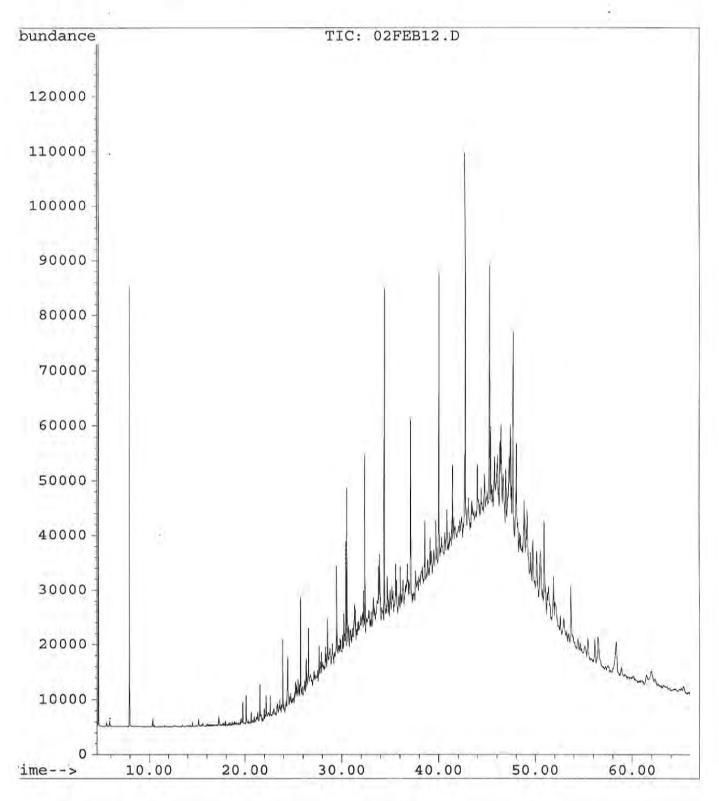
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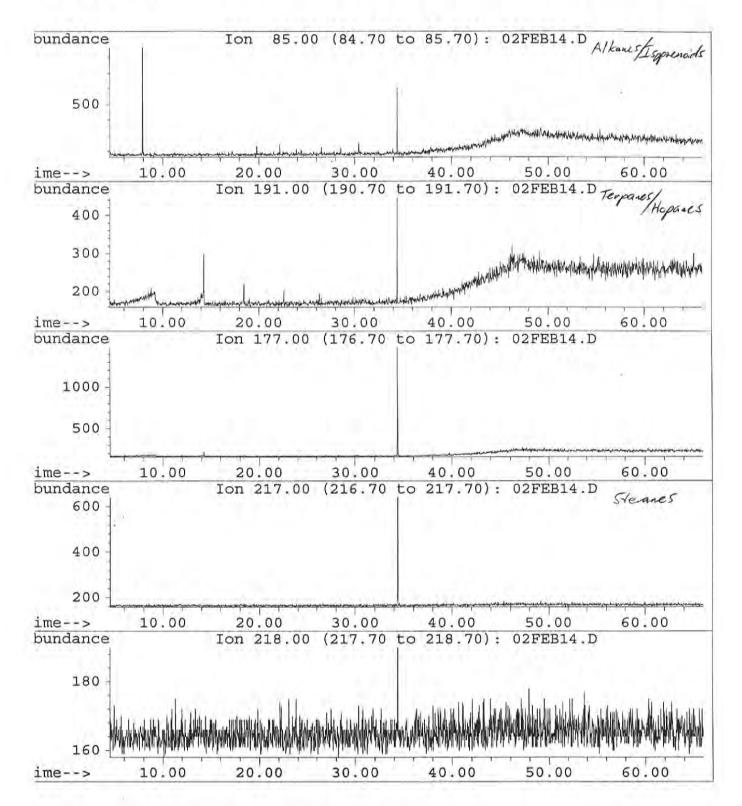
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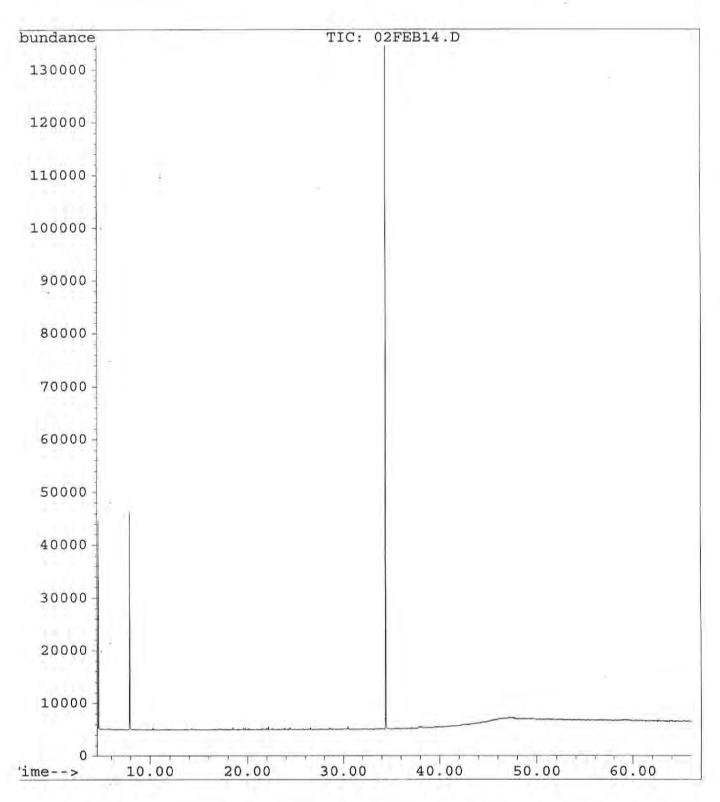
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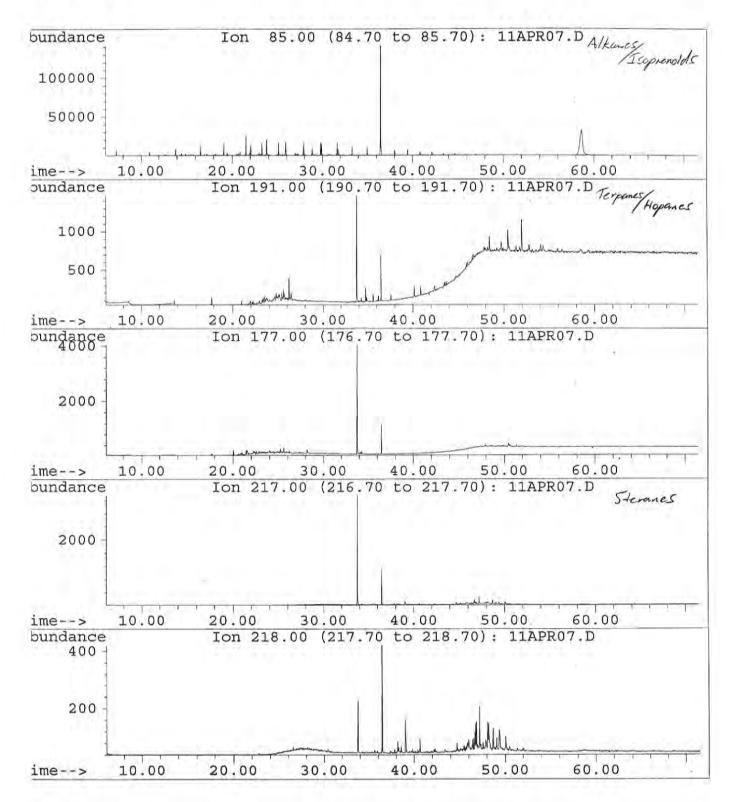
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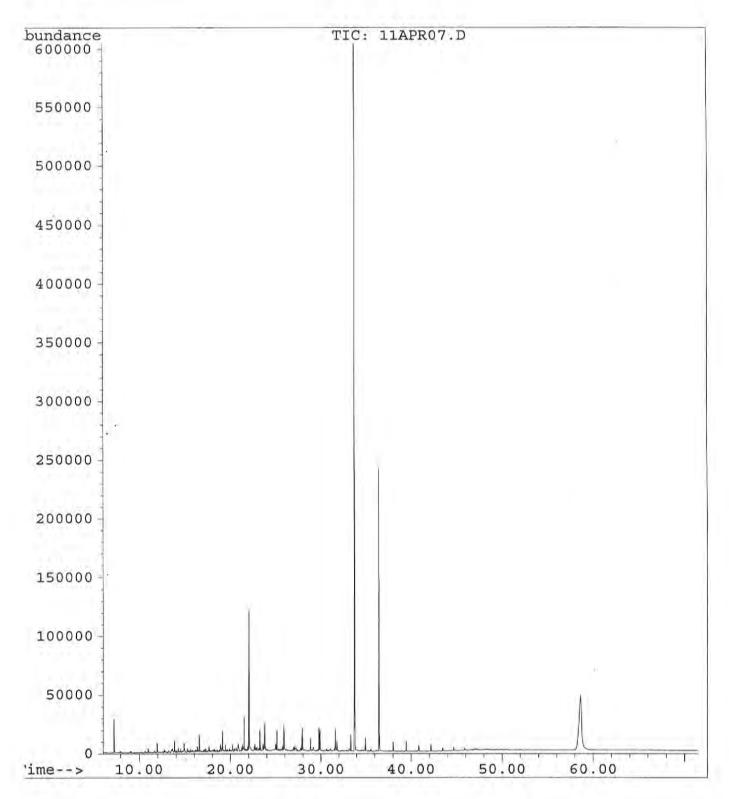
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isc Info :
ial Number: 7
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'isc Info :
'ial Number: 7
```



SUB-ATTACHMENT 2D-2.5 Hydrocarbon Fingerprint Report TA Environmental, Inc.

19 November 1999

Mr. Dan Baker ThermoRetec Consulting Corporation 1011 S.W. Klickitat Way Suite 207 Seattle, WA 98134

RE: Gas Works Park Hydrocarbon Fingerprinting Results

Dear Mr. Baker:

This package contains the analytical results from seventeen frozen sediment samples received on 15 and 21 October 1999 by META Environmental, Inc. (META) from ThermoRetec Consulting Corporation (ThermoRetec). The analytical data from three non-aqueous phase liquid (NAPL) samples received on 24 February 1998 and 4 June 1998 by META were added to the report as possible source tars collected nearby. Reference materials were selected from the META reference materials archive for comparative purposes.

Methods

The NAPL samples were diluted to 10 mg/mL in dichloromethane (DCM). The sediment samples were packaged in glass jars and wrapped in zip-locked bags. The samples were transferred to new pre-cleaned containers because the original glass containers were received broken. Prior to sample preparation, the samples were thawed and mixed. Two grams of sample were dried with sodium sulfate and extracted with 15 mL of DCM. The sample extracts were dried with sodium sulfate and concentrated to 1 mL. The sample extracts were spiked with internal standard and analyzed by gas chromatography with a flame ionization detector (GC/FID) for monocyclic aromatic hydrocarbons (MAHs), polycyclic aromatic hydrocarbons (PAHs), and GC/FID fingerprints.

Results

The concentrations of MAHs and PAHs and the GC/FID fingerprints are enclosed. No quality control problems were noted during the analysis of the samples or the preparation of the report.

Confidential and priviledged attorney-client work product

Please do not hesitate to contact me if you have any questions about these data or would like META to perform additional analyses.

Sincerely,

2 a.

David M. Mauro President

Confidential and priviledged attorney-client work product

META

ANALYTICAL RESULTS MAHs and PAHs Client: EPRI Project: GW Site

Lab ID Field ID:	RE980604-01 MW-5 Product		RE980604-0		EL980224-01		
MAHs:	MW-5 Produ	CI	DW-4 Produ	ct	MLS-4-1-29	8	
Benzene	563		2,440		1 7 7 7		
Toluene	2,040		6,490		1,760		
Ethylbenzene	1,530	1	3,130		5,540		
m/p-Xylene	3,520		5,880		3,090		
Styrene	177				5,020		
o-Xylene	1,620		2,630 2,520		1,600		
1,2,4-Trimethylbenzene	3,320		5,460		2,140		
Total MAHs:	9,450		23,100		4,780		
PAHs:							
Naphthalene	04.400		444 444				
2-Methylnaphthalene	84,400	D	131,000	D	117,000	E	
1-Methylnaphthalene	38,900	D	49,400	D	47,100	E	
Acenaphthylene	23,700	D	27,400	D	25,900		
Acenaphthene	2,330		7,310		6,910		
Dibenzofuran	10,600		10,900		9,930		
Fluorene	3,690		6,000		7,480		
Phenanthrene	8,680		10,900	100	11,300		
Anthracene	25,700	D	31,900	D	27,500	E	
Fluoranthene	6,460		7,840		7,490		
New Constant State State State	7,560		10,400		9,710		
^D yrene	9,840		11,600		10,100		
Benz(a)anthracene	3,090		4,320		4,250		
Chrysene	3,290		3,890		3,820		
Benzo(b)fluoranthene	1,260		1,690		1,720		
Benzo(k)fluoranthene	1,720		2,350		2,270		
Benzo(a)pyrene	2,690		3,480		3,330		
ndeno(1,2,3-cd)pyrene	1,180		1,610		1,490		
Dibenz(a,h)anthracene	293		378		384		
Benzo(g,h,i)perylene	1,230		1,570		1,490		
otal PAHs:	233,000		318,000		292,000		
Quantitation Limit:	25.8	1	29.1		33.3		
Detection Limit:	10.3		11.6	3.4	13.3		
Concentration Units:	mg/kg		mg/kg		mg/kg		

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene. Total PAHs does not include Dibenzofuran.

Lab ID	RP991015-01	RP991015-03	RP991015-04		
Field ID:	CR-01B	CR-8A	CR-10A		
MAHs:			21.5		
Benzene	0.23 U	6.18	700		
Toluene	0.11 J	2.15	630		
Ethylbenzene	1.75 B	0.43 JB	943 B		
m/p-Xylene	1.73 B	2.45 B	990 B		
Styrene	0.12 J	0.72 J	155		
o-Xylene	0.79	0.91 U	442		
1,2,4-Trimethylbenzene	2.22	0.41 J	937		
Total MAHs:	4.49	11.9	3,860		
PAHs:					
Naphthalene	184	36.4	54,200 D		
2-Methylnaphthalene	79.1	7.37	7,500		
1-Methylnaphthalene	49.9 B	5.72 B	4,210 E		
Acenaphthylene	5.08	9.65	2,260		
Acenaphthene	51.5	74.6	5,600		
Dibenzofuran	13.8	5.77	1,490		
Fluorene	30.2	42.6	3,000		
Phenanthrene	98.2	658	13,400		
Anthracene	21.2	163	3,660		
Fluoranthene	43.8	651	7,400		
Pyrene	40.3	749	7,840		
Benz(a)anthracene	16.9	305	3,600		
Chrysene	15.1	240	3,550		
Benzo(b)fluoranthene	6.75	165	1,970		
Benzo(k)fluoranthene	9.23	149	1,920		
Benzo(a)pyrene	13.8	289	3,420		
Indeno(1,2,3-cd)pyrene	6.04	196	1,870		
Dibenz(a,h)anthracene	1.30	7.26	260		
Benzo(g,h,i)perylene	6.47	236	2,040		
Total PAHs:	679	3,990	128,000		
Quantitation Limit:	0.23	0.91	8.73		
Detection Limit:	0.09	0.37	3.49		
Fluorobenzene (SS1)	72%	65%	74%		
2-Fluorobiphenyl (SS2)	92%	91%	l		
Concentration Units:	mg/kg	mg/kg	mg/kg		

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

META

Total PAHs does not include Dibenzofuran.

Lab ID	RP991015-05		RP991015-06		RP991015-07	
Field ID:	CR-13C (108)		CR-14A		CR-18A	
MAHs:				(C) 1		
Benzene	11.8		3.63		1.42	
Toluene	5.58		1.59	1.1	2.91	
Ethylbenzene	29.0	B	9.58	В	10.9	В
m/p-Xylene	41.0	в	6.45	B	11.9	В
Styrene	1.54	U	2.68		1.38	
o-Xylene	14.5		1.44		7.70	
1,2,4-Trimethylbenzene	12.6		26.4		13.7	
Total MAHs:	102		25.4		36.3	_
PAHs:				-		
Naphthalene	351		331		636	D
2-Methylnaphthalene	71.2		294	110	139	-
1-Methylnaphthalene	46.3	в	173	в	85.4	В
Acenaphthylene	1.54	υ	10.6	-	3.59	
Acenaphthene	3.87	100	93.8		131	
Dibenzofuran	1.54	U	6.00		19.3	
Fluorene	1.70		55.3		52.6	
Phenanthrene	1.54	U	327		146	
Anthracene	1.54	U	85.9		34.6	
Fluoranthene	1.54	U	304		66.9	
Pyrene	1.54	U	374		88.8	
Benz(a)anthracene		1	157		23.9	
Chrysene	1.54	U	124		24.5	
Benzo(b)fluoranthene	1.54	U	78.8	- 10	10.2	
Benzo(k)fluoranthene	1.54	U	79.7		13.2	
Benzo(a)pyrene	1.54	U	149		20.7	
Indeno(1,2,3-cd)pyrene	1.54	U	88.8		10.2	
Dibenz(a,h)anthracene	1.54	U	9.72		2.16	
Benzo(g,h,i)perylene	1.54	U	111		12.4	
Total PAHs:	474		2,850		1,500	
Quantitation Limit:	1.54		0.88		0.22	1
Detection Limit:	0.62	_	0.35		0.09	
Fluorobenzene (SS1)	65%	1.1	61%	11	60%	1
2-Fluorobiphenyl (SS2)	84%		83%		104%	-
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META 🖗

Lab ID	RP991015-08	RP991015-09
Field ID:	CR-19A	CR-21A
MAHs:		
Benzene	6.50	1.37
Toluene	14.2	2.52
Ethylbenzene	37.9 B	2.00 B
m/p-Xylene	31.2 B	4.91 B
Styrene	0.26 U	1.27
o-Xylene	15.6	0.70
1,2,4-Trimethylbenzene	35.8	4.03
Total MAHs:	105	12.8
PAHs:		
Naphthalene	1,160	12.8
2-Methylnaphthalene	616	8.81
1-Methylnaphthalene	334 B	23.8 B
Acenaphthylene	84.1	3.61
Acenaphthene	222	22.7
Dibenzofuran	44.6	4.10
Fluorene	145	23.9
Phenanthrene	418	126
Anthracene	115	38.6
Fluoranthene	186	98.8
Pyrene	225	119
Benz(a)anthracene	105	51.4
Chrysene	91.4	42.4
Benzo(b)fluoranthene	47.8	22.4
Benzo(k)fluoranthene	51.9	26.2
Benzo(a)pyrene	88.3	46.5
Indeno(1,2,3-cd)pyrene	48.3	24.9
Dibenz(a,h)anthracene	3.30	3.30
Benzo(g,h,i)perylene	43.0	30.7
Total PAHs:	3,990	725
Quantitation Limit:	0.26	0.53
Detection Limit:	0.11	0.21
Fluorobenzene (SS1)	68%	63%
2-Fluorobiphenyl (SS2)	83%	107%
Concentration Units:	mg/kg	mg/kg

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META

Lab ID	RP991019-SB	RP991019-SBS
Field ID:	Soil Blank	Soil Blank Spike
MAHs:	2017	61.6
Benzene	0.24 U	72%
Toluene	0.24 U	89%
Ethylbenzene	0.31	90%
m/p-Xylene	0.28	91%
Styrene	0.24 U	90%
o-Xylene	0.24 U	92%
1,2,4-Trimethylbenzene	0.24 U	91%
Total MAHs:	0.59	
PAHs:		
Naphthalene	0.24 U	90%
2-Methylnaphthalene	0.24 U	90%
1-Methylnaphthalene	0.15 J	89%
Acenaphthylene	0.24 U	88%
Acenaphthene	0.24 U	90%
Dibenzofuran	0.24 U	90%
Fluorene	0.24 U	89%
Phenanthrene	0.24 U	89%
Anthracene	0.24 U	90%
Fluoranthene	0.24 U	94%
Pyrene	0.24 U	89%
Benz(a)anthracene	0.24 U	90%
Chrysene	0.24 U	91%
Benzo(b)fluoranthene	0.24 U	90%
Benzo(k)fluoranthene	0.24 U	91%
Benzo(a)pyrene	0.24 U	90%
Indeno(1,2,3-cd)pyrene	0.24 U	91%
Dibenz(a,h)anthracene	0.24 U	96%
Benzo(g,h,i)perylene	0.24 U	97%
Total PAHs:	0.15	
Quantitation Limit:	0.24	
Detection Limit:	0.10	1
Fluorobenzene (SS1)	72%	71%
2-Fluorobiphenyl (SS2)	85%	91%
Concentration Units:	mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META D

Lab ID	RP991015-01	RP991015-01D	Laboratory Duplicate
Field ID:	CR-01B	CR-018	Relative Percent Difference
MAHs:			
Benzene	0.23 U	0.17 U	1.000
Toluene	0.11 J	0.14 J	20%
Ethylbenzene	1.75 B	2.77	45%
m/p-Xylene	1.73 B	2.57	39%
Styrene	0.12 J	0.15 J	23%
o-Xylene	0.79	1.36	54%
1,2,4-Trimethylbenzene	2.22	3.39	41%
Total MAHs:	4.49	6.99	44%
PAHs:			
Naphthalene	184	243	28%
2-Methylnaphthalene	79.1	98.1	21%
1-Methylnaphthalene	49.9 B	61.5	21%
Acenaphthylene	5.08	6.36	22%
Acenaphthene	51.5	62.1	19%
Dibenzofuran	13.8	16.6	18%
Fluorene	30.2	36.2	18%
Phenanthrene	98.2	117	18%
Anthracene	21.2	23.7	11%
Fluoranthene	43.8	51.9	17%
Pyrene	40.3	51.6	25%
Benz(a)anthracene	16.9	19.8	16%
Chrysene	15.1	17.7	16%
Benzo(b)fluoranthene	6.75	8.18	19%
Benzo(k)fluoranthene	9.23	11.0	17%
Benzo(a)pyrene	13.8	15.6	13%
Indeno(1,2,3-cd)pyrene	6.04	7.30	19%
Dibenz(a,h)anthracene	1.30	1.61	21%
Benzo(g,h,i)perylene	6.47	7.56	15%
Total PAHs:	679	840	21%
Quantitation Limit:	0.23	0.17	1
Detection Limit:	0.09	0.07	· · · · · · · · · · · · · · · · · · ·
Fluorobenzene (SS1)	72%	59%	20%
2-Fluorobiphenyl (SS2)	92%	74%	22%
Concentration Units:	mg/kg	mg/L	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META #

Lab ID	RP991021-01		RP991021-03		RP991021-04	
Field ID:	FP-01		FP-03		ST-01	
MAHs:	75	1				
Benzene	0.70	U	8.04		1.19	J
Toluene	1.70		2.11		2.43	
Ethylbenzene	1.06	В	1.15	в	3.38	В
m/p-Xylene	2.86	В	2.15	в	5.12	в
Styrene	0.52	J	0.46	J	2.17	U
o-Xylene	0.52	J	0.43	J	2.17	U
1,2,4-Trimethylbenzene	1.00	в	0.95	в	1.07	JB
Total MAHs:	6.65	-	14.3		12.1	
PAHs:		1				
Naphthalene	16.7	в	100	в	8.65	в
2-Methylnaphthalene	15.8	в	32.6	в	5.03	в
1-Methylnaphthalene	96.1	в	15.8	в	11.7	В
Acenaphthylene	7.11	<u> </u>	84.9	2	2.87	10
Acenaphthene	36.2		123	- L	14.4	
Dibenzofuran	6.94		19.9		2.83	
Fluorene	22.2		230		12.4	
Phenanthrene	46.4	в	2,360	BD	23.6	В
Anthracene	16.7		1,080	D	8.16	
Fluoranthene	99.5		1,680	D	35.1	
Pyrene	123		1,970	D	38.8	
Benz(a)anthracene	108		578	3	18.4	
Chrysene	46.9		482		20.8	
Benzo(b)fluoranthene	36.0		555		10.6	
Benzo(k)fluoranthene	36.7		264		11.9	
Benzo(a)pyrene	64.0		674		16.1	
Indeno(1,2,3-cd)pyrene	43.9		286		10.5	
Dibenz(a,h)anthracene	4.00		12.0		2.17	U
Benzo(g,h,i)perylene	59.3		295		12.6	
Total PAHs:	878		10,800		262	_
Quantitation Limit:	0.70		0.64		2.17	
Detection Limit:	0.28		0.26		0.87	
Fluorobenzene (SS1)	70%		68%	-	73%	
2-Fluorobiphenyl (SS2)	93%		90%	-	91%	
Concentration Units:	mg/kg	1	mg/kg		mg/kg	-

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DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

META D

Lab ID	RP991021-05		RP991021-06		RP991021-10	-
Field ID:	ST-02	-	ST-03		ST-08	
MAHs:			1		100	
Benzene	1.93		1.90	U	1.78	U
Toluene	2.25	1.1	1.22	J	1.06	J
Ethylbenzene	2.11	в	2.15	в	2.58	В
m/p-Xylene	3.55	в	3.17	в	3.30	В
Styrene	1.11	U	1.90	U	1.78	U
o-Xylene	1.11	U	1.90	U	1.78	U
1,2,4-Trimethylbenzene	0.58	JB	1.90	U	1.78	U
Total MAHs:	9.84		6.54		6.94	
PAHs:				171		
Naphthalene	11.0	в	5.88	в	1.69	JB
2-Methylnaphthalene	3.25	B	35.9	в	1.78	U
1-Methylnaphthalene	4.23	в	30.7	в	2.30	в
Acenaphthylene	4.13	-	1.19	J	0.75	J
Acenaphthene	4.84		14.1		0.97	J
Dibenzofuran	1.70		2.83		1.78	Ŭ
Fluorene	3.86		10.9	. I	0.75	Ĵ
Phenanthrene	12.2	в	20.6	в	3.48	В
Anthracene	6.94	2	6.83	- L	1.13	J
Fluoranthene	109		16.4		14.5	- 7
Pyrene	138		20.8		18.0	
Benz(a)anthracene	59.9		10,6		20.8	
Chrysene	54.6		8.06		5.44	
Benzo(b)fluoranthene	30.9		6.27		5.97	
Benzo(k)fluoranthene	35.6		6.15		7.12	
Benzo(a)pyrene	66.1		10.2		9.97	
Indeno(1,2,3-cd)pyrene	37.6		7.25		10.0	
Dibenz(a,h)anthracene	1.13	1.1	1.90	U	1.25	J
Benzo(g,h,i)perylene	51.6	- U.	8.80	191	14.0	2
Total PAHs:	635		221		118	
Quantitation Limit:	1.11		1.90		1.78	-
Detection Limit:	0.45		0.76	1.1	0.71	
Fluorobenzene (SS1)	78%		65%		87%	-
2-Fluorobiphenyl (SS2)	101%		78%		104%	
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene,

Total PAHs does not include Dibenzofuran.

META V

Lab ID	RP991021-15		RP991021-16		RP991021-17	
Field ID:	ST-34		ST-35		ST-37	
MAHs:						
Benzene	0.87	J	0.55	J	0.96	U
Toluene	2.84	12.1	1.64		1.21	
Ethylbenzene	3.12	В	2.21	в	1.93	В
m/p-Xylene	5.25	В	2.66	в	2.94	В
Styrene	1.69	U	0.97	U	0.96	U
o-Xylene	1.69	U	0.97	U	0.96	U
1,2,4-Trimethylbenzene	1.69	U	0.68	JB	0.96	U
Total MAHs:	12.1		7.06		6.08	
PAHs:		01				
Naphthalene	8.73	в	10.6	в	8.46	в
2-Methylnaphthalene	1.21	JB	2.59	в	0.74	JE
1-Methylnaphthalene	2.84	в	4.14	в	1.66	В
Acenaphthylene	1.48	J	4.12	e.	0.82	J
Acenaphthene	1.96		3.43		0.58	J
Dibenzofuran	1.09	J	1.47		0.61	J
Fluorene	2.45	124	3.38		0.56	J
Phenanthrene	6.25	в	7.27	в	1.89	в
Anthracene	2.09	1.17	3.28	C. 1	0.49	J
Fluoranthene	16.4		27.2		3.06	
Pyrene	19.0		32.9		9.71	
Benz(a)anthracene	10.1		23.0		6.42	
Chrysene	7.13		19.0		1.84	
Benzo(b)fluoranthene	6.34	- I	12.3		1.55	
Benzo(k)fluoranthene	6.52		15.3		0.79	J
Benzo(a)pyrene	8.89		24.5		6.38	
Indeno(1,2,3-cd)pyrene	5.26	10.00	15.2		3.93	
Dibenz(a,h)anthracene	1.69	U	1.68	A 11	2.46	
Benzo(g,h,i)perylene	6.72	- 1 I	23.5		5.55	
Total PAHs:	113		233		56.9	
Quantitation Limit:	1.69		0.97		0.96	-
Detection Limit:	0.68		0.39		0.39	
Fluorobenzene (SS1)	88%		76%		72%	-
2-Fluorobiphenyl (SS2)	104%		96%	1	94%	
Concentration Units:	mg/kg		mg/kg		mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

Total PAHs does not include Dibenzofuran.

Lab ID	DA991021-SB	DA991021-SBS
Field ID:	Soil Blank	Soil Blank Spike
MAHs:		
Benzene	0.18 U	66%
Toluene	0.18 U	81%
Ethylbenzene	0.30	82%
m/p-Xylene	0.30	82%
Styrene	0.18 U	81%
o-Xylene	0.18 U	83%
1,2,4-Trimethylbenzene	0.07 J	82%
Total MAHs:	0.59	
PAHs:		1000
Naphthalene	0.22	81%
2-Methylnaphthalene	0.10 J	81%
1-Methylnaphthalene	0.18	81%
Acenaphthylene	0.18 U	82%
Acenaphthene	0.18 U	82%
Dibenzofuran	0.18 U	82%
Fluorene	0.18 U	82%
Phenanthrene	0.16 J	81%
Anthracene	0.18 U	80%
Fluoranthene	0.18 U	82%
Pyrene	0.18 U	83%
Benz(a)anthracene	0.18 U	82%
Chrysene	0.18 U	82%
Benzo(b)fluoranthene	0.18 U	81%
Benzo(k)fluoranthene	0.18 U	84%
Benzo(a)pyrene	0.18 U	82%
Indeno(1,2,3-cd)pyrene	0.18 U	80%
Dibenz(a,h)anthracene	0.18 U	85%
Benzo(g,h,i)perylene	0.18 U	83%
Total PAHs:	0.65	
Quantitation Limit:	0.18	
Detection Limit:	0.07	
Fluorobenzene (SS1)	77%	67%
2-Fluorobiphenyl (SS2)	98%	85%
Concentration Units:	mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

L = Coeluted with compound listed above

NM = Not measured

U = Not detected at quantitation limit shown

Total MAHs does not include 1,2,4-Trimethylbenzene.

META #

Total PAHs does not include Dibenzofuran.

Lab ID	RP991021-16	RP991021-16MS
Field ID:	ST-35	ST-35
MAHs:		
Benzene	0.55 J	80%
Toluene	1.64	91%
Ethylbenzene	2.21	92%
m/p-Xylene	2.66	93%
Styrene	0.97 U	92%
o-Xylene	0.97 U	94%
1,2,4-Trimethylbenzene	0.68 J	94%
Total MAHs:	7.06	
PAHs:		
Naphthalene	10.6	92%
2-Methylnaphthalene	2.59	96%
1-Methylnaphthalene	4.14	95%
Acenaphthylene	4.12	96%
Acenaphthene	3.43	96%
Dibenzofuran	1.47	97%
Fluorene	3.38	98%
Phenanthrene	7.27	95%
Anthracene	3.28	92%
Fluoranthene	27.2	94%
Pyrene	32.9	95%
Benz(a)anthracene	23.0	94%
Chrysene	19.0	91%
Benzo(b)fluoranthene	12.3	90%
Benzo(k)fluoranthene	15.3	89%
Benzo(a)pyrene	24.5	93%
Indeno(1,2,3-cd)pyrene	15.2	89%
Dibenz(a,h)anthracene	1.68	93%
Benzo(g,h,i)perylene	23.5	96%
Total PAHs:	233	
Quantitation Limit:	0.97	
Detection Limit:	0.39	
Fluorobenzene (SS1)	76%	83%
2-Fluorobiphenyl (SS2)	96%	103%
Concentration Units:	mg/kg	

B = Analyte detected in the blank

D = Values from a diluted sample extract

DL = QC compounds diluted out

E = Estimated value, above calibration range

I = Interference

J = Estimated value

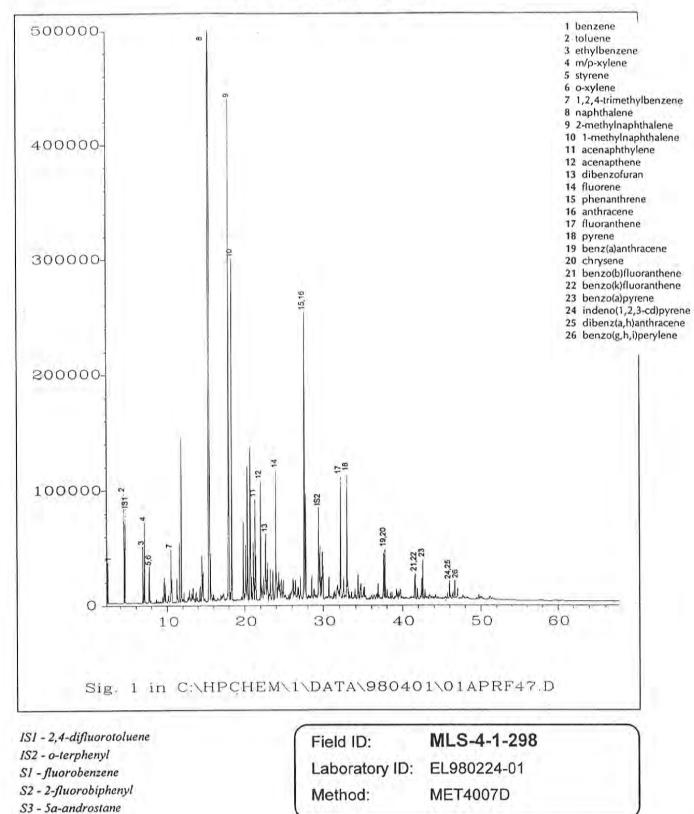
L = Coeluted with compound listed above

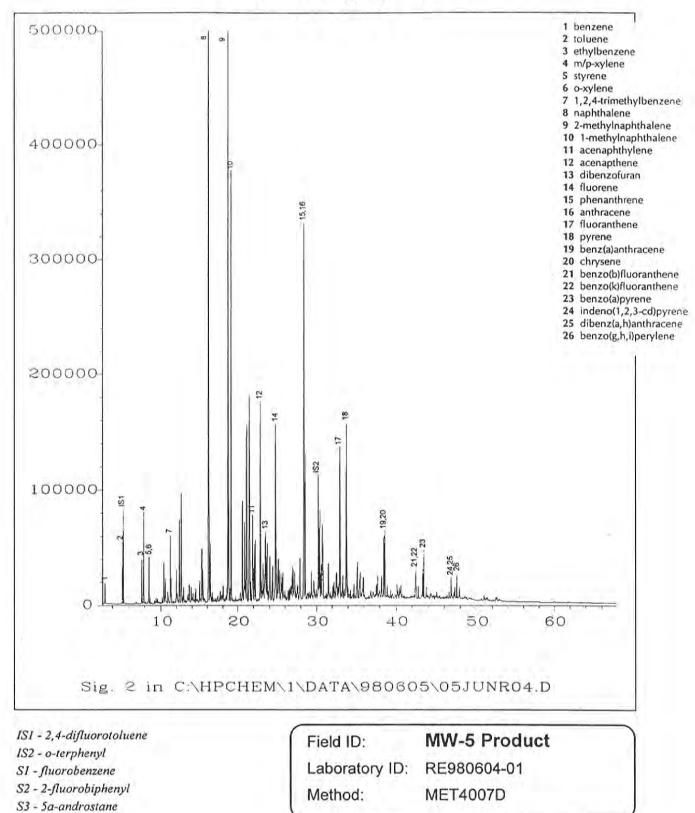
NM = Not measured

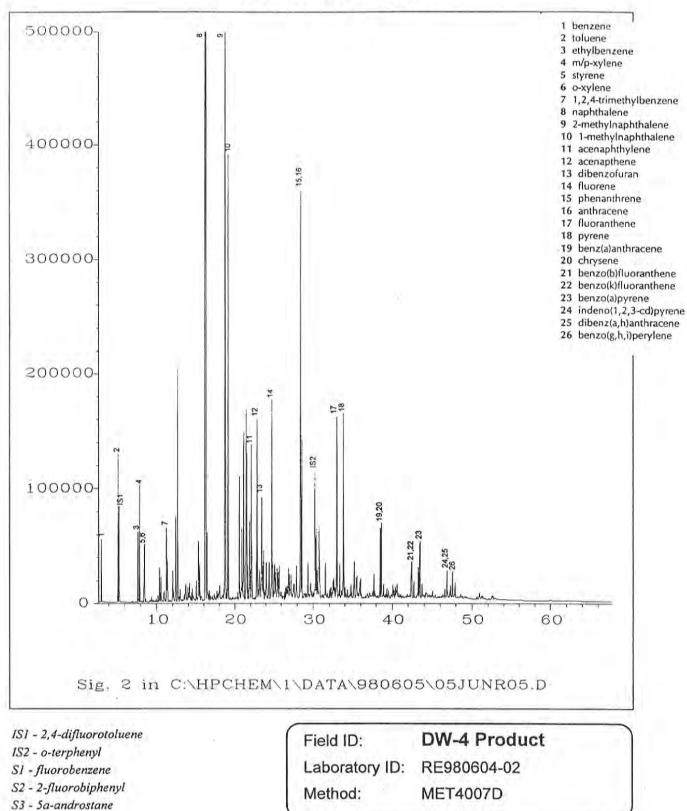
U = Not detected at quantitation limit shown

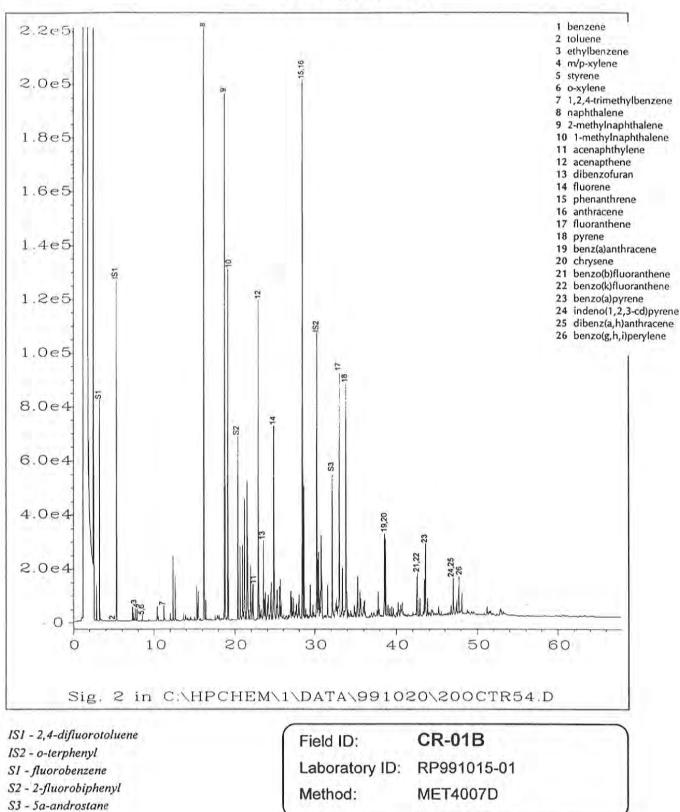
Total MAHs does not include 1,2,4-Trimethylbenzene.

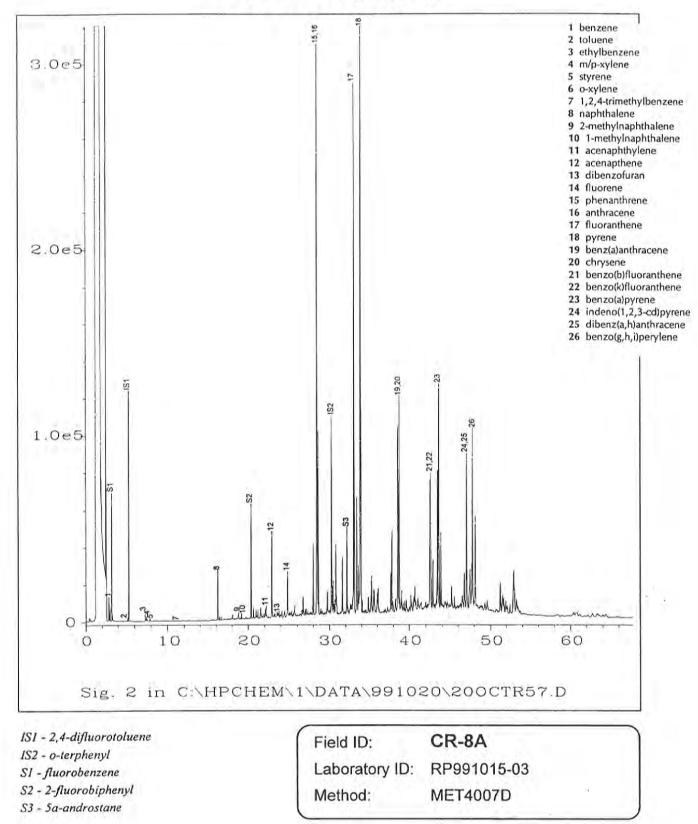
Total PAHs does not include Dibenzofuran.

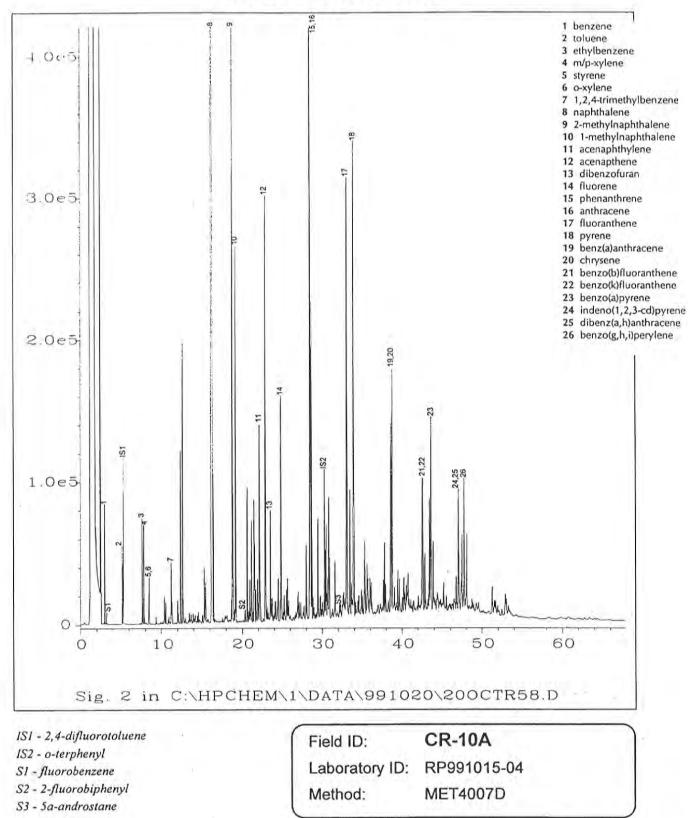


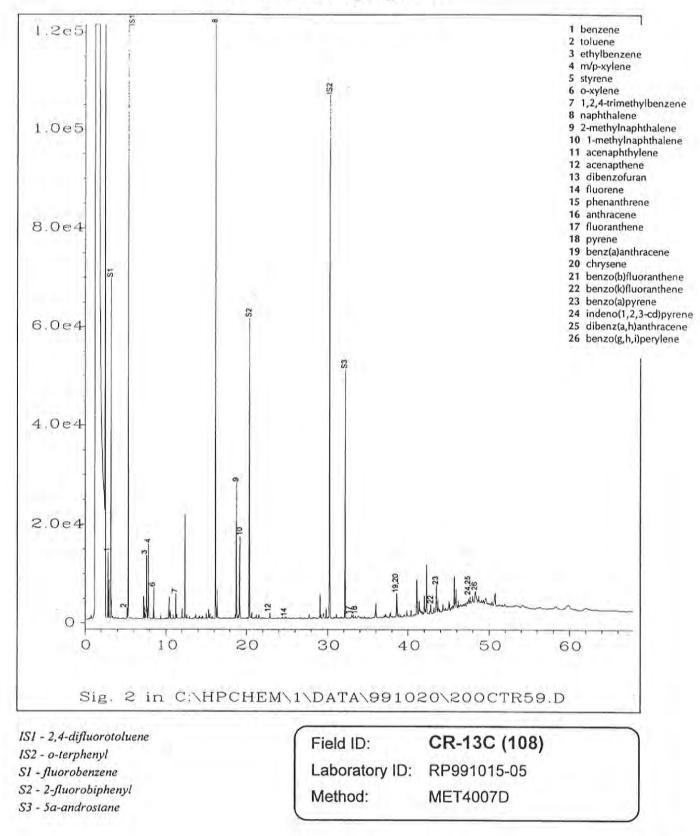








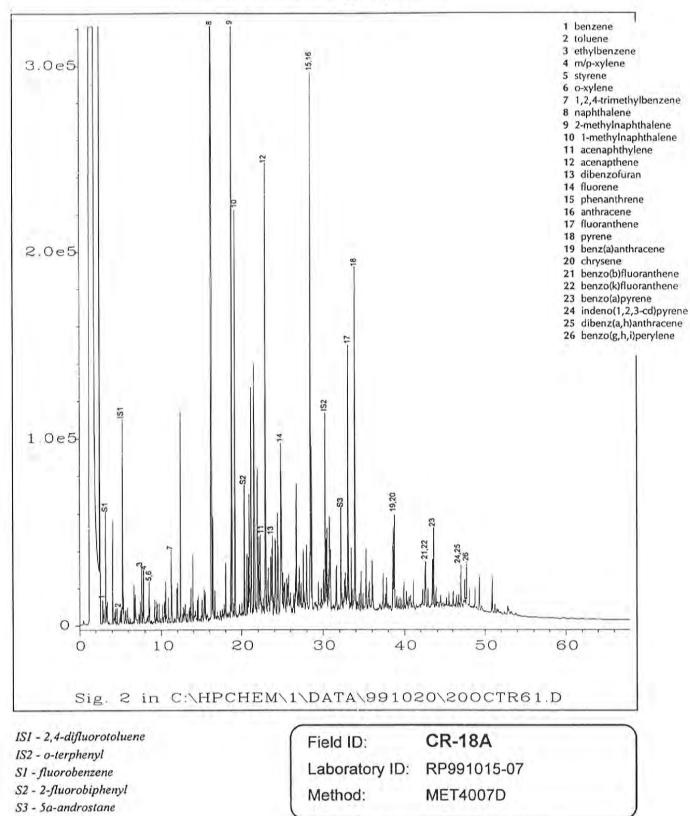


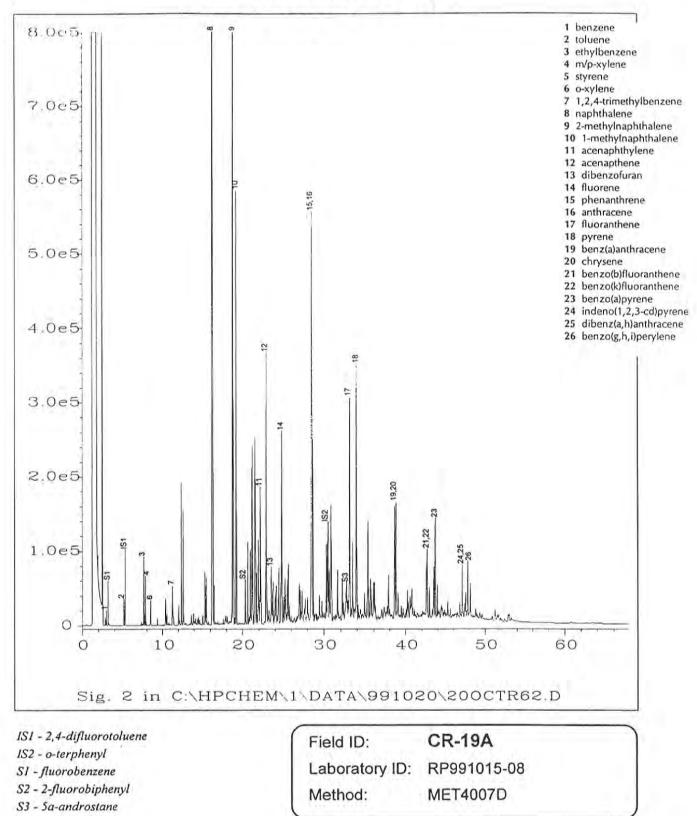


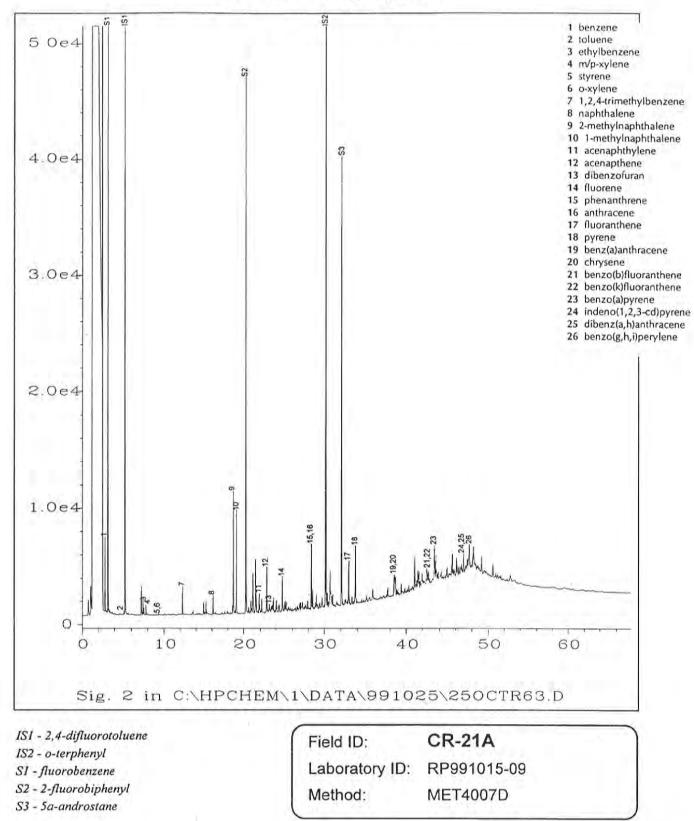
1 benzene 2.005 2 toluene 3 ethylbenzene 4 m/p-xylene 5 styrene 15,16 1.8e5 6 o-xylene 7 1,2,4-trimethylbenzene 8 naphthalene 9 2-methylnaphthalene 10 1-methylnaphthalene 1.6e5 5 11 acenaphthylene 12 acenapthene 13 dibenzofuran 14 fluorene 15 phenanthrene 1.4e5 16 anthracene 17 fluoranthene 18 pyrene 19 benz(a)anthracene 20 chrysene 1.2e5 21 benzo(b)fluoranthene ŝ 22 benzo(k)fluoranthene 23 benzo(a)pyrene 23 24 indeno(1,2,3-cd)pyrene 25 dibenz(a,h)anthracene 1.0e5 26 benzo(g,h,i)perylene 8.0e4 2 9,20 23 6.0e4 24,25 5 N 21,22 3 4.0e4 4 2.0e4 200 Ō 10 20 30 0 40 50 60 Sig. 2 in C:\HPCHEM\1\DATA\991020\200CTR60.D ISI - 2,4-difluorotoluene **CR-14A** Field ID: IS2 - o-terphenyl Laboratory ID: RP991015-06 S1 - fluorobenzene S2 - 2-fluorobiphenyl Method: MET4007D

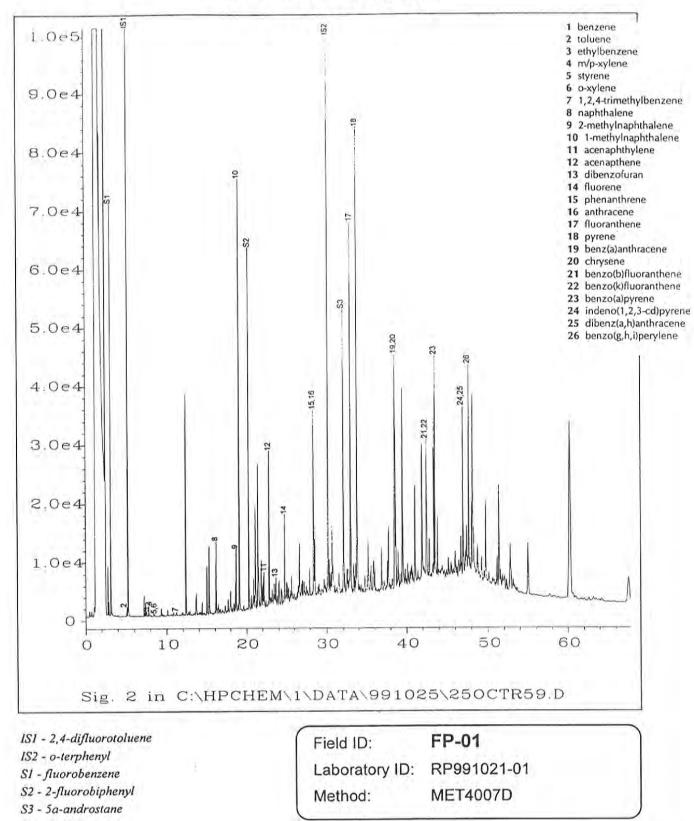
S3 - 5a-androstane

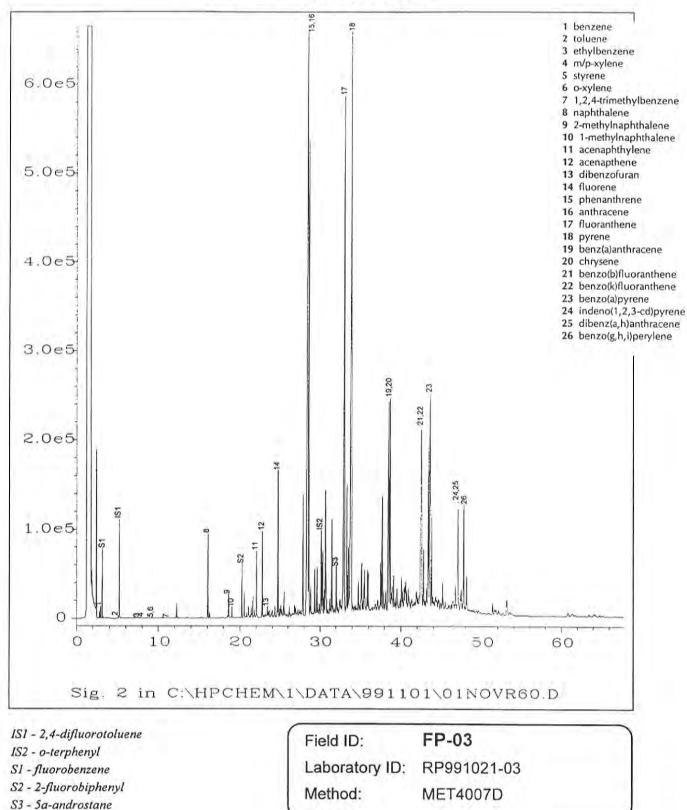
GC/FID Fingerprint

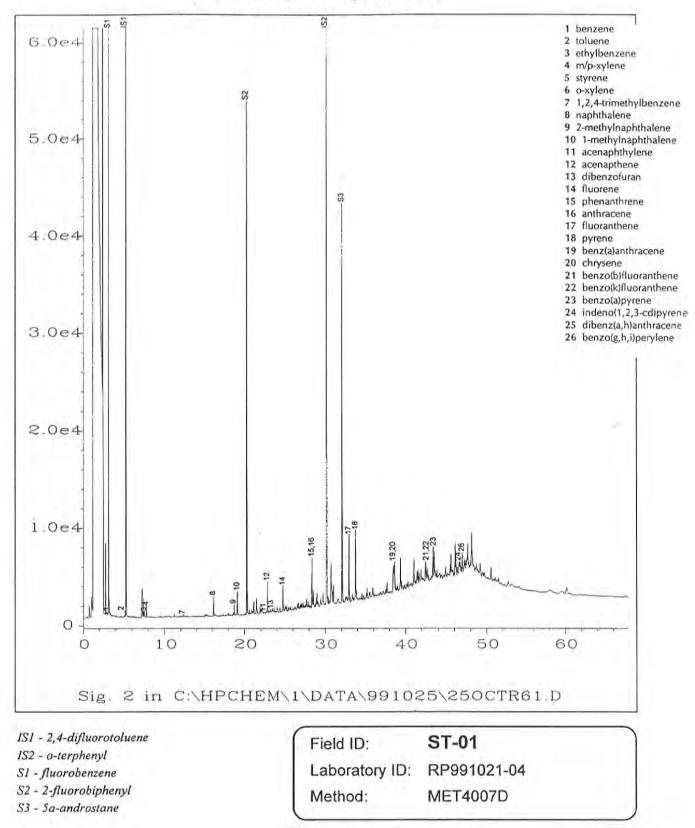


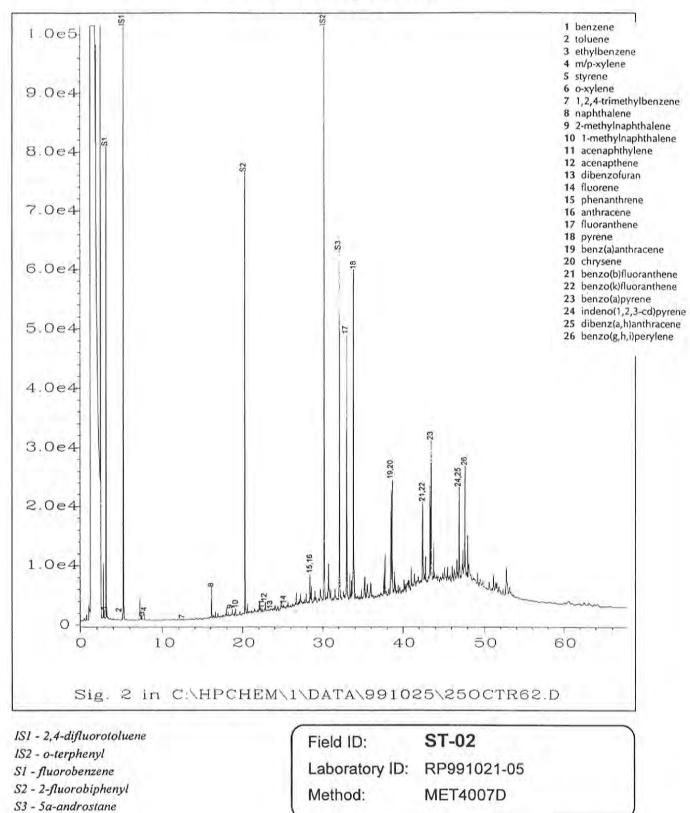


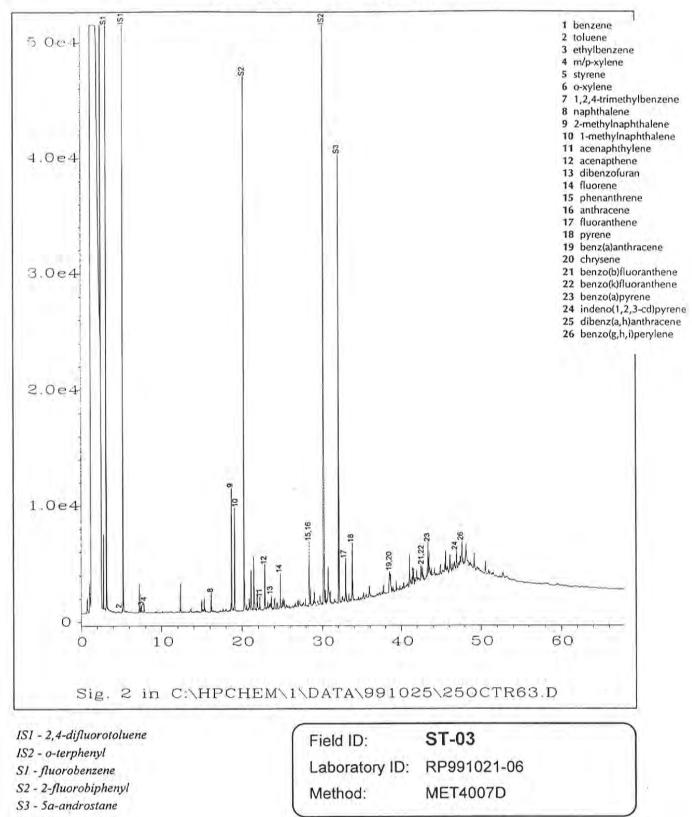


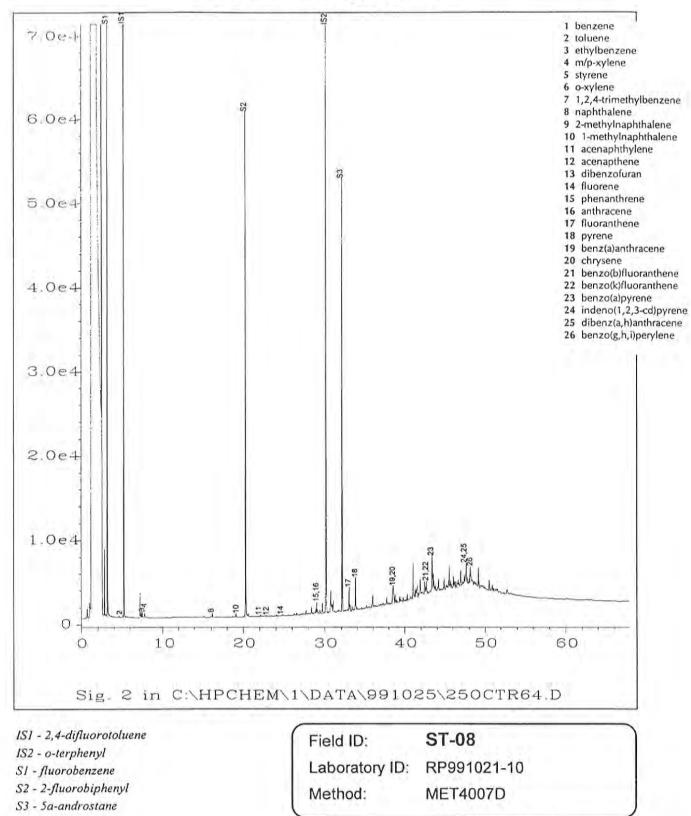












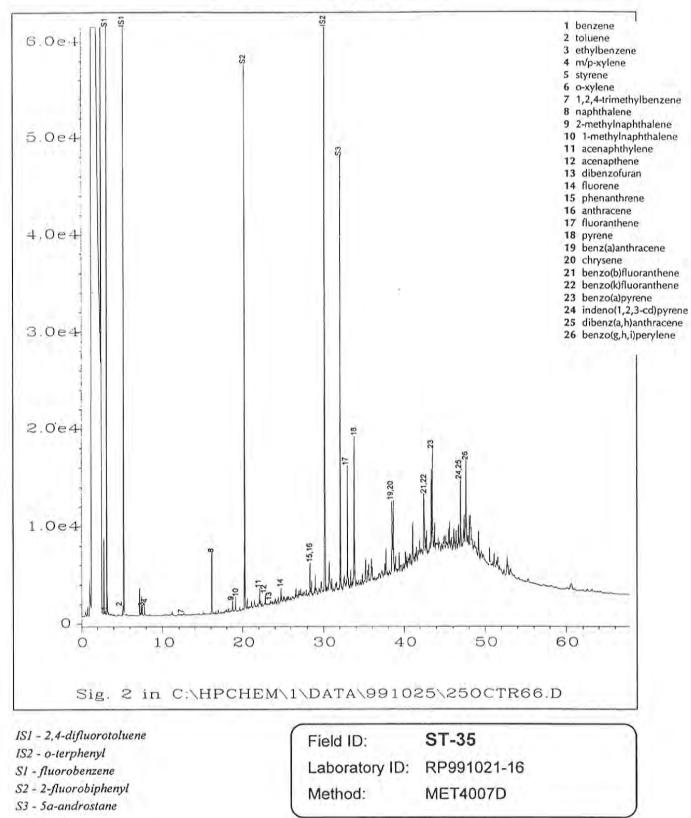
META

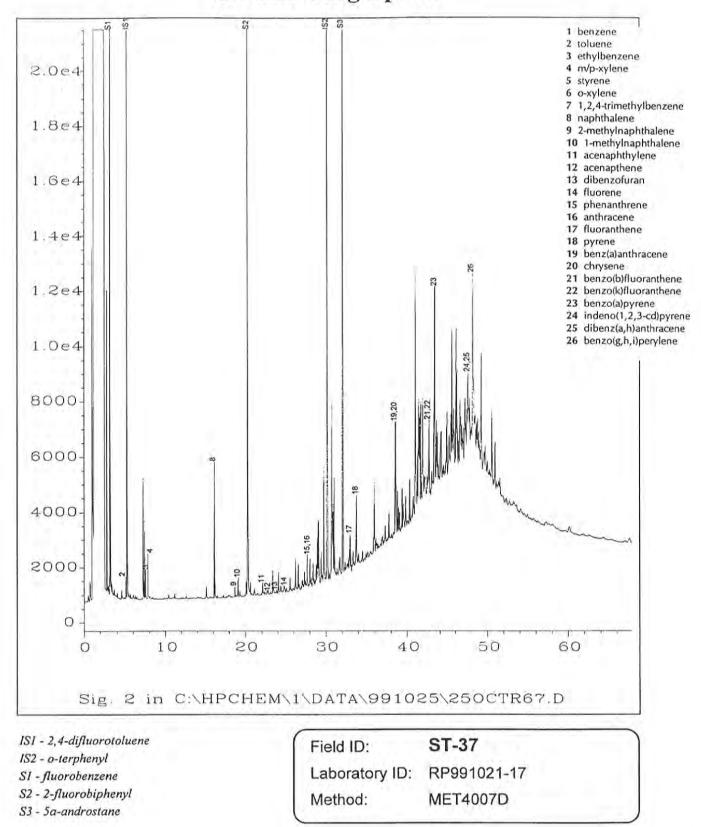
.

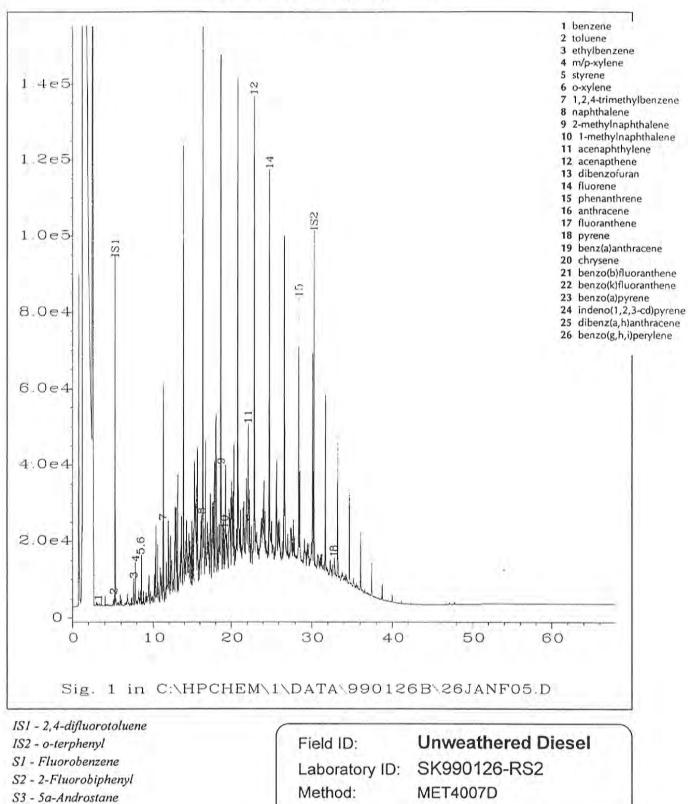
5 IS2 is S 1 benzene 2 toluene 3 ethylbenzene 4 m/p-xylene 5 styrene 2 0e4 6 o-xylene 7 1,2,4-trimethylbenzene 8 naphthalene 1.8e4 9 2-methylnaphthalene 10 1-methylnaphthalene 11 acenaphthylene 12 acenapthene 13 dibenzofuran 1.6e4 14 fluorene 15 phenanthrene 16 anthracene 17 fluoranthene 1.4e4 18 pyrene 19 benz(a)anthracene 20 chrysene 21 benzo(b)fluoranthene 22 benzo(k)fluoranthene 1.2e4 23 benzo(a)pyrene 24 indeno(1,2,3-cd)pyrene 25 dibenz(a,h)anthracene 26 benzo(g,h,i)perylene 1.0e4 8000 5 6000 4000 2000 11 1312 19 10 0 50 60 10 20 30 40 0 Sig. 2 in C:\HPCHEM\1\DATA\991025\250CTR65.D ISI - 2,4-difluorotoluene ST-34 Field ID: IS2 - o-terphenyl Laboratory ID: RP991021-15 S1 - fluorobenzene S2 - 2-fluorobiphenyl Method: MET4007D

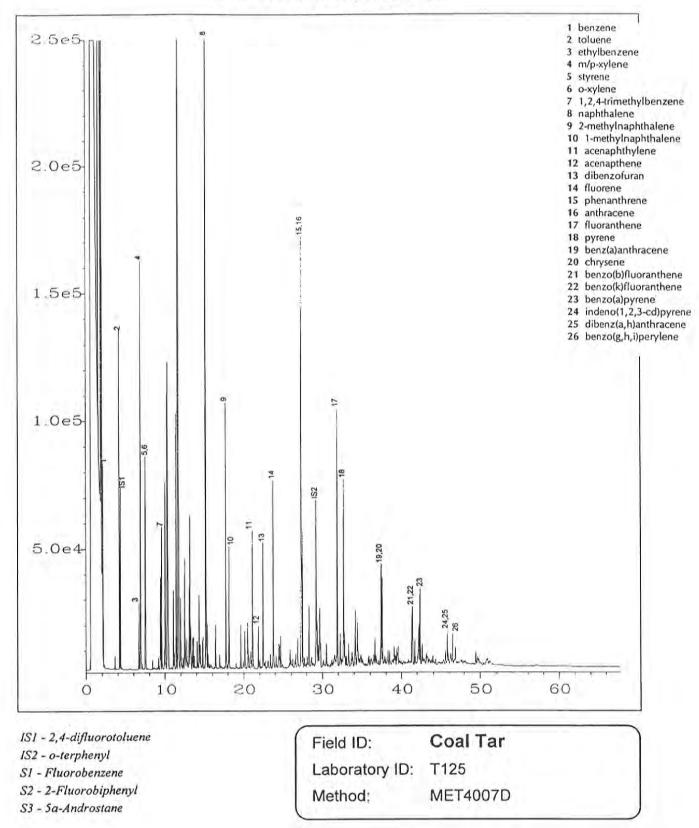
S3 - Sa-androstane

GC/FID Fingerprint









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230 Signature Signature	5-3434-230 Gasworks	SAMPLERS: D. KINNEY RECEIVING LABORATORY: MOTA		ZIJ BER 1220									-	hipper Information

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NO. OF CONTRINERS	1 KE 38 00 V	Relinquished by: (Signature)	Sur Sur
A FADZIC A SAMPLE NO.	TWW-S-PADOUCT	Date / Time Received by: (Signature) 6/3/98/1645 Date / Time Received for Laboratory by:	<u> </u>
PROJECT NAME	Sizi 1	12	UIA E

<u>(</u> - -	(- -			Date	<u>.</u>	
רשם וה	FIETA IU	Matrix	Analysis	sampleo	Heceived Project	ct Storage
IP991015-01	CR-01B	Soil	2508/4007	10/06/99	10/15/99 RO1020-60	-60 32 oz. jar
RP991015-02	CR-5A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-03	CR-8A	Soil	2508/4007	10/01/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-04	CR-10A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar
3P991015-05	CR-13C (108)	Soil	2508/4007	10/04/99	10/15/99 R01020-60	.60 32 oz. jar
R991015-06	CR-14A	Soil	2508/4007	10/02/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-07	CR-18A	Soil	2508/4007	10/04/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-08	CR-19A	Soil	2508/4007	10/07/99	10/15/99 R01020-60	60 32 oz. jar
RP991015-09	CR-21A	Soil	2508/4007	10/06/99	10/15/99 R01020-60	60 32 oz. jar

10/15/99

Page 1 of 1

PARCINA		REMARKS					porfirm with	Dan Baker							Time Received by: (Signature)	REMEDIATION TECHNOLOGIES 1011 S.W. Klickitat Way	Suite 207 Seattle, WA 98134 (206) 624-9349	
11/1	111	111			/		$\langle \rangle$	_/		/	/				Date / T		R E M E D I A T I O N TECHNOLOGIES INC	יאדאר אמטע פינדאע
ONTRINER:															Relinquished by: (Signature)	Date / Time		
1.61		SAMPLE NO.	OIB	CR-5A	8A	CR-10A	CK-13C(103)	14A	18A A81-	19A	ala				Received by: (Signature)	Received for Laboratory by: (Signature)	Saple	YFLLOW COPY Lahoratory
H	ARI	TIME	14:40 CQ-	17:20 CR-	11:00 CK-8A		-	11:05 CR-	-	Pizzo CR-	-			1	Date / Time	bate / Time		Samoler
JZ VM		DATE	66/9/01	10/619	10/1/99	06:51 10/01	10/4/99		10/4/09/4:25	ak: 6 66/5/01	10/01/01				Refindlished by: (Signature)	Reling (Ished by: Sgnature)	mation	PINK COPY - Sampler
SAMPLERS:		LAB I.D. NO.													Refinquished	Reling	Shipper Information	

ATTACHMENT 2D-3 Battelle 2002 and 2003 Reports

ATTACHMENT 2D-3 Battelle Data Packages



Duxbury Operations 397 Washington Street Duxbury, Massachusetts 02332 Telephone 781-934-0571 Fax: 781-934-2124

February 4, 2003

Harry Edward Grant Riddell Williams, P.S. 1001 Fourth Avenue Plaza, Suite 4500 Seattle, WA 98154-1065 Tel: (206) 624-3600 Tel: (206) 389-1708

Mr. Grant:

The enclosed deliverable contains selected raw data for the Lake Union Sediment Chemistry Study. It includes the quantitative biomarker, total organic carbon (TOC), total petroleum hydrocarbons (TPH), butyltin, polychlorinated biphenyl (PCB) and DDT data. In addition, it includes a summary of the organic petrology results and the GC/MS fingerprints of saturated hydrocarbons (normal alkanes and alkylcyclohexanes).

Please contact Scott Stout or myself if you have any questions regarding this material. We can be reached by phone at (781) 934-0571.

Sincerely,

ML

Stephen EmsbocMattingly Principal Research Scientist

cc: M. Larsen, RETEC S. Stout, Battelle

Battelle unt

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID NLU-102-SS-0010 Battelle Sample ID

				1120-100-00-0010	1120-100-03-0010
Battelle Sample ID	U0169-F1	U0170-F1	U0142-F1-D	U0143-F1-D	U01 44 -F1
Battelle Batch ID	02-667	02-667	02-667	02-667	02-667
Associated Blank	AB484PB	AB484PB	AB484PB	AB484PB	AB484PB
Field Date	11/14/02	11/14/02	11/12/02	11/12/02	11/12/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	11/22/02	11/22/02
Acquired Date	12/14/02	12/14/02	12/28/02	12/28/02	12/13/02
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids Matrix	14.6 %	70.9 %	13.3 %	20 %	10.9 %
Sample Size	Sediment	Sediment	Sediment	Sediment	Sediment
Weight Basis	27.5 mg OIL	74.7 mg OlL	39.6 mg OIL	55.5 mg	36.4 mg
Min Reporting Limit	0.268	0.134	0.174	OIL 0.120	OIL
Amount Units	mg/kg	mg/kg	mg/kg	mg/kg	0.195 mg/kg
				mgrag	iiig/kg
Q9- Sesquiterpane (9)	1.08	3.57	0.22	1.18	1.36
Q10- Sesquiterpane (10)	0,692	2,96	0.104 J	0.506	0.528
Q1- Sesquiterpane (1)	1.77	12.5	0.431	1.04	1.86
Q2- Sesquiterpane (2)	2.32	13.7	0.513	1.12	2.26
Q3- Sesquiterpane (3) Q4- Sesquiterpane (4)	4.39	18.7	0.723	1.36	3.3
Q5- Sesquiterpane (5)	1.87	12.7	0.401	0.83	1.84
Q6- Sesquiterpane (6)	0.866 2.06	4.96 13.3	0.146 J 0.302	0.338 0.584	0.717
Q7- Sesquiterpane (7)	0.863	13.3	0.302	0.348	1.92 0.91
Q8- Sesquiterpane (8)	6.64	57.3	1.42	2.34	6.23
11-C15-Isoprenoid (1380)	1.76	11.7	0.474	1.24	3.36
I2-C15-Isoprenoid (1470)	4.55	25.3	1.08	2.17	5.61
I3-C18-Isopranoid (1650)	4.5	18.3	0.897	2.35	5.08
I4-C19-Isoprenoid (Pristane)	10.6	55.9	1.97	4.14	9.36
I5-C20-Isoprenoid (Phytane)	15.5	48.8	3.04	5.84	16.5
T4-C23 Tricyclic Terpane T5-C24 Tricyclic Terpane	29	22.4	2.91	4	30.7
T6-C25 Tricyclic Terpane	19.2 24.5	14.1 18.1	1.98 2.61	2.79	22
T6c-C26 Tricyclic Terpane-22R	10.5	7.27	1.16	3.57 1.64	26.9 11.3
T6b-C26 Tricyclic Terpane-22S	9.42	7.87	1.10	1.63	10.6
T6a-C24 Tetracyclic Terpane	10.4	10.8	1.04	1.06	12.2
T7-C28 Tricyclic Terpane-22S	9.15	10.5	1.36	2.2	11.4
T8-C28 Tricyclic Terpane-22R	10.2	11.3	1.43	2.48	12.3
T9-C29 Tricyclic Terpane-22S	13.3	13.3	1.79	2.79	15.2
T10-C29 Tricyclic Terpane-22R	12.1	13.5	1.61	2.58	14.6
T11-18a(H)-22,29,30-Trisnomeohopane-TS T12-17a(H)-22,29,30-Trisnorhopane-TM	31.2 32.5	34.2 45.4	3.37 3.48	3.59	36.3
T14a-a,b- and b,a-28,30-Bisnorhopane	32.5	45.4	3.48	4.07 4.42	34.2 32.8
T14b-17a(H),21b(H)-25-Norhopane	15.1	18.6	1.65	2.48	16.9
T15-30-Norhopane	115	146	12.3	14	133
T16-18a(H)-30-Nomeohopane-C29Ts	34.8	45.3	4.22	4.89	41.1
X- 17a(H)-Diahopane	9.48	9.42	1.23	1.18	10.6
T17- 30-Normoretane	19.5	25.7	1.88	2.15	19.5
T18-18a(H) & 18b(H)-Oleanane T19-Hopane	23	27	2.51	3.97	25.2
T20- Mortane	179 56	245 51.1	20.6 5.2	26.9	198
T21-30-Homohopane-22S	75.9	94.1	8.36	6.74	57.9
T22-30-Homohopane-22R	91.8	65.6	7.42	9.44 6.62	94.3 84.1
T26-30-Bishomohopane-22S	48.1	62	4.8	5.46	58.4
T27-30,31-Bishomohopane-22R	35.4	46.6	3,8	4.19	42.3
T30-30,31-Trishomohopane-22S	66.7	51.9	5.08	5.04	66
T31-30,31-Trishomohopane-22R	27.5	36.5	3	3.96	33.2
T32-Tetrakishomohopane-22S T33-Tetrakishomohopane-22R	21.3	28.4	2.28	2.63	28.1
T34-Pentakishomohopane-22S	14.5 22	19.3 31.4	1.55 2.23	1.76	18.8
T35-Pentakishomohopane-22R	14.5	20.5	1.56	2.21 1.49	29.2
S4-13b(H),17a(H)-20S-Diacholestane	37.4	32.5	5.51	8.91	18.9 50
S5-13b(H),17a(H)-20R-Diacholestane	20.8	20.3	3.26	5.61	27.8
S8-13b(H),17a(H)-20S-Methyldiacholestane	30.1	29.3	4.41	8.62	39.8
S12-14a(H),17a(H)-20S-Cholestane	80.6	79.5	11	17	102
S14-14b(H),17b(H)-20R- Cholestane	42.7	48.4	5.81	9.15	49,1
S15-14b(H),17b(H)-20S- Cholestane	40.7	49,5	5.95	9.46	50.1
S17-14a(H),17a(H)-20R- Cholestane S18-13b(H) 17a(H) 20R Elbudischelestere	88.7	98.6	12.3	21.4 E	99
S18-13b(H),17a(H)-20R- Ethyldiacholestane S19-13a(H),17b(H)-20S-Ethyldiacholestane	16.6	10.6	2.26	2.9	22.7
S18-134(H),172(H)-20S- Methylcholestane	4.11 45.3	4.6 54.2	0.597	0,826	4.69
S22-14b(H),17b(H)-20R-Methylcholestane	43.3 87.6	54.2 77	5.62 8.32	9.17 13.6	82.4 76.4
S23-14b(H),17b(H)-20S-Methylcholestane	74.4	62.3	10,1	14.3	76.4 82.7
S24-14a(H),17a(H)-20R-Methylcholestane	55.9	78.8	7.44	15.2	60.8
S25-14a(H),17a(H)-20S-Ethylcholestane	46.6	53.7	5.81	8.35	55.2
S26-14b(H),17b(H)-20R-Ethylcholestane	67.7	80.5	9.24	12.1	88.2
S27-14b(H),17b(H)-20S-Ethylcholestane	56.6	51.6	6.74	8.52	55.2
S28-14a(H),17a(H)-20R-Ethylcholestane	69.8	86.5	7.88	14	75.1

NLU-103-SS-0010

NLU-104-SS-0010

NLU-105-SS-0010

NLU-106-SS-0010

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-107-SS-0010	NLU-109 1214	NLU-109-2830	NLU-109-3840	NLU-110 0406
Battelle Sample ID	U0145-F1	U0277-D-F1	U0285-D-F1	U0290-D-F1	U0353-D-F1
Battelle Batch ID	02-667	03-0159	03-0137	03-0137	03-0159
Associated Blank	AB484PB	BB426PB	BB278PB	BB278PB	BB426PB
Field Date	11/11/02	11/15/02	11/15/02	11/15/02	11/15/02
Receipt Date	11/15/02	11/21/02	11/21/02	11/21/02	11/21/02
Extraction Date	11/22/02	02/21/03	02/11/03	02/11/03	02/21/03
Acquired Date	12/13/02	03/06/03	02/20/03	02/20/03	03/06/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	12.1 %	21.36 %	23.08 %	26.21 %	28.81 %
Matrix	Sediment	Solid	Solid	Solid	Solid
Sample Size	41 mg	0.24 mg	0.51 mg	0.61 mg	0.36 mg
Weight Basis	OIL	DRY	DRY	DRY	DRY
Min Reporting Limit Amount Units	0,168 mg/kg	59,500 µg/kg	15.300 μg/kg	12.8 µg/kg	21.700 µg/kg
Q9- Sesquiterpane (9) Q10- Sesquiterpane (10)	0.903 0.443	119 52.7 J	211 91.1	394 147	183
Q1- Sesquiterpane (1)	1.66	118	156	217	78.3 128
Q2- Sesquiterpane (2)	2.95	134	202	305	140
Q3- Sesquiterpane (3)	3.97	214	294	479	222
Q4- Sesquiterpane (4)	2.2	126	149	243	112
Q5- Sesquiterpane (5)	0.99	ND	89.9	149	50.2
Q6- Sesquiterpane (6)	2.57	85.5	133	218	93.2
Q7- Sesquiterpane (7)	2.18	52.4 J	46.7	87.5	ND
Q8- Sesquiterpane (8)	8.71	293	376	604	311
11-C15-Isoprenoid (1380)	1.86	697	1330	2590	678
12-C15-Isoprenoid (1470)	3.64	1110	1980	3960	1130
13-C18-Isoprenoid (1650)	3.72	1420	2550	5280	1330
14-C19-Isoprenoid (Pristane) 15-C20-Isoprenoid (Phytane)	9.74	2990	4590	10300 E	2510
T4-C23 Tricyclic Terpane	16.4	2780	4620	9500 E	2090
T5-C24 Tricyclic Terpane	42	468	613	1120	413
T6-C25 Tricyclic Terpane	26.4	313	413	734	272
T6c-C26 Tricyclic Terpane-22R	31.4	423	528	902	346
T6b-C28 Tricyclic Terpane-22S	13.5 12.3	220 200	239 231	409	144
T6a-C24 Tetracyclic Terpane	13.7	128	112	360	155
T7-C28 Tricyclic Terpane-22S	13.3	236	337	201 556	95.5
T8-C28 Tricyclic Terpane-22R	13.7	230	342	553	210
T9-C29 Tricyclic Terpane-22S	17,7	324	343	535	221 210
T10-C29 Tricyclic Terpane-22R	17.5	339	349	573	201
T11-18a(H)-22,29,30-Trisnomechopane-TS	41.6	373	395	595	223
T12-17a(H)-22,29,30-Trisnorhopane-TM	39.4	468	427	701	534
T14a-a,b- and b,a-28,30-Bisnorhopane	35.7	376	474	830	298
T14b-17a(H),21b(H)-25-Norhopane	17.7	207	309	500	193
T15-30-Norhopane	148	1280	1380	2000	1260
T16-18a(H)-30-Nomeohopane-C29Ts	46.2	471	490	753	333
X- 17a(H)-Diahopane	12.4	174	109	160	86.1
T17- 30-Normoretane	20.8	238	245	373	268
T16-18s(H) & 18b(H)-Oleansne	27.6	352	445	704	300
T19-Hopane	229	2430	2590	3700	2070
T20- Mortane T21-30-Hornohopane-22S	58.4	681	451	704	630
	98.4	943	877	1190	877
T22-30-Homohopane-22R T26-30-Bishomohopane-22S	86.5 63.8	748	665	853	638
T27-30,31-Bishomohopane-22R	47.5	621 452	484 385	657	370
T30-30,31-Trishomohopane-225	70.9	452	475	510	300
T31-30,31-Trishomohopane-22R	36.3	356	354	627 493	338 271
T32-Tetrakishomohopane-225	29	317	270	323	200
T33-Tetrakishomohopane-22R	19.7	212	169	222	111
T34-Pentakishomohopane-22S	29.2	179	216	289	127
T35-Pentakishomohopane-22R	18.9	185	155	212	85.4
S4-13b(H),17a(H)-20S-Diacholestane	70.6	1040	1350	2270	758
S5-13b(H),17a(H)-20R-Diacholestane	32.7	887	926	1460	500
S8-13b(H),17a(H)-20S-Methyldiacholestane	108	809	1140	1960	739
S12-14a(H),17a(H)-20S-Cholestane	122	1760	2060	3360	1210
S14-14b(H),17b(H)-20R- Cholestane	56.8	744	920	1490	578
S15-14b(H),17b(H)-20S- Cholestane	55.1	771	1040	1700	809
S17-14a(H),17a(H)-20R- Cholestane	122	2210	2580	4220	1540
S18-13b(H),17a(H)-20R- Ethyldiacholestane	24.7	523	410	536	286
S19-13a(H),17b(H)-20S-Ethyldiacholestane	4.92	ND	78.7	147	ND
S20-14a(H),17a(H)-20S- Methylcholestane S22-14b(H),17b(H)-20R-Methylcholestane	74.6	875	1040	1550	825
S22-14b(H),17b(H)-20R-Methylcholestane S23-14b(H),17b(H)-20S-Methylcholestane	78.8	1120	1520	2300	816
S24-14a(H),17a(H)-20R-Methylcholestane	101 71.7	1200	1620	2390	887
S25-14a(H),17a(H)-20S-Ethylcholestane	67.3	1320	1600	2710	1080
S26-14b(H),17b(H)-20R-Ethylcholestane	81.5	774 1020	848	1220	554
S27-14b(H),17b(H)-20S-Ethylcholestane	86	769	1 160 890	1840	717
S28-14a(H),17a(H)-20R-Ethylcholestane	86	1220	1440	1120 2180	469
		1224	1770	2 100	975

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Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-110-1214	NLU-110 2022	NLU-112-SS-0010	NLU-112-SS-2030	NLU-113-SS-0010
Battelle Sample ID	U0357-D-F1	U0361-D-F1	U0171-F1	U0101-F1	U0146-F1
Battelle Batch ID	03-0137	03-0159	02-667	02-668	02-667
Associated Blank	BB276PB	BB426PB	AB484PB	AB489PB	AB484PB
Field Date	11/15/02	11/15/02	11/14/02	11/14/02	11/14/02
Receipt Date	11/21/02	11/21/02	11/15/02	11/15/02	11/15/02 11/22/02
Extraction Date	02/11/03 02/20/03	02/21/03 03/06/03	11/22/02 12/14/02	11/22/02 12/15/02	12/13/02
Acquired Date Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	30.97 %	24.27 %	11.3 %	18.29 %	12.8 %
Matrix	Solid	Solid	Sediment	Sediment	Sediment
Sample Size	0.63 mg	0.47 mg	34.1 mg	31.2 mg	41.2 mg
Weight Basis	DRY	DRY	OIL	OIL	OIL
Min Reporting Limit	10.800	30,400	0.208	0.231	0.167
Amount Units	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg
			4.74	47.4	
Q9- Sesquiterpane (9)	233	83.6	1.78	17.4	3.94
Q10- Sesquiterpane (10)	87.8 156	ND 40.9	0.945 2.43	6.75 12.1	2.41 5.21
Q1- Sesquiterpane (1)	186	73.4	2.43	12.1	5.8
Q2- Sesquiterpane (2) Q3- Sesquiterpane (3)	264	97.1	5.75	19.8	12.2
Q4- Sesquiterpane (4)	137	48	2.58	10.3	5.1
Q5- Sesquiterpane (5)	85.4	-78 27.8 J	1.17	4.41	2.56
Q5- Sesquiterpane (5) Q6- Sesquiterpane (6)	132	35.6	3.15	10.6	7.1
Q7- Sesquiterpane (7)	47	ND	10	4.76	4.16
Q8- Sesquiterpane (8)	353	112	10	28.9	17.1
I1-C15-isoprenoid (1380)	1210	131	3.99	77.1	4,35
12-C15-Isoprenoid (1470)	2010	219	7.26	112	9.22
I3-C18-Isoprenoid (1650)	2520	200	8.53	119	9.08
I4-C19-isoprenoid (Pristane)	4540	374	16.5	202	17.4
I5-C20-Isoprenoid (Phytane)	3910	405	23.8	219	25.5
T4-C23 Tricyclic Terpane	441	395	34.4	40.1	39.7
T5-C24 Tricyclic Terpane	289	273	23	26.4	27.9
T6-C25 Tricyclic Terpane	343	370	28.3	34.6	32.8
T6c-C26 Tricyclic Terpane-22R	158	163	12	14.8	14.5
T6b-C26 Tricyclic Terpane-22S	147	153	11.6	15	13.4
T6a-C24 Tetracyclic Terpane	72	77.6	13.1	7.81	12.2
17-C28 Tricyclic Terpane-22S	221 218	190 192	11.6 12.2	21.2 22.1	14.9
T8-C28 Tricyclic Terpane-22R T9-C29 Tricyclic Terpane-22S	218	252	12.2	23.7	15 19.8
T10-C29 Tricyclic Terpane-22R	210	223	15.2	23.6	18.4
T11-18a(H)-22,29,30-Trisnomeohopane-TS	233	257	37.7	27.5	39.6
T12-17a(H)-22,29,30-Trisnorhopane-TM	281	334	36.5	30.7	37.4
T14a-a,b- and b,a-28,30-Bisnorhopane	344	462	34.2	31.5	35.2
T14b-17a(H),21b(H)-25-Norhopane	180	280	16.9	20.2	18.9
T15-30-Norhopane	870	994	140	108	137
T16-18a(H)-30-Nomeohopane-C29Ts	314	395	42.6	37.3	44.9
X- 17a(H)-Dishopane	87.2	89.4	10.1	10.3	12
T17- 30-Normoretane	163	213	20	17.2	20.4
T18-18a(H) & 18b(H)-Oleanane	290	410	24.5	34,9	28.8
T19-Hopane	1630	2040	206 56.7	221 48	232
T20- Mortane	314	512	90.5		61.2
T21-30-Homohopane-22S T22-30-Homohopane-22R	530 439	710 575	91.5	81.3 57.2	92.5 83.7
T26-30-Bishomohopane-22S	292	353	59,7	44.9	59.1
T27-30,31-Bishomohopane-22R	234	283	43.1	34.2	43.8
T30-30,31-Trishomohopane-22S	292	410	66.4	42.8	68.2
T31-30,31-Trishomohopane-22R	215	287	33	32.9	33.6
T32-Tetrakishomohopane-22S	148	182	26.8	23.3	29
T33-Tetrakishomohopane-22R	101	123	19.9	14.8	19.2
T34-Pentakishomohopane-22S	127	118	28,1	20.3	26.4
T35-Pentakishomohopane-22R	95.9	114	18.8	15.7	18
S4-13b(H),17a(H)-20S-Diacholestane	747	706	48.9	82.2	71.8
S5-13b(H),17a(H)-20R-Diacholestane	478	443	26.5	53.9	38
S8-13b(H),17a(H)-20S-Methyldiacholestane	661	664	40.2	76.4	60.5
S12-14a(H),17a(H)-20S-Cholestane	1210	1300	99	148	133
S14-14b(H),17b(H)-20R- Cholestane	581	624	50.5	78.7	63.9
S15-14b(H),17b(H)-20S- Cholestane	630	629	51.2	77.4	65.2
S17-14a(H),17a(H)-20R- Cholestane	1610	1710	101 18.6	180	130
S18-13b(H),17a(H)-20R- Ethyldiacholestane S19-13a(H),17b(H)-20S-Ethyldiacholestane	230 53.3	282 ND	18.6 5.46	25 5.76	22.4 5.47
S19-13a(H), 17b(H)-203-Enyidiaciolestane S20-14a(H),17a(H)-20S- Methylcholestane	839	726	51.2	74.9	5.47
S22-14b(H),17b(H)-20R-Methylcholestane	891	914	73.8	115	91.1
S23-14b(H),17b(H)-20S-Methylcholestane	935	942	87.1	120	105
S24-14a(H),17a(H)-20R-Methylcholestane	1150	1440	62.4	130	86.1
S25-14a(H),17a(H)-20S-Ethylcholestane	500	849	54.4	70.7	66.2
S26-14b(H), 17b(H)-20R-Ethylcholestane	707	844	79.8	96,8	92.5
S27-14b(H),17b(H)-20S-Ethylcholestane	535	522	65.2	65,6	76.7
S28-14a(H),17a(H)-20R-Ethylcholestane	. 927	1150	74.1	122	94.2
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Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-113-SS-1020	NLU-115-SS-0010	NLU-118-SS-0010	NLU-116-SS-1020	NLU-116-SS-2030 10384,
Battelle Sample ID	U0108-D-F1 (IVD)	U0149-F1	U0150-F1-D	U0122-D-F1 (IVD)	V0123-F1 (IVD)
Battelle Batch ID	03-0100	02-668	02-667	03-0100	03-0023
Associated Blank	BB142PB	AB489PB	AB484PB	BB142PB	AB851PB
Field Date	11/14/02	11/12/02	11/11/02	11/11/02	11/11/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	01/31/03	11/22/02	11/22/02	01/31/03	01/09/03
Acquired Date	02/19/03	12/15/02	12/28/02	02/17/03	02/19/03
Analytical Method	8270M	8270M	6270M	8270M	8270M
Percent Solids	18.34 %	15.86 %	19.4 %	18.36 %	18.31 %
Metrix	Solid	Sediment	Sediment	Solid	Sediment
Sample Size	5.67 g	25.3 mg	63.8 mg	5.55 g	5.76 mg
Weight Basis	DRY	OIL	OIL	DRY	DRY
Min Reporting Limit Amount Units	1.460 μg/kg	0.292 mg/kg	0.134 mg/kg	2.160 µg/kg	2.08 µg/kg
Q9- Sesquitemane (9)	118	19.8	0.967	274	292
Q10- Sesquiterpane (10)	51.8	7.11	0.34	108	113
Q1- Sesquiterpane (1)	125	16.2	0.83	202	270
Q2- Sesquiterpane (2)	147	18.5	0.919	243	258
Q3- Sesquiterpane (3)	226	26.9	1.41	313	292
Q4- Sesquiterpane (4)	110	11.9	0.695	166	171
Q5- Sesquiterpane (5)	61.8	4.82	0.299	94.5	96.7
Q6- Sesquiterpane (6)	96.6	8.8	0.492	133	126
Q7- Sesquiterpane (7)	47.5	4.57	0.269	72.9	72.6
Q8- Sesquiterpane (8)	292	30.2	1.93	394	407
11-C15-Isoprenoid (1380)	341	79.8	1.41	495	246
I2-C15-Isoprenoid (1470)	542	97,6	2.4	718	424
I3-C18-Isoprenoid (1650) I4-C19-Isoprenoid (Pristane)	547 937	80.5 128	2,75 4,16	647 1100	351 583
I5-C20-Isoprenoid (Phytane)	1150	126	4.10 5.44	1260	782
T4-C23 Tricyclic Terpane	442	41.8	3,09	658	782
T5-C24 Tricyclic Terpane	315	28	2.02	445	527
T6-C25 Tricyclic Terpane	402	34.5	2.64	575	696
T6c-C26 Tricyclic Terpane-22R	181	15.2	1.2	246	326
T6b-C28 Tricyclic Terpane-22S	175	15	1.17	248	304
T6a-C24 Tetracyclic Terpane	115	11.5	0.731	127	158
T7-C28 Tricyclic Terpane-22S	259	17.3	1.58	408	475
T8-C28 Tricyclic Terpane-22R	244	18.8	1.76	421	487
T9-C29 Tricyclic Terpane-22S	281	21.4	2.03	423	506
T10-C29 Tricyclic Terpane-22R	272	19.6	1.66	400	482
T11-18a(H)-22,29,30-Trisnomechopane-TS	401	36.4	2.71	451	531
T12-17a(H)-22,29,30-Trisnorhopane-TM	402	39.8	2.95	509	669
T14a-a,b- and b,a-28,30-Bisnomopane	412	39.9	3.04	607	916
T14b-17a(H),21b(H)-25-Norhopane	230	21.3	1.7	339	554
T15-30-Norhopane	1380	136	10.5	1680	2000
T16-18a(H)-30-Nomeohopane-C29Ts	489	47.2	3.73	611	810
X- 17a(H)-Diahopane	122	13.6	0.886	137	145
T17- 30-Normoretane	222	21.2	1.58	304	424
T18-18a(H) & 18b(H)-Oleanane	364	33	2.8	559	778
T19-Hopane	2550	242	19.7	3400	4110
T20- Mortane	839	63.5	5.18	581	744
T21-30-Homohopane-22S	894	97.3	7.13	1110	1260
T22-30-Homohopane-22R T26-30 Bishomohopane 22S	731	76.5	5.42	797	901
T26-30-Bishomohopane-22S T27-30,31-Bishomohopane-22R	516 400	60.4 43.7	4.04	613	640
T30-30,31-Trishomohopane-22S	400 540	43.7 55.8	3.13 3.98	475 566	528
T31-30,31-Trishomohopane-22R	348	38.4	2.9	461	642 546
T32-Tetrakishomohopane-22S	258	27.5	2.9	320	331
T33-Tetrakishomohopane-22R	162	20.4	1.34	200	215
T34-Pentakishomohopane-22S	224	26	1.76	260	215
T35-Pentakishomohopane-22R	161	18.4	1.18	212	218
S4-13b(H),17a(H)-20S-Diacholestane	966	74.4	6.42	1380	1510
S5-13b(H),17a(H)-20R-Diacholestane	612	46.8	4.04	902	974
S8-13b(H),17a(H)-20S-Methyldiacholestane	905	63.6	6.19	1290	1450
S12-14a(H),17a(H)-205-Cholestane	1740	141	12.2	2450	2940
S14-14b(H),17b(H)-20R- Cholestane	871	74.4	6.56	1180	1540
S15-14b(H),17b(H)-20S- Cholestane	849	70.4	6.78	1290	1490
S17-14a(H),17a(H)-20R- Cholestane	2110	170	15.6	3220	4010
S18-13b(H),17a(H)-20R- Ethyldiacholestane	314	25.7	2.22	422	418
S19-13a(H),17b(H)-20S-Ethyldiacholestane	71.1	6,44	0.55	97.5	140
S20-14a(H),17a(H)-20S- Methylcholestane	924	74.4	6.95	1320	1560
S22-14b(H),17b(H)-20R-Methylcholestane	1260	107	9.76	1840	2270
S23-14b(H),17b(H)-20S-Methylcholestane	1330	116	10.6	1900	2300
S24-14a(H),17a(H)-20R-Methylcholestane	1290	114	10.7	2170	2980
S25-14a(H),17a(H)-20S-Ethylcholestane	780	77.1	6.27	1060	1400
S26-14b(H),17b(H)-20R-Ethylcholestane	1160	109	8.93	1510	1830
S27-14b(H),17b(H)-20S-Ethylcholestane	819	70.8	6.26	1050	1220
S28-14a(H),17a(H)-20R-Ethylcholestane	1320	120	10.5	2020	2590

Project Name Lake Union Sediment Investigation Project Number N005443

Client Samole ID NLU-117-0010c NLU-117 0810 NLU-117 2830 NLU-117 4850 NLU-117-US-9.6 Battelle Sample ID U6525-D-F1 U0387-D-F1 U0397-D-F1 U0407-D-F1 U4507-D-F1 Battelle Batch ID 03-0159 03-0137 03-0159 03-0159 03-0100 BB426PB 11/15/02 BB426PB 11/15/02 Associated Blank BB278PB BB426PB BB142PB Field Date 11/15/02 11/15/02 11/18/02 11/21/02 02/21/03 01/29/03 01/31/03 Receipt Date 11/21/02 11/21/02 11/21/02 Extraction Date Acquired Date 02/11/03 02/21/03 02/21/03 02/17/03 8270M 02/21/03 03/05/03 03/05/03 03/05/03 Analytical Method 8270M 8270M 8270M 8270M Percent Solids 87.86 % Solid 32.43 % 27.62 % 22.52 % 26.72 % Matrix Solid Solid Solid Solid Sample Size 0.68 mg 0.33 mg 0.3 mg 0.39 mg 10.1 g DRY Weight Basis Min Reporting Limit DRY DRY DRY DRY 9.970 36 600 23.6 34.200 2 970 Amount Units µg/kg µg/kg µg/kg µg/kg µg/kg Q9- Sesquiterpane (9) Q10- Sesquiterpane (10) 384 155 499 390 228 154 173 180 235 95 60 Q1- Sesquiterpane (1) 181 258 110 63.6 Q2- Sesquiterpane (2) 251 288 244 168 86.8 Q3- Sesquiterpane (3) Q4- Sesquiterpane (4) 511 215 422 483 351 130 175 210 116 34.8 Q5- Sesquiterpane (5) Q6- Sesquiterpane (6) 90,3 135 91.9 111 65,6 19.9 146 161 74.2 21.3 Q7- Sesquiterpane (7) Q8- Sesquiterpane (8) 48.2 396 62.5 405 ND ND 9.67 402 344 100 11-C15-Isoprenoid (1380) 12-C15-Isoprenoid (1470) 2890 4960 2360 2830 1000 262 3190 4040 1250 408 13-C18-Isoprenoid (1650) 4010 5110 4480 1020 218 I4-C19-Isoprenoid (Pristane) I5-C20-Isoprenoid (Phytane) 7790 E 10600 6720 1750 515 7190 9190 5990 1710 170 T4-C23 Tricyclic Terpane 528 791 841 1040 16.2 T5-C24 Tricyclic Terpane T6-C25 Tricyclic Terpane T6c-C26 Tricyclic Terpane-22R 338 515 615 807 738 7.8 9.63 406 679 881 368 356 4.78 5.71 187 269 392 T6b-C26 Tricyclic Terpane-22S T6a-C24 Tetracyclic Terpane 173 273 428 136 529 550 86.2 133 203 562 8.48 T7-C28 Tricyclic Terpane-22S T8-C28 Tricyclic Terpane-22R 257 376 ND ND ND 280 398 583 T9-C29 Tricyclic Terpane-22S T10-C29 Tricyclic Terpane-22R 433 399 566 555 275 642 270 583 548 ND T11-18a(H)-22,29,30-Trisnormeohopane-TS T12-17a(H)-22,29,30-Trisnorhopane-TM T14a-a,b- and b,a-28,30-Bisnorhopane 269 331 394 472 472 7.38 633 907 48.6 441 576 850 1400 ND T14b-17a(H),21b(H)-25-Norhopane 228 355 459 730 ND T15-30-Norhopane T16-18a(H)-30-Nomeohopane-C29Ts X- 17a(H)-Diahopane 1430 540 1890 751 983 2480 94.1 368 61.8 938 ND 131 280 171 422 165 ND T17- 30-Normoretane T18-18a(H) & 18b(H)-Oleanane 185 423 27 754 3650 359 501 995 15.8 T19-Hopane T20- Mortane 1950 2810 4470 110 366 690 1040 1100 34.6 44.2 T21-30-Hornohopane-22S 631 971 1360 1560 T22-30-Homohopane-22R 788 628 36.4 24.4 439 634 1050 T26-30-Bishomohopane-22S T27-30,31-Bishomohopane-22R 339 458 719 284 420 500 605 563 738 16.2 T30-30,31-Trishomohopane-22S T31-30,31-Trishomohopane-22R 326 468 13.3 274 368 483 619 11.9 T32-Tetrakishomohopane-22S T33-Tetrakishomohopane-22R 193 265 297 198 360 ND 120 167 245 ND T34-Pentakishomohopane-22S T35-Pentakishomohopane-22R 165 202 257 310 ND 218 1740 118 149 239 ND S4-13b(H),17a(H)-20S-Diacholestane S5-13b(H),17a(H)-20R-Diacholestane 1040 1700 1770 11.8 668 1100 1180 1100 5.85 S8-13b(H),17a(H)-20S-Methyldiacholestane S12-14a(H),17a(H)-20S-Cholestane 933 1450 1560 1740 ND 2560 1620 2990 4110 25.8 S14-14b(H),17b(H)-20R- Cholestane S15-14b(H),17b(H)-20S- Cholestane 753 818 1110 1180 1480 1970 11.7 1410 1940 11.2 4350 504 S17-14a(H),17a(H)-20R- Cholestane 2150 3410 32.5 8060 S18-13b(H),17a(H)-20R- Ethyldiacholestane 278 452 523 12.4 S19-13a(H),17b(H)-20S-Ethyldiacholestane S20-14a(H),17a(H)-20S- Methylcholestane 61.3 799 116 147 1700 ND ND 1290 2380 14.1 S22-14b(H),17b(H)-20R-Methylcholestane S23-14b(H),17b(H)-20S-Methylcholestane 1140 1660 2130 17.1 2890 1730 1190 2320 2770 18.3 S24-14a(H),17a(H)-20R-Methylcholestane 1500 2220 3250 5000 24.8 S25-14a(H),17a(H)-20S-Ethylcholestane 664 1260 17.6 898 1250 1840 S25-14b(H),17b(H)-20R-Ethylcholestane S27-14b(H),17b(H)-20S-Ethylcholestane 924 1650 1970 965 648 1150 13.3 1560 S28-14a(H),17a(H)-20R-Ethylcholestane 1700 1220 3620 2420 J=Result < Sample RL. ND= Not Detected.

D= Values reported using secondary dilution factor.

&= Outside of DQO. E= Estimated Value. Result above high level in I-Cal.

ME= Matrix Interference. Estimated Value.

Project Name Lake Union Sediment Investigation Project Number N005443

Intel® Sample D U052-D-F1 U046D-F1 U046D-F1 U046D-F1 U045D-F1 Backle Starth B171022 B17102 B171022 B17102 B171022 B17102 B171022 B17102 B171022 B17102 B171022 B17102	Client Sample ID	NLU-119-0010c	NLU-119-0608	NLU-119-1618	NLU-119-2426	NLU-119R2-US-0.5
Bathle Bach D 03-017 <th0< td=""><td>Battelle Sample ID</td><td>U6524-D-F1</td><td>U0455-D-F1</td><td>U0460-D-F1</td><td>U0464-D-F1</td><td>U4512-D-F1</td></th0<>	Battelle Sample ID	U6524-D-F1	U0455-D-F1	U0460-D-F1	U0464-D-F1	U4512-D-F1
Pact Date 11/18/2		03-0137	03-0137	03-0137	03-0137	
Receip Date 11/21/02 11/21/02 11/21/02 01/21/03 02/10/03	Associated Blank	BB278PB	BB278PB	BB278PB	BB278PB	BB426PB
Extension Date 021103 <th< td=""><td>Field Date</td><td>11/18/02</td><td>11/18/02</td><td>11/18/02</td><td>11/18/02</td><td>11/21/02</td></th<>	Field Date	11/18/02	11/18/02	11/18/02	11/18/02	11/21/02
Acquired later 022003 <th< td=""><td>Receipt Date</td><td>11/21/02</td><td>11/21/02</td><td>11/21/02</td><td>11/21/02</td><td>01/29/03</td></th<>	Receipt Date	11/21/02	11/21/02	11/21/02	11/21/02	01/29/03
Avalytics Medieg 12/21 M 12/21 M 12/21 M 12/20 M	Extraction Date	02/11/03	02/11/03	02/11/03	02/11/03	
Process Data 21,3 % 17,32 % 21,0 % 22,77 % 45,78 % Mark Bod DRY mp DRY mp </td <td>Acquired Date</td> <td>02/20/03</td> <td>02/20/03</td> <td></td> <td></td> <td>03/06/03</td>	Acquired Date	02/20/03	02/20/03			03/06/03
Latis Solid Solid <th< td=""><td>Analytical Method</td><td>8270M</td><td></td><td>8270M</td><td>8270M</td><td></td></th<>	Analytical Method	8270M		8270M	8270M	
Sample Size 0.45 mg 0.27 mg 0.28 mg 0.5 mg 1.01 mg Veryet Ram 110 ¹⁰ 100 ¹⁰ <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
Neight Basis DPV DPV DPV DPV DPV DPV DPV Annard Diss 1990			-			
Mr. Reporting Limit 15:00 18:00 25:00 25:00 27:01 Dr. Sequelarisons (9) 204 2410 1960 1929 1929 Dr. Sequelarisons (9) 642 914 65:1 15:6 112: Dr. Sequelarisons (1) 842 914 65:1 15:6 112: Dr. Sequelarisons (1) 86:0 120:0 63:2 114: Dr. Sequelarisons (2) 2050 23:30 16:20 16:0:0 16:0:0 Dr. Sequelarisons (2) 2050 23:0:0 16:0:0						
Attentivité ppg ppg ppg ppg ppg ppg C10-Sacadespare (10) 200 241 160 160 163 C10-Sacadespare (10) 482 161 163 154 C2-Sacadespare (10) 100 1200 1600 762 163 C2-Sacadespare (1) 283 200 1600 762 163 C2-Sacadespare (1) 283 200 1600 762 163 C2-Sacadespare (1) 483 264 364 344 44 C2-Sacadespare (1) 1500 1160 1540 1404 228 C2-Sacadespare (1) 1500 11600 1540 1270 1270 C2-Sacadespare (1) 1500 13000 200 1270 1390 1270 C2-C3-Sacadespare (1994are) 17000 E 14000 E 1200 1466 668 C2-C3-Sacadespare (1994are) 17000 E 14000 E 1200 1400 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>						
Col Excl						
010.5cs.ubinpane (10) 942 918 919 518 112 01.5cs.ubinpane (1) 1080 1202 150 833 134 02.5cs.ubinpane (1) 1080 1202 150 160 184 02.5cs.ubinpane (2) 683 200 150 446 189 02.5cs.ubinpane (2) 450 450 450 446 189 02.5cs.ubinpane (2) 450 1600 450 446 180 760 02.6cs.ubinpane (2) 1500 1600 1600 1600 770 136 12.4C15.ubinpane (1) 1500 1300 E 750 770 136 12.4C15.ubinpane (190) 10100 E 1300 E 1200 460 770 12.4C15.ubinpane (190) 10100 E 1200 E 1200 1460 460 770 12.4C15.ubinpane (190) 10100 E 1300 E 1200 140 460 770 136 562 770 136 562 770 136 562 770 136 562 770 136 562 770	Amount Onits	ружу	рд/кд	рулку	hð\kð	рулку
O1-Sequence (1) 888 1020 800 833 134 O2-Sequence 100 1220 100 100 130 O2-Sequence 200 1200 100 130 O2-Sequence 200 1200 100 130 O2-Sequence 400 200 100 140 400 100 O2-Sequence 200 100 130 140 140 100 100 100 130 100 100 130 100 100 130 100 100 130 100 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
02.5 singularginary (2) 1000 1280 1000 702 163 03.5 singularginary (4) 063 4203 1980 1070 1311 03.5 singularginary (4) 063 4203 1980 4263 1981 03.5 singularginary (5) 040 4203 1800 1800 1800 1285 05.5 Singularginary (7) 1212 2011 144 1444 NO 05.5 Singularginary (7) 1500 1800 1800 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1800 1700 1700 1800 1700 1200 6400 1800 1700 1200 6400 1800 1700 1200 1800 1700 1200 1800 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200						
G3-Sequergiane (b) 250 2430 150 1070 331 G4-Sequergiane (b) 460 620 380 460 189 G5-Sequergiane (b) 460 630 380 189 189 G5-Sequergiane (b) 120 120 144 144 ND G5-Sequergiane (b) 1200 1860 380 4620 786 G1-Sequergiane (b) 1000 1800 780 1700 1310 1200 1800 1200 1100 1310 1200 1100 1200 1200 1100 1200						
Ch-Sequetry (i) 693 620 580 446 196 Ch-Sequetry (i) 421 514 424 304 100 Ch-Sequetry (i) 100 1600 1300 100 20 Ch-Sequetry (i) 1000 11800 1800 420 780 Ch-Sequetry (i) 11900 11800 6500 5700 100 100 Ch-Sequetry (i) 11900 11800 6500 5700 100 770 Ch-Sequetry (i) 11900 11800 1200 1600 770						
GS-Sequelmpane (b) 401 428 556 248 156 GS-Sequelmpane (C) 421 210 210 144 146 145 145 145 145 145 145 145 145 145 145 145 145 145 145 145 145 145 145 146 145 146 145 146 145 146 145 146 145 146 145 146 145 146 145 146 145 146 145 146 146 146 146 146 146 146 146 146						
Gb-Sequeripane (b) 449 514 450 328 94 GJ-Sequeripane (b) 120 1000 1380 1000 22 GB-Sequeripane (b) 1300 1380 1000 230 230 C1-Sequeripane (b) 1300 1380 920 970 138 C1-Sequeripane (b) 1700 1500 750 4160 777 C1-Sequeripane (b) 1700 E 1900 1900 200 240 270 C1-Sequeripane (b) 1700 E 1900 E 1900 200 260 270 C1-Sequeripane (b) 1700 E 1900 E 1900 140 480 C2-ST fright Terpane 225 59 60 101 471 248 T1-Sequeripane (b) 170 26 669 852 669 361 T1-Sequeripane 225 571 661 671 670 390 111 T1-Sequeripane 225 573 669 850 660 760 390 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
Or.7-sequelarigname (r) 122 201 14.4 14.4 14.4 14.4 ND OS. Sesquelarigname (r) 1500 1500 1500 1500 1500 7500 750 11-C1F isopproxid (1500) 1000 E 1500 E 2500 760 7500 1600 7500 1600 7500 1600 7500 170						
GB-Sequenterpane (b) 1500 1600 1800 8300 4400 232 11-G15-Isopproxid (1470) 11300 1130 1170 1130 1170 1130 1170 1130 1170 1130 1130 1170 11300 1130 1170						
11-15:boppmont (1980) 10200 11800 8880 4820 786 22-15:boppmont (1970) 10300 11800 7500 4160 727 12-15:boppmont (1970) 1020 12000 11800 7200 4160 727 12-15:boppmont (1970) 1020 12000 12000 4160 7200 4200 727 12-15:boppmont (1970) 1200 1200 1200 1200 4100 680 727 15-24:Troycki: Tepane 680 800 617 740 458 579 562 562 568 590 562 562 579 741 246 176-253 571 563 560 661 442 176 574 564 566 560 661 442 170-233 573 565 660 661 442 170-233 565 560 661 462 360 470 360 470 360 360 470 360 360 471 476 354 554 660 661 422 170-231 560 <						
B2-015.biogramodi (1470) 11300 E 13300 E 9520 9770 1380 B2-016.biogramodi (1450) 10100 11800 7500 4160 7700 B2-016.biogramodi (1450) 17000 E 11800 11800 7000 872 B2-230.biogramodi (1450) 17000 E 19400 E 11800 6463 872 B15-23 Tingquic Terpane 160 1070 657 628 579 B16-23 Tingquic Terpane-228 347 396 413 411 244 T6-24 Tingquic Terpane-228 367 665 660 672 669 344 T7-223 Tingquic Terpane-228 573 666 679 760 720 369 T11-1414/-22.33,0-Tinomenopane-TS 602 685 660 681 402 T11-1414/-22.33,0-Tinomenopane-TS 602 720 369 412 T14-1414/-22.33,0-Tinomenopane-TS 602 685 680 680 582 T14-1414/-22.33,0-Tinomenopane-CS 750 534 534						
B3-C18.bispersoid (1650) 1000 11800 7500 4160 757 M3-C18.bispersoid (Phylane) 17000 E 19400 E 1000 6460 872 M5-C2.01 Knyckic Trapse 160 1000 1001 1017 1740 653 M5-C2.01 Knyckic Trapse 669 477 972 655 926 579 M5-C2.01 Knyckic Trapse 686 439 447 447 248 M5-C2.01 Knyckic Trapse 586 496 443 441 244 M5-C2.01 Knyckic Trapse 586 660 672 668 391 M5-C2.01 Knyckic Trapse 573 665 660 661 402 M5-C2.01 Knyckic Trapse 573 665 660 661 402 M5-C2.01 Knyckic Trapse 573 665 660 661 402 M1-C2.01 Knyckic Trapse 573 665 660 661 402 M1-C2.01 Knyckic Trapse 573 665 660 661 402 M1-C2.01 Knyckic Trapse 573 655 660						
H-C19:bsprendi (Phistane) 17800 E 1800 E 1800 672 FC20:bsprendi (Phistane) 1700 E 1800 1230 1110 689 FC21:Troyclic Terpane 680 800 817 7406 899 FC21:Troyclic Terpane 860 800 817 7406 899 FFC21:Troyclic Terpane-22R 866 940 413 441 244 FFSC23:Troyclic Terpane-22S 597 661 671 676 334 FFSC23:Troyclic Terpane-22S 597 661 669 682 686 361 FFSC23:Troyclic Terpane-22S 597 665 680 680 680 680 680 680 680 680 680 680 680 680 680 680 680 680 582 583 5						
15-620-bageneoid (Phyame) 17000 E 1800 E 1200 1840 672 174-623 Tricyclic Terpane 1880 1890 1817 1440 438 175-624 Tricyclic Terpane 1887 1700 E 1870						
14-62 Tricyclic Terpane 1120 1280 1230 1110 658 15-62 Tricyclic Terpane 649 800 617 740 448 15-62 Tricyclic Terpane-228 366 439 437 447 224 156-62 Tricyclic Terpane-228 347 356 413 411 246 17-62 Tricyclic Terpane-228 347 356 669 692 696 361 17-62 Tricyclic Terpane-228 595 669 669 692 696 361 17-62 Tricyclic Terpane-228 595 669 692 696 361 17-62 Tricyclic Terpane-228 595 669 692 696 361 17-62 Tricyclic Terpane-228 595 662 690 680 360 17-14 Tricy-223 Joritiscondopane-TS 602 685 582 686 582 17-14 Tricy-223 Joritiscondopane-C975 203 204 591 300 300 17-14 Tricy-14 Joritiscondopane-C975 205 206 200 690 412 17-14 Sol-Mononopane-2075 215 166		17000 E	19400 E	12000	6480	872
IF6-25 Tricyclic Tepane-22B 847 972 955 926 779 IF6-26 Tricyclic Tepane-22B 347 366 443 441 244 IF6-26 Tricyclic Tepane-22B 347 366 413 411 244 IF6-26 Tricyclic Tepane-22B 347 366 661 671 675 334 IF6-26 Tricyclic Tepane-22B 567 661 671 675 344 IF6-26 Tricyclic Tepane-22B 573 666 660 660 360 IF1-162H/12223-05 Trisonchopane-2B 668 679 726 365 562 IF1-162H/12223-05 Trisonchopane-1M 754 759 632 655 562 IF1-164H/12223-05 Trisonchopane 476 534 534 660 412 IF1-164H/12223-05 Trisonchopane 754 549 541 423 163 IF1-164H/12223-05 Trisonchopane 757 549 544 562 573 IF1-164H/12223-05 Trisonchopane 757 549 544 563 </td <td></td> <td></td> <td>1280</td> <td>1230</td> <td>1110</td> <td></td>			1280	1230	1110	
TBe:C2B Tright: Fagane-22R 386 439 437 447 248 TBe:C2B Tright: Fagane-22R 347 386 413 411 244 TBe:C2B Tright: Fagane-22R 586 669 661 671 676 354 TB:C2B Tright: Fagane-22R 586 669 682 686 681 <td>T5-C24 Tricyclic Terpane</td> <td>689</td> <td>800</td> <td>817</td> <td>740</td> <td>438</td>	T5-C24 Tricyclic Terpane	689	800	817	740	438
Töb-C28 Tringelic Terjane-225 347 366 413 411 244 Tö-C28 Tringelic Terjane-225 567 661 671 676 354 Tö-C28 Tringelic Terjane-228 573 665 660 681 402 Tö-C28 Tringelic Terjane-228 573 665 660 681 402 Tö-C28 Tringelic Terjane-228 573 665 680 680 360 Ti-Taga Tringelic Terjane-228 573 665 680 680 360 Ti-Taga Tringelic Terjane-228 357 673 680 680 360 Ti-Taga Tringelic Terjane-228 351 680 680 560 570 Ti-Taga Tringelic Terjane-228 353 926 945 690 570 Ti-S-So Monopane 457 519 554 550 573 578 Ti-S-So Monopane 453 948 1000 1150 684 Ti-S-So Monopane-228 1550 1770 1740 1740 770	T6-C25 Tricyclic Terpane	847	972	955	926	579
Tipe-C24 Terraycic Tepane 100 216 206 202 110 Tr-C28 Tricycli Tepane-Z2B 557 661 671 676 354 TP-C28 Tricycli Tepane-Z2B 556 665 660 661 402 TP-C28 Tricycli Tepane-Z2B 608 679 765 720 399 T11-1161/1-222 3/0-Trisonorbopane-TS 602 665 660 680 300 T14-1161/1-222 3/0-Trisonorbopane-TM 754 675 665 660 690 300 T14-ab. and bac 28.00 Ensonorbopane-TS 602 685 680 680 300 T14-ab. and bac 28.00 Ensonorbopane-C207s 353 524 534 669 420 170 1600 T15-30 Anomologane-C207s 353 926 945 952 556 220 171 113 T15-30 Anomologane-C207s 853 940 1500 556 220 171 114 114 114 114 114 114 114 114 114	T6c-C26 Tricyclic Terpane-22R					
T7-C2B Tricyclic Terpane-22S 587 661 671 676 354 T8-C2B Tricyclic Terpane-22R 576 669 682 666 681 402 T9-C2B Tricyclic Terpane-22R 608 679 706 720 389 T11-f84(H)-222,8).0-Trisromeohogane-TS 602 685 680 680 300 T14-f84(H)-222,8).0-Trisromeohogane-TS 602 685 680 680 300 T14-f84(H)-222,8).0-Trisromeohogane-TS 608 1120 1080 1200 227 T14-f84(H)-122,8).0-Trisromeohogane-C20Ts 835 260 240 561 348 T14-f84(H)-54,9-Abordopane 477 519 504 561 348 T14-84,00 180(H)-Cleanane 788 882 623 674 578 T14-84,00 180(H) 1180 1170 1740 1780 365 344 T14-84,00 180(H) 180(H) 180 140(H) 1780 365 344 T14-84,00 180 1710 1740 1740 1780 365 342<	T6b-C26 Tricyclic Terpane-22S					
TB-C22 Tricyclic Terpane-22R 596 669 692 696 691 402 T10-C23 Tricyclic Terpane-22R 603 673 765 720 389 T11-18(1)-22,3).0.Trisnomebopane-TS 603 685 680 680 380 T11-18(1)-22,3).0.Trisnomebopane-TM 754 673 832 895 582 T14-aba.du ba-23,0.Binsnomebopane-C2R 896 1120 1080 1200 927 T14-aba.du ba-23,0.Binsnomebopane-C2R 835 266 945 692 590 T13-30-Momoretame 476 534 594 592 590 T13-30-Momoretame 457 515 594 591 593 T13-30-Momoretame 453 590 570 570 590 T14-ball,14 1610 1180 1210 771 590 590 590 590 590 290 T14-30-Momoretame 663 967 772 170 170 170 770 770 7	T6a-C24 Tetracyclic Terpane	190				
TP-C23 Trysicit Tensone-225 573 665 660 681 402 T14-C23 Titisomechopane-TS 602 685 660 680 380 T14-Taff+22,23.9.3-Tissomechopane-TS 602 685 660 680 380 T14-Taff+22,23.9.3-Tissomechopane-TS 666 1120 1080 1200 927 T14b-Taff+1)T2(h)-25-Monopane-TS 835 926 945 982 950 T14b-Taff+1)Chopane 242 186 247 213 113 T17-30-Normostrane 457 519 504 561 348 T14-Ba(H)A 18b(H)-Oleanane 788 882 923 974 578 T19-Hopane 480 560 570 555 242 T24-30 Homolopane-225 1550 1770 1740 1780 940 T24-30 Homolopane-226 667 770 792 757 351 T33-030-Tristomolopane-227 864 742 798 712 355						
T10-C22 Trivelic Tengane-22R 606 679 705 720 369 T11-184(H)-22,33.0-Tinsonchopane TM 754 879 832 885 562 T14-a,b. and b>23.3.0-Eisonchopane 966 1120 1080 1200 227 T14-b-174(H)-22,3.0-Tinsonchopane 476 534 534 609 412 T15-30-Notropane 476 534 534 609 412 T15-30-Notropane 476 534 534 609 412 T15-30-Notropane 420 186 247 213 113 T17-30-Notropane 457 519 504 561 348 T18-18-18(H) & 180(H)-Oleanane 788 882 523 974 578 T20-Motne 853 948 1060 1150 664 T23-30-Tinsonbopane-22R 1500 1770 1740 1780 940 T24-30-Homobpane-22R 1640 1160 1160 120 777 T33-03.31-Tristomotopane-22R 667 770 792 757 551 T33-0-Sta						
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S14-14b(H) T7b(H)-20R Cholestane 1690 1990 1920 2040 1160 S15-14b(H) T7b(H)-20R Cholestane 1820 2070 2080 2080 1160 S15-14b(H) T7b(H)-20R Cholestane 1730 5500 5660 5920 3760 S18-13b(H) T34(H)-20R Ethydiacholestane 550 647 682 525 213 S19-13a(H).17b(H)-20R Methydiacholestane 121 158 168 156 103 S20-14a(H) T20R Methydiacholestane 2560 2980 2110 2160 1480 S22-14b(H) T20R Methydicholestane 2560 2980 2910 3070 1890 S22-14b(H).17b(H)-20R Methydicholestane 2590 2920 2960 3100 1690 S24-14b(H).17a(H)-20S-Ethydicholestane 340 3320 3850 4570 3010 S25-14a(H).17a(H)-20S-Ethydicholestane 1450 1670 1720 1850 1280						
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S17-14a(H),17a(H)-20R- Cholestane 4730 5500 560 5920 3760 S18-13b(H),17a(H)-20R- Ethyldiacholestane 550 647 682 525 213 S19-13a(H),17b(H)-20S- Ethyldiacholestane 121 158 168 156 103 S20-14a(H),17a(H)-20S- Methylcholestane 1840 2090 2110 2160 1480 S22-14b(H),17b(H)-20S-Methylcholestane 2560 2980 2910 3070 1890 S23-14b(H),17b(H),20R-Methylcholestane 2590 2920 2960 3100 1690 S24-14a(H),17a(H),20R-Methylcholestane 3340 3920 3850 4570 3010 S25-14b(H),17b(H)-20R-Ethylcholestane 1450 1670 1720 1850 1280 S25-14a(H),17a(H)-20S-Ethylcholestane 1860 2210 2450 2290 1200 S26-14b(H),17b(H)-20R-Ethylcholestane 1860 2100 1490 1900 979						
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S27-14b(H),17b(H)-20S-Ethylcholestane 1590 1700 1490 1900 979						
	S27-14b(H),17b(H)-20S-Ethylcholestane		1700		1900	979
	S28-14a(H),17a(H)-20R-Ethylcholestane	2840	3210	3150	3620	2190

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-121-5S-0010	NLU-121-SS-2030	NLU-122-SS-0010	NLU-122-SS-2030	NLU-123-SS-0010
Battelle Sample ID	U0151-F1	U0152-F1	U0153-F1	U0154-F1	U0155-F1
Battelle Batch ID	02-667	02-668	02-668	02-668	02-667
Associated Blank	AB484PB	AB489PB	AB489PB	AB489PB	AB484PB
Field Date	11/13/02	11/13/02	11/13/02	11/13/02	11/13/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	11/22/02	11/22/02
Acquired Date	12/13/02	12/15/02	12/15/02	12/15/02	12/13/02
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	11.9 %	19.2 %	43.46 %	29.53 %	14.8 %
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Size	48.2 mg	33 mg	49.5 mg	173.2 mg	83.2 mg
Weight Basis	OIL	OIL	OIL	OIL	OIL
Min Reporting Limit Amount Units	0.139 mg/kg	0.215 mg/kg	0.136 mg/kg	0.124 mg/kg	0.136 mg/kg
				34.3	10.5
Q9- Sesquiterpane (9)	18.5 8.48	27.2 8.4	24.7 10.9	16.5	4.24
Q10- Sesquiterpane (10) Q1- Sesquiterpane (1)	12.8	17	16.5	20.3	9.07
Q2- Sesquiterpane (2)	13.5	16,7	18.7	18	10.2
Q3- Sesquiterpane (2)	30.6	27.9	28	27.8	18.3
Q4- Sesquiterpane (4)	12	13.3	12	13.7	7.92
Q5- Sesquiterpane (5)	5.07	5.52	5	6.01	3.32
Q6- Sesquiterpane (6)	10.4	11.1	9.48	12.4	7.47
Q7- Sesquiterpane (7)	4.92	5.48	5.01	5.64	3.49
Q8- Sesquiterpane (6)	27.6	34.6	36.4	33	24.1
(1-C15-Isoprenoid (1380)	15.3	120	114	369 E	28
12-C15-Isoprenoid (1470)	30.5	157	123	381 E	38.9
I3-C18-isoprenoid (1650)	15.9	156	91.6 164	280 462 E	33.6 54.3
I4-C19-Isoprenoid (Pristane)	25	269	184	402 E 373 E	85.7
15-C20-Isoprenoid (Phytane)	29.6	298 36.4	35.4	15.8	34
T4-C23 Tricyclic Terpane	30.4 20.4	24.8	24	10.9	23.9
T5-C24 Tricyclic Terpane	20.4	29.7	28.6	12.6	28.6
T6-C25 Tricyclic Terpane T6c-C26 Tricyclic Terpane-22R	10.4	12.9	12.1	5.01	11.8
T6b-C26 Tricyclic Terpane-22S	10.2	12.6	11.9	5.29	11.8
T6a-C24 Tetracyclic Terpane	9.65	6.56	10.6	2.74	9.55
T7-C28 Tricyclic Terpane-22S	10.9	18	11.7	7.17	14.2
T8-C28 Tricyclic Terpane-22R	10.8	19.4	13.1	7.93	14.5
T9-C29 Tricyclic Terpane-22S	14.2	20	16.9	8.72	16.8
T10-C29 Tricyclic Terpane-22R	12.9	19	15.9	8.8	17
T11-18a(H)-22,29,30-Trisnomeohopane-TS	31.4	25.1	31.1	10.3	32.2
T12-17a(H)-22,29,30-Trisnorhopane-TM	29.7	27.6	37.8	13.5 22.9	31.9 31.5
T14a-a,b- and b,a-28,30-Bisnorhopane	29.6	29.4 17.3	46.2 19.2	6.59	17.1
T14b-17a(H),21b(H)-25-Norhopane	14 111	97	131	47.9	115
T15-30-Norhopane T16-18a(H)-30-Nomeohopane-C29Ts	35.2	34.6	38.8	15.3	36.1
X- 17a(H)-Diahopane	9.58	8.67	10.6	4.43	9.62
T17- 30-Normoretane	18.2	15.3	22.1	8.78	17.4
T18-18a(H) & 18b(H)-Oleanane	24.7	28.3	34	14.8	25.5
T19-Hopane	180	188	222	96 .1	198
T20- Mortane	48.4	48.4	46	19.2	47.9
T21-30-Homohopane-22S	71.4	69	88	37.4	78.7
T22-30-Homohopane-22R	61.8	49.1	65.2	24.9	64,2
T26-30-Bishomohopane-22S	46.4	39.5	59	23.6	47.5
T27-30,31-Bishomohopane-22R	34.4	30.3	42	17.8 21.8	35.2 49.1
T30-30,31-Trishomohopane-22S	54.4	38.4 29.2	50.4 36.4	18.5	30.6
T31-30,31-Trishomohopane-22R	28.7 22.3	29.2	27.6	13.7	22.7
T32-Tetrakishomohopane-22S	15.1	15.9	19.8	9.14	14.8
T33-Tetrakishomohopane-22R T34-Pentakishomohopane-22S	22.1	19	29.9	15.6	21
T35-Pentakishomohopane-22R	14.7	13.4	19.6	11.8	13.7
S4-13b(H),17a(H)-20S-Diacholestane	45.6	70.9	46.3	25.4	69.2
S5-13b(H),17a(H)-20R-Diacholestane	25.7	45.4	27.4	15.5	34.4
S8-13b(H),17a(H)-20S-Methyldiacholestane	39.7	60.1	47.7	24.2	67.6
S12-14a(H),17a(H)-20S-Cholestane	67.3	123	112	53.1	106
S14-14b(H),17b(H)-20R- Cholestane	47	65.8	58.6	32.7	57.1
S15-14b(H),17b(H)-20S- Cholestane	47.2	62.7	59.4	31	56
S17-14a(H),17a(H)-20R- Cholestane	98	152	135	74.5	123 16.2
S18-13b(H),17a(H)-20R- Ethyldiacholestane	15.8	20.9	16.8	8,19 2 34	4.18
S19-13a(H),17b(H)-20S-Ethyldiacholestane	4.25	5.11	5.55 60.9	2.34 30.7	4.18
S20-14a(H),17a(H)-20S- Methylcholestane	51.8	83,5 93,6	93,4	46	78.6
S22-14b(H),17b(H)-20R-Methylcholestane	88.8 80.8	101	102	48.4	91.6
S23-14b(H),17b(H)-20S-Methylcholestane	68.1	112	114	60.3	88.7
S24-14a(H),17a(H)-20R-Methyicholestane S25-14a(H),17a(H)-20S-Ethyicholestane	50.3	60.6	66	31.1	58.3
S26-14b(H), 17b(H)-20R-Ethylcholestane	76	79.2	93.7	37.7	76.2
S27-14b(H), 17b(H)-20S-Ethylcholestane	52.5	60.8	65.2	30.2	68.3
S28-14a(H),17a(H)-20R-Ethylcholestane	75.1	105	116	55.3	93.3

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. E= Estimated Value. Result above high level in I-Cal. ME= Matrix Interference. Estimated Value.

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Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-124-SS-0010	NLU-124-SS-2030	NLU-126-SS-0010	NLU-126-SS-0010	NLU-128-SS-1020
Battelle Sample ID	U0156-F1	U0157-F1	U0158-F1	U4517-D-F1	U0097-D-F1 (IVD)
Battelle Batch ID	02-667	02-668	02-668	03-0100	03-0100
Associated Blank	AB484PB	AB489PB	AB489PB	BB142PB	BB142PB
Field Date	11/13/02	11/13/02	11/13/02	11/13/02	11/13/02
Receipt Date	11/15/02	11/15/02	11/15/02	01/29/03	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	01/31/03	01/31/03
Acquired Date	12/14/02	12/15/02	12/15/02	02/17/03	02/19/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	11.3 %	24.16 %	18.66 %	24.92 %	30.91 %
Matrix	Sediment	Sediment	Sediment	Solid	Solid
Sample Size	56.4 mg OIL	40 mg OiL	22.9 mg OIL	7.57 g DRY	9.48 g DRY
Weight Basis Min Reporting Limit	0.133	0.173	0.333	3.960	1.270
Amount Units	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (9)	2.36	26.7	9.42	4.31	56.1
Q10- Sesquiterpane (10)	1.22	9.44	4.89	3.72 J	28.1
Q1-Sesquiterpane (1)	2.84	18.9	13.4	10.6	72.5
Q2- Sesquiterpane (2)	3.5	20.1 29.8	14 20.3	5.88 14.2	92 120
Q3- Sesquiterpane (3)	6.56 2.46	13.6	9.87	5.75	63.1
Q4- Sesquiterpane (4) Q5- Sesquiterpane (5)	1.09	5.36	4.11	12	29.2
Q5- Sesquiterpane (5) Q6- Sesquiterpane (6)	2.16	10.9	7.85	2.59 J	44.1
Q7- Sesquiterpane (7)	1.21	5.15	4.32	0.986 J	27
Q8- Sesquiterpane (8)	10.7	36.6	30.8	7.23	171
I1-C15-Isoprenoid (1380)	5.56	63.9	18.5	3.56 J	131
I2-C15-Isoprenoid (1470)	9.13	76.2	37.9	10.5	237
I3-C18-Isoprenoid (1650)	7.8	51.1	28.9	4.89	232
H-C19-Isoprenoid (Pristane)	18.2	85.9	47.6	13.1	474
I5-C20-isoprenoid (Phytane)	29.9	77.8	60	17.6	478
T4-C23 Tricyclic Terpane	23.5	70.4 46.4	42.6 28.4	4.21 3.95 J	298 193
T5-C24 Tricyclic Terpane T6-C25 Tricyclic Terpane	15.2 17.3	40.4 55.9	35.2	7.25	246
T6c-C26 Tricyclic Terpane-22R	7.02	26.2	14,3	2.81 J	123
T6b-C26 Tricyclic Terpane-22S	6.93	24.3	13.6	2.19 J	110
T6a-C24 Tetracyclic Terpane	8.81	14.6	11.4	1.96 J	88.9
T7-C28 Tricyclic Terpane-22S	6.9	31.5	15.8	ND	159
T6-C28 Tricyclic Terpane-22R	7.44	36.4	17.1	ND	154
T9-C29 Tricyclic Terpane-22S	9.46	37.2	19.2	ND	173
T10-C29 Tricyclic Terpane-22R	9.72	35.6	18.6	ND	176
T11-18a(H)-22,29,30-Trisnomeohopane-TS	24	45 56.2	38.1 37.1	6.56 8.54	281 297
T12-17a(H)-22,29,30-Trisnorhopane-TM	24 20.7	50.2 64.1	33.8	0.54 ND	302
T14a-a,b- and b,a-28,30-Bisnomopane T14b-17a(H),21b(H)-25-Nomopane	10.6	44.5	20.5	ND	192
T15-30-Norhopane	90.8	179	133	23.2	1030
T16-18a(H)-30-Nomeohopane-C29Ts	25.8	61.3	45.7	8.55	342
X- 17a(H)-Diahopane	6.26	14.2	11.5	ND	72.9
T17- 30-Normoretane	12.4	31.9	19.9	6.33	162
T18-18a(H) & 18b(H)-Oleanane	14.1	55.6	29.3	5.44	247
T19-Hopane	131	334	218	37.6	1690
T20- Mortane	31.3 57.7	62.1 108	47.8 86.4	18.7 15.2	372 607
T21-30-Homohopane-22S T22-30-Homohopane-22R	49.8	82.1	68.2	10.6	490
T26-30-Bishomohopane-22S	36.2	66.9	53.6	7.94	356
T27-30,31-Bishomohopane-22R	26.9	49.4	39.4	9.04	286
T30-30,31-Trishomohopane-22S	39.2	61.9	51.6	9.51	368
T31-30,31-Trishomohopane-22R	20.8	49.3	32.9	ND	230
T32-Tetrakishomohopane-22S	17.8	29	24.4	ND	168
T33-Tetrakishomohopane-22R	13	22.1	16.5	ND	125
T34-Pentakishomohopane-22S	17,7	28.1 20	23.6 17.2	ND ND	153 118
T35-Pentakishomohopane-22R S4-13b(H),17a(H)-20S-Diacholestane	11.6 32,3	118	71.5	11.2	507
S5-13b(H),17a(H)-20R-Diacholestane	14.7	74.4	42.6	6.82	308
S8-13b(H),17a(H)-20S-Methyldiacholestane	28	150	55.5	6.64	435
S12-14a(H),17a(H)-20S-Cholestane	61.1	287	117	17.7	1040
S14-14b(H), 17b(H)-20R- Cholestane	30.6	137	64.7	7.52	504
S15-14b(H),17b(H)-20S- Cholestane	31.2	140	69.2	7.38	513
S17-14a(H),17a(H)-20R- Cholestane	61.9	379 E	140	17	1280
S18-13b(H),17a(H)-20R- Ethyldiacholestane	9.79	21	22.3	17.3	180
S19-13a(H),17b(H)-20S-Ethyldiacholestane	3	10.6	7,06	ND 0.25	52,7
S20-14a(H),17a(H)-20S- Methylcholestane S22-14b(H) 17b(H) 20B Methylcholestane	29.3 45.1	147 201	64.5 93.1	9.25 9.84	579 761
S22-14b(H),17b(H)-20R-Methylcholestane S23-14b(H),17b(H)-20S-Methylcholestane	45.1 51.2	201	93.1	9.04	833
S24-14b(H),17b(H)-20S-Methylcholestane	43.2	317	91	8.98	882
S25-14a(H),17a(H)-20S-Ethylcholestane	34.1	131	58.8	7.05	504
S26-14b(H),17b(H)-20R-Ethylcholestane	52.4	142	97.6	11.5	711
S27-14b(H),17b(H)-20S-Ethylcholestane	36.8	134	68.1	10.6	555
S28-14a(H),17a(H)-20R-Ethylcholestane	49.6	244	98,1	10.1	861

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. E= Estimated Value. Result above high level in I-Cal. ME= Matrix Interference. Estimated Value.

Not Surrogate Corrected Final Results

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-127-SS-0010	NLU-128-SS-0010	NLU-129-SS-0010	NLU-129-SS-2030
Battelle Sample ID	U0159-F1-D	U0160-F1	V0135-F1 (IVD)	V0137-F1 (IVD)
Battelle Batch ID	02-667	02-667	03-0023	03-0023
Associated Blank	AB484PB	AB484PB	AB851PB	AB851PB
Field Date	11/12/02	11/13/02	11/11/02	11/11/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	01/09/03	01/09/03
	12/28/02	12/14/02	02/19/03	02/19/03
Acquired Date	8270M	8270M	8270M	8270M
Analytical Method	75 %	81.3 %	20.2 %	24.34 %
Percent Solids	Sediment	Sediment	Sediment	Sedimant
Matrix				
Sample Size	68.9 mg	53.7 mg	6.45 mg	7.72 mg
Weight Basis	OIL	OIL	DRY	DRY
Min Reporting Limit	0.125	0.123	3.10	3.89
Amount Units	mg/kg	mg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (9)	1.37	1.38	13.6	11.6
Q10- Sesquiterpane (10)	0.693	0.67	8.69	7.04
Q1- Sesquiterpane (1)	2	2.22	41.3	72.9
Q2- Sesquiterpane (2)	2.14	2.28	26.8	27.8
Q3- Sesquiterpane (3)	2.77	4.76	50.4	44.3
Q4- Sesquiterpane (4)	1,48	2.08	29.7	51
Q5- Sesquiterpane (5)	0.616	0.788	6.9	16.1
Q6- Sesquiterpane (6)	0.892	1.53	18.2	14
Q7- Sesquiterpane (7)	0.626	1.24	8.83	6.08
Q8- Sesquiterpane (8)	4.46	6.73	70.3	64.1
I1-C15-Isoprenoid (1380)	7.96	8.96	98.5	81.5
12-C15-Isoprenoid (1470)	13.2	14.5	261	319
I3-C18-isoprenoid (1650)	17.2	17.5	142	149
I4-C18-Isoprenoid (Pristane)	33.5 E	35.6	327	300
15-C20-Isoprenoid (Phytane)	26.9	41.5	450	430
T4-C23 Tricyclic Terpane	5.07	36.1	740	482
T5-C24 Tricyclic Terpane	3.32	23.2	449	294
	4.24	32.8	601	366
T6-C25 Tricyclic Terpane		13.9	263	157
T6c-C26 Tricyclic Terpane-22R	1.75		263	152
T6b-C26 Tricyclic Terpane-22S	1.82	15	263	300
T6a-C24 Tetracyclic Terpane	1.33	12.2		
T7-C28 Tricyclic Terpane-22S	2.08	23.1	402	250
T8-C28 Tricyclic Terpane-22R	2.27	25.4	413	241
T9-C29 Tricyclic Terpane-22S	2.54	25.8	422	259
T10-C29 Tricyclic Terpane-22R	2.31	26.2	446	291
T11-18a(H)-22,29,30-Trisnomeohopane-TS	4.11	34.9	840	655
T12-17a(H)-22,29,30-Trisnomopane-TM	4.48	43.8	812	690
T14a-a,b- and b,a-28,30-Bisnorhopane	4.32	83.4	1010	548
T14b-17a(H),21b(H)-25-Norhopane	3	30.5	329	228
T15-30-Norhopane	14.5	156	2780	2520
T16-18a(H)-30-Nomeohopane-C29Ts	5.21	43,5	793	631
X- 17a(H)-Diahopane	1.32	11.7	194	118
T17- 30-Normoretane	2.43	22.3	338	284
T18-18a(H) & 18b(H)-Oleanane	3.73	38.2	424	313
T19-Hopane	25.4	252	3740	3220
T20- Mortane	5.39	40.8	636	4 44
T21-30-Homohopane-22S	9.01	108	1650	1500
T22-30-Homohopane-22R	6.01	66.6	1110	1020
T26-30-Bishomohopane-22S	5.07	66.2	1010	911
T27-30,31-Bishomohopane-22R	3.97	49.2	766	695
T30-30,31-Trishomohopane-22S	4.27	56.7	794	737
T31-30,31-Trishomohopane-22R	3.49	44.1	557	538
T32-Tetrakishomohopane-22S	2.39	31.3	470	470
T33-Tetrakishomohopane-22R	1,62	20	312	305
T34-Pentakishomohopane-22S	2.15	40.3	557	516
	1.38	40.5	393	354
T35-Penlakishomohopane-22R			1010	646
S4-13b(H),17a(H)-20S-Diacholestane	6.86 5.81	62 35.1	575	405
S5-13b(H),17a(H)-20R-Diacholestane				
S8-13b(H),17a(H)-20S-Methyldiacholestane	8.58	56.6	734 1990	479 1400
S12-14a(H),17a(H)-20S-Cholestane	16	140		
S14-14b(H),17b(H)-20R- Cholestane	8.3	83	1370	912
S15-14b(H),17b(H)-20S- Cholestane	8.85	80.5	1280	845
S17-14a(H),17a(H)-20R- Cholestane	20.9 E	186	2540	1730
S18-13b(H),17a(H)-20R- Ethyldiacholestane	3.13	13	323	268
S19-13a(H),17b(H)-20S-Ethyldiacholestane	0.821	6.62	100	58.5
S20-14a(H),17a(H)-20S- Methylcholestane	8.67	85.1	1030	721
S22-14b(H),17b(H)-20R-Methylcholestane	13	118	1560	1060
S23-14b(H),17b(H)-20S-Methylcholestane	14.7	134	1720	1170
S24-14a(H),17a(H)-20R-Methylcholestane	14.7	141	1550	991
S25-14a(H),17a(H)-20S-Ethylcholestane	8.02	79.8	990	711
S26-14b(H),17b(H)-20R-Ethylcholestane	12.6	92	1460	1180
S27-14b(H),17b(H)-20S-Ethylcholestane	7.9	90.5	1280	1010
S28-14a(H),17a(H)-20R-Ethylcholestane	14.3	131	1450	1260

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-130-SS-0010	NLU-131-SS-0010	NLU-133-SS-0010	NLU-133-SS-1020	NLU-136-SS-0010
Battelle Sample ID	U0161-F1	U4518-D-F1	U0162-F1	U0163-F1	U0172-F1
Battelle Batch ID	02-688	03-0100	02-668	02-667	02-667
Associated Blank	AB489PB	88142PB	AB469PB	AB464PB	AB484PB
Field Date	11/12/02	11/14/02	11/14/02	11/14/02	11/14/02
Receipt Date	11/15/02	01/29/03	11/15/02	11/15/02	11/15/02
		01/31/03	11/22/02	11/22/02	11/22/02
Extraction Date	11/22/02		12/15/02		12/15/02
Acquired Date	12/15/02	02/17/03		12/14/02	
Analytical Method	6270M	8270M	8270M	8270M	8270M
Percent Solids	61.73 %	36.45 %	86.06 %	88 %	12.6 %
Matrix	Sediment	Solid	Sediment	Sediment	Sediment
Sample Size	102.8 mg	4.06 g	21.6 mg	55.2 mg	42.9 mg
Weight Basis	OIL	DRY	OIL	OIL	OIL
Min Reporting Limit Amount Units	0,121 mg/kg	7.390 µg/kg	0.353 mg/kg	0.120 mg/kg	0,161 mg/kg
Q9- Sesquiterpane (9)	9.72	27.2	3.08	3.1	9.37
Q10- Sesquiterpane (10)	3.49	10.9	1.23	1.35	3.16
Q1- Sesquiterpane (1)	5.9	13.6	3	2.94	7.74
Q2- Sesquiterpane (2)	8.04	19.7	3.53	3.35	8.58
Q3- Sesquiterpane (3)	20.2	35.7	7	6.62	12.9
Q4- Sesquiterpane (4)	5.98	13.2	2.97	3.33	7.14
Q5- Sesquiterpane (5)	2.35	9.01	1.35	1.2	3.13
Q6- Sesquiterpane (6)	4.8	8.56	2.18	3.01	4.94
Q7- Sesquiterpane (7)	1.29	2.64 J	1,44	1.07	5.14
Q8- Sesquiterpane (6)	30.2	40.1	10.1	9,55	19.5
11-C15-Isoprenoid (1380)	35.2	328	9.8	6.31	14.3
12-C15-Isoprenoid (1470)	57.5	385	17.1	9.78	24
12-C15-Isoprenoid (1470) 13-C18-Isoprenoid (1650)	38.9	332	20.3	11.8	24
I4-C19-Isoprenoid (Pristane)	66.1	486	34.5	21.6	38,4
14-C19-Isoprenoid (Pristane) 15-C20-Isoprenoid (Phytane)	43	400	34.5	21.6	55.4
		90.2	9.65	8.58	
T4-C23 Tricyclic Terpane	13.3				49.3
T5-C24 Tricyclic Terpane	8.75	59	6.22	5.82	31.3
T6-C25 Tricyclic Terpane	10.5	78.6	7.24	6.82	39.1
T6c-C26 Tricyclic Terpane-22R	4	39	2.92	2.57	16.2
T6b-C26 Tricyclic Terpane-22S	4	35.5	2.8	2.61	14.4
T6a-C24 Tetracyclic Terpane	3.64	16.2	2.14	1.77	11.6
T7-C28 Tricyclic Terpane-22S	4.8	61.1	3.39	3.53	21.8
T6-C28 Tricyclic Terpane-22R	5.08	61.9	3.63	3.46	21.6
T9-C29 Tricyclic Terpane-22S	4.92	56.9	4.26	3.92	24.1
T10-C29 Tricyclic Terpana-22R	4.79	65.7	4.05	3.48	22.5
T11-18a(H)-22,29,30-Trisnomechopane-TS	6.87	69	6.16	5.57	39.1
T12-17a(H)-22,29,30-Trisnorhopane-TM	15.9	69.1	9.37	8.71	39.9
T14a-a,b- and b,a-28,30-Bisnorhopane	6.52	61.9	13.6	12.8	39.5
T14b-17a(H),21b(H)-25-Norhopane	4.41	25.8	6.03	5.29	21.2
T15-30-Norhopane	34.8	226	27.6	27.2	147
T16-18a(H)-30-Nomeohopane-C29Ts	8.95	75.7	8.87	10,1	49.2
X- 17a(H)-Diahopane	3.68	17.3	2.22	2.1	11.5
T17- 30-Normoretane	5.82	35.8	5.56	5.34	21.8
T18-18a(H) & 18b(H)-Oleanane	8.21	78.7	11.6	11.4	33.3
T19-Hopane	59.8	442	52.2	48.5	252
T20- Mortane	12.8	76.4	11.2	11.7	61.2
T21-30-Homohopane-22S	22	146	18.3	18.6	96.7
		87.7	13.1	13.4	80.7
T22-30-Homohopane-22R T26-30-Bishomohopane-22S	14.8 11 <i>.</i> 8	77.1	13.1	13.4	63.3
	11.6 8.54	66.6	8,54	8,44	45.5
T27-30,31-Bishomohopane-22R T30-30-31 Trichemohopane 22S	7.53	64.8	11.6	10.8	45.5 64.9
T30-30,31-Trishomohopane-22S T31-30-31 Trishomohopane-22P			8.65		
T31-30,31-Trishomohopane-22R	6.01 3.72	64.2 40.8	6,16	8.12 5.46	39.3 29.6
T32-Tetrakishomohopane-22S					
T33-Tetrakishomohopane-22R	2.48	27.1	4.03	3.69	21.1
T34-Pentakishomohopane-22S	2.89	32.3	6.45	6.41	25.5
T35-Pentakishomohopane-22R	2.05	24.3	5.18	4.5	18.2
S4-13b(H),17a(H)-20S-Diacholestane	22.8	243	11.4	10.5	92.3
S5-13b(H),17a(H)-20R-Diacholestane	14.1	156	6.9	8.37	51.7
S8-13b(H),17a(H)-20S-Methyldiacholestane	16.7	186	11.7	10.9	96.6
S12-14a(H),17a(H)-20S-Cholestane	29.3	330	25.6	23.2	149
S14-14b(H),17b(H)-20R- Cholestane	15.1	178	12.8	11.5	73.3
S15-14b(H),17b(H)-20S- Cholestane	16.4	196	11.6	11	77
S17-14a(H),17a(H)-20R- Cholestane	35.4	439	32.2	29.6	173
S16-13b(H),17a(H)-20R- Ethyldiacholestane	5.5	80.4	4.96	3.84	22.9
S19-13a(H),17b(H)-20S-Ethyldiacholestane	1.28	· 14	1.48	1.33	5.74
S20-14a(H),17a(H)-20S- Methylcholestane	12.7	159	17.4	18.3	84.3
S22-14b(H), 17b(H)-20R-Methylcholestane	21.2	250	23.3	20.9	107
S23-14b(H),17b(H)-20S-Methylcholestane	24.2	263	24.6	23.4	121
S24-14a(H),17a(H)-20R-Methylcholestane	20.7	242	28.5	27.1	115
S25-14a(H),17a(H)-20S-Ethylcholestane	11.8	118	13.7	14.8	77.4
S28-14b(H),17b(H)-20R-Ethylcholestane	19.8	185	18.6	17.8	111
S27-14b(H),17b(H)-20S-Ethylcholestane	14.2	133	15.6	14.9	76.1
S27-14b(H),17b(H)-20S-Enytcholestane	14.2	199	28.8	29.1	118
Car Halli, Halli-zon-Elliyoloidstalla	10.8	103	20,0	27.1	110

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	DW-5-1202	DW-5 MV	V-5 Product (T190)	GWP Tank (T192)	SS-1-1202
Battelle Sample ID	U4514-D-F1	11451.	U3754-D-F1	U3752-D-F1	U4515-D-F1
Battelle Batch ID	03-0100		03-0100	03-0100	03-0100
Associated Blank	BB146PB		BB146PB	BB146PB	BB146PB
	12/06/02		01/14/03	01/14/03	12/06/02
Field Date	01/29/03		01/15/03	01/15/03	01/29/03
Receipt Date			01/31/03	01/31/03	01/31/03
Extraction Date	01/31/03			02/18/03	02/17/03
Acquired Date	02/18/03		02/18/03	8270M	8270M
Analytical Method	8270M		8270M	N %	N %
Percent Solids		%	N %		Oily Material
Matrix	Oily Material		Oily Material	Oily Material	
Sample Size	517.8		506.8 g	427.2 g	447.2 g
Weight Basis	OIL		OIL	OIL 0.140	OIL 0.134
Min Reporting Limit	0.116		0.118		
Amount Units	mg/kg		mg/kg	mg/kg	mġ/kg
00 0	11		10.8	1.3	2.07
Q9- Sesquiterpane (9)	3.53		3.91	0.507	0.615
Q10- Sesquiterpane (10)			4,26	0,556	0.858
Q1- Sesquiterpane (1)	3.95			0.350	0.888
Q2- Sesquiterpane (2)	5.47		5.62	0.918	1.54
Q3- Sesquiterpane (3)	12		12.5	0.247	0.464
Q4- Sesquiterpane (4)	2.6		3.17	0.247	0.464
Q5- Sesquiterpane (5)	1.53		1.78		0.236
Q6- Sesquiterpane (6)	1.8		2.1	0.138 J	
Q7- Sesquiterpane (7)	0.494		0.78	0.0865 J	0.154
Q8- Sesquiterpane (8)	7.86		7.49	0.508	0.855
I1-C15-Isoprenoid (1380)	58.1		67.9	4.33	5.22
I2-C15-Isoprenoid (1470)	73.6		83.1 E	4.14	5.26
13-C18-Isoprenoid (1650)	50.8		58.2	2.86	4.38
I4-C19-Isoprenoid (Pristane)	88.1		83.9 E	3.76	5.57
15-C20-Isoprenoid (Phytane)	55.2	2	60.8	3.28	5.39
T4-C23 Tricyclic Terpane	2.5	i	4.73	0.459	0.42
T5-C24 Tricyclic Terpane	1.5	3	2.94	0.265	0.232
T6-C25 Tricyclic Terpane	1.7	1	3.27	0.293	0.222
T6c-C26 Tricyclic Terpane-22R	0.779)	1.5	0.118 J	0,118 J
T6b-C26 Tricyclic Terpane-22S	0.6		1.39	0.129 J	0.114 J
T6a-C24 Tetracyclic Terpane	0.49		0.91	0.0785 J	0.0641 J
T7-C28 Tricyclic Terpane-22S	1.1	1	2.2	0.153	0.111 J
T8-C28 Tricyclic Terpane-22R	1.1		2.3	0.166	0.125 J
T9-C29 Tricyclic Terpane-22S	1.0		2.24	0.162	0.149
T10-C29 Tricyclic Terpane-22R	1.1		2.23	0.128 J	0.148
T11-18a(H)-22,29,30-Trisnomeohopane-TS	1.0		2.22	0.131 J	0.168
T12-17a(H)-22,29,30-Trisnorhopane-TM	3.0		4.54	0.2	0.168
T14a-a,b- and b,a-28,30-Bisnorhopane	3.		6.88	0,336	0.246
T14b-17a(H),21b(H)-25-Norhopane	0.96		2.03	0,175	0.204
T15-30-Norhopane	6.5		11.4	0.421	0.4
T16-18a(H)-30-Nomeohopane-C29Ts	1.5		3.4	0.242	0.231
X- 17a(H)-Diahopane	0.37		0.557	0.0609 J	0.107 J
T17- 30-Normoretane	1.5		2.45	ND	ND
T18-18a(H) & 18b(H)-Oleanane	1.7		3.66	0.27	0.302
T19-Hopane	11.		20.7	0,693	0.546
T20- Mortane	2.8		5.41	ND	ND
	3.8		7.04	0.224	0.223
T21-30-Homohopane-22S			4.5	0.138 J	0.141
T22-30-Homohopane-22R	2.5 2.0		4.5	0.150 5	0.126 J
T26-30-Bishomohopane-22S	2.0		3,95	0.0673 J	0.0972 J
T27-30,31-Bishomohopane-22R	1.0		3.61	0.0918 J	0.0916 J
T30-30,31-Trishomohopane-22S			3.28	0.083 J	0.0964 J
T31-30,31-Trishomohopane-22R	1.5 1.1		3.28	0.063 J ND	0.0804 J ND
T32-Tetrakishomohopane-22S				ND	ND
T33-Tetrakishomohopane-22R	0.76		1.63	ND	ND
T34-Pentakishomohopane-22S	1.		2.58		
T35-Pentakishomohopane-22R	0.82		2.1	ND	ND
S4-13b(H),17a(H)-20S-Diacholestane	2.7		5.66	0.386	0.316
S5-13b(H),17a(H)-20R-Diacholestane	1.7		3.36	0.22	0.194
S8-13b(H),17a(H)-20S-Methyldiacholestane	2.7		5.59	0.301	0.266
S12-14a(H),17a(H)-20S-Cholestane	6.4		12.3	0.609	0.463
S14-14b(H),17b(H)-20R- Cholestane	3,8		7.02	0.326	0.218
S15-14b(H),17b(H)-20S- Cholestane	3.4		6.82	0.302	0.216
S17-14a(H),17a(H)-20R- Cholestane		0	19.1	0.884	0.596
S18-13b(H),17a(H)-20R- Ethyldiacholestane	0.75		1.33	0.429	0,481
S19-13a(H),17b(H)-20S-Ethyldiacholestane	0.23		0.487	ND	ND
S20-14a(H),17a(H)-20S- Methylcholestane	3.6	7	6.97	0.304	0.228
S22-14b(H),17b(H)-20R-Methylcholestane	5.1		10.1	0.369	0.24
S23-14b(H),17b(H)-20S-Methylcholestane	5.3		9.73	0.325	0.22
S24-14a(H),17a(H)-20R-Methylcholestane	8		15.6	0,63	0.443
S25-14a(H),17a(H)-20S-Ethylcholestane	3.4		5.8	0.205	0.145
S26-14b(H),17b(H)-20R-Ethylcholestane	3.7		6.74	0.238	0.196
S27-14b(H),17b(H)-20S-Ethylcholestane	2.4		5.69	0.186	0.123 J
S28-14a(H),17a(H)-20R-Ethylcholestane	8.1		12.2	0.503	0.301
and a set of the set o	0.		1.0.0		

Battelle
 Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	AB484PB-F1	
Battelle Batch ID	02-667	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	11/22/02 12/13/02	
Acquired Date Analytical Method	6270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size		mg
Weight Basis	NA	
Min Reporting Limit Amount Units	0.24 mg/kg	
Q9- Sesquiterpane (9)		ND
Q10- Sesquiterpane (10)		ND
Q1- Sesquiterpane (1) Q2- Sesquiterpane (2)		ND ND
Q3- Sesquiterpane (3)		ND
Q4- Sesquiterpane (4)		ND
Q5- Sesquiterpane (5)		ND
Q6- Sesquiterpane (6)		ND
Q7- Sesquiterpane (7) Q8- Sesquiterpane (8)		ND ND
I1-C15-Isoprenoid (1380)		ND
12-C15-Isoprenoid (1470)		ND
I3-C18-Isoprenoid (1850)		ND
I4-C19-Isoprenoid (Pristane)		ND
I5-C20-Isoprenoid (Phytane) T4-C23 Tricyclic Terpane		ND ND
T5-C24 Tricyclic Terpane		ND
T6-C25 Tricyclic Terpane		ND
T6c-C28 Tricyclic Terpane-22R		ND
T6b-C28 Tricyclic Terpane-22S T6a-C24 Tetracyclic Terpane		ND ND
T7-C28 Tricyclic Terpana-22S		ND
T8-C26 Tricyclic Terpana-22R		ND
T9-C29 Tricyclic Terpane-22S		ND
T10-C29 Tricyclic Terpane-22R		ND ND
T11-18a(H)-22,29,30-Trisnomeohopane-TS T12-17a(H)-22,29,30-Trisnomopane-TM		ND
T14a-a,b- and b,a-26,30-Bisnorhopane		ND
T14b-17a(H),21b(H)-25-Norhopane		ND
T15-30-Norhopane T16-18a(H)-30-Norneohopane-C29Ts		ND ND
X- 17a(H)-Diahopane		ND
T17- 30-Normoretane		ND
T18-18a(H) & 16b(H)-Oleanane		ND
T19-Hopane T20- Mortane		ND ND
T21-30-Homohopane-22S		ND
T22-30-Homohopane-22R		ND
T26-30-Bishomohopane-22S		ND
T27-30,31-Bishomohopane-22R		ND ND
T30-30,31-Trishomohopane-22S T31-30,31-Trishomohopane-22R		ND
T32-Tetrakishomohopane-22S		ND
T33-Tetrakishomohopane-22R		ND
T34-Pentakishomohopane-22S		ND
T35-Pentakishomohopane-22R S4-13b(H), 17a(H)-20S-Diacholestane		ND ND
S5-13b(H),17a(H)-20R-Diacholestane		ND
S8-13b(H), 17a(H)-20S-Methyldiacholestane		ND
S12-14a(H),17a(H)-20S-Cholestane		ND
S14-14b(H),17b(H)-20R- Cholestane S15-14b(H),17b(H)-20S- Cholestane		ND ND
S17-14a(H),17a(H)-20R- Cholestane		ND
S18-13b(H),17a(H)-20R- Ethyldiacholestane		ND
S19-13a(H),17b(H)-20S-Ethyldiacholestane		ND
S20-14a(H),17a(H)-20S- Methylcholestane S22-14b(H),17b(H)-20R-Methylcholestane		ND ND
S22-14b(H),17b(H)-20S-Methylcholestane		ND
S24-14a(H),17a(H)-20R-Methylcholestane		ND
S25-14a(H),17a(H)-20S-Ethylcholestane		ND
S26-14b(H),17b(H)-20R-Ethylcholestane		ND ND
S27-14b(H),17b(H)-20S-Ethylcholestane S28-14a(H),17a(H)-20R-Ethylcholestane		ND
A MARINE AND AND AND AND AND AND AND AND AND AND		

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Battelle
 Turning Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

statis D U042-Ft-D U042DUP-Ft-D Associator Blank AB444PB A4844PB Field Date Field Pate	Client Sample ID	NLU-104-SS-0010	NLU-104-SS-0010	
Batele Bach ID 0.2467 02-667 42-667 Associated Blank AB444PF AB444PF AB444PF Field Date 11/1502 11/1502 Extraction Date 11/1502 11/1502 11/1502 Extraction Date 11/1502 11/1	Battelle Sample ID	U0142-F1-D	U0142DUP-F1-D	
Fride Date 11/12/02 11/12/02 11/12/02 Extraction Date 11/12/02 11/12/02 11/12/02 Analytical Method B2/20M 22/20/02 Analytical Method Parenti Solids 10.3 % 13.3 % Matrix Sedimati Sedimati Sedimati 0 Min Reporting Limit 0.174 0.234 Amounti Units 0 Min Reporting Limit 0.174 0.234 Amounti Units 0 0 C0- Secularizante (1) 0.313 0.422 0.487 1 NA C1- Secularizante (1) 0.331 0.422 NA 0<		02-667		
Receip Date 11/1502 11/1502 Extraction Date 11/22/02 11/22/02 Acquired Date 11/22/02 11/22/02 Acquired Date 12/28/02 12/28/02 Analytical Method 82/70M 82/70M Marix Sedimatin Social many Marix Sedimatin 0 Min Reporting Limit 0.174 0.234 Amount Units mg/kg mg/kg RPD(%) Q G9-Sequilerpane (%) 0.22 0.187 J NA G1-Sequilerpane (%) 0.2723 0.176 NA G1-Sequilerpane (%) 0.2723 0.776 NA G2-Sequilerpane (%) 0.414 0.388 NA G3-Sequilerpane (%) 0.414 0.392 0.285 NA G2-Sequilerpane (%) 0.414 0.392 0.367 NA G2-Sequilerpane (%) 0.416 0.302 0.867 NA G2-Sequilerpane (%) 0.416 0.302 0.867 NA G2-Sequilerpane (%	Associated Blank			
Extraction Date 11/22/02 11/22/02 Analycial Method 8270M 82770M Percent Solids 13.3 % 13.3 % Matrix Sediment Sediment Sample Site 3.6 mg 3.0 mg Yein Plasma 0.174 0.234 Amount Units mg/kg mg/kg RPD(%) Q Ge Sequiterpane (9) 0.22 0.187 J NA Q1 - Sequiterpane (9) 0.22 0.187 J NA Q2 - Sequiterpane (9) 0.22 0.187 J NA Q2 - Sequiterpane (9) 0.22 0.177 J NA Q2 - Sequiterpane (9) 0.22 0.173 J NA Q3 - Sequiterpane (1) 0.431 0.422 NA 0.288 NA Q3 - Sequiterpane (1) 0.146 J 0.168 J NA Q3 - Sequiterpane (1) 0.146 J 0.168 J NA Q4 - Sequiterpane (1) 0.18 0.179 J NA Q2 - Sequiterpane (1) 0.18 0.179 J NA Q4 - Sequiterpane (1) 0.414 J 1.98 0.247 F				
Acquired Date 1228/02 1228/02 Percent Bolids 8270M 8270M Matrix Sediment Sediment Sample Size 38.8 mg 30.8 mg Velapit Basic 0.14 0.14 Amont Units 0.14 0.14 Amount Units 0.14 0.14 Amount Units 0.14 0.14 OD-Sequiperpane (10) 0.161 J NA OLS-Sequiperpane (10) 0.431 0.422 NA O2-Sequiperpane (10) 0.431 0.422 NA O2-Sequiperpane (2) 0.513 0.562 NA O2-Sequiperpane (2) 0.513 0.562 NA O2-Sequiperpane (3) 0.440 J 0.166 J NA O2-Sequiperpane (3) 0.474 0.575 NA O2-Sequiperpane (11/20) 1.08 1.1 NA O2-Sequiperpane (13/20) 0.474 0.575 NA O2-Sequiperpane (13/20) 0.474 0.575 NA V2-O15-Separation (14/20) 1.				
Analytical Method 1270M B270M Percent Solis 13.3 % 13.3 % Matrix Sediment Sediment Sample Size 3.8 mg 3.0 mg Mit Reporting Linit 0.1 0.1 Amout Units mg/g mg/g FPD(%) Q G9. Sacquiterpane (9) 0.22 0.76 NA G2. sacquiterpane (9) 0.123 0.43 0.422 NA G2. sacquiterpane (9) 0.123 0.76 NA C G2. sacquiterpane (9) 0.123 0.76 NA C G2. sacquiterpane (9) 0.164 J 0.768 NA C G2. sacquiterpane (9) 0.014 J 0.768 NA C G3. sacquiterpane (9) 0.022 0.286 NA C G3. sacquiterpane (9) 0.302 0.286 NA C G3. sacquiterpane (110) 0.479 0.571 NA C G4. Sacquiterpane (120) 0.487 0.571 NA C C<				
Parcent Solids 13.3 % 13.3 % Sample Size 38.8 mg 30.8 mg Sample Size 0.1L 0.1L Min Reporting Limit 0.174 0.234 Amount Units mpkg mpkg PPD(%) Q Op-Sequiprepane (%) 0.22 0.87 J NA Q1-Sequiprepane (%) 0.431 0.422 NA Q2-Sequiprepane (%) 0.513 0.528 NA Q2-Sequiprepane (%) 0.441 0.776 NA Q2-Sequiprepane (%) 0.441 0.776 NA Q2-Sequiprepane (%) 0.442 0.776 NA Q2-Sequiprepane (%) 0.442 1.73 NA Q3-Sequiprepane (%) 0.444 1.73 NA Q4-Sequiprepane (%) 0.474 1.73 NA Q2-Sequiprepane (%) 0				
Nativ Sediment Sediment Sediment Sample Size 3.9.6 mg 0.1 0.1 Min Reporting Limit 0.174 0.234 RPD(%) Q Ge-Sequilerpane (9) 0.22 0.187 J NA G1-Sequilerpane (10) 0.104 0.133 NA G G2-Sequilerpane (10) 0.104 0.133 NA G G3-Sequilerpane (10) 0.144 0.168 NA G G3-Sequilerpane (10) 0.161 0.776 NA G4-Sequilerpane (10) 0.161 0.776 NA G2-Sequilerpane (6) 0.302 0.2285 NA G2-Sequilerpane (7) 0.18 0.17 NA G4-Sequilerpane (7) 0.18 0.17 NA G2-Sequilerpane (7) 0.18 0.17 NA G2-Sequilerpane (1380) 0.474 0.57 NA G2-Sequilerpane (1470) 1.39 0.17 NA G2-Sequilerpane (1430) 0.471 0.44 0.26 <				
Sample Size 38.6 mg 30.8 mg 0.1 0.1 Min Reporting Limit 0.174 0.234 Anount Units mg/g mg/g RPD(%) 0 Clo-Sesquiserpane (9) 0.22 0.167 J NA NA Clo-Sesquiserpane (9) 0.23 0.13 J NA Clo-Sesquiserpane (1) 0.431 0.22 NA Clo-Sesquiserpane (1) 0.431 0.22 NA Clo-Sesquiserpane (1) 0.440 0.776 NA Clo-Sesquiserpane (1) 0.440 0.776 NA Clo-Sesquiserpane (1) 0.146 0.179 J NA Clo-Sesquiserpane (1) 0.16 0.179 J NA Clo-Sesquiserpane (1) 0.18 0.179 J NA Clo-Sesquiserpane (1) 0.18 0.179 J NA Clo-Sesquiserpane (1) 0.87 0.337 NA NA Clo-Sesquiserpane (1) 0.87 0.337 NA NA Clo-Sesquiserpane (1) 1.97 1 1.22 2.57 1.61 1.18 1.17 Clo-Ses				
Nin Reporting Limit 0.174 0.234 Amount Units mg/kg mg/kg mg/kg RPD(%) Q Q10-Sesquiterpane (1) 0.104 J 0.13 J NA Q10-Sesquiterpane (1) 0.144 J 0.13 J NA Q2-Sesquiterpane (2) 0.513 0.528 NA Q3-Sesquiterpane (3) 0.723 0.776 NA Q4-Sesquiterpane (4) 0.401 0.378 NA Q3-Sesquiterpane (6) 0.302 0.225 NA Q3-Sesquiterpane (7) 0.18 0.177 NA Q4-Sesquiterpane (6) 0.302 0.225 NA Q2-Sesquiterpane (7) 0.18 0.177 NA Q2-Isteprenoid (1800) 0.474 0.576 NA Q2-Isteprenoid (1800) 0.474 0.576 NA Q4-C2-Isteprenoid (1800) 0.474 0.577 NA Q2-Isteprenoid (1800) 0.474 0.576 NA Q4-C2-Isteprenoid (1800) 0.477 0.527 NA Q2-Isteprenoid (1800)	Sample Size	39.6 mg		
mount Units mg/kg mg/kg mg/kg PPD(%) Q Qe-Seequilerpane (1) 0.164 J 0.13 J NA Q1-Seequilerpane (1) 0.431 0.422 NA Q2-Seequilerpane (2) 0.513 0.528 NA Q3-Seequilerpane (3) 0.723 0.776 NA Q4-Seequilerpane (6) 0.416 J 0.186 J NA Q3-Seequilerpane (7) 0.18 0.173 J NA Q3-Seequilerpane (6) 0.302 0.285 NA NA Q3-Seequilerpane (7) 0.18 0.179 J NA Q3-Seequilerpane (7) 0.18 0.179 J NA Q4-Seequilerpane (7) 0.168 0.179 J NA Q4-Seequilerpane (1470) 0.44 1.52 Z Seequilerpane (150) 0.687 Q3-Seequilerpane (160) 0.877 NA H C10-Seequilerpane (160) Q4 Q2-Seequilerpane (160) 0.877 NA Seequilerpane (160) Q4 Q2 Q66 Q2-Seequilerpane (160) 0.461 3.05 <td></td> <td></td> <td></td> <td></td>				
Construction Construction<				BBD(%) 0
c10: Sequitarpane (10) 0.104 J 0.13 J NA C1: Sequitarpane (2) 0.513 0.528 NA C3: Sequitarpane (2) 0.776 NA C4: Sequitarpane (3) 0.723 0.776 NA C5: Sequitarpane (4) 0.461 0.378 NA C5: Sequitarpane (5) 0.146 J 0.168 NA C5: Sequitarpane (7) 0.18 0.179 J NA C6: Sequitarpane (7) 0.18 0.11 NA C6: Sequitarpane (1) 0.474 0.576 NA C1: C1: Setopranoid (1300) 0.474 0.576 NA C2: C1: Setopranoid (1470) 1.08 1.1 NA C2: C1: Setopranoid (1400) 1.97 1.92 2.57 C2: C2: Setopricid Fepane 2.91 3.05 4.7 C2: C2: Setopricid Fepane 2.91 3.05 4.7 C2: C2: Setopricid Fepane 2.61 2.66 3.06 C2: C2: Setopricid Fepane 2.61 2.68 1.9 C2: C2: Setopricid Fepane <	Amount Units	mg/Kg	mg/kg	
010. Sequitarpane (10) 0.104 J 0.13 J NA 02. Sequitarpane (2) 0.513 0.528 NA 02. Sequitarpane (2) 0.723 0.776 NA 02. Sequitarpane (3) 0.723 0.776 NA 02. Sequitarpane (6) 0.401 0.378 NA 02. Sequitarpane (7) 0.18 0.179 J NA 02. Sequitarpane (7) 0.18 0.179 J NA 02. Sequitarpane (7) 0.18 0.11 NA 02. Sequitarpane (1) 0.474 0.576 NA 12-015-teoprencid (1400) 0.897 0.937 NA 12-015-teoprencid (1400) 1.98 2.91 3.05 4.7 15-024 Tricyclic Terpane 2.91 3.05 4.7 1.1 NA 15-024 Tricyclic Terpane-228 1.11 1.12 NA 1.06 1.18 1.71 16-023 Tricyclic Terpane-228 1.11 1.12 NA 1.05 NA 17-024 Tricyclic Terpane-228 1.06 1.18 1.71	Q9- Sesquiterpane (9)	0.22	0.187 J	NA
22. Singuilargiane (2) 0.513 0.528 NA 02. Sesquilargiane (3) 0.723 0.776 NA 03. Sesquilargiane (4) 0.401 0.378 NA 03. Sesquilargiane (5) 0.146 0.783 NA 03. Sesquilargiane (6) 0.302 0.285 NA 03. Sesquilargiane (7) 0.18 0.779 NA 03. Sesquilargiane (7) 0.414 0.376 NA 14.151-Stappermid (1470) 1.08 1.1 NA 15.151-Stappermid (1470) 1.08 1.1 NA 15.021-Stappermid (Phylane) 3.04 3.02 0.65 15.224 Tricyclic Terpane 2.91 3.05 4.7 15.224 Tricyclic Terpane 2.81 3.05 1.7 15.224 Tricyclic Terpane-228 1.11 1.12 NA 17.223 Tricyclic Terpane-228 1.86 1.24 0.619 171-1242 Tricyclic Terpane-228 1.81 1.62 0.619 171-1242 Tricyclic Terpane-228 1.84 1.83 3.66		0.104 J	0.13 J	NA
G3. Sequiterpane (a) 0.723 0.776 NA G4. Sequiterpane (b) 0.461 0.378 NA G5. Sequiterpane (c) 0.464 0.662 0.285 NA G5. Sequiterpane (c) 0.302 0.285 NA G5. Sequiterpane (c) 1.42 1.39 2.13 H-C15-leoprenoid (1300) 0.474 0.576 NA II-C15-leoprenoid (1470) 1.08 1.1 NA I2-C15-leoprenoid (Pistane) 1.97 1.92 2.57 I2-C23 Incyclic Terpane 2.91 3.05 4.7 I5-C24 Tricyclic Terpane 2.81 2.86 1.9 I5-C25 Tricyclic Terpane 2.81 1.88 2.06 1.9 I5-C25 Tricyclic Terpane 22S 1.11 1.12 NA I5-C25 Tricyclic Terpane 22S 1.16 1.18 1.77 1.12 I5-C25 Tricyclic Terpane 22S 1.36 1.24 9.23 1.76 I7-C28 Tricyclic Terpane 22S 1.79 1.77 1.12 1.11 1.12 NA <td></td> <td>0.431</td> <td></td> <td></td>		0.431		
G-4 Sequimpane (i) 0.401 0.768 NA GS-Sequimpane (i) 0.146 J 0.6166 J NA GS-Sequimpane (i) 0.302 0.285 NA GS-Sequimpane (i) 0.48 0.779 J NA GS-Sequimpane (i) 1.42 1.39 2.13 II-C15-Leoprenoid (1300) 0.474 0.576 NA I2-C15-Leoprenoid (1470) 1.08 1.1 NA IS-C16-Leoprenoid (1650) 0.897 0.337 NA IA-C15-Leoprenoid (1650) 0.897 0.337 NA IA-C16-Leoprenoid (1650) 0.897 0.337 NA IA-C21 Hoycilo Terpane 2.91 3.05 4.7 IS-C22 Triopcilo Terpane-228 1.16 1.16 1.71 IFB-C23 Triopcilo Terpane-228 1.36 1.26 0.619 IT1-G12 Triopcilo Terpane-228 1.36 1.26 0.619 IT1-G21 Triopcilo Terpane-228 1.36 3.56 0.573 IT4-G22 Triopcilo Terpane-228 1.61 1.62				
Cits Stagulating pane (b) 0.166 J 0.166 J NA Cof-Sasquileppane (f) 0.302 0.285 INA Cof-Sasquileppane (f) 0.18 0.179 J NA Cof-Sasquileppane (f) 1.42 1.39 2.13 II-C15-lesprenoid (1300) 0.474 0.576 NA II-C15-lesprenoid (1470) 1.08 1.1 NA II-C15-lesprenoid (1470) 1.08 0.477 NA II-C21 Floppronoid (Phytane) 3.04 3.02 0.66 II-C23 Tricyclic Terpane 2.81 2.86 1.9 II-C23 Tricyclic Terpane 228 1.11 1.12 NA II-C23 Tricyclic Terpane 228 1.11 1.12 NA II-C24 Totracyclic Terpane 228 1.11 1.12 NA II-C25 Tricyclic Terpane 228 1.13 1.38 3.66 1.24 9.23 II-C24 Tricyclic Terpane 228 1.79 1.77 1.12 II-C24 NA 1.66 1.66 1.66 1.66 1.66 1.66 1.66 1.66				
G6-Sequelarpane (7) 0.302 0.265 NA 07-Sequelarpane (7) 0.18 0.179 J NA 08-Sequelarpane (8) 1.42 1.39 2.13 11-015-tappenoid (180) 0.474 0.576 NA 12-015-tappenoid (180) 0.474 0.576 NA 12-015-tappenoid (1850) 0.887 NA 14-016-tappenoid (Pistane) 1.97 1.92 2.57 15-024 tripyclic Tepane 2.91 3.05 4.7 15-024 tripyclic Tepane 2.91 3.05 4.7 15-024 tripyclic Tepane 2.861 2.96 3.96 15-024 tripyclic Tepane-225 1.11 1.12 NA 176-024 tripyclic Tepane-225 1.36 1.24 9.23 176-024 tripyclic Tepane-227 1.43 3.36 3.56 170-025 Tripyclic Tepane-228 1.36 3.25 1.77 1.12 171-022 Tripyclic Tepane-227 1.43 3.36 3.56 1.77 1.12 1710-023 Tripyclic Tepane-227 1.56 1.57				
Or. Sequelarpane (6) 1.42 1.39 Z.13 II-015-trappenoid (1470) 0.474 0.576 NA I2-015-trappenoid (1470) 1.08 1.1 NA I2-015-trappenoid (1470) 0.887 0.937 NA I2-015-trappenoid (Phytane) 3.04 3.02 0.66 IX-023 Tricyclic Terpane 2.91 3.05 4.7 IS-224 Tricyclic Terpane 2.81 2.06 3.06 IR-C23 Tricyclic Terpane 2.81 2.06 1.9 IR-C24 Tricyclic Terpane-225 1.11 1.12 NA IR-C24 Tricyclic Terpane-225 1.11 1.12 NA IR-C24 Tricyclic Terpane-225 1.13 1.36 1.26 2.92 IR-C24 Tricyclic Terpane-225 1.14 1.12 NA IR-C24 Tricyclic Terpane-227 1.83 1.36 1.26 0.819 IR-C24 Tricyclic Terpane-228 1.79 1.77 1.12 TA IR-228 Tricyclic Terpane-228 1.84 1.85 0.573 1.14 <				
CB- Sequilarpane (8) 1.42 1.39 2.13 II-C15-tapprenoid (180) 0.474 0.576 NA I2-C15-tapprenoid (1850) 0.477 0.897 NA IA-C18-tapprenoid (1850) 0.897 0.897 NA IA-C18-tapprenoid (Pristane) 1.97 1.92 2.57 IS-C20-tapprenoid (Pristane) 2.91 3.05 4.7 IS-C21-tapprenoid (Pristane) 2.91 3.05 4.7 IS-C21 Tricyclic Terpane 2.81 3.06 4.7 IS-C23 Tricyclic Terpane-22R 1.16 1.18 1.71 IS-C23 Tricyclic Terpane-22S 1.11 1.12 NA IS-C23 Tricyclic Terpane-22S 1.35 1.24 9.23 IS-C23 Tricyclic Terpane-22S 1.16 1.62 0.619 IT1-15 (19) 1.77 1.12 NA IS-C23 Tricyclic Terpane-22S 1.79 1.77 1.12 IT1-C23 Tricyclic Terpane-22S 1.79 1.77 1.12 IT1-15 (19) 2.42 0.50 0.573 <td< td=""><td></td><td></td><td></td><td></td></td<>				
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iii - Cite Jesprenoid (Phylane) 197 192 2.87 ii:5-C20.isoprenoid (Phylane) 3.04 3.02 0.66 ii:5-C20.isoprenoid (Phylane) 3.04 3.02 0.66 i:5-C22 Tricyclic Terpane 2.91 3.05 4.7 I:5-C23 Tricyclic Terpane-22R 1.16 1.18 1.77 I:5-C23 Tricyclic Terpane-22S 1.11 1.12 NA I:5-C23 Tricyclic Terpane-22S 1.36 1.24 9.23 I:5-C23 Tricyclic Terpane-22S 1.36 1.24 9.23 I:5-C23 Tricyclic Terpane-22S 1.78 1.71 1.12 I:10-C23 Tricyclic Terpane-22S 1.78 1.77 1.12 I:10-C23 Tricyclic Terpane-22S 1.78 3.61 1.82 0.619 I:11-1:16:16:10-22.29.30-Trianomeopane-TM 3.48 3.5 0.573 1.14+7:a(I)-22.29.30-Trianomopane-TM 3.48 3.5 0.573 I:14+1:7a(I)-22.29.30-Trianomopane-22S 1.23 1.24 0.81 1.15 0.33 3.25 I:14+1:16:16:10-30-Nomeochopane-22S 2.51 1.55 <td></td> <td></td> <td></td> <td></td>				
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TB-C2B Tricyclic Terpane 2.61 2.66 1.9 TBe-C2B Tricyclic Terpane-22R 1.16 1.18 1.71 TBe-C2B Tricyclic Terpane-22S 1.11 1.12 NA TBe-C2B Tricyclic Terpane-22S 1.36 1.24 9.23 TR-C2B Tricyclic Terpane-22S 1.36 1.24 9.23 TR-C2B Tricyclic Terpane-22S 1.70 1.77 1.12 TI-C2D Tricyclic Terpane-22S 1.70 1.77 1.12 TI-C2D Tricyclic Terpane-22S 1.70 1.77 1.12 TI-C2D Tricyclic Terpane-22S 1.76 9.77 1.12 TI-C2D Tricyclic Terpane-22S 1.76 9.77 1.12 TI-C2D Tricyclic Terpane-22S 1.76 9.67 1.11 1.12 TI-S0 Tricyclic Terpane-22S 1.76 1.77 1.12 1.11 1.62 0.61 TI-S0 Tricyclic Terpane-22S 1.65 1.69 2.4 0.57 TI-S0 Tricyclic Terpane-22S 2.52 0.706 2.4 0.57 TI-S0 Tricyclic Terpane-22S 2.56 <t< td=""><td></td><td></td><td></td><td></td></t<>				
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T15-30-Norhoppane 12.3 12.4 0.81 T15-30-Normorbopane-C29Ts 4.22 4.25 0.708 X-17a(H)-Johomeohopane-C29Ts 4.22 4.25 0.708 X-17a(H)-Diahopane 1.23 1.35 9.3 T17-30-Normoretane 1.88 1.88 0 T18-18a(H) & 18b(H)-Oleanane 2.0.5 2.0.4 0.976 T20-Mortane 5.2 5.47 5.06 T21-30-Homohopane-22S 8.36 8.1 3.16 T22-30-Homohopane-22R 7.42 7.28 1.9 T27-0.31-Lishomohopane-22R 3.8 3.87 1.82 T33-Tetrakishomohopane-22R 3 3.03 0.995 T33-Tetrakishomohopane-22R 1.55 1.67 7.45 T33-Tetrakishomohopane-22R 1.55 1.67 7.45 T33-Tetrakishomohopane-22R 1.55 1.67 7.45 T34-Pentakishomohopane-22R 1.55 1.67 7.45 T34-Pentakishomohopane-22R 1.55 1.67 7.45 T34-Pentakishomohopane-22R 1.55 1.67 7.45 T34-Pentak	T14a-a,b- and b,a-28,30-Bisnorhopane			
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SB-13b(H),17a(H)-20S-Methyldiacholestane 4.41 4.81 8.68 S12-14a(H),17a(H)-20S-Cholestane 11 11.3 2.69 S14-14b(H),17b(H)-20S-Cholestane 5.81 5.73 1.39 S15-14b(H),17b(H)-20S-Cholestane 5.85 6.19 3.95 S15-14b(H),17b(H)-20S-Cholestane 5.85 6.19 3.95 S17-14a(H),17a(H)-20R-Cholestane 2.26 2.28 0.881 S18-13b(H),17b(H)-20R-Cholestane 2.26 2.28 0.881 S19-13a(H),17a(H)-20R-Ethyldiacholestane 0.597 0.606 NA S20-14a(H),17a(H)-20R-Methylcholestane 5.82 5.66 0.709 S21-44b(H),17b(H)-20R-Methylcholestane 5.82 5.66 0.709 S21-44b(H),17b(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14a(H),17a(H)-20S-Methylcholestane 7.84 6.97 6.52 S25-14a(H),17a(H)-20S-Ethylcholestane 7.84 6.97 6.52 S25-14a(H),17a(H)-20S-Ethylcholestane 5.81 5.6 3.68 S25-14a(H),17a(H)-20S-Ethylcholestane 8.81 3.64<				
S12-144(H),17a(H)-20S-Cholestane 11 11.3 2.69 S14-14b(H),17a(H)-20S-Cholestane 5.81 5.73 1.39 S15-14b(H),17b(H)-20S-Cholestane 5.85 6.19 3.95 S15-14b(H),17a(H)-20S-Cholestane 5.85 6.19 3.95 S17-14a(H),17a(H)-20R-Cholestane 12.3 12.6 2.41 S18-13b(H),17a(H)-20R-Cholestane 2.26 2.28 0.881 S19-13a(H),17a(H)-20R-Ethyldiacholestane 0.597 0.606 NA S20-14a(H),17b(H)-20S-Ethyldiacholestane 5.62 5.66 0.709 S22-14b(H),17b(H)-20S-Methylcholestane 8.32 7.93 4.6 S23-14b(H),17b(H)-20S-Methylcholestane 10.1 9.26 8.68 S24-14b(H),17b(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14b(H),17b(H)-20R-Methylcholestane 5.81 5.6 3.64 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S14-14b(H),17b(H)-20R-Cholestane 5.81 5.73 1.39 S15-14b(H),17b(H)-20R-Cholestane 5.95 6.19 3.95 S17-144(H),17b(H)-20R-Cholestane 12.3 12.8 2.41 S18-13b(H),17a(H)-20R-Cholestane 2.26 2.28 0.881 S19-13a(H),17a(H)-20R-Ethyldiacholestane 0.597 0.606 NA S20-14a(H),17b(H)-20R-Ethyldiacholestane 5.62 5.66 0.709 S22-14b(H),17b(H)-20R-Methylcholestane 8.32 7.93 4.8 S23-14b(H),17b(H)-20R-Methylcholestane 10.1 9.26 8.68 S24-14b(H),17b(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14b(H),17b(H)-20R-Methylcholestane 7.84 6.97 6.52 S25-14b(H),17b(H)-20R-Ethylcholestane 5.81 5.6 3.64 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20R-Ethylcholestane 6.74 7.49 10.5				
S15-14b(H),17b(H)-20S- Cholestane 5.85 6.19 3.95 S17-14a(H),17a(H)-20R- Cholestane 12.3 12.6 2.41 S18-13b(H),17a(H)-20R- Ethyldiacholestane 2.26 2.28 0.881 S19-13a(H),17a(H)-20R- Ethyldiacholestane 0.597 0.606 NA S20-14a(H),17a(H)-20R- Methylcholestane 5.62 5.66 0.709 S22-14b(H),17b(H)-20R-Methylcholestane 8.32 7.93 4.6 S23-14b(H),17b(H)-20R-Methylcholestane 10.1 9.26 8.68 S24-14a(H),17a(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14a(H),17a(H)-20R-Methylcholestane 7.81 5.6 3.64 S24-14a(H),17a(H)-20S-Ethylcholestane 8.81 3.64 5.61 S25-14a(H),17a(H)-20S-Ethylcholestane 8.24 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 8.74 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S18-13b(H),17a(H)-20R-Ethyldiacholestane 2.26 2.28 0.881 S19-13b(H),17a(H)-20S-Ethyldiacholestane 0.567 0.606 NA S20-14a(H),17b(H)-20S-Ethyldiacholestane 5.62 5.66 0.709 S22-14b(H),17b(H)-20R-Methylcholestane 8.32 7.93 4.8 S23-14b(H),17b(H)-20R-Methylcholestane 10.1 9.26 8.68 S24-14a(H),17a(H)-20R-Methylcholestane 7.44 6.97 6.52 S24-14a(H),17a(H)-20R-Methylcholestane 7.84 6.97 6.52 S25-14a(H),17a(H)-20R-Ethylcholestane 5.81 5.6 3.64 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20R-Ethylcholestane 6.74 7.49 10.5	S15-14b(H),17b(H)-20S- Cholestane	5.95		
S19-13a(H), 17b(H)-20S-Ethyldiacholestane 0.597 0.606 NA S20-14a(H), 17b(H)-20S-Methylcholestane 5.62 5.66 0.709 S22-14b(H), 17b(H)-20S-Methylcholestane 8.32 7.93 4.8 S23-14b(H), 17b(H)-20S-Methylcholestane 8.32 7.93 4.8 S23-14b(H), 17b(H)-20S-Methylcholestane 10.1 9.26 8.68 S24-14a(H), 17a(H)-20S-Ethylcholestane 7.44 6.97 6.52 S25-14b(H), 17a(H)-20S-Ethylcholestane 5.81 5.6 3.64 S25-14b(H), 17b(H)-20S-Ethylcholestane 9.24 8.91 3.64 S27-14b(H), 17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S20-14a(H),17a(H)-20S- Methylcholestane 5.62 5.66 0.709 S22-14b(H),17a(H)-20R-Methylcholestane 8.32 7.93 4.8 S23-14b(H),17b(H)-20R-Methylcholestane 10.1 9.26 8.68 S24-14b(H),17a(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14b(H),17a(H)-20R-Ethylcholestane 5.81 5.6 3.64 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S22-14b(H),17b(H)-20R-Methylcholestane 8.32 7.93 4.6 S23-14b(H),17b(H)-20R-Methylcholestane 10.1 9.26 8.68 S24-14a(H),17a(H)-20R-Methylcholestane 7.44 6.97 6.52 S24-14a(H),17a(H)-20R-Methylcholestane 7.84 6.97 6.52 S25-14a(H),17a(H)-20R-Ethylcholestane 5.81 5.6 3.68 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S23-14b(H), 17b(H)-20S-Methylcholestane 10.1 9.26 8.68 S24-14a(H), 17a(H)-20S-Methylcholestane 7.44 6.97 6.52 S25-14a(H), 17a(H)-20S-Ethylcholestane 5.81 5.6 3.68 S25-14b(H), 17a(H)-20S-Ethylcholestane 9.24 8.91 3.64 S25-14b(H), 17b(H)-20S-Ethylcholestane 6.74 7.49 10.5				
S24-14a(H),17a(H)-20R-Methylcholestane 7.44 6.97 6.52 S25-14a(H),17a(H)-20R-Ethylcholestane 5.81 5.6 3.68 S25-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20R-Ethylcholestane 6.74 7.49 10.5				
S25-14a(H),17a(H)-20S-Ethylcholestane 5.81 5.6 3.68 S26-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20E-Ethylcholestane 6.74 7.49 10.5				
S26-14b(H),17b(H)-20R-Ethylcholestane 9.24 8.91 3.64 S27-14b(H),17b(H)-20S-Ethylcholestane 6.74 7.49 10.5	S25-14a(H),17a(H)-20S-Ethylcholestane	5.81	5.6	3.68
	S26-14b(H),17b(H)-20R-Ethylcholestane			
520-148(H), 1/8(H)-2UK-EUNIChOlestane /.88 8.35 5./9				
	020-148(H),1/8(H)-20K-EINVICholestane	7.08	0.30	0.19

J=Result < Sample RL, B=Result < 5 x PB, ND= Not Detected, NA= Not Applicable, &= Outside of DQO, ME= Matrix Interference, Estimated Value,

Battelle To Wive

Project Name Lake Union Sediment Investigation Project Number N005443

Procedural Blank **Client Sample ID** Battelle Sample ID AB489PB-F1 Battelle Batch ID 02-668 Associated Blank NA NA Field Date Receipt Date NA 11/22/02 Extraction Date Acquired Date Analytical Method 12/14/02 8270M Percent Solids NA Sediment Matrix Sample Size 56 mg Weight Basis Min Reporting Limit OIL 0.214 Amount Units mg/kg Q9- Sesquiterpane (9) ND Q10- Sesquiterpane (10) ND Q1- Sesquiterpane (1) ND Q2- Sesquiterpane (2) Q3- Sesquiterpane (3) ND ND ND ND ND ND Q4- Sesquiterpane (4) Q5- Sesquiterpane (5) Q6- Sesquiterpane (6) Q7- Sesquiterpane (7) ND ND Q8- Sesquiterpane (8) II-C15-Isoprenoid (1880) I2-C15-Isoprenoid (1870) I3-C18-Isoprenoid (1850) I4-C19-Isoprenoid (Pristane) ND ND ND 15-C20-Isoprenoid (Phytane) T4-C23 Tricyclic Terpane ND ND T5-C24 Tricyclic Terpane T6-C25 Tricyclic Terpane ND ND T6c-C26 Tricyclic Terpane-22R T6b-C26 Tricyclic Terpane-22S ND ND T6a-C24 Tetracyclic Terpane T7-C28 Tricyclic Terpane-22S ND ND T8-C28 Tricyclic Terpane-22R ND ND T9-C29 Tricyclic Terpane-22S T10-C29 Tricyclic Terpane-22R T11-18a(H)-22,29,30-Trisnomeohopane-TS ND ND T12-17a(H)-22,29,30-Tristoneropane-TM T14a-a,b- and b,a-28,30-Bisnorhopane T14b-17a(H),21b(H)-25-Norhopane ND ND ND T15-30-Norhopane T16-18a(H)-30-Norneohopane-C29Ts ND ND X- 17a(H)-Diahopane T17- 30-Normoretane ND ND T18-16a(H) & 18b(H)-Oleanane ND ND T19-Hopane ND T20-Monane ND T21-30-Homohopane-22S T22-30-Homohopane-22R ND T26-30-Bishomohopane-22S T27-30,31-Bishomohopane-22R ND ND ND ND T30-30,31-Trishomohopane-22S T31-30,31-Trishomohopane-22R ND ND ND ND T32-Tetrakishomohopane-22S T33-Tetrakishomohopane-22R T34-Pentakishomohopane-22S T35-Pentakishomohopane-22R ND ND S4-13b(H), 17a(H)-20S-Diacholestane S5-13b(H), 17a(H)-20S-Distribusiane S8-13b(H), 17a(H)-20S-Methyldiacholestane S12-14a(H), 17a(H)-20S-Cholestane S12-14a(H), 17a(H)-20S-Cholestane ND ND ND ND ND ND ND ND S15-14b(H),17b(H)-20S- Cholestane S17-14a(H),17a(H)-20R- Cholestane S18-13b(H), 17a(H)-20R- Ethyldiacholestane S19-13a(H), 17b(H)-20S-Ethyldiacholestane S20-14a(H),17a(H)-20S- Methylcholestane S22-14b(H),17b(H)-20R-Methylcholestane ND ND S22-14b(H),17b(H)-20R-Methylcholestane S24-14a(H),17a(H)-20R-Methylcholestane S24-14a(H),17a(H)-20R-Methylcholestane S26-14b(H),17b(H)-20R-Ethylcholestane S27-14b(H),17b(H)-20R-Ethylcholestane S27-14b(H),17b(H)-20R-Ethylcholestane ND ND ND ND ND

J=Result < Sample RL

ND= Not Detected. D= Values reported using secondary dilution factor.

&= Outside of DQO, B= Result >5*Sample RL.

Police
 Control Technology To Work
 Project Name
 Lake Union Sediment Investigation
 Project Number
 N005443

Client Sample ID	NLU-112-SS-2030	NLU-112-SS-2030		
Battelle Sample ID	U0101-F1	U0101DUP-F1		
Battelle Batch ID	02-668	02-668		
Associated Blank	AB489PB	AB489PB		
Field Date	11/14/02	11/14/02		
Receipt Date	11/15/02	11/15/02		
Extraction Date	11/22/02	11/22/02		
Acquired Date	12/15/02	12/15/02		
Analylical Method Percent Solida	8270M 18.29	8270M 18.29		
Matrix	Sediment	Sediment		
Sample Size	31.2 mg	32.2 mg		
Weight Basis	OIL	OIL		
Min Reporting Limit	0.231	0.22		
Amount Units	mg/kg	mg/kg	RPD(%)	Q
Q9- Sesquiterpane (9)	17.4	19.2	9.64	
Q10- Sesquiterpane (10)	6.75	7.28	7.56	
Q1- Sesquiterpane (1)	12.1	15.2	22.7	
Q2- Sesquiterpane (2)	12.6	15	17.4	
Q3- Sesquiterpane (3)	19.8	23	15	
Q4- Sesquiterpane (4)	10.3	12.7	20.9 13.9	
Q5- Sesquiterpane (5) Q6- Sesquiterpane (6)	4.41 10.6	5.07 10.8	13.9	
Q7- Sesquiterpane (7)	4.76	4.34	9.23	
Q8- Sesquiterpane (8)	28.9	31.9	9.87	
I1-C15-Isoprenoid (1380)	77.1	84.3	8.92	
I2-C15-Isoprenoid (1470)	112	122	8.55	
I3-C18-Isoprenoid (1650)	119	133	11.1	
I4-C19-Isoprenoid (Pristane)	202	230	13	
15-C20-Isoprenoid (Phytane)	219	256	15.6	
T4-C23 Tricyclic Terpane	40.1 26.4	42.7 29.9	6.28 12.4	
T5-C24 Tricyclic Terpane T6-C25 Tricyclic Terpane	34.6	29.9 37.7	8.57	
T6c-C26 Tricyclic Terpane-22R	14.8	16	7.79	
T6b-C26 Tricyclic Terpane-22S	15	16.4	8.92	
T6a-C24 Tetracyclic Terpane	7.81	7.87	0.765	
T7-C28 Tricyclic Terpane-22S	21.2	26.3	21.5	
T8-C28 Tricyclic Terpane-22R	22.1	25.1	12.7	
T9-C29 Tricyclic Terpane-22S	23.7	26	9.26	
T10-C29 Tricyclic Terpane-22R	23.6 27.5	24.8 30.2	4.96 9.36	
T11-18a(H)-22,29,30-Trisnomeohopane-TS T12-17a(H)-22,29,30-Trisnomopane-TM	30.7	33.1	7.52	
T14a-a,b- and b,a-28,30-Bisnorhopane	31.5	34	7.63	
T14b-17a(H),21b(H)-25-Northopane	20.2	20	0.995	
T15-30-Norhopane	108	116	7.14	
T16-18a(H)-30-Nomeohopane-C29Ts	37.3	42	11.8	
X- 17a(H)-Diahopane	10.3	10.4	0.966	
T17- 30-Normoretane	17.2	19.5	12.5	
T18-18a(H) & 18b(H)-Oleanane	34.9 221	37.3 237	6.65 6.99	
T19-Hopane T20- Mortane	48	61.5	24.6	
T21-30-Homohopane-22S	40 81,3	61.5	8.82	
T22-30-Homohopane-22R	57.2	63.1	9.81	
T26-30-Bishomohopane-22S	44.9	49.2	9.14	
T27-30,31-Bishomohopane-22R	34.2	36.4	6.23	
T30-30,31-Trishomohopane-22S	42.8	47.2	9.78	
T31-30,31-Trishomohopane-22R	32.9	37	11.7	
T32-Tetrakishomohopane-22S	23.3	26.4 15.6	12.5 5.26	
T33-Tetrakishomohopane-22R T34-Pentakishomohopane-22S	14.8 20.3	15.6	5.26	
T35-Pentakishomohopane-22R	20.3	16.4	4.36	
S4-13b(H),17a(H)-20S-Diacholestane	62.2	95.3	14.8	
S5-13b(H),17a(H)-20R-Diacholestane	53.9	59.9	10.5	
S8-13b(H),17a(H)-20S-Methyldiacholestane	76.4	83.5	8.88	
S12-14a(H),17a(H)-20S-Cholestane	148	160	7.79	
S14-14b(H),17b(H)-20R- Cholestane	78.7	85.8	8,63	
S15-14b(H),17b(H)-20S- Cholestane	77.4	82.9	6.86	
S17-14a(H),17a(H)-20R- Cholestane	180	197	9.02	
S18-13b(H),17a(H)-20R- Ethyldiacholestane S19-13a(H),17b(H)-20S-Ethyldiacholestane	25 5.76	26.9 6.16	7.32 6.71	
S20-14a(H),17a(H)-20S- Eurytolacholestane S20-14a(H),17a(H)-20S- Methylcholestane	5.76	81.8	8,81	
S22-14b(H),17b(H)-20R-Methylcholestane	115	125	8.33	
S23-14b(H),17b(H)-20S-Methylcholestane	120	128	6.45	
S24-14a(H),17a(H)-20R-Methylcholestane	130	146	11.6	
S25-14a(H),17a(H)-20S-Ethylcholestane	70.7	77.7	9.43	
S26-14b(H),17b(H)-20R-Ethylcholestane	96.8	104	7.17	
S27-14b(H),17b(H)-20S-Ethylcholestane	65.6	73.1	10.8	
S28-14a(H),17a(H)-20R-Ethylcholestane	122	133	8,63	

J=Result < Sample RL. B=Result < 5 x PB. ND= Not Detected. NA= Not Applicable. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Not Surrogate Corrected DUP results

Battelle
 Truthing Tachnology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Procedural Blank		
Battelle Sample ID	AB851PB		
Battelle Batch ID	03-0023		
Associated Blank	NA		
Field Date	NA		
Receipt Date	NA 01/09/03		
Extraction Date	01/09/03		
Acquired Date-Biornarker Analytical Method	8270M		
Percent Solids	NA		
Matrix	Sediment		
Sample Size	7	8	
Weight Basis	NA		
Min Reporting Limit Amount Units	1.71 µg/kg		
Anodite Onits	Harry B		
Q9- Sesquiterpane (9)		ND	
Q10- Sesquiterpane (10)		ND	
Q1- Sesquiterpane (1)		ND	
Q2- Sesquiterpane (2)		ND ND	
Q3- Sesquiterpane (3) Q4- Sesquiterpane (4)		ND	
Q5- Sesquiterpane (5)		ND	
Q6- Sesquiterpane (6)		ND	
Q7- Sesquiterpane (7)		ND	
Q8- Sesquiterpane (8)		ND	
11-C15-Isoprenoid (1380)		ND ND	
l2-C15-isoprenoid (1470) l3-C18-isoprenoid (1650)		ND	
I4-C19-Isoprenoid (Pristane)		ND	
15-C20-Isoprenoid (Phytane)		ND	
T4-C23 Tricyclic Terpane		ND	
T5-C24 Tricyclic Terpane		ND ND	
T6-C25 Tricyclic Terpane T6c-C26 Tricyclic Terpane-22R		ND	
T6b-C26 Tricyclic Terpane-22S		ND	
T6a-C24 Tetracyclic Terpane		ND	
17-C28 Tricyclic Terpane-22S		ND	
T8-C28 Tricyclic Terpane-22R		ND	
T9-C29 Tricyclic Terpane-22S T10-C29 Tricyclic Terpane-22R		ND ND	
T11-18a(H)-22,29,30-Trisnomeohopane-TS		ND	
T12-17a(H)-22,29,30-Trisnorhopane-TM		ND	
T14a-a,b- and b,e-28,30-Bisnomopane		ND	
T14b-17a(H),21b(H)-25-Norhopane		ND ND	
T15-30-Norhopane T16-18a(H)-30-Nomechopane-C29Ts		ND	
X- 17a(H)-Diahopane		ND	
T17- 30-Normoretane		ND	
T18-18a(H) & 18b(H)-Oleanane		ND	
T19-Hopane T20- Mortane		ND ND	
T21-30-Homohopane-22S		ND	
T22-30-Homohopane-22R		ND	
T26-30-Bishomohopane-22S		ND	
T27-30,31-Bishomohopane-22R		ND	
T30-30,31-Trishomohopane-22S		ND ND	
T31-30,31-Trishomohopane-22R T32-Tetrakishomohopane-22S		ND	
T33-Tetrakishomohopane-22R		ND	
T34-Pentakishomohopane-22S		ND	
T35-Pentakishomohopane-22R		ND	
S4-13b(H),17a(H)-20S-Diacholestane		ND ND	
S5-13b(H),17a(H)-20R-Diacholestane S8-13b(H),17a(H)-20S-Methyldiacholestane		ND	
S12-14a(H), 17a(H)-20S-Cholestane		ND	
S14-14b(H),17b(H)-20R- Cholestane		ND	
S15-14b(H), 17b(H)-20S- Cholestane		ND	
\$17-14a(H),17a(H)-20R- Cholestane		ND	
S18-13b(H),17a(H)-20R- Ethyldiacholestane S19-13a(H),17b(H)-20S-Ethyldiacholestane		ND ND	
S20-14a(H), 17a(H)-20S- Ethyldiactiolestane S20-14a(H), 17a(H)-20S- Methylcholestane		ND	
S22-14b(H), 17b(H)-20R-Methylcholestane		ND	
S23-14b(H), 17b(H)-20S-Methylcholestane		ND	
S24-14a(H),17a(H)-20R-Methylcholestane		ND	
S25-14a(H), 17a(H)-20S-Ethylcholestane S26-14b(H), 17b(H)-20R-Ethylcholestane		ND ND	
S20-14b(H), 17b(H)-20S-Ethylcholestane		ND	
		ND	

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Battelle
 ... Puring Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	NLU-116-SS-2030	NLU-116-SS-2030		
Battelle Sample ID	V0123-F1 (IVD)	V0123DUP-F1 (IVD)		
Battelle Batch ID	03-0023	03-0023		
Associated Blank	AB851PB	AB851PB		
Field Date	11/11/02	11/11/02		
Receipt Date	11/15/02	11/15/02		
Extraction Date	01/09/03	01/09/03		
Acquired Date-Biomarker	02/19/03	02/19/03 8270M		
Analytical Method Percent Solids	8270M 18.31 %	18.31 %		
Matrix	Sediment	Sediment		
Sample Size	5.78 g	5.73 g		
Weight Basis	DRY	DRY		
Min Reporting Limit	2.080	2.090		-
Amount Units	µg/kg	µg/kg	RPD(%)	٩
Q9- Sesquiterpane (9)	292	286	2.08	
Q10- Sesquiterpane (10)	113	123	8.47	
Q1- Sesquiterpane (1)	270	275	1.83	
Q2- Sesquiterpane (2)	258	262	1.54	
Q3- Sesquiterpane (3)	292	320	9.15	
Q4- Sesquitemane (4)	171	189 97.1	10 0.413	
Q5- Sesquiterpane (5) Q6- Sesquiterpane (6)	96.7 126	97.1	11.2	
Q7- Sesquiterpane (7)	72.6	74.9	3.12	
Q8- Sesquiterpane (8)	407	401	1.48	
I1-C15-Isoprenoid (1380)	246	266	7.81	
12-C15-Isoprenoid (1470)	424	446	5.06	
13-C18-Isoprenoid (1650)	351	388	10	
I4-C19-Isoprenoid (Pristane)	583	603	3.37 6 OR	
I5-C20-Isoprenoid (Phylane)	782 776	831 806	6.08 3.79	
74-C23 Tricyclic Terpane 75-C24 Tricyclic Terpane	527	552	4.63	
T6-C25 Tricyclic Terpane	696	730	4.77	
T6c-C26 Tricyclic Terpane-22R	326	314	3.75	
T6b-C26 Tricyclic Terpane-22S	304	310	1.95	
T6a-C24 Tetracyclic Terpane	158	153	3.22	
T7-C28 Tricyclic Terpane-22S	475	492	3.52	
T8-C28 Tricyclic Terpane-22R	487 506	497 524	2.03 3,5	
T9-C29 Tricyclic Terpane-22S T10-C29 Tricyclic Terpane-22R	482	539	11.2	
T11-18a(H)-22,29,30-Trisnomeohopane-TS	531	548	3.15	
T12-17a(H)-22,29,30-Trisnorhopane-TM	669	685	2.36	
T14a-a,b- and b,a-28,30-Bisnorhopane	916	968	5.52	
T14b-17a(H),21b(H)-25-Norhopane	554	549	0.907	
T15-30-Norhopane	2000	2040	1.98	
T16-18a(H)-30-Nomeohopane-C29Ts	810 145	826 172	1.96 17	
X- 17a(H)-Diahopane T17- 30-Normoretane	424	431	1.64	
T18-18a(H) & 18b(H)-Oleanane	778	783	0.641	
T19-Hopane	4110	4190	1.93	
T20- Mortane	744	756	1.6	
T21-30-Homohopane-22S	1260	1280	1.57	
T22-30-Homohopane-22R	901	908	0.774	
T26-30-Bishomohopane-22S	. 640	693 654	7.95	
T27-30,31-Bishomohopane-22R T30-30,31-Trishomohopane-22S	528 642	554 650	4.8 1.24	
T31-30,31-Trishomohopane-22R	546	532	2.6	
T32-Tetrakishomohopane-22S	331	347	4.72	
T33-Tetrakishomohopane-22R	215	224	4.1	
T34-Pentakishomohopane-22S	288	289	0.347	
T35-Pentakishomohopane-22R	218	226	3.6	
S4-13b(H),17a(H)-20S-Diacholestane	1510	1520	0.66	
S5-13b(H),17a(H)-20R-Diacholestane	974 1450	980 1430	0.614 1.39	
S8-13b(H),17a(H)-20S-Methyldiacholestane S12-14a(H),17a(H)-20S-Cholestane	2940	3070	4.33	
S12-14a(H),17a(H)-20S-Cholestane	1540	1500	2.63	
S15-14b(H), 17b(H)-20S- Cholestane	1490	1540	3.3	
S17-14a(H),17a(H)-20R- Cholestane	4010	4110	2.46	
S18-13b(H),17a(H)-20R- Ethyldiacholestane	418	384	8,48	
S19-13a(H),17b(H)-20S-Ethyldiacholestene	140	145	3.51	
S20-14a(H),17a(H)-20S- Methylcholestane	1560	1690	8 0	
S22-14b(H),17b(H)-20R-Methylcholestane S23-14b(H),17b(H)-20S-Methylcholestane	2270 2300	2270 2290	0.436	
S23-14b(H),17b(H)-20S-Methylcholestane	2980	3060	2.65	
S25-14a(H), 17a(H)-20S-Ethylcholestane	1400	1310	6,64	
S26-14b(H),17b(H)-20R-Ethylcholestane	1830	1710	6.78	
S27-14b(H),17b(H)-20S-Ethylcholestane	1220	1410	14.4	
S28-14a(H),17a(H)-20R-Ethylcholestane	2590	2640	1.91	

J=Result < Sample RL. B=Result < 5 x PB. ND= Not Detected. NA= Not Applicable. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Battelle
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 Troject Name
 Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Procedurel Blank	
Battelie Sample ID	88278P8-D-F1	
Battelle Batch ID	03-0137	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date Acquired Date-Biomarker	02/11/03	
Analytical Method	02/19/03 8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size	0.5	g
Weight Basis	NA	
Min Reporting Limit	24	
Amount Units	µg/kg	
Q9- Sesquiterpane (9)		ND
Q10- Sesquiterpane (10)		ND
Q1- Sesquiterpane (1)		ND
Q2- Sesquiterpane (2)		ND
Q3- Sesquiterpane (3)		ND
Q4- Sesquiterpane (4)		ND
Q5- Sesquiterpane (5)		ND
Q6- Sesquiterpane (6) Q7- Sesquiterpane (7)		ND ND
Q8- Sesquiterpane (8)		ND ND
I1-C15-Isoprenoid (1380)		ND
12-C15-Isoprenoid (1470)	5.2	
I3-C18-Isoprenoid (1650)		ND
I4-C19-Isoprenoid (Pristane)	6.12	
15-C20-Isoprenoid (Phytane)	6.33	
T4-C23 Tricyclic Terpane T5-C24 Tricyclic Terpane		ND ND
T8-C25 Tricyclic Terpane		ND
T6c-C26 Tricyclic Terpane-22R		ND
T6b-C26 Tricyclic Terpane-22S		ND
T6a-C24 Tetracyclic Terpane		ND
T7-C26 Tricyclic Terpane-22S		ND
T8-C28 Tricyclic Terpane-22R T9-C29 Tricyclic Terpane-22S		ND
T10-C29 Tricyclic Terpane-22R		ND ND
T11-18a(H)-22,29,30-Trisnorneohopane-TS		ND
T12-17a(H)-22,29,30-Trisnorhopane-TM		ND
T14a-a,b- and b,a-28,30-Bisnorhopane		ND
T14b-17a(H),21b(H)-25-Norhopane		ND
T15-30-Norhopane		ND
T16-18a(H)-30-Norneohopane-C29Ts X- 17a(H)-Diahopane		ND ND
T17- 30-Nomoretane		ND
T18-18a(H) & 18b(H)-Oleanane		ND
T19-Hopane		ND
T20- Mortane		ND
T21-30-Homohopane-22S		ND
T22-30-Homohopane-22R T26-30-Bishomohopane-22S		ND ND
T27-30,31-Bishomohopane-22R		ND
T30-30,31-Trishomohopane-22S		ND
T31-30,31-Trishomohopane-22R		ND
T32-Tetrakishomohopane-22S		ND
T33-Tetrakishomohopane-22R		ND
T34-Pentakishomohopane-22S T35-Pentakishomohopane-22R		ND
S4-13b(H),17a(H)-20S-Diacholestane		ND ND
S5-13b(H),17a(H)-20R-Diacholestane		ND
S8-13b(H), 17a(H)-20S-Methyldiacholestane		ND
S12-14a(H),17a(H)-20S-Cholestane		ND
S14-14b(H),17b(H)-20R- Cholestane		ND
S15-14b(H),17b(H)-20S- Cholestane S17-14#(H) 17#(H)-20B, Cholestane		ND
S17-14a(H),17a(H)-20R- Cholestane S18-13b(H),17a(H)-20R- Ethyldiacholestane		ND ND
S19-13a(H),17b(H)-20S-Ethyldiacholestane		ND
S20-14a(H),17a(H)-20S- Methylcholestane		ND
S22-14b(H),17b(H)-20R-Methylcholestane		ND
S23-14b(H),17b(H)-20S-Methylcholestane		ND
S24-14a(H),17a(H)-20R-Methylcholestane		ND
S25-14a(H),17a(H)-20S-Ethylcholestane S26-14b(H),17b(H)-20R-Ethylcholestane		ND
S26-14b(H), 17b(H)-20R-Ethylcholestane S27-14b(H), 17b(H)-20S-Ethylcholestane		ND ND
S28-14a(H),17a(H)-20R-Ethylcholestane		ND

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5°Sample RL.

Battelle
 Switch Technology Te Mark
 Project Name
 Lake Union Sediment Investigation
 Project Number N005443

Batkle BB3CPB-F1 Associated Blank 03-0137 Associated Blank NA Receipl Date NA Receipl Date NA Extraction Date 02/1803 Acquired Date-Biomarker 02/1803 Acquired Date-Biomarker 02/1803 Analytical Method 8270M Percent Solids NA Matrix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 OP- Sasquilerpane (0) ND O1- Sasquilerpane (1) ND O2- Sasquilerpane (2) ND O3- Sasquilerpane (3) ND O4- Sasquilerpane (3) ND O4- Sasquilerpane (6) ND O3- Sasquilerpane (7) ND O2- Sasquilerpane (7) ND O2- Sasquilerpane (8) ND O2- Sasquilerpane (9) ND O2- Sasquilerpane (1) ND O2- Sasquilerpane (1) ND O2- Sasquilerpane (1) ND	ample ID Pro	ocedural Blank-F1 Only	
Associated Blank NA Receip! Date NA Receip! Date NA Extraction Date 02/1903 Analytical Method 8270M Percent Solids NA Matrix Solid Sample Size 0.5 g Veright Basis NA Min Reporting Limit 12 Amount Units µptg OP- Sasquilerpane (10) ND O1- Sasquilerpane (10) ND O2- Sasquilerpane (10) ND O2- Sasquilerpane (6) ND O3- Sasquilerpane (6) ND O4- Sasquilerpane (6) ND O4- Sasquilerpane (6) ND O2- Sasquilerpane (6) ND O3- Sasquilerpane (7) ND O4- Sasquilerpane (7) ND O4- Sasquilerpane (8) ND O4- Sasquilerpane (8) ND O4- C1- Sasquilerpane (8) ND C1- C1- Sasquilerpane (8) ND C1- C1- Sasquilerpane (9) ND C1- C1- Sasquilerpane (9) ND <th>Sample ID</th> <th>BB362PB-F1</th> <th></th>	Sample ID	BB362PB-F1	
Field Date NA Extraction Date 02/1903 Acquired Date Silomarker 02/1903 Analytical Method 62/2003 Analytical Method 62/2003 Analytical Method 62/2003 Amalytical Method 62/2003 Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µp/kg G8. Sequilerpane (9) ND G10- Sequilerpane (10) ND G3. Sequilerpane (2) ND G3. Sequilerpane (3) ND G4. Sequilerpane (1) ND G4. Sequilerpane (3) ND G4. Sequilerpane (1) ND G5. Sequilerpane (1) ND G5. Sequilerpane (1) ND G5. Garginger (1) ND G5. Garginger (1)	Batch ID		
Receip Date NA Extinction Date 02/1903 Anaplical Method 62270M Percent Solids NA Mattix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µg/kg Ce- Sesquiterpane (0) ND Q1- Sesquiterpane (1) ND Q2- Sesquiterpane (2) ND Q2- Sesquiterpane (3) ND Q2- Sesquiterpane (4) ND			
Extraction Date 02/1903 Analytical Method 6270M Procent Solids NA Matrix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µg/kg C9-Sequiterpane (10) ND Q1-Sequiterpane (2) ND Q2-Sequiterpane (2) ND Q3-Sequiterpane (3) ND Q4-Sequiterpane (3) ND Q4-Sequiterpane (3) ND Q1-Sequiterpane (3) ND Q1-Sequiterpane (3) ND Q1-Sequiterpane (3) ND Q1-C1-Sequiterpane (3) ND Q1-C1-Sequiterpane (3) ND Q1-C1-Sequiterpane (3) ND Q1-C1-Seqtrepane ND			
Araguical Nethod 62/1903 Analytical Method 62/200 Percent Solids NA Mattx Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µg/kg Cole - Sequiterpane (0) ND Q10 - Sesquiterpane (1) ND Q2 - Sequiterpane (2) ND Q2 - Sequiterpane (3) ND Q2 - Sequiterpane (1) ND Q2 - Sequiterpane (1) ND Q2 - Sequiterpane (1) ND Q2 - Sequiterpane (2)			
Analytical Method B270M Percant Solids NA Matrix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µp/kg QP. Sarquiterpane (1) ND Q1- Sarquiterpane (2) ND Q2- Sarquiterpane (3) ND Q3- Sarquiterpane (3) ND Q4- Sarquiterpane (6) ND Q4- Sarquiterpane (7) ND Q2- Sarquiterpane (6) ND Q4- Sarquiterpane (6) ND Q2- Sarquiterpane (7) ND Q2- Sarquiterpane (7) ND Q2- Sarquiterpane (7) ND Q4- Sarquiterpane (7) ND Q2- Sart Sart Sart Sart Sart Sart Sart			
Parent Solids NA Matrix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µp/kg Ole Sesquiterpane (9) ND Olit-Sesquiterpane (10) ND Scalar Sesquiterpane (10) ND <t< td=""><td></td><td></td><td></td></t<>			
Matrix Solid Sample Size 0.5 g Weight Basis NA Min Reporting Linit 12 Amount Units µg/kg QB- Saculiterpane (10) ND Q1- Sequiterpane (2) ND Q2- Sacuiterpane (2) ND Q3- Sacuiterpane (3) ND Q4- Sacuiterpane (6) ND Q4- Sacuiterpane (7) ND Q4- Sacuiterpane (8) ND Q4- Sacuiterpane (100) ND Q4- Sacuiterpane (100) ND Q4- Sacuiterpane (1100) ND Q4- Sacuit			
Sampa Size 0.5 g Weight Basis NA Min Reporting Limit 12 Amount Units µg/kg QB - Sasquilerpane (0) ND Q10-Sesquilerpane (1) ND Q2 - Sasquilerpane (2) ND Q3 - Sesquilerpane (2) ND Q4 - Sesquilerpane (3) ND Q4 - Sesquilerpane (6) ND Q4 - Sesquilerpane (6) ND Q4 - Sesquilerpane (6) ND QF - Sesquilerpane (7) ND Q4 - Sesquilerpane (6) ND Q12- Sesquilerpane (7) ND Q4 - Sesquilerpane (6) ND Q12- Sesquilerpane (7) ND Q12- Sesquilerpane (7) ND Q12- Sesquilerpane (8) ND Q12- Sesquilerpane (1/470) ND Q12- Sesquilerpane (1/470) ND Q2- Sesquilerpane (1/470) ND Q2- Sesquilerpane (1/470) ND Q2- Sesquilerpane (2/2) ND Q2- Sesquilerpane (2/2) ND Q2- Sesqtrexyclic Terpane 2/2R ND </td <td>Solids</td> <td></td> <td></td>	Solids		
Weight Basis NA Min Reporting Limit 12 Amount Units µg/kg QP: Sesupliterpane (10) ND Q1: Sesupliterpane (11) ND Q2: Sesupliterpane (2) ND Q2: Sesupliterpane (3) ND Q3: Sesupliterpane (3) ND Q4: Sesupliterpane (6) ND Q4: Sesupliterpane (6) ND Q4: Sesupliterpane (7) ND Q3: Sesupliterpane (6) ND Q2: Sesupliterpane (7) ND Q2: Sesupliterpane (7) ND Q2: Sesupliterpane (7) ND Q2: Sesupliterpane (6) ND Q2: Sesupliterpane (7) ND	• •		
Min Reporting Limit 12 Amount Units µp/kg Q10-Sasquiterpane (1) ND Q10-Sasquiterpane (1) ND Q2-Sasquiterpane (2) ND Q2-Sasquiterpane (2) ND Q2-Sasquiterpane (3) ND Q2-Sasquiterpane (6) ND Q2-Sasquiterpane (7) ND Q2-Sasquiterpane (2)			
Amount Uniti µg/kg QB: Sequilespane (10) ND Q1: Sequilespane (1) ND Q2: Sequilespane (2) ND Q2: Sequilespane (3) ND Q2: Sequilespane (3) ND Q4: Sequilespane (3) ND Q4: Sequilespane (6) ND Q4: Sequilespane (7) ND Q4: Sequilespane (1470) ND Q2: Sequilespane (1470) ND Q2: Sequilespane (1670) ND Q2: Sequilespane (170) ND Q2: Sequilespane (10) ND Q2: Sequilespane (22) ND Q2: Sequilespane (22) ND Q2: Sequilespane (22) ND Q2: Sequil			
C10-Ssequiterpane (10) ND C1-Ssequiterpane (1) ND C2-Sequiterpane (2) ND C3-Sequiterpane (2) ND C4-Sequiterpane (3) ND C4-Sequiterpane (6) ND C7-Ssequiterpane (6) ND C7-Ssequiterpane (6) ND C7-Ssequiterpane (7) ND C3-Sesquiterpane (8) ND C1-Stasprenoid (170) ND C3-C1-Stasprenoid (1710) ND C3-C1-Stasprenoid (1710) ND C3-C2-Stasprenoid (1710) ND C3-C3-Stasprenoid (1710) ND C3-C3-Stasprenoid (1710) ND C3-C3-Tricycitic Terpane-22R ND C3-C3-Tricycitic Terpane-22R ND C3-C3-Tricycitic Terpane-22R			
C10-Ssequiterpane (10) ND C1-Ssequiterpane (1) ND C2-Sequiterpane (2) ND C3-Sequiterpane (2) ND C4-Sequiterpane (3) ND C4-Sequiterpane (6) ND C7-Ssequiterpane (6) ND C7-Ssequiterpane (6) ND C7-Ssequiterpane (7) ND C3-Sesquiterpane (8) ND C1-Stasprenoid (170) ND C3-C1-Stasprenoid (1710) ND C3-C1-Stasprenoid (1710) ND C3-C2-Stasprenoid (1710) ND C3-C3-Stasprenoid (1710) ND C3-C3-Stasprenoid (1710) ND C3-C3-Tricycitic Terpane-22R ND C3-C3-Tricycitic Terpane-22R ND C3-C3-Tricycitic Terpane-22R	aultomana (9)	ND	
Q1 - Sequiterpane (2) ND Q2 - Sequiterpane (3) ND Q3 - Sequiterpane (4) ND Q4 - Stequiterpane (5) ND Q4 - Stequiterpane (5) ND Q4 - Stequiterpane (7) ND Q4 - Stequiterpane (8) ND Q4 - Stequiterpane (7) ND Q4 - Stequiterpane (7) ND Q4 - Stequiterpane (8) ND 12-C15-Isoprenoid (1430) ND 12-C15-Isoprenoid (1750) ND 12-C16-Isoprenoid (1750) ND 14-C19-Isoprenoid (1750) ND 15-C20-Isoprenoid (1751ane) ND 15-C23 Tricyclic Terpane ND 15-C24 Tricyclic Terpane-228 ND 15-C24 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-C22 Tricyclic Terpane-228 ND 17-12-23 Tricyclic Terpane-228 ND			
Q2-Sequiterpane (2) ND Q3-Sequiterpane (3) ND Q4-Sequiterpane (4) ND Q6-Sequiterpane (5) ND Q6-Sequiterpane (6) ND Q7-Sequiterpane (7) ND Q6-Sequiterpane (8) ND Q1-Sequiterpane (1380) ND Q1-C15-Isoprenoid (1470) ND Q2-C15-Isoprenoid (Physine) ND J5-C20-Isoprenoid (Physine) ND J5-C22-Isoprenoid (Physine) ND J5-C23-Ticyclic Terpane-22R ND J7-C28 Ticyclic Terpane-22S ND J7-Q28 Ticyclic Terpane-22R ND J1-C29 Ticyclic Terpane-22R ND J1-C29 Ticyclic Terpane-22R ND J1-C29 Ticyclic Terpane-22R ND J1-21-Ta(J1-Z28,3-0-Jinsnomeohopane-TS ND J1-14-J72(J1-Z28,3-0-Jinsnomeohopane-TM ND J1-14-J72(J1-Z28,3-0-Jinsnomeohopane-C2S			
G3< Serquiterpane (3)			
Q4 Sequitopane (d) ND Q5 Sequitopane (d) ND Q6 Sequitopane (f) ND Q7 Sequitopane (f) ND Q2 Sequitopane (f) ND Q2 Sequitopane (f) ND Q2 Sequitopane (f) ND Q2 Sequitopane (f) ND U2 Tricyclic Terpane 22S ND U2 Tricyclic Terpane 22R ND U2 Tricyclic Terpane 22R ND U1 U2 ND U1 U2 ND U1			
QS- Sequiterpane (6) ND QF- Sequiterpane (7) ND QF- Sequiterpane (8) ND QF- Sequiterpane (8) ND QF- Sequiterpane (8) ND QF- Sequiterpane (8) ND ZC-15-Isoprenoid (1470) ND SC-18-Isoprenoid (Phytane) ND SC-20-Isoprenoid (Phytane) ND T4-C23 Tricyclic Terpane ND T6-C24 Tricyclic Terpane-22R ND T6b-C25 Tricyclic Terpane-22R ND T6b-C26 Tricyclic Terpane-22R ND T6b-C26 Tricyclic Terpane-22R ND T62-C28 Tricyclic Terpane-22R ND T16-C28 Tricyclic Terpane-22R ND T10-C28 Tricyclic Terpane-22R ND T10-C28 Tricyclic Terpane-22R ND T11-18e(H)-22, 29, 30-Trisnomechopane-TS ND T11-18e(H)-22, 29, 30-Trisnomechopane-TM ND T14-17ae(H)-22, 30, 30-Trisnomechopane-C28T ND T14-17ae(H)-22, 30, 30-Trisnomechopane-C28T ND T14-17ae(H)-20 Nomechopane-22S ND T14-17ae(H)-20 Nomechopane-22S ND			
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Q7- Sesquiterpane (i) ND Q8- Sequiterpane (i) ND 11-C15-Isoprenoid (1380) ND 12-C15-Isoprenoid (170) ND 12-C16-Isoprenoid (170) ND 12-C16-Isoprenoid (Pristane) ND 15-C20-Isoprenoid (Pristane) ND 15-C20-Isoprenoid (Pristane) ND 15-C21-Stricyclic Terpane ND 15-C22 Tricyclic Terpane-22R ND 150-C28 Tricyclic Terpane-22S ND 170-C28 Tricyclic Terpane-22S ND 170-C28 Tricyclic Terpane-22S ND 170-C28 Tricyclic Terpane-22S ND 171-18e(H)-22, 28, 30-Tisnomehopane-TS ND 171-18e(H)-22, 28, 30-Tisnomehopane-TS ND 1714-17e(H)-22, 28, 30-Tisnomehopane-TS ND 1714-17e(H)-22, 28, 30-Tisnomehopane-SS ND <td< td=""><td></td><td></td><td></td></td<>			
Qe. Sequiterpane (e) ND 12-015-leoprenoid (1930) ND 12-015-leoprenoid (1950) ND 13-018-leoprenoid (1950) ND 13-018-leoprenoid (1950) ND 15-020-leoprenoid (Pristane) ND 15-020-leoprenoid (Pristane) ND 15-022-liroycitic Terpane ND 15-022-liroycitic Terpane-22R ND 160-023 Tricycitic Terpane-22R ND 17-023 Tricycitic Terpane-22R ND 17-17-174(H)-22.2,9,30-Trisnomeohopane-TS ND 17-13-14(H)-22.2,9,30-Trisnomeohopane ND 17-14-15.30-Motropane ND 17-14-13.41(H)-22.2,9,30-Trisnomeohopane ND 17-14-14.21(H)-22.2,9,30-Trisnomeohopane-28 ND 17-14-15.41(H)-22.42,9,30-Trisnomeohopane-29 ND 17-15-30-Motropane			
11-C15-lapprenoid (1430) ND 12-C15-lapprenoid (1650) ND 13-C18-lapprenoid (1650) ND 13-C18-lapprenoid (1650) ND 15-C20-lapprenoid (Phytane) ND 16-C220 Tricyclic Terpane-228 ND 17-C28 Tricyclic Terpane-228 ND 17-C28 Tricyclic Terpane-228 ND 17-C28 Tricyclic Terpane-228 ND 17-14-174 (H)-22.28,30-Tisnomeohopane-TS ND 171-14ea(h)-2.28,30-Tisnomeohopane-TM ND 171-14ea(h)-3.28,0-Neisondropane ND 171-14ea(h)-3.0-Nerechopane-C29Ts ND 171-30-Normoretane ND 171-30-Normoretane ND 172-30-All (H)-Cleanane ND 172-30-All			
12-C15-lsoprenoid (1470) ND 12-C16-lsoprenoid (Phytane) ND 13-C20-lsoprenoid (Phytane) ND 15-C20-lsoprenoid (Phytane) ND 15-C20-lsoprenoid (Phytane) ND 15-C20-lsoprenoid (Phytane) ND 15-C20-lsoprenoid (Phytane) ND 15-C20 Tricyclic Terpane ND 15-C20 Tricyclic Terpane-22R ND 15-C20 Tricyclic Terpane-22S ND 15-C23 Tricyclic Terpane-22R ND 15-C23 Tricyclic Terpane-22R ND 15-C23 Tricyclic Terpane-22R ND 15-C23 Tricyclic Terpane-22R ND 17-C23 Tricyclic Terpane-22R ND 17-C23 Tricyclic Terpane-22R ND 17-148(H)-22 J3.0-Trisnomeohopane-TS ND 17-148(H)-22 J3.0-Trisnomeohopane ND 17-148(H)-22 J3.0-Irisnomeohopane-C30TS ND 17-15-30-Notmoehopane-C20TS ND 17-15-30-Notmoehopane-C20TS ND 17-3-30-Nomoretane ND 17-3-30-Nomoretane ND 17-3-30-Homohopane-22S ND 1			
13-C18-loprenoid (Pristane) ND 14-C19-isoprenoid (Pristane) ND 15-C20-isoprenoid (Pristane) ND 15-C21 Tricyclic Terpane ND 15-C22 Tricyclic Terpane ND 15-C25 Tricyclic Terpane-228 ND 150-C26 Tricyclic Terpane-228 ND 170-C28 Tricyclic Terpane-228 ND 170-C29 Tricyclic Terpane-228 ND 170-C29 Tricyclic Terpane-228 ND 170-C29 Tricyclic Terpane-228 ND 170-C29 Tricyclic Terpane-228 ND 171-184(H)-22, 29, 30-Trisnomeohopane-TS ND 171-184(H)-22, 29, 30-Trisnomeohopane-TM ND 1714-174(H)-12(H)-12(H)-14(H)-14(H)-14(H) ND 1714-174(H)-12(H)-12(H)-14(H)-14(H) ND 1714-174(H)-12(H)-12(H)-14(H) ND 1714-174(H)-12(H)-14(H)-14(H) ND 1714-174(H)-12(H)-14(H)-14(H) ND 1714-174(H)-22(H)-14(H)-14(H) ND 1714-174(H)-21(H)-21(H)-21(H) ND 1714-174(H)-21(H)-21(H) ND 1714-174(H)-21(H) ND 1714-174(H)-21(H) ND<			
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IS-C20-isoprenoid (Phytane) ND T4-C23 Tricyclic Terpane ND T6-C25 Tricyclic Terpane ND T6-C25 Tricyclic Terpane-22R ND T6-C26 Tricyclic Terpane-22S ND T6-C26 Tricyclic Terpane-22S ND T6-C26 Tricyclic Terpane-22R ND T10-C28 Tricyclic Terpane-22R ND T10-C28 Tricyclic Terpane-22R ND T12-278 Trisomechopane-TS ND T14-28.2 And b, #28,30-Bisnothopane-TM ND T14-17a(H)-22.28,30-Trisomechopane-TS ND T14b-17a(H)-22.28,30-Trisonechopane ND T14b-17a(H)-22.28,30-Disnothopane ND T14b-17a(H)-22.28,30-Disnothopane ND T14b-17a(H)-22.28,30-Disnothopane ND T14b-17a(H)-22.83,30-Bisnothopane ND T14b-17a(H)-22.83,30-Bisnothopane ND T14b-17a(H)-22.83,30-Bisnothopane ND T14b-17a(H)-22.83,30-Bisnothopane ND T14b-17a(H)-20.16(Panane ND T17-80-Normoretane ND T20-Mortane ND T22-30-Distomotopane-22S ND <td></td> <td></td> <td></td>			
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T5-C24 Tricyclic Terpane ND T8-C25 Tricyclic Terpane-22R ND T6b-C26 Tricyclic Terpane-22R ND T6b-C28 Tricyclic Terpane-22R ND T6-C28 Tricyclic Terpane-22R ND T9-C28 Tricyclic Terpane-22R ND T9-C28 Tricyclic Terpane-22R ND T10-C28 Tricyclic Terpane-22R ND T11-18a(H)-22, 29, 30-Trisnomeohopane-TS ND T14-17a(H)-22, 29, 30-Trisnomeohopane ND T14-17a(H)-22, 29, 30-Trisnomeohopane ND T14-17a(H)-22, 29, 30-Trisnomeohopane ND T14-57a(H)-22, 29, 30-Trisnomeohopane ND T14-17a(H)-22, 29, 30-Trisnomeohopane ND T14-17a(H)-22, 29, 30-Trisnomeohopane ND T14-57a(H)-22, 29, 30-Trisnomeohopane ND T14-57a(H)-22, 29, 30-Trisnomeohopane ND T14-57a(H)-216(H)-216(H)-216(H) ND T14-58a(H)-30-Normeohopane-228 ND T17-30-Normoretane ND T24-30-Homohopane-22R ND T27-30, 31-Erishomohopane-22R ND T33-03 1-Trishomohopane-22R ND <			
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T68-C24 Tetracyclic Terpane ND T7-C28 Tricyclic Terpane-22S ND T9-C29 Tricyclic Terpane-22R ND T10-C29 Tricyclic Terpane-22R ND T11-88(1-):22,29,30-Trisnomeohopane-TS ND T11-88(1-):22,29,30-Trisnomeohopane-TS ND T11-818(1-):22,29,30-Trisnomeohopane-TS ND T14-a-b, and b, a-28,30-Bisnorhopane ND T14-30-Norhopane ND T14-18(4-):22,29,30-Trisnomeohopane-C20Ts ND T14-18(4-):30-Norhopane ND T16-18(4-):30-Norhopane ND T17-30-Normoretane ND T17-30-Normoretane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T23-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Tetrakishomo			
T7-C28 Tricyclic Terpane-228 ND T8-C28 Tricyclic Terpane-22R ND T10-C29 Tricyclic Terpane-22R ND T11-18a(H)-22,29,30-Trisnomeohopane-TS ND T12-17a(H)-22,29,30-Trisnomeohopane-TM ND T14-a-a,b- and b,a-28,30-Bisnomopane ND T14-18a(H)-22,29,30-Trisnomeohopane-TM ND T14-17a(H),21b(H)-25-Norhopane ND T14-18a(H)-30-Normeohopane-C28TS ND × 17a(H)-Diahopane ND T14-18a(H)-30-Normeohopane-C28TS ND × 17a(H)-Diahopane ND T18-18a(H)-4, a 18b(H)-Oleanane ND T19-Hopane ND T20-Mortane ND T22-30-Homohopane-22R ND T22-30-Homohopane-22R ND T30-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S12-14a(H),			
TB-C28 Tricyclic Terpane-22R ND T9-C29 Tricyclic Terpane-22R ND T10-C29 Tricyclic Terpane-22R ND T11-T8a(H)-22,29,30-Trisnomeohopane-TS ND T12-T7a(H)-22,29,30-Trisnomeohopane-TM ND T14a-a,b- and b,a-28,30-Disnorhopane ND T14a-a,b- and b,a-28,30-Disnorhopane ND T14a-b, and b,a-28,30-Disnorhopane ND T14a-b, and b,a-28,30-Disnorhopane ND T14a-b, and b,a-28,30-Disnorhopane ND T14a-B(H),21b(H)-25-Norhopane ND T18-188(H)-19-ON-meohopane-C28Ts ND X - 17a(H)-Diahopane ND T18-188(H) & 18b(H)-Cleanane ND T18-188(H) & 18b(H)-Cleanane ND T20- Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T35-Pentakishomohopane-22R ND <td></td> <td></td> <td></td>			
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T11-16a(H)-22.29.30-Trisnomeohopane-TS ND T12-17a(H)-22.29.30-Trisnomeohopane-TM ND T14a-a,b. and b,a-28.30-Eisnombopane ND T14a-a,b. and b,a-28.30-Eisnombopane ND T14a-a,b. and b,a-28.30-Eisnombopane ND T14-16a(H).21b(H)-25-Norhopane ND T16-18a(H).30-Normeohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Normeotane ND T18-18a(H) & 18b(H)-Cleanane ND T20-Mortane ND T21-30-Hornohopane-22S ND T24-30-Hornohopane-22R ND T27-30,31-Bishornohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S5-13b(H), 17a(H)-20S-Diacholestane ND S14-14b(H), 17a(H)-20S-Cholestane ND			
T12-17a(H)-22.29.30-Trisnorhopane-TM ND T14a-b.7.and b, a-28,30-Binomopane ND T14b-17a(H),21b(H)-25-Norhopane ND T14-b17a(H),21b(H)-25-Norhopane ND T18-18a(H)-30-Norneohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Normoretane ND T18-18a(H) & 18b(H)-Oleanane ND T18-18a(H) & 18b(H)-Oleanane ND T20-Mortane ND T22-30-Homohopane-22S ND T22-30-Bishomohopane-22R ND T32-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Cholestane ND S14-14b(H), 17a(H)-20S-Cholestane ND S14-14b(H), 17a(H)-20S-Cholestane ND S14-14b(H), 17a(H)-20S-Cholestane ND			
T14a-a,b- and b,a-28,30-Bisnorhopane ND T14b-17a(H),21b(H)-25-Norhopane ND T15-30-Normochopane-C29Ts ND T14-18a(H)-30-Normochopane-C29Ts ND X - 17a(H)-Diahopane ND T17 - 30-Normoretane ND T18-18ba(H) & 18b(H)-Cleanane ND T18-18a(H) & 18b(H)-Cleanane ND T20- Mortane ND T22-30-Homohopane-22R ND T22-30,31-Bishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-10,31-Trishomohopane-22R ND T33-10,31-Trishomohopane-22R ND T33-10,31-Trishomohopane-22R ND T33-10,31-Trishomohopane-22R ND T33-10,31-Trishomohopane-22R ND T34-20-Rishomohopane-22R ND T34-20-Rishomohopane-22R ND T34-20-Rishomohopane-22R ND T34-20-Rishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pontakishomohopane-22R ND T35-Pontakishomohopane-22R ND T35-Pontakishomohopane-22R ND T35-Pontakishomohopane-22R ND T35-Pontakishomohopane-22R ND T35-Pontakishomohopane-22R ND			
T14b-17a(H),21b(H)-25-Norhopane ND T15-30-Norhopane ND T15-30-Norhopane ND T16-18a(H),30-Normeohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Normoretane ND T18-18a(H) & 18b(H)-Cleanane ND T18-16a(H) & 18b(H)-Cleanane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T32-30,31-Bishomohopane-22R ND T31-30,31-Tishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S5-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Cholestane ND S12-44a(H), 17a(H)-20S-Cholestane ND S12-44a(H), 17a(H)-20S-Cholestane ND S12-44a(H), 17a(H)-20S-Cholestane ND S12-44a(H), 17a(H)-20S-Cholestane			
T15-30-Norhopane ND T18-18a(H)-30-Norneohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Normeohopane-C29Ts ND X-17a(H)-Diahopane ND T18-18a(H) & 18b(H)-Oleanane ND T18-18a(H) & 18b(H)-Oleanane ND T20-Mortane ND T22-30-Homohopane-22S ND T22-30-Homohopane-22R ND T30-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-7etrakishomohopane-22R ND T33-7etrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Cholestane ND S12-14a(H), 17a(H)-20S-Cholestane ND S12-14a(H), 17b(H)-20S-Cholestane ND S14-14b(H), 17b(H)-20S-Cholestane ND S15-14b(H), 17b(H)-20S			
T18-18a(H)-30-Nomeohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Nomoretane ND T17-30-Nomoretane ND T18-18a(H) & 18b(H)-Oleanane ND T18-18a(H) & 18b(H)-Oleanane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T23-30,31-Bishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Diacholestane ND S4-13b(H), 17a(H)-20S-Cholestane ND S12-14a(H), 17a(H)-20S-Cholestane ND S14-14b(H), 17b(H)-20S-Cholestane ND S15-14b(H), 17a(H)-20S-Cholestane ND S15-14b(H), 17a(H)-20S-Cholestane ND S15-14b(H), 17a(
X-172(H)-Diahopane ND T17-30-Normoretane ND T18-18a(H)-Oleanane ND T18-18a(H)-Oleanane ND T18-18a(H)-Oleanane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T27-30,31-Tishomohopane-22R ND T31-30,31-Tishomohopane-22R ND T31-30,31-Tishomohopane-22R ND T32-Tetrakishomohopane-22R ND T31-30,31-Tishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Methyldiacholestane ND S5-13b(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Methylcholestane ND S2-14a(H),17a(H)-20S-Methylch			
T17- 30-Normoretane ND T18-Ba(H) & 18b(H)-Oleanane ND T18-Hopane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T27-30,31-Bishomohopane-22R ND T30-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-30,31-Trishomohopane-22R ND T33-Testrakishomohopane-22R ND T33-Testrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND Stabl(h), 17a(H)-20S-Diacholestane ND Stabl(h), 17a(H)-20S-Diacholestane ND Stabl(h), 17a(H)-20S-Cholestane ND St12-14a(H), 17a(H)-20S-Cholestane ND St14-14b(H), 17b(H)-20S-Cholestane ND St14-14b(H), 17b(H)-20S-Cholestane ND St14-14b(H), 17b(H)-20S-Cholestane ND St2-14a(H), 17a(H)-20S-Ethyldiacholestane ND <td< td=""><td></td><td></td><td></td></td<>			
T18-18a(H) & 18b(H)-Oleanane ND T19-Hopane ND T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T23-30,31-Bishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S5-13b(H),17a(H)-20S-Diacholestane ND S4-13b(H),17a(H)-20S-Diacholestane ND S4-13b(H),17a(H)-20S-Cholestane ND S4-13b(H),17a(H)-20S-Cholestane ND S4-13b(H),17a(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(
T19-Inopane ND T20- Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T27-30,31-Bishomohopane-22R ND T30-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Methyldiacholestane ND S4-13b(H),17a(H)-20S-Methyldiacholestane ND S4-13b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Methylcholestane ND			
T20-Mortane ND T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T23-30-Jishomohopane-22R ND T30-30,31-Bishomohopane-22R ND T33-03,1-Tishomohopane-22S ND T33-03,1-Tishomohopane-22R ND T33-10,31-Tishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Fentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T34-Fentakishomohopane-22R ND Stafb(H), 17a(H)-20S-Diacholestane ND Stafb(H), 17a(H)-20S-Diacholestane ND Stafb(H), 17a(H)-20S-Cholestane ND Stafb(H), 17a(H)-20S-Cholestane ND Stafb(H), 17a(H)-20S-Cholestane ND Stafb(H), 17a(H)-20R- Cholestane ND Stafb(H), 17a(H)-20R- Cholestane ND Stafb(H), 17a(H)-20R- Cholestane ND Stafb(H), 17a(H)-20R- Ethylicholestane ND Stafb(H), 17a(H)-20R- Ethylicholestane ND Stafb(H), 17b(H)-20R- Ethylicholestane ND			
T21-30-Homohopane-22S ND T22-30-Homohopane-22R ND T22-30,31-Bishomohopane-22R ND T30-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T33-78 ND T31-30,31-Trishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Diacholestane ND S4-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S15-14b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Methylcholestane ND S22-14b(H),17a(H)-20S-Methylcholestane ND <td></td> <td></td> <td></td>			
T22-30-Homohopane-22R ND T26-30-Bishomohopane-22R ND T30-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Diacholestane ND S4-13b(H),17a(H)-20S-Methyldiacholestane ND S4-13b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17b(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-			
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T27-30,31-Bishomohopane-22R ND T30-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S5-13b(H),17a(H)-20S-Diacholestane ND S6-13b(H),17a(H)-20S-Diacholestane ND S8-13b(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S2-14a(H),17a(H)-20S-Methylcholestane ND S2-14a(H),17a(H)-20S-Methylcholestane ND S23-14b(H),17b(H			
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T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22S ND T33-Tetrakishomohopane-22R ND T34-Epentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Diacholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S14-14b(H),17a(H)-20S-Cholestane ND S14-14a(H),17a(H)-20S-Cholestane ND S14-14a(H),17a(H)-20S-Cholestane ND S14-14a(H),17a(H)-20S-Ethyldiacholestane ND S14-14a(H),17a(H)-20S-Ethyldiacholestane ND S19-13a(H),17b(H)-20S-Ethyldiacholestane ND S20-14a(H),17a(H)-20S-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S23-14b(H),17a(H)-20S-Methylcholestane ND			
T32-Tetrakishomohopane-22S ND T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S5-Piotakishomohopane-22R ND S5-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Diacholestane ND S8-13b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S20-14a(H),17a(H)-20S-Methylcholestane ND S21-14b(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S24-14b(H),17b(H)-20S-Methylcholestane ND			
T33-Tetrakishomohopane-22R ND T34-Pentakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Diacholestane ND S6-13b(H),17a(H)-20S-Diacholestane ND S6-13b(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S17-14a(H),17a(H)-20S-Cholestane ND S18-13b(H),17b(H)-20S-Cholestane ND S19-13a(H),17b(H)-20S-Cholestane ND S19-13a(H),17b(H)-20S-Ethyldiacholestane ND S20-14a(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S24-14a(H),17a(H)-20S-Methylcholestane ND S24-14a(H),17a(H)-20S-Methylcholestane ND S25-14a(H),17a(H)-20S-Methylcholestane </td <td></td> <td></td> <td></td>			
T34-Pentakishomohopane-22S ND T35-Pentakishomohopane-22R ND S4-13b(H), 17a(H)-20S-Diacholestane ND S5-13b(H), 17a(H)-20R-Diacholestane ND S5-13b(H), 17a(H)-20R-Diacholestane ND S12-14a(H), 17a(H)-20R-Cholestane ND S12-14a(H), 17a(H)-20R-Cholestane ND S14-14b(H), 17b(H)-20R-Cholestane ND S20-14a(H), 17b(H)-20R-Cholestane ND S22-14b(H), 17b(H)-20R-Methylcholestane ND S24-14b(H), 17b(H)-20R-Methylcholestane ND S24-14b(H), 17a(H)-20R-Methylcholestane ND S24-14b(H), 17a(H)-20R-Methylcholestane ND S24-14b(H), 17a(H)-20R-Methylcholestane ND S26-14b(H), 17a(H)-20			
T35-Pentakishomohopane-22R ND S4-13b(H), 17a(H)-20S-Diacholestane ND S5-13b(H), 17a(H)-20S-Diacholestane ND S8-13b(H), 17a(H)-20S-Cholestane ND S12-14a(H), 17a(H)-20S-Cholestane ND S12-14a(H), 17a(H)-20S-Cholestane ND S14-14b(H), 17a(H)-20S-Cholestane ND S15-14b(H), 17b(H)-20S-Cholestane ND S15-14b(H), 17b(H)-20S-Cholestane ND S15-14b(H), 17b(H)-20S-Cholestane ND S15-14b(H), 17a(H)-20S-Cholestane ND S15-14b(H), 17a(H)-20S-Cholestane ND S18-13b(H), 17a(H)-20S-Cholestane ND S19-13a(H), 17a(H)-20S-Cholestane ND S20-14a(H), 17a(H)-20S-Methylcholestane ND S22-14b(H), 17b(H)-20S-Methylcholestane ND S23-14b(H), 17b(H)-20S-Methylcholestane ND S23-14b(H), 17b(H)-20S-Methylcholestane ND S23-14b(H), 17b(H)-20S-Methylcholestane ND S23-14b(H), 17a(H)-20S-Methylcholestane ND S24-14a(H), 17a(H)-20S-Ethylcholestane ND S25-14a(H), 17a(H)-20S-Ethylcholestane ND S			
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S14-14b(H),17b(H)-20R- Cholestane ND S15-14b(H),17b(H)-20R- Cholestane ND S17-14a(H),17a(H)-20R- Cholestane ND S18-13b(H),17a(H)-20R- Cholestane ND S18-13b(H),17a(H)-20R- Ethyldiacholestane ND S20-14a(H),17b(H)-20S- Ethyldiacholestane ND S22-14b(H),17a(H)-20R- Methylcholestane ND S22-14b(H),17a(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S24-14b(H),17a(H)-20R-Methylcholestane ND S25-14a(H),17a(H)-20R-Methylcholestane ND S25-14a(H),17a(H)-20R-Ethylcholestane ND S26-14b(H),17a(H)-20R-Ethylcholestane ND	Ia(H) 17a/H)-20S-Cholestane		
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S25-14a(H),17a(H)-20S-Ethylcholestane ND S26-14b(H),17b(H)-20R-Ethylcholestane ND			
S28-14b(H),17b(H)-20R-Ethylcholestane ND			
527-14D(H)-17D(H)-205-Ethylcholestane NU			
S28-14a(H),17a(H)-20R-Ethylcholestane ND			

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Battelle
 Juntors Technology To Work
 Project Name
 Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	NLU-109-2830	NLU-109-2830		
Battelle Sample ID	U0285-D-F1	U0285DUP-D-F1		
Battelle Batch ID	03-0137	03-0137		
Associated Blank	BB278PB	BB278PB		
Field Date	11/15/02	11/15/02		
Receipt Date	11/21/02	11/21/02		
Extraction Date	02/11/03	02/11/03		
Acquired Date-Biomarker	02/20/03	02/20/03		
Analytical Method	8270M	8270M		
Percent Solids	23.08 %	25.74 %		
Matrix	Solid	Solid		
Sample Size	0.51 g	0.58 g		
Weight Basis	DRY	DRY		
Min Reporting Limit	15.300	13.400	RPD(%)	Q
Amount Units	µg/kg	µg/kg	RFD(%)	<u> </u>
	211	248	16.1	
Q9- Sesquiterpane (9)	91.1	113	21.5	
Q10- Sesquiterpane (10) Q1- Sesquiterpane (1)	156	183	15.9	
Q2- Sesquiterpane (2)	202	229	12.5	
Q3- Sesquiterpane (3)	294	349	17.1	
Q4- Sesquiterpane (4)	149	163	6.97	
Q5- Sesquitemane (5)	89.9	99.5	10.1	
Q8- Sesquiterpane (6)	133	157	16.6	
Q7- Sesquiterpane (7)	46.7	72.8	NA	
Q8- Sesquiterpane (8)	376	428	12.9	
I1-C15-Isoprenoid (1380)	1330	1570	16.6	
I2-C15-Isoprenoid (1470)	1960	2260	13.2	
13-C18-Isoprenoid (1650)	2550	2730	6,82	
I4-C19-Isoprenoid (Pristane)	4590	5140	11.3	
I5-C20-Isoprenoid (Phytane)	4620	5230	12.4 6.01	
T4-C23 Tricyclic Terpane	613	651 444	7.23	
T5-C24 Tricyclic Terpane	413	561	6.06	
T6-C25 Tricyclic Terpane	528 239	234	2.11	
T6c-C26 Tricyclic Terpane-22R	239	231	0	
T6b-C26 Tricyclic Terpane-22S T6a-C24 Tetracyclic Terpane	112	125	11	
T7-C28 Tricyclic Terpane-22S	337	381	12.2	
T8-C28 Tricyclic Terpane-22R	342	365	6.51	
T9-C29 Tricyclic Terpane-22S	343	371	7.84	
T10-C29 Tricyclic Terpane-22R	349	407	15.3	
T11-18a(H)-22,29,30-Trianomeohopane-TS	395	422	6.61	
T12-17a(H)-22,29,30-Trisnomopane-TM	427	461	7.66	
T14a-a,b- and b,a-28,30-Bisnorhopane	474	512	7.71	
T14b-17a(H),21b(H)-25-Norhopane	309	312	0.965	
T15-30-Norhopane	1380	1490	7.66	
T16-18a(H)-30-Nomeohopane-C29Ts	490	547	11	
X- 17a(H)-Diahopane	109	135	21.3	
T17- 30-Normoretane	245	253 480	3.21 7.57	
T18-18a(H) & 18b(H)-Oleanane	445	2810	8.15	
T19-Hopane	2590	533	16.7	
T20- Mortane T21 20 Hemobonane 22S	451 877	926	5.44	
T21-30-Homohopane-22S T22-30-Homohopane-22B	665	728	9.04	
T22-30-Homohopane-22R T26-30-Bishomohopane-22S	484	525	8,13	
T27-30,31-Bishomohopane-22R	365	415	7.5	
T30-30,31-Trishomohopane-22S	475	510	7.11	
T31-30,31-Trishomohopane-22R	354	384	8.13	
T32-Tetrakishomohopane-22S	270	282	4.35	
T33-Tetrakishomohopane-22R	169	180	6.3	
T34-Pentakishomohopane-22S	216	225	4.0B	
T35-Pentakishomohopane-22R	155	162	4.42	
S4-13b(H),17a(H)-20S-Diacholestane	1350	1400	3.64	
S5-13b(H),17a(H)-20R-Diacholestane	926	928	0.216	
S8-13b(H),17a(H)-20S-Methyldiacholestane	1140	1200	5.13	
S12-14a(H),17a(H)-20S-Cholestane	2060	2240	8.37	
S14-14b(H),17b(H)-20R- Cholestane	920	995	7.83	
S15-14b(H),17b(H)-20S- Cholestane	1040 2580	2810	8,29	
S17-14a(H),17a(H)-20R- Cholestane	410	416	1.45	
S18-13b(H),17a(H)-20R- Ethyldiacholestane	78.7	102	25.8	
S19-13a(H),17b(H)-20S-Ethyldiacholestane S20-14a(H),17a(H)-20S- Methylcholestane	1040	1150	10	
S20-144(H),174(H)-20S- Methylcholestane	1520	1600	5.13	
S22-14b(H),17b(H)-20S-Methylcholestane	1620	1680	3.64	
S24-14a(H),17a(H)-20R-Methylcholestane	1600	1710	6.65	
S25-14a(H),17a(H)-20S-Ethylcholestane	848	956	12	
S26-14b(H),17b(H)-20R-Ethylcholestane	1160	1240	6.67	
S27-14b(H),17b(H)-20S-Ethylcholestane	890	1030	14.6	
S28-14a(H),17a(H)-20R-Ethylcholestane	1440	1580	9.27	

J=Result < Sample RL. B=Result < 5 x PB. ND= Not Detected. NA= Not Applicable. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Particle
 Andra Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

	Barra dana birah		
Client Sample ID	Procedural Blank		
Battelle Sample ID Battelle Batch ID	BB426PB-D-F1 03-0159		
Associated Blank	NA		
Field Date	NA		
Receipt Date	NA		
Extraction Date	02/21/03		
Acquired Date-Biomarker	03/05/03		
Analytical Method	8270M		
Percent Solids Matrix	NA Solid		
Sample Size	0,4		
Weight Basis	NA		
Min Reporting Limit	30		
Amount Units	µg/kg		
Q9- Sesquiterpane (9)		ND ND	
Q10- Sesquiterpane (10) Q1- Sesquiterpane (1)		ND	
Q2- Sesquiterpane (2)		ND	
Q3- Sesquiterpane (3)		ND	
Q4- Sesquiterpane (4)		ND	
Q5- Sesquitemane (5)		ND	
Q8- Sesquiterpane (6)		ND	
Q7- Sesquilerpane (7)		ND	
Q8- Sesquiterpane (8)		ND	
11-C15-Isoprenoid (1380)		ND ND	
12-C15-Isoprenoid (1470) (3-C18-Isoprenoid (1650)		ND ND	
14-C19-Isoprenoid (Pristane)		ND	
15-C20-Isoprenoid (Phytane)		ND	
T4-C23 Tricyclic Terpane		ND	
T5-C24 Tricyclic Terpane		ND	
T6-C25 Tricyclic Terpane		ND	
T6c-C26 Tricyclic Terpana-22R		ND	
T6b-C26 Tricyclic Terpane-22S		ND ND	
T6a-C24 Tetracyclic Terpane T7-C28 Tricyclic Terpane-22S		ND	
T8-C28 Tricyclic Terpane-22R		ND	
T9-C29 Tricyclic Terpane-22S		ND	
T10-C29 Tricyclic Terpane-22R		ND	
T11-18a(H)-22,29,30-Trisnomeohopene-TS		ND	
T12-17a(H)-22,29,30-Trisnorhopane-TM		ND	
T14a-a,b- and b,a-28,30-Bisnorhopane		ND	
T14b-17a(H),21b(H)-25-Norhopane		ND ND	
T15-30-Norhopane T16-18a(H)-30-Nomeohopane-C29Ts		ND	
X- 17a(H)-Diahopane		ND	
T17-30-Normoretane		ND	
T18-18a(H) & 18b(H)-Oleanane		ND	
T19-Hopane		ND	
T20- Mortane		ND	
T21-30-Homohopane-22S		ND	
T22-30-Homohopane-22R		ND	
T26-30-Bishomohopane-22S T27-30,31-Bishomohopane-22R		ND ND	
T30-30,31-Trishomohopane-22S		ND	
T31-30,31-Trishomohopane-22R		ND	
T32-Tetrakishomohopane-22S		ND	
T33-Tetrakishomohopane-22R		ND	
T34-Pentakishomohopane-22S		ND	
T35-Pentakishomohopana-22R		ND	
S4-13b(H),17a(H)-20S-Diacholestane		ND	
S5-13b(H),17a(H)-20R-Diacholestane S8-13b(H),17a(H)-20S-Methyldiacholestane		ND ND	
S12-14a(H),17a(H)-20S-Metrykiacholestane		ND	
S14-14b(H),17b(H)-20R- Cholestane		ND	
S15-14b(H),17b(H)-20S- Cholestane		ND	
S17-14a(H),17a(H)-20R- Cholestane		ND	
S18-13b(H),17a(H)-20R- Ethyldiacholestane		ND	
S19-13a(H),17b(H)-20S-Ethyldiacholestane		ND	
S20-14a(H),17a(H)-20S- Methylcholestane		ND	
S22-14b(H),17b(H)-20R-Methylcholestane		ND	
S23-14b(H),17b(H)-20S-Methylcholestane S24-14a(H),17a(H)-20R-Methylcholestane		ND ND	
S25-14a(H),17a(H)-20S-Ethylcholestane		ND	
S26-14b(H), 17b(H)-20R-Ethylcholestane		ND	
S27-14b(H),17b(H)-20S-Ethylcholestane		ND	

J=Result < Sample RL. ND≕ Not Detected. D≕ Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Project Name Lake Union Sediment Investigation Project Name N005443

Client Sample ID	Procedurel Blank-F1 Only		
Battelle Sample ID	BB501PB-F1		
Battelle Batch ID	03-0159		
Associated Blank	NA		
Field Date	NA		
Receipt Date	NA 02/26/03		
Extraction Date Acquired Date-Biomarker	03/05/03		
Analytical Method	8270M		
Percent Solids	NA		
Matrix	Solid		
Sample Size Weight Basis	0.4 NA	9	
Min Reporting Limit	15		
Amount Units	µg/kg		
Q9- Sesquiterpane (9) Q10- Sesquiterpane (10)		ND ND	
Q1- Sesquiterpane (1)		ND	
Q2- Sesquiterpane (2)		ND	
Q3- Sesquiterpane (3)		ND	
Q4- Sesquiterpane (4)		ND	
Q5- Sesquiterpane (5) Q6- Sesquiterpane (6)		ND ND	
Q7- Sesquiterpane (7)		ND	
Q6- Sesquiterpane (6)		ND	
11-C15-Isoprenoid (1380)		ND	
I2-C15-Isoprenoid (1470)		ND ND	
13-C18-Isoprenoid (1650) 14-C19-Isoprenoid (Pristane)		ND	
15-C20-Isoprenoid (Phytane)		ND	
T4-C23 Tricyclic Terpane		ND	
T5-C24 Tricyclic Terpane		ND	
T6-C25 Tricyclic Terpane T8- C25 Tricyclic Terpane 228		ND ND	
T6c-C26 Tricyclic Terpane-22R T6b-C26 Tricyclic Terpane-22S		ND	
T6a-C24 Tetracyclic Terpane		ND	
T7-C28 Tricyclic Terpane-22S		ND	
T8-C28 Tricyclic Terpane-22R		ND ND	
T9-C29 Tricyclic Terpane-22S T10-C29 Tricyclic Terpane-22R		ND	
T11-18a(H)-22,29,30-Trisnomeohopane-TS		ND	
T12-17a(H)-22,29,30-Trisnorhopane-TM		ND	
T14a-a,b- and b,a-28,30-Bisnorhopane		ND	
T14b-17a(H),21b(H)-25-Norhopane T15-30-Norhopane		ND ND	
T16-18a(H)-30-Norneohopane-C29Ts		ND	
X- 17a(H)-Diahopane		ND	
T17- 30-Normoretane		ND	
T18-18a(H) & 18b(H)-Oleanane T19-Hopana		ND ND	
T19-Hopane T20- Mortane		ND	
T21-30-Homohopane-22S		ND	
T22-30-Homohopane-22R		ND	
T26-30-Bishomohopane-22S		ND	
T27-30,31-Bishomohopane-22R T30-30,31-Trishomohopane-22S		ND ND	
T31-30,31-Trishomohopane-22R		ND	
T32-Tetrakishomohopane-22S		ND	
T33-Tetrakishomohopane-22R		ND	
T34-Pentakishomohopane-22S T35-Pentakishomohopane-22R		ND ND	
S4-13b(H),17a(H)-20S-Diacholestane		ND	
S5-13b(H), 17a(H)-20R-Diacholestane		ND	
S8-13b(H),17a(H)-20S-Methyldiacholestan	9	ND	
S12-14a(H),17a(H)-20S-Cholestane		ND	
S14-14b(H),17b(H)-20R- Cholestane S15-14b(H),17b(H)-20S- Cholestane		ND ND	
S17-14a(H),17a(H)-208- Cholestane		ND	
S18-13b(H),17a(H)-20R- Ethyldiacholestan		ND	
S19-13a(H),17b(H)-20S-Ethyldiacholestan		ND	
S20-14a(H),17a(H)-20S- Methylcholestane S22-14b(H),17b(H)-20R-Methylcholestane		ND ND	
S22-14b(H),17b(H)-20K-Methylcholestane S23-14b(H),17b(H)-20S-Methylcholestane		ND	
S24-14a(H),17a(H)-20R-Methylcholestane		ND	
S25-14a(H),17a(H)-20S-Ethylcholestane		ND	
S28-14b(H),17b(H)-20R-Ethylcholestane		ND	
S27-14b(H),17b(H)-20S-Ethylcholestane S28-14a(H),17a(H)-20R-Ethylcholestane		ND ND	
Contracting to a tracting to the traction of t			

J=Resuit < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Resuit >5*Sample RL.

Project Name Lake Union Sediment Investigation Project Name N005443

Client Courses ID	Procedural Blank	
Client Sample ID		
Battelle Sample ID Battelle Batch ID	BB142PB-D-F1 03-0100	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	01/31/03	
Acquired Date-Biomarker	02/18/03	
Analytical Method	8270M	
Percent Solids Matrix	NA Solid	
Sample Size	7 g	
Weight Basis	NA	
Min Reporting Limit	1.71	
Amount Units	µg/kg	
Q9- Sesquiterpane (9)	ND ND	
Q10- Sesquiterpane (10) Q1- Sesquiterpane (1)	ND	
Q2- Sesquiterpane (2)	ND	
Q3- Sesquiterpane (3)	ND	
Q4- Sesquiterpane (4)	ND	
Q5- Sesquiterpane (5)	ND	
Q6- Sesquiterpane (6)	ND	
Q7- Sesquiterparte (7)	ND	
Q8- Sesquiterpane (8) I1-C15-Isoprenoid (1380)	ND ND	
12-C15-Isoprenoid (1470)	ND	
13-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	0.157 J	
I5-C20-Isoprenoid (Phytane)	0.282 J	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND ND	
T6c-C26 Tricyclic Terpane-22R T6b-C26 Tricyclic Terpane-22S	ND	
T6a-C24 Tetracyclic Terpane	ND	
T7-C28 Tricyclic Terpane-22S	ND	
T8-C28 Tricyclic Terpane-22R	ND	
T9-C29 Tricyclic Terpane-22S	ND	
T10-C29 Tricyclic Terpane-22R	ND	
T11-18a(H)-22,29,30-Trisnomeohopane-TS	ND ND	
T12-17a(H)-22,29,30-Trisnomopane-TM T14a-a,b- and b,a-28,30-Bisnomopane	ND	
T14b-17a(H),21b(H)-25-Norhopane	ND	
T15-30-Norhopane	ND	
T16-18a(H)-30-Nomeohopane-C29Ts	ND	
X- 17a(H)-Diahopane	ND	
T17- 30-Normoretane	ND	
T18-18a(H) & 18b(H)-Oleanane	ND ND	
T19-Hopane T20- Mortane	ND ND	
T21-30-Homohopane-22S	ND	
T22-30-Homohopane-22R	ND	
T26-30-Bishomohopane-22S	ND	
T27-30,31-Bishomohopane-22R	ND	
T30-30,31-Trishomohopane-22S	ND	
T31-30,31-Trishomohopane-22R	ND	
T32-Tetrakishomohopane-22S	ND	
T33-Tetrakishomohopane-22R T34-Penlakishomohopane-22S	ND ND	
T35-Pentakishomohopane-228	ND	
S4-13b(H),17a(H)-20S-Diacholestane	ND	
S5-13b(H),17a(H)-20R-Diacholestane	ND	
S8-13b(H),17a(H)-20S-Methyldiacholestane	ND	
S12-14a(H),17a(H)-20S-Cholestane	ND	
S14-14b(H),17b(H)-20R- Cholestane	ND	
S15-14b(H),17b(H)-20S- Cholestane	ND ND	
S17-14a(H),17a(H)-20R- Cholestane S18-13b(H),17a(H)-20R- Ethyldiacholestane	ND	
S19-13s(H),17b(H)-20S-Ethyldiacholestane	ND	
S20-14a(H),17a(H)-20S- Methylcholestane	ND	
S22-14b(H),17b(H)-20R-Methylcholestane	ND	
S23-14b(H),17b(H)-20S-Methylcholestane	ND	
S24-14s(H), 17s(H)-20R-Methylcholestane	ND	
S25-14a(H),17a(H)-20S-Ethylcholestane	ND	
S26-14b(H),17b(H)-20R-Ethylcholestane	ND ND	
S27-14b(H),17b(H)-20S-Ethylcholestane S28-14a(H),17a(H)-20R-Ethylcholestane	ND ND	
Szo- 14a(ri), 1/a(ri)-zurt-cinyichoiestane	עא	

J=Result < Sample RL. ND= Not Detected. D≃ Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

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Battelle
 The Annual State Content Investigation
 Project Number N005443

Client Sample ID Procedural Blank Batelle Sample ID BB149PB-D-F1 Batelle Sample ID BB149PB-D-F1 Batelle Sample ID BB149PB-D-F1 Batelle Sample ID BB149PB-D-F1 Batelle Sample Size NA BacepiDate NA BacepiDate NA BacepiDate NA BacepiDate Date-Biomarker D20603 Aquired Date-Biomarker D21803 Amount Units ND C3 G-Sequiferpane (9) C10 C3 G-Sequiferpane (9) C3 C3 Sequiferpane (9) C3 C3 Sequiferpane (10) ND C4 Sequiferpan			
Batabi Batch ID 0.9-000 Associated Blank NA Field Date NA Extraction Date 0.20603 Analysical Mathed 8.270M Percent Solids NA Mathed State Blomarker 0.21803 Analysical Mathed 8.270M Percent Solids NA Many State Blomarker 0.21803 Analysical Mathed 8.270M Many State Blomarker 0.21803 Amaged Mathed 8.270M Many State Blomarker 0.0235 Amount Units mg/kg QP - Sesquiterpane (9) ND Q1 - Sesquiterpane (9) ND Q2 - Sesquiterpane (1) ND Q2 - Sesquiterpane (2) ND Q3 - Sesquiterpane (3) ND Q4 - Sesquiterpane (3) ND Q4 - Sesquiterpane (3) ND Q2 - Sesquiterpane (1) ND Q2 - Sesquiterpane (1) ND Q2 - Sesquiterpane (2) ND Q2 - Sesquiterpane (3) ND Q2 - Sesq	Client Sample ID	Procedural Blank	
Batabi Batabi D 0.9-000 Ascolated Blank NA Field Date NA Extraction Date 0.206003 Analydad Mathod B.270M Percent Solids 0.11 Analydad Mathod B.270M Percent Solids 0.11 Mathematic Mathod B.270M Many Date Blank ND Min Reporting Limit 0.0235 Amagnet Units mg/kg Q-9 - Sacyullerpane (9) ND Q-10 - Sacyullerpane (9) ND Q-10 - Sacyullerpane (9) ND Q-2 - Sacyullerpane (9) ND Q-3 - Sacyullerpane (9) ND Q-4 - Sacyullerpane (9) ND Q-5 - Sacyullerpane (1) ND Q-6 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 - Sacyullerpane (1) ND Q-7 -	Battelle Sample iD	BB146PB-D-F1	
Field Date NA Receipt Date NA Extraction Date 02/6603 Analyciad Method 8270M Parcent Solids NA Matrix Oily Material Sample Size S11 mg Min Reporting Limit 0.0235 Amount Units mg/kg Coll Sesquiterpane (0) ND Q2 - Sesquiterpane (10) ND Q2 - Sesquiterpane (2) ND Q3 - Sesquiterpane (2) ND Q3 - Sesquiterpane (2) ND Q4 - Sesquiterpane (3) ND Q4 - Sesquiterpane (4) ND Q4 - Sesquiterpane (6) ND Q4 - Sesquiterpane (7) ND Q4 - Sesquiterpane (1			
Receip Date NA Extraction Date Biomarker 0206003 Acquired Date Biomarker 021803 Analysical Michold 8270M Parcent Solids NA Matix Obj Material Sample Size 511 mg Weight Basis NA Min Reporting Limit 0.0233 Amount Units mgKg C9. Sequilerpane (1) ND C1. Sequilerpane (1) ND C2. Sequilerpane (1) ND C3. Sequilerpane (1) ND C3. Sequilerpane (3) ND C4. Sequilerpane (6) ND C5. Sequilerpane (7) N			
Extraction Date 2006003 Analytical Method 6270M Percent Solids MAA Metrix 0i) Material Sample Size 011 mg Weight Basis NA Matrix 0i) Material Sample Size 511 mg Weight Basis NA Metrix 0,233 Amount Units ngkg G9. Sacquiterpane (0) ND G9. Sacquiterpane (0) ND G9. Sacquiterpane (1) ND G9. Sacquiterpane (1) ND G9. Sacquiterpane (2) ND G9. Sacquiterpane (2) ND G9. Sacquiterpane (2) ND G9. Sacquiterpane (3) ND G9. Sacquiterpane (4) ND G9. Sacquiterpane (5) ND G9. Sacquiterpane (6) ND G9. Sacquiterpane (7) ND G9. Sacquiterpane (7) ND G9. Sacquiterpane (6) ND G9. Sacquiterpane (7) ND G9. Sacquiterpane (7) ND G9. Sacquiterpane (6) ND G9. Sacquiterpane (7) ND G9. Sacquiter			
Analytical Method 5270M Percent Solids NA Matrix Oily Material Sample Size S111 mg Weight Basis NA Min Reporting Limit 0.0235 Arrount Units mg/kg Q9. Sesquiterpane (I) ND C10. Sesquiterpane (I) ND C13. Sesquiterpane (I) ND C3. Sesquiterpane (I) ND C4. Sesquiterpane (I) ND C5. Articity (I (1) ND C5. C4. Sesquiterpane (I) ND C5. C4.			
Percent Solicis NA Matrix Oijk Matrial Sample Size 511 mg Walph Basis NA Min Reporting Limit 0.0235 Amount Units mg/kg Q9- Sesquiterpane (9) ND Q10- Sesquiterpane (9) ND Q1- Sesquiterpane (10) ND Q2- Sesquiterpane (2) ND Q3- Sesquiterpane (3) ND Q4- Sesquiterpane (3) ND Q4- Sesquiterpane (3) ND Q4- Sesquiterpane (6) ND Q4- Sesquiterpane (7) ND Q2- Sesquiterpane (7) ND Q2- Sesquiterpane (3) ND Q4- Sesquiterpane (3) ND Q4- Sesquiterpane (3) ND Q2- Sesquiterpane (4) ND Q2- Sesquiterpane (4) ND Q2- Sesquiterpane (4) <td></td> <td></td> <td></td>			
Matrix Oly Material Sample Size Stilling Sample Size NA Min Reporting (Jimit 0.0335 Amount Units mg/kg C9- Sequilespane (1) ND C1- Sequilespane (2) ND C2- Sequilespane (3) ND C3- Sequilespane (3) ND C3- Sequilespane (3) ND C3- Sequilespane (3) ND C4- Sequilespane (6) ND C3- Sequilespane (7) ND C3- Sequilespane (6) ND C3- Sequilespane (7) ND C3- Sequilespane (6) ND C3- Sequilespane (7) ND C3- Sequilespane (6) ND C3- Sequilespane (6) ND C3- Sequilespane (7) ND C3- Sequilespane (7) ND C3- Sequilespane (7) ND C3- Sequilespane (8) ND <			
Sample Size 511 mg Weight Bais NA Min Reporting Limit 0.0235 Amount Units mg/kg C10-Sequiterpane (0) ND C10-Sequiterpane (1) ND C1-Sequiterpane (2) ND C2-Sequiterpane (3) ND C2-Sequiterpane (3) ND C2-Sequiterpane (4) ND C2-Sequiterpane (5) ND C2-Sequiterpane (6) ND C2-Sequiterpane (7) ND C2-Sequiterpane (7) ND C2-Sequiterpane (7) ND C1-Sequiterpane (7) ND C2-Sequiterpane (7) ND C2-Sequiterpane (7) ND			
Weight Basis NA Min Reporting (Jimit) 0.0335 Amount Units mg/kg QP-Sequilerpane (1) ND Q1-Sequilerpane (1) ND Q2-Sequilerpane (2) ND Q2-Sequilerpane (3) ND Q2-Sequilerpane (3) ND Q2-Sequilerpane (3) ND Q2-Sequilerpane (3) ND Q2-Sequilerpane (6) ND Q2-Sequilerpane (7) ND Q2-Sequilerpane (7) ND Q2-Sequilerpane (6) ND Q2-Sequilerpane (7) ND Q2-Sequilerpane (7) ND Q2-Sequilerpane (7) ND Q3-Sequilerpane (7) ND Q2-Sequilerpane (8) ND Q2-Sequilerpane (9) ND <td></td> <td></td> <td></td>			
Amouni Uniti mg/kg QP. Sequilerpane (10) ND Q1- Sequilerpane (1) ND Q2- Sequilerpane (2) ND Q3- Sequilerpane (3) ND Q4- Sequilerpane (3) ND Q4- Sequilerpane (6) ND Q4- Sequilerpane (6) ND Q7- Sequilerpane (6) ND Q7- Sequilerpane (7) ND Q2- Sequilerpane (7) ND Q2- Sequilerpane (6) ND Q1- Sequilerpane (7) ND Q2- Sequilerpane (7) ND Q2- Sequilerpane (6) ND Q2- Stappenoid (1970) ND Q2- Stappenoid (1970) ND Q2- Stappenoid (1970) ND Stappenoid (Phytane) ND T5-C23 Tricyclic Terpane ND T5-C23 Tricyclic Terpane 228 ND T5-C23 Tricyclic Terpane 227 ND T5-C23 Tricyclic Terpane 228 ND T5-C23 Tricyclic Terpane 228 ND T10-C23 Tricyclic Terpane 228 ND T10-C23 Tricyclic Terpane 228 ND			
C-2 Sequilspane (1) ND C10-Sesquilspane (1) ND ND C2-Sesquilspane (2) ND C2-Sesquilspane (3) ND C4-Sesquilspane (3) ND C4-Sesquilspane (4) ND C5-Sesquilspane (5) ND C4-Sesquilspane (6) ND C4-Sesquilspane (7) ND C4-Sesquilspane (1) ND C4-Sesquilspane (1) ND C4-Sesquilspane (1) ND C4-Sesquilspane (2) ND C4-Sesqui			
C10-Sequiterpane (10) ND C2-Sequiterpane (2) ND C2-Sequiterpane (2) ND C3-Sequiterpane (3) ND C4-Sequiterpane (4) ND C4-Sequiterpane (6) ND C5-Sequiterpane (6) ND C7-Sequiterpane (7) ND C4-Sequiterpane (6) ND C10-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C5-C4-Sequiterpane (7) ND C5-C24-Sequiterpane (7) ND C5-C24-Sequitererpane (7) ND <td< td=""><td>Amount Units</td><td>mg/kg</td><td>)</td></td<>	Amount Units	mg/kg)
C10-Sequiterpane (10) ND C2-Sequiterpane (2) ND C2-Sequiterpane (2) ND C3-Sequiterpane (3) ND C4-Sequiterpane (4) ND C4-Sequiterpane (6) ND C5-Sequiterpane (6) ND C7-Sequiterpane (7) ND C4-Sequiterpane (6) ND C10-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C4-Sequiterpane (7) ND C5-C4-Sequiterpane (7) ND C5-C24-Sequiterpane (7) ND C5-C24-Sequitererpane (7) ND <td< td=""><td>Q9- Sesquiterpane (9)</td><td></td><td>ND</td></td<>	Q9- Sesquiterpane (9)		ND
Q2-Sequiterpane (2) ND Q4-Sequiterpane (3) ND Q4-Sequiterpane (3) ND Q4-Sequiterpane (5) ND Q5-Sequiterpane (6) ND Q7-Sequiterpane (7) ND Q6-Sequiterpane (8) ND Q7-Sequiterpane (7) ND Q6-Sequiterpane (8) ND Q1-Sequiterpane (8) ND Q1-Sequiterpane (1470) ND Q2-Clasprenoid (1470) ND Q3-Clasprenoid (Pristen) ND U5-C23 Tricyclic Terpane ND T6-C23 Tricyclic Terpane-22R ND T62-C23 Tricyclic Terpane-22S ND T62-C23 Tricyclic Terpane-22S ND T10-C23 Tricyclic Terpane-22S ND T10-C23 Tricyclic Terpane-22S ND T112-124 Tricyclic Terpane-22S ND T12-227 Tricyclic Terpane-22S ND T12-228 Tricyclic Terpane-22S ND T12-124 Tricyclic Terpane-22S ND T12-124 Tricyclic Terpane-22S ND T12-124 Tricyclic Terpane-22S ND <t< td=""><td></td><td></td><td></td></t<>			
G3-Sequiterpane (a) ND G4-Sequiterpane (b) ND G5-Sequiterpane (c) ND G7-Sequiterpane (c) ND G7-C28 Tripotic Terpane (c) ND G7-C28 Tripotic Terpane 22R ND G7-G7 Tripotic Terpane 22R			
Q4-5equilerpane (s) ND Q5-Sequilerpane (f) ND Q6-Sequilerpane (f) ND L10-15-loopranoid (180) ND L2-05-laopranoid (Pristane) ND L2-015-laopranoid (Pristane) ND L2-023 Tricyclic Terpane ND L5-C23 Tricyclic Terpane-22R ND T6-C23 Tricyclic Terpane-22S ND T6-C23 Tricyclic Terpane-22S ND T6-C23 Tricyclic Terpane-22S ND T6-C23 Tricyclic Terpane-22S ND T10-C23 Tricyclic Terpane-22S ND T12-127 Tricyclic Terpane-22S ND T14-128 (H)-22.8).3-Dritinomelopane-TS ND T14-128 (H)-22.8).3-Dritinomelopane-TS ND T14-138 (H) -22.8).3-Dritinomelopane-TS ND T14-138 (H) -22.8).3-Dritinomelopane-TS ND T14-138 (H) -22.8).3-Dritinomelopane-TS ND T14-138 (H) -22.8).3-Dritinomelopane-22S ND			
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11-C15-lapprenoid (1380) ND 12-C15-lapprenoid (1950) ND 13-C18-lapprenoid (1950) ND 13-C18-lapprenoid (1950) ND 12-C21-lapprenoid (Phylane) ND 12-C22 Tricyclic Terpane ND 15-C22 Tricyclic Terpane-22R ND 15-C22 Tricyclic Terpane-22R ND 15-C22 Tricyclic Terpane-22R ND 17-C22 Tricyclic Terpane-22R ND 17-11-54(H)-22, 9, 30-Trinsorbopane-TM ND 17-12-174(H)-22, 9, 30-Trinsorbopane-TM ND 17-14-a, b, and b, ac 28, 30-Binsorbopane ND 17-14-bindpane ND 17-30-Normortane ND 17-30-Normortane ND 17-30-Normortane ND 17-30-Normortane ND 17-30-Alomontopane-22S N	Q7- Sesquiterpane (7)		ND
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T16-18a(H)-30-Nomeohopane-C29Ts ND X-17a(H)-Diahopane ND T17-30-Normoretane ND T17-30-Normoretane ND T18-18a(H) & 18b(H)-Oleanane ND T18-18a(H) & 18b(H)-Oleanane ND T20-Mortane ND T20-Mortane ND T20-Mortohopane-22S ND T23-30-Homohopane-22R ND T30-30,31-Trishomohopane-22R ND T31-30,31-Trishomohopane-22R ND T32-Tetrakishomohopane-22R ND T33-7etrakishomohopane-22R ND T33-7etrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T33-Tetrakishomohopane-22R ND T35-Pentakishomohopane-22R ND S4-13b(H),174(H)-20S-Diacholestane ND S5-13b(H),174(H)-20S-Cholestane ND S12-14a(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane ND S14-14b(H),174(H)-20S-Cholestane <td< td=""><td></td><td></td><td></td></td<>			
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T34-Pentakishomohopane-22S ND T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-liacholestane ND S5-13b(H),17a(H)-20S-liacholestane ND S8-13b(H),17a(H)-20S-keltyldiacholestane ND S8-13b(H),17a(H)-20S-cholestane ND S12-14a(H),17a(H)-20S-cholestane ND S12-14a(H),17a(H)-20S-cholestane ND S14-14b(H),17b(H)-20S-cholestane ND S17-14a(H),17a(H)-20S-cholestane ND S17-14a(H),17a(H)-20S-cholestane ND S18-13b(H),17a(H)-20S-cholestane ND S18-13b(H),17a(H)-20S-cholestane ND S20-14a(H),17a(H)-20S-cholestane ND S20-14a(H),17a(H)-20S-Methylcholestane ND S20-14a(H),17a(H)-20S-Methylcholestane ND S21-14a(H),17a(H)-20S-Methylcholestane ND S21-14a(H),17a(H)-20S-Ehylcholestane ND S21-14a(H),17a(H)-20S-Ehylcholestane ND S21-14a(H),17a(H)-20S-Ehylcholestane ND S21-14a(H),17a(H)-20S-Ehylcholestane ND S21-14a(H),17a(H)-20S-Ehylcholestane ND S21-14a(H),17a(H)-20S-Ehylch			
T35-Pentakishomohopane-22R ND S4-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Methyldiacholestane ND S1-14a(H),17a(H)-20S-Methyldiacholestane ND S1-14b(H),17a(H)-20S-Cholestane ND S1-14b(H),17b(H)-20S-Cholestane ND S1-14b(H),17b(H)-20S-Cholestane ND S1-14b(H),17a(H)-20R-Cholestane ND S1-14b(H),17a(H)-20R-Cholestane ND S1-14b(H),17a(H)-20R-Cholestane ND S1-14b(H),17a(H)-20R-Cholestane ND S20-14a(H),17a(H)-20R-Methylcholestane ND S20-14a(H),17b(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S27-14b(H),17b(H)-20S-Ethylcholestane ND S27			
S4-13b(H),17a(H)-20S-Diacholestane ND S5-13b(H),17a(H)-20S-Methyldiacholestane ND S6-13b(H),17a(H)-20S-Methyldiacholestane ND S1-14b(H),17a(H)-20S-Cholestane ND S1-14b(H),17b(H)-20S-Cholestane ND S1-14b(H),17b(H)-20S-Cholestane ND S1-14b(H),17b(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17b(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S1-14a(H),17a(H)-20S-Cholestane ND S2-14a(H),17a(H)-20S-Methylcholestane ND S2-14b(H),17b(H)-20S-Methylcholestane ND S2-14b(H),17b(H)-20S-Methylcholestane ND S2-14b(H),17b(H)-20S-Methylcholestane ND S2-14b(H),17b(H)-20S-Ethylcholestane ND S2-14b(H),17b(H)-20S-Ethylcholestane ND S2-14a(H),17b(H)-20S-Ethylcholestane ND S2-14b(H),17b(H)-20S-Ethylcholestane ND S2-14b(H),17b(H)-20S-Ethylcholestane ND S2-14b(H),17b(H)-20S-Ethylcholestane ND S2-14b(H),17	T35-Pentakishomohopane-22R		
S8-13b(H),17a(H)-20S-Methyldiacholestane ND S12-14a(H),17a(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S17-14a(H),17a(H)-20S-Cholestane ND S18-13b(H),17a(H)-20R-Cholestane ND S18-13b(H),17a(H)-20R-Cholestane ND S18-13a(H),17a(H)-20R-Methylcholestane ND S20-14a(H),17a(H)-20R-Methylcholestane ND S20-14a(H),17a(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20R-Ethylcholestane ND	S4-13b(H),17a(H)-20S-Diacholestane		
S12-14a(H),17a(H)-20S-Cholestane ND S14-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S15-14b(H),17b(H)-20S-Cholestane ND S17-14a(H),17a(H)-20R-Cholestane ND S18-13b(H),17a(H)-20R-Cholestane ND S19-13a(H),17b(H)-20S-Eihyldiacholestane ND S20-14a(H),17a(H)-20R-Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S23-14b(H),17b(H)-20S-Eihylcholestane ND S24-14a(H),17b(H)-20S-Eihylcholestane ND S24-14a(H),17b(H)-20S-Eihylcholestane ND S24-14a(H),17b(H)-20S-Eihylcholestane ND S24-14a(H),17b(H)-20S-Eihylcholestane ND S24-14a(H),17b(H)-20S-Eihylcholestane ND S28-14b(H),17b(H)-20S-Eihylcholestane ND S27-14b(H),17b(H)-20S-Eihylcholestane ND S27-14b(H),17b(H)-20S-Eihylcholestane ND			
S14-14b(H),17b(H)-20R- Cholestane ND S15-14b(H),17b(H)-20S- Cholestane ND S17-14a(H),17a(H)-20R- Cholestane ND S14-13b(H),17a(H)-20R- Cholestane ND S14-13b(H),17a(H)-20R- Cholestane ND S19-13a(H),17b(H)-20S- Ethyldiacholestane ND S20-14a(H),17a(H)-20S- Methylcholestane ND S20-14a(H),17a(H)-20S- Methylcholestane ND S22-14b(H),17b(H)-20S-Methylcholestane ND S24-14a(H),17b(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20R-Ethylcholestane ND			
S15-14b(H),17b(H)-20S-Cholestane ND S17-14a(H),17a(H)-20R-Cholestane ND S18-13b(H),17a(H)-20R-Ethyldiacholestane ND S19-13a(H),17b(H)-20S-Ethyldiacholestane ND S20-14a(H),17b(H)-20S-Methylcholestane ND S20-14a(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S27-14b(H),17b(H)-20S-Ethylcholestane ND	S14-14b(H).17b(H)-20R- Cholestane		
S17-14a(H),17a(H)-20R- Cholestane ND S18-13b(H),17a(H)-20R- Ethyldiacholestane ND S19-13a(H),17b(H)-20S-Ethyldiacholestane ND S20-14a(H),17a(H)-20S-Ethyldiacholestane ND S22-14b(H),17a(H)-20S-Methylcholestane ND S22-14b(H),17a(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S27-14b(H),17b(H)-20S-Ethylcholestane ND			
S19-13a(H),17b(H)-20S-Ethyldiacholestane ND S20-14a(H),17b(H)-20S-Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S25-14b(H),17b(H)-20R-Methylcholestane ND S28-14b(H),17b(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20R-Methylcholestane ND	S17-14a(H),17a(H)-20R- Cholestane		ND
S20-14a(H),17a(H)-20S- Methylcholestane ND S22-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17a(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20S-Ethylcholestane ND S24-14a(H),17a(H)-20S-Ethylcholestane ND S24-14a(H),17a(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14a(H),17b(H)-20S-Ethylcholestane ND S24-14b(H),17b(H)-20R-Ethylcholestane ND			
S22-14b(H),17b(H)-20R-Methylcholestane ND S23-14b(H),17b(H)-20S-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S24-14a(H),17a(H)-20R-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND S27-14b(H),17b(H)-20S-Ethylcholestane ND			
S23-14b(H),17b(H)-20S-Methylcholestane ND S24-14a(H),17a(H)-20R-Methylcholestane ND S25-14a(H),17a(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20S-Ethylcholestane ND			
S24-14a(H),17a(H)-20R-Methylcholestane ND S25-14a(H),17a(H)-20S-Ethylcholestane ND S28-14b(H),17b(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20R-Ethylcholestane ND			
S25-14a(H),17a(H)-205-Ethylcholestane ND S28-14b(H),17b(H)-20R-Ethylcholestane ND S27-14b(H),17b(H)-20S-Ethylcholestane ND			
S27-14b(H),17b(H)-20S-Ethylcholestane ND	S25-14a(H),17a(H)-20S-Ethylcholestane		ND
	S27-14b(H),17b(H)-20S-Ethylcholestane S28-14a(H),17a(H)-20R-Ethylcholestane		ND ND

J=Result < Sample RL. ND= Not Detected. D≖ Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Summary of TPH, TOC, and PAH Measur

· · · · · · · · · · ·	Battelle				Total PAH	EPA 16 PAH	L PAH	H PAH
Client Sample ID:	Sample ID:	Matrix	TPH (ug/kg)		(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg
ILU-102-SS-0010	U0169	Sediment	2560000	13.1	21600	13500	6010	15600
ILU-103-SS-0010	U0170	Sediment	1700000	1.11	9880	5230	3550	6330
NLU-104-SS-0010	U0142	Sediment	4760000	10.6	61600	43600	10700	51000
NLU-104-SS-0010	U0142DUP	Sediment	3800000	10.6	47900	33900	8310	39600
NLU-105-SS-0010	U0143	Sediment	5140000	6.89	129000	97100	18000	111000
LU-106-SS-0010	U0144	Sediment	3820000	12.3	44700	30500	8570	36200
ILU-107-SS-0010	U0145	Sediment	4340000	12	73100	51400	13200	59900
ILU-109 1214	U0277	Sediment	7370000	10.5	213000	149000	91200	121000
NLU-109-2830	U0285	Sediment	10200000	18.7	1070000	755000	496000	570000
NLU-109-2830	U0285DUP	Sediment	9880000		1090000	773000	518000	576000
NLU-109-3840	U0290	Sediment	16500000	19.2	2320000	1650000	1050000	1270000
ILU-110 0406	U0353	Sediment	18100000	29.7	5450000	4610000	1210000	4250000
ILU-110-1214	U0357	Sediment	21200000	36.1	7050000	5910000	1520000	5530000
ILU-110 2022	U0361	Sediment	8500000	22	1820000	1470000	330000	1490000
ILU-112-SS-0010	U0171	Sediment	6190000	15	216000	171000	33100	183000
ILU-112-SS-2030	U0101	Sediment	8930000	15.9	2060000	1620000	681000	1380000
ILU-112-SS-2030	U0101DUP	Sediment	9330000	15.9	2230000	1770000	726000	150000
VLU-113-SS-0010	U0146	Sediment	4160000	10.0	170000	128000	30400	140000
ILU-113-SS-1020	U0108	Sediment	7230000	12.5	516000	341000	189000	327000
LU-115-SS-0010	U0149	Sediment	7230000	10.5	1120000	517000	696000	424000
ILU-116-SS-0010	U0150	Sediment	5360000	8.92	211000	139000	49800	424000
ILU-116-SS-1020	U0122	Sediment	10200000		1240000	984000	255000	99000
LU-116-SS-2030	U0122		10200000		and the second se	984000		
LU-116-SS-2030	U0123	Sediment Sediment	11000000		1180000 1190000		151000	103000
ILU-117-0010c	U6525		and the second sec			963000	149000	1040000
		Sediment	20600000		6720000	5170000	2140000	4580000
LU-117 0810	U0387	Sediment	32300000		9290000	7110000	2950000	6340000
LU-117 2830	U0397	Sediment	22400000	35.6	3370000	2360000	1360000	2010000
LU-117 4850	U0407	Sediment	11300000		691000	430000	391000	300000
LU-117-US-9.6	U4507	Sediment	20400000		14400000	9300000	11100000	3270000
ILU-119-0010c	U6524	Sediment	72700000		30500000	14100000	22500000	8040000
LU-119-0608	U0455	Sediment	83500000		28800000	13500000	21000000	7830000
LU-119-1618	U0460	Sediment	75400000		24400000	11700000	17700000	6690000
ILU-119-2426	U0464	Sediment	36600000		9480000	5390000	5980000	350000
LU-119R2-US-0.5	U4512	Sediment	26400000		1000000	5130000	8980000	106000
LU-121-SS-0010	U0151	Sediment	5740000		323000	185000	86200	237000
ILU-121-SS-2030	U0152	Sediment	15600000	14.9	2780000	1660000	1290000	149000
LU-122-SS-0010	U0153	Sediment	5130000		804000	447000	486000	318000
LU-122-SS-2030	U0154	Sediment	62200000		18900000	10300000	14200000	471000
ILU-123-SS-0010	U0155	Sediment	5640000	10.7	501000	306000	187000	31400
LU-124-SS-0010	U0156	Sediment	4600000		157000	100000	41000	11600
LU-124-SS-2030	U0157	Sediment	7080000	7.98	332000	203000	115000	21700
ILU-126-SS-0010	U0158	Sediment	3970000		222000	133000	65900	15600
LU-126-SS-0010 Roofing	U4517	Sediment	5810000	1	192000	91800	153000	3930
ILU-126-SS-1020	U0097	Sediment	4290000		248000	153000	100000	14800
ILU-127-SS-0010	U0159	Sediment	2090000			42100	28400	4480
LU-128-SS-0010	U0160	Sediment	702000			5150	1980	633
ILU-129-SS-0010	U0135	Sediment	11400000		95600	57000	29000	6660
LU-129-SS-2030	U0137	Sediment	14700000			64100	29600	7830
ILU-130-SS-0010	U0161	Sediment	8090000		3000000	2260000	618000	238000
ILU-131-SS-0010	U4518	Sediment	46300000		29900000	27200000	10300000	1960000
ILU-133-SS-0010	U0162	Sediment	1130000		368000	298000	65400	30300
LU-133-SS-1020	U0163	Sediment	955000		372000	303000	62400	30300
LU-136-SS-0010	U0172	Sediment	6730000			128000		
W-5-1202	U4514		75500000		350000000			14600
		Oily Material						4280000
AW-5 Product(T190)	U3754	Oily Material	67000000			17000000		4310000
GWP Tank(T192)	U3752	Oily Material	969000000			29400000	294000000	8790000
SS-1-1202	U4515	Oily Material	69100000	82.3		118000000	19000000	4130000
NLU-VV2	U0165	Wipe	L	1	85.7	30.3	62.2	23.
NLU-VV3	U0166	Wipe	L	1	60.1	16.6	57.7	2.4
NLU-VV4	U0167	Wipe	ļ		46.6	14.2	45.4	1.2
NLU-VV5	U0168	Wipe	1		116	19.9	113	2.2

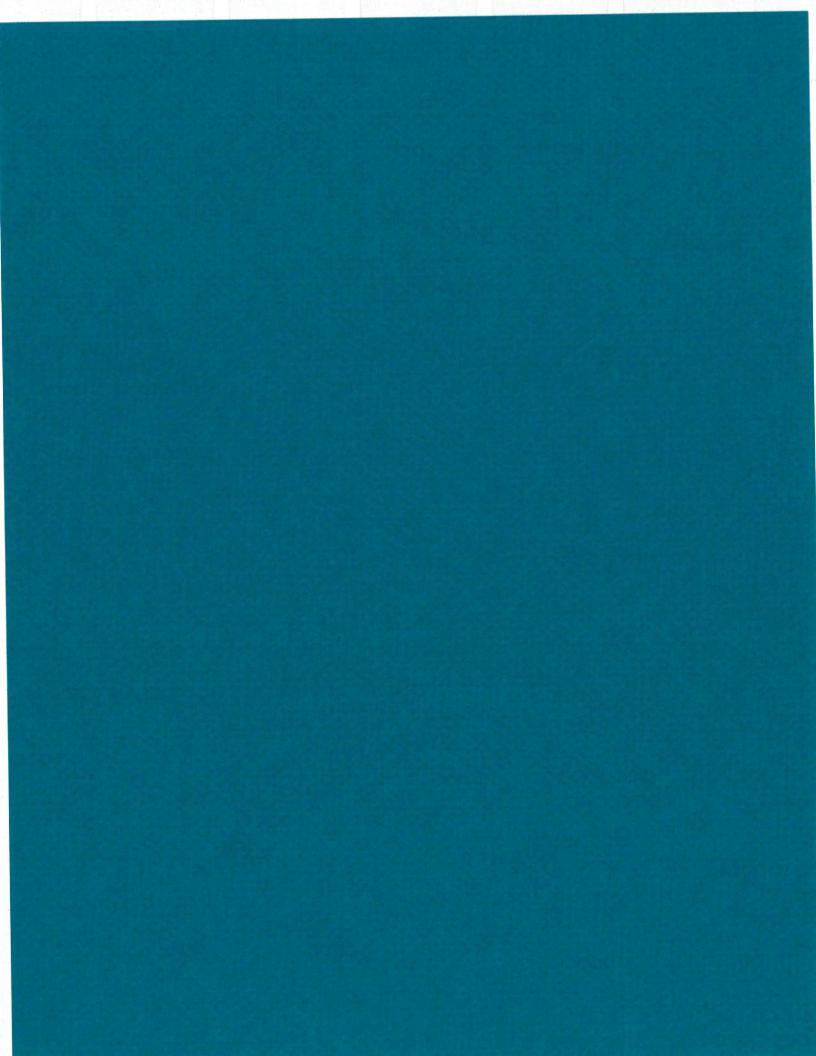
Summary of Butyltin, Pesticide, and PCB Measurements

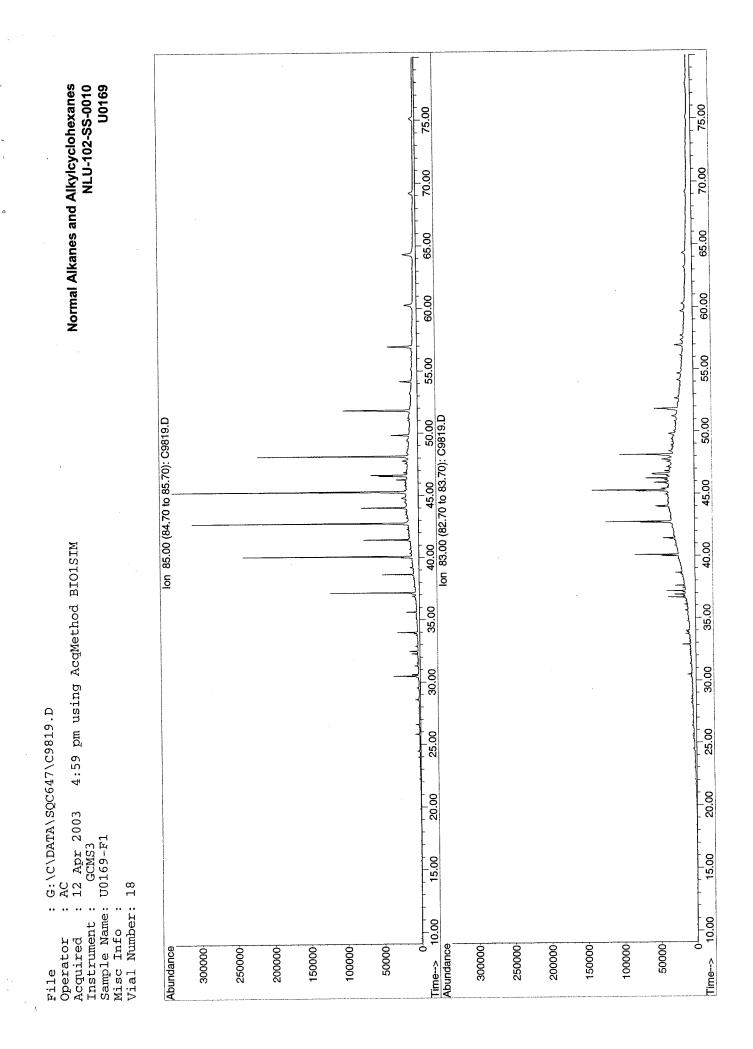
						Sum of	Total	Total PCB	
	BATTELLE	ттвт	твт	DBT	MBT	Butyltins	Pesticides	(Homologue)	Dominant
CLIENT ID	ID	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)		
NLU-109 1214	U0277	< 21.7	29.8	20.9	< 21.1	50.7	ND	ND	
NLU-109 2830	U0285	< 22	< 22.3	< 20.9	< 21.4	< DL	ND	ND	
NLU-109 3840	U0290	< 21.5	< 21.8	< 20.4	< 20.9	< DL	ND	ND	
NLU-110 0406	U0353	< 15.7	20.5	17.10	< 15.2	37.6	ND	ND	
NLU-110 1214	U0357	< 16.3	< 16.5	< 15.5	< 15.8	16.0	ND	ND	
NLU-110 2022	U0361	< 18.3	< 18.5	< 17.3	< 17.7	13.1	ND	ND	
NLU-116-SS-0010	U0150-2	< 4.89	131	83.3	11.9	226	233	3260	4
NLU-116-SS-0010	U0150DUP	< 4.91	399	274	5.79	679	ND	ND	
NLU-116-SS-1020	U0122	< 5.21	799	255	10.8	1065	338	4110	4
NLU-116-SS-2030	U0123-1	< 5.25	< 5.31	< 4.97	< 5.09	< DL	235	3890	4
NLU-117 0810	U0387	< 20.3	< 20.6	< 19.3	< 19.7	< DL	ND	ND	
NLU-117 2830	U0397	< 17.7	< 17.9	< 16.8	< 17.2	< DL	ND	ND	
NLU-117 4850	U0407	< 19.2	< 19.5	< 18.2	< 18.7	< DL	ND	ND	
NLU-119 0608	U0455	< 26	< 26.3	< 24.6	< 25.2	< DL	8320	33600	3
NLU-119 1618	U0460	< 38.5	< 38.9	< 36.5	< 37.3	< DL	7960	30300	3
NLU-119 2426	U0464	< 13.4	< 13.5	< 12.7	< 13	< DL	3330	MI	
NLU-126-SS-0010	U0158-2	16.0	1060	641	62.7	1775	217	693	5
NLU-126-SS-1020	U0097	< 3.07	1150	60.8	< 2.98	1209	180	3060	4

MBT	Monobutyltin
DBT	Dibutyltin
ТВТ	Tributyltin
TTBT	Tetrabutyltin
LOC	Level of chlorination or homologue
<dl< td=""><td>Below detection limit</td></dl<>	Below detection limit
ND	Not determined
MI	Matrix Interference

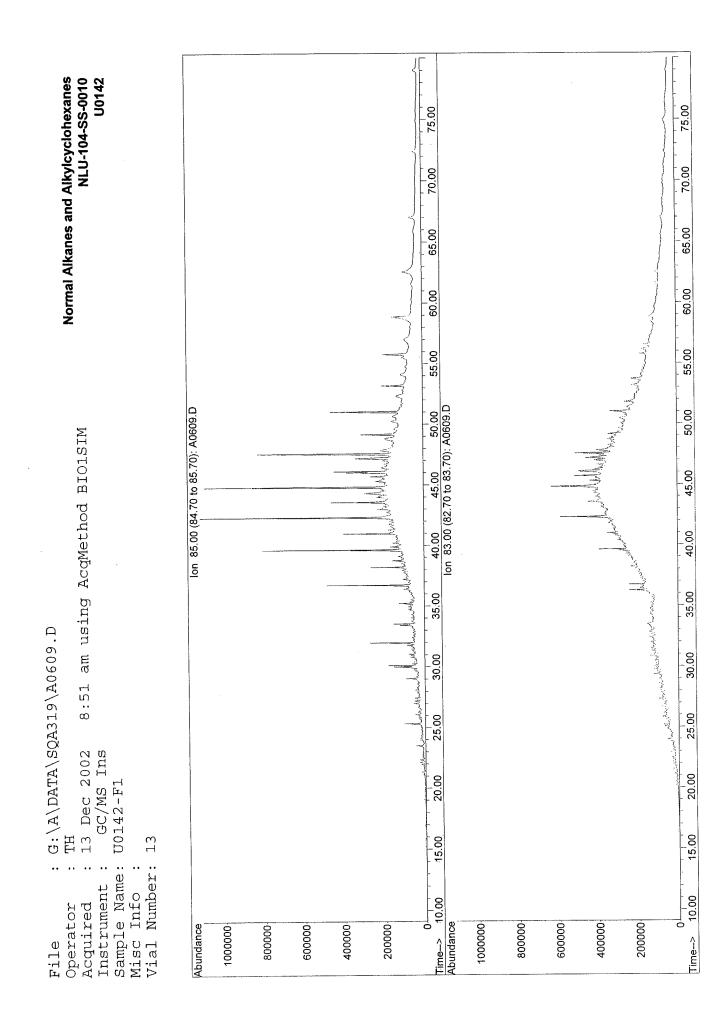
	Battelle					
	Sample				%Sediment	
Client Sample ID	٩	%Coal	%Coke	%Tar/Pitch	Particulates	Vitrinite Reflectance
NLU126-1020	U0047	<1	<1	<1	100	100 not detected
NLU113-1020	U0108	v	1>	41	100	100 not detected
NLU116-1020	U0122	8.5	4۱>	2.5	88	88 not detected
NLU116-2030	U0123	<1 >1	۲>	1.5	26	97 not detected
NLU116-0010	U0150	<1	۲>	2.5		96 not detected
NLU126-0010	U0158		-1	4۱>	100	100 not detected
NLU117-2830	U0397	₹	2	36	62	62 not detected
						high volatile C bituminous and
NLU119-1618	U0460	2	7	28.5		72 lesser amounts of
						high volatile A bituminous
						high volatile C bituminous and
		L C			00	lesser amounts of
INFUL INK	71040	0.0	0.2	2	00	high volatile A bituminous and
						medium volatile bituminous
NLU126-0010	114517	V	V	100	1	c1 not detected
Roofing Material		7		202	,	
NLU131-0010	U4518	<1	L	95	4	4 not detected

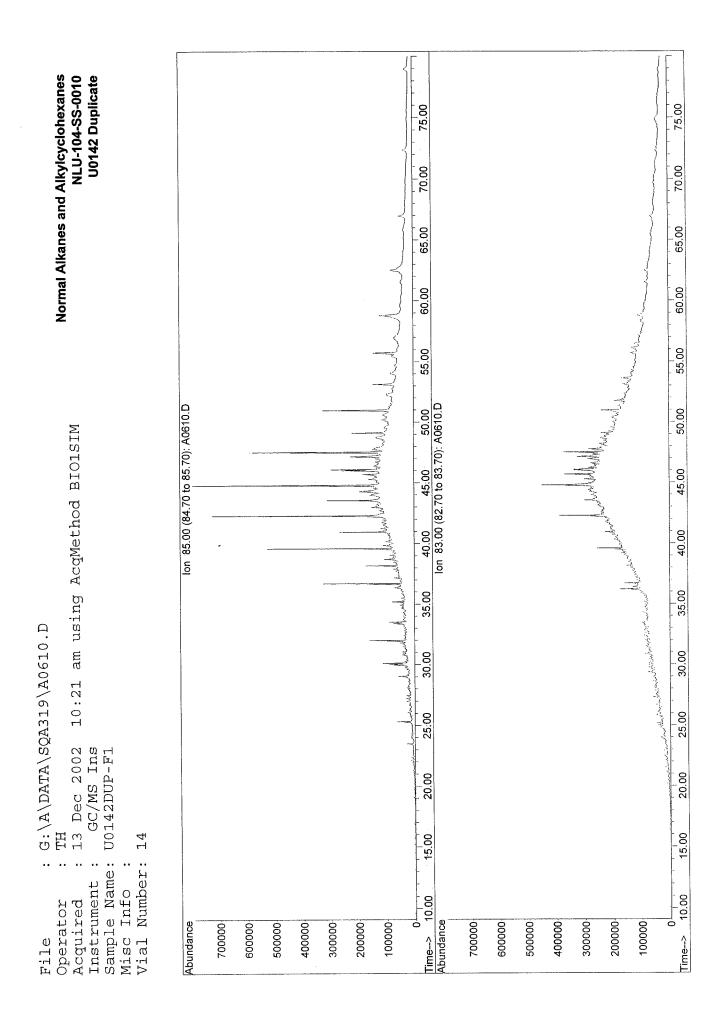
Summary of Petrology Measurements

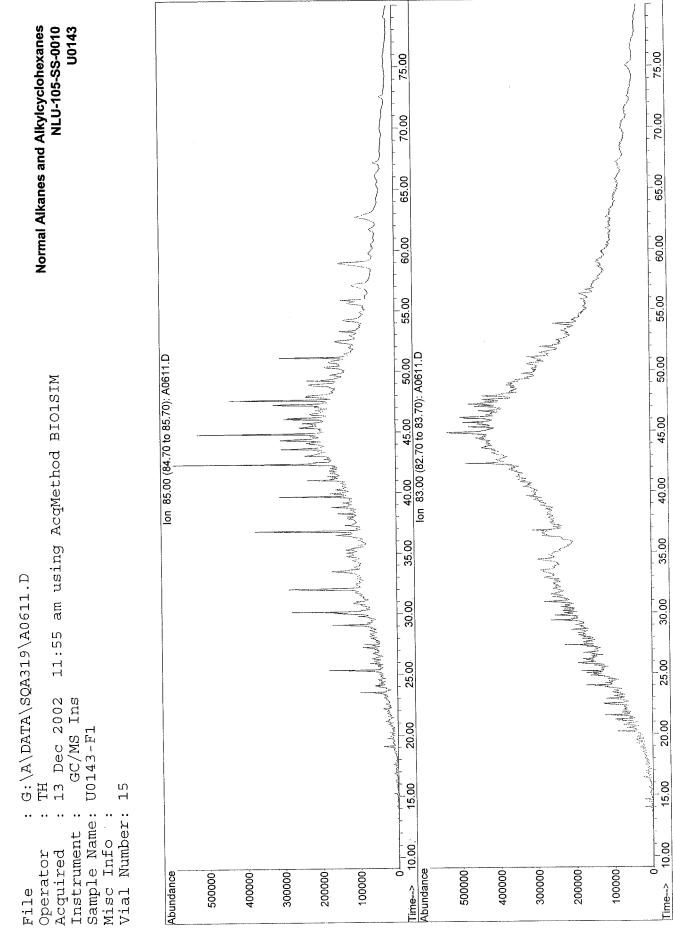




U0170 Normal Alkanes and Alkylcyclohexanes NLU-103-SS-0010 75.00 75.00 70,00 70.00 65.00 65.00 60.00 60.00 55.00 55.00 40.00 45.00 50.00 lon 83.00 (82.70 to 83.70): C9820.D 50.00 lon 85.00 (84.70 to 85.70): C9820.D Multur Wall walland 45.00 40.00 6:30 pm using AcqMethod BI01SIM 35.00 35.00 30.00 30,00 مسامسك يحالسا لمسك سألك يستهزا للألج لمستبعد بالمستعم بمسالح بمنالج أعملهم مع : G:\C\DATA\SQC647\C9820.D ...or : AC ...quired : 12 Apr 2003 6:30 pm Instrument : GCMS3 Sample Name: U0170-F1 Misc Info : Vial Number: 19 Another the she was a second and the second 25.00 25.00 20.00 20.00 15.00 15.00 10.00 10.00 Time--> 1 Abundance 200000 150000 100000 50000 9 50000 200000 150000-100000 Time-->

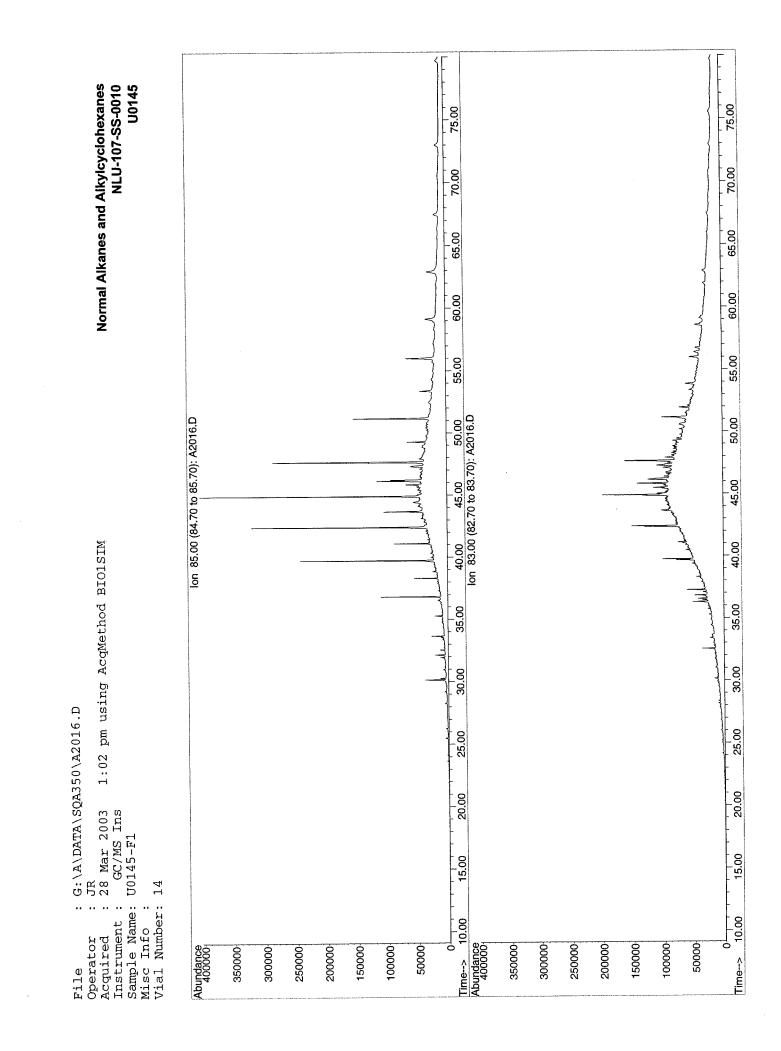






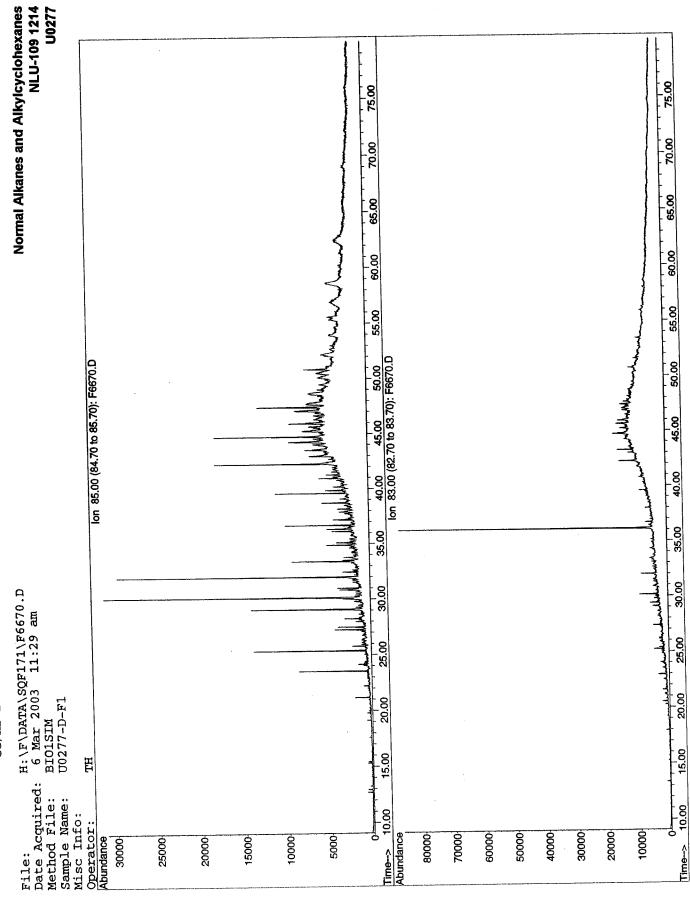
File

U0144 Normal Alkanes and Alkylcyclohexanes NLU-106-SS-0010 75.00 75.00 70.00 70.00 65.00 65.00 60.00 60.00 4 55.00 55.00 40.00 45.00 50.00 lon 83.00 (82.70 to 83.70): A2015.D lon 85.00 (84.70 to 85.70): A2015.D 50.00 45.00 11:30 am using AcqMethod BI01SIM 40.00 35.00 35.00 30.00 30,00 : G:\A\DATA\SQA350\A2015.D ..or : JR ..quired : 28 Mar 2003 11:30 ar Instrument : GC/MS Ins Sample Name: U0144-F1 Misc Info : Vial Number: 13 25.00 25.00 20.00 20.00 15.00 15.00 Time--> 10.00 Abundance 10.00 50000-100000 250000 150000 0 250000-200000-150000 100000 50000ð 200000 Time-->

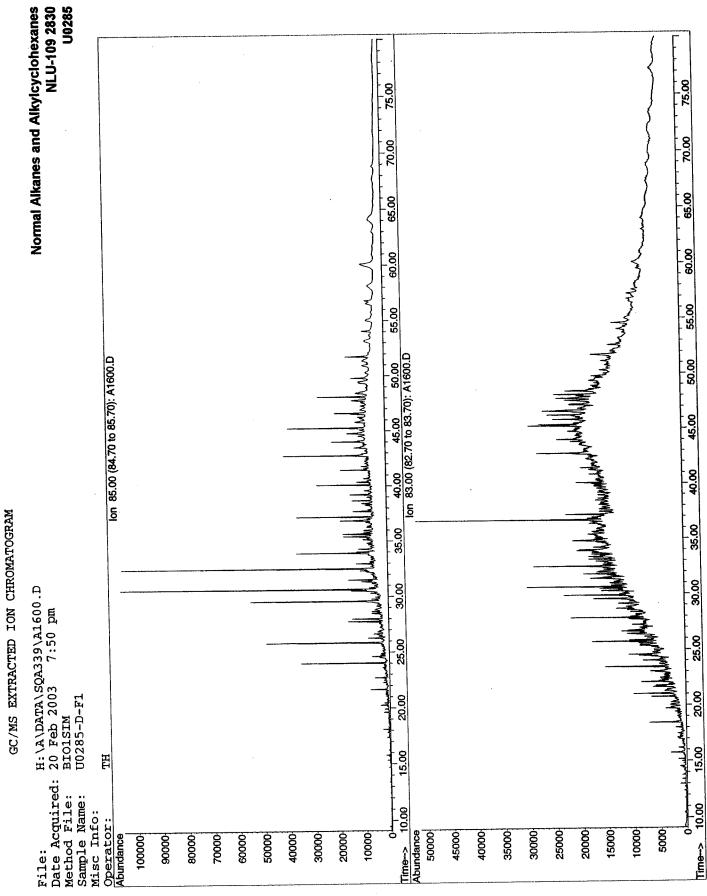


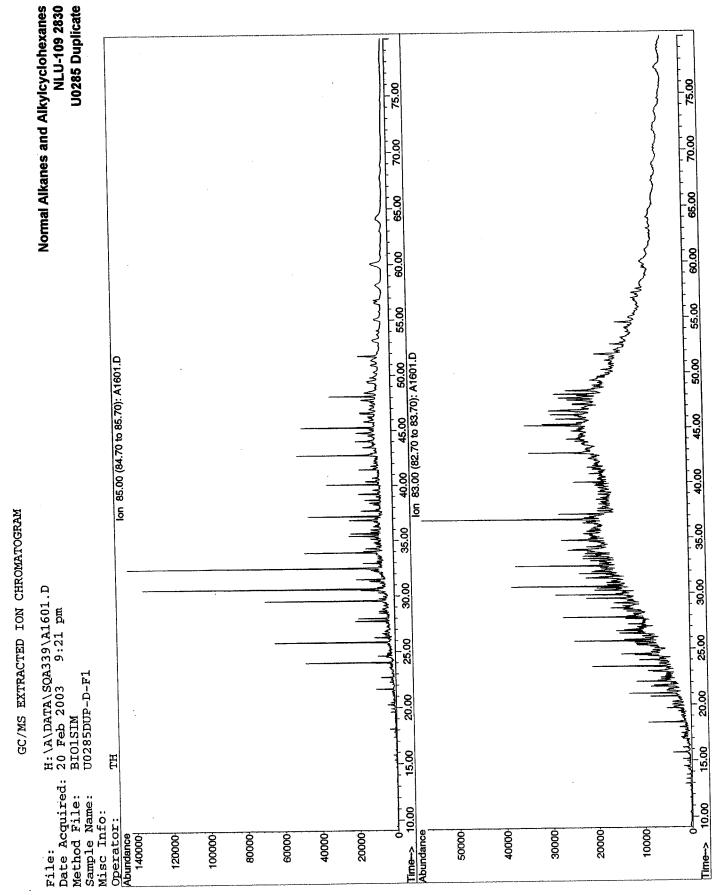






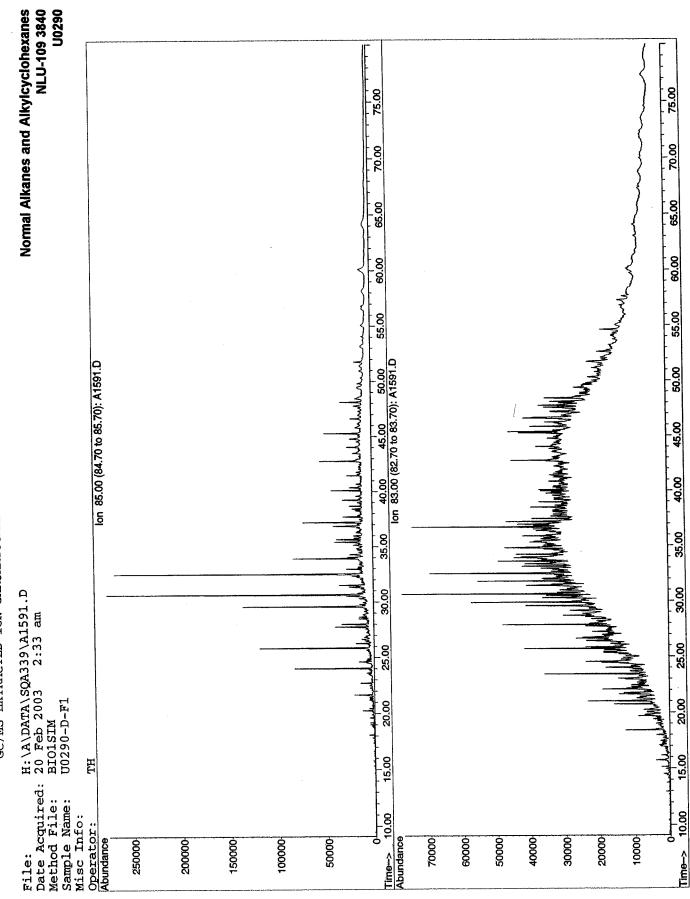




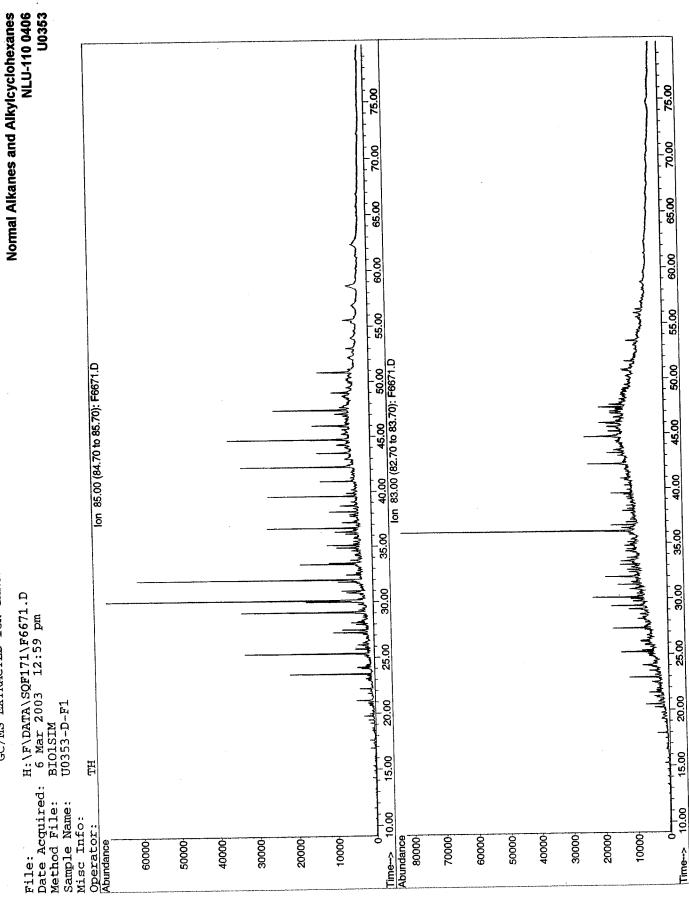


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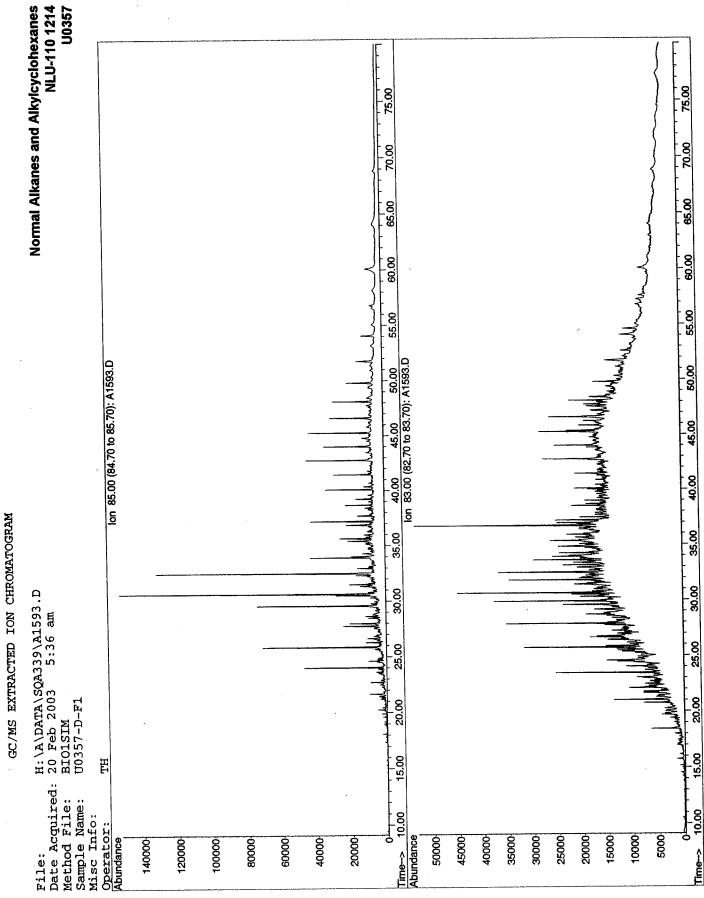


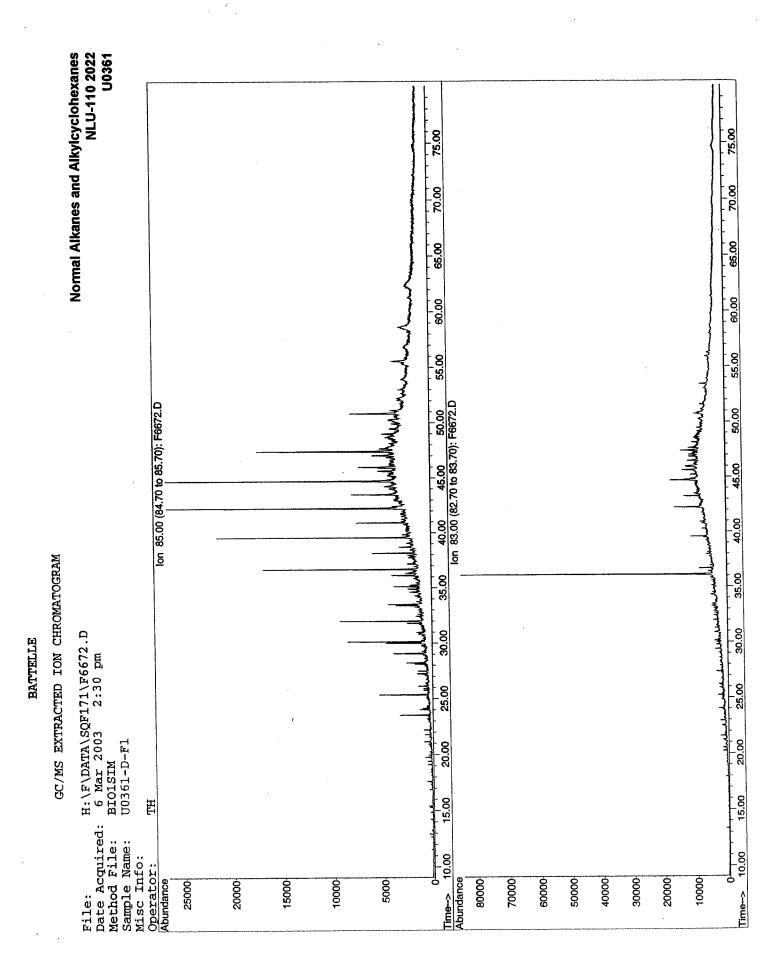


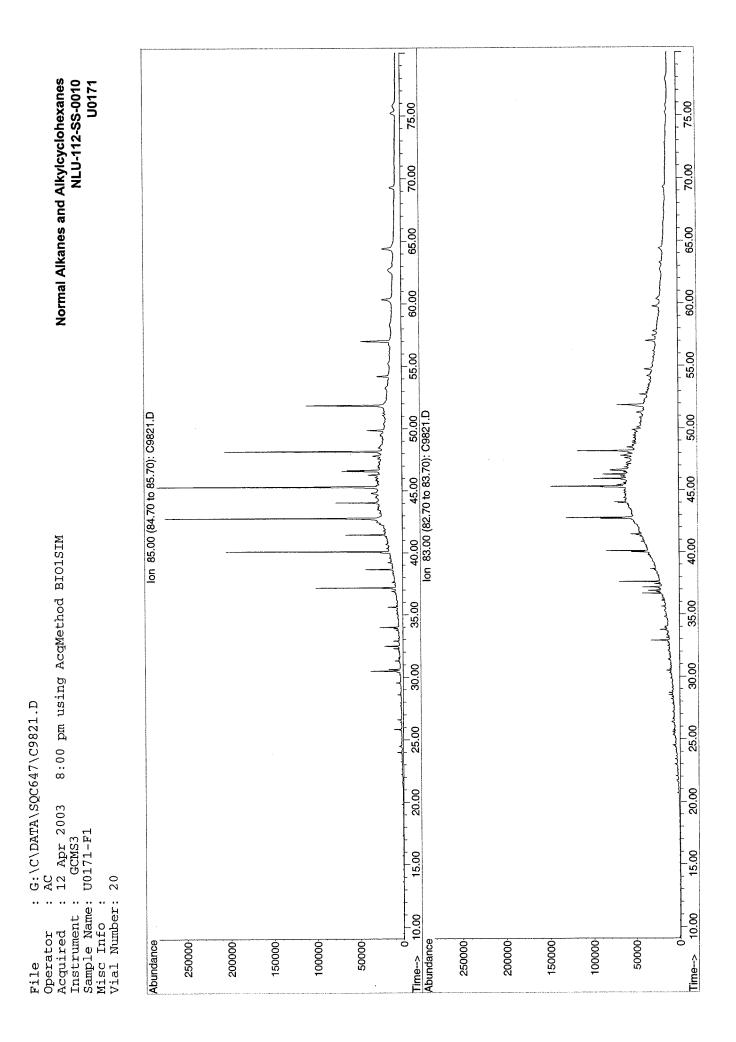


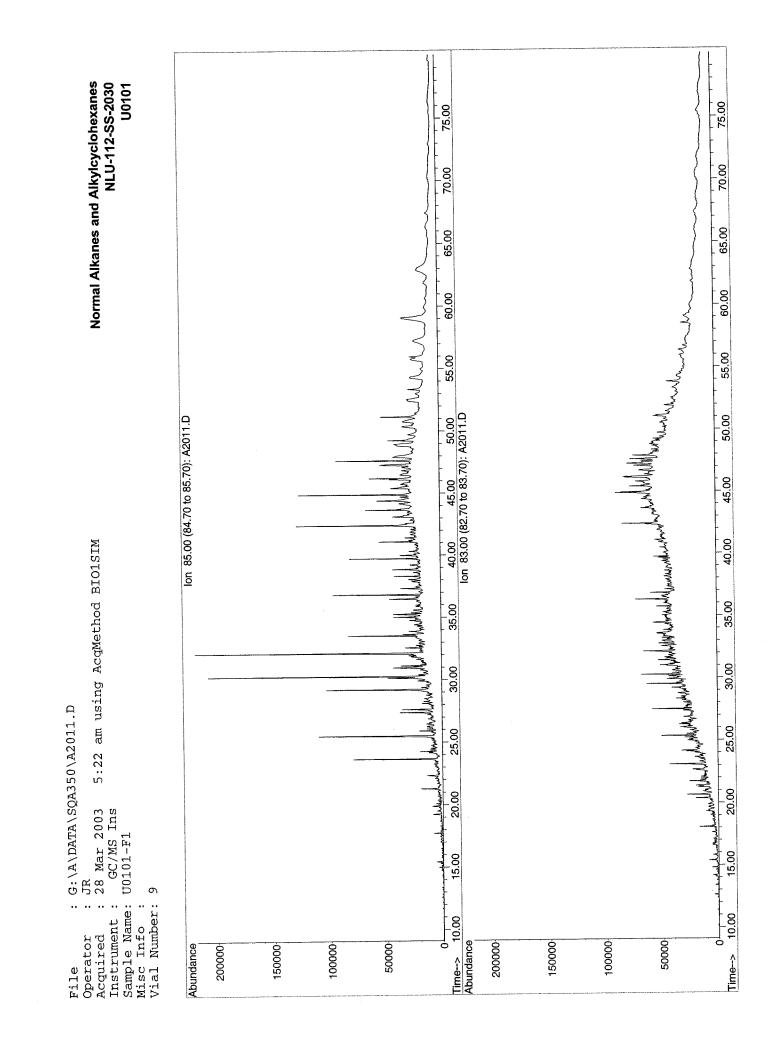


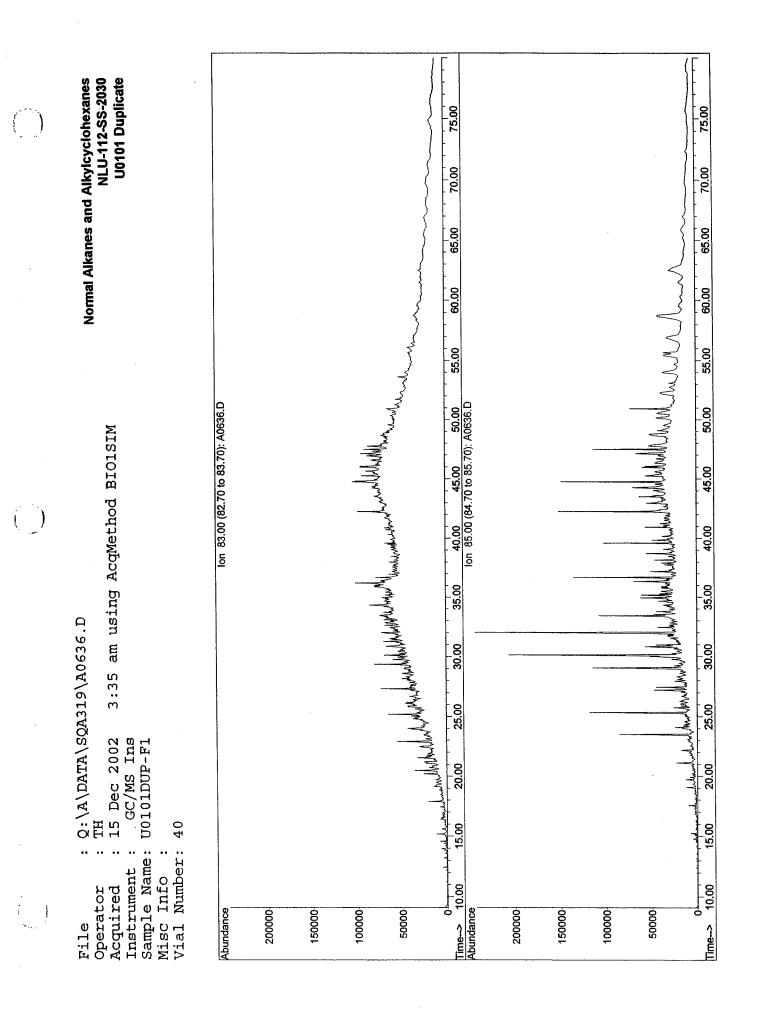


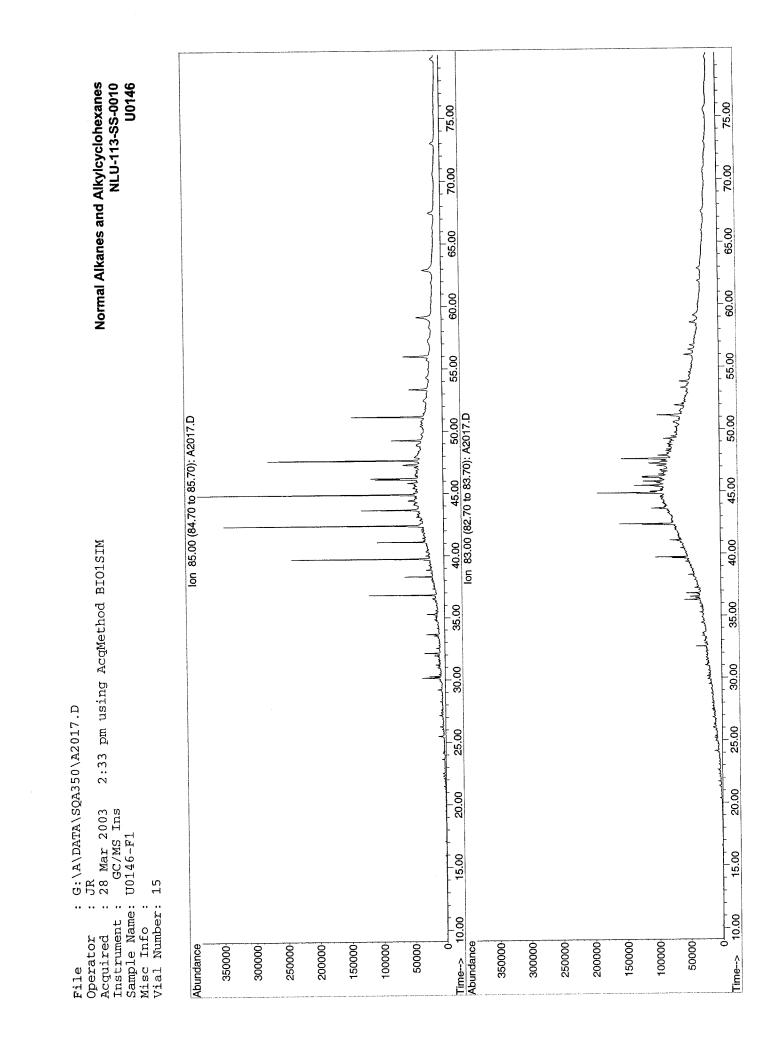


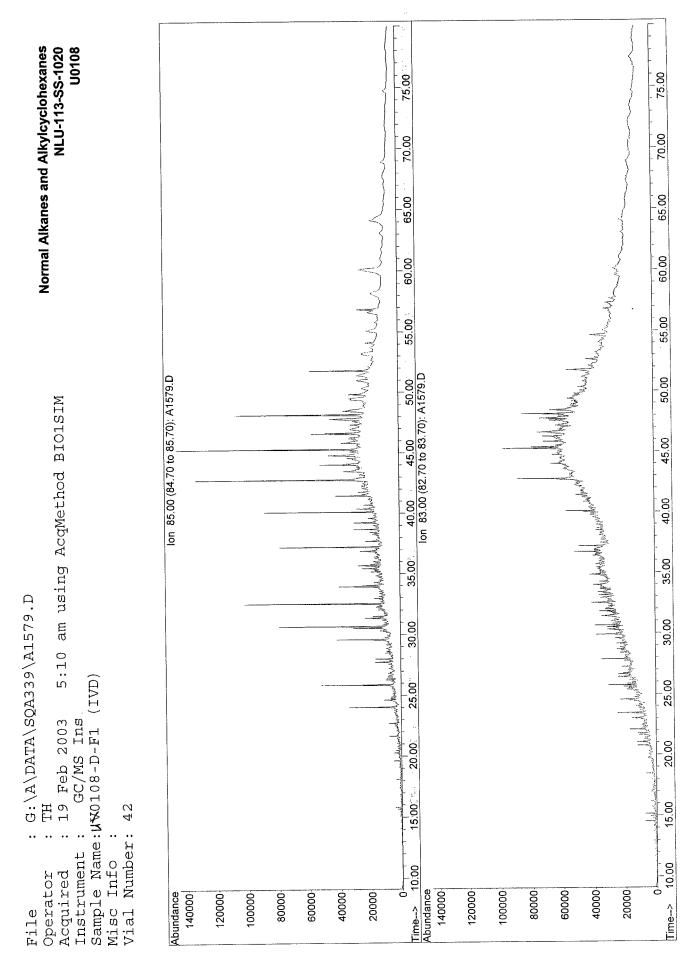


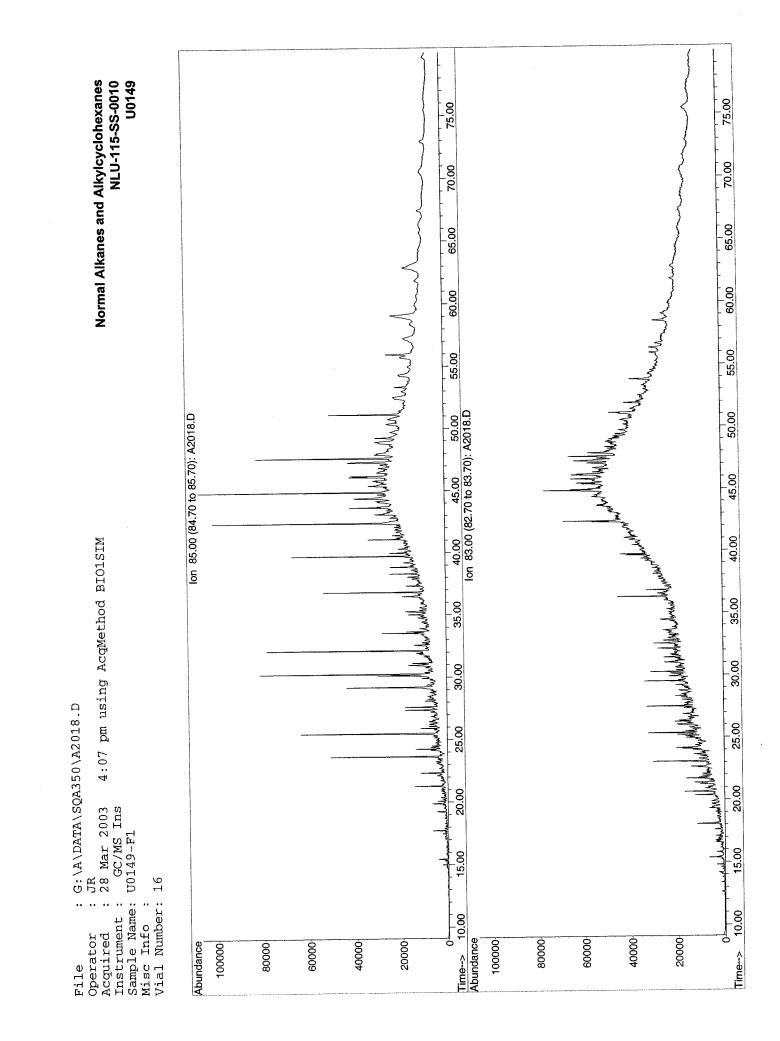


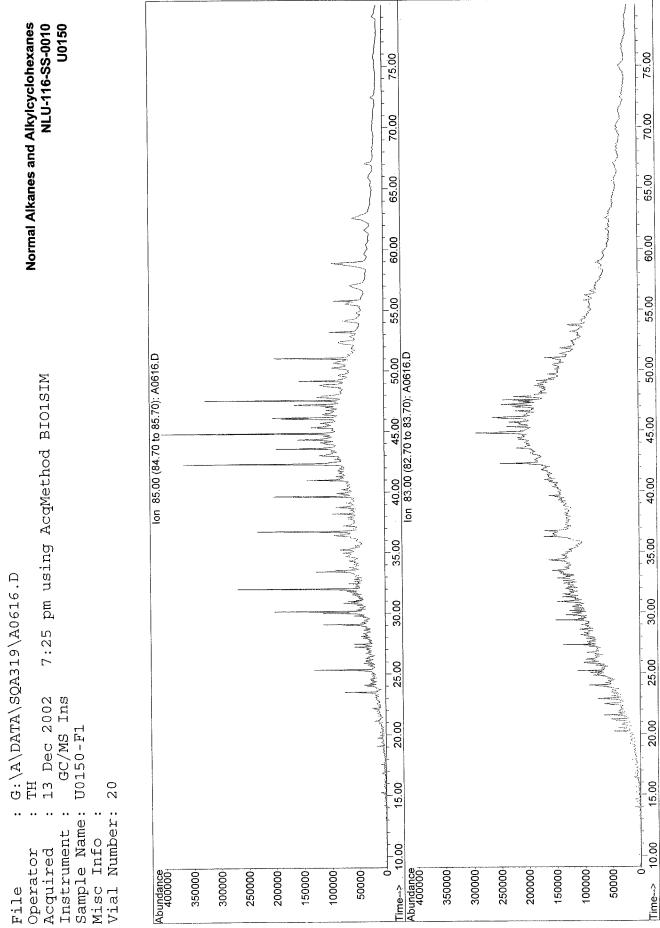




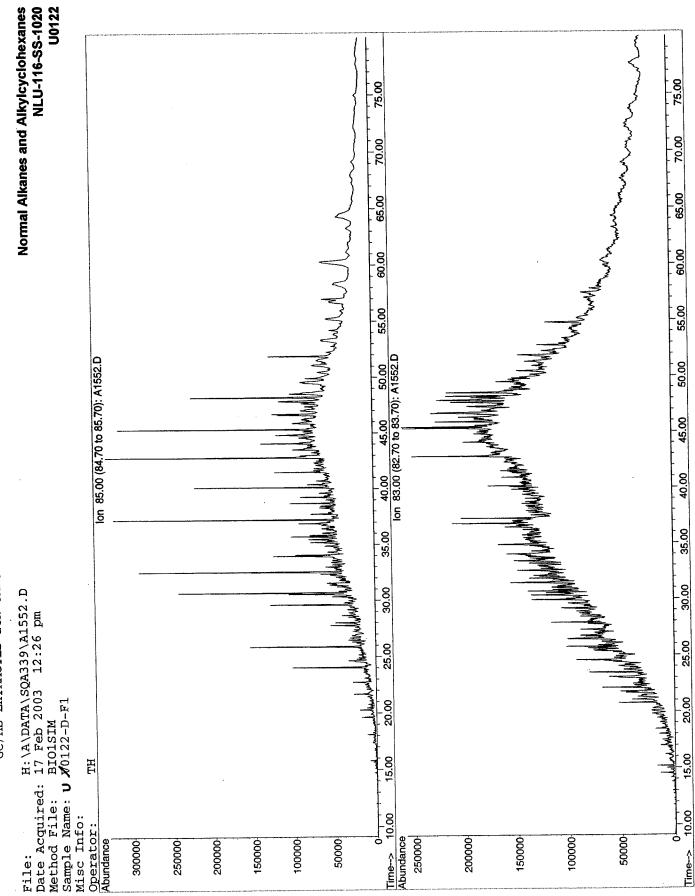


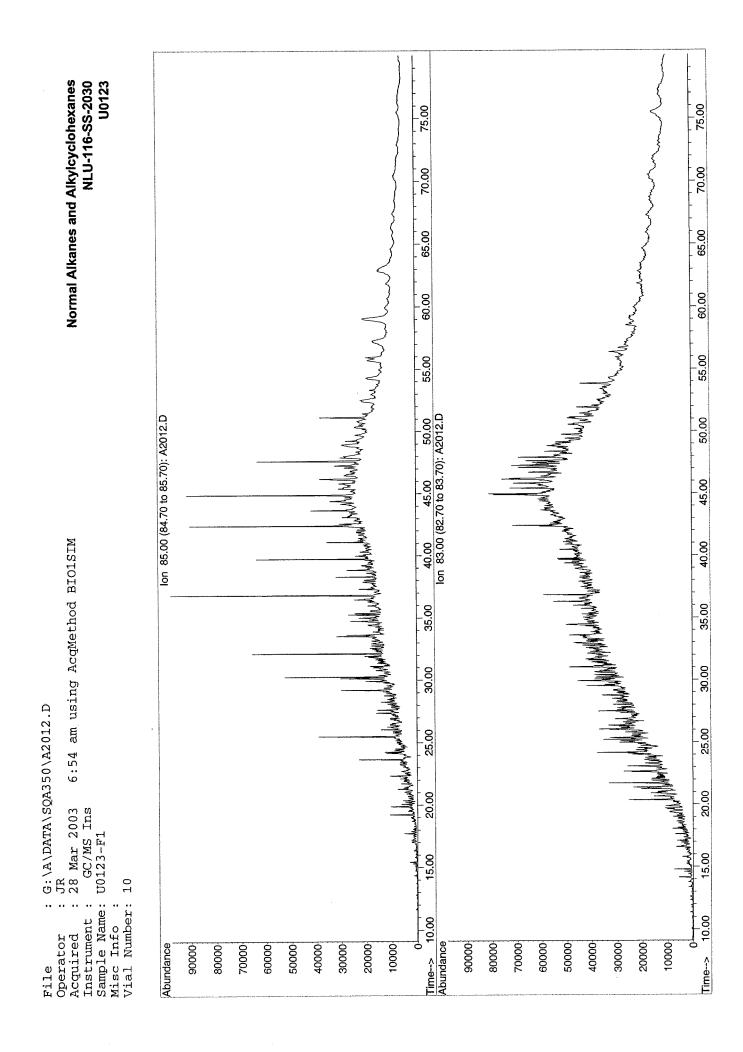


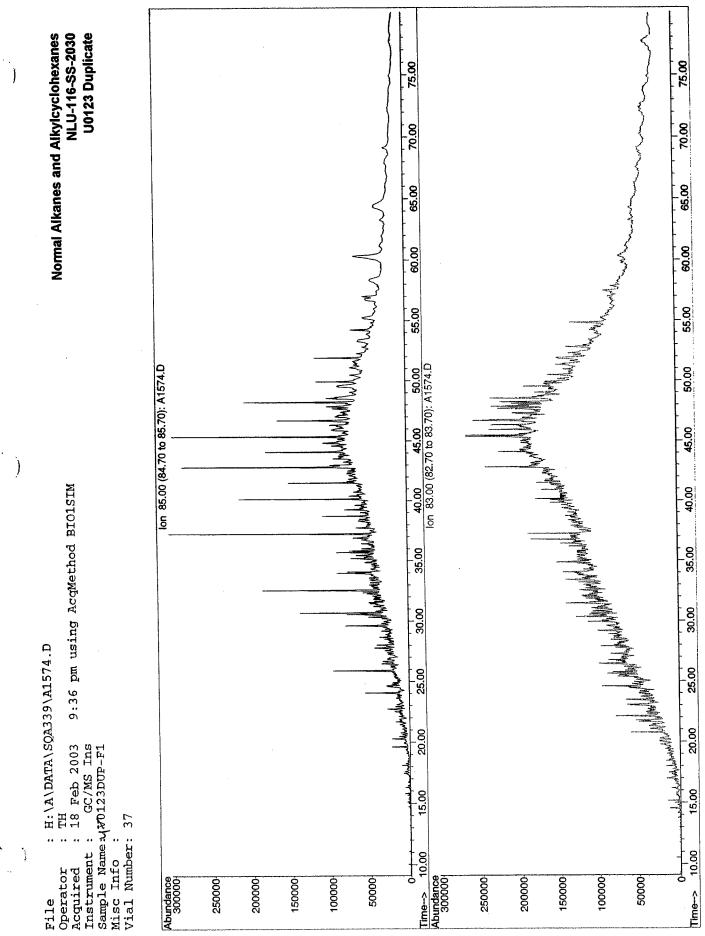










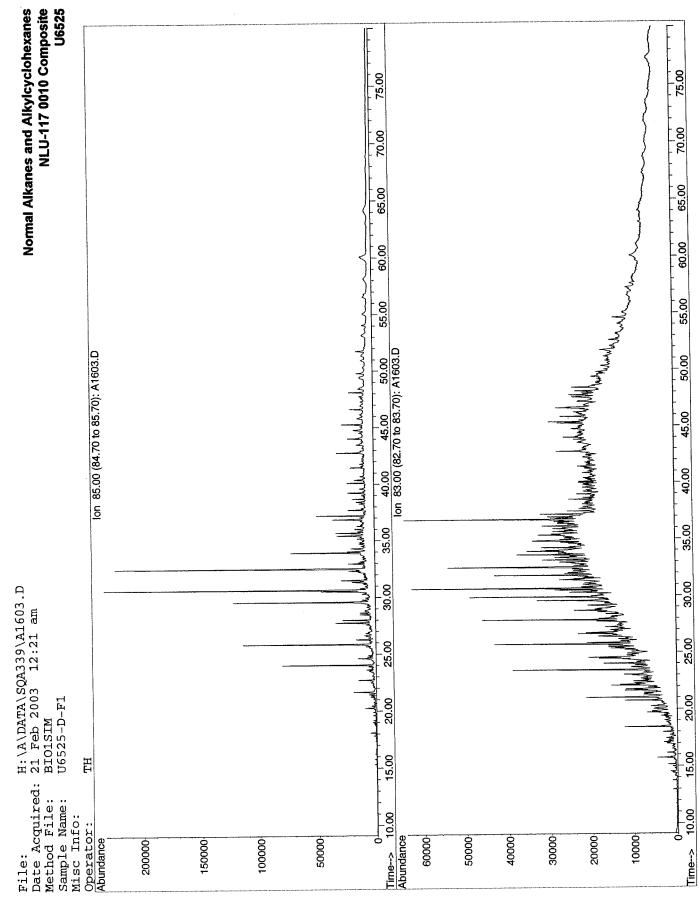


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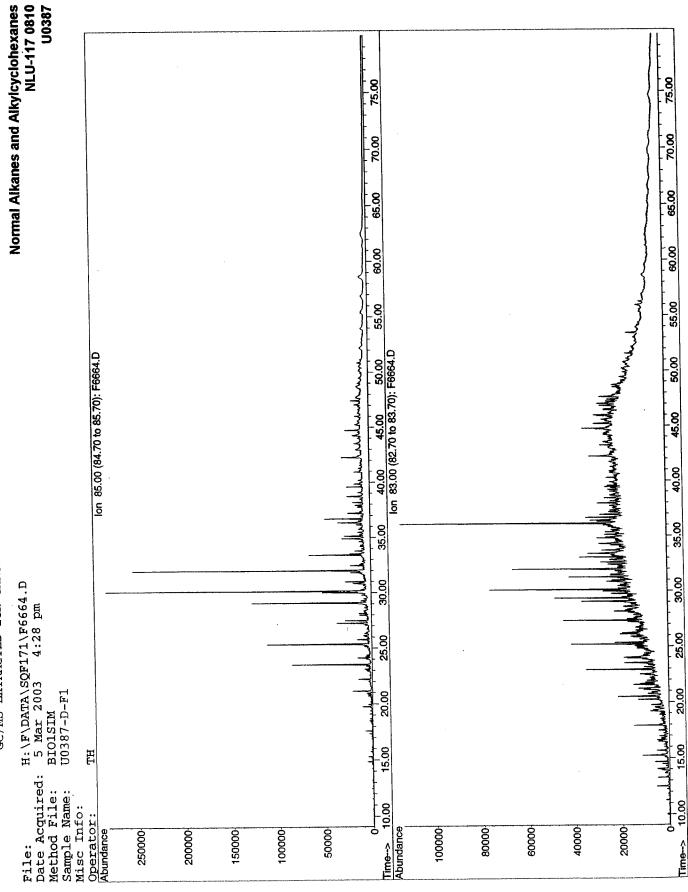
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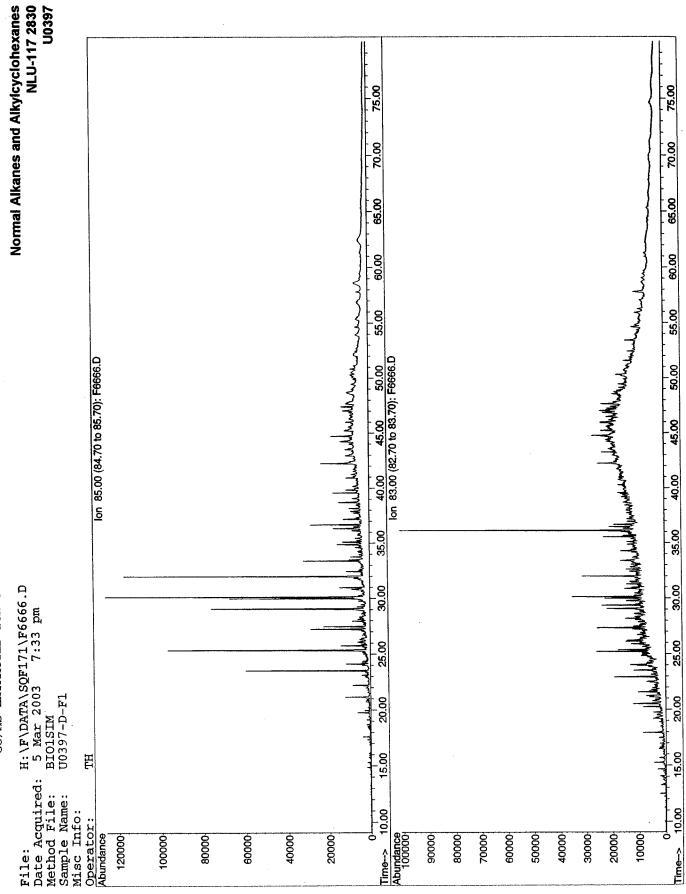




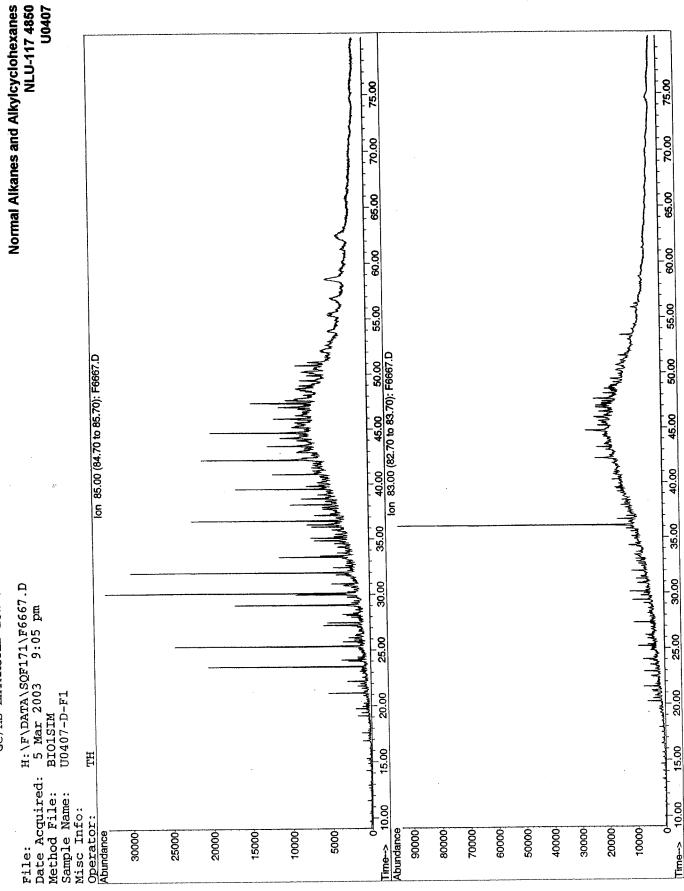




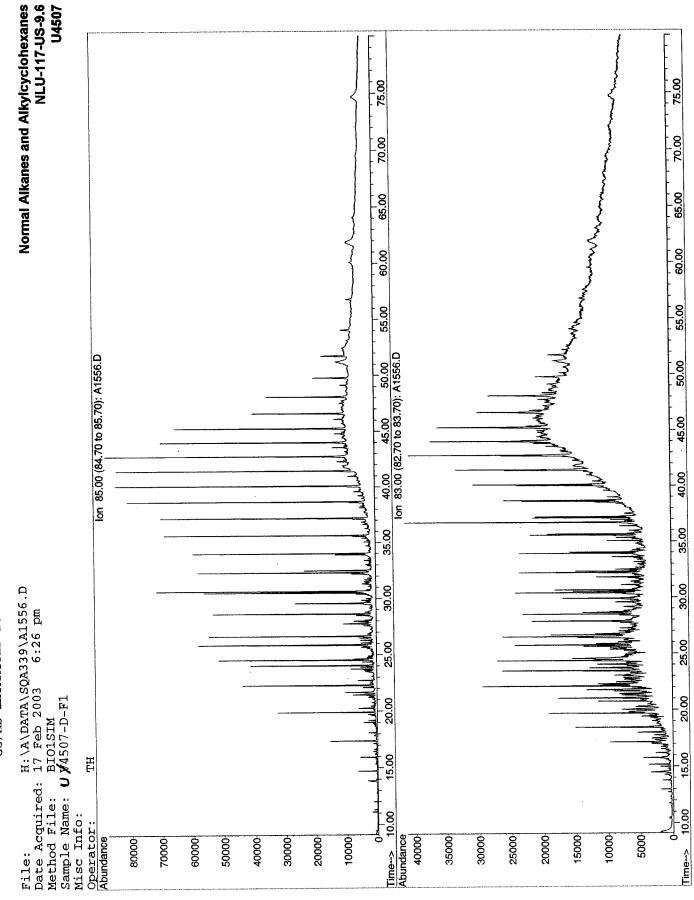


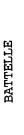


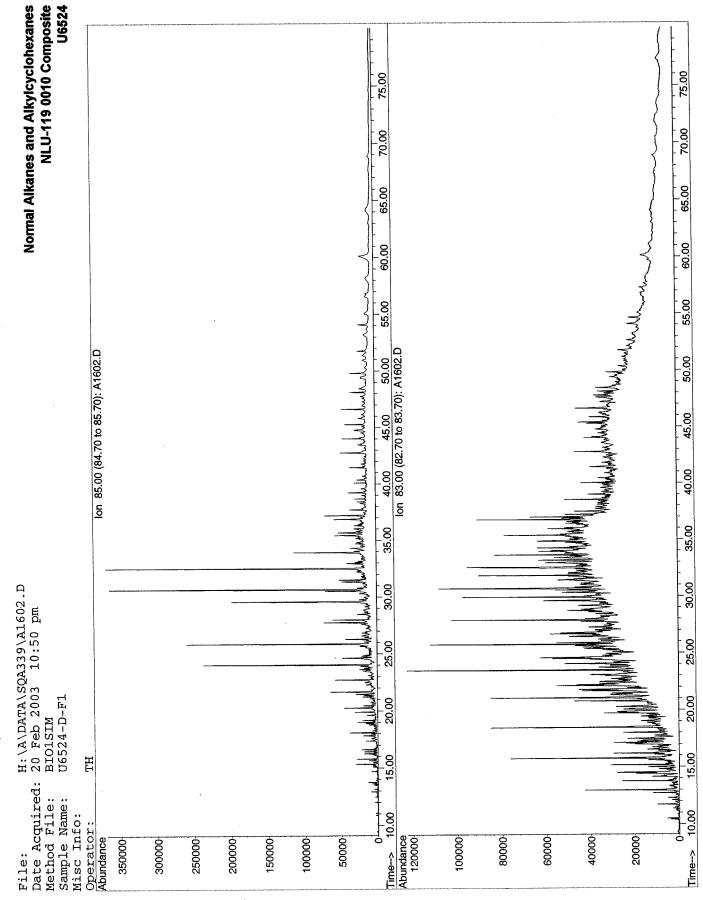




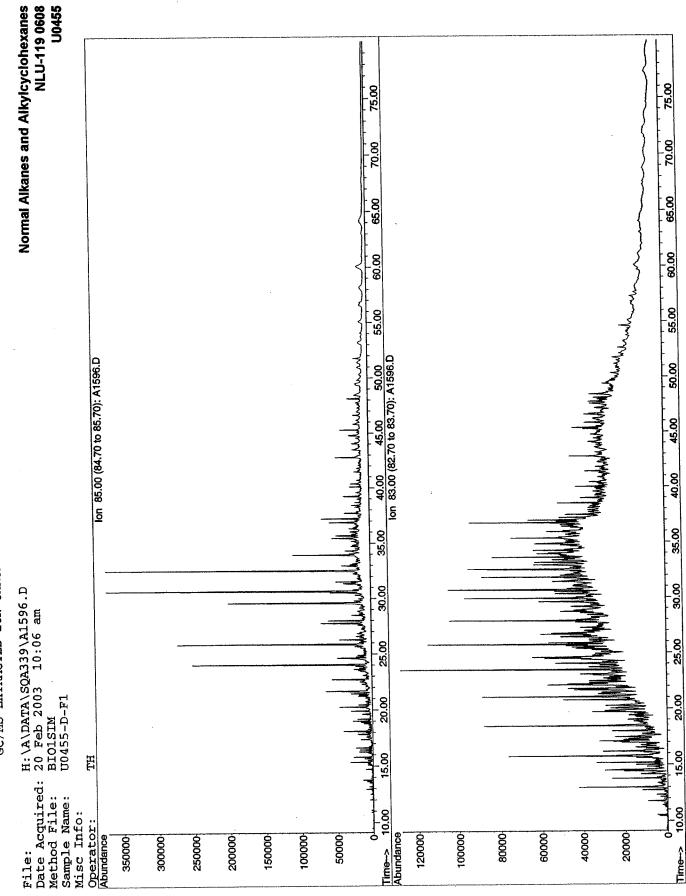




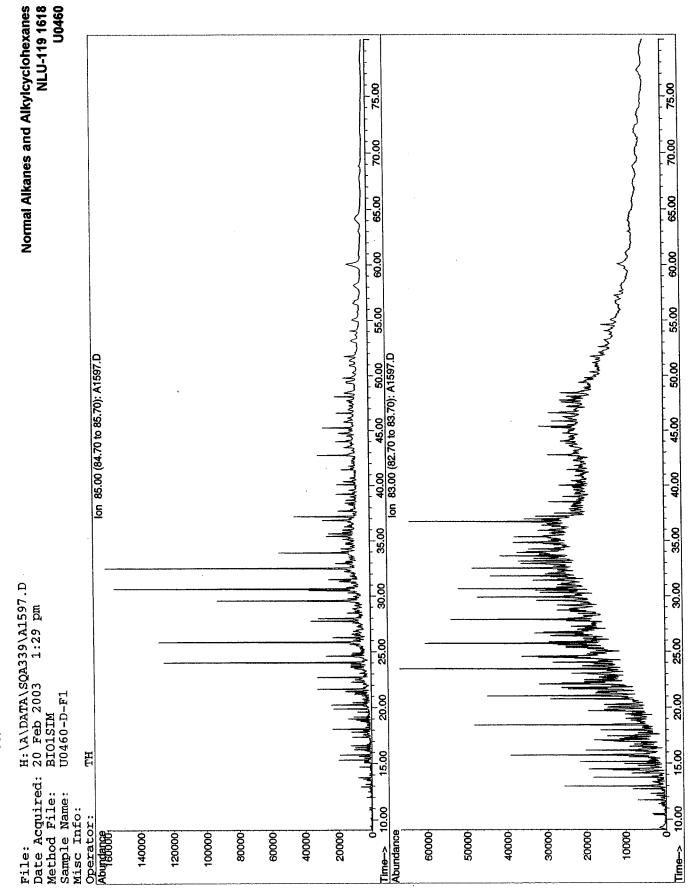




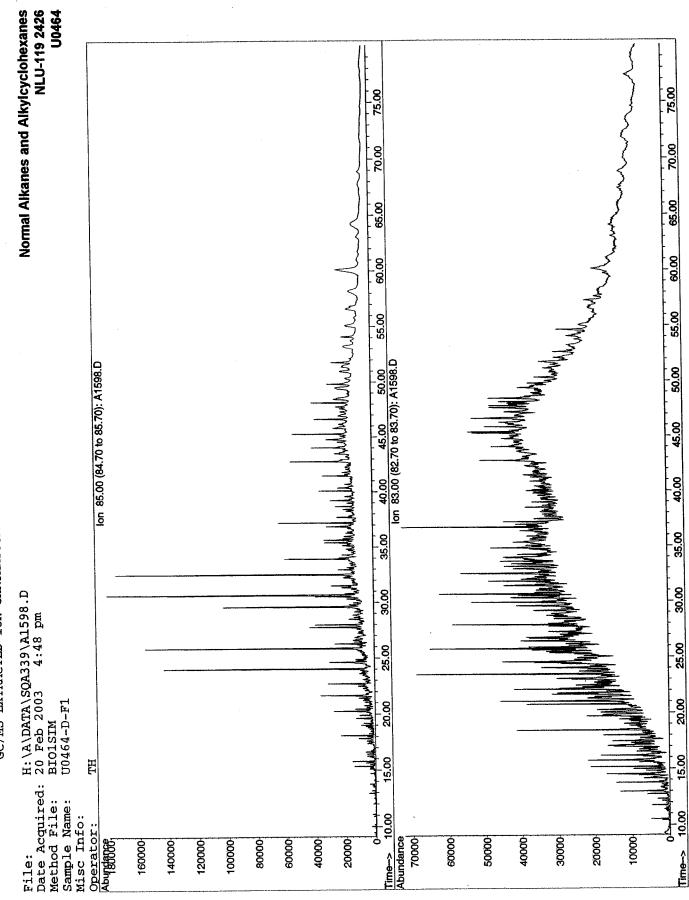




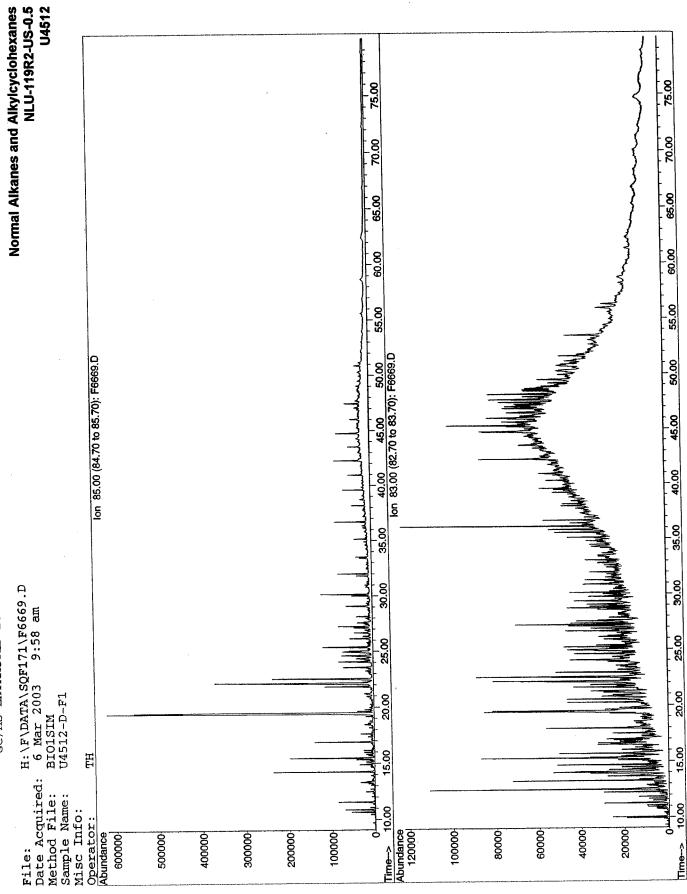


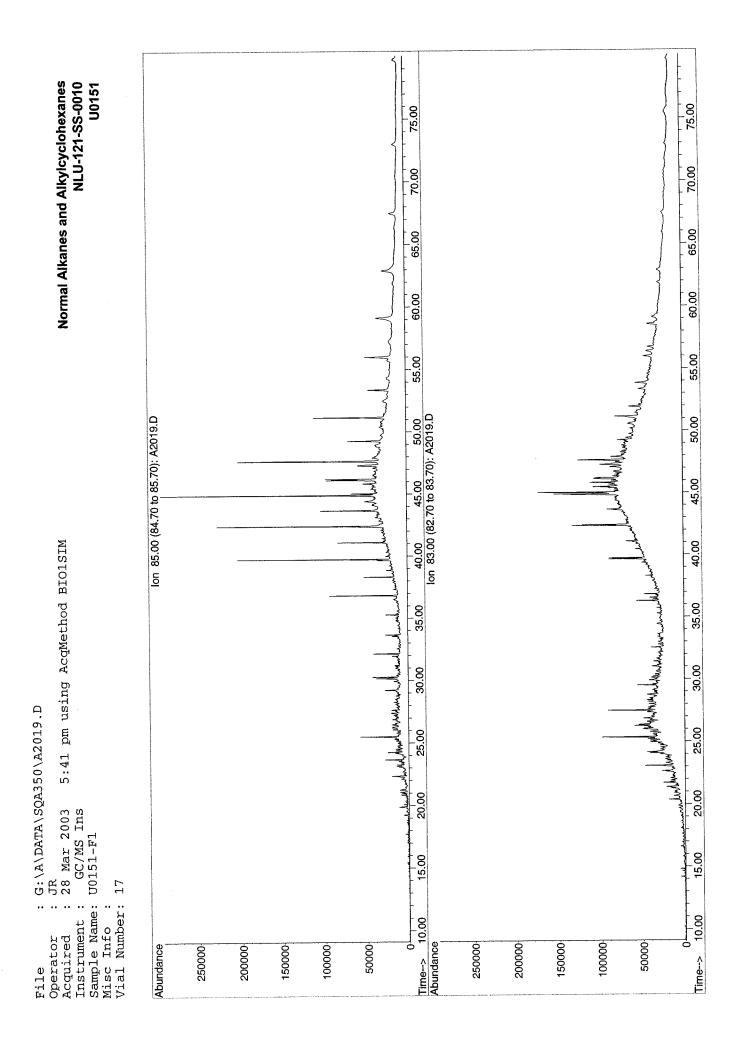


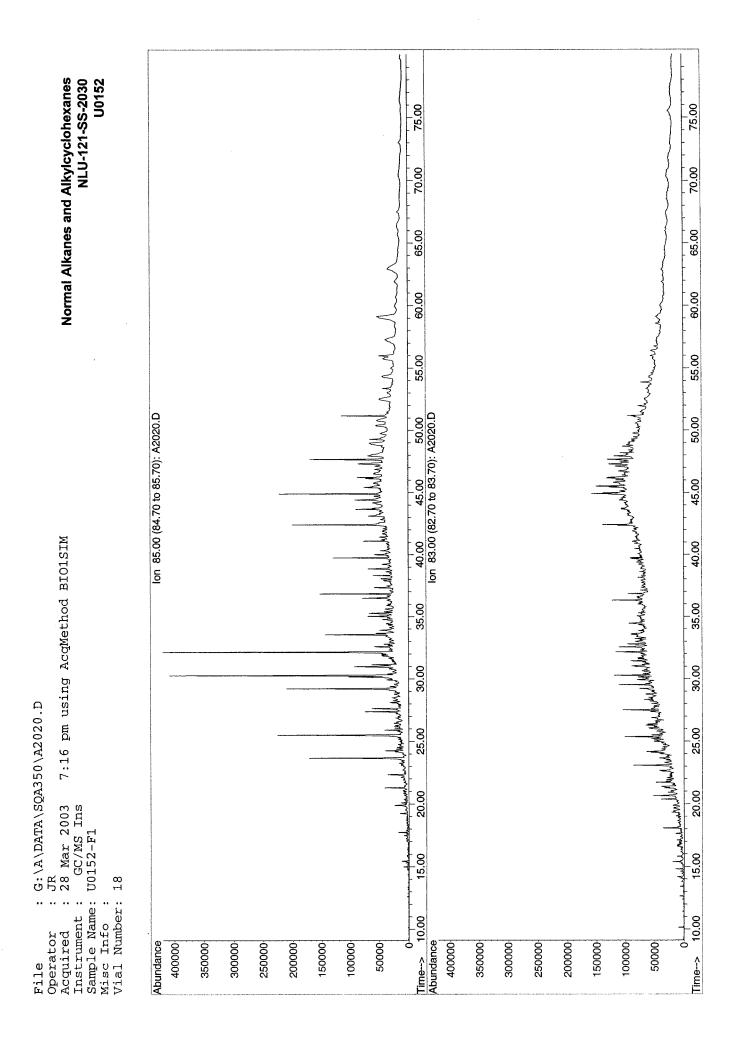


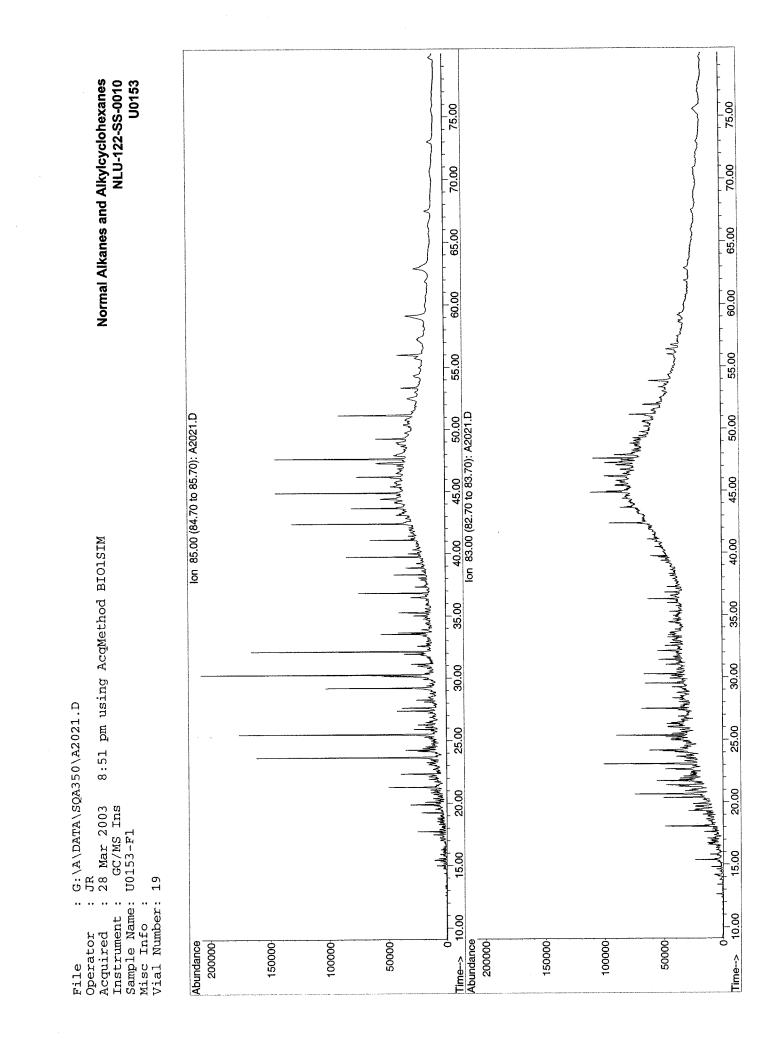


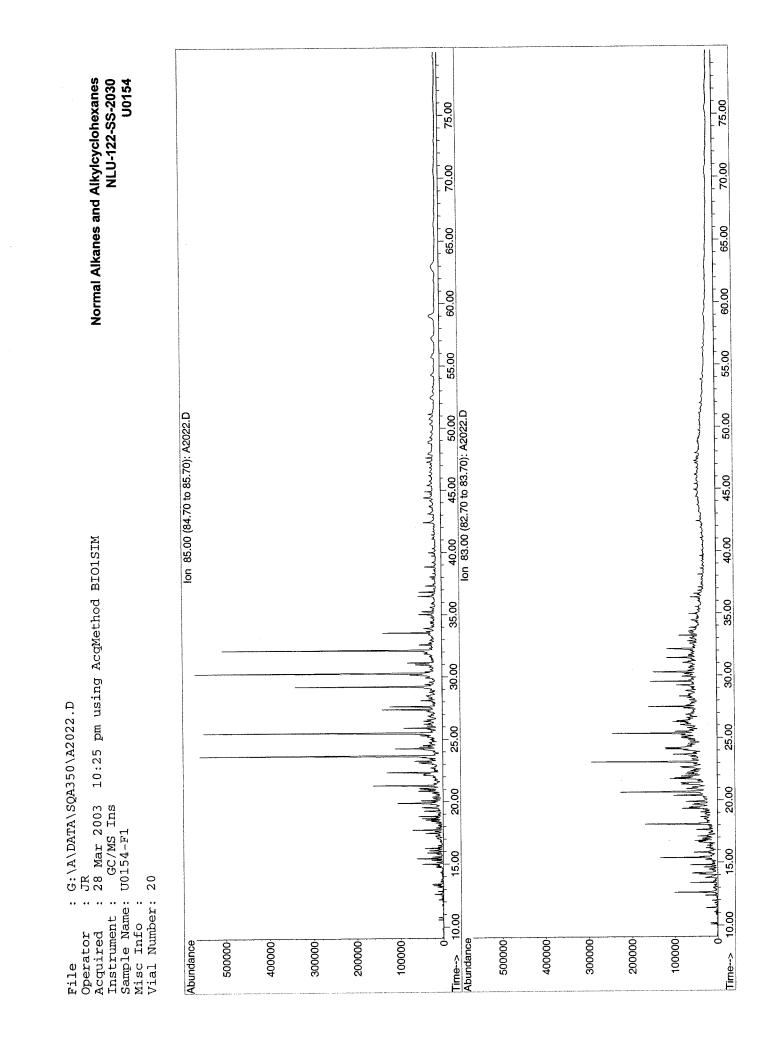


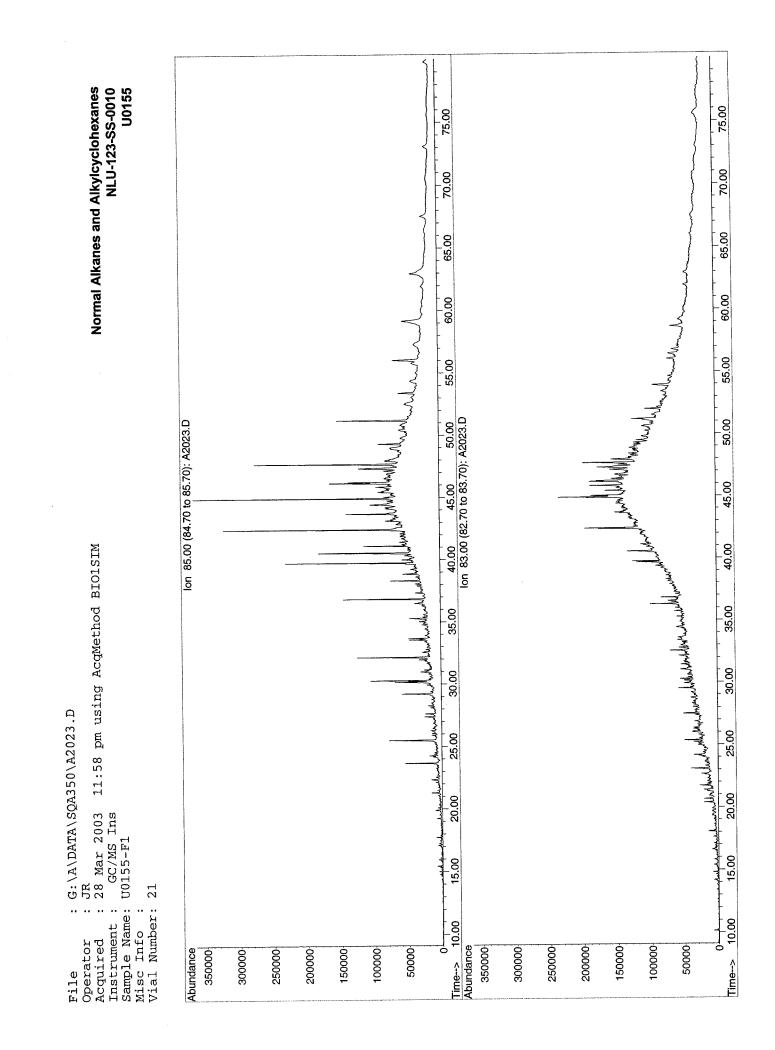


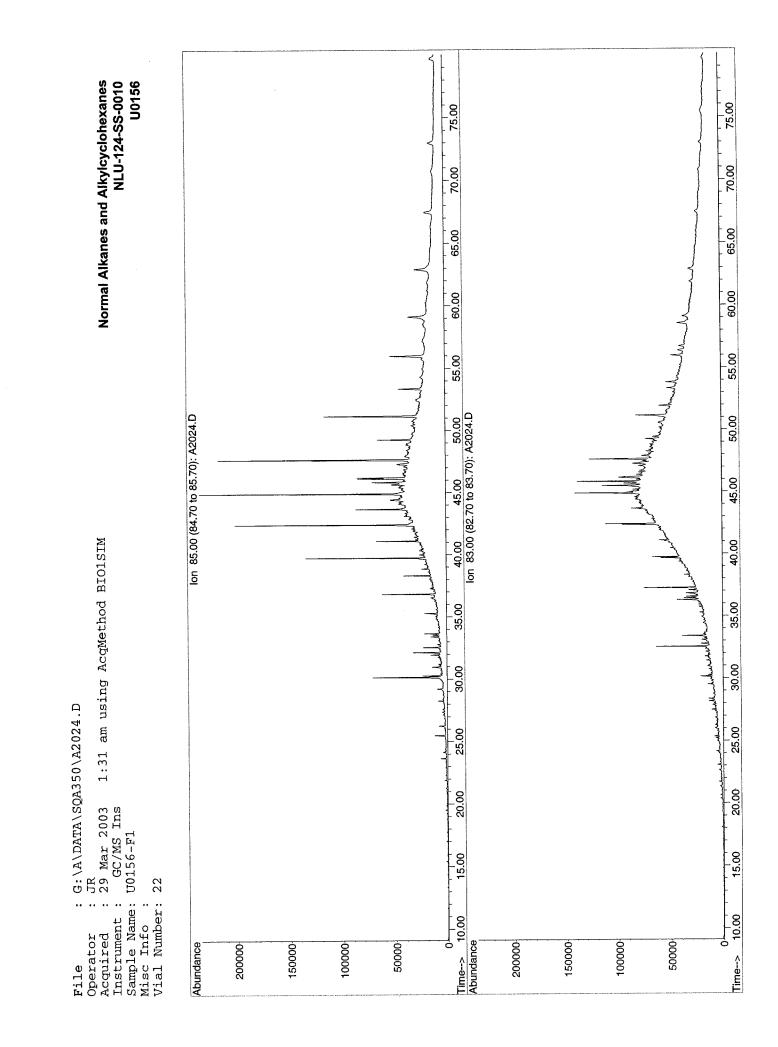


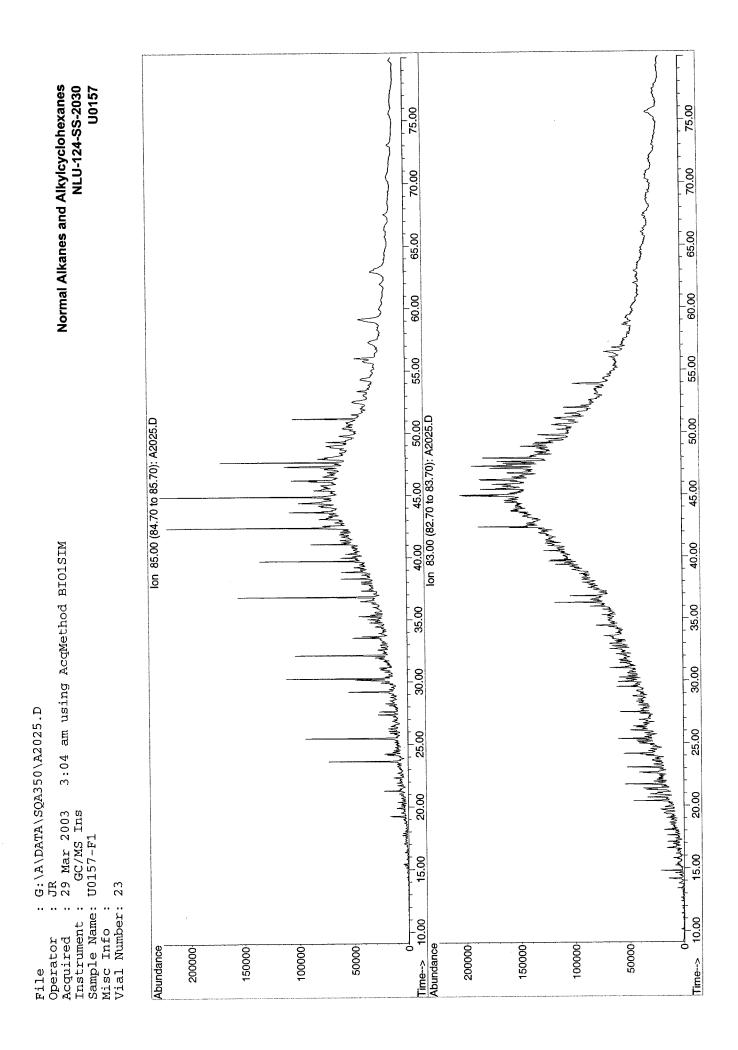


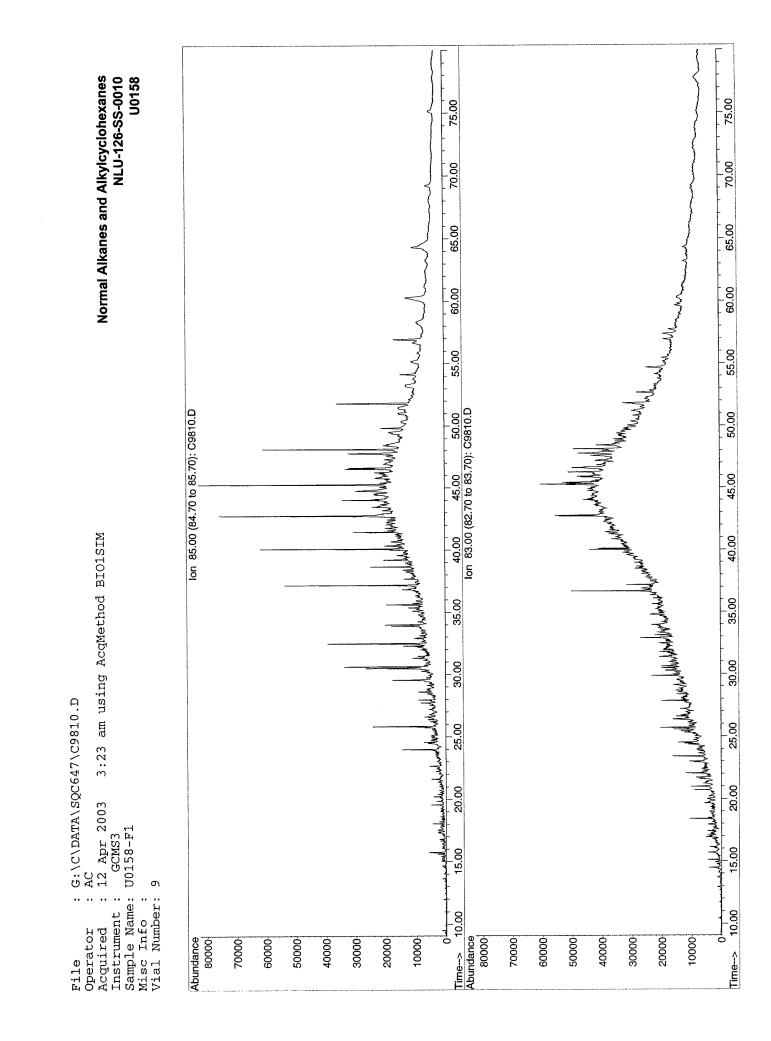




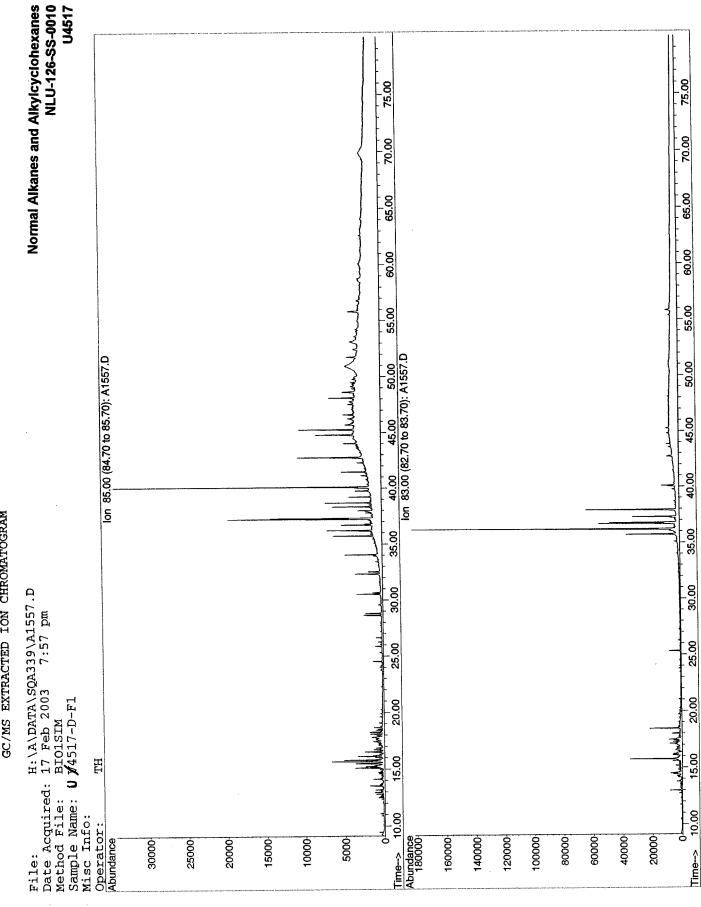




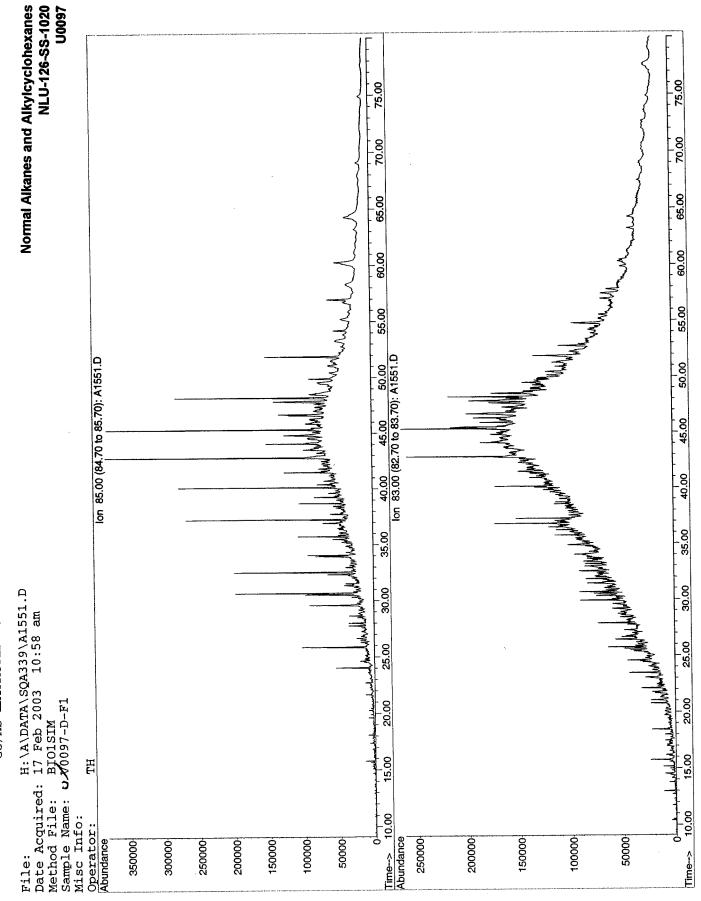


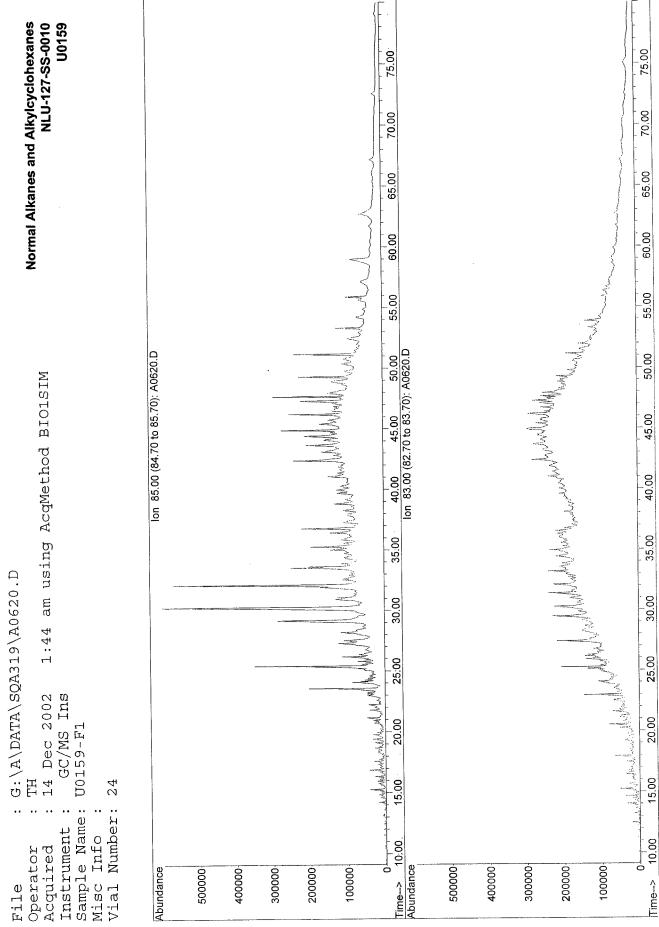


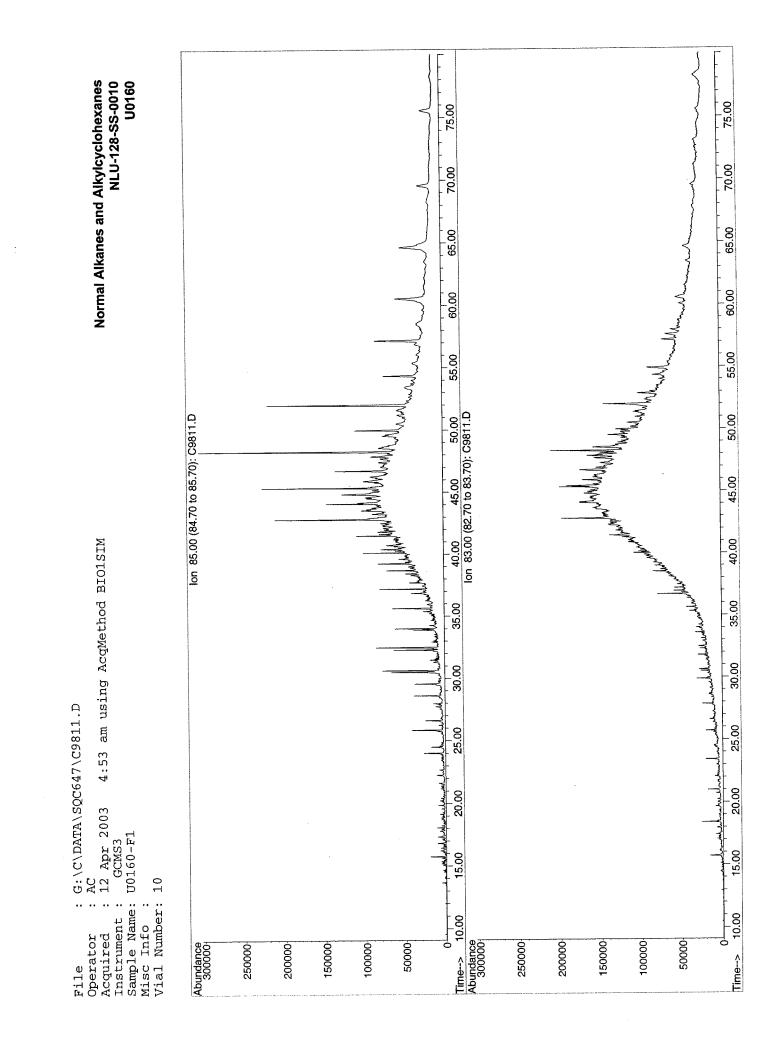




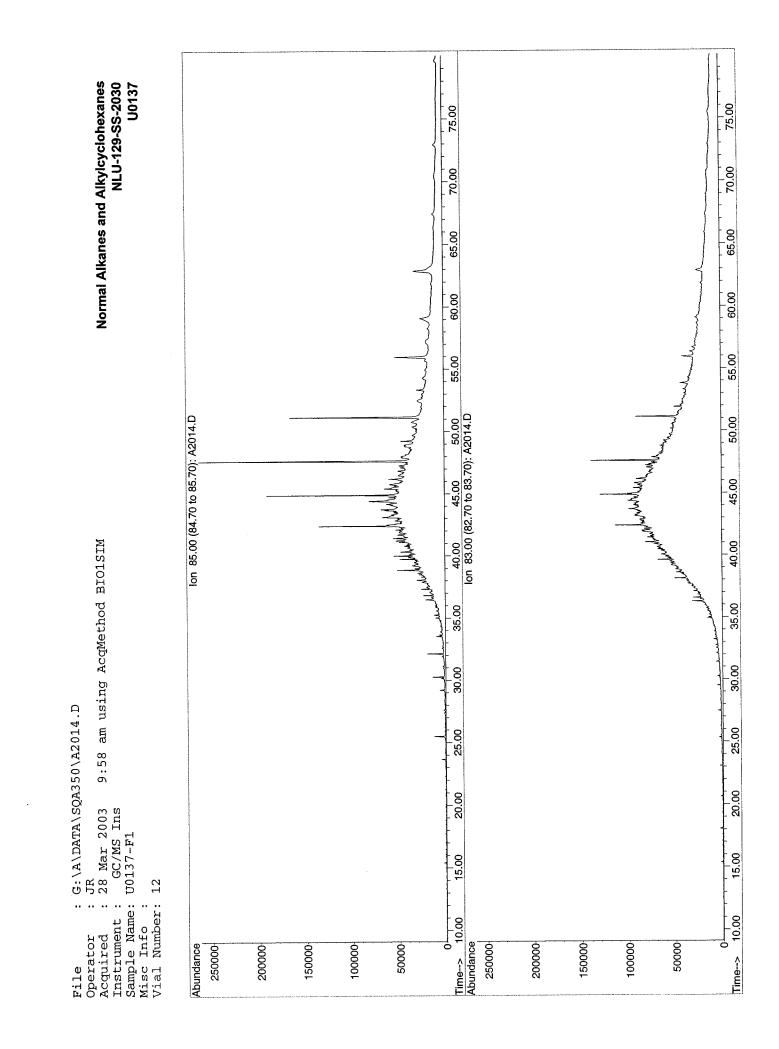


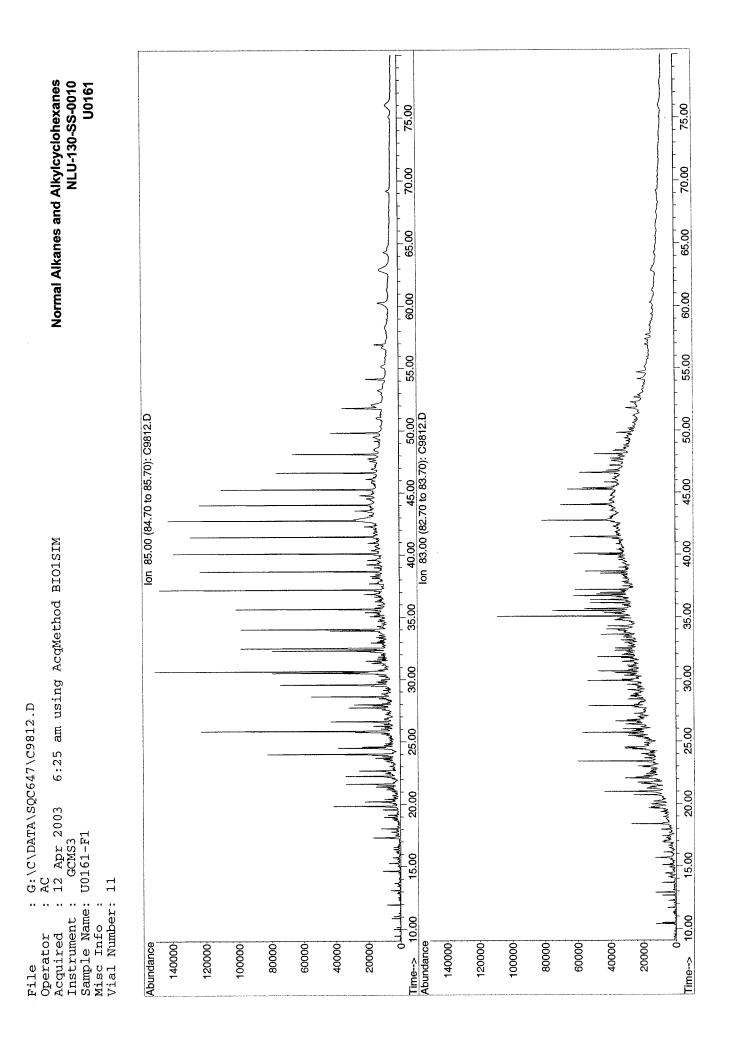




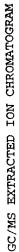


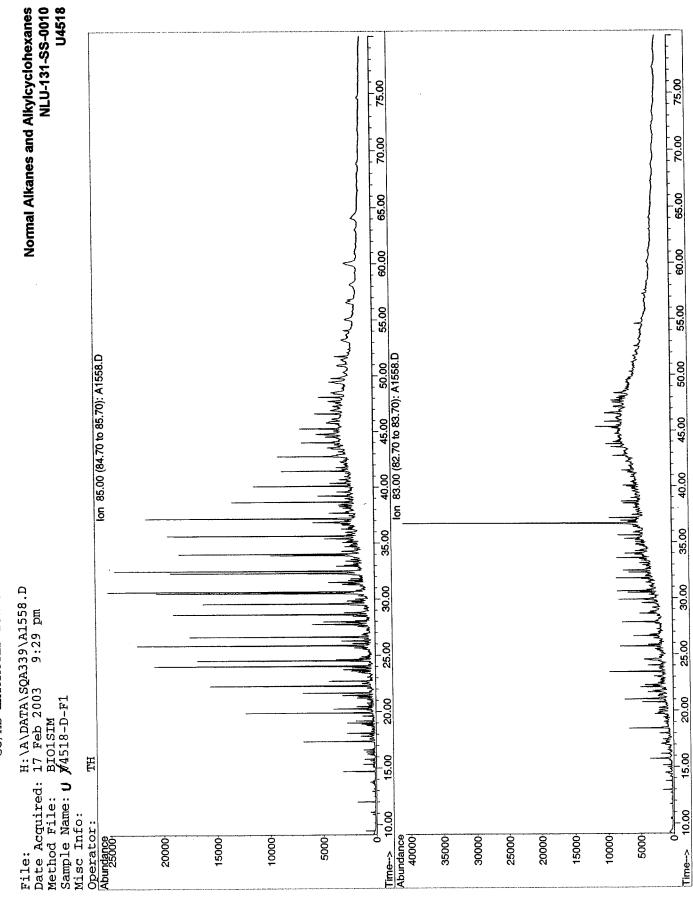
U0135 Normal Alkanes and Alkylcyclohexanes NLU-129-SS-0010 75.00 75.00 70,00 70,00 65.00 65.00 60.00 60.00 55.00 55.00 lon 85.00 (84.70 to 85.70): A2013.D 50.00 45.00 8:25 am using AcqMethod BI01SIM 40.00 35.00 35.00 30.00 30.00 : G:\A\DATA\SQA350\A2013.D JR JR JR JR Junstrument : GC/MS Ins Sample Name: U0135-F1 Misc Info : Vial Number: 11 25.00 25.00 20.00 20.00 15.00 15.00 10.00 10.00 Time--> 1(Abundance 700000 9 100000 600000 500000 400000 300000 200000 100000 6 700000 600000 500000-400000 300000 200000 Time-->

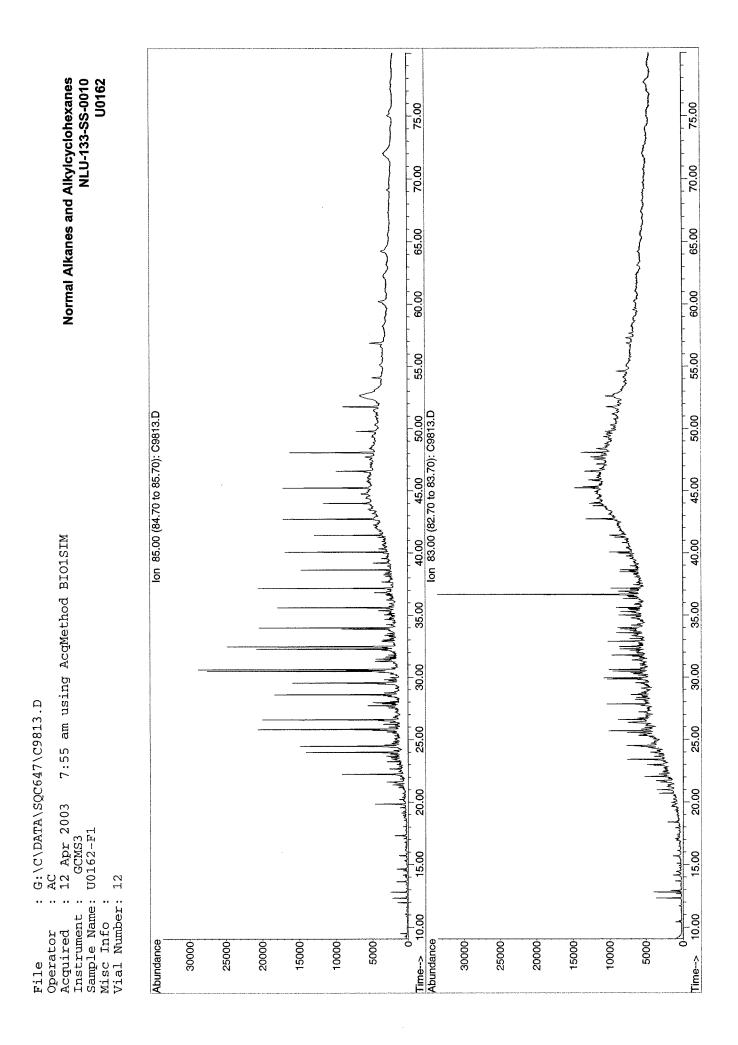


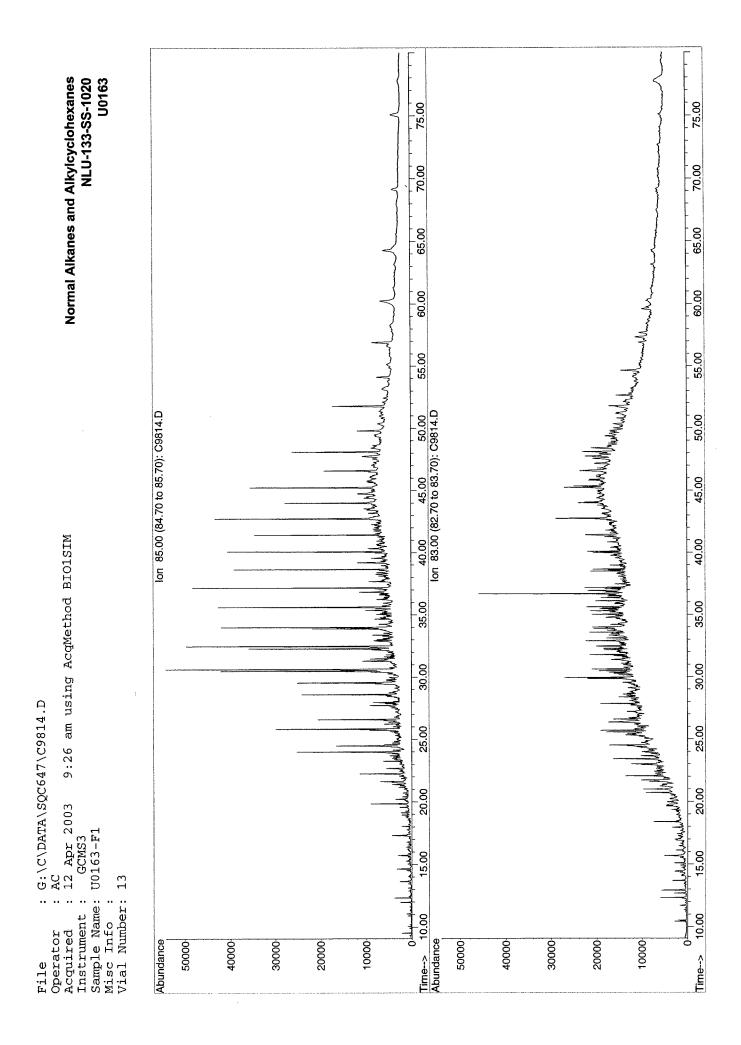


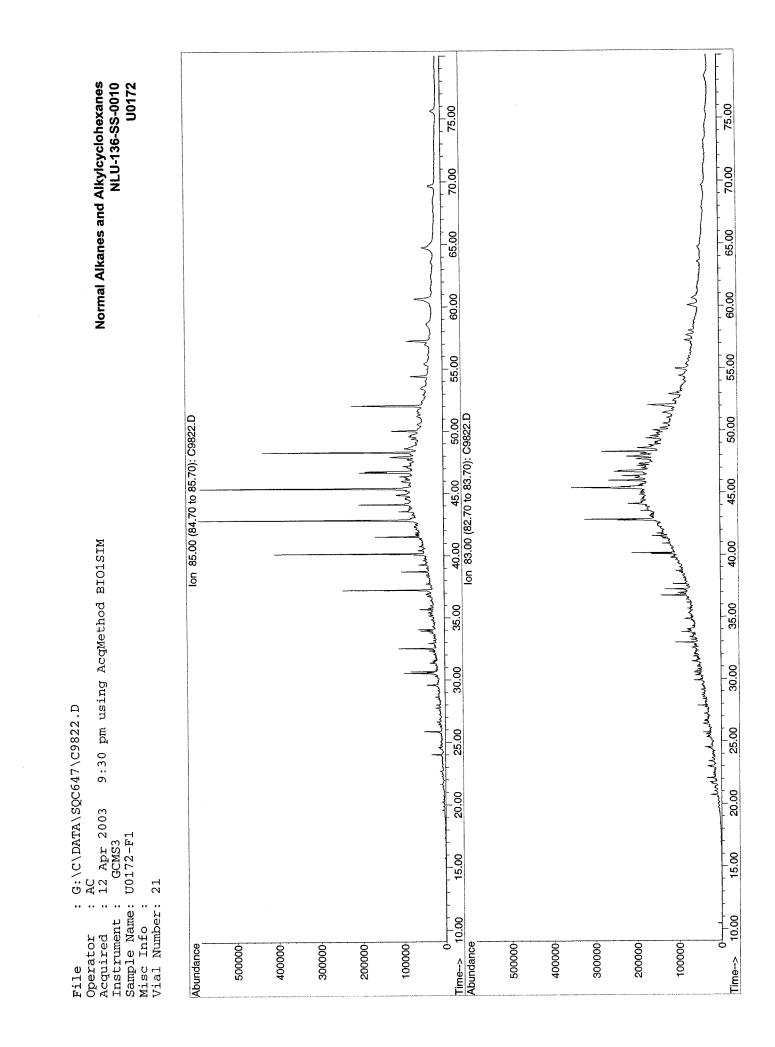




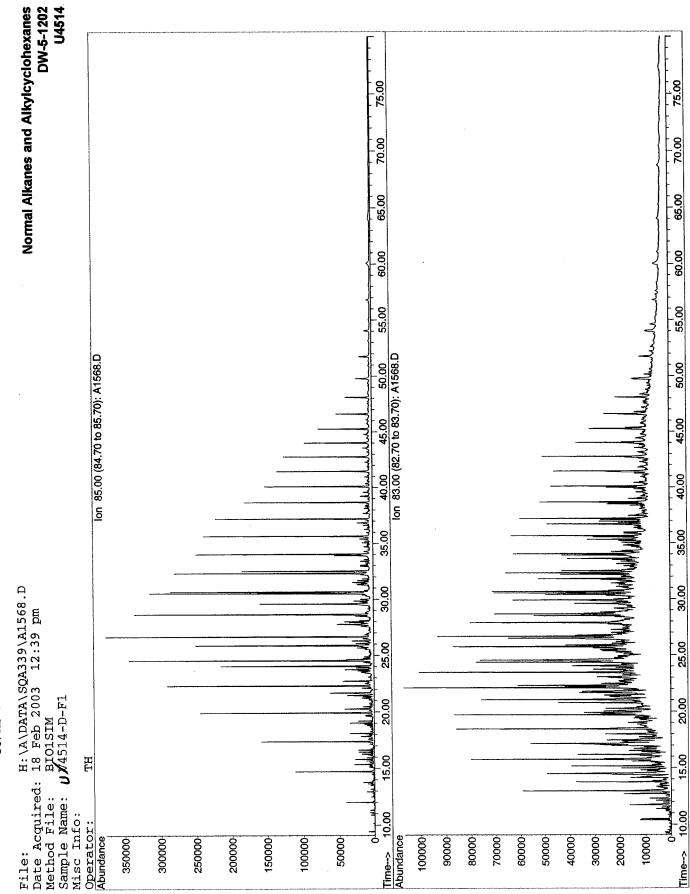






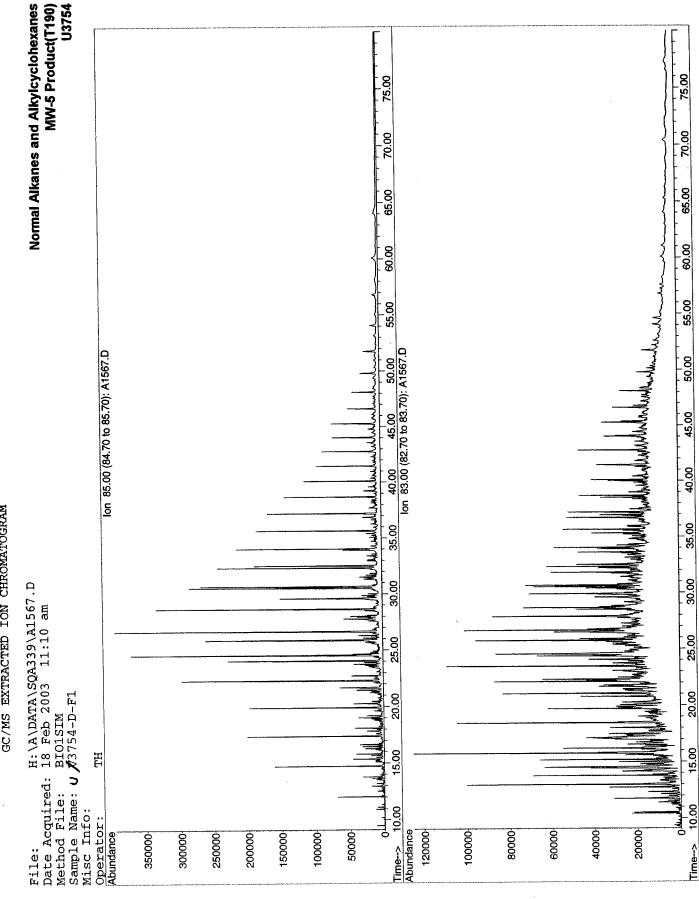




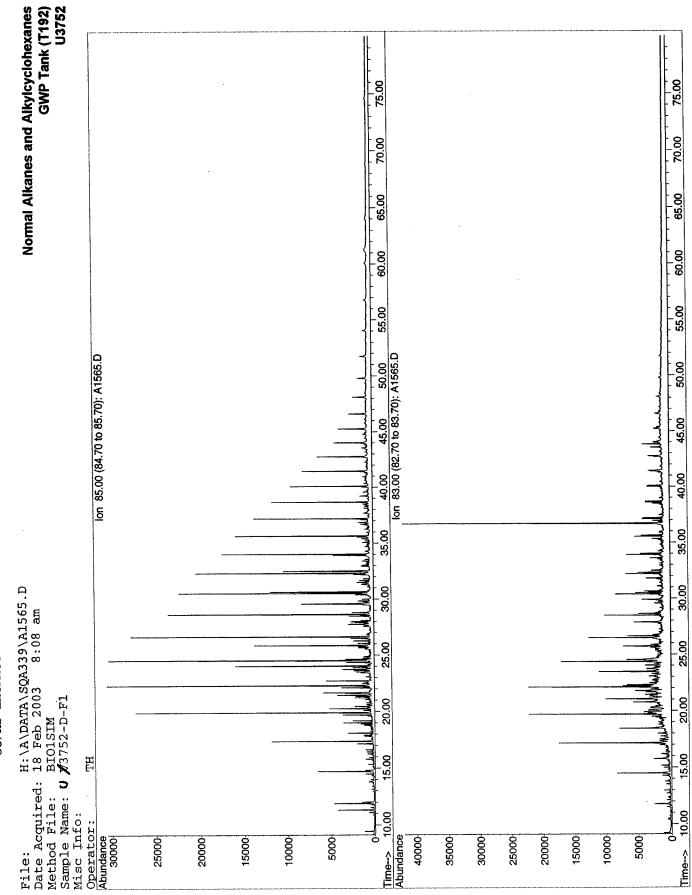




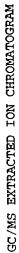


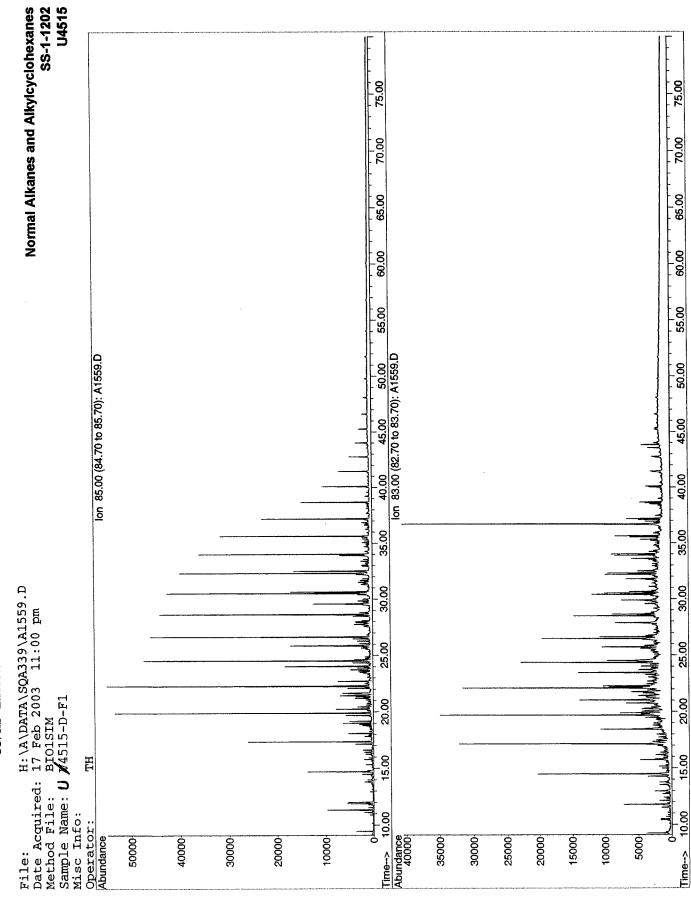




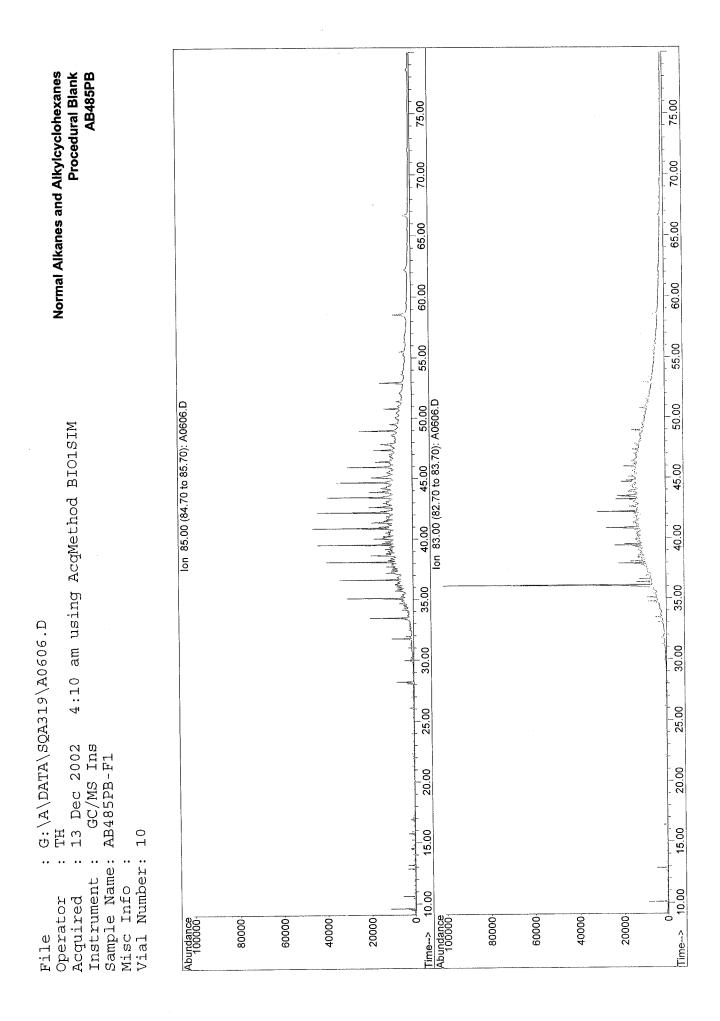








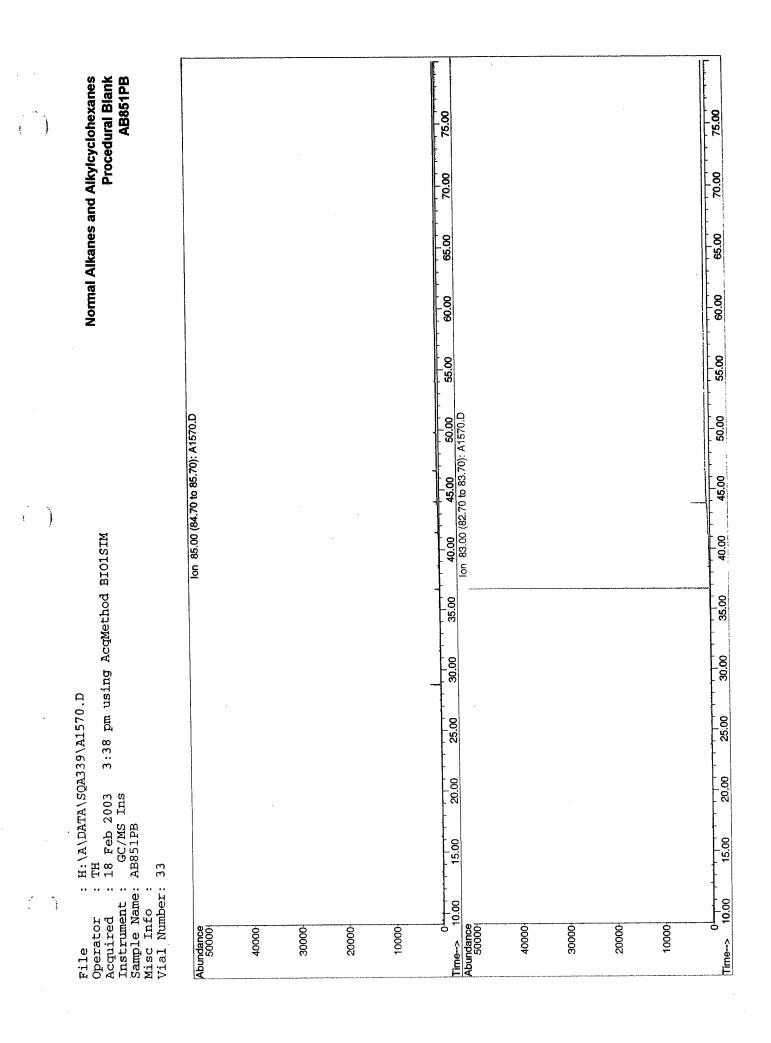
Normal Alkanes and Alkylcyclohexanes Procedural Blank AB484PB							00 65.00 70.00 75.00						00 65.00 70.00 75.00
Nor							60,00						60.00
							55.00						55.00
WIS	: A0605.D						50.00 50.00						50.00
L BIOLSIM	0 to 85.70)						45.00 70 to 83.70						45.00
AcqMethod	Ion 85.00 (84.70 to 85.70): A0605.D						40.00 45.00 50.00 100 83.70): A0605.D						40.00
D using							35.00						35.00
A0605 4 am 1							30.00						30.00
24319\A 2:34							25.00						25.00
G:\A\DATA\SQA319\A0605 TH 13 Dec 2002 2:34 am GC/MS Ins AB484PB-F1 9							20:00						20.00
							15.00						15.00
File :: Operator :: Acquired :: Instrument : Sample Name: Misc Info : Vial Number:	Abundance	100000	80000	60000	4000	20000	0 Time> 10.00 Abundance	100000	80000	60000	40000	20000-	0 <mark></mark>

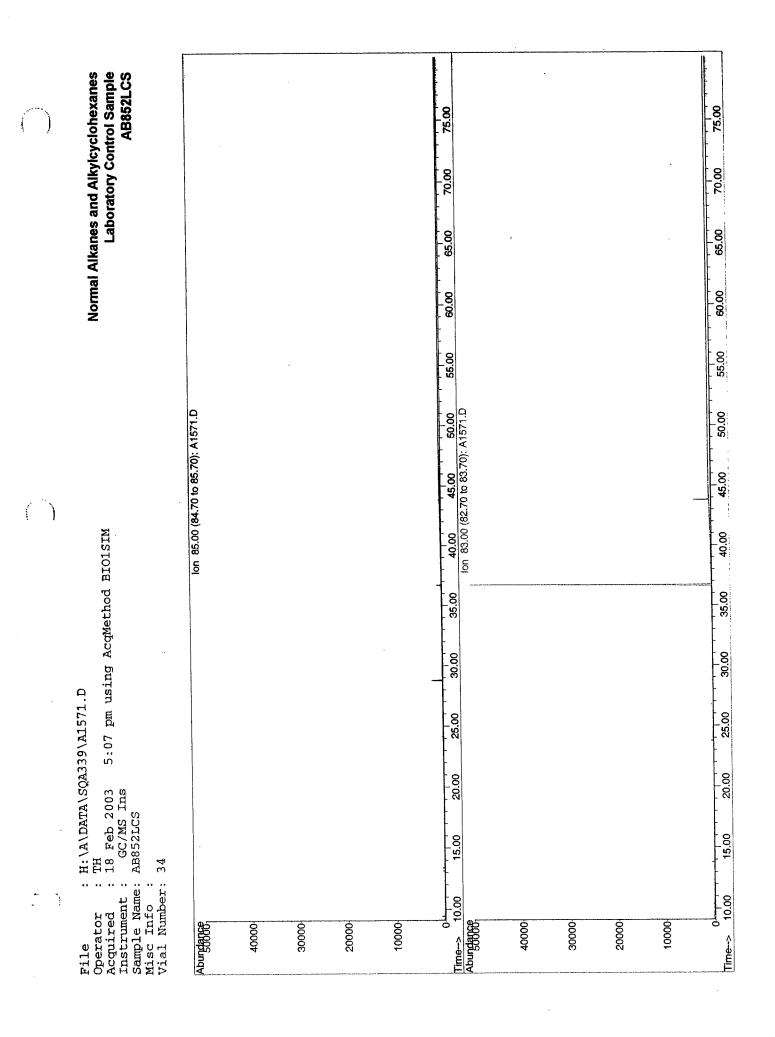


Normal Alkanes and Alkylcyclohexanes Procedural Blank AB489PB						60.00 65.00 70.00 75.00					60.00 65.00 70.00 75.00
						55.00					55.00
MIS.); A0627.D					50.00 50.00)): A0627.D					50.00
bd BIOLSIM	4.70 to 85.70					40.00 45.00 50.00 10n 83.00 (82.70 to 83.70): A0627.D					45.00
AcqMethod	lon 85.00 (84.70 to 85.70): A0627.D					40.00 lon 83.00 (8					40.00
627.D pm using A						35.00					35.00
A0627. 58 pm u						30.00					30.00
SQA319\A(2 12:58 s						25.00					25.00
G:\A\DATA\SQA319\A0627 TH 14 Dec 2002 12:58 pm GC/MS Ins AB489PB-F1 31						20:00					20.00
: G:\A\DA : TH : TH : 14 Dec : GC/MS : AB489PB : AB489PB : 31						15.00					15.00
File : Operator : Acquired : Instrument : Sample Name: Misc Info : Vial Number:	Abundance	40000	30000-	20000	1 0000	0 4 1, -, -, -, -, -, -, -, -, -, -, -, -, -,	40000-	30000	50000	10000	0 Time> 10.00

Laboratory Control Sample AB490LCS Normal Alkanes and Alkylcyclohexanes 75.00 75.00 70,00 70,00 65.00 65.00 60,00 60.00 55.00 55.00
 40.00
 45.00
 50.00

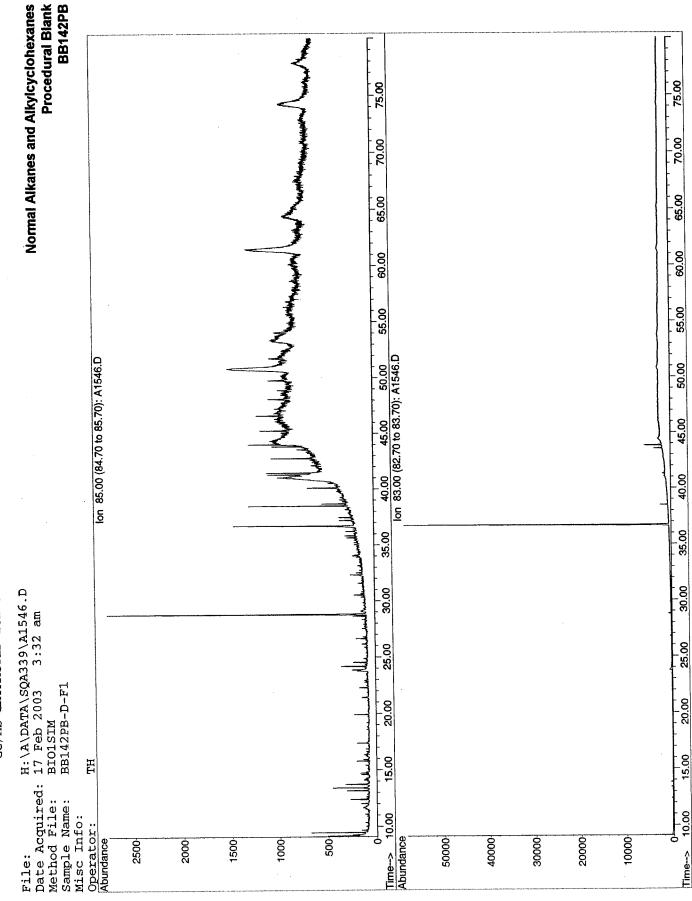
 lon
 83.00 (82.70 to 83.70); A0628.D
 lon 85.00 (84.70 to 85.70): A0628.D 50.00 2:33 pm using AcqMethod BIO1SIM 45.00 40.00 35.00 35,00 G:\A\DATA\SQA319\A0628.D TH 30.00 30,00 25.00 25.00 14 Dec 2002 GC/MS Ins Sample Name: AB490LCS-F1 20.00 20,00 Misč Info : Vial Number: 32 15.00 15.00 Instrument 10.00 10,00 Acquired Operator 2 0 Time 1(Abundance 10000 40000 30000-20000-40000-30000-20000-10000 Abundance File Time-->



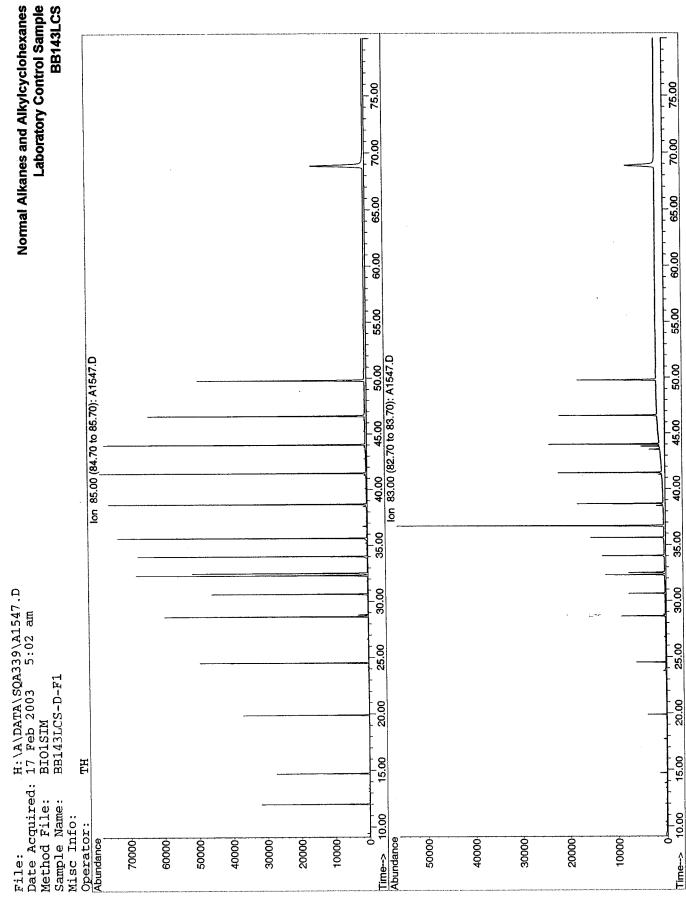






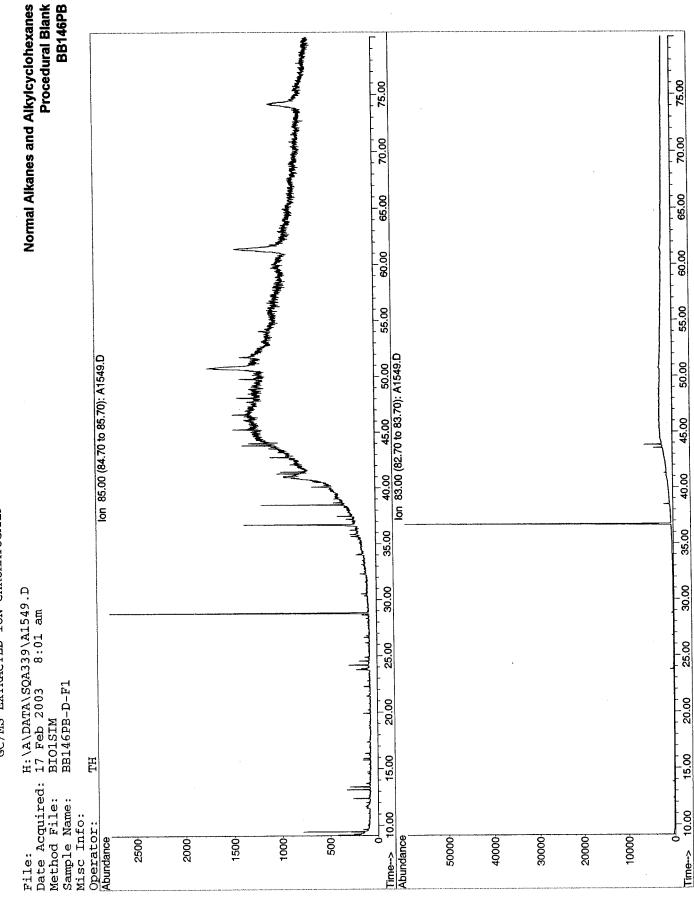


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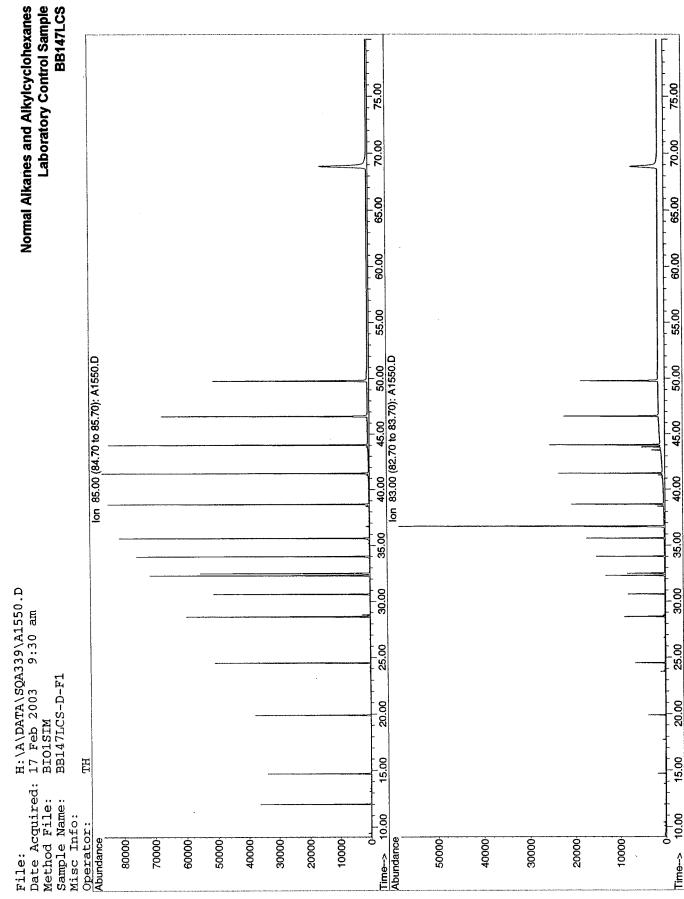






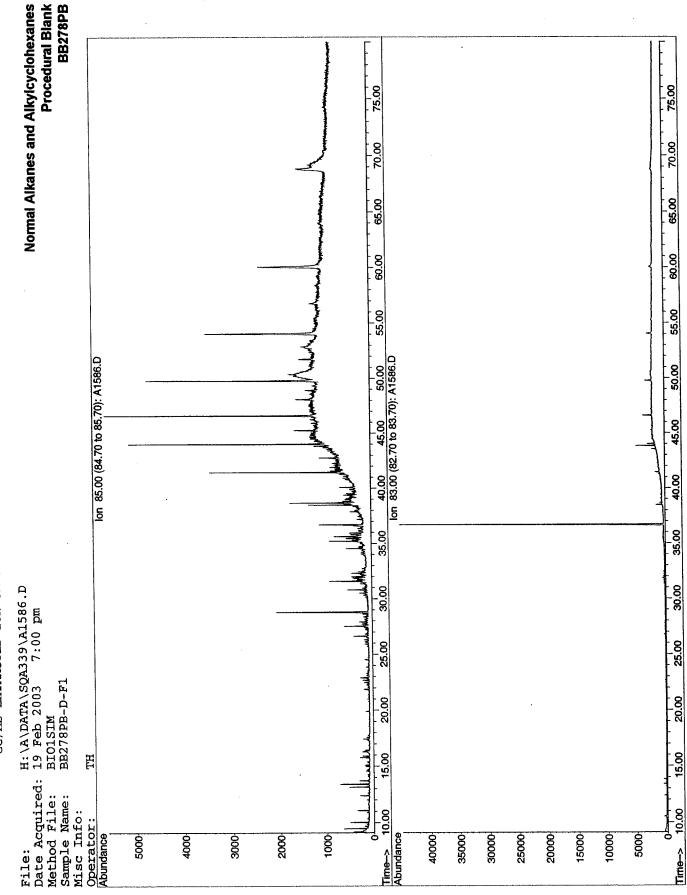




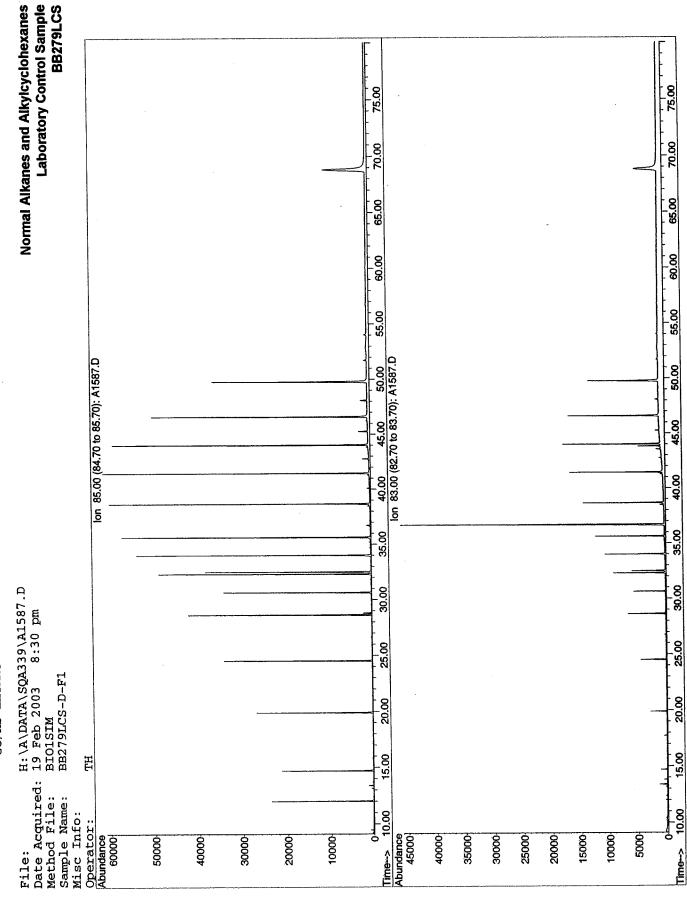






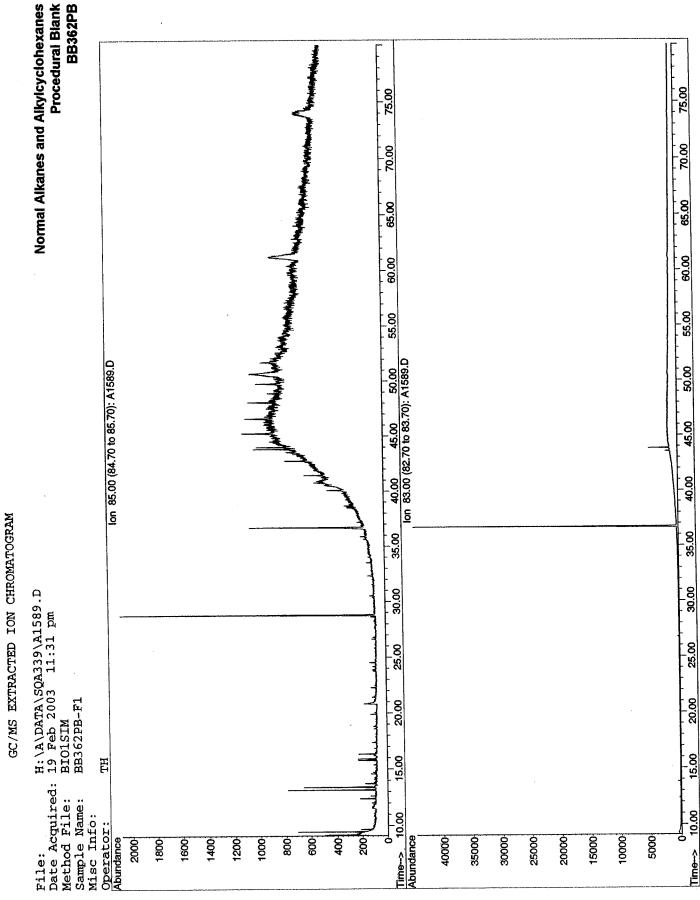


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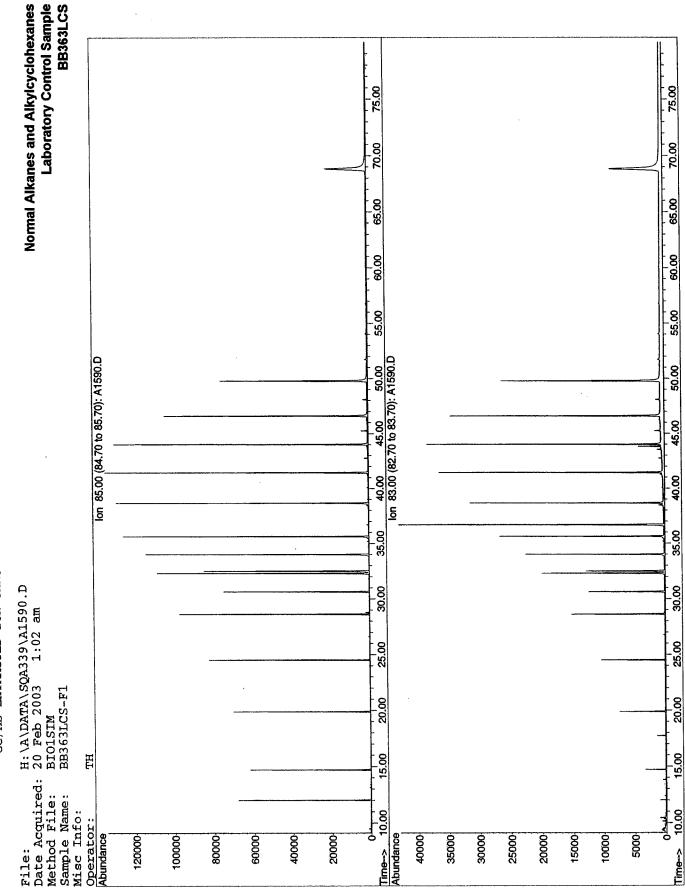


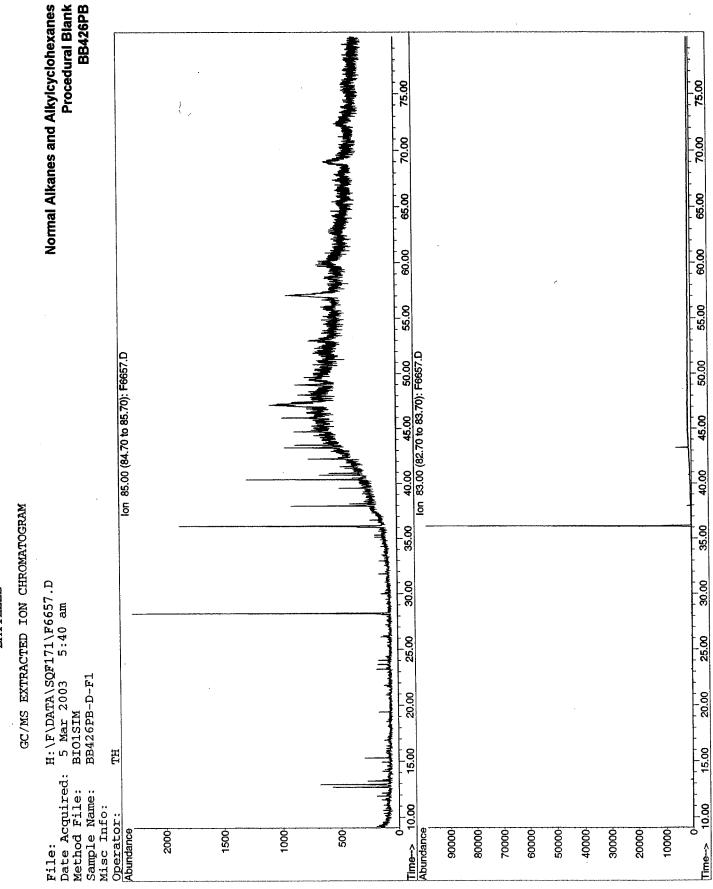








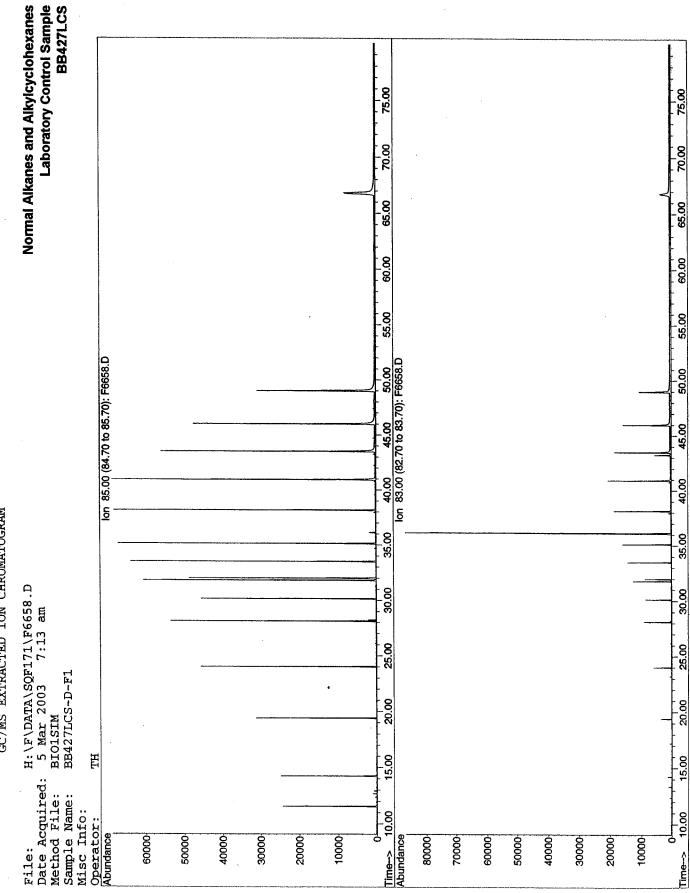






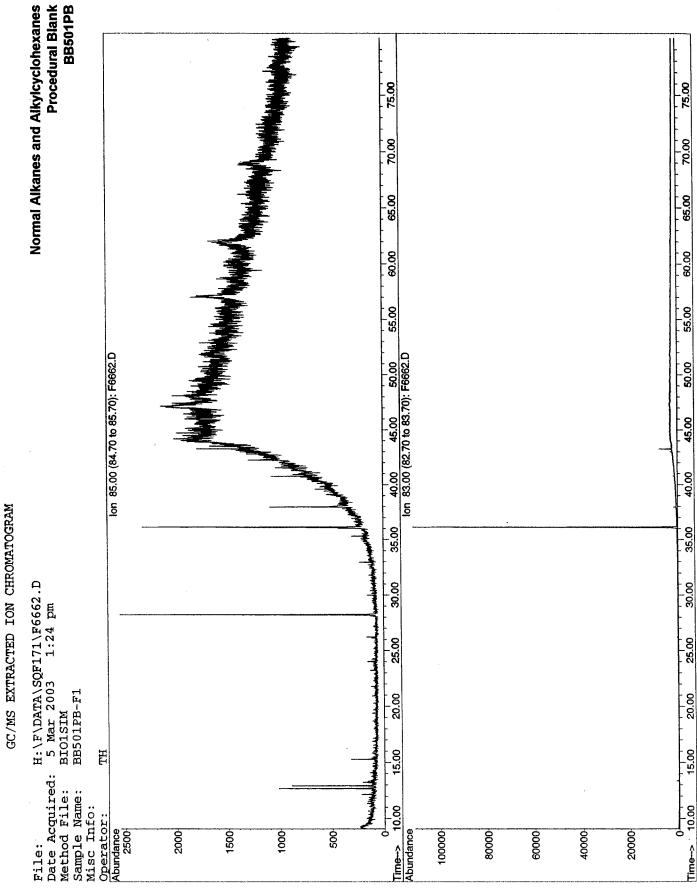




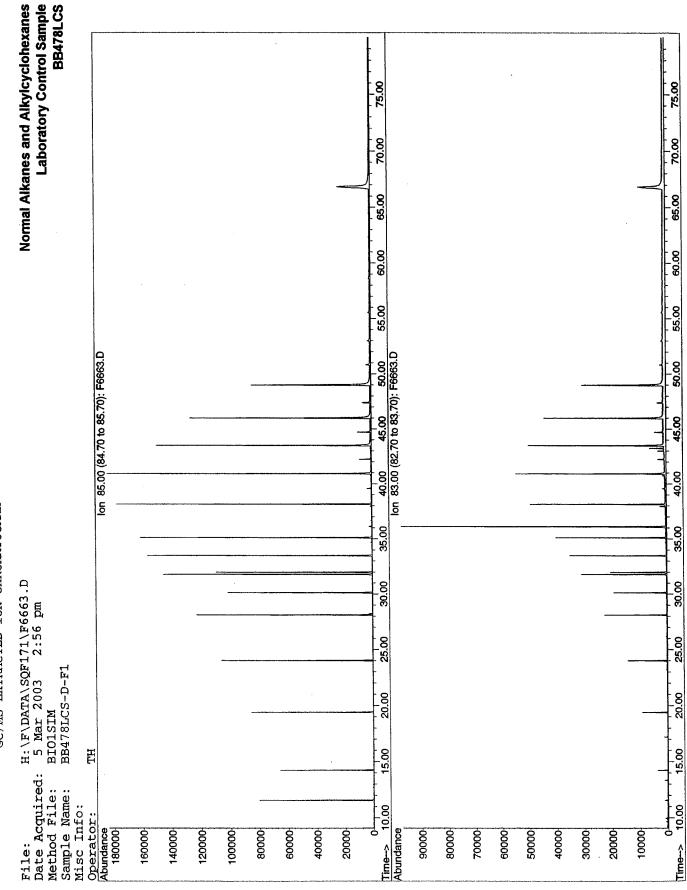






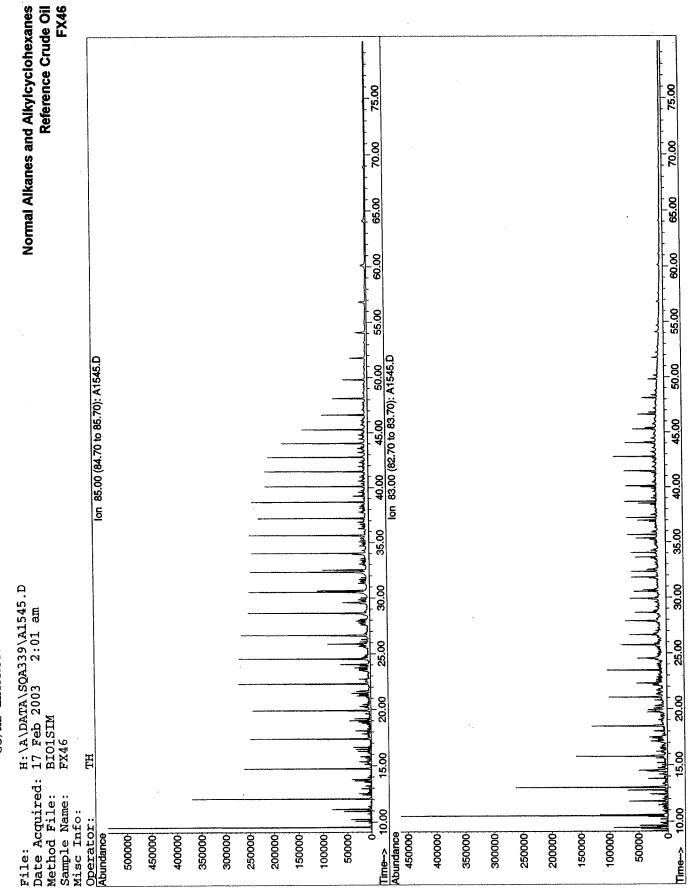


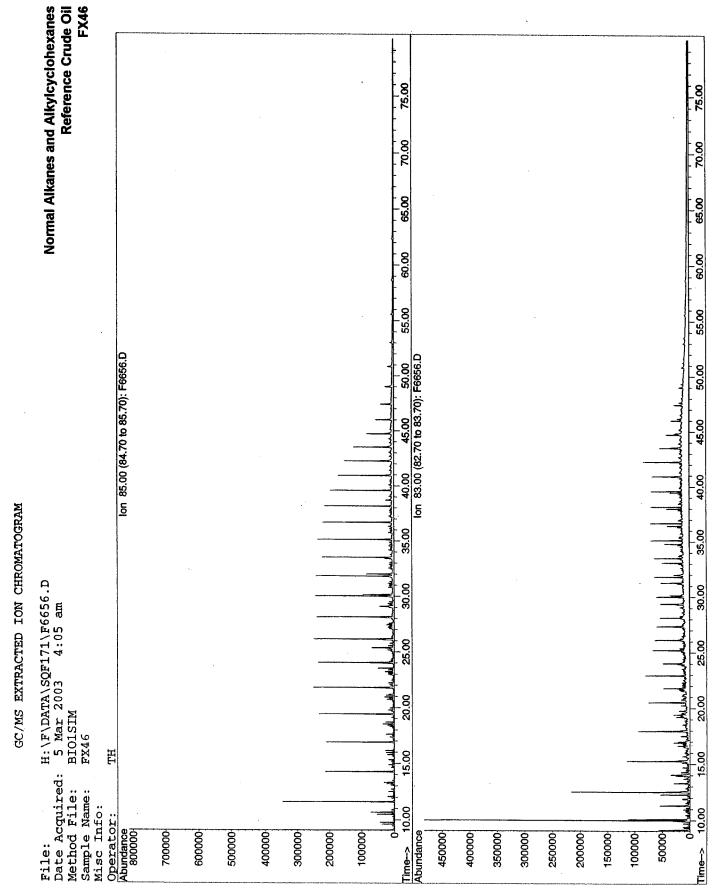




FX46 Normal Alkanes and Alkylcyclohexanes **Reference Crude Oil** 75.00 75.00 70,00 70,00 65.00 65.00 60.00 60.00 55.00 55.00 Ion 85.00 (84.70 to 85.70): A0603.D 40.00 45.00 50.00 lon 83.00 (82.70 to 83.70): A0603.D 50.00 11:23 pm using AcqMethod BI01SIM 45.00 ואטלאט الربيمار بالريغيا المنابل المنابسة سالمانية إسالا لمنها المنابلان المنابلان 40.00 35.00 35.00 G:\A\DATA\SQA319\A0603.D TH 30.00 30.00 1 W 25.00 25,00 12 Dec 2002 GC/MS Ins FX46 NSC i i i 20.00 20.00 Are of Ŕ ALL M 15.00 15.00 5 Misc Info : Vial Number: Sample Name: Instrument 10.00 Operator 10.00 Acquired 0 IL H L 600000 200000 1200000 800000 400000 Abundance 1400000 1000000 400000 200000-Abundance 800000 600000 1400000 1000000 1200000 File Time--> Time-->

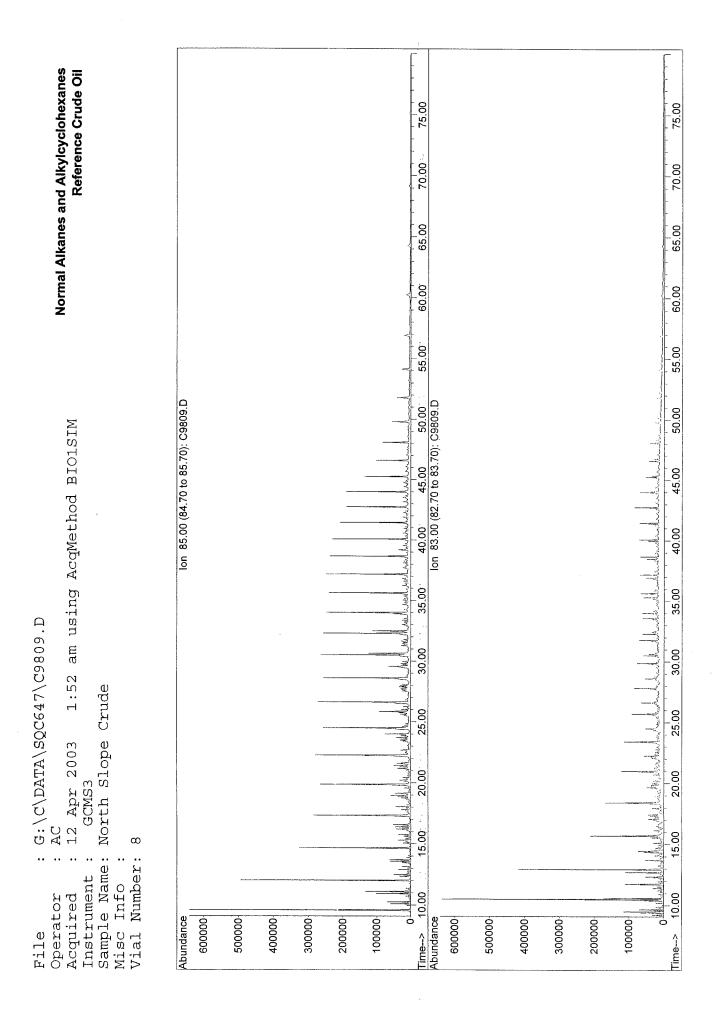


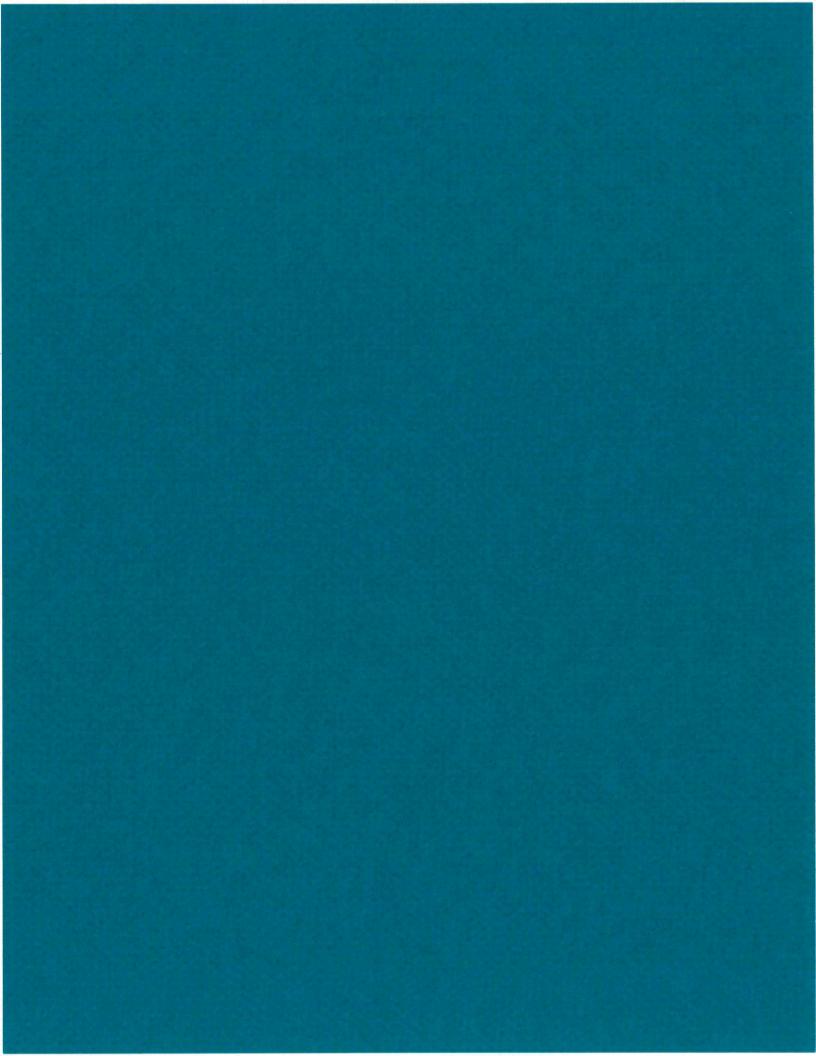


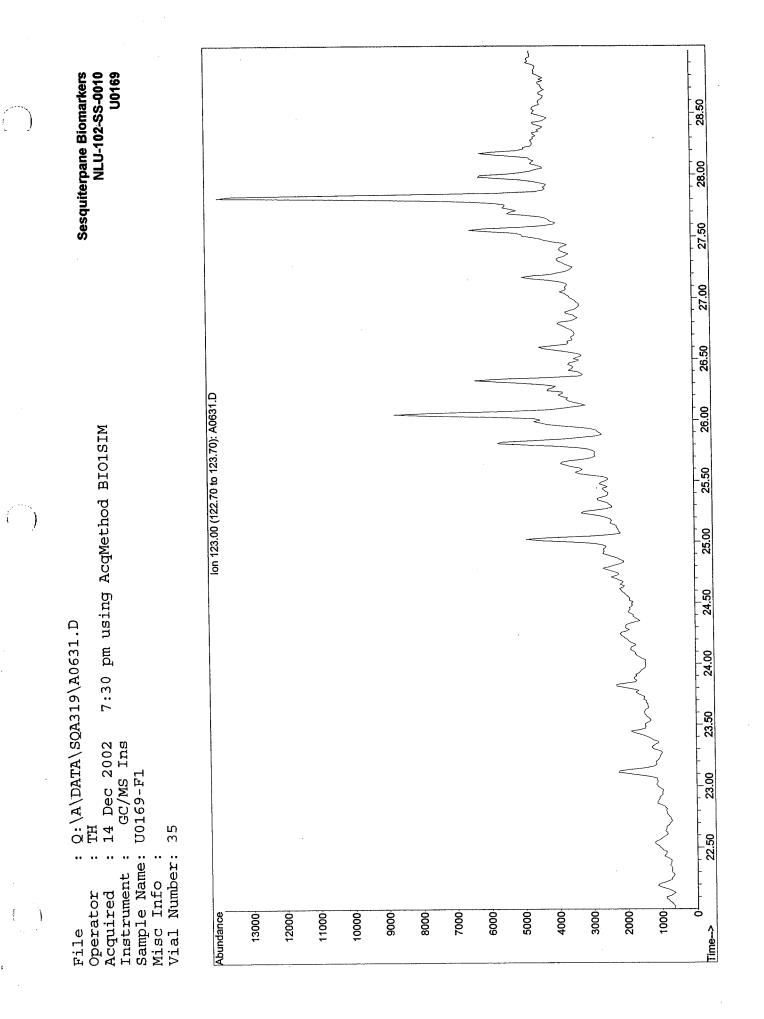


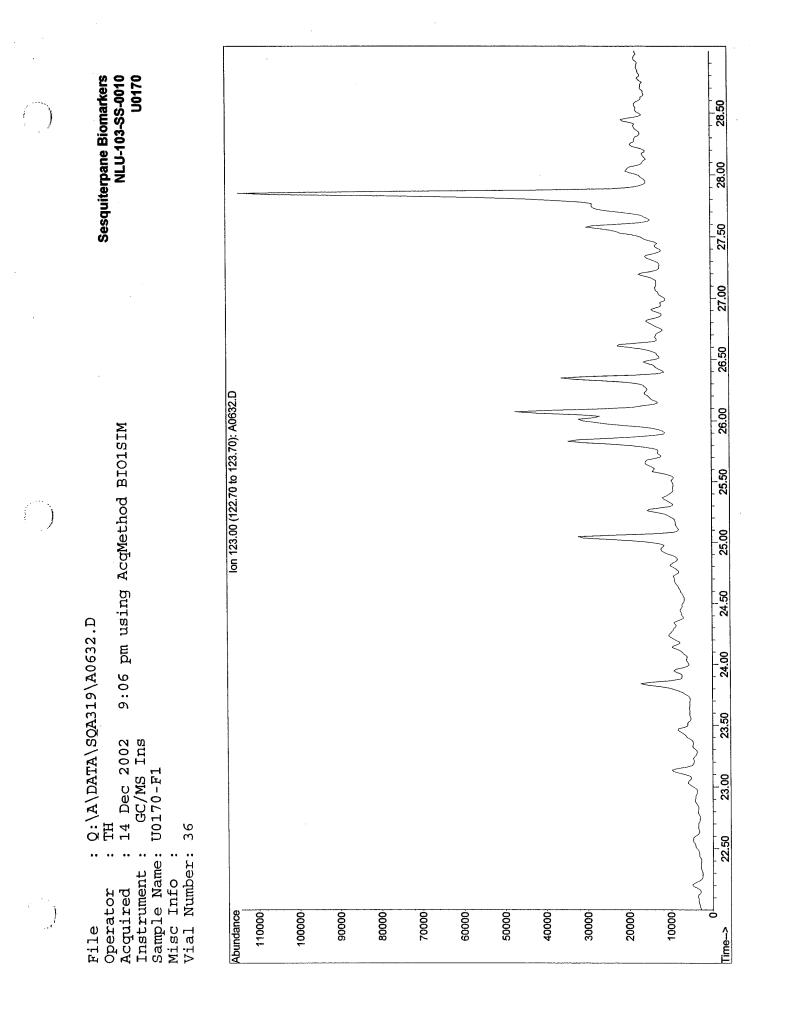
Reference Crude Oil

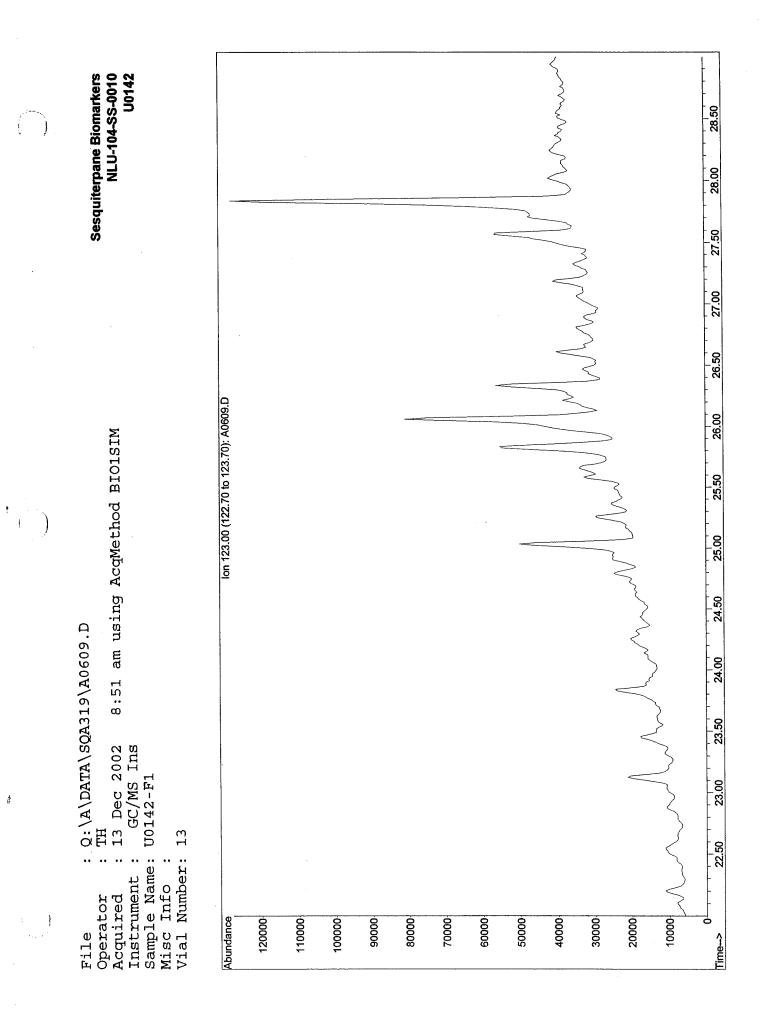
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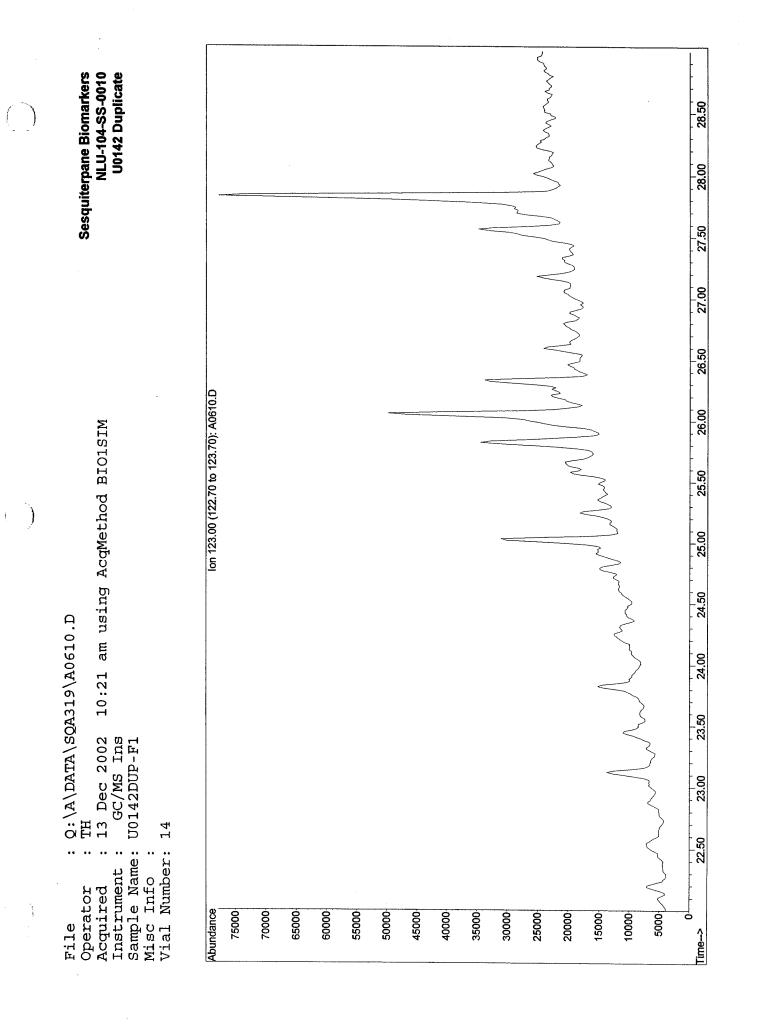


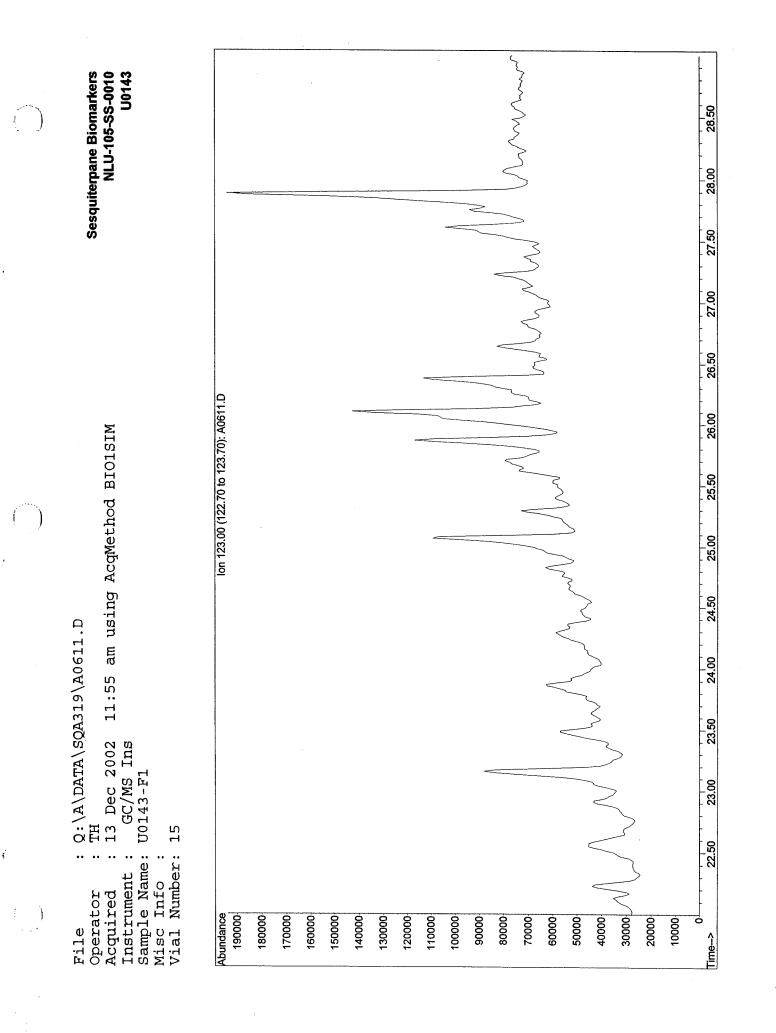


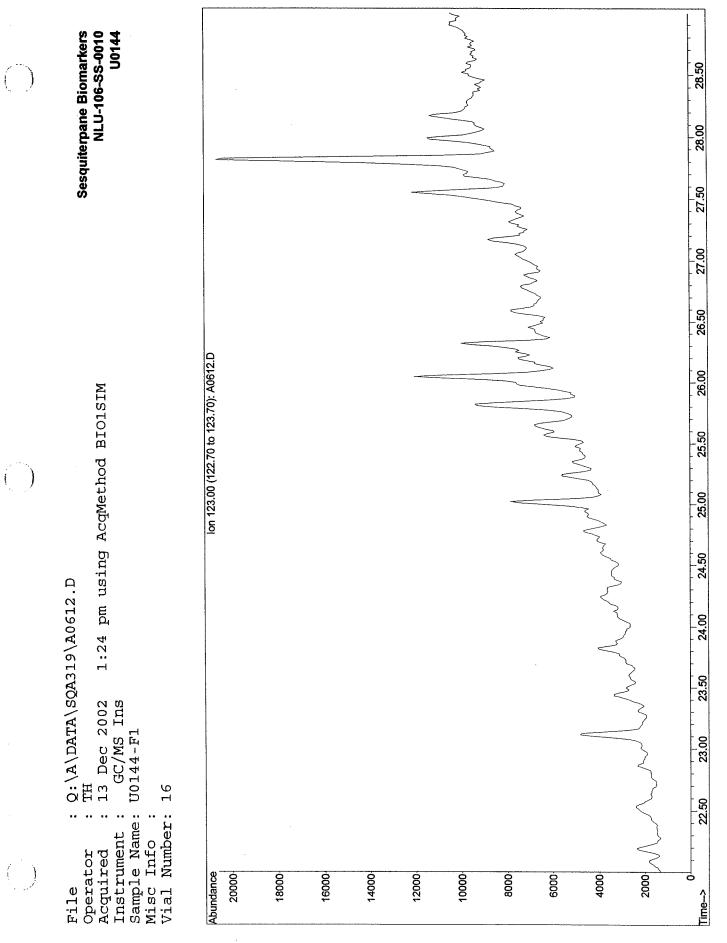


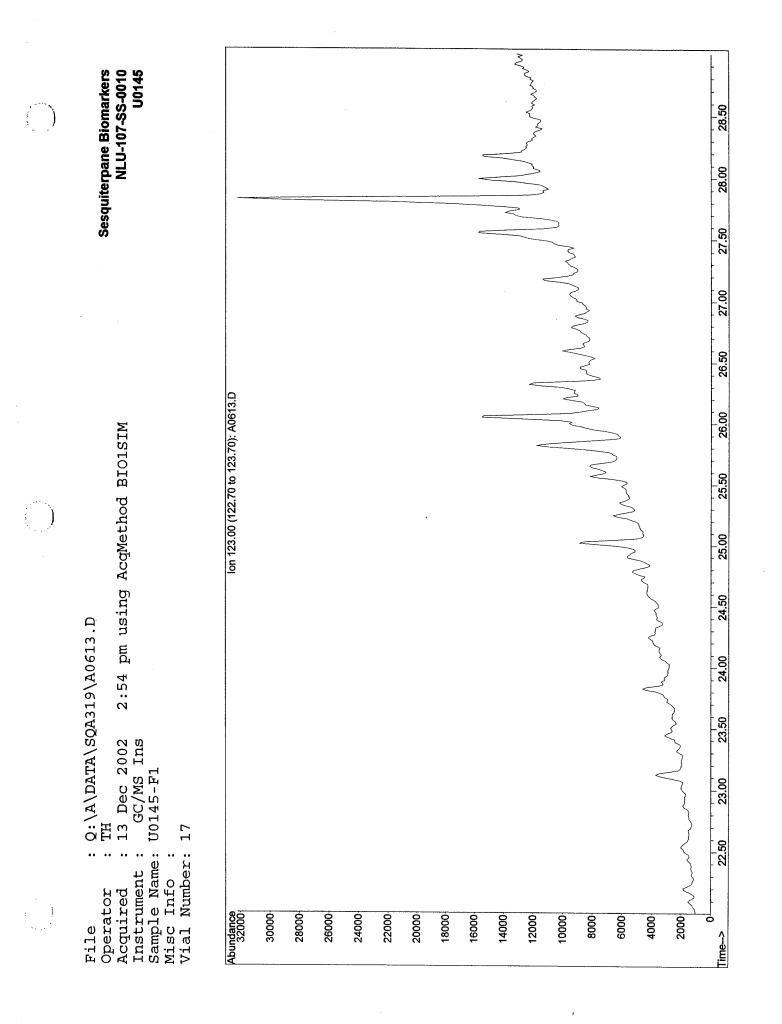


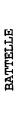


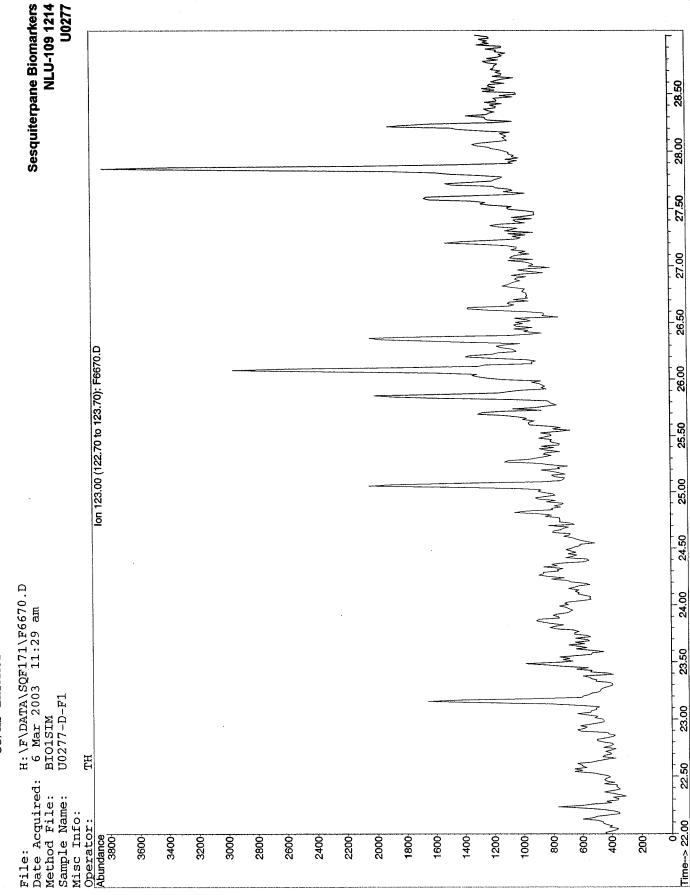


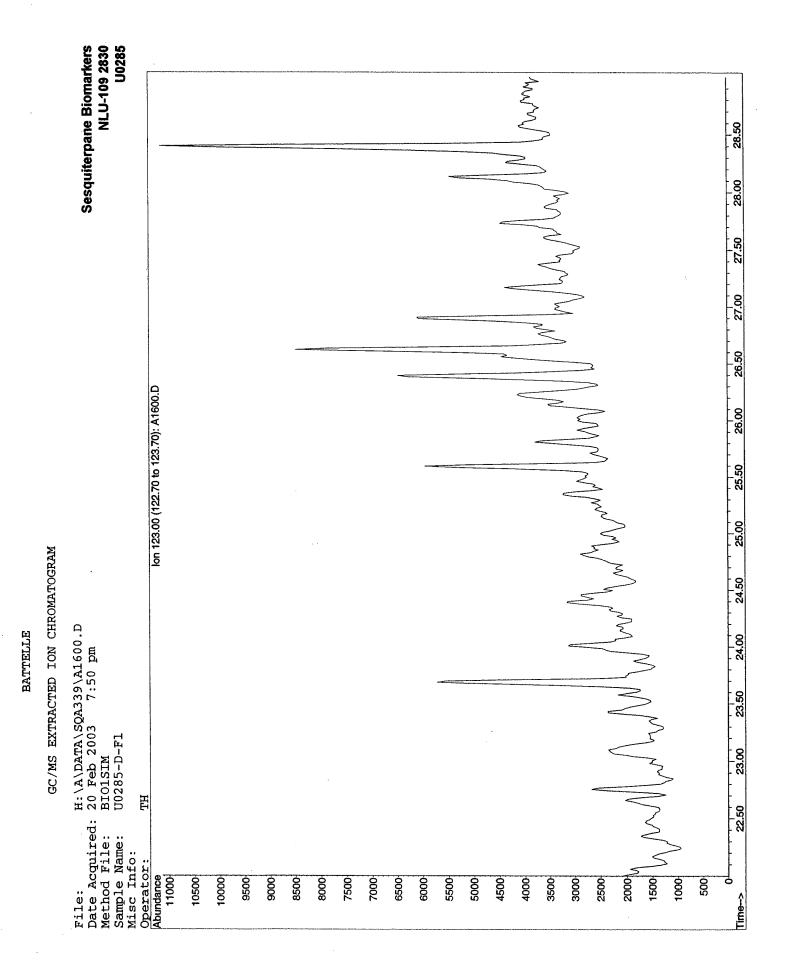


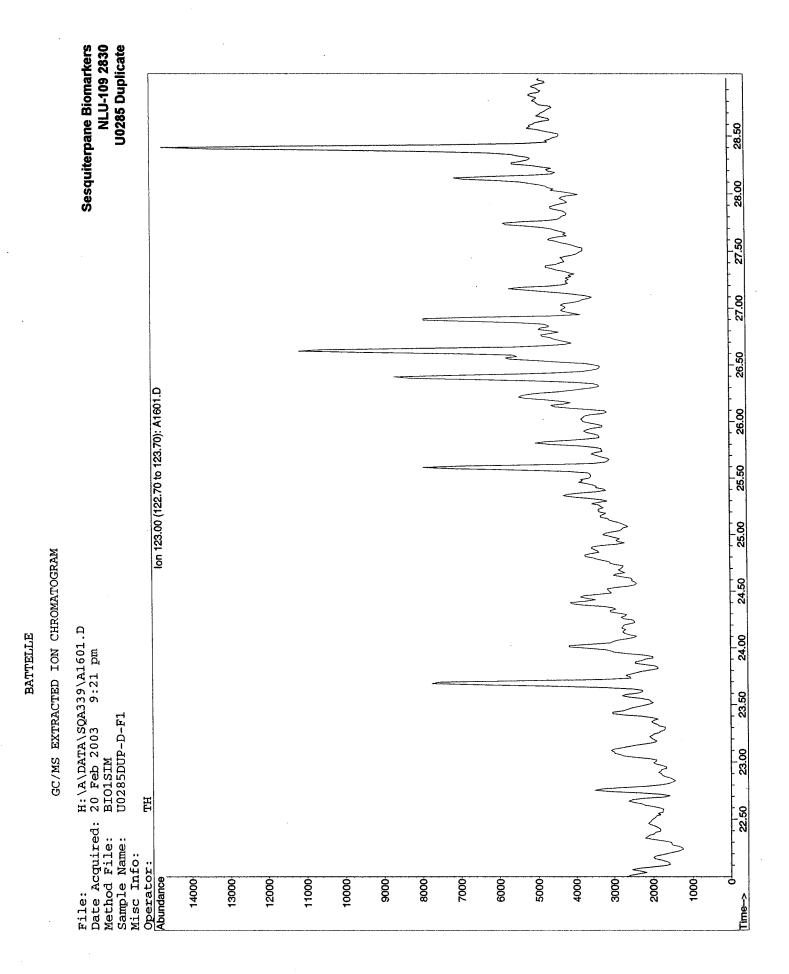




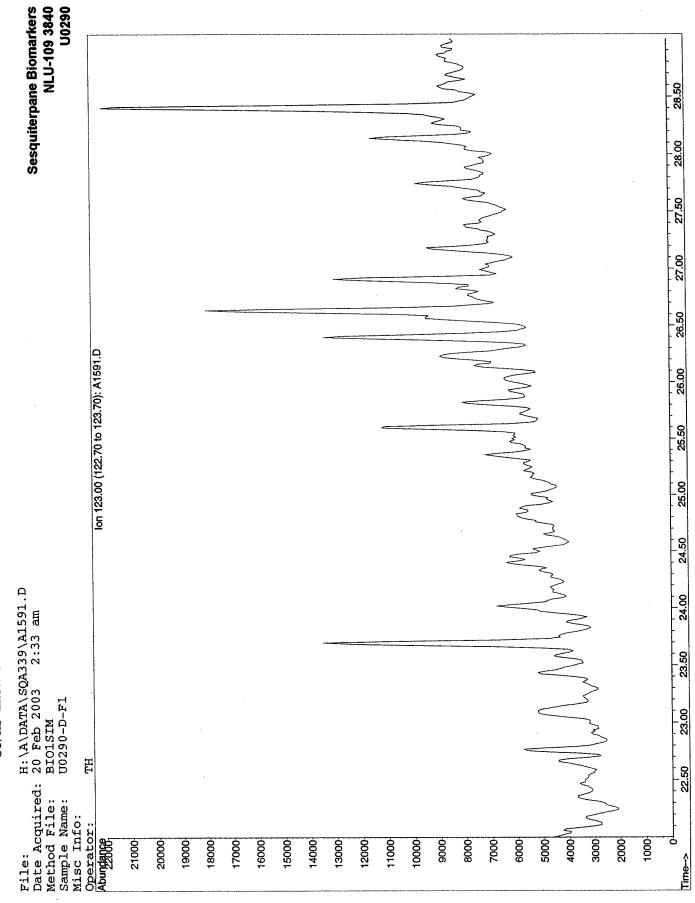


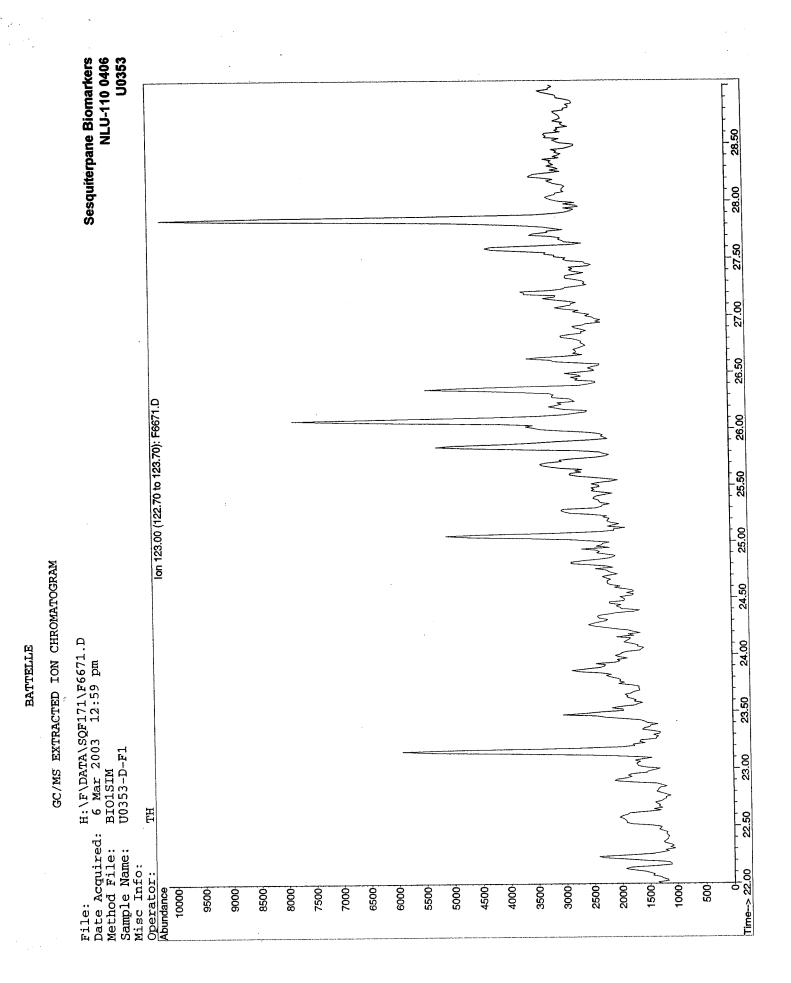


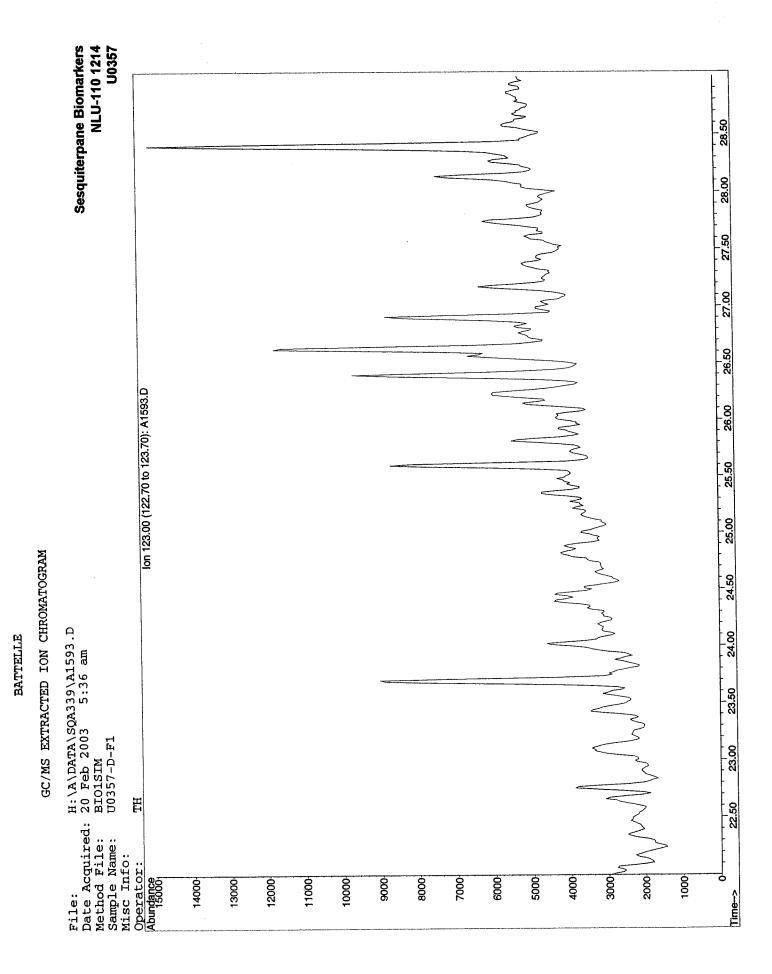




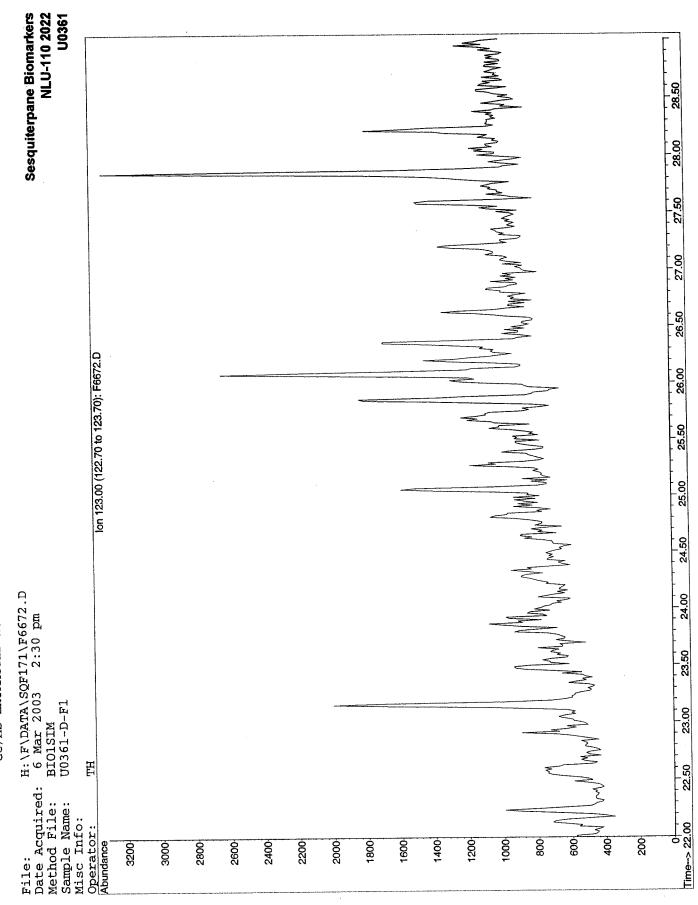


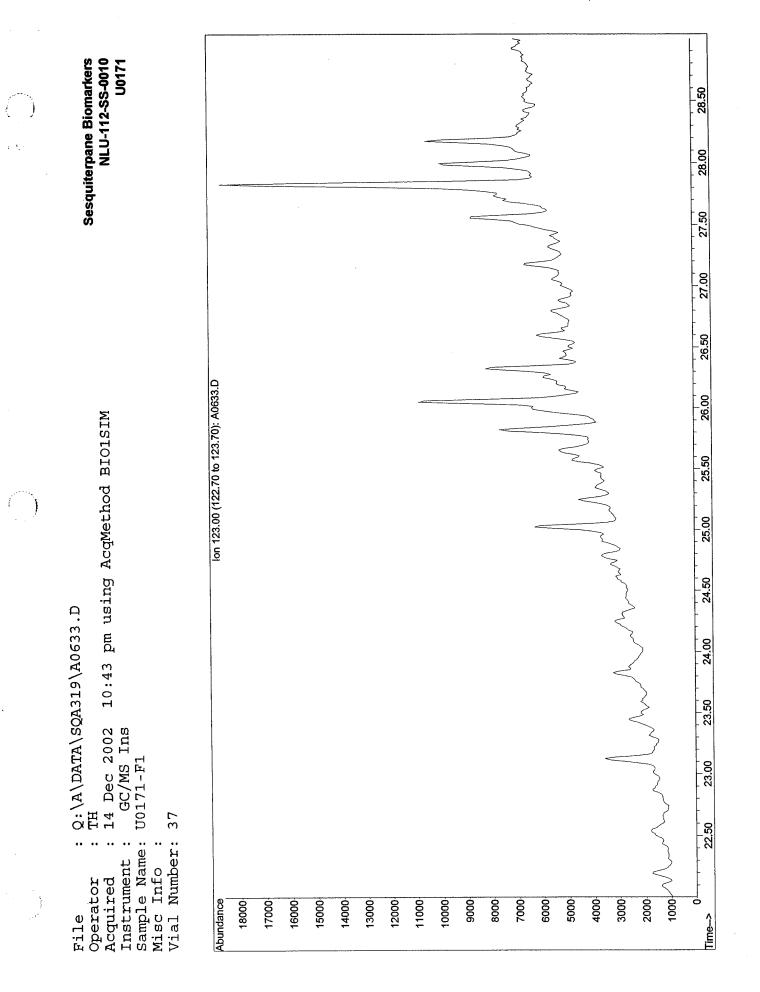




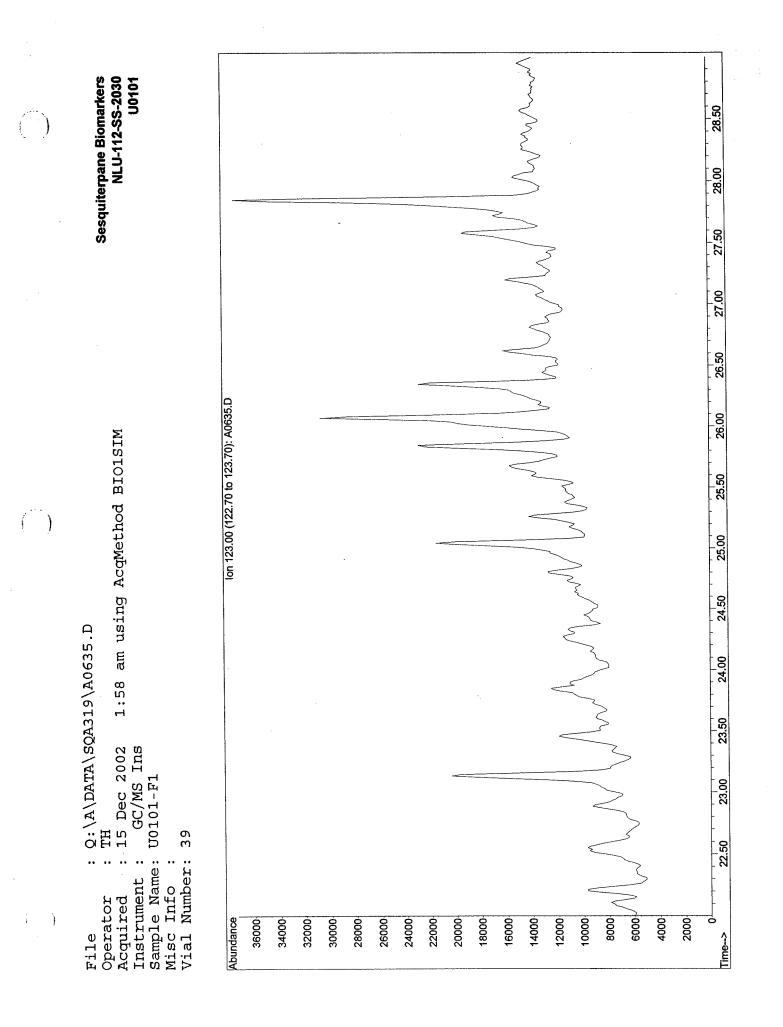


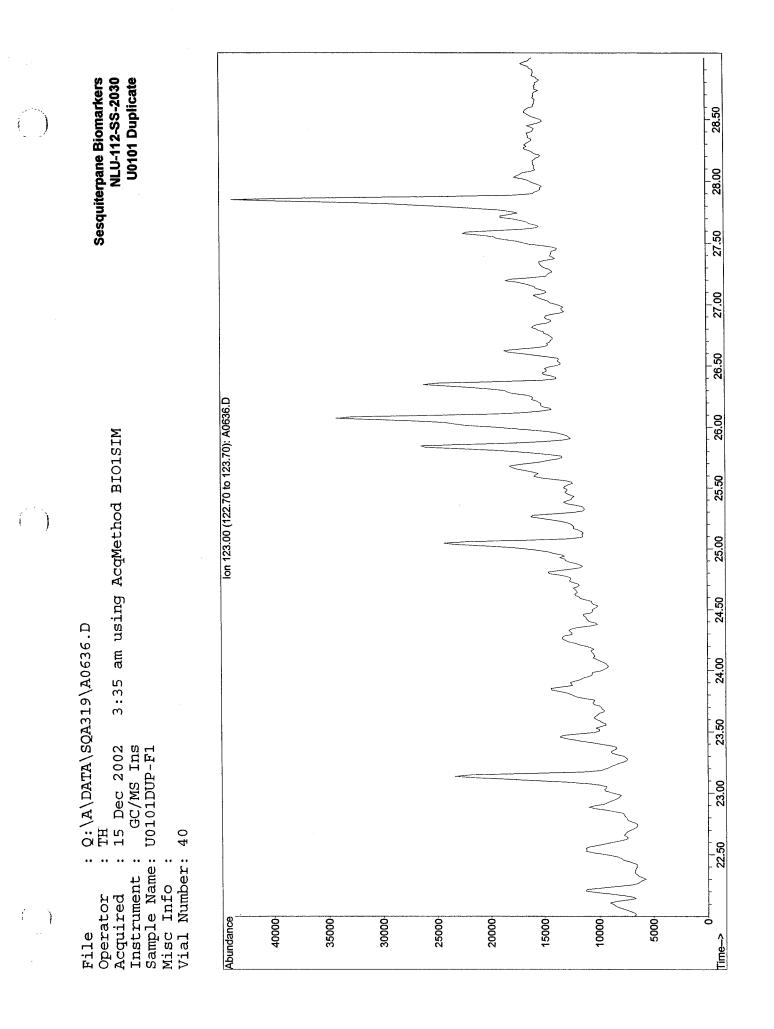


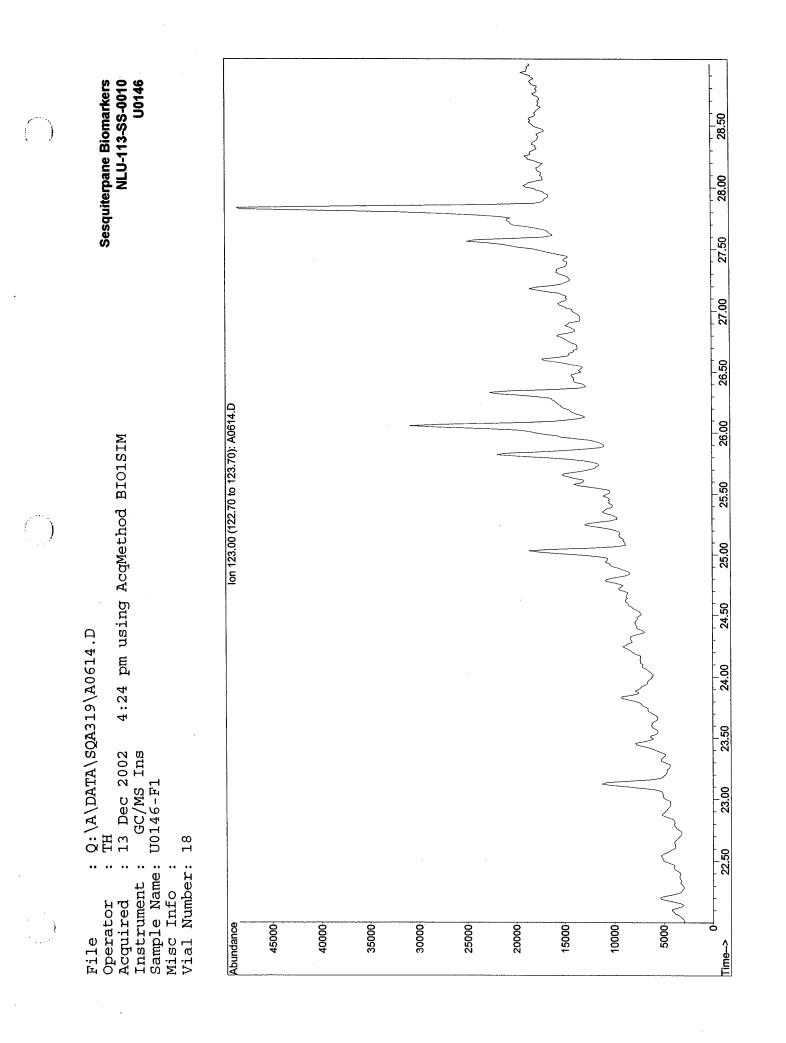




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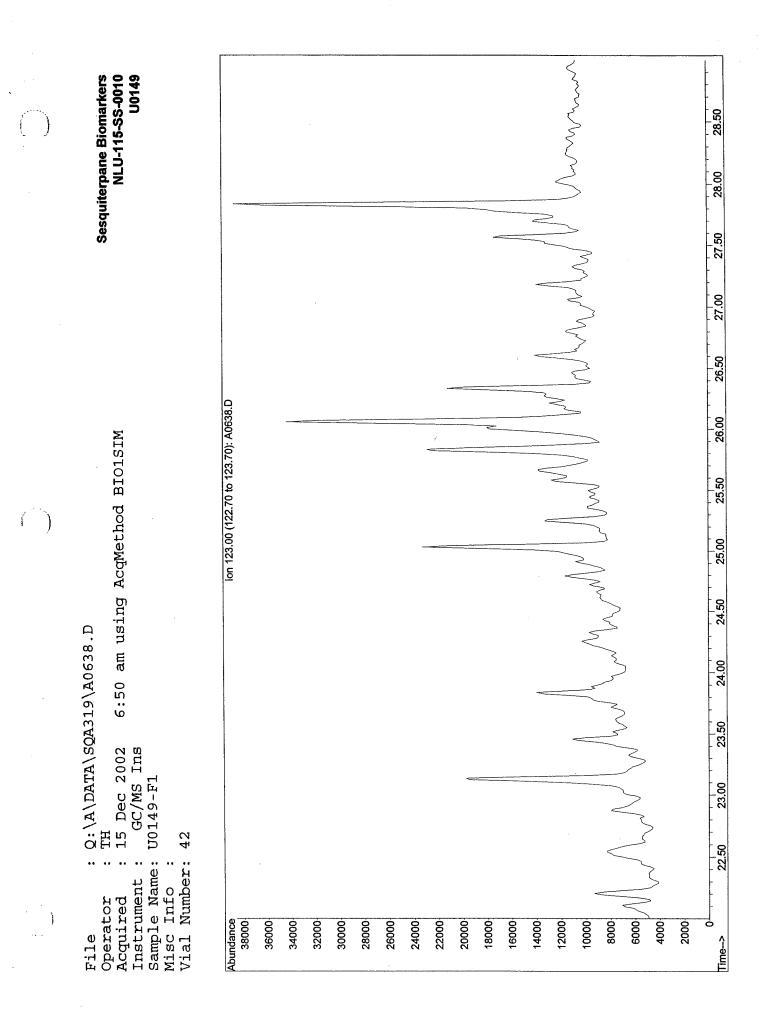


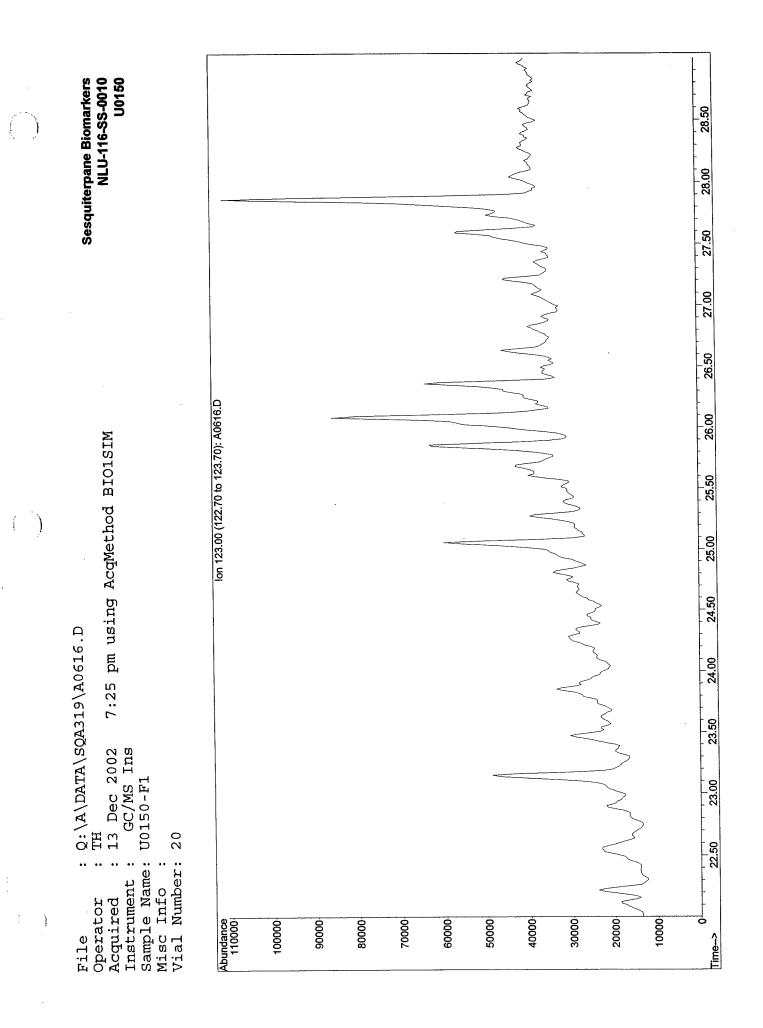


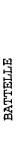


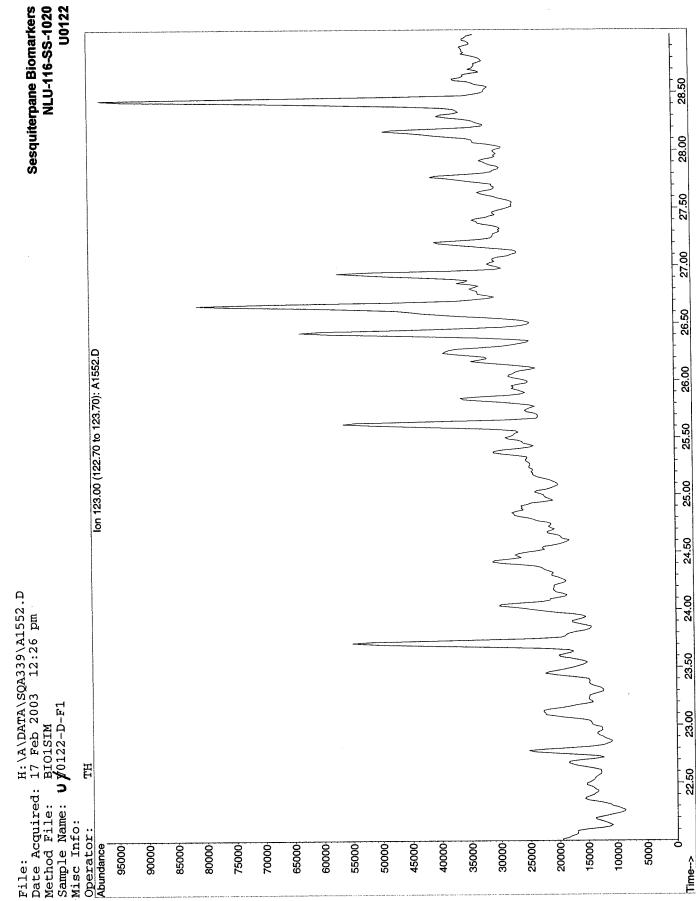
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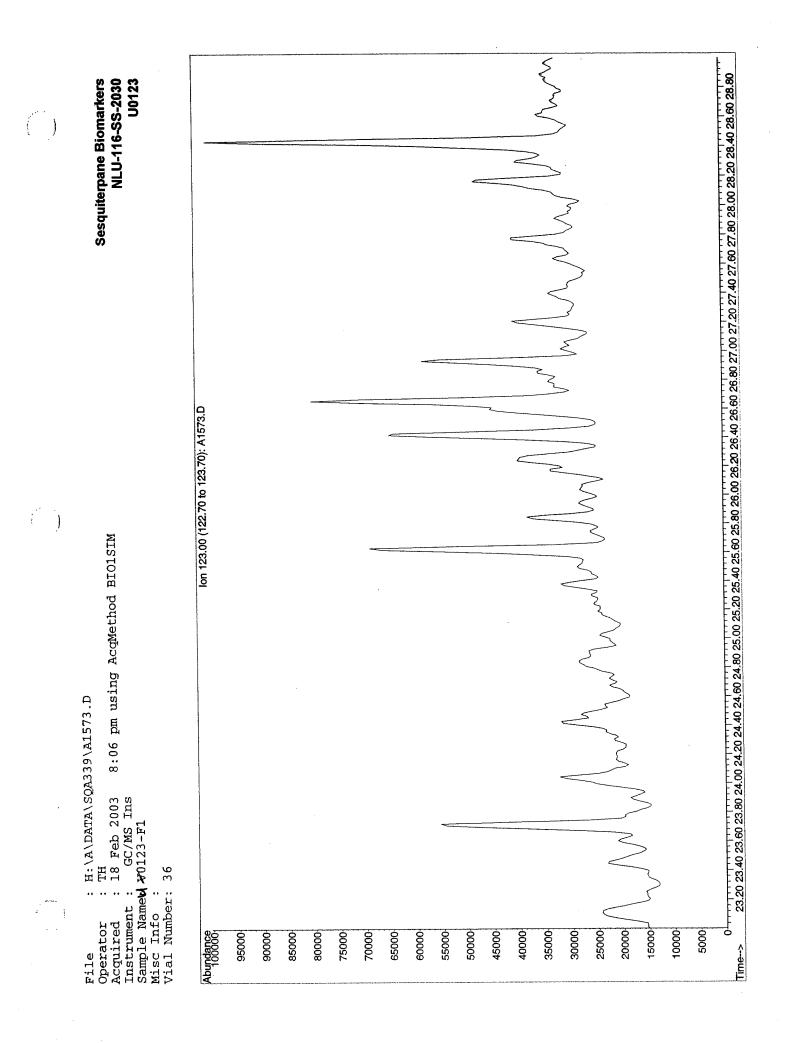
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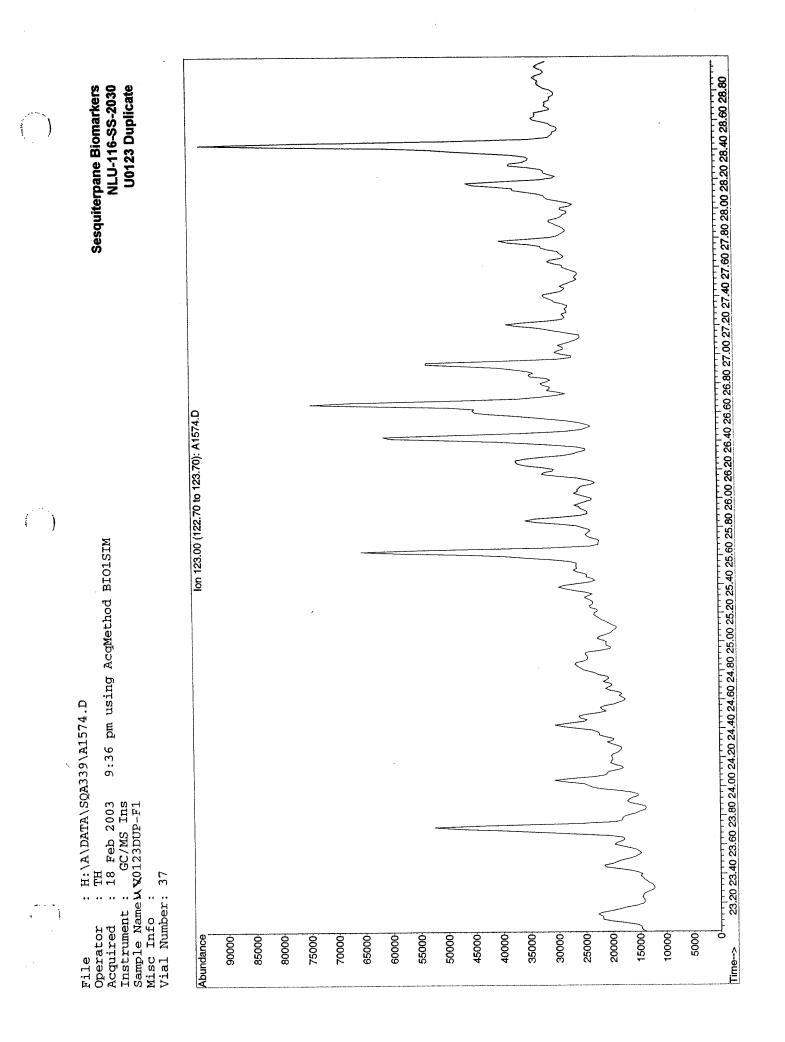


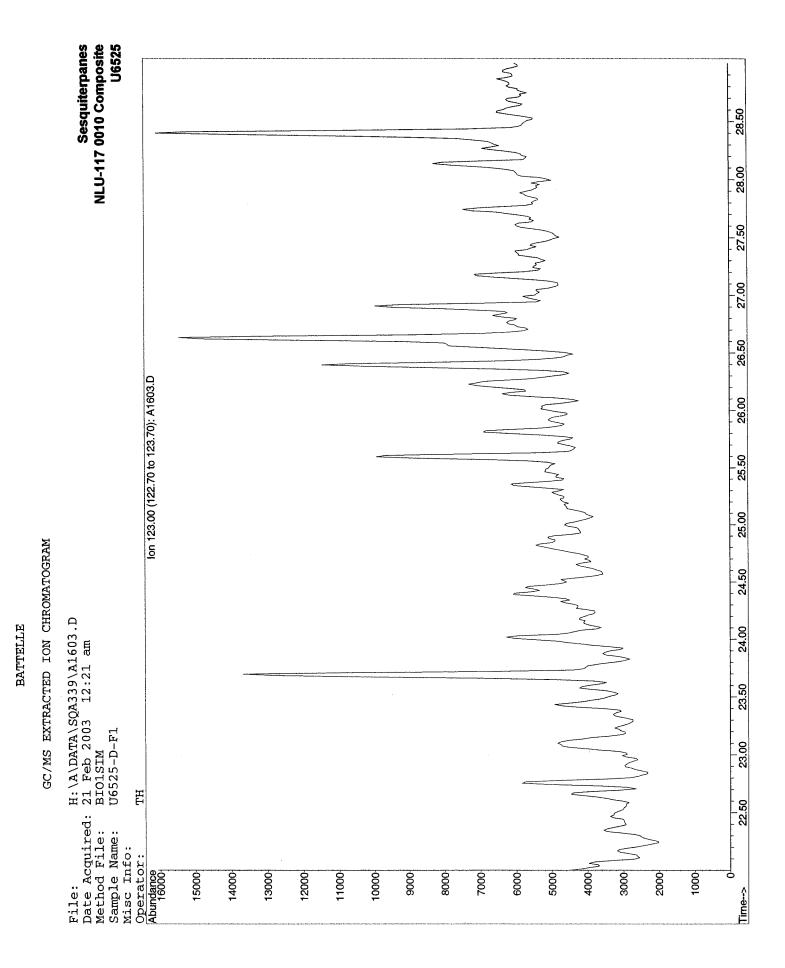




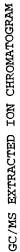


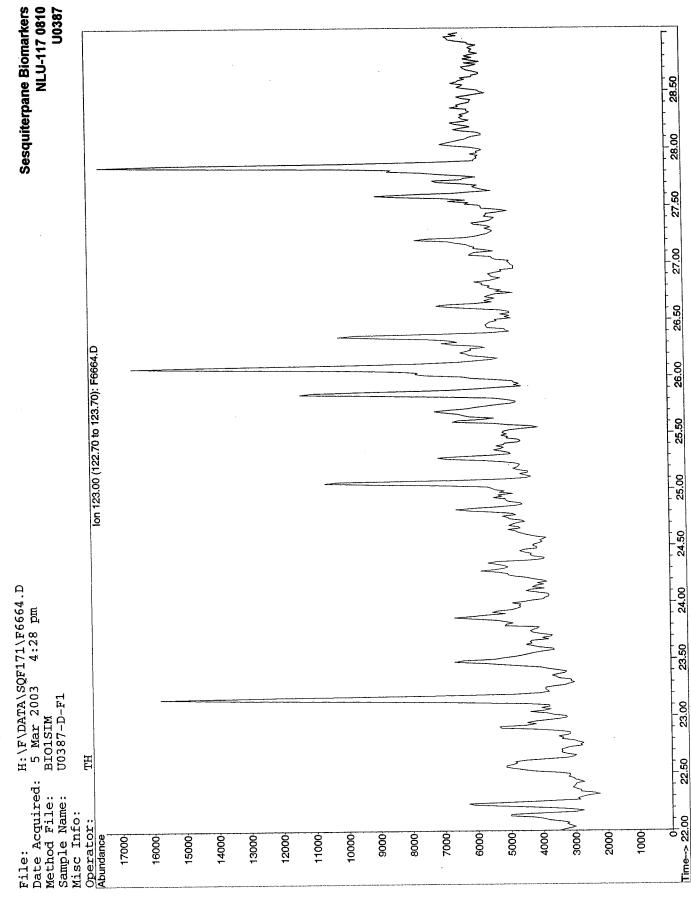




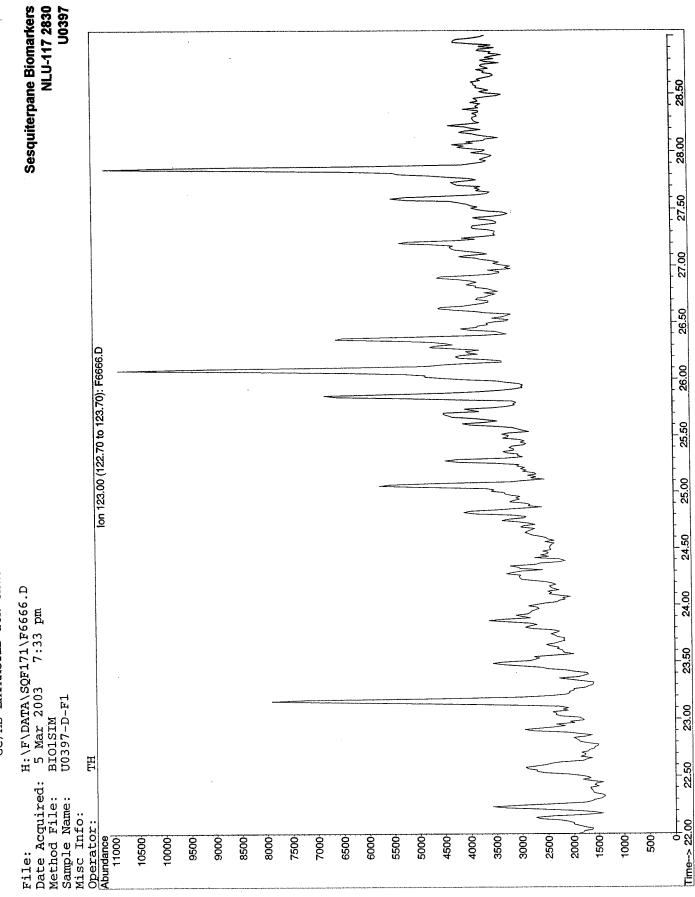




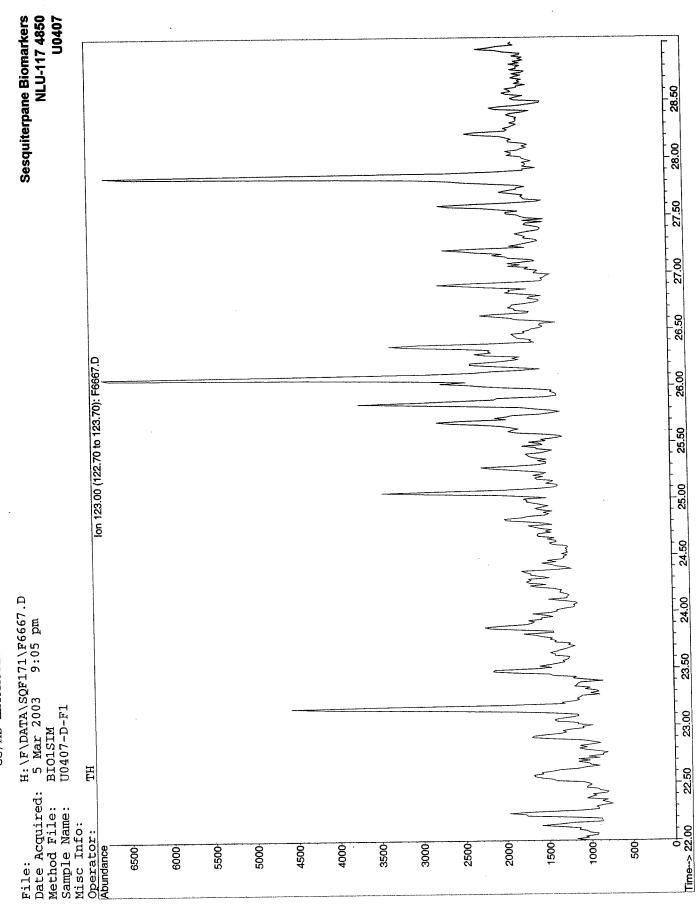












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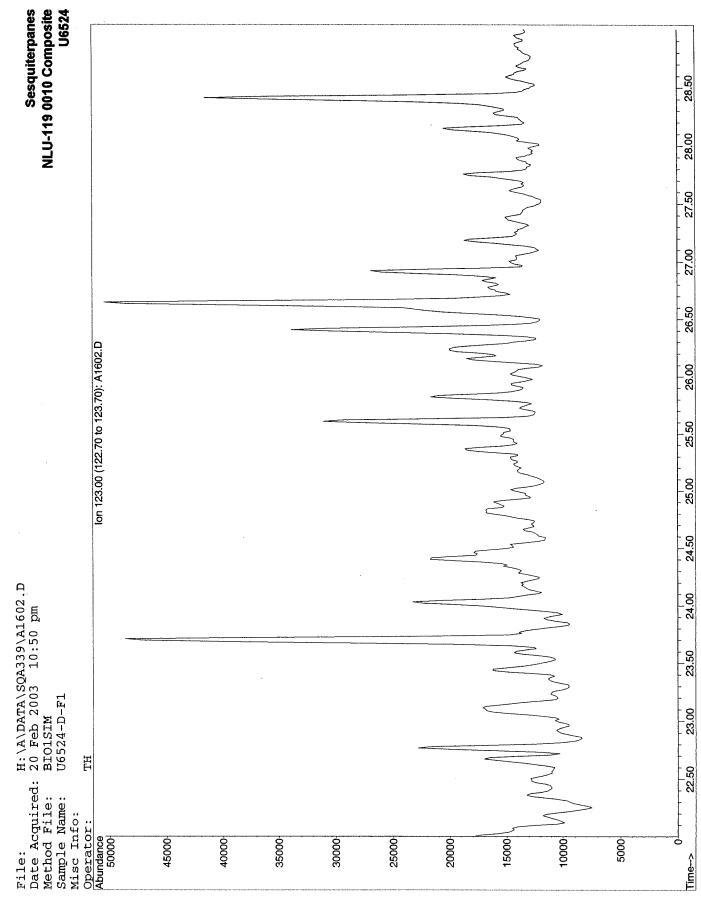
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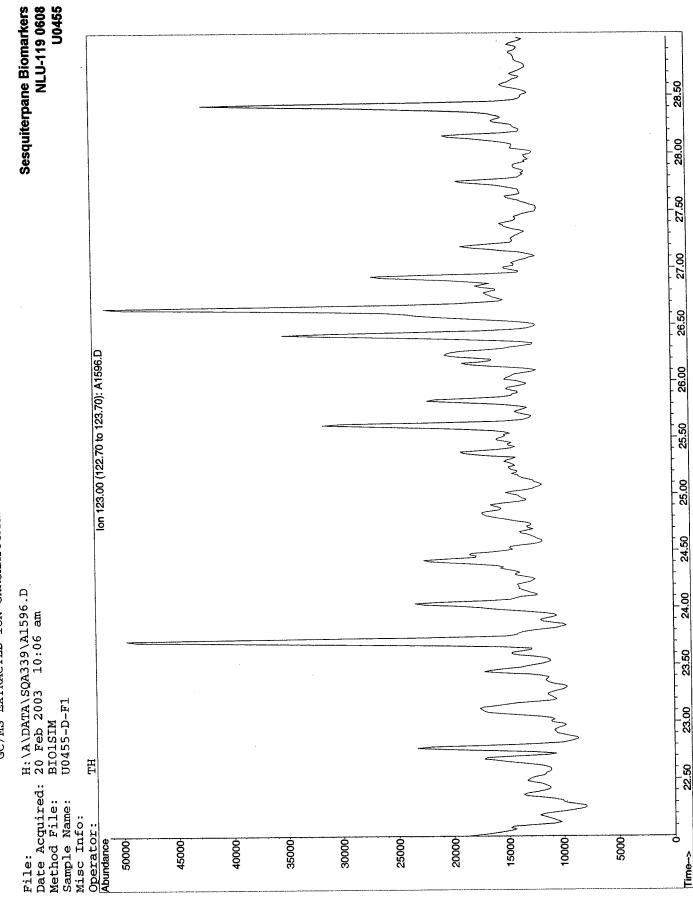
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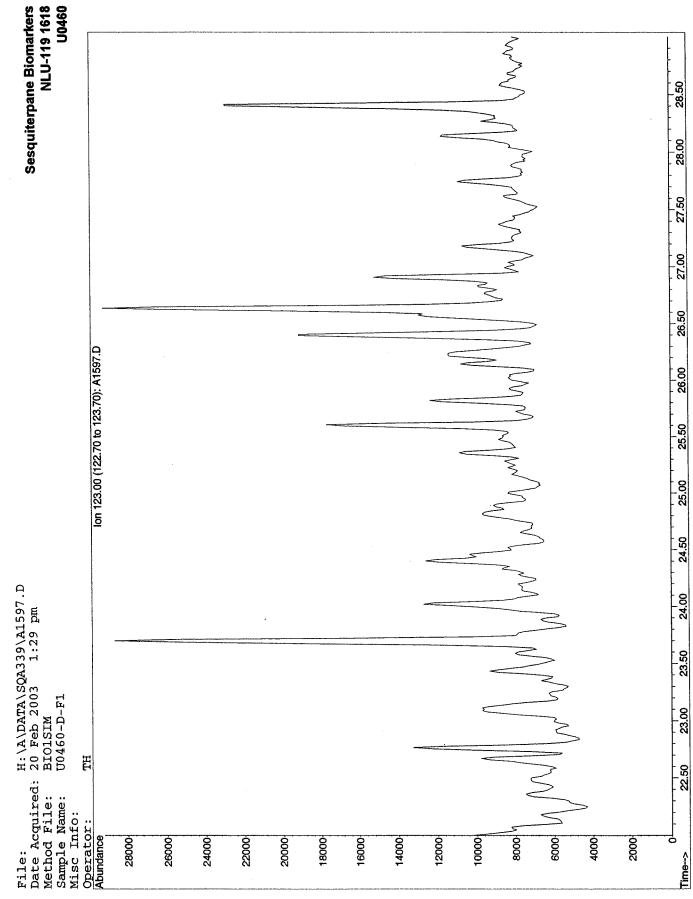


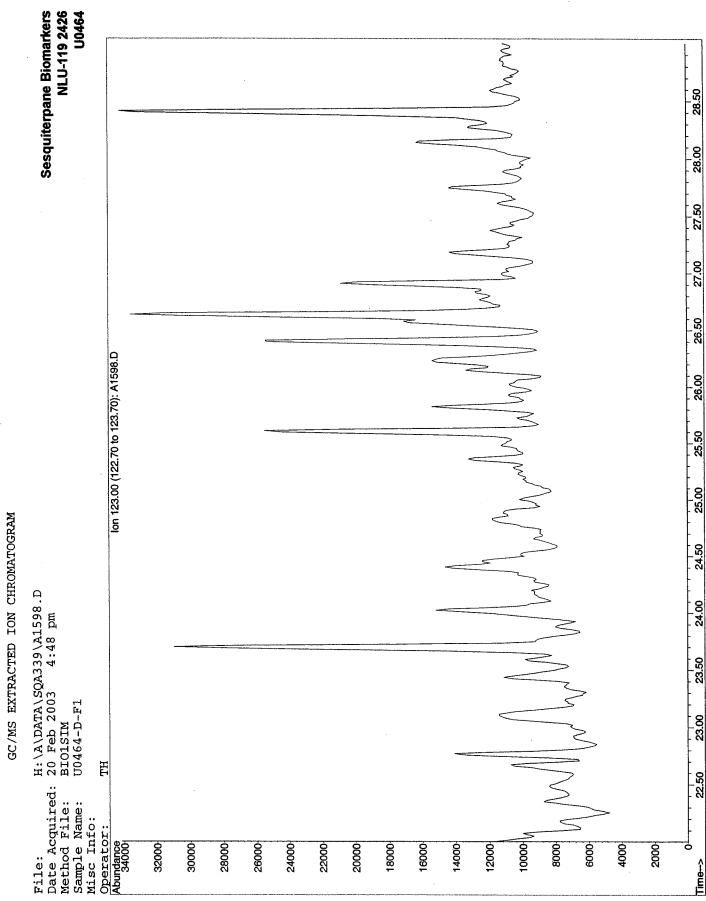




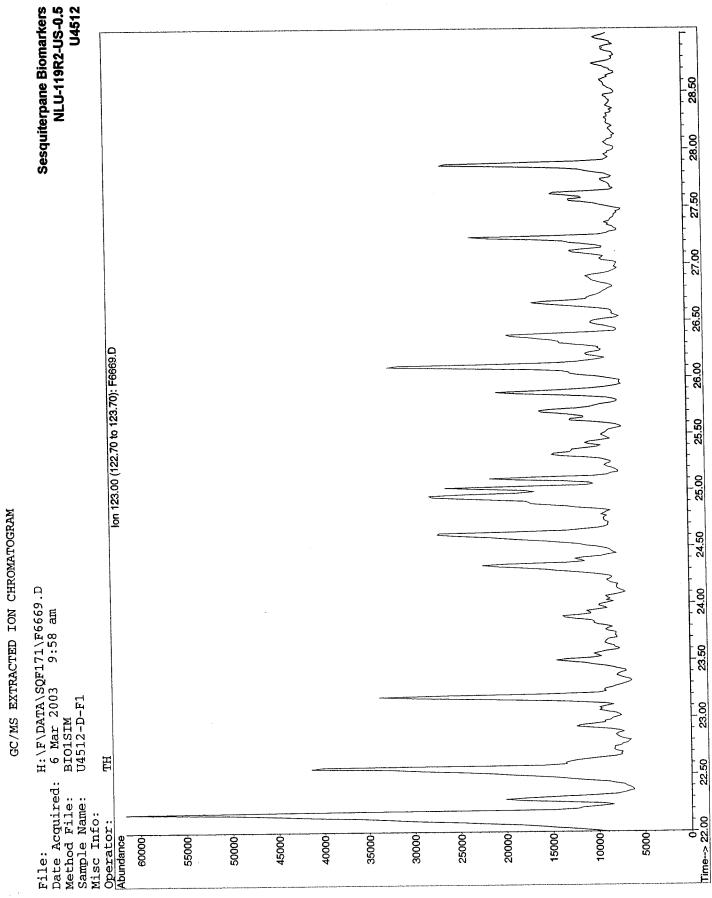


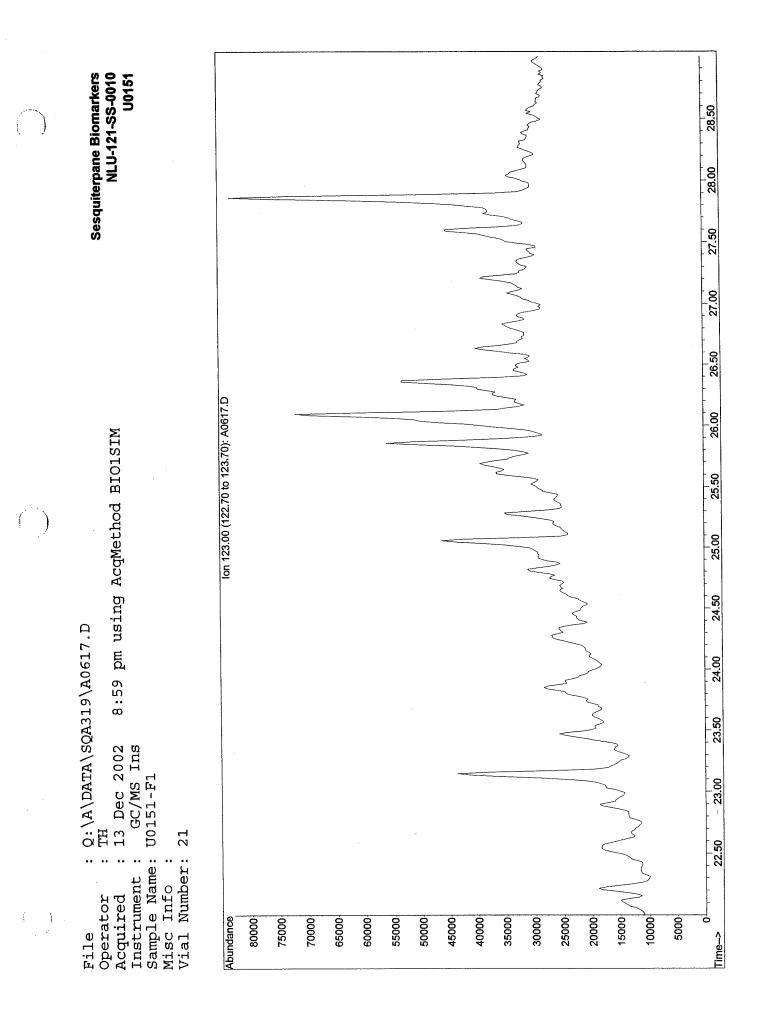


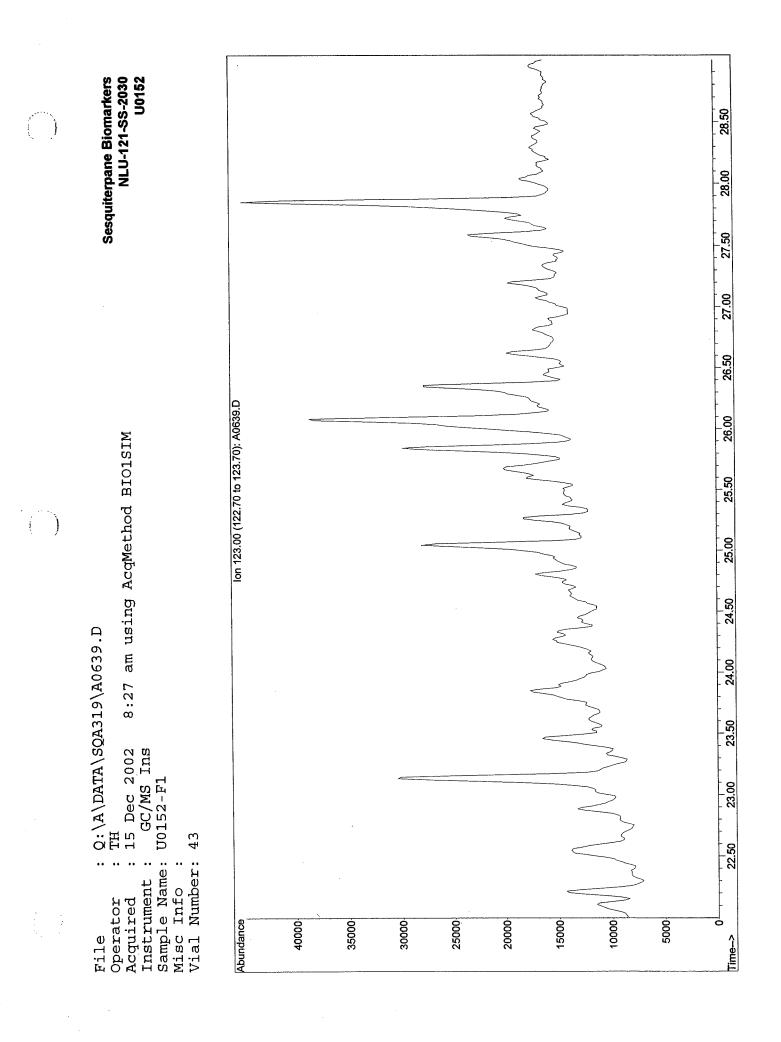


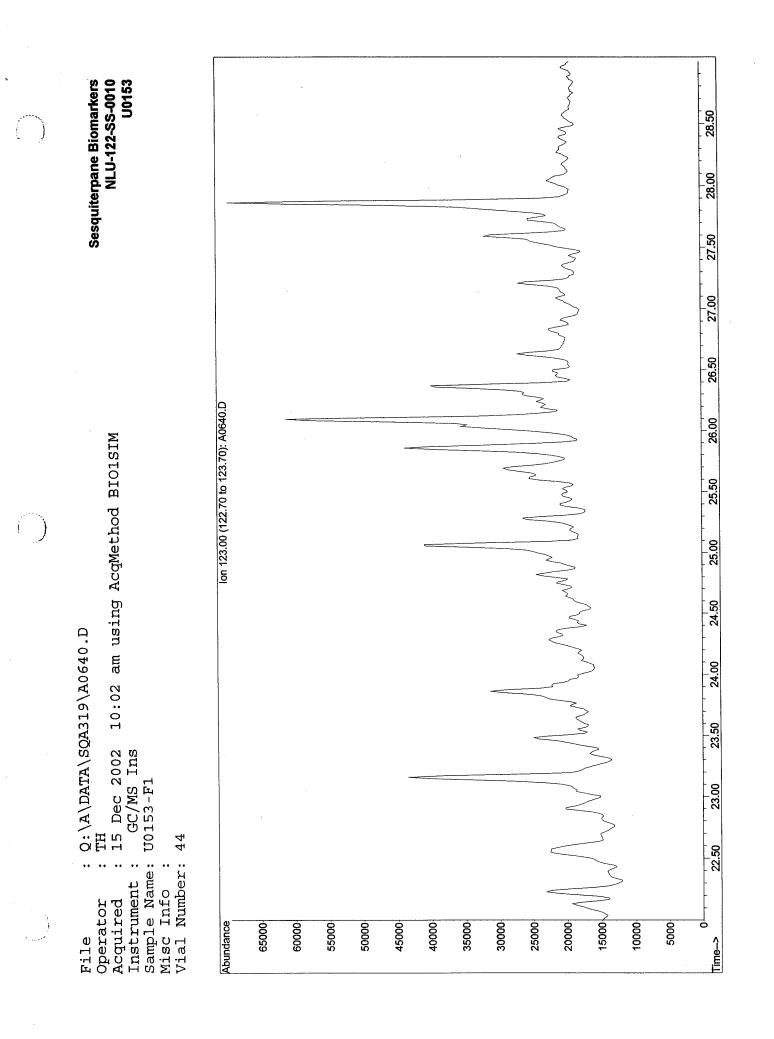


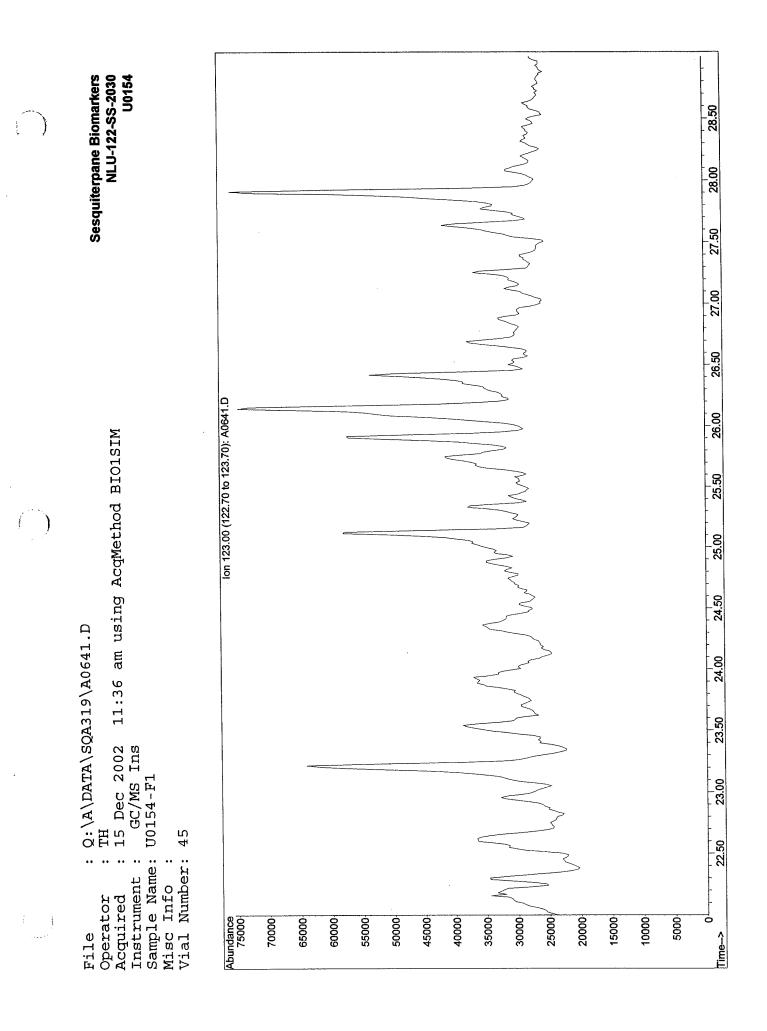


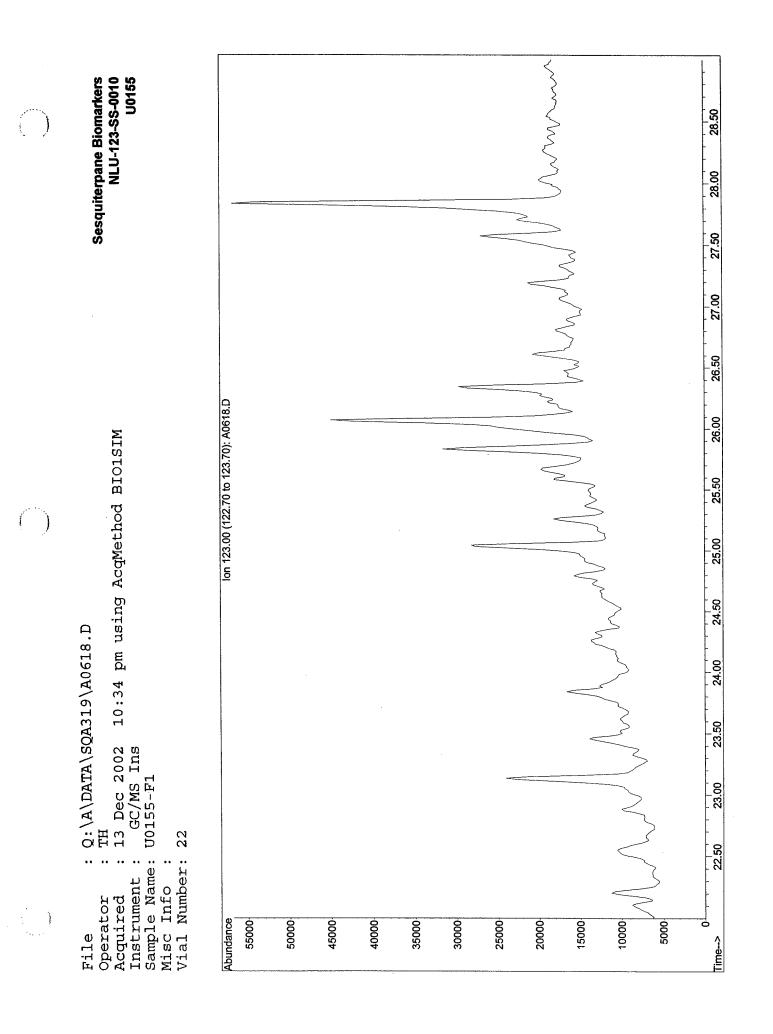


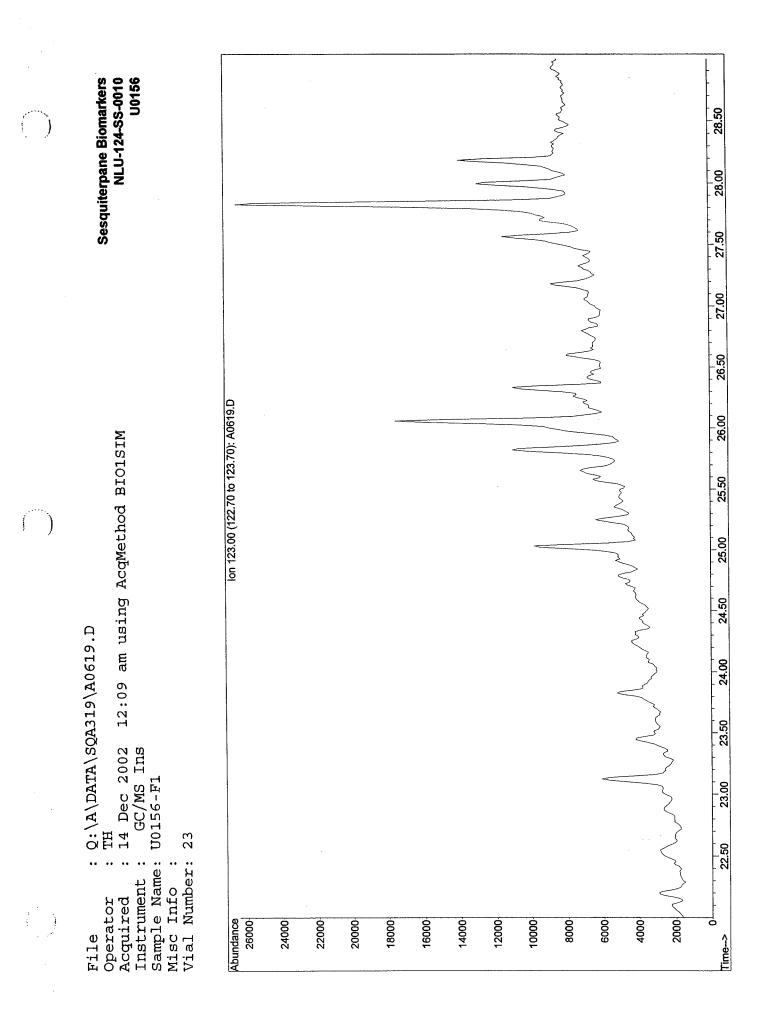


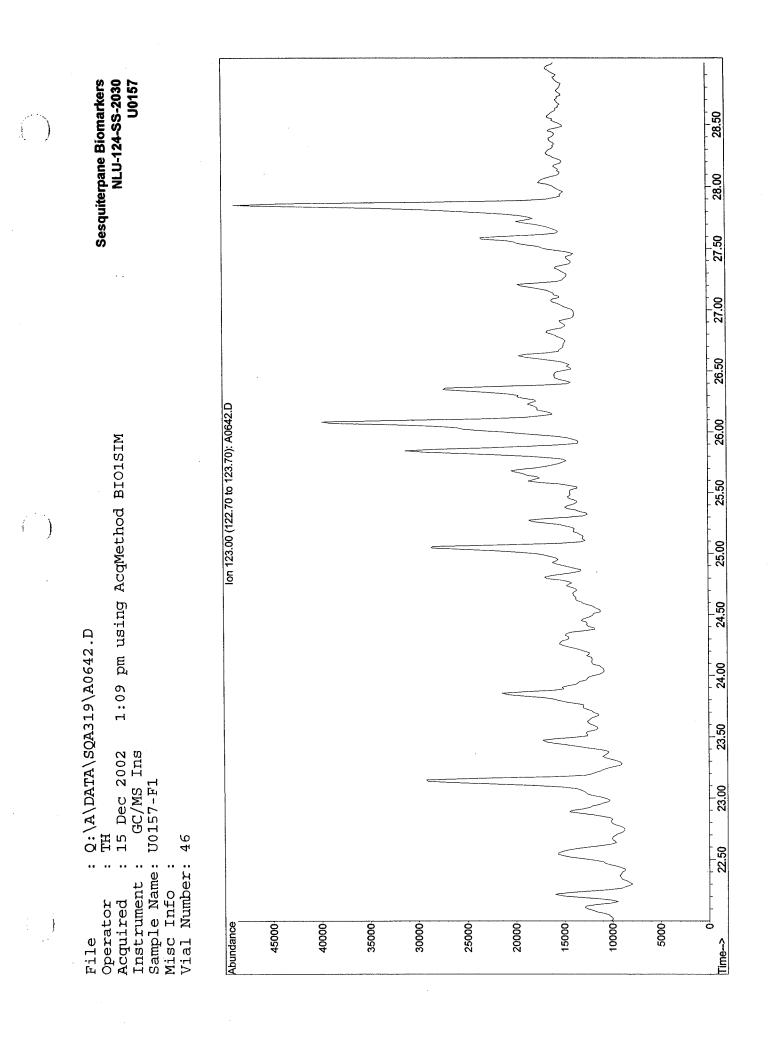


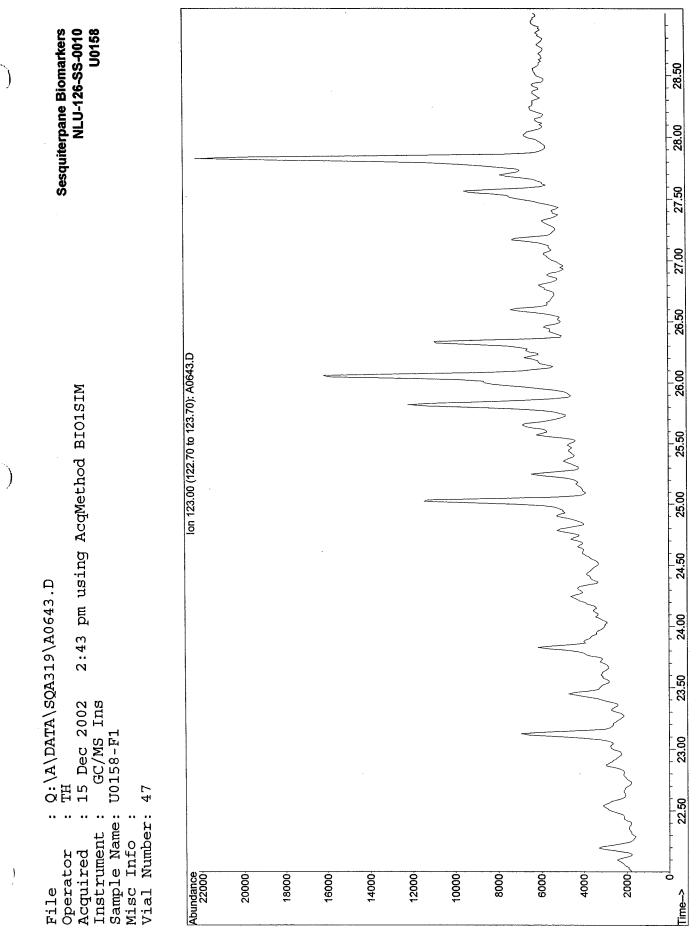








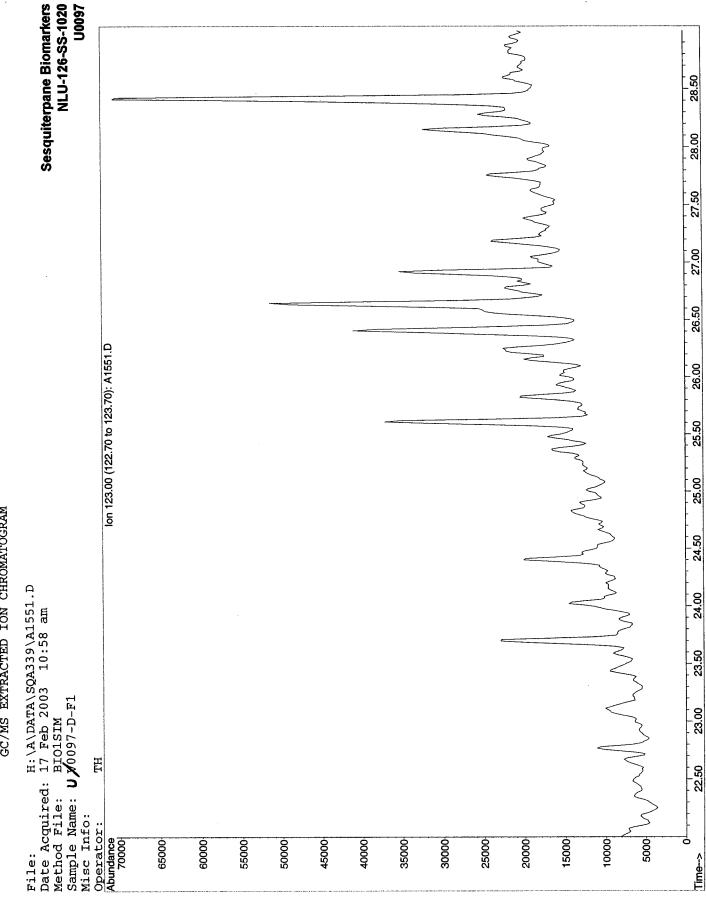


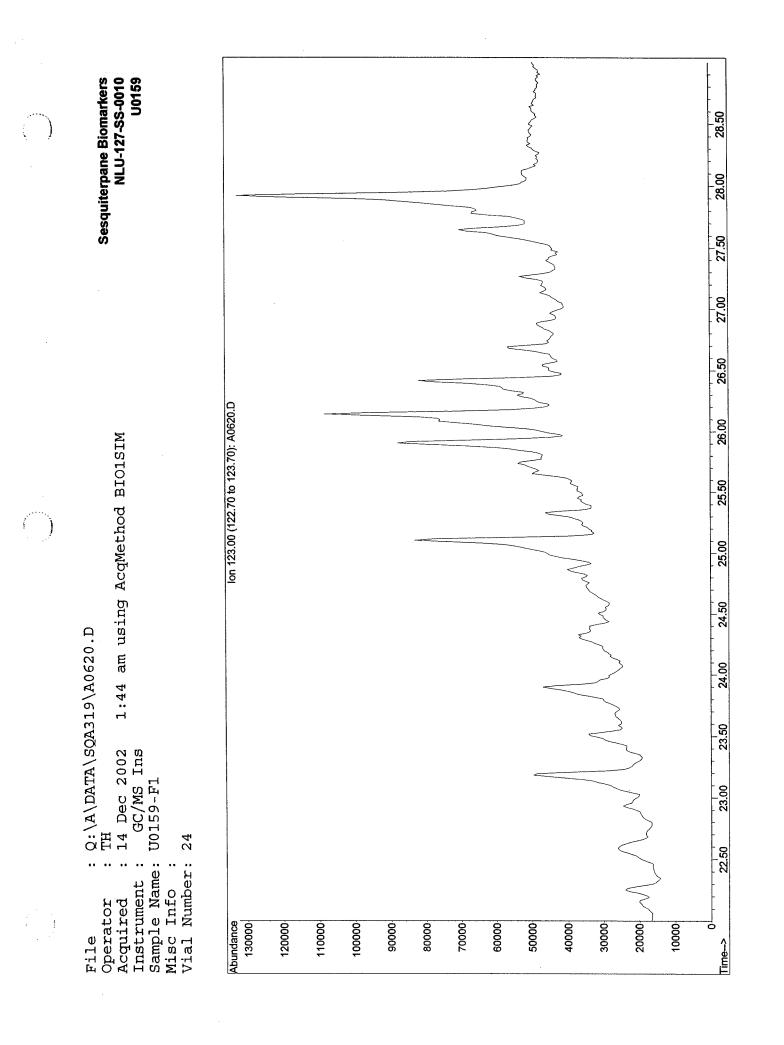


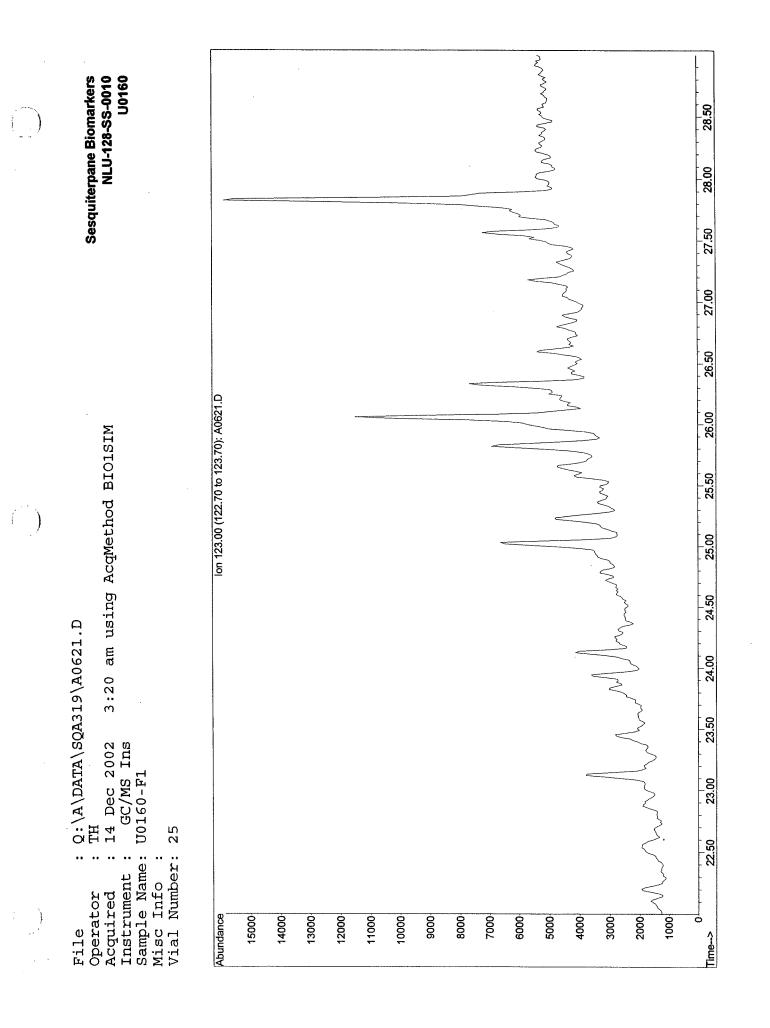
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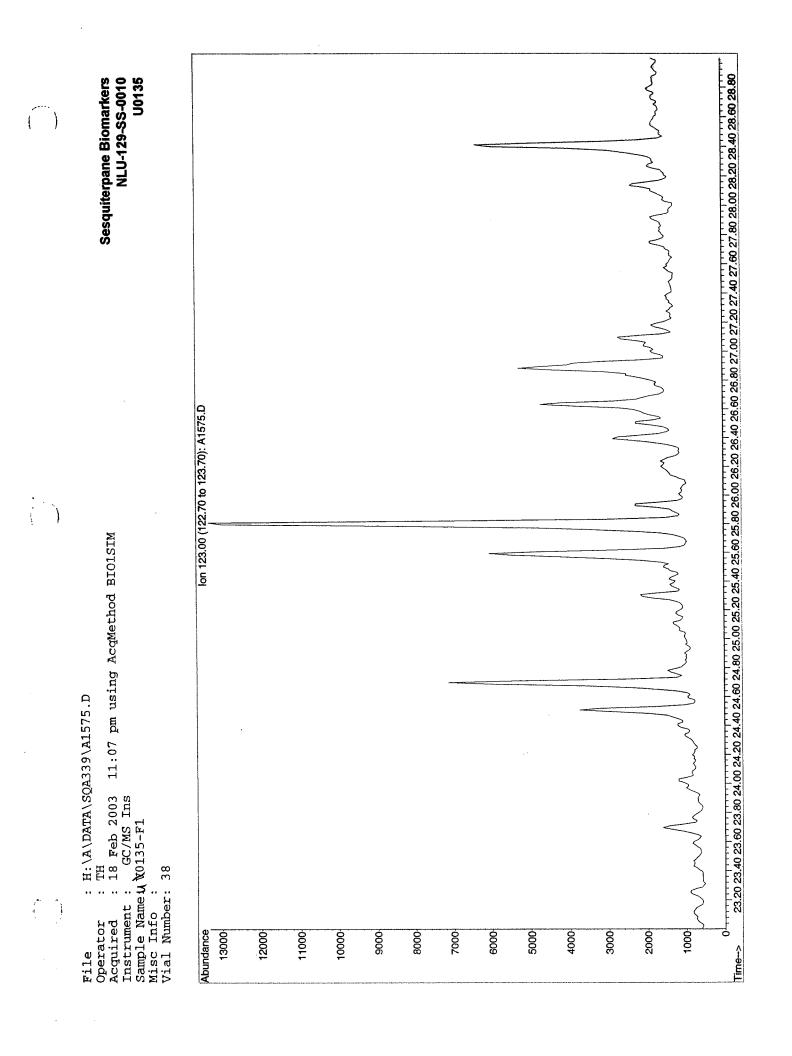
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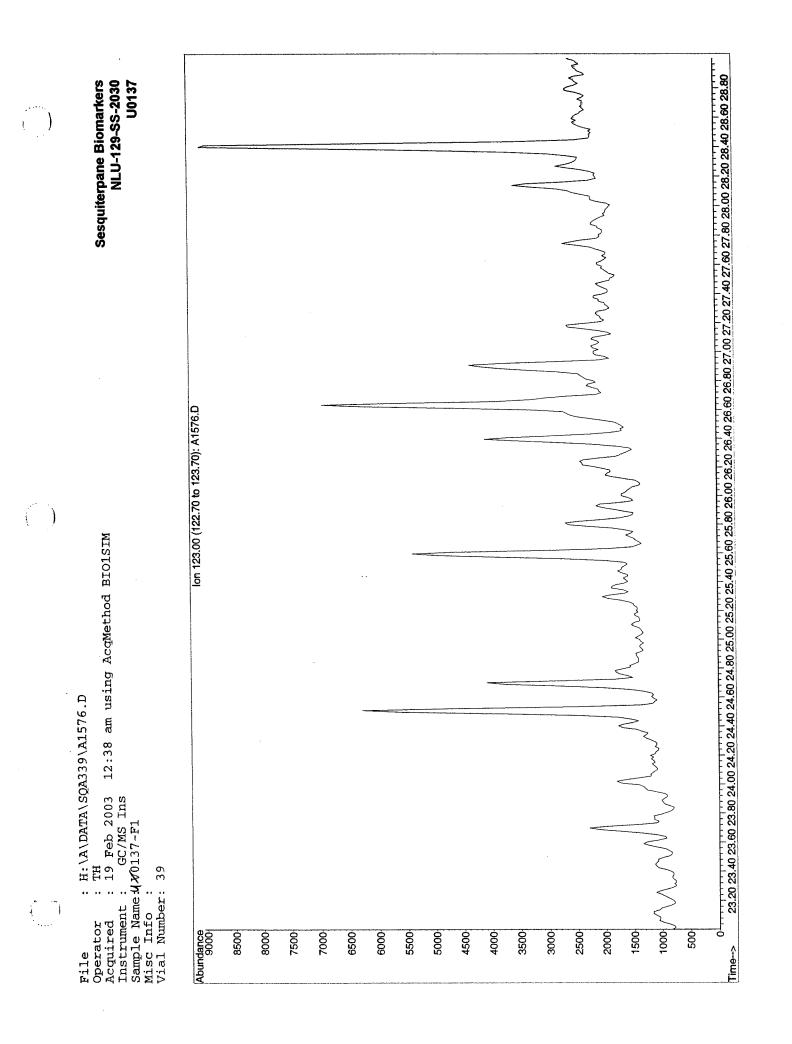


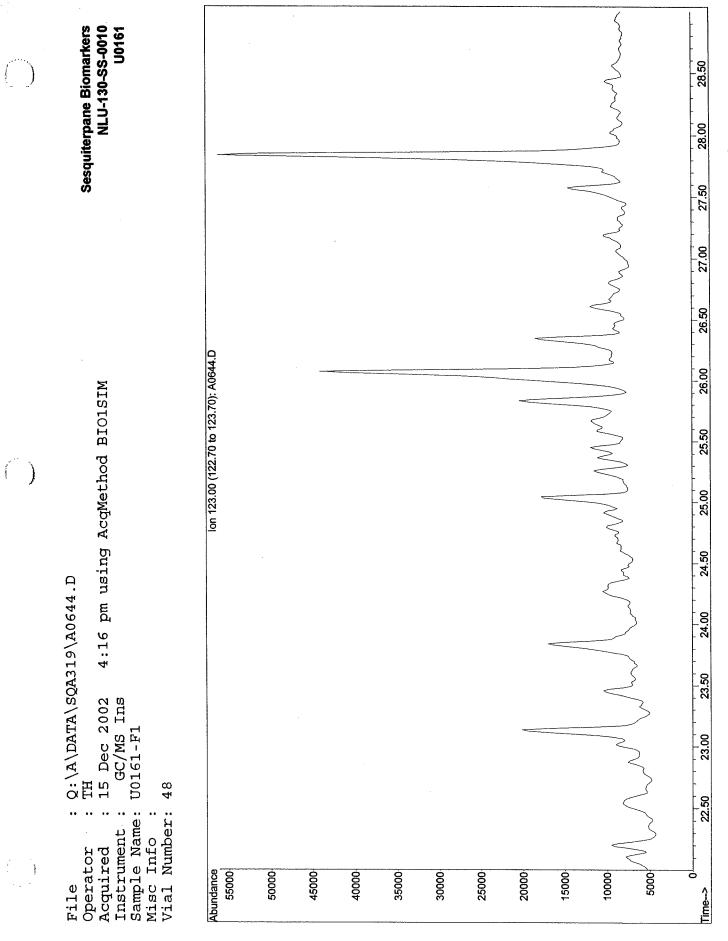




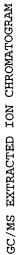


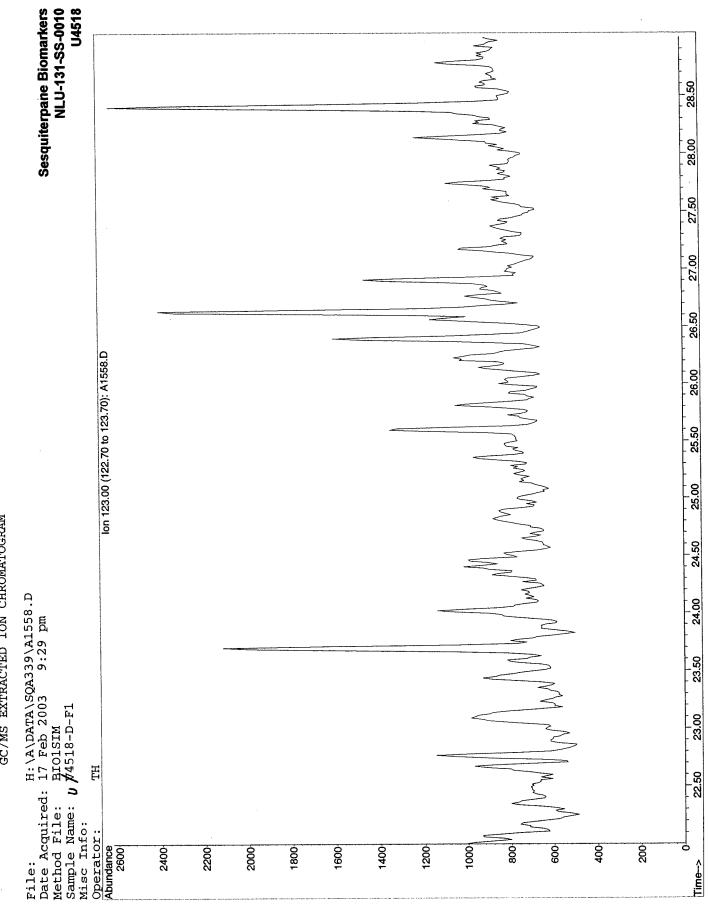


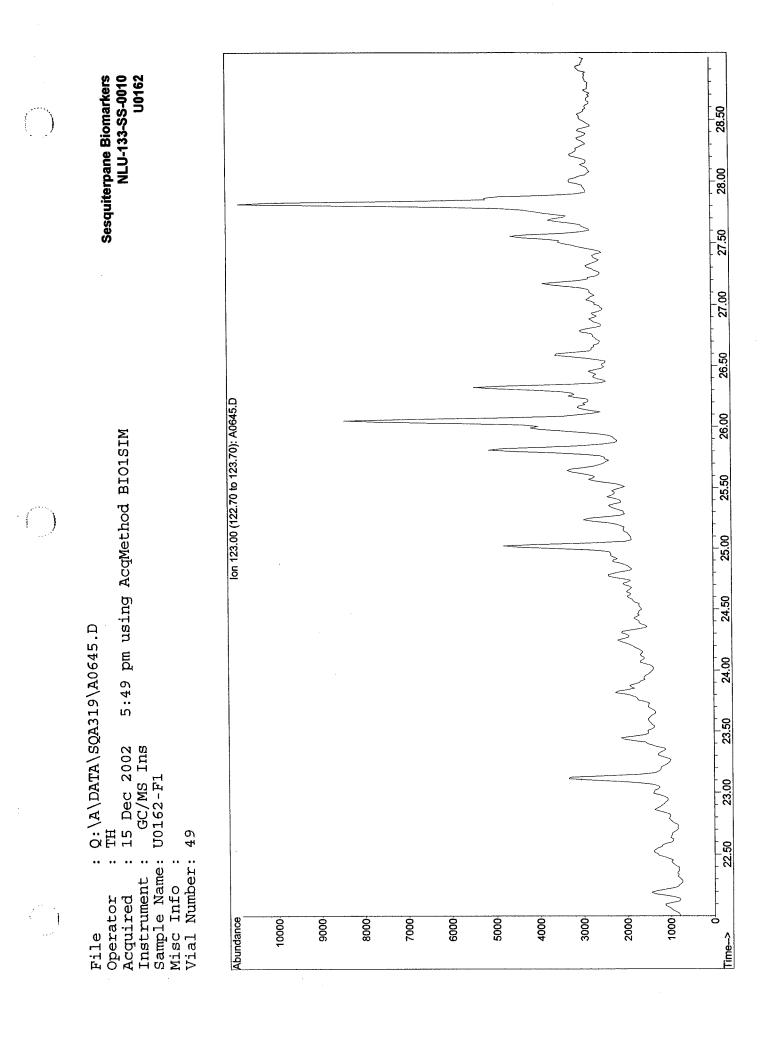


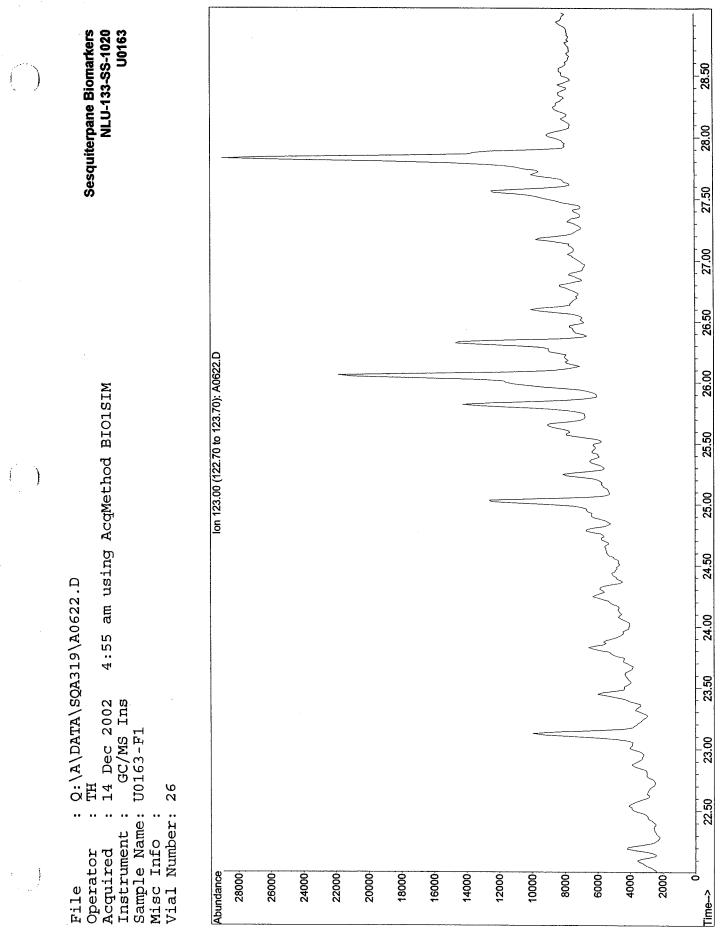


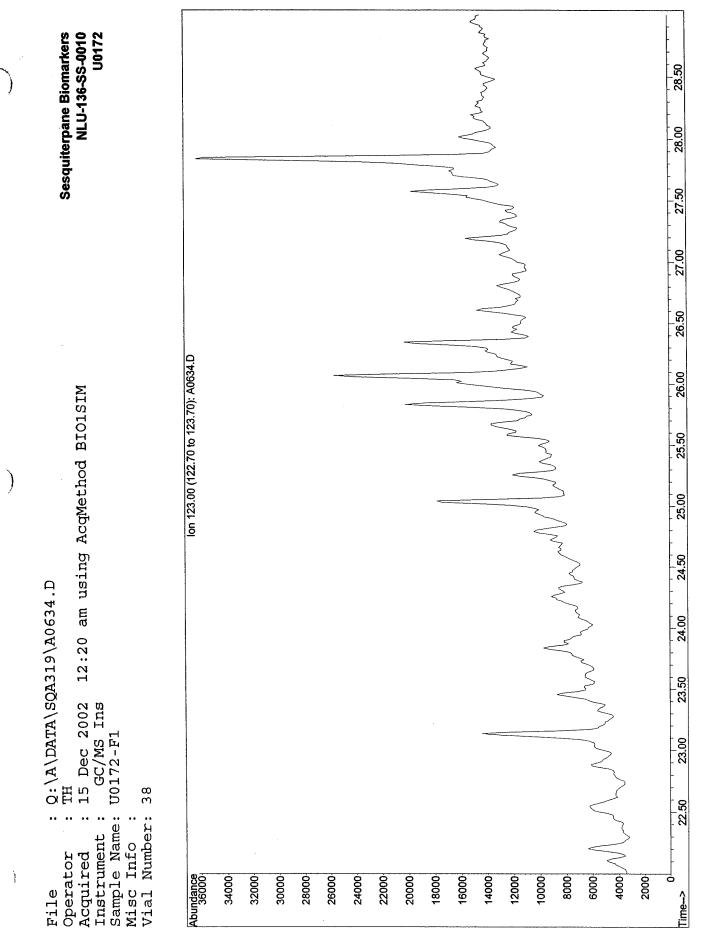






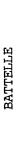


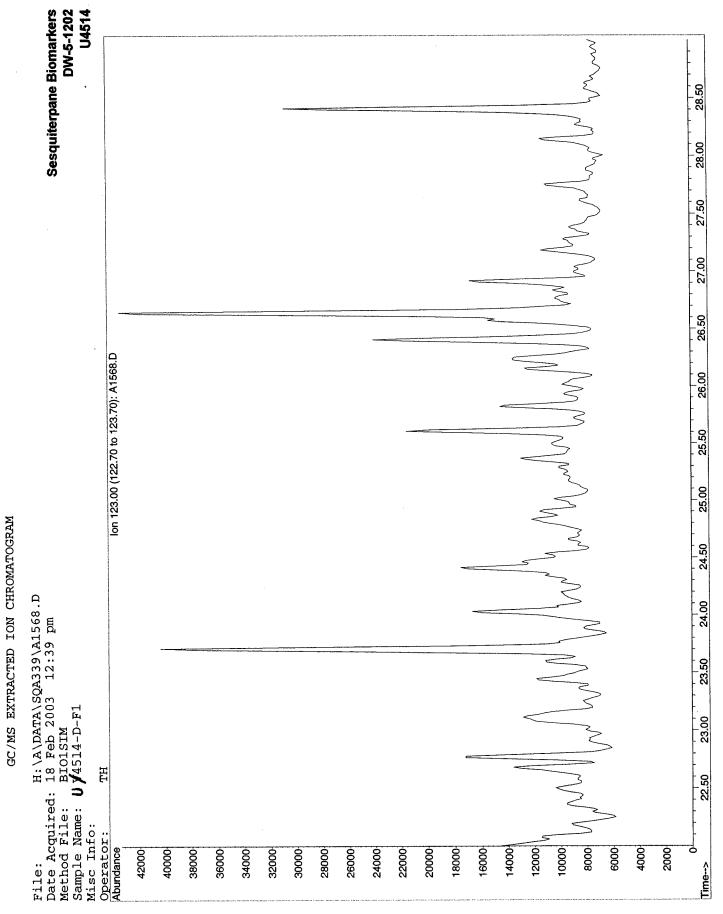


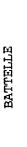


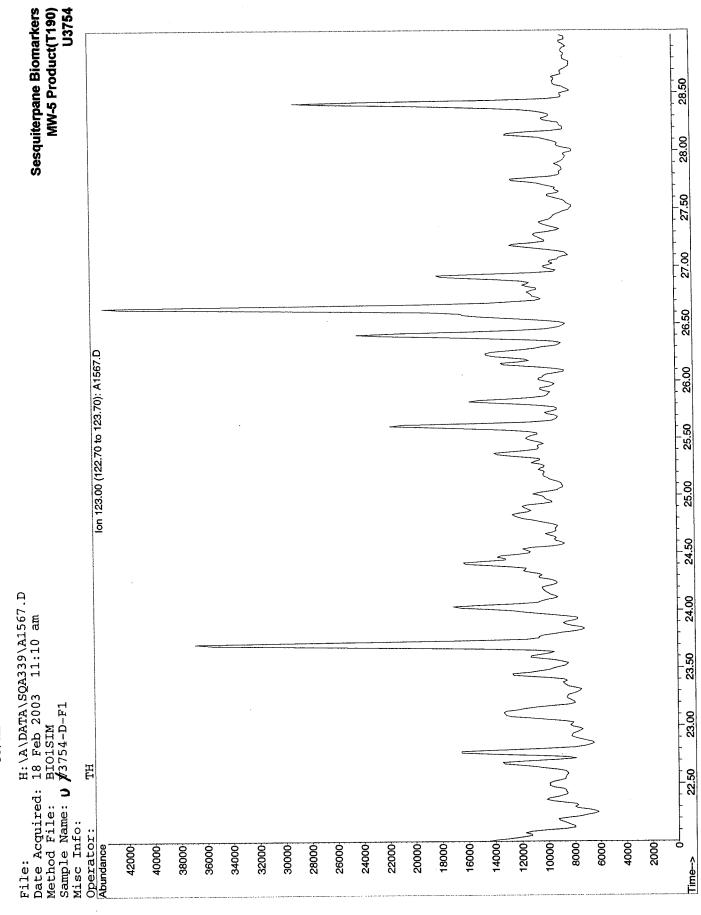
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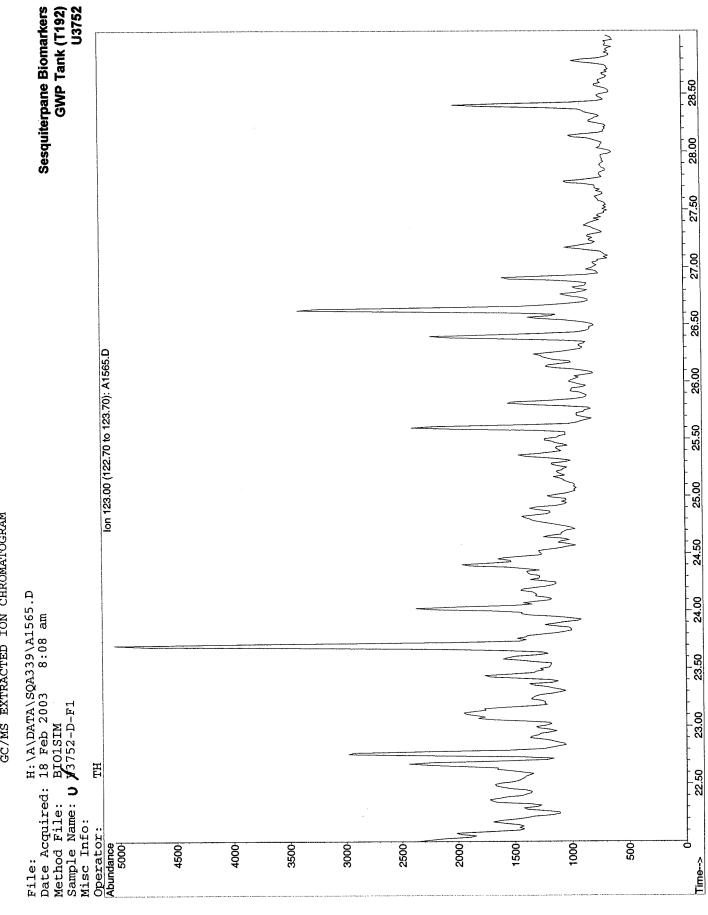




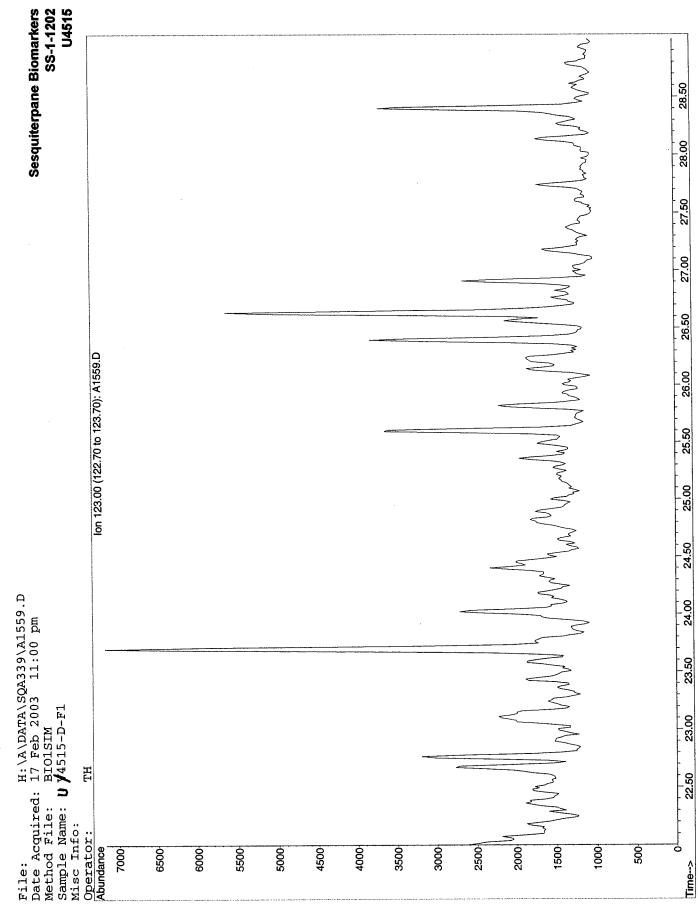


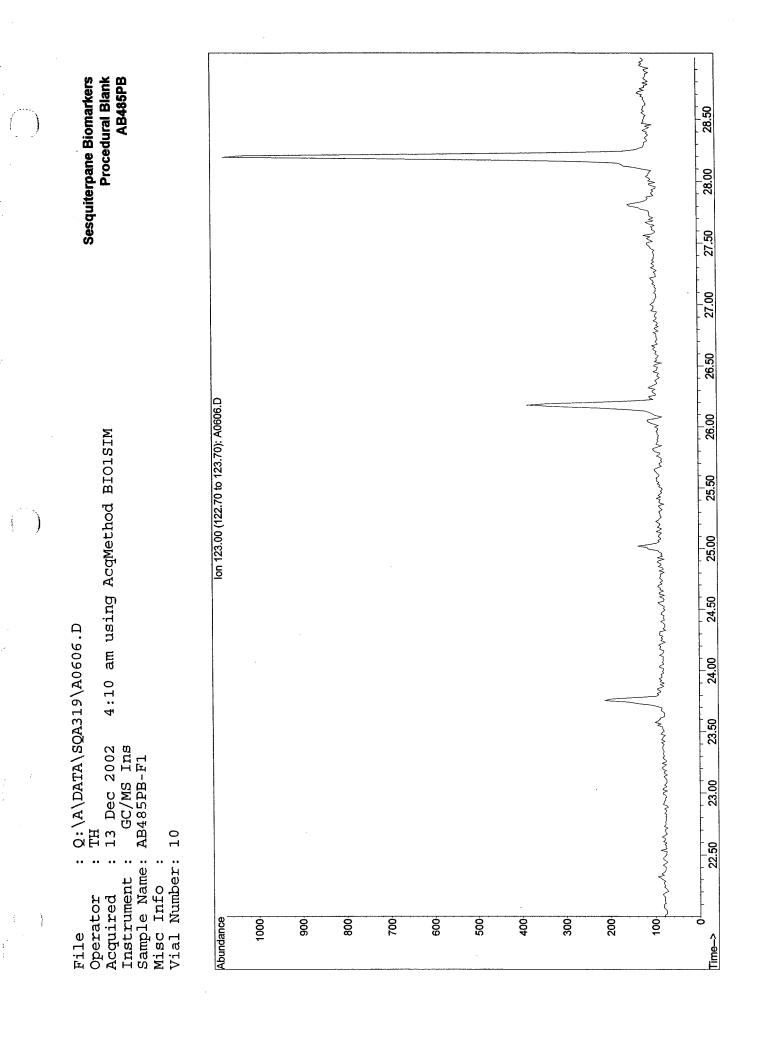


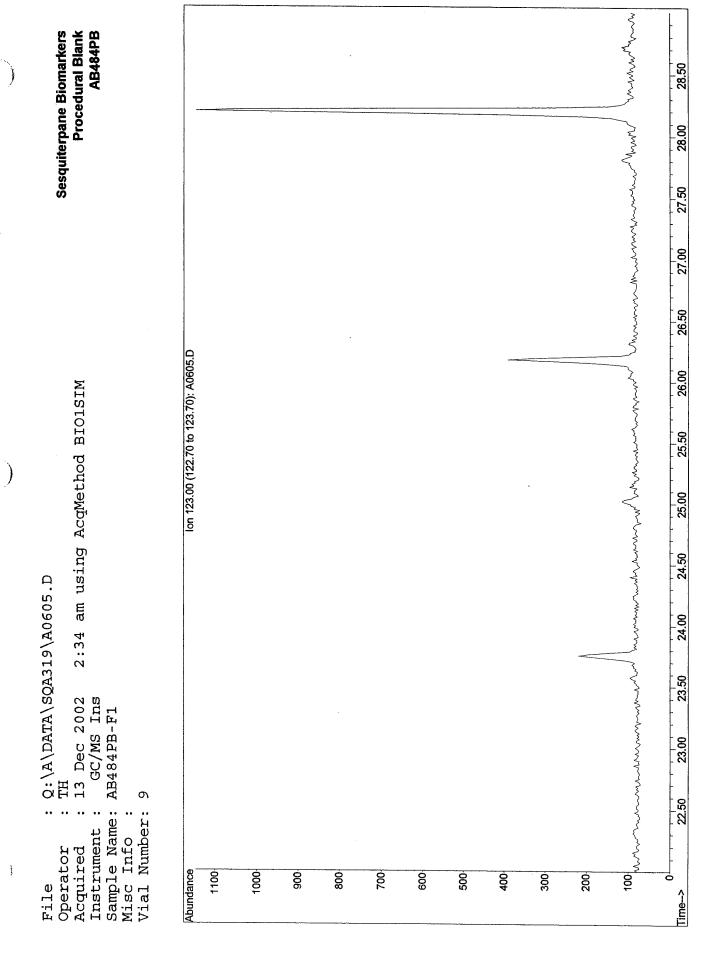


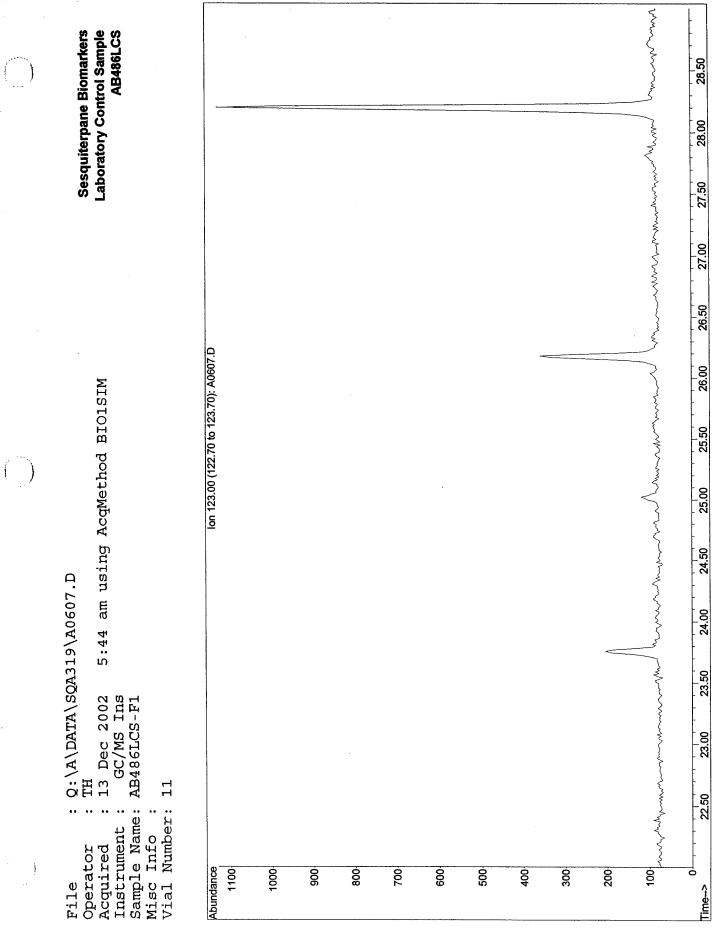


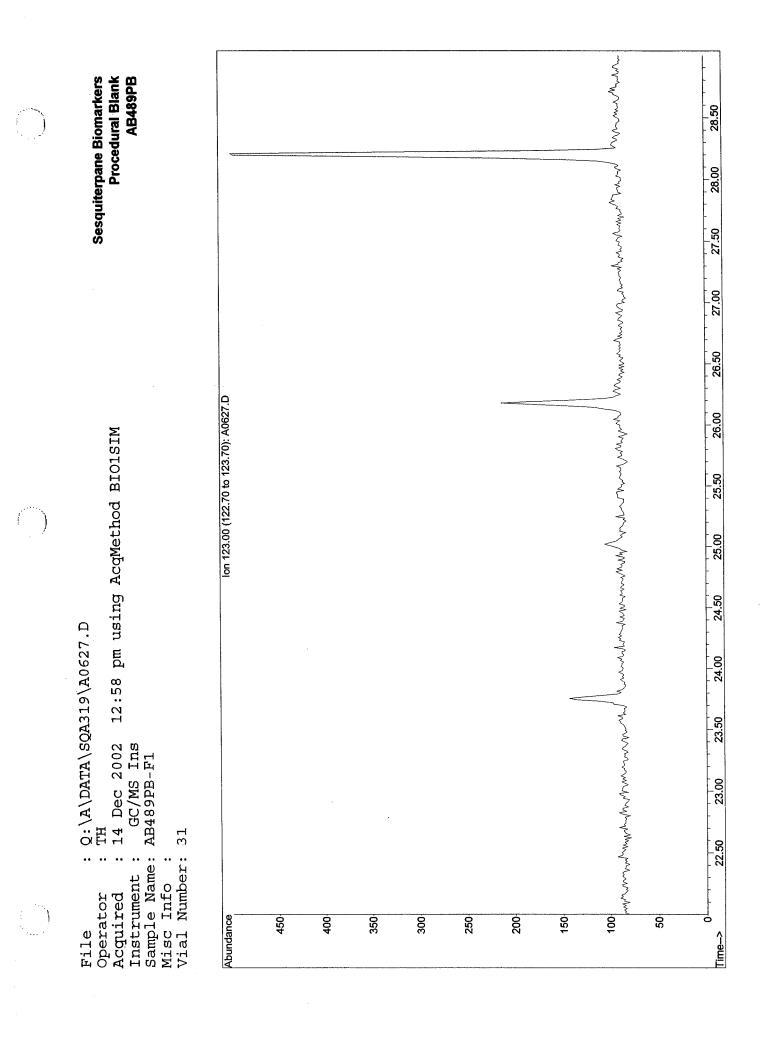


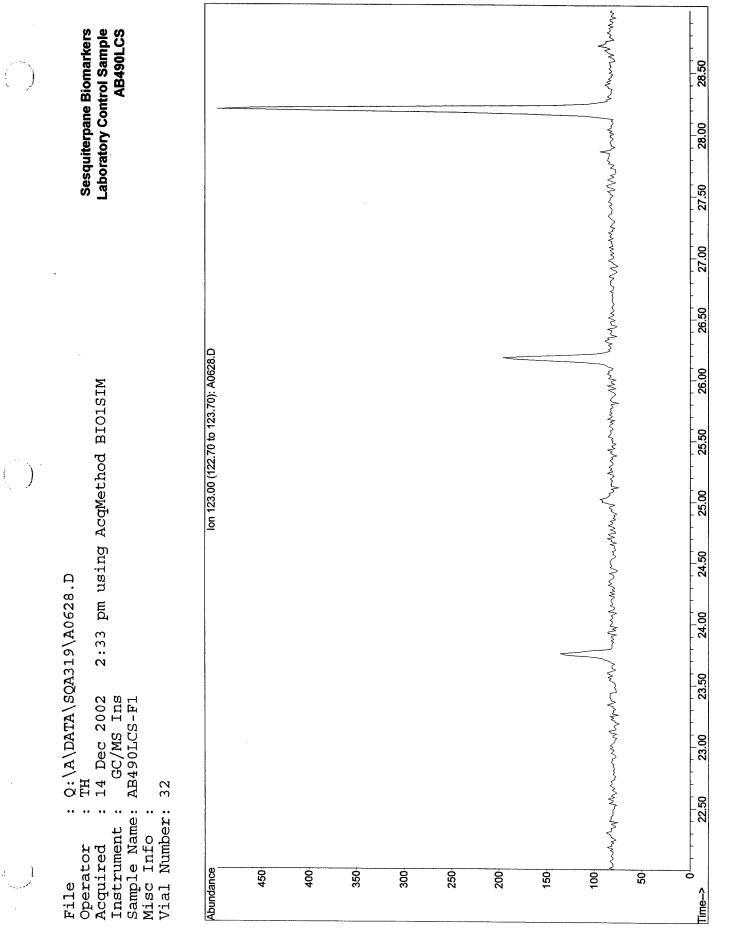




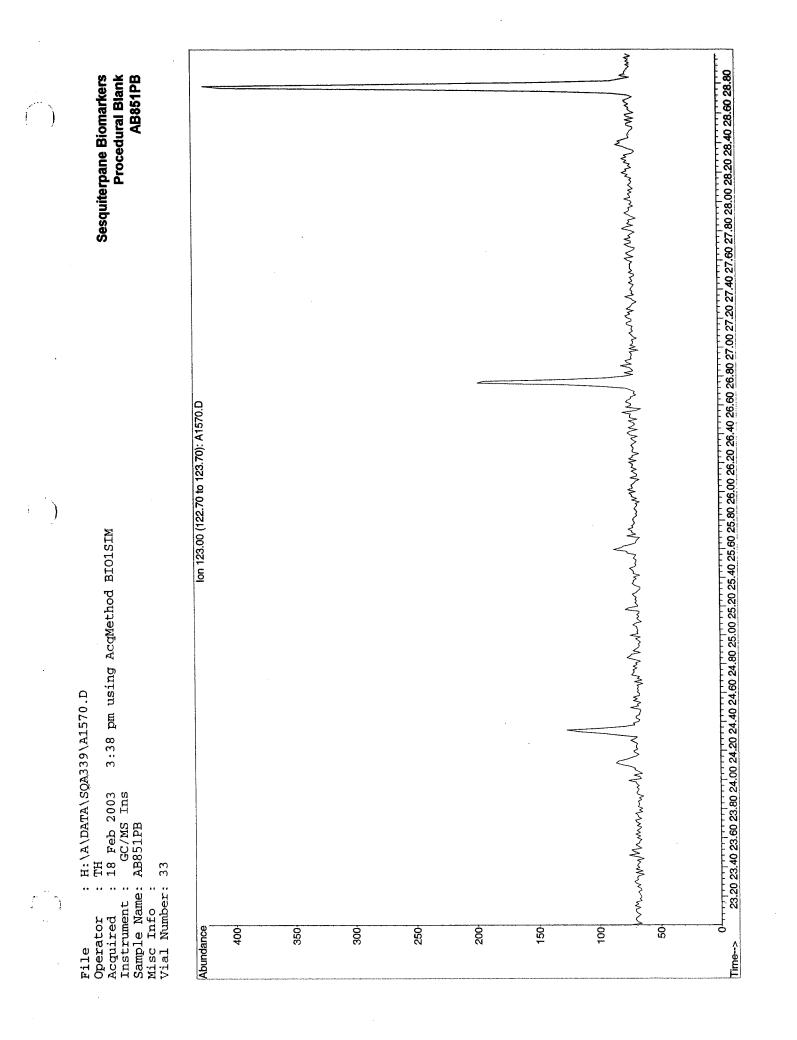


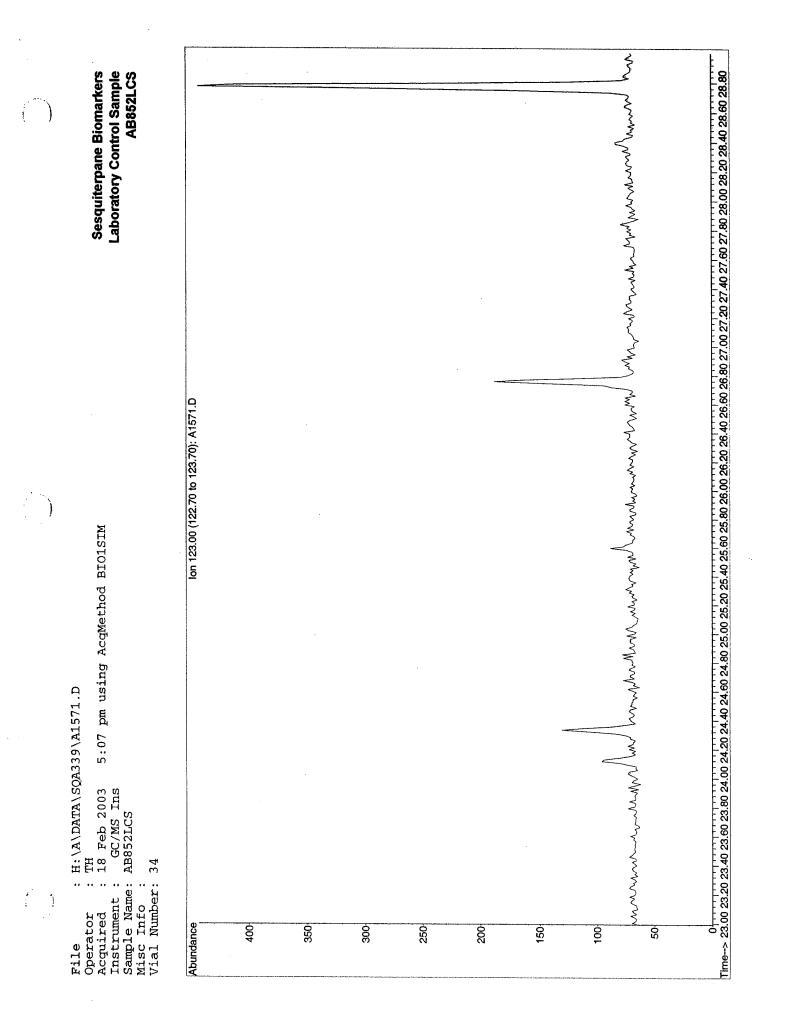


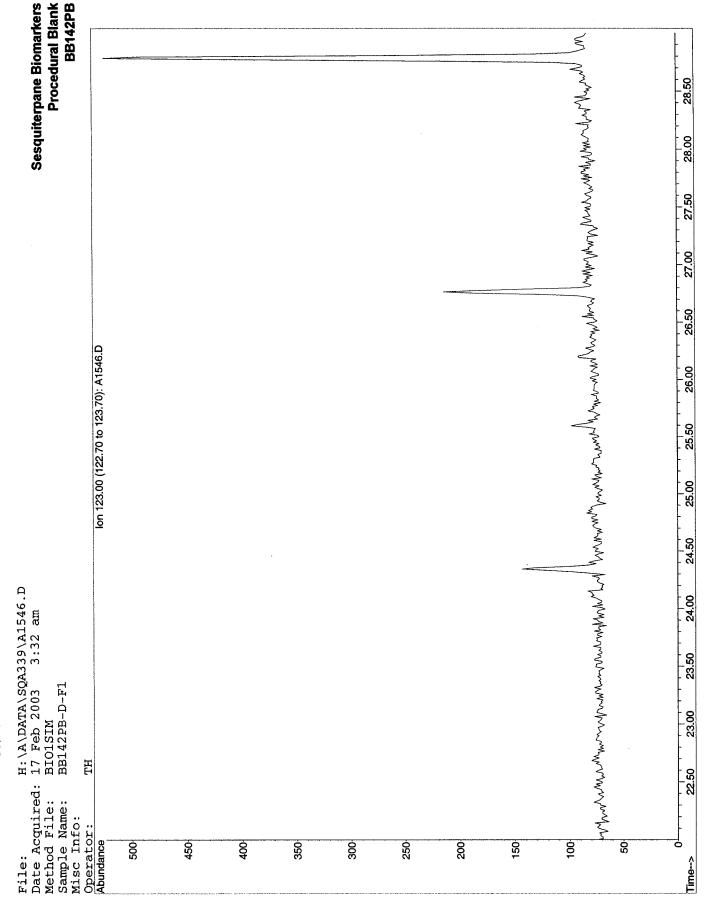


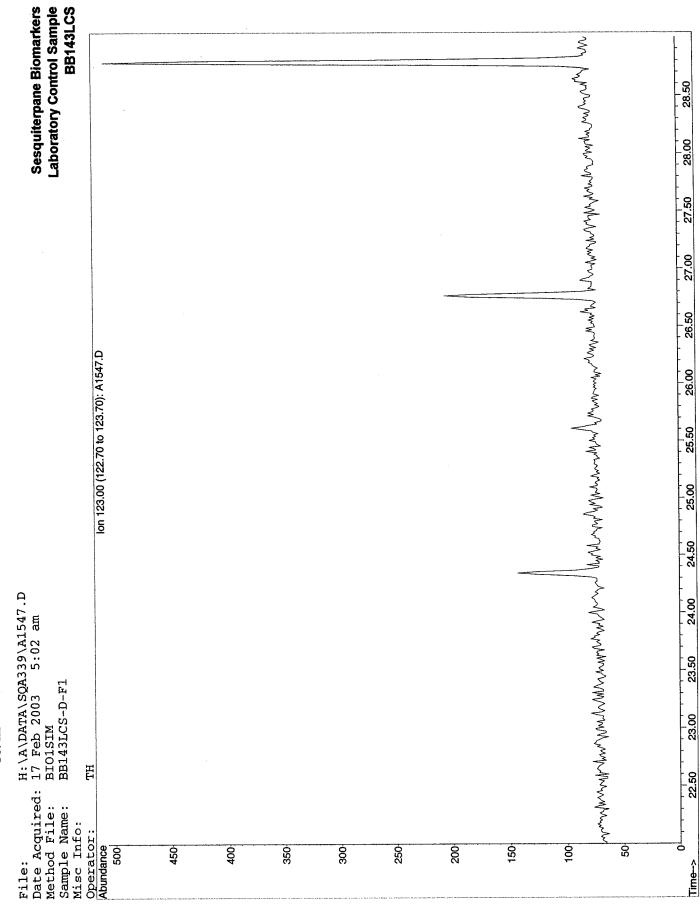


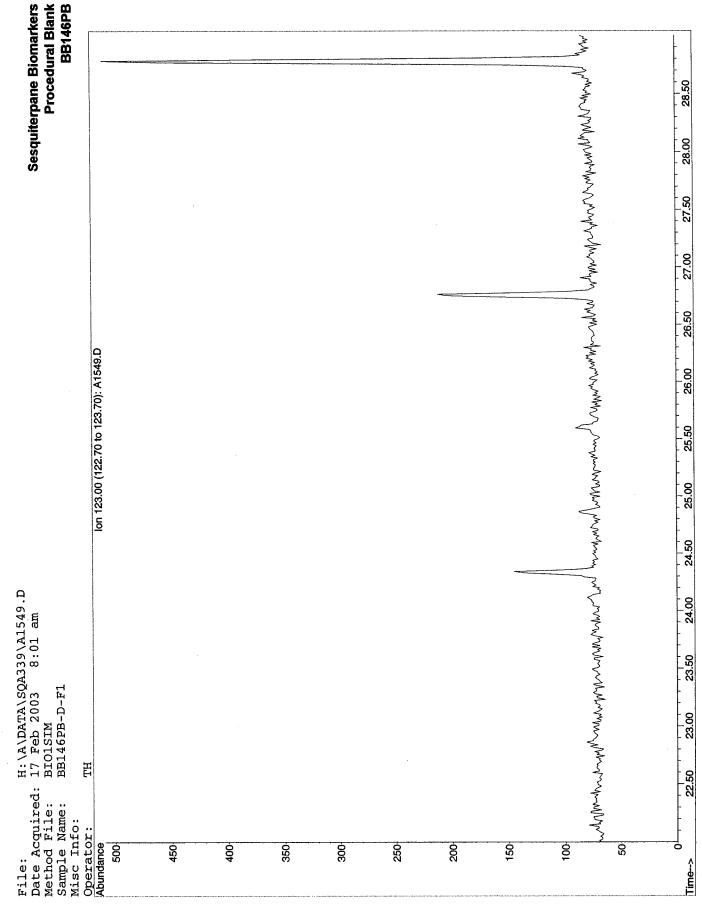
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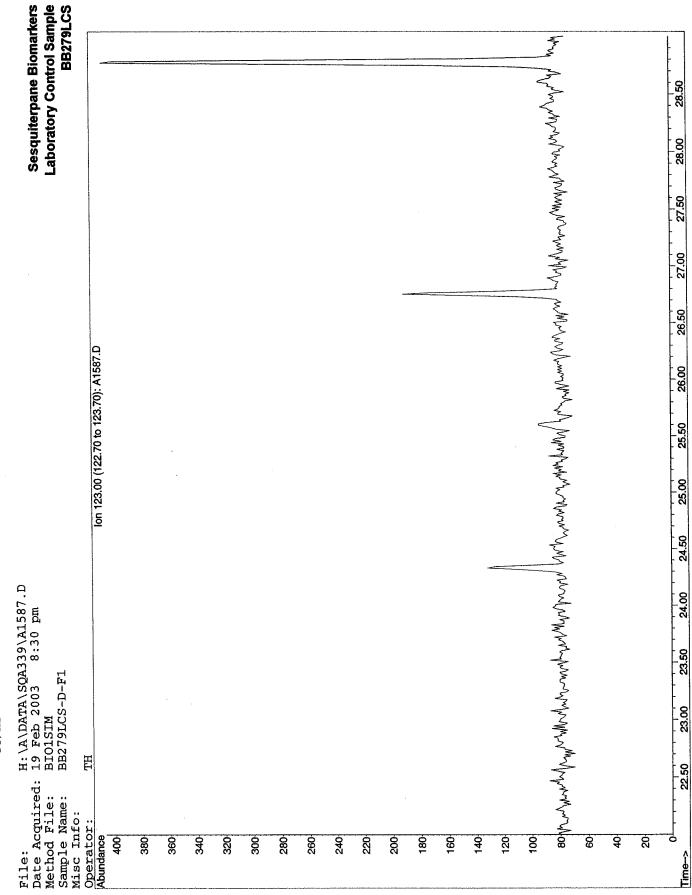


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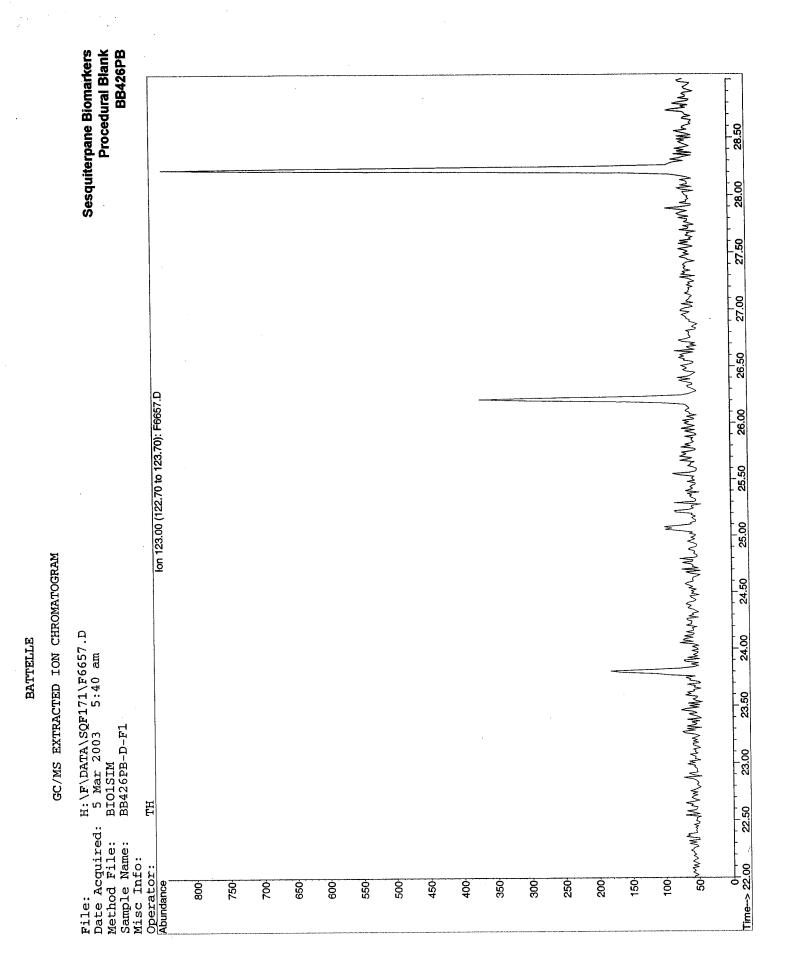
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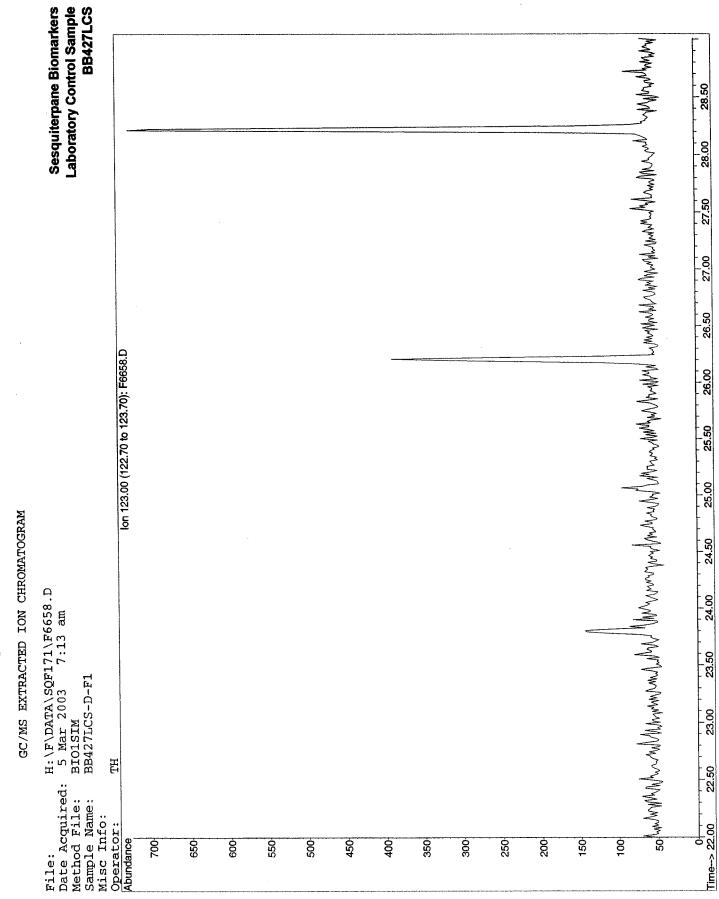
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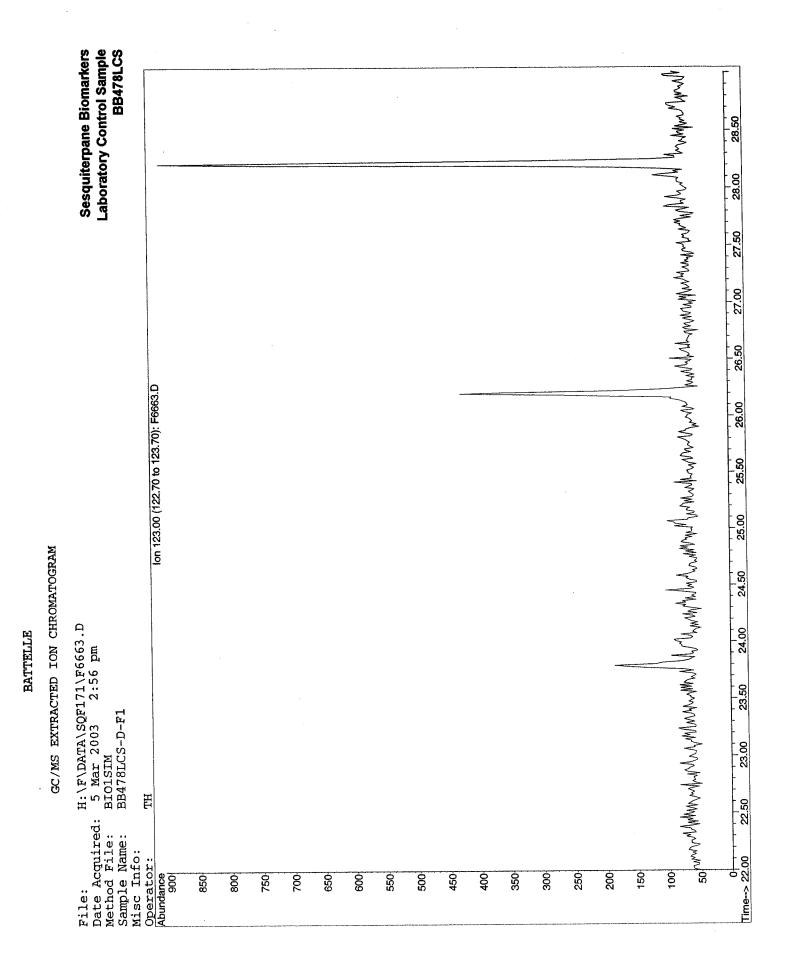


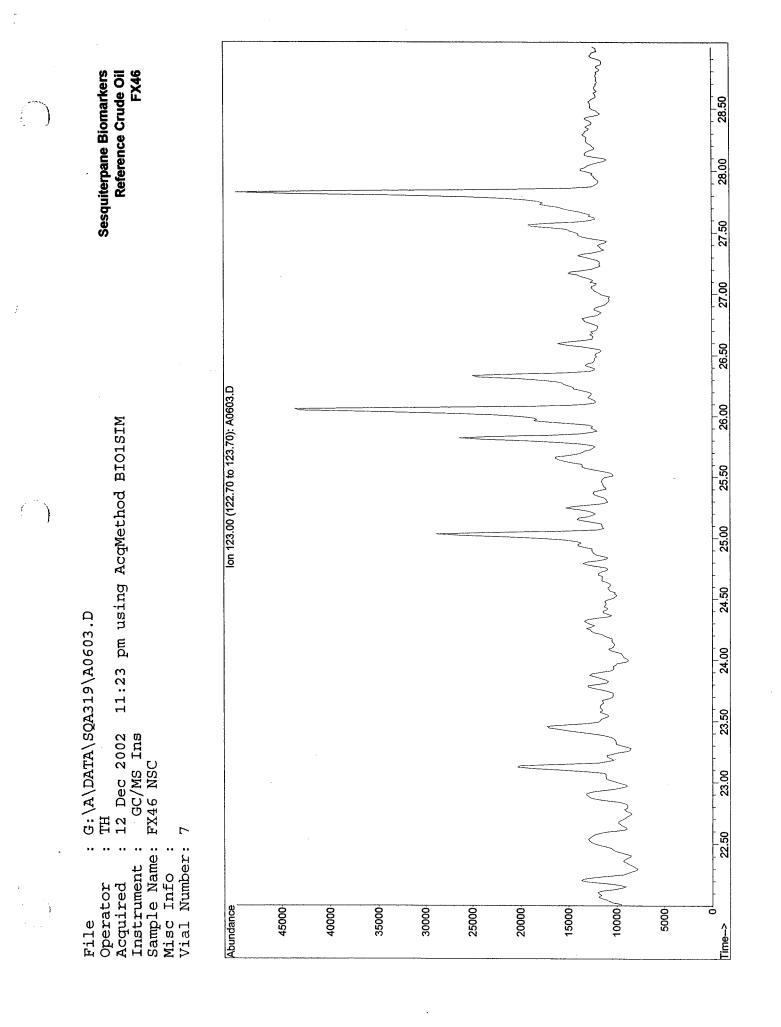
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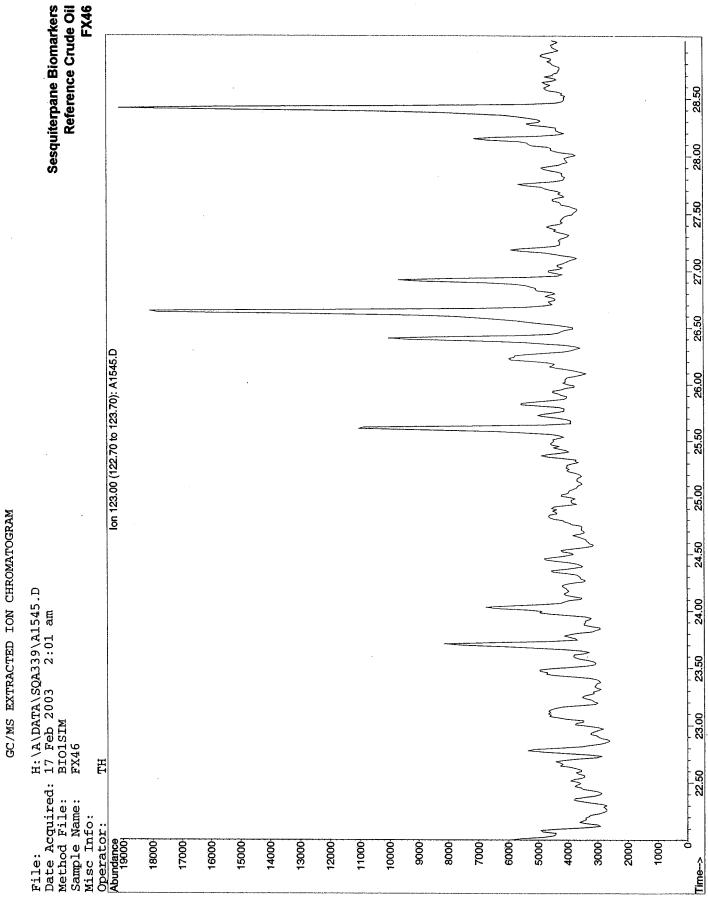


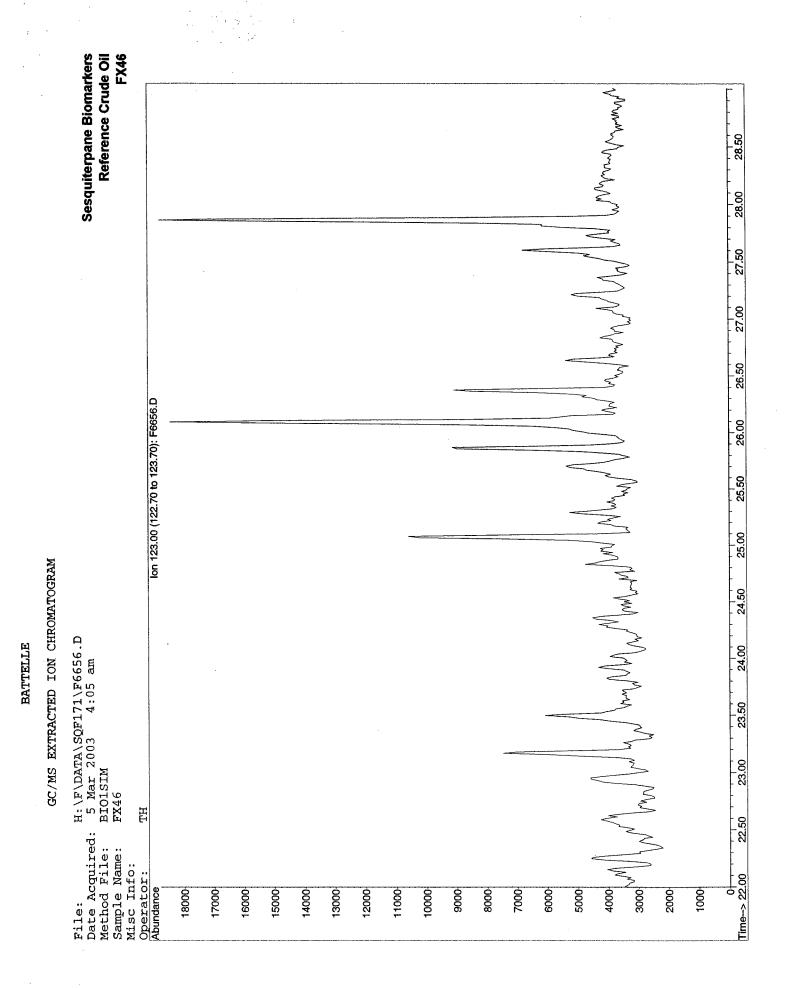


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PRIVILEGED AND CONFIDENTIAL Prepared in Anticipation of Litigation at the Request of Counsel



Duxbury Operations 397 Washington Street Duxbury, Massachusetts 02332 Telephone 781-934-0571 Fax: 781-934-2124

March 27, 2003

Harry E. Grant Riddell Williams P.S. 1001 Fourth Avenue Plaza, Suite 4500 Seattle, WA 98154-1065 Tel: (206) 624-3600 Fax: (206) 389-1708

RE: Lake Union Sediment Chemistry Study Raw Data Submittal

Dear Mr. Grant:

The enclosed deliverable includes selected raw data for the Lake Union Sediment Chemistry Study. It includes the high resolution hydrocarbon fingerprints, PAH concentrations, and biomarker (triterpane and sterane) fingerprints.

Please contact Scott Stout or me if you have any questions regarding this material. We can be reached by phone at (781) 934-0571.

Sincerely,

Stephen Emsbo-Mattingly, M.S.

cc: Mark Larsen (RETEC)

Battelle Sample ID Battelle Batch ID Associated Blank Field Date Recaipt Date Extraction Date Acquired Date Analytical Method Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalene C1-Naphthalenes C2-Naphthalenes C3-N	AB484PB 02-657 NA NA NA 11/122/02 12/14/02 8270M 8270M NA Sediment 10 q NA Sediment 10 q NA 2.5 µg/kg 0.282 J ND ND ND ND ND
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Receipt Date Extraction Date Acquired Date Acquired Date Acquired Date Acquired Date Analytical Method Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalene C1-Naphthalenes C3-Naphthalene	NA NA 11/22/02 12/14/02 8270M NA Sediment 10 q NA 2.5 µg/kg 0.282 J ND ND ND ND ND
Extraction Date Extraction Date Analytical Method Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalene C1-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes 2-Methytnaphthalene 1-Ethytnaphthalene 1-Ethytnaphthalene 1-Ethytnaphthalene 1-Storestytnaphthalene 1,Solimethytnaphthalene	11/22/02 12/14/02 8/2704 NA Sediment 10 g NA 2.5 µg/kg 0.282 J ND ND ND ND ND
Acquired Date Analytical Method Percent Solids Matrix Sampte Size Weight Basis Min Reporting Limit Amount Units Naphthalenes C2-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C4/C7-Dimethynaphthalenes C5/C7-Dimethynaphthalenes C3/C7-Dimethynaphthalenes C3/C7-Dimethynaphthalenes C3/C7-Dimethynaphthalenes C3-Nachapthalenes C3/C7-Dimethynaphthalenes C3/C7-Dimethy	12/14/02 8270M NA Sediment NA 2.5 .pg/kg 0.282 J ND ND ND ND
Analytical Melhod Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalene C1-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C4/C2-Direktlynaphthalenes C4/C2-Direktlynaphthalenes C4/C2-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C4/C3-Direktlynaphthalenes C3/C3-	6270M NA Sediment 10 g NA 2.5 ууу/кд 0.282 J ND ND ND ND ND ND
Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalenes C2-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalene C3-Naphthalen	NA Sediment 10 q NA 2.5 μg/kg 0.282 J ND ND ND ND ND ND
Matrix Sample Size Weight Basis Min Reporting Limit Amount Units Naphthalene C1-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes 2-Methynaphthalene 1-Ethynaphthalene 1-Ethynaphthalene 2.Si/2.7-Dimethynaphthalene 1.5-Dimethynaphthalene	Sediment 10 g NA 2.5 <u>Hg/kg</u> 0.282 J ND ND ND ND ND
Sample Size Weight Basis Min Reporting Limit Amount Units Of 1-Naphthalenes C2-Naphthalenes C3-Naphthalenes C3-Naphthalenes C4-Naphthalenes C4-Naphthalenes 2-Methynaphthalene 1-Methynaphthalene 2-Ethynaphthalene 2.6/2,7-Dimethynaphthalene 1,5-Dimethynaphthalene	10 g NA 2.5 µg/kg 0.282 J ND ND ND ND ND
Weight Basis Min Reporting Limit Amount Units Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes C3-Naphthalenes 2-Methynaphthalene 1-Eithynaphthalene 1-Eithynaphthalene 2-Eithynaphthalene 1-Strijmethynaphthalene 1,5-Dimethynaphthalene	NA 2.5
Min Reporting Limit Amount Units Amount Units C1-Naphthalenes C2-Naphthalenes C3-Naphthalenes C4-Naphthalenes 2-Metlynaphthalene 1-Metrynaphthalene 2-Ethynaphthalene 1-Ethynaphthalene 1-Strürnethynaphthalene 1,5-Dimethynaphthalene	2.5 µg/kg 0.282 J ND ND ND ND
Amount Units Naphihalenes C2-Naphihalenes C3-Naphihalenes C3-Naphihalenes C4-Naphihalenes 2-Methynaphihalene 1-Methynaphihalene 1-Ethylnaphihalene 1-Ethylnaphihalene 1.5C/Inmethylnaphihalene 1.5C/	µg/kg 0.282 J ND ND ND ND ND
C1-Naphthalenes C2-Naphthalenes C3-Naphthalenes C4-Naphthalenes 2-Melhyinaphthalene 2-Ethyinaphthalene 2-Ethyinaphthalene 3-6/27Direktivinaphthalene 1,5-Direktivinaphthalene Accenaphtwene	0.282 J ND ND ND ND ND
C1-Naphthalenes C2-Naphthalenes C3-Naphthalenes C4-Naphthalenes 2-Melhyinaphthalene 2-Ethyinaphthalene 2-Ethyinaphthalene 3-6/27Direktivinaphthalene 1,5-Direktivinaphthalene Accenaphtwene	ND ND ND ND ND
C2-Naphthalenes C3-Naphthalenes C4-Naphthalenes 2-Melfynaphthalene 1-Methynaphthalene 2-Ethynaphthalene 1-Ethynaphthalene 2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene	ND ND ND ND
C3-Naphthalenes C4-Naphthalenes 2-Methynaphthalene 1-Methynaphthalene 2-Ethynaphthalene 1-Ethynaphthalene 2.6/27.7-Direktynaphthalene 1.5-Dirnethynaphthalene Accenaphtwene	ND ND
2-Methynaphthalene 1-Methynaphthalene 2-Eithynaphthalene 1-Eithynaphthalene 2.6/2,7-Direkthynaphthalene 1,5-Dirnethynaphthalene Accenaphthyene	ND
1-Methylnaphthalene 2-Ethylnaphthalene 1-Ethylnaphthalene 2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene Acenaphthylene	
2-EthyInaphihalene 1-EthyInaphihalene 2,6/2,7-DimethyInaphIhalene 1,5-DimethyInaphIhalene AcenaphIhyIene	ND
1-Ethýinaphthalene 2,6/2,7-Dimethýinaphthalene 1,5-Dimethýinaphthalene Acenaphthylene	
2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene Acenaphthylene	ND
1.5-Dimethylnaphthalene Acenaphthylene	ND
Acenaphthylene	ND
	ND
Acenaphthene	ND
Biphenyl	ND ND
Dibenzofuran	ND
Cadalene	ND
Fluorene	ND
C1-Fluorenes	ND
C2-Fluorenes	ND
C3-Fluorenes	ND
2-Methylfluorene	ND
1-Methylfluorene	ND
Anthracene	ND
Phenanthrene	ND
C1-Phenanthrenes/Anthracenes	ND
C2-Phenanthrenes/Anthracenes C3-Phenanthrenes/Anthracenes	ND
C4-Phenanthrenes/Anthracenes	ND ND
3-Methylphenanthrene	ND
2/4- Melhylphenanthrene	ND
2-Methylanthracene	ND
9-Methylphenanthrene	ND
1-Methylphenanthrene	ND
2,7-Dimethylphenanthrene	ND
1,7-Dimethylphenanthrene	ND
Dibenzothiophene	ND
C1-Dibenzothiophenes	ND
C2-Dibenzothiophenes	ND
C3-Dibenzothiophenes C4-Dibenzothiophenes	ND
4-Methyldibenzolhiophene	ND ND
2/3-Methyldibenzothiophene	ND ND
1-Melhyldibenzothiophene	ND ND
Dehydroabielin(e)	ND
Relene	ND
Fluoranthene	ND
Pyrene	ND
Benzo(b)Nuorene	ND
C1-Fluoranthenes/Pyrenes	ND
C2-Fluoranthenes/Pyrenes	ND
C3-Fluoranthenes/Pyrenes Benzo(a)anthracene	ND
Benzolajanthracene Chrysene	ND ND
C1-Chrysenes	ND ND
C2-Chrysenes	ND
C3-Chrysenes	ND
C4-Chrysenes	ND
Benzo(b)fluoranthene	ND
Benzo(j/k)fluoranihene	ND
Benzo(a)fluoranthene	ND
Benzo(e)pyrene	ND
Benzo(a)pyrene	ND
Perviene	ND
Indeno(1,2,3-c,d)pyrene	ND
Dibenz(a,h)anthracene	ND
Benzo(g,h,i)perylene	ND

Surrogate Recoveries (%) Naphihalene-d8 Phenanihrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of OQ. B= Result >5 Sample RL.

Project Number N005443

Client Sample ID	Equipment Blank	
Battelle Sample ID		
Battelle Batch ID	AB485PB 02-667	
Associated Blank	AB484PB	
Field Date	NA	
Receipt Date Extraction Date	NA 11/22/02	
Acquired Date	12/14/02	
Analytical Method	8270M	
Percent Solids Matrix	NA	
Sample Size	Wipe 10 g	
Weight Basis	NA	
Min Reporting Limit Amount Units	2.5 µg/kg	
Naphihalene		
C1-Naphthalenes	1.47 J ND	
C2-Naphthaienes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes 2-Methylnaphthalene	ND	
1-Methylnaphthalene	ND ND	
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-DimethyInaphthalene 1,5-DimethyInaphthalene	ND ND	
Acenaphthylene	ND ND	
Acenaphthene	0.469 J	
Biphenyl Dibenzofuran	ND	
Cadalene	1.87 J ND	
Fluorene	1.6 J	
C1-Fluorenes	3.79	
C2-Fluorenes C3-Fluorenes	ND ND	
2-Methylfluorene	ND	
1-Methylfluorene	0.362 J	
Anthracene Phenanthrene	ND	
C1-Phenanthrenes/Anthracenes	13.4 3.98	
C2-Phenanthrenes/Anthracenes	ND	
C3-Phenanthrenes/Anthracenes C4-Phenanthrenes/Anthracenes	ND	
3-Methylphenanthrene	ND 0.975 J	
2/4-Methylphenanthrene	L 66.0	
2-Methylanthracene	ND	
9-Melhylphenanthrene 1-Melhylphenanthrene	0.852 J 0.579 J	
2,7-Dimethylphenanthrene	ND	
1,7-Dimethylphenanthrene	ND	
Dibenzothiophene C1-Dibenzothiophenes	0.964 J ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes 4-Methyldibenzothiophene	ND ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e) Retene	ND 0.991 J	
Fluoranthene	1.01 J	
Pyrene Benzo(b)fluorene	0.754 J ND	
C1-Fluoranthenes/Pyrenes	ND ND	
C2-Fluoranthenes/Pyrenes	ND	
C3-Fluoranthenes/Pyrenes Benzo(a)anthracene	ND	
Chrysene	ND ND	
C1-Chrysenes	ND	
C2-Chrysenes	ND	
C3-Chrysenes C4-Chrysenes	ND ND	
Benzo(b)fluoranthene	ND ND	
Benzo(j/k)/luoranthene	ND	
Benzo(a)fluoranthene Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND ND	
Perviene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene Benzo(g,h,i)perylene	ND ND	
	NU	

Surrogale Recoveries (%) Naphlhalene-d8 Phenanihrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5°Sample RL.

Project Number N005443

	l aba				
Client Sample ID	Labo	ratory Control Sample			
Battelle Sample ID		AB486LCS			
Battelle Batch ID		02-667			
Associated Blank		AB484PB			
Field Date		NA			
Receipt Date		NA			
Extraction Date		11/22/02			
Acquired Date Analytical Method		12/14/02			
Percent Solids		8270M			
Matrix		NA Sediment			
Sample Size			~		
Weight Basis		10 NA	y		
Min Reporting Limit		25			
Amount Units	FW67	ng		% Recovery Q	
Naphthalene	1001	879		88	
C1-Naphthalenes		1090			
C2-Naphthalenes			ND		
C3-Naphthalenes			ND		
C4-Naphthalenes 2-Methytnaphthalene			ND		
1-Methylnaphthalene		565 523			
2-Ethylnaphthalene			ND		
1-Ethylnaphthalene			ND		
2,6/2,7-Dimethylnaphthalene			ND		
1,5-Dimethylnaphthalene			ND		
Acenaphthylene	1000	890		89	
Acenaphthene	1000	905		90	
Biphenyl	1003	904		90	
Dibenzofuran			ND		
Cadalene Fluorene	4003		ND		
Fluorene C1-Fluorenes	1001	936		94	
C1-Fluorenes			ND		
C3-Fluorenes			ND ND		
2-Methylfluorene			ND		
1-Methylfluorene			ND		
Anthracene	1000	955		95	
Phenanthrene	1000	956		96	
C1-Phenanthrenes/Anthracenes			ND		
C2-Phenanthrenes/Anthracenes			ND		
C3-Phenanthrenes/Anthracenes			ND		
C4-Phenanthrenes/Anthracenes 3-Methylphenanthrene			ND		
2/4-Methylphenanthrene			ND ND		
2-Methylanthracene			ND		
9-Methylphenanthrane			ND		
1-Methylphenanthrene		687			
2,7-Dimethylphenanthrene			ND		
1,7-Dimethylphenanthrene			ND		
Dibenzothiophene			ND		
C1-Dibenzothiophenes			ND		
C2-Dibenzothlophenes			ND		
C3-Dibenzothiophenes			ND		
C4-Dibenzothiophenes 4-Methyldibenzothiophene			ND		
2/3-Methyldibenzothiophene			ND ND		
1-Methyldibenzothiophene			ND		
Dehydroabietin(e)			ND		
Retene			ND		
Fluoranthene	1000	1020		102	
Pyrene	1000	1020		102	
Benzo(b)fluorene			ND		
C1-Fluoranthenes/Pyrenes			ND		
C2-Fluoranthenes/Pyrenes			ND		
			ND		
C3-Fluoranthenes/Pyrenes Benzo(a)anthracene	1001	4040		104	
Benzo(a)anthracene	1001	1040		104	
Benzo(a)anthracene Chrysene	1001 1001	1020		104 102	
Benzo(a)anthracene Chrysene C1-Chrysenes		1020	ND		
Benzo(a)anthracene Chrysene		1020			
Benzo(a)anthracene Chrysene C1-Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes	1001	1020	ND ND		
Benzo(a)anthracene Chrysene C1-Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b)fluoranthene	1001	1020	ND ND ND	102 108	
Benzo(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b)lluoranihene Benzo(k)fluoranthene	1001	1020	ND ND ND ND	102	
Benzca(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzca(b)fluoranthene Benzca(b)fluoranthene	1001 1001 1000	1020 1080 1080	ND ND ND	102 108 108	
Benzo(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b)/uoranthene Benzo(a)/luoranthene Benzo(a)/luoranthene Benzo(a)/uoranthene	1001 1001 1000 989	1020 1080 1080 1040	ND ND ND ND	102 108 108 105	
Benzo(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b/liuoranthene Benzo(a)(luoranthene Benzo(a)(luoranthene Benzo(a)(symene Benzo(a))gymene	1001 1001 1000 989 1001	1020 1080 1080 1080 1040 1080	ND ND ND ND	102 108 108 105 108	
Benzo(a)anthracene Chrysenes C1-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b)/luoranthene Benzo(b)/luoranthene Benzo(a)/luoranthene Benzo(a)/luoranthene Benzo(a)/pyrene Benzo(a)pyrene Perylene	1001 1001 1000 989 1001 1000	1020 1080 1080 1080 1080 1080 1080	ND ND ND ND	102 108 108 105 108 102	
Benzo(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/III and the set of the	1001 1001 1000 989 1001 1000 1001	1020 1080 1080 1040 1080 1040 1080 1020 997	ND ND ND ND	102 108 108 105 108 102 100	
Benzc(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)grene Benzc(a)pyrene Benzc(a)pyrene Perylene Indenc(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	1001 1001 1000 989 1001 1000	1020 1080 1080 1040 1080 1020 997 1070	ND ND ND ND	102 108 105 108 102 100 107	
Benzo(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzo(b/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/Iluoranthene Benzo(a)/III and the set of the	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1080 1040 1080 1040 1080 1020 997	ND ND ND ND	102 108 108 105 108 102 100	
Benzc(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)grene Benzc(a)pyrene Benzc(a)pyrene Perylene Indenc(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1080 1040 1080 1020 997 1070	ND ND ND ND	102 108 105 108 102 100 107	
Benzc/a)anthracene Chrysenes C1-Chrysenes C2-Chrysenes C3-Chrysenes Benzc/bi/uoranthene Benzc/i/ki/luoranthene Benzc/a)ryene Benzc/a)ryene Benzc/a)ryene Benzc/a)ryene Dibenz(a,h)anthracene Benzc/a,h)ryene Dibenz(a,h)anthracene Benzc/g,h,i)perylene	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1080 1040 1080 1020 997 1070 998	ND ND ND ND	102 108 105 108 102 100 107	
Benzc(a)anthracene Chrysenes C1-Chrysenes C3-Chrysenes C4-Chrysenes Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)pyrene Perytene Indenc(1,2,3-c,d)pyrene Dibenz(a,h)anthracene Benzc(a),h)renytene Surrogate Recoveries (%) Napthalainen-38	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1080 1080 1020 997 1070 998 88	ND ND ND ND	102 108 105 108 102 100 107	
Benzc(a)anthracene Chrysenes C2-Chrysenes C3-Chrysenes C4-Chrysenes Benzc(b)/luoranthene Benzc(a)/luoranthene Benzc(a)/purene Benzc(a)/purene Benzc(a)/purene Dibenz(a,h)anthracene Benzc(a),hi)perylene Dibenz(a,h)anthracene Benzc(a,h,i)perylene	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1040 1080 1020 997 1070 998 88 88	ND ND ND ND	102 108 105 108 102 100 107	
Benzc(a)anthracene Chrysenes C1-Chrysenes C3-Chrysenes C4-Chrysenes Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)fuoranthene Benzc(a)pyrene Perytene Indenc(1,2,3-c,d)pyrene Dibenz(a,h)anthracene Benzc(a),h)renytene Surrogate Recoveries (%) Napthalainen-38	1001 1001 1000 989 1001 1000 1001 1000	1020 1080 1080 1080 1020 997 1070 998 88	ND ND ND ND	102 108 105 108 102 100 107	

J=Result < Sample RL. ND= Not Detected. NA≖ Not Applicable. &≖ Outside of DQO.

Construction Technology To Work Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	NLU-104-SS-0010	NLU-104-SS-0010		
Battelle Sample ID	U0142	U0142DUP		
Battelle Batch ID	02-667	02-667		
Associated Blank	AB484PB	AB484PB		
Field Date	11/12/02	11/12/02		
Receipt Date	11/15/02	11/15/02		
Extraction Date	11/22/02	11/22/02		
Acquired Date	12/14/02	12/14/02		
Analylical Method	8270M	8270M		
Percent Solids	13.3 %	13.3 %		
Matrix	Sediment	Sediment		
Sample Size	4.02 g	4.07 g		
Weight Basis	DRY	DRY		
Min Reporting Limit Amount Units	25.9	19.2		_
	µg/kg	µg/kg	RPD(%)	Q
Naphthalene	1010	740	30.8	&
C1-Naphthalenes	269	204	27.5	
C2-Naphthalenes	334	284	16.2	
C3-Naphthalenes	308	260	16.9	
C4-Naphthalenes	355	276	25	
2-Melhylnaphthalene	172	133	25.6	
1-Melhylnaphthalene	90.1	69	NA	
2-Ethylnaphthalene	13.1 J	15 J	NA	
1-Ethylnaphthalene	5.19 J	3.96 J	NA	
2,6/2,7-Dimethylnaphthalene	149	130	13.6	
1,5-Dimethylnaphthalene	13.1 J	10.4 J	NA	
Acenaphthylene	451	357	23.3	
Acenaphthene	272	217	22.5	
Biphenyl	163	119	31.2	8
Dibenzofuran	120	92.2	NA	
Cadalene	7.06 J	7.16 J	NA	
Fluorene	213	174	20.2	
C1-Fluorenes	151	142	6.14	
C2-Fluorenes	278	200	32.6	8
C3-Fluorenes	390 ME	253 ME	42.6	8
2-Methylfluorene	34.9	18.9 J	NA	
1-Methylfluorene	33.1	26	NA	
Anthracene	677	531	24.2	
Phenanthrene	1560	1270	20.5	
C1-Phenanthrenes/Anthracenes	730	583	22.4	
C2-Phenanthrenes/Anthracenes	629	664	22.1	
C3-Phenanthrenes/Anthracenes	586	451	26,4	
C4-Phenanthrenes/Anthracenes	503	362	32.6	&
3-Methylphenanthrene	139	105	27.9	
2/4-Methylphenanthrene	152	118	25.2	
2-Melhylanthracene	98.4	78.3	NA	
-Methylphenanthrene	186	147	24.5	
1-Methylphenanthrene	103	81.1	NA NA	
2,7-Dimethylphenanthrene	91.6	77.0	NA	
1,7-Dimethylphenanthrene	58.1	45.4	NA	
Dibenzothiophene	220	169	26.2	
C1-Dibenzothiophenes	194	142	31	8
C2-Dibenzothiophenes	301	224	29.3	-
C3-Dibenzolhiophenes	423	377	11.5	
C4-Dibenzolhiophenes	338	217	43.6	8
4-Methyldibenzothiophene	56.8	39.3	43.0 NA	-
2/3-Methyldibenzolhiophene	59.4	59.2	NA	
I-Methyldibenzothiophene	17.6 J	14.2 J	NA	
Dehydroabielin(e)	ND	ND		
Relens	57.5	37.2	NA	
luoranthene	5390	4060	28.1	
Pyrene	6720	5130	26,8	
Benzo(b)fluorene	253	190	26.6	
C1-Fluoranthenes/Pyrenes	2120	1690	20.4	
2-Fluoranthenes/Pyrenes	994	770	22.0	
C3-Fluoranthenes/Pyrenes	596	343	25.4 53.9	&
Benzo(a)anthracene	2500	1960	24.2	u
Chrysene	2800	2220	24.2	
C1-Chrysenes	1060	2220 845	23.1	
C2-Chrysenes	770	645 724	22.6 6.16	
C3-Chrysenes	722	486	39,1	8
24-Chrysenes	295			
Benzo(b)fluoranthene	3730	210 2900	33.7	&
Benzo(j/k)fluoranthene	3530	2900	25 25.2	
Benzo(a)fluoranthene	816			
Benzo(e)pyrene	3940	660 3030	21.1	
Benzo(a)pyrene	5100	4030	26.1	
Perviene	1810		23.4	
ndeno(1,2,3-c,d)pyrene	4350	1420	24.1	
Dibenz(a,h)anthracene		3440	23,4	
Benzo(g,h,i)perviene	612 4660	490 3670	22.1 23.8	
·····	4000	30/0	£3.8	
Surrogate Recoveries (%)				
Naphthalene-d8	76	84	10	
Phenanthrene-d10	66	76	17	
Chrysene-d12	78	95	19	
	110	96	14	
5b(H)-Cholane				
5b(H)-Cholane				
ib(H}-Cholane I≈Result < Sample RL.				
ib(H)-Cholane I=Result < Sample RL. 3≖Result < 5 x PB.				
b(H}-Cholane I=Result < Sample RL. 3≉Result < 5 x PB. ID≈ Not Detected.				
ib(H)-Cholane I=Result < Sample RL. 3≖Result < 5 x PB.				

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Clent Sample (D Procedural Blank Batelie Sample (D AB469PB Batelie Sample (D C C486 Associated Blank N NA NA Patelie Sample (D C C486 Associated Blank N NA Patelie Sample (D C C486 Associated Blank N NA Patelie Sample (D C C486 11/2202 Associated Blank N NA Patelie Sample (D C C486 11/2202 Associated Blank N NA Patelie Sample (D C C486 N NA Patelie N NA Patelie NA			
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Edracion Dale 11/22/02 Acquired Dale 12/16/02 Analylical Method 8270M Percent Solis NA Matrix Sodiment Sample Size 3.00 g Weight Basis DRY Min Reporting Limit 6.33 Amount Units Ug/92 Naphthalene 1.17 J C2-Naphthalenes ND C2-Naphthalenes D C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Naphthalene ND C2-Maphthalene ND C2-Maphthalene ND C3-Kurornes ND C3-Kurornes ND C3-Kurornes ND C3-Kurornes ND C3-Kurornes ND C3-Hurornes ND C4-Phenanthrenes Anthracenes ND C4-Phenanthrenes ND C4-Phenanthrenes ND C4-Phenanthrenes ND C4-Diencothiophene ND C4-Diencothi			
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C4-Chrvenes ND Berazo(h)/luoranihane ND Berazo(h)/luoranihane ND Berazo(a)/luoranihane ND Berazo(a)/luoranihane ND Berazo(a)/luoranihane ND Berazo(a)/luoranihane ND Berazo(a)/luoranihane ND Berazo(a)/luoranihane ND Jerazo(a)/luoranihane ND Jerayona ND Johnson, 12, 3-c, d)pyrene ND Johnson, 2-d, d)/luoraniharacene ND	C2-Chrysenes	ND)
Berac(a)(U)(u)ranthene ND Berac(a)(U)(u)ranthene ND Berac(a)(u)ranthene ND Berac(a)(u)ranthene ND Berac(a)(u)ranthene ND Berac(a)(u)ranthene ND Berac(a)(u)ranthene ND Derac(a)(u)ranthene ND Derac(a)(u)ranthene ND Disen(a)(a)(a)(a)(a)(a)(a)(a)(a)(a)(a)(a)(a)(
Berzo(a)/(x/kluoranthene ND Berzo(a)/(xoranthene ND Berzo(a)/(xoranthene ND Berzo(a)/(xoranthene ND Pervicene ND Pervicene ND Indenci,1,2,3-c,d)pyrene ND Diberz(a,h)anthracene ND			
Berzo(a)/fuoranthene ND Berzo(a)/ryrene ND Berzo(a)/ryrene ND Perdene ND Indeno(1,2,3-c,d)pyrene ND Diben2(a,h)/anthracene ND			
Benzo(a)pyrene ND Benzo(a)pyrene ND Pervlene ND Indenc(1,2,3-c,d)pyrene ND Dibenz(a,h)anitracene ND	Benzo(a)fluoran(hene		
Perylene ND Indeno(1,2,3-c,d)pyrene ND Diberx(a,h)anitracene ND	Benzo(e)pyrene	ND)
Indeno(1,2,3-c,d)pyrene ND Dibenz(a,h)anlhracene ND			
Dibenz(a,h)anthracene ND	Perviene		

Surrogate Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Resuli < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. B≔ Result >5°Sample RL.

Point References
 Anning Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

	AB490LCS 02-868 AB489PB NA NA 11/22/02 12/18/02 8270M		
	02-668 AB489PB NA NA 11/22/02 12/18/02		
	NA NA 11/22/02 12/18/02		
	NA 11/22/02 12/18/02		
	11/22/02 12/18/02		
	12/18/02		
	NA		
	Sediment		
	1.00		
	OIL		
01/07	25.00		
FW67	ng	% Recovery Q	
1001	944	94	
1000			
	ND		
1001	991	99	
1000			
1000	997	100	
	ND)	
4000			
1000			
	ND	1	
	1140	114	
1001			
1001	\$100	110	
1000	1110	111	
080			
1001	1020 921	102 92	
	828	92 83	
1001		96	
1001	960		
	1000 1000 1003 1001 1000 1000 1000 1000	1001 944 1180 NC NC NC NC NC NC NC NC NC NC	1001 944 1180 94 ND ND ND ND ND ND ND ND ND ND ND ND ND

Battelle

Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID NLU-112-SS-2030 NLU-112-SS-2030 Battelle Sample ID Battelle Batch ID U0101 U0101DUP U0101 02-668 AB489PB 37574 37575 37582 613.72153 U0101DUP 02-668 AB489PB 37574 37575 37582 Associated Blank Field Date Receipt Date Receipt Date Extraction Date Acquired Date Analytical Method Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units 37613 37609.75694 8270M 8270M 18.29 % 18.29 % Sediment 1.93 g DRY 5ediment 1.95 g DRY 45.80 40.50 µg/kg RPD(%) Q µg/kg Naphthalene C1-Naphthalenes C2-Naphthalenes C3-Naphthalenes C4-Naphthalenes 2-Metlyknaphthalene 1-Metlyknaphthalene 1-Ethyknaphthalene 1-Ethyknaphthalene 1-Ethyknaphthalene 1.5Dimethyknaphthalene Acenaphthylene 22600 4000 21600 24400 10300 23300 3.05 1.49 4.52 1.22 1.92 0.862 3.55 9.18 6.66 5.22 6.76 9.73 5.02 4.02 1.82 4060 22600 24700 10500 2330 1720 402 7470 8080 55100 4060 3270 10500 7750 299000 299000 2370 60100 D 299000 239000 D 255100 2310 1660 426 378 7090 1000 7330 52400 3900 3330 90 28000 Acenanhlhviene Acenaphthene Acenaphthene Biphenyt Dibenzofuran Cadalene Fluorene C1-Fluorenes C2-Fluorenes C3-Fluorenes 2-Methylfluorene 1-Methylfluorene NA 3.51 2.9 1.92 5.15 11.5 2.91 9.86 9.82 1.08 5.74 4.87 2.56 4.14 1.37 0 1.65 7.79 2.85 2.79 0.285 2.79 0.287 0.287 0.287 10200 7900 5490 5490 1890 2440 D 271000 D 55500 25400 8810 3160 14200 14700 6590 Anthracene Phenanthrene Phenanthrene C1-Phenanthrenes/Anthracenes C2-Phenanthrenes/Anthracenes C3-Phenanthrenes/Anthracenes C4-Phenanthrenes/Anthracenes 3-Methylphenanthrene 2-Methylphenanthrene 1-Methylphenanthrene 1-Methylphenanthrene 9250 3080 14800 14500 6590 6590 6590 12000 7200 1940 2000 38100 10600 7490 3980 12200 6860 1670 1850 39200 10900 7510 4010 1260 3650 4060 1020 2,7-Dimethylphenanthrene 1.7-Dimethytphenanthrene 1.7-Dimethytphenanhtrene Dibenzothiophene C1-Dibenzothiophenes C2-Dibenzothiophenes C3-Dibenzothiophenes C4-Dibenzothiophenes 2/3-Methytdibenzothiophene 2/3-Methytdibenzothiophene Dehytphanaktin(e) Refere 3980 1210 3590 4.05 1.66 1.74 1.94 3990 1040 ND ND ND 1020 294000 D 358000 D 7930 62000 11600 2580 NC 617 322000 D 395000 D 8050 81700 49.2 9.09 10.4 1.5 0.485 Retene Fluoranthene 8 Telena Proteina Filooranthenes Prone Berzo(b)fluorene C1-Filouranthenes/Pyrenes C3-Filouranthenes/Pyrenes Berzo(a)anitracene C1-Chrysenes C3-Chrysenes C3-Chrysenes C3-Chrysenes Berzo(a)fluoranthene 12300 5.86 4.84 10.6 8.34 8.59 0.154 7.05 3580 62400 D 79400 D 17600 3750 3750 89400 D 84800 D 18800 6480 2350 6490 2190 ND 50800 D 60300 D 19700 62400 D 106000 D 34000 79100 D 3490 2190 2350 ND 54100 D 66600 D 21100 75000 D 118000 D 6.29 9.93 6.88 16.3 10.7 5.44 8.25 1.34 35900 84200 D 3740 97600 D 3690 94700 D 3.22 Surrogate Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane 86 90 101 91 87 85 99 96 1.02 5.79 2.55 5.08 J=Result < Sample RL. B=Result < 5 x PB. ND= Not Detected. NA= Not Applicable. &= Outside of DOO

Not Surrogate Corrected DUP results

ME= Matrix Interference. Estimated Value.

Project Number N005443

Client Sample ID	Procedural Blank	(
Battelle Sample ID	AB851PB	3
Battelle Batch ID	03-0023	
Associated Blank	NA	N
Field Date	NA	
Receipt Date	NA	
Extraction Date Acquired Date	01/09/03	
Acquired Date Analylical Method	02/25/03	
Percent Solids	8270M NA	
Matrix	Sediment	
Sample Size		a a a a a a a a a a a a a a a a a a a
Weight Basis	NA	
Min Reporting Limit	3.61	i
Amount Units	µg/kg	I
Naphthalene	2.18	
C1-Naphthalenes	2.23	
C2-Naphthalenes C3-Naphthalenes		ND
C4-Naphthalenes		ND ND
2-Melhyinaphthalene	1.38	
1-Methylnaphthalene	0.723	
2-Elhyinaphthalene	0.723	, J ND
1-Ethylnaphthalene		ND
2,6/2,7-Dimethylnaphthalene	0.258	
1.5-Dimethylnaphthaiene	0.200	ND
Acenaphthylene		ND
Acenaphthene		ND
Biphenyl	0.229	
Dibenzofuran		ND
Cadalene		ND
Fluorene		ND
C1-Fluorenes		ND
C2-Fluorenes C3-Fluorenes		ND
2-Methylfluorene		ND ND
1-Methylfluorene		ND
Anthracene		ND
Phenanthrene		ND
C1-Phenanthrenes/Anthracenes		ND
C2-Phenanthrenes/Anthracenes		ND
C3-Phenanthrenes/Anthracenes		ND
C4-Phenanthrenes/Anthracenes		ND
3-Methylphenanthrene		ND
2/4-Methylphenanthrene		ND
2-Methylanthracene		ND
9-Methylphenanthrene		ND
1-Methylphenanthrene 2,7-Dimethylphenanthrene		ND ND
1,7-Dimethylphenanthrene		
Dibenzothiophene		ND ND
C1-Dibenzothiophenes		ND
C2-Dibenzothiophenes		ND
C3-Dibenzolhiophenes		ND
C4-Dibenzothiophenes		ND
4-Methyldibenzothiophene		ND
2/3-Methyldibenzothiophene		ND
1-Methyldibenzothiophene		ND
Dehydroabietin(e)		ND
Retene		ND
Fluoranthene		ND
Pyrene Benzo(b)fluorene	0.228	
C1-Fluoranthenes/Pyrenes		
C2-Fluoranthenes/Pyrenes		ND ND
C3-Fluoranthenes/Pyrenes		ND
Benzo(a)anthracene		ND
Chrysene		ND
C1-Chrysenes		ND
C2-Chrysenes		ND
C3-Chrysenes		ND
C4-Chrysenes		ND
Benzo(b)/luoranthene		ND
Benzo(j/k)/luoranthene		ND
Benzo(a)fluoranthene		ND
Benzo(e)pyrene		ND
Benzo(a)pyrene		ND
Perylene Indeno(1,2,3-c,d)pyrene		ND
INVENUE 1. Z. J-C. O IDVIENE		ND
Dibenz(a,h)an(hracene Benzo(g,h,i)perylene		ND ND

Surrogale Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected, D= Values reported using secondary dilution factor, &= Outside of OQO, B= Result >5*Sample RL.

Policy Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

01.10				
Client Sample ID		Laboratory Control Sample		
Battelle Sample (D		AB852LCS		
Battelle Batch ID		03-0023		
Associated Blank		AB851PB		
Field Date Receipt Date		NA		
Extraction Date		NA		
Acquired Date		01/09/03 02/25/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Sediment		
Sample Size			a	
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67	ng		% Recovery Q
41				
Naphihalene C1-Naphihalenes	1001	881 1040		68
C2-Naphthalenes		1040		
C3-Naphihalenes			ND ND	
C4-Naphihalenes			ND	
2-Methyinaphthalene		534		
1-Melhyinaphthalene		501		
2-Ethylnaphlhalene			ND	
1-Ethylnaphihalene			ND	
2,6/2,7-Dimethylnaphthalene		448		
1,5-Dimelhylnaphthalene	1		ND	
Acenaphthylene Acenaphthene	1000	800		80
Biphenyl	1000	862		86
Dibenzofuran	1003	862 2.54	,	86
Cadalene		2.04	ND	
Fluorene	1001	898	10	90
C1-Fluorenes			ND	
C2-Fluorenes			ND	
C3-Fluorenes			ND	
2-Melhyffluorene			ND	
1-Melhylfluorene Anthracene	1000		ND	
Anthracene Phenanthrene	1000	842 893		84
C1-Phenanthrenes/Anthracenes	1000	893	ND	89
C2-Phenanthrenes/Anthracenes			ND	
C3-Phenenthrenes/Anthracenes			ND	
C4-Phenanthrenes/Anthracenes			ND	
3-Melhylphenanihrene			ND	
2/4-Methylphenanthrene			ND	
2-Methylanthracene			ND	
9-Methylphenanthrene			ND	
1-Methylphenanthrene		601		
2,7-Dimethylphenanthrene			ND	
1,7-Dimelhylphenanthrene Dibenzothlophene		11.3	ND	
C1-Dibenzothiophenes		11.3	ND	
C2-Dibenzolhiophenes			ND	
C3-Dibenzothiophenes			ND	
C4-Dibenzothiophenes			ND	
4-Methyldibenzothkophene			ND	
2/3-Methyldibenzothiophene			ND	
1-Methyldibenzothiophene			ND	
Dehydroabletin(e) Retene			ND	
Retene	1000	893	ND	50
Pyrene	1000	893 912		89 81
Benzo(b)fluorene	1000	812	ND	
C1-Fluoranthenes/Pyrenes			ND	
C2-Fluoranthenes/Pyrenes			ND	
C3-Fluoranthenes/Pyrenes			ND	
Benzo(a)anthracene	1001	904		90
Chrysene	1001	932		93
C1-Chrysenes C2-Chrysenes			ND	
C2-Chrysenes C3-Chrysenes			ND	
C4-Chrysenes			ND ND	
Benzo(b)fluoranthene	1001	872	nυ	87
Benzo(i/k)fluoranthene	1000	990		8) 99
Benzo(a)fluoranthene		000	ND	
Benzo(e)pytene	989	883		89
Benzo(a)pyrene	1001	918		9 2
Perylene	1000	877		88
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)enthracene	1001	895		89
	1000	952		95
Benzo(g,h,i)pervlene	1001	936		94
Surrogate Recoveries (%)				
Naphthalene-d8		93		
Naphihalene-d8 Phenanihrene-d10		93 84		
Naphthalene-d8 Phenanihrene-d10 Chrysene-d12		84 92		
Naphihalene-d8 Phenanihrene-d10		84		

J=Result < Sample RL. ND= Not Detected. NA= Not Applicable. &= Outside of DQO.

Poting Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	NLU-116-SS-2030	NLU-116-SS-2030		
Battelle Sample ID	U0123-D	U0123DUP-D		
Battelle Batch ID	03-0023	03-0023		
Associated Blank	A8851PB	AB851PB		
Field Date	11/11/02	11/11/02		
Receipt Date Extraction Date	11/15/02	11/15/02		
Acquired Date	01/09/03 02/25/03	01/09/03 02/25/03		
Analytical Method	6270M	02/25/03 8270M		
Percent Solids	18.31 %	18.31 %		
Matrix	Sediment	Sediment		
Sample Size	5.76 g	5.73 g		
Weight Basis Min Reporting Limit	DRY	DRY		
Amount Units	43.8	44.1	DDD (0()	_
Anothe Critica	µg/kg	hâyka	RPD(%) (<u> </u>
Naphthelene	12200	11900	2.49	
C1-Naphthalenes	3040	3000	1.32	
C2-Naphthalenes C3-Naphthalenes	5540	5390	2,74	
C4-Naphthalenes	7150 5010	6920 4880	3.27 2.83	
2-Methylnaphihalene	1510	4880	1.33	
1-Methylnaphthalene	1510	1500	0.664	
2-Ethylnaphthelene	169	153	NA	
1-Ethylnaphthelene	263	276	2.5	
2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene	1420	1400	1.42	
Acenaphihylene	419 3660	414 3800	1.2 3.75	
Acenaphthene	8530	8250	3.75	
Biphenvi	1950	1870	4.19	
Dibenzofuran	1570	1530	2.58	
Cadalene	ND	ND		
Fluorene C1-Fluorenes	5500	5360	2.58	
C2-Fluorenes	4350 3570	4220 3470	3.03 2.84	
C3-Fluorenes	2720	2720	2.64	
2-Methyffluorene	1170	1200	2,53	
1-Methyffluorene	1170	1090	7.08	
Anthracene Phenanthrene	13200 20900	13100	0.76	
C1-Phenanthrenes/Anthracenes	20900	20600	1.44 0	
C2-Phenanthrenes/Anthracenes	11600	14600	0.866	
C3-Phenanthrenes/Anthracenes	6150	6310	2.57	
C4-Phenanthranes/Anthracenes	2330	2500	7.04	
3-Methylphenanthrene 2/4-Methylphenanthrene	4240	4240	0	
2/4-Methylphenanthrene 2-Methylanthracene	1590 2530	1570 2440	1.26	
9-Methylphenanthrene	2530 3940	2440 3850	3.62 2.31	
1-Methylphenanthrene	2310	2280	1.31	
2,7-Dimethylphenanthrene	554	583	5,1	
1,7-Dimethylphenanthrene	926	942	1.71	
Dibenzothiophene	5600	5480	2.17	
C1-Dibenzothiophenes C2-Dibenzothiophenes	4110 3870	4060 3590	1.22 7.51	
C3-Dibenzothiophenes	2610	2640	7.51	
C4-Dibenzolhiophenes	1190	1150	3.42	
4-Methyldibenzothiophene	1600	1570	1.89	
2/3-Methyldibenzothlophene	1270	1260	0.79	
1-Methyldibenzothiophene Dehydroabletin(e)	424	428	0.939	
Retene	ND 2850	ND 2800	1.77	
Fluoranthene	181000 D	183000 D	1.77	
Pyrene	226000 D	229000 D	1.32	
Benzo(b)fluorene	4650	4690	0.856	
C1-Fluoranthenes/Pyrenes	36500	36500	0	
C2-Fluoranthenes/Pyrenes C3-Fluoranthenes/Pyrenes	9000	8850	1.66	
Benzo(a)anthrecene	2300 59200 D	2400 60100 D	4.26 1.51	
Chrysene	75200 D	76500 D	1.51	
C1-Chrysenes	11700	11800	0,851	
C2-Chrysenes	4030	4100	1.72	
C3-Chrysenes	1590	1540	3.19	
C4-Chrysenes Benzo(b)fluoranthene	ND	ND		
Benzo(D/k)fluoranthene	54200 D 39900	55100 D	1.65	
Benzo(a)fluoranthene	15300	39100 15200	2.02 0.656	
Benzo(e)pyrene	57800 D	57900 D	0.173	
Benzo(a)pyrene	91500 D	92900 D	1.52	
Perviene	19500	19400	0.514	
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	71500 D 6990	72500 D	1.39	
Benzo(g,h,i)perviene	6990 64500 D	6800 85100 D	2.76 0.708	
Surrogate Recovaries (%)				
Naphthalene-d8 Phenanthrene-d10	101	95	6	
Phenanthrene-d10 Chrysene-d12	90 101	89 91	2	
5b(H)-Cholane	101	91 100	10	
		100	U U	
J=Result < Sample RL.				
B=Result < 5 x PB. ND= Not Detected,				
NAR Not Areliantia				

ND= Not Detected. NA= Not Applicable. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Poing Technology To Week
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	BB142PB-D	
Battelle Batch ID	03-0100	
Associated Blank Field Date	NA NA	
Receipt Date	NA	
Extraction Date	01/31/03	
Acquired Date Analytical Method	02/17/03	
Percent Solids	8270M NA	
Matrix	Solid	
Sample Size Weight Basis	7.00 g	
Min Reporting Limit	NA 3.61	
Amount Units	нд/kg	
Naphthalene	1.15 J	
C1-Naphihalenes C2-Naphihalenes	0.557 J	
C3-Naphthalenes	ND ND	
C4-Naphihalenes	ND	
2-Methylnaphthalene	0.334 J	
1-Methylnaphthalene	0.195 J	
2-Ethylnaphthalene 1-Ethylnaphthalene	ND ND	
2,6/2,7-Dimethytnaphthalene	ND	
1,5-Dimethylnaphthalene Acenaphthylene	ND	
Acenaphthylene	ND ND	
Biphenyl	ND	
Dibenzofuran	ND	
Cadalene Fluorene	ND	
C1-Fluorenes	ND ND	
C2-Fluorenes	ND	
C3-Fluorenes	ND	
2-Methylfluorene 1-Methylfluorene	ND ND	
Anthracene	ND	
Phenanthrene	0.31 J	
C1-Phonanthrenes/Anthracenes C2-Phonanthrenes/Anthracenes	ND ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/Anthracenes	ND	
3-Methylphenanthrene 2/4-Methylphenanthrene	ND ND	
2-Melhylanthracene	ND	
9-Methylphenanthrene	ND	
1-Methylphenanthrene 2,7-Dimethylphenanthrene	ND ND	
1,7-Dimethylphenanthrene	ND	
Dibenzothiopherie	ND	
C1-Dibenzothiophenes C2-Dibenzothiophenes	ND ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldiberizothiophene 2/3-Methyldiberizothiophene	ND	
1-Methyldibenzothiophene	ND ND	
Dehydroabielin(e)	ND	
Retene Fluoranthene	ND: 0,193 J	
Рутепе	0.193 J 0.217 J	
Benzo(b)fluorene	ND	
C1-Fluoranthenes/Pyrenes C2-Fluoranthenes/Pyrenes	ND ND	
C3-Fluoranthenes/Pyrenes	ND ND	
Benzo(a)anthracene	ND	
Chrysene C1-Chrysenes	ND ND	
C2-Chrysenes	ND ND	
C3-Chrysenes	ND	
C4-Chrysenes Benzo(b)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene Perylene	ND ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene Benzo(g,h,i)perylene	ND	
	ND	

Surrogate Recoveries (%) Naph(halene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected, D= Values reported using secondary dilution factor. &= Outside of DQO. B= Result >5*Sample RL.

Chaing Technology To West Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	Leb	oratory Control Sample				
	Laco					
Battelle Sample ID		BB143LCS-D				
Battelle Batch ID Associated Blank		03-0100				
Field Date		AB851PB NA				
Receipt Date		NA				
Extraction Date		01/31/03				
Acquired Date		02/17/03				
Analytical Method Percent Solids		8270M				
Matrix		NA Solid				
Sample Size		1.00				
Weight Basis		NA				
Min Reporting Limit		25.3				
Amount Units	FW67/FX61	ng		% Recovery Q	 	
Naphihalene	1502	1430		95		
C1-Naphihalenes	1502	1800		85		
C2-Naphihalenes		1000	ND			
C3-Naphihalenes			ND			
C4-Naphthalenes			ND			
2-Melhyinaphihalene 1-Melhyinaphihalene		929				
2-Elhyinaphthalene		869	ND			
1-Elhvinaphinalene			ND			
2,6/2,7-Dimethylnaphthalene		837				
1,5-Dimelhyinaphthalene			ND			
Acenaphthylene Acenaphthene	1500	1240		83		
Acenaphthene Biohenvi	1501 1504	1350		90		
Dibenzofuran	1,004	1380 477		92		
Cadalene			ND			
Fluorene	1501	1440		96		
C1-Fluorenes			ND			
C2-Fluorenes C3-Fluorenes			ND			
2-Methylfluorene			ND ND			
1-Methylfluorene			ND			
Anthracene	1501	1400)	93		
Phenanthrene	1504	1460		97		
C1-Phenanthrenes/Anthracenes C2-Phenanthrenes/Anthracenes			ND ND			
C3-Phenanthrenes/Anthracenes			ND			
C4-Phenenthrenes/Anthracenes			ND			
3-Methylphenanthrene			ND			
2/4-Methylphenanthrene 2-Methylanthracane			ND			
9-Methylphenanthrene			ND ND			
1-Methylphenanthrene			ND			
2,7-Dimethylphenanthrene			ND			
1,7-Dimelhylphenanthrene Dibenzothiophene			ND			
C1-Dibenzothiophenes		433	ND			
C2-Dibenzothiophenes			ND			
C3-Dibenzothiophenes			ND			
C4-Dibenzothiophenes			ND			
4-Methyldibenzothkophene 2/3-Methyldibenzothiophene			ND			
1-Methyklibenzothiophene			ND ND			
Dehydroabietin(e)			ND			
Retene			ND			
Fluoranihene Pyrene	1512 1501	1380 1380		91		
Benzo(b)fluorene	1301	1380	ND	92		
C1-Fluoranthenes/Pyrenes			ND			
C2-Fluoranthenes/Pyrenes			ND			
C3-Fluoranthenes/Pyrenes Benzo(a)anthracene	1502		ND			
Chrysene	1502	1330		89 90		
C1-Chrysenes	1000	1350	ND	50		
C2-Chrysenes			ND			
C3-Chrysenes			ND			
C4-Chrysenes Benzo(b)fluoranthene	1502	1000	ND	60		
Benzo(l/k)fluoranthene	1502	1230		82 99		
Benzo(a)fluoranihene			ND			
Benzo(e)pyrene	1483	1230		83		
Benzo(a)pyrene	1501	1250		83		
Perviene Indeno(1,2,3-c,d)pyrene	1500 1501	1220		81		
Dibenz(a,h)an(hracane	1501	1160		73 77		
Benzo(g,h,i)perviene	1502	1220	i i	81		
Surrogale Recoveries (%)					 	
Naphthalene-d8		96				
Phenenthrene-d10		94				
Chrysene-d12 5b(H)-Cholane		89				
ob(i f)-Onolane		83				
I-Reguli - Comple PI						

J=Resuit < Sample RL. ND= Not Detected. NA= Not Applicable. &= Outside of DQO,

The Battele ... Auting Technology To Week Project Nume Lake Union Sediment Investigation Project Number N005443

Client Sample ID	Procedural Blank		
Battelle Sample ID	88146PB-D		
Battelle Batch ID	03-0100		
Associated Blank	NA		
Field Date	NA		
Receipt Date	NA		
Extraction Date	02/06/03		
Acquired Date Analytical Method	02/18/03		
Percent Solids	8270M NA		
Matrix	Oily Material		
Sample Size	511.00	ma	
Weight Basis	NA		
Min Reporting Limit	0.0494		
Amount Units	mg/kg		
Naphthalene	0.00307		
C1-Naph(halenes C2-Naph(halenes		ND	
C3-Naphthalenes		ND ND	
C4-Naphthalenes		ND	
2-Methylnaphthalene		ND	
1-Methylnaphthalene		ND	
2-Ethylnaphthalene		ND	
1-Ethylnaphthalene		ND	
2,8/2,7-Dimethylnaphthalene		ND	
1,5-Dimethylnaphthalene Acenaphthylene		ND	
Acenaphthene		ND ND	
Biphenvi		ND	
Dibenzofuran		ND	
Cadalene		ND	
Fluorene		ND	
C1-Fluorenes		ND	
C2-Fluorenes		ND	
C3-Fluorenes		ND	
2-Methylfluorene		ND	
1-Methylfluorene Anthracene		ND ND	
Phenanthrene		ND	
C1-Phenanthrenes/Anthracenes		ND ND	
C2-Phenanthrenes/Anthracenes		ND	
C3-Phenanthrenes/Anthracenes		ND	
C4-Phenanthrenes/Anthracenes		ND	
3-Methylphenanthrene		ND	
2/4-Methylphenanthrene		ND	
2-Methylanthracene 9-Methylphenanthrene		ND	
1-Methylphenanthrene		ND ND	
2,7-Dimethylphenanthrene		ND	
1,7-Dimelhylphenanthrene		ND	
Dibenzothiophene		ND	
C1-Dibenzolhiophenes		ND	
C2-Dibenzolhiophenes		ND	
C3-Dibenzothiophenes		ND	
C4-Dibenzolhiophenes		ND	
4-Methyldibenzothiophene		ND	
2/3-Methyldibenzothiophene 1-Methyldibenzothiophene		ND	
Dehydroabietin(e)		ND ND	
Retene		ND	
Fluoranthene		ND	
Pyrene		ND	
Benzo(b)fluorene		ND	
C1-Fluoranthenes/Pyrenes		ND	
C2-Fluoranthenes/Pyrenes		ND	
C3-Fluoranthenes/Pyrenes		ND	
Benzo(a)anthracene		ND	
Chrysene C1-Chrysenes		ND ND	
C2-Chrysenes		ND	
C3-Chrysenes		ND	
C4-Chrysenes		ND	
Benzo(b)fluoranthene		ND	
Benzo(j/k)fluoranlhene		ND	
Benzo(a)fluoranthene		ND	
Benzo(e)pyrene		ND	
Benzo(a)pyrene		ND	
Perviene		ND	
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene		ND ND	
Benzo(g,h,i)perylene		ND ND	
		110	

Surrogale Recoveries (%) Naphthatene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND≕ Not Detected. D≕ Values reported using secondary dilution factor. &≡ Outside of DQO. B≕ Result >5*Sample RL.

Battelle ... Polity Technology To Wast Project Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	l shor	atory Control Sample				
	Labor	BIOLA COURSI SAUIDIE				
Battelle Sample ID		BB147LCS-D				
Battelie Batch ID		03-0100				
Associated Blank		BB146PB-D				
Field Date Receipt Date		NA				
Extraction Date		NA				
Acquired Date		02/06/03				
Analylical Method		02/18/03				
Percent Solids		8270M				
Matrix		NA				
Sample Size		Oily Material				
Weight Basis		1.00 NA				
Min Reporting Limit		25.3				
Amount Units	FW67/FX61	ng		% Recovery Q		
				in the start of the	*	
Naphihalens	1502	1400		93		
C1-Naphthalenes		1810				
C2-Naphthalenes			ND			
C3-Naphthalenes			ND			
C4-Naphthalanes			ND	_		
2-Methylnaphthalene		934				
1-Methylnaphthalene 2-Ethylnaphthalene		882				
1-Ethylnaphthalene			ND			
2,6/2,7-Dimethylnaphthalene		852	ND			
1,5-Dimethylnaphthalene		852	ND			
Acenaphthylene	1500	1300		87		
Acenaphthene	1501	1300		91		
Biphenyl	1504	1380		92		
Dibenzofuran		482		~_		
Cadalene			ND			
Fluorene	1501	1480		99		
C1-Fluorenes			ND			
C2-Fluorenes			ND			
C3-Fluorenes			ND			
2-Methylfluorene			ND			
1-Methylfluorene			ND			
Anthracene Phenanthrene	1501	1460		97		
C1-Phenanthrenes/Anthracenes	1504	1520		101		
C2-Phenanihrenes/Anthracenes			ND ND			
C3-Phenanthrenes/Anthracenes			ND ND			
C4-Phenanihrenes/Anthracenes			ND			
3-Methylphenanthrene			ND			
2/4-Methylphenanthrene			ND			
2-Methylanthracene			ND			
9-Methylphenanthrene			ND			
1-Methylphenanthrene			ND			
2,7-Dimethylphenanthrene			ND			
1,7-Dimethylphenanthrene			ND			
Dibenzothiophene C1-Dibenzothiophenes		450				
C2-Dibenzothiophenes			ND			
C3-Dibenzothiophenes			ND ND			
C4-Dibenzothiophenes			ND			
4-Methyldibenzothiophene			ND			
2/3-Methyldibenzothiophene			ND			
1-Methyldibenzothiophene			ND			
Dehydroabietin(e)			ND			
Retene			ND			
Fluoranthene	1512	1440		95		
Pyrene	1501	1450		97		
Benzo(b)fluorene			ND			
C1-Fluoranthenes/Pyrenes C2-Fluoranthenes/Pyrenes			ND			
C2-Fluoranthenes/Pyrenes C3-Fluoranthenes/Pyrenes			ND			
Benzo(a)anthracene	1502	1490	ND	00		
Chrysene	1503	1490		99 97		
C1-Chrysenes		1450	ND	01		
C2-Chrysenes			ND			
C3-Chrysenes			ND			
C4-Chrysenes			ND			
Benzo(b)fluoranthene	1502	1410		94		
Benzo(I/k)fluoran(hene	1501	1630		109		
Benzo(a)fluoranthene			ND			
Benzo(e)pyrene Benzo(a)pyrene	1483	1380		93		
Benzo(a)pyrene Perviene	1501	1440		96		
ndeno(1,2,3-c,d)pyrene	1500 1501	1440		96		
Dibenz(a,h)anthracene	1501	1460 1460		97		
Benzo(g,h,i)perviene	1501	1460		97 97		
		1400		v,		
Surrogate Recoveries (%)						
Naphthalene-d8		94				
Phenanthrene-d10		98				
Chrysene-d12		96				
5b(H)-Cholane		82				

J≕Result < Sample RL. ND≕ Not Detected. NA≕ Not Applicable. &= Outside of DQO.

Troject Number N005443

Client Sample (D	Procedural Blank	
Battelle Sample ID Battelle Batch ID	BB278PB	
Associated Blank	03-0137 NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	02/11/03	
Acquired Date Analytical Method	02/25/03 8270M	
Percent Solids	6270M	
Matrix	Solid	
Sample Size	0.5	i g
Weight Basis Min Reporting Limit	NA	
Amount Units	50,5 µg/kg	
Naphlhalene	9.78	
C1-Naphthalenes	25.6	
C2-Naphthalenes		ND
C3-Naphthalenes C4-Naphthalenes		ND
2-Methylnaphthalene	15.4	ND
1-Methylnaphthalene	6.09	
2-Ethylnaphthalene		ND
1-Elhylnaphihalene		ND
2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene		ND ND
Acenaphthylene	1.96	
Acenaphthene		ND
Biphenyl		ND
Dibenzofuran Cadalene		ND
Fluorene		ND ND
C1-Fluorenes		ND
C2-Fluorenes		ND
C3-Fluorenes 2-Methylfluorene		ND
1-Methylfluorene		ND ND
Anthracene		ND
Phenanthrene	4.05	
C1-Phenanthrenes/Anthracenes C2-Phenanthrenes/Anthracenes		ND
C2-Phenanihrenes/Anthracenes C3-Phenanihrenes/Anthracenes		
C4-Phenanthrenes/Anthracenes		ND
3-Methylphenanthrene		ND
2/4-Methylphenanthrene		ND
2-Melhylanthracene 9-Melhylphenanthrene		ND ND
1-Methylphenanthrene		ND
2,7-Dimethylphenanthrene		ND
1,7-Dimethylphenanthrene		ND
Dibenzolhiophene C1-Dibenzolhiophenes		ND ND
C2-Dibenzothiophenes		
C3-Dibenzothiophenes		ND
C4-Dibenzothiophenes		ND
4-Melhyldibenzothiophene 2/3-Melhyldibenzothiophene		ND
1-Methyldibenzothiophene		
Dehydroabietin(e)		ND
Retene		ND
Fluoranthene Pyrene	2.62	
Benzo(b)(luorene		ND
C1-Fluoranthenes/Pyrenes		ND
C2-Fluoranthenes/Pyrenes		ND
C3-Fluoranthenes/Pyrenes Benzo(a)anthracene		ND
Chrysene		
C1-Chrysenes		ND
C2-Chrysenes		ND
C3-Chrysenes C4-Chrysenes		ND ND
Benzo(b)fluoranthene		ND ND
Benzo(j/k)fluoranthene		ND
Benzo(a)fluoranthene		ND
Benzo(e)pyrene		ND
Benzo(a)pyrene Perylene		ND ND
Indeno(1,2,3-c,d)pyrene		ND
Dibenz(a,h)anthracene		ND
Benzo(g,h,i)perylene		ND

Surrogate Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Resuit < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of OQO. B= Result >5*Sample RL.

Battelle

 Nining Technology 70 Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Laborato	ry Control Sample		
Battelle Sample ID		BB279LCS		
Battelle Batch ID		03-0137		
Associated Blank		BB278PB		
Field Date		NA		
Receipt Date		NA		
Extraction Date		02/11/03		
Acquired Date Analytical Method		02/25/03		
Percent Solids		8270M NA		
Matrix		Saild		
Sample Size		0.5 g		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67 & FX61	ng	% Recove	ry Q
Naphihalene				
C1-Naphthalenes	1502	1320	88	
C2-Naphthalenes		1600 NE		
C3-Naphthalenes		NE		
C4-Naphthalenes		NE		
2-Methylnephthalene		820		
1-Methylnaphihalene		774		
2-Ethylnephthalene		NE		
1-Ethylnaphthalene		NE		
2,6/2,7-Dimethylnaphthalene		703		
1,5-Dimethylnaphthalene Acenaphthylene	1500	NE 1200	80	
Acenaphthene	1500	1330	80 89	
Biphenyl	1504	1350	80 8A	
Dibenzofuran	500	454	91	
Cadalene		ND)	
Fluorene	1501	1400	93	
C1-Fluorenes		N		
C2-Fluorenes		N)	
C3-Fluorenes 2-Methylfluorene		N		
1-Methylfluorene				
Anthracene	1501	1300	, 87	
Phenanthrene	1504	1420	94	
C1-Phenanthrenes/Anthracenes		NC)	
C2-Phenanihrenes/Anthracenes		N		
C3-Phenanthrenes/Anthracenes		NC		
C4-Phenanthrenes/Anthracenes		NC		
3-Methylphenanihrene 2/4-Methylphenanihrene		NC		
2-Methylanthracene				
9-Methylphenanthrene		NC		
1-Methylphenanthrene		NC		
2,7-Dimethylphenanthrene		N		
1.7-Dimethylphenanthrene		NE)	
Dibenzothiophene	501	421	84	
C1-Dibenzothlophenes		NE		
C2-Dibenzothiophenes		N		
C3-Dibenzothlophenes C4-Dibenzothlophenes		N		
4-Methyldibenzothiophene				
2/3-Methyldibenzothiophene		NL		
1-Melhyldibenzothiophene		N		
Dehydroabietin(e)		NE		
Retene		NE)	
Fluoranthene	1512	1420	94	
Pyrene Benzo(b)fluorene	1501	1430	95	
C1-Fluoranihenes/Pyrenes				
C2-Fluoranthenes/Pyrenes		NL		
C3-Fluoranthenes/Pyrenes		N		
Benzo(a)anthracene	1502	1350	, 90	
Chrysene	1503	1410	94	
C1-Chrysenes		NC)	
C2-Chrysenes		NC)	
C3-Chrysenes		N		
C4-Chrysenes Benzo(b)fluoranthene	1502	1340 NE		
Benzo(i/k)fluoranthene	1502	1340 1500	89 100	
Benzo(a)fluoranthene	1001	1500 NE		
Benzo(e)pyrene	1483	1320	, 89	
Senzo(a)pyrene	1501	1230	82	
Perviene	1500	862	57	
Indeno(1,2,3-c,d)pyrene	1501	1260	84	
Dibenz(a,h)anthracene	1501	1320	88	
Benzo(g,h,i)parviene	1502	1310	87	

Surrogate Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected. NA≃ Not Applicable. &≃ Outside of DQO.

Project Number N005443

Client Sample ID	NLU-109-2830	NLU-109-2830		
Battelie Sample ID	U0285-D			
Battelie Batch ID	03-0137	U0285DUP-D 03-0137		
Associated Blank	BB278PB	BB278PB		
Field Date	11/15/02	11/15/02		
Receipt Date	11/21/02	11/21/02		
Extraction Dete Acquired Date	02/11/03	02/11/03		
Analytical Method	02/26/03 8270M	02/26/03 8270M		
Percent Solids	23.08 %	25.74 %		
Malrix	Solid	Solid		
Sample Size	0.51 g	0.58 g		
Welght Basis Min Reporting Limit	DRY	DRY		
Amount Units	124 mg/kg	109 µg/kg	RPD(%)	Q
C			14 0(14)	<u>u</u>
Naphthalene	44300	44800	1,12	
C1-Naphihalenes C2-Naphihalenes	34100	36300	6.25	
C3-Naphhalenes	32900 17100	34900 17800	5.9 4.01	
C4-Naphthalenes	7850	7790	1.81	
2-Methylnaphthalene	8540	8860	3.68	
1-Methylnaphthalene	25500	27500	7.55	
2-Ethylnaphihalene	2430	2600	6.76	
1-Ethylnaphthalene 2,6/2,7-Dimethylnaphthalene	499 9360	527	NA	
1,5-Dimethyinaphthalene	1280	9920 1410	5.81 9.66	
Acenaphthylene	6450	6010	9.00	
Acenaphthene	58800	61800	4.97	
Biphenyl	2610	2570	1.54	
Dibenzofuran	3480	3640	4.49	
Cadalene Fluorene	ND 24200	ND	4 10	
C1-Fluorenes	24300 8100	25400 8600	4.43 5.99	
C2-Fluorenes	5440	5560	2.18	
C3-Fluorenes	3100 ME	3470 ME	11.3	
2-Methytfluorene	1860	1760	5.52	
1-Methylfluorene Anibracene	2150	2160	0.464	
Phenanthrene	31700 122000 D	32200 129000 D	1.56 5.58	
C1-Phenanthrenes/Anthracenes	37100	38200	5.58	
C2-Phenanthrenes/Anthracenes	16500	17600	6.45	
C3-Phenanthrenes/Anthracenes	6950	7120	2.42	
C4-Phenanthrenes/Anthracenes	2120	2180	2,79	
3-Methylphenanthrene	9460	9760	3.12	
2/4-Methylphenanihrene 2-Methylanihracene	9650 4280	9870 4350	2.25	
9-Methylphenanthrane	8650	4,150 8670	1.62 0.231	
1-Methylphenanthrene	5160	5410	4.73	
2,7-Dimethylphenenthrene	978	996	1.62	
1,7-Dimethylphenanthrene	1420	1560	9.4	
Dibenzothiophene	15800	16000	2.53	
C1-Dibenzothiophenes C2-Dibenzothiophenes	7170 4820	7360	2.62	
C3-Dibenzothiophenes	2810	5210 2930	7.78 4.16	
C4-Dibenzothiophenes	1020	1080	5,71	
4-Methyldibenzathiophene	2360	2470	4.55	
2/3-Methyldibenzothiophene	2640	2690	1.88	
1-Methyldibenzothiophen e Dehydroabietin(e)	771 ND	782 ND	1.42	
Retene	1940	2090	7.44	
Fluoranthene	92900	94200	1.39	
Pyrene	134000 D	141000 D	5.09	
Benzo(b)fluorene	3860	3960	2.56	
C1-Fluoranthenes/Pyrenes	33200	33800	1.79	
C2-Fluoranthenes/Pyrenes C3-Fluoranthenes/Pyrenes	8580 2170	8840	2.98	
Benzo (a)anihracena	32000	2190 31700	0.917 0.942	
Chrysene	37500	37300	0.535	
C1-Chrysenes	10200	10300	0.976	
C2-Chrysenes	3720	3460	7.24	
C3-Chrysenes C4-Chrysenes	1470 ND	1470	0	
Benzo(b)fluoranthene	25800	ND 25800	0.778	
Benzo((/k)fluoran(hene	30100	29300	2,69	
Benzo(a)fluoranthene	9660	9540	1.25	
Benzo(e)pyrene	29100	28700	1.38	
Benzo(a)pyrene Perylene	42500 11800	42000	1.18	
Indeno(1,2,3-c,d)pyrene	31800	11600 31600	1.71 0.631	
Dibenz(a,h)anthracene	4280	4380	2,31	
Benzo(g,h,l)perviene	37000	36300	1.91	
		······	·····	······
Surrogate Recoveries (%)	= :			
Naphthalene-dB Phenanthrene-d10	74	87	16	
Chrysene-d12	78 77	87 86	11 11	
5b(H)-Cholane	83	89	7	
J=Result < Sample RL.				
B≍Result < 5 x PB. ND≕ Not Detected.				
NA= Not Applicable.				
D= Values reported using secondary dilution factor.				
&= Outside of DQO.				
ME= Matrix Interference, Estimated Value,				

Maing Technology To Work
 Project Name Lake Union Sediment Investigation
 Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	BB426PB	
Battelle Batch ID	03-0159	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date Acquired Date	02/21/03 03/04/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size Weight Basis	0.4 g	
Min Reporting Limit	NA 63.1	
Amount Units	µg/kg	
Naphthalene	10.3 J	
C1-Naphthalenes	6.89 J	
C2-Naphthalenes	ND	
C3-Naphihalenes C4-Naphihalenes	ND ND	
2-Melhylnaphthalene	3.69 J	
1-Melhyinaphthalene	2.97 J	
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene	ND ND	
Acenaphthylene	ND ND	
Acenaphthene	ND	
Biphenyl	ND	
Dibenzofuran	ND	
Cadalene Fluorene	ND	
C1-Fluorenes		
C2-Fluorenes	ND	
C3-Fluorenes	ND	
2-Methylfluorene	ND	
1-Methylfluorene Anthracene	ND ND	
Phenanibrene	5.65 J	
C1-Phenanthrenes/Anthracenes	ND	
C2-Phenanthranes/Anthracenes	ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/Anthracenes 3-Methylphenanthrene	ND	
2/4-Methylphenanthrene	ND ND	
2-Methylanthracene	ND	
9-Methylphenanthrene	ND	
1-Methylphenanthrene	ND	
2,7-Dimethylphenanthrene 1,7-Dimethylphenanthrene		
Dibenzolhiophene	ND	
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes 4-Methyldibenzothiophene	ND ND	
2/3-Methylaibenzothiophene	ND ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	ND	
Retene	ND	
Fluoranthene Pvrene	3.95 J 8.49 J	
Pyrene Benzo(b)fluorene	8.49 J ND	
C1-Fluoranthenes/Pyrenes	ND	
C2-Fluoranthenes/Pyrenes	ND	
C3-Fluoranthenes/Pyrenes	ND	
Benzo(a)anthracene Chrvsene	ND ND	
C1-Chrysenes	ND	
C2-Chrysenes	ND	
C3-Chrysenes	ND	
C4-Chrysenes	ND	
Benzo(b)fluoranthene Benzo(j/k)fluoranthene	ND ND	
Benzo(a)fluoranthene	ND ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perviene	ND	
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	ND ND	
Benzo(g,h,i)perviene		
· · · · · · · · · · · · · · · · · · ·	NU	

Surrogate Recoveries (%) Naphthatene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Cutiside of OQ. B= Result >5*Sample RL.

Battelle Nating Technology To Week Prolect Name Lake Union Sediment Investigation Project Number N005443

Client Sample ID	l shorsio	ry Control Sample		
	Laborator			
Battelle Sample ID		BB427LCS		
Battelle Batch ID Associated Blank		03-0159		
Field Date		BB426PB NA		
Receipt Date		NA		
Extraction Date		02/21/03		
Acquired Date		03/04/03		
Analylical Method		8270M		
Percent Solids		NA		
Matrix		Solid		
Sample Size		0.4	s.	
Weight Basis		NA		
Min Reporting Limit		25.3		_
Amount Units	FW67 & FX61	ng	% Reco	Very Q
Naphthalene	1502	1220	81	
C1-Naphihalenes	1302	1480	01	
C2-Naphthalenes		1400	ND	
C3-Naphthalenes			ND	
C4-Naphthalenes			ND	
2-Methylnaphthalene		760		
1-Methylnaphthalene		716		
2-Ethylnaphthalene 1-Ethylnaphthalene			ND	
2,6/2,7-Dimethylnaphthalene		652	ND	
1,5-Dimethylnaphthalene			ND	
Acenaphthylene	1500	1150	77	
Acenaphthene	1501	1240	83	
Biphenyl	1504	1250	83	
Dibenzofuran	500	418	64	
Cadalene		1	ND	
Fluorene C1 Ekissenen	1501	1290	86	
C1-Fluorenes C2-Fluorenes			ND ND	
C2-Fluorenes			ND ND	
2-Methylfluorene			ND	
1-Methylfluorene			ND	
Anthracene	1501	1180	79	
Phenanthrene	1504	1280	85	
C1-Phenanthrenes/Anthracenes			ND	
C2-Phenanthrenes/Anthracenes C3-Phenanthrenes/Anthracenes			ND	
C3-Phenaninrenes/Anthracenes			ND ND	
3-Methylphenanthrene			ND ND	
2/4-Methylphenanthrane			ND	
2-Methylanthracene			ND	
9-Methylphenanlhrene			ND	
1-Methylphenanthrene			ND	
2,7-Dimethylphenan(hrene		1	ND	
1,7-Dimethylphenanthrene			ND	
Dibenzolhiophene	501	376	75	
C1-Dibenzothiophenes C2-Dibenzothiophenes			ND	
C3-Dibenzothlophenes			ND ND	
C4-Dibenzothiophenes			ND	
4-Methyldibenzothlophene			ND	
2/3-Methyldibenzothlophene			ND	
1-Methyldibenzothiophene		1	ND	
Dehydroabletin(e)			ND	
Retene Fluoranthene	1512		ND	
Pyrene	1512 1501	1300 1290	86 86	
Benzo(b)fluorene	1301	1290	ND 86	
C1-Fluoranthenes/Pyrenes			ND	
C2-Fluoranthenes/Pyrenes			ND	
C3-Fluoranthenes/Pyrenes		l l	ND	
Benzo(a)anthracene	1502	1250	83	
Chrysene C1 Chamanan	1503	1300	87	
C1-Chrysenes C2-Chrysenes			ND ND	
C3-Chrysenes			ND ND	
C4-Chrysenes			ND	
Benzo(b)fluoranthene	1502	1190	79	
Benzo(j/k)fluoranthene	1501	1270	85	
Benzo(a)fluoranthene		1	ND	
Benzo(e)pyrene	1483	1200	81	
Benzo(a)pyrene Perviene	1501 1500	1230	82	
Indeno(1,2,3-c,d)pyrene	1500	1150 1150	77 77	
Dibenz(a,h)an(hrecene	1501	1150	81	
Benzo(g,h,l)perviene	1502	1210	81	
		.2.0		
Surrogate Recoveries (%)				
Naphthalene-d8		85		
Phenanthrene-d10		82		
Chrysene-d12 5b(H)-Cholane		85 79		
		/9		

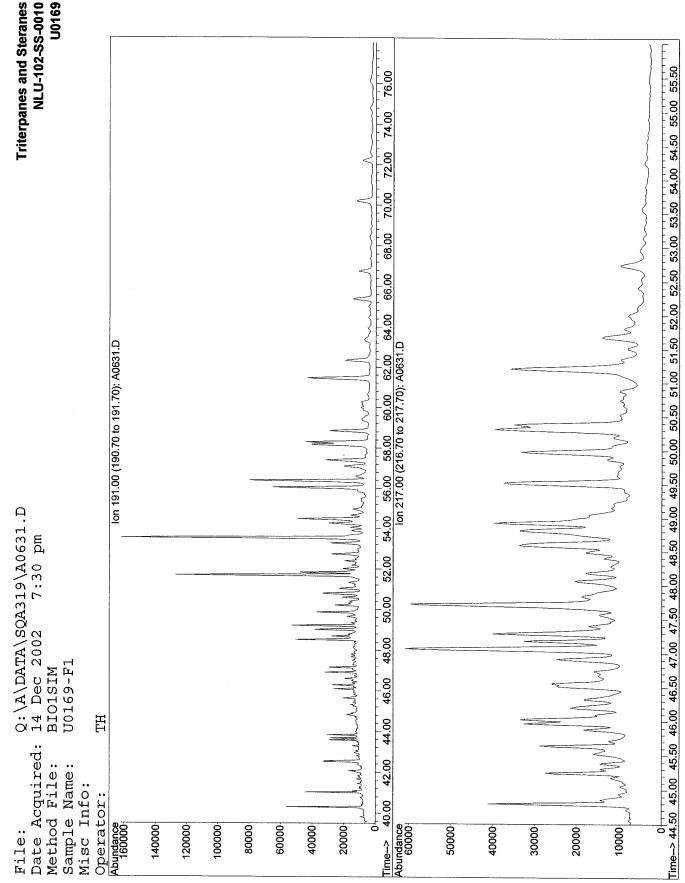
Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Semple RL. ND≖ Not Detected. NA≂ Not Applicable. &= Outside of DQO.

Attachment 3 Triterpane and Sterane Fingerprints (GC/MS)

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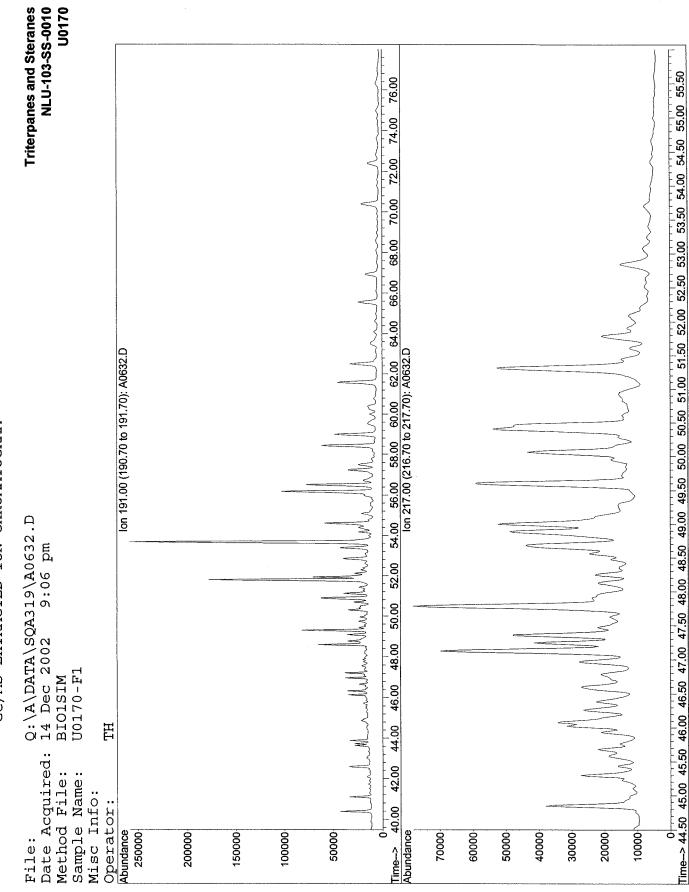
GC/MS EXTRACTED ION CHROMATOGRAM



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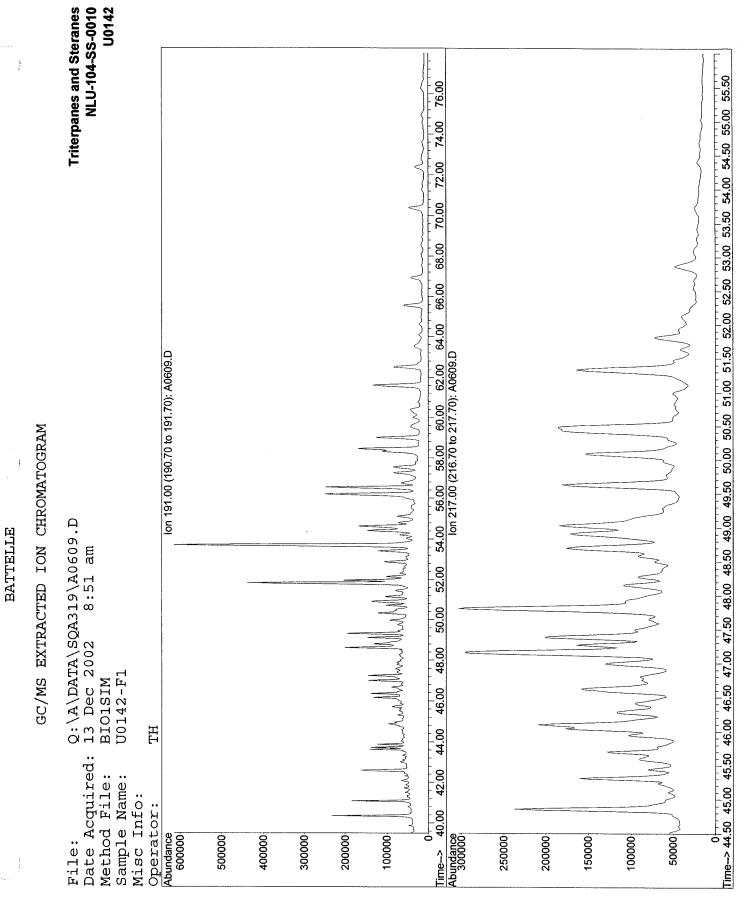
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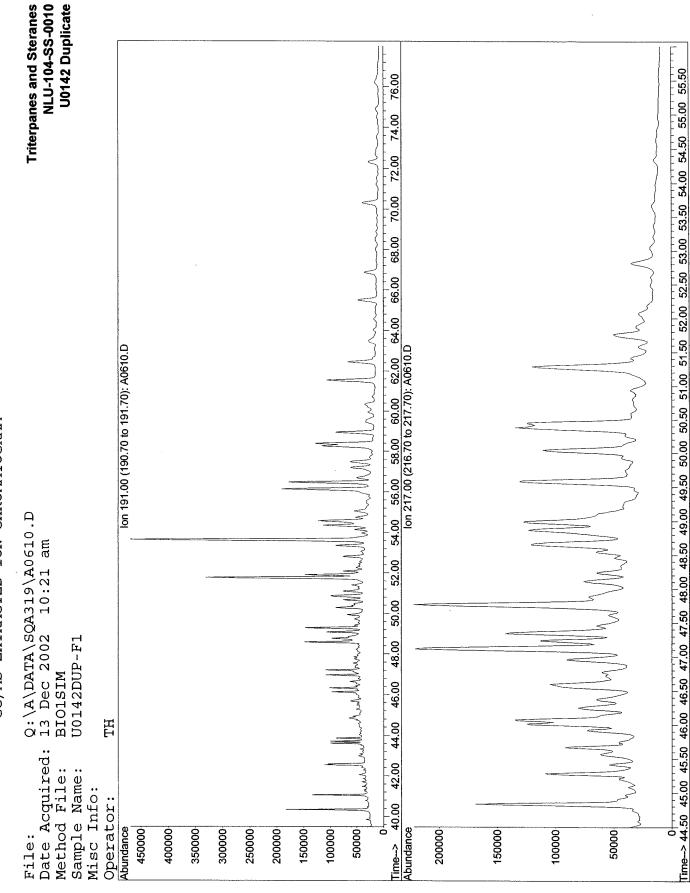
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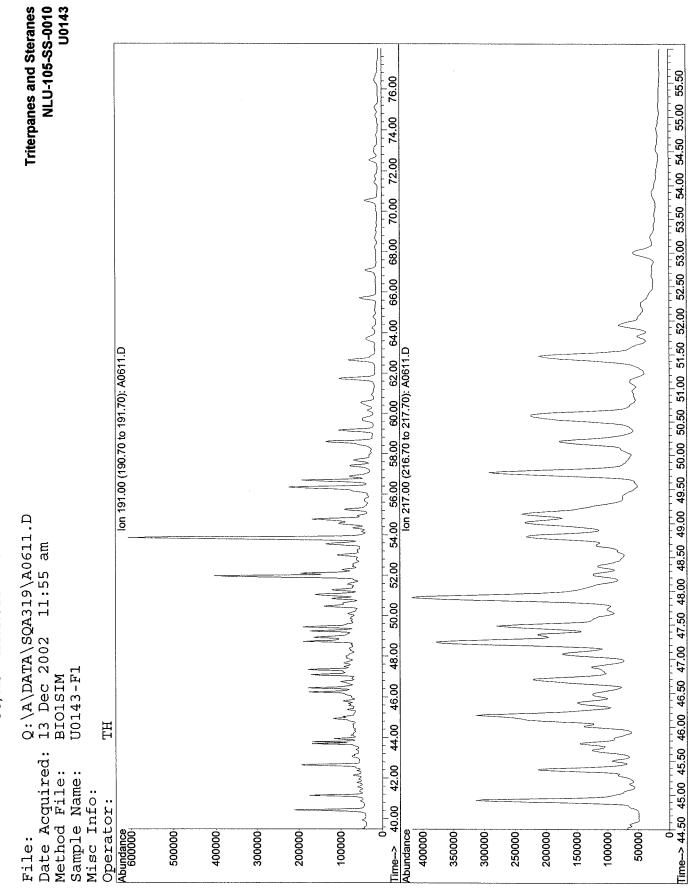
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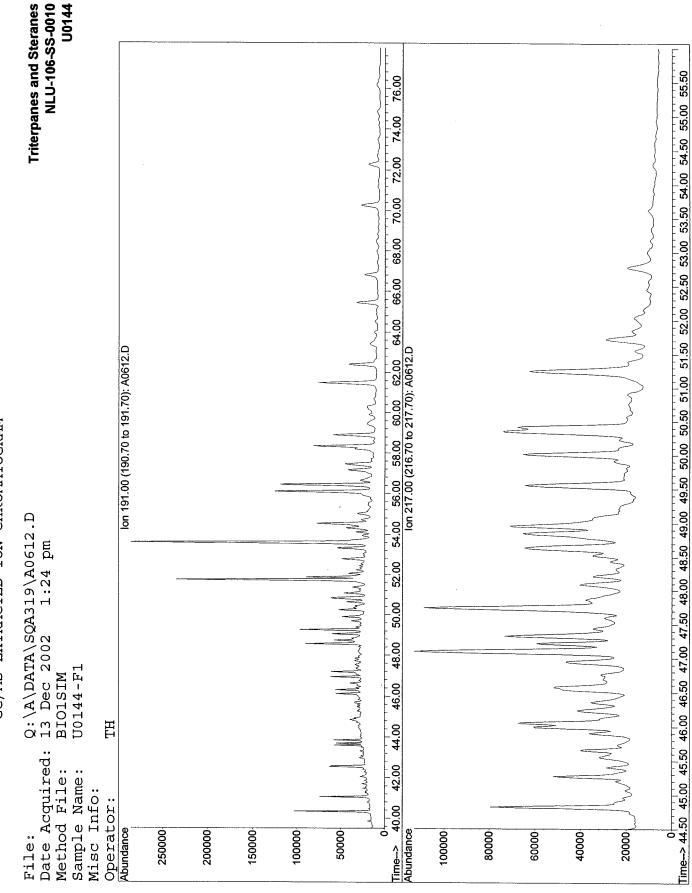


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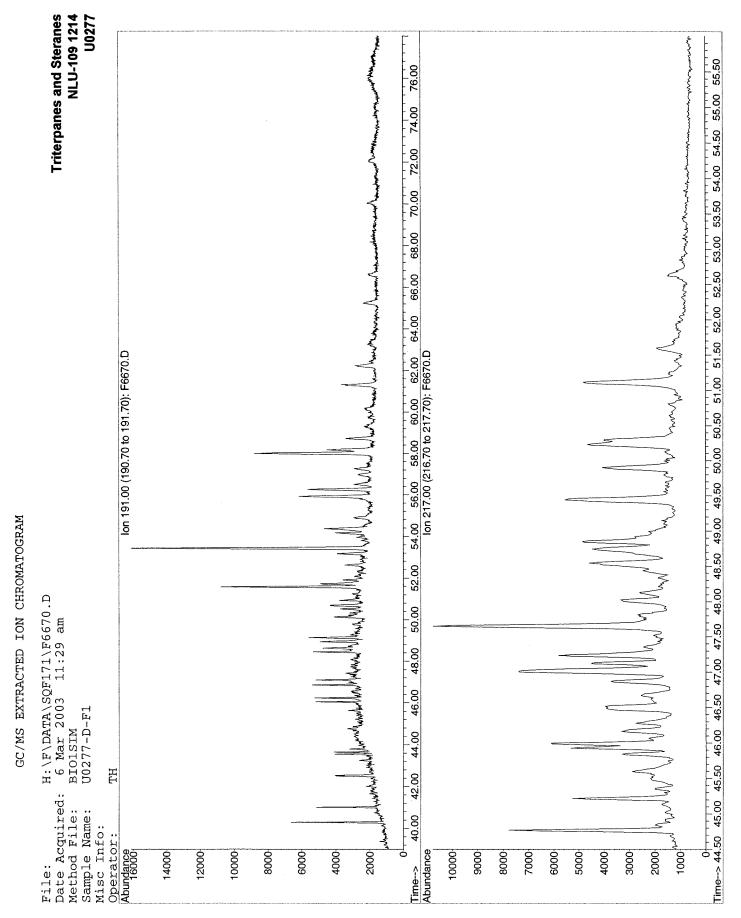


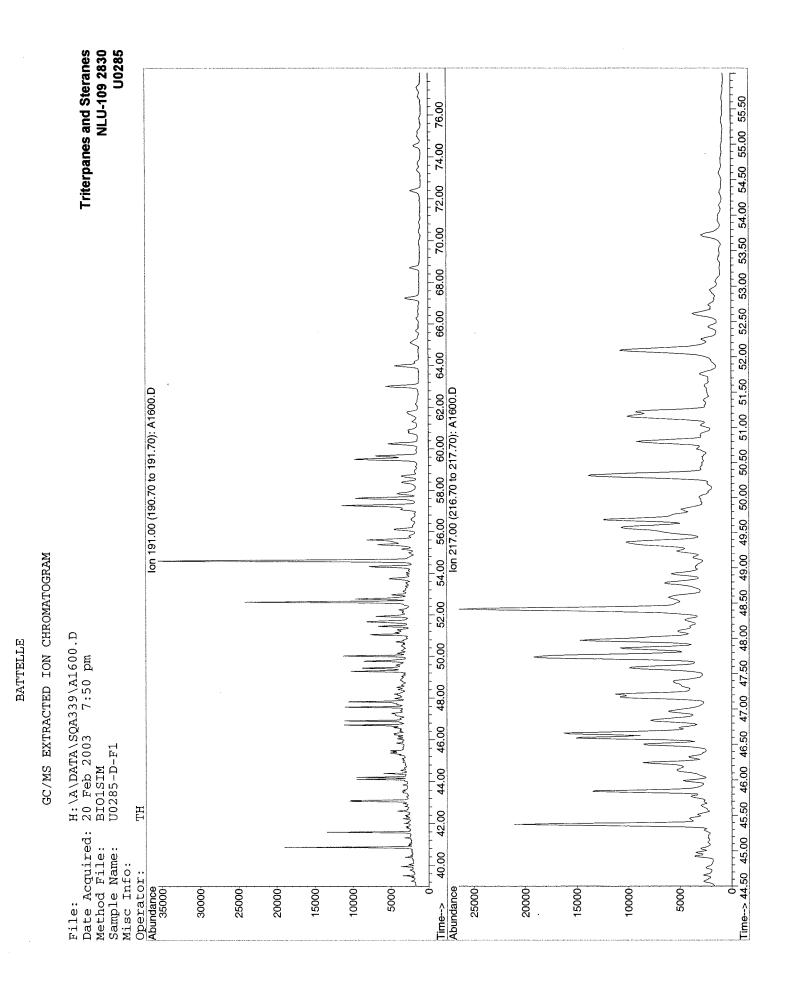
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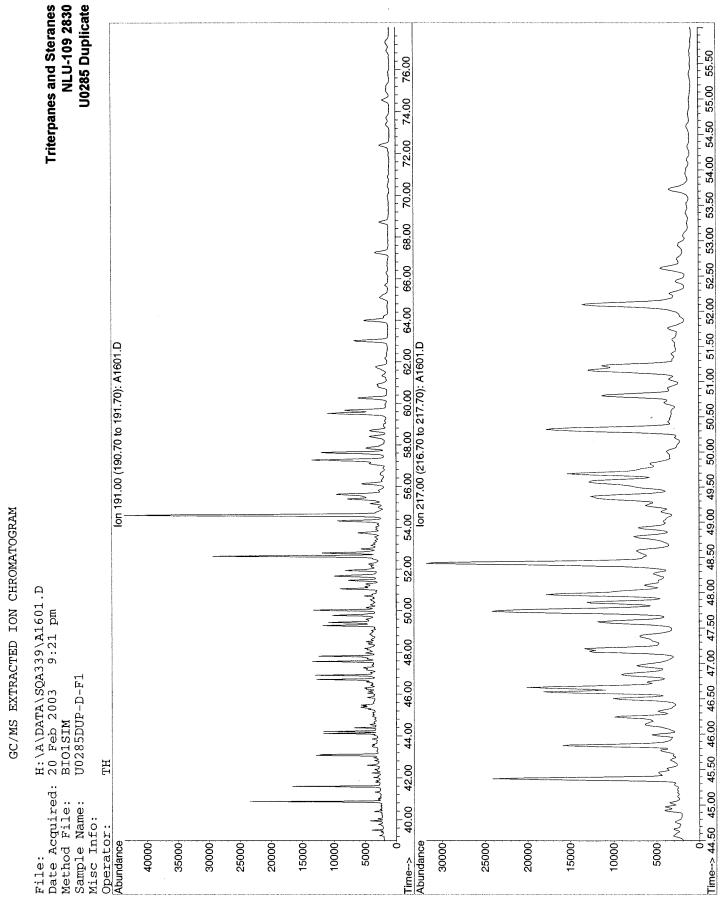
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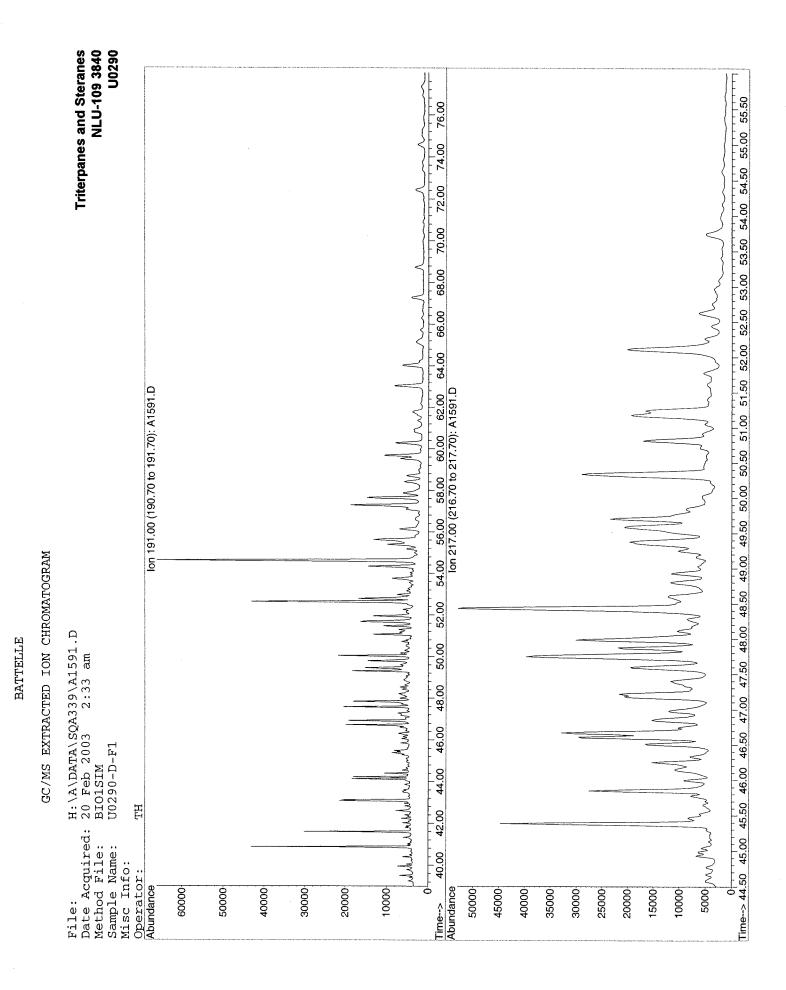
GC/MS EXTRACTED ION CHROMATOGRAM

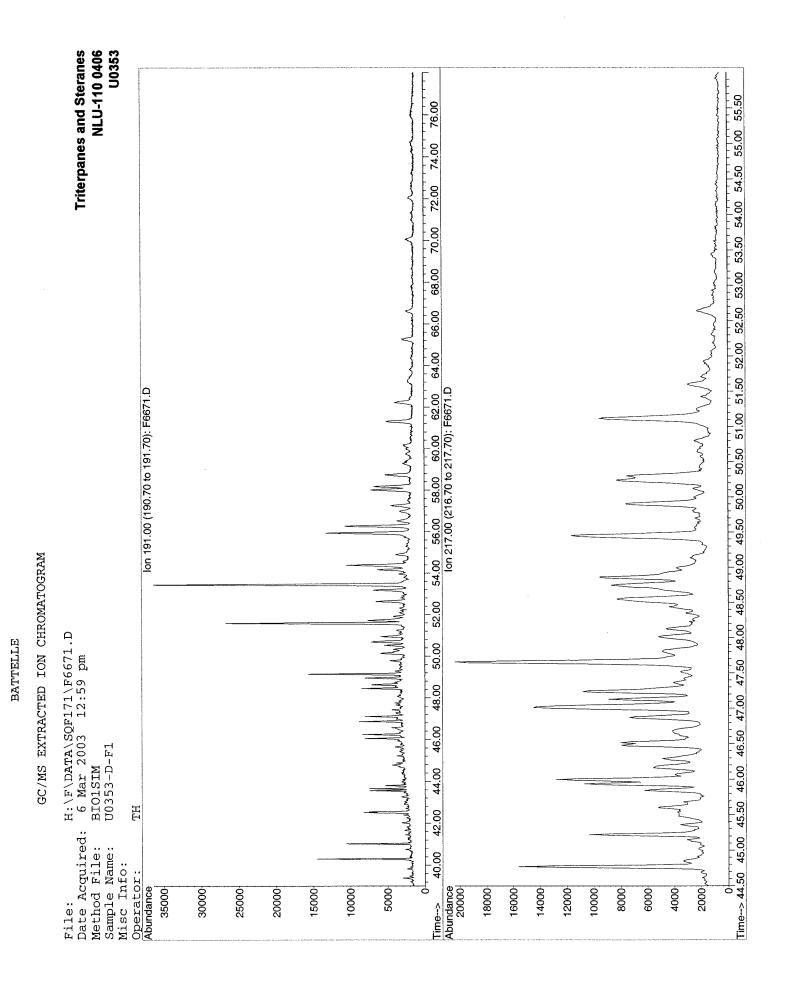
NLU-107-SS-0010 U0145 **Triterpanes and Steranes** Time--> 44.50 45.00 45.50 46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00 50.50 51.00 51.50 52.00 52.50 53.00 53.50 54.00 54.50 55.00 55.50 76.00 74.00 72.00 70.00 68.00 66.00 54.00 56.00 58.00 60.00 62.00 64.00 lon 217.00 (216.70 to 217.70); A0613.D lon 191.00 (190.70 to 191.70): A0613.D Q:\A\DATA\SQA319\A0613.D 13 Dec 2002 2:54 pm BIO1SIM 52.00 50.00 48.00 Lunder U0145-F1 46.00 ΗT 44.00 Date Acquired: 42.00 Method File: Sample Name: Misc Info: Operator: 40.00 Abundance 300000 50000 100000 250000 200000 150000-6 Abundance 100000 80000 60000 40000 20000 ò File: Time->

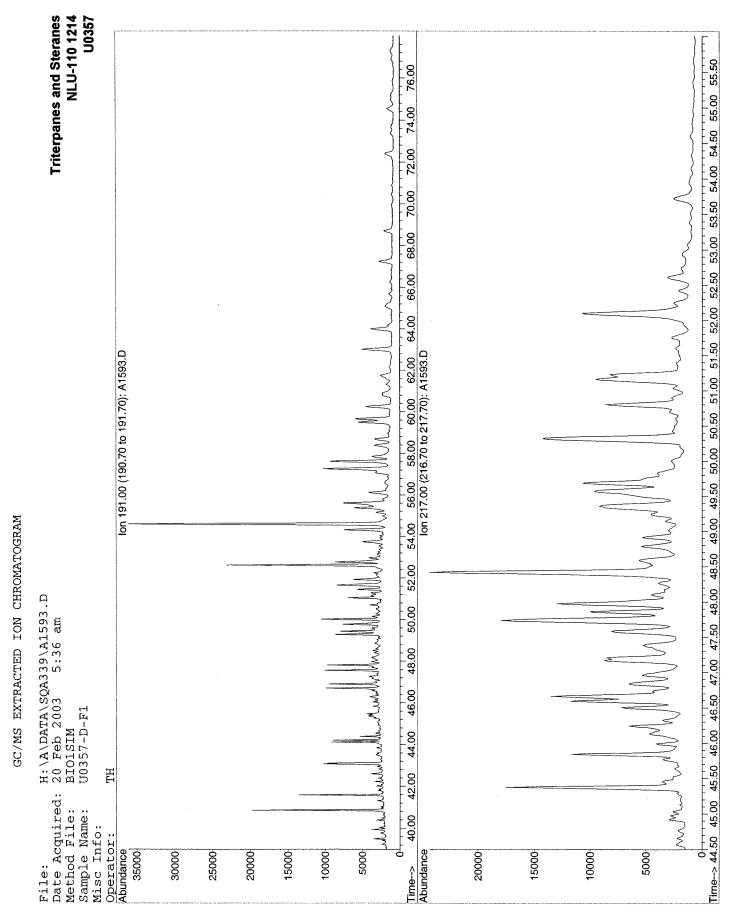


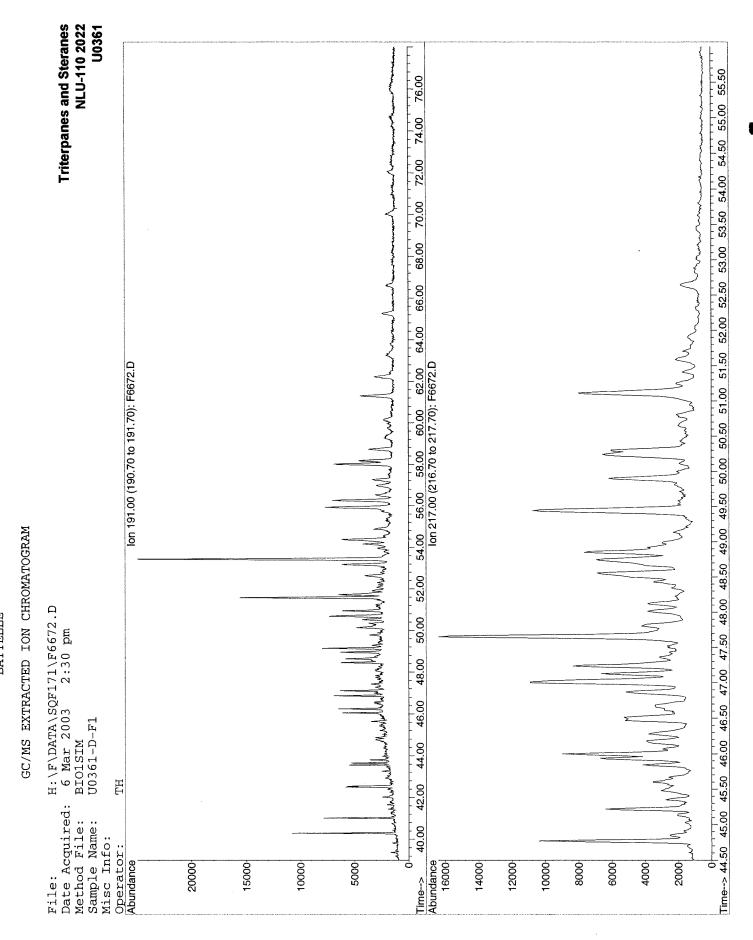










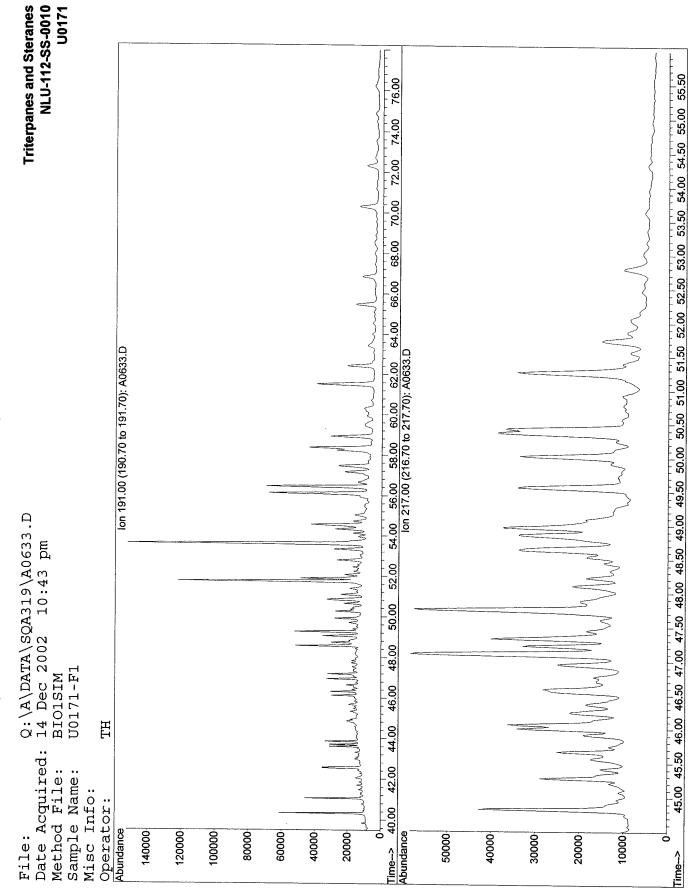


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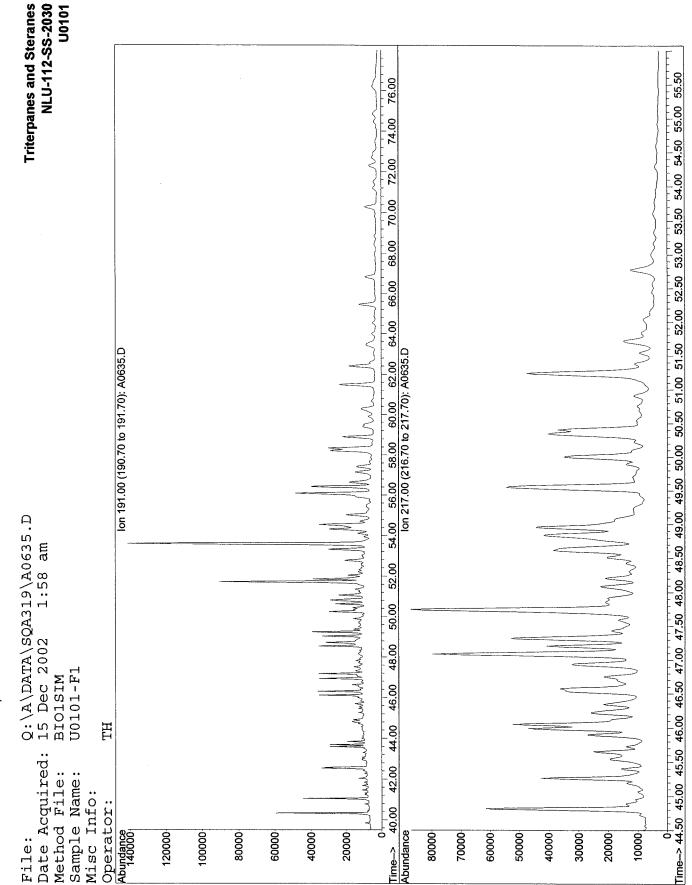
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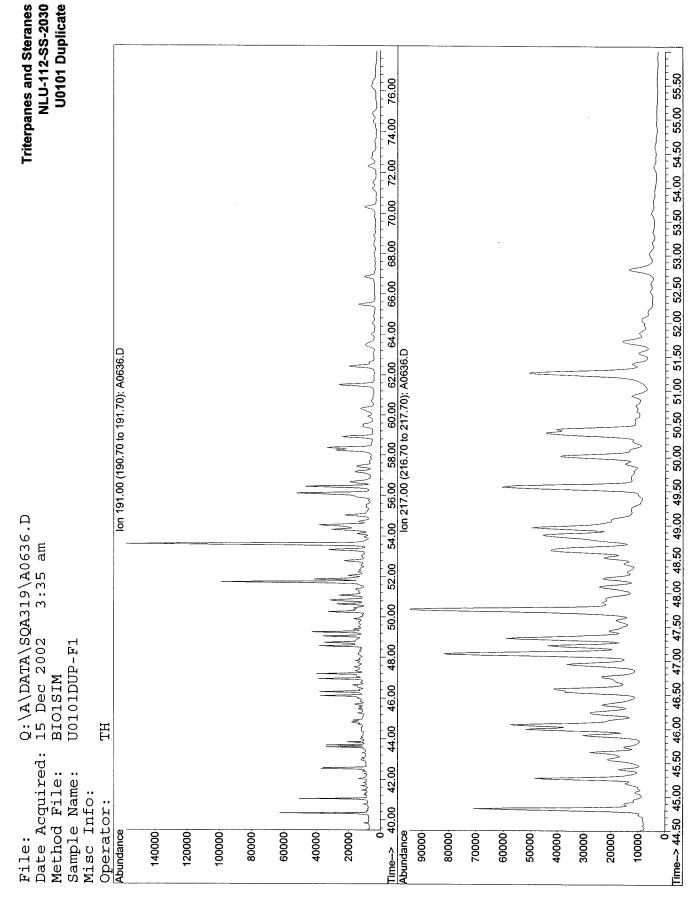
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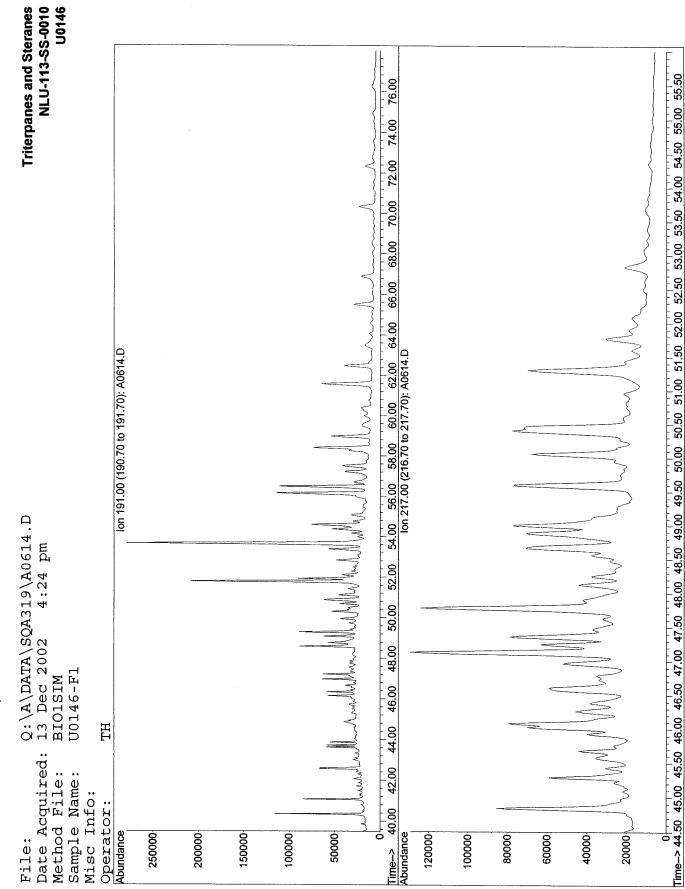


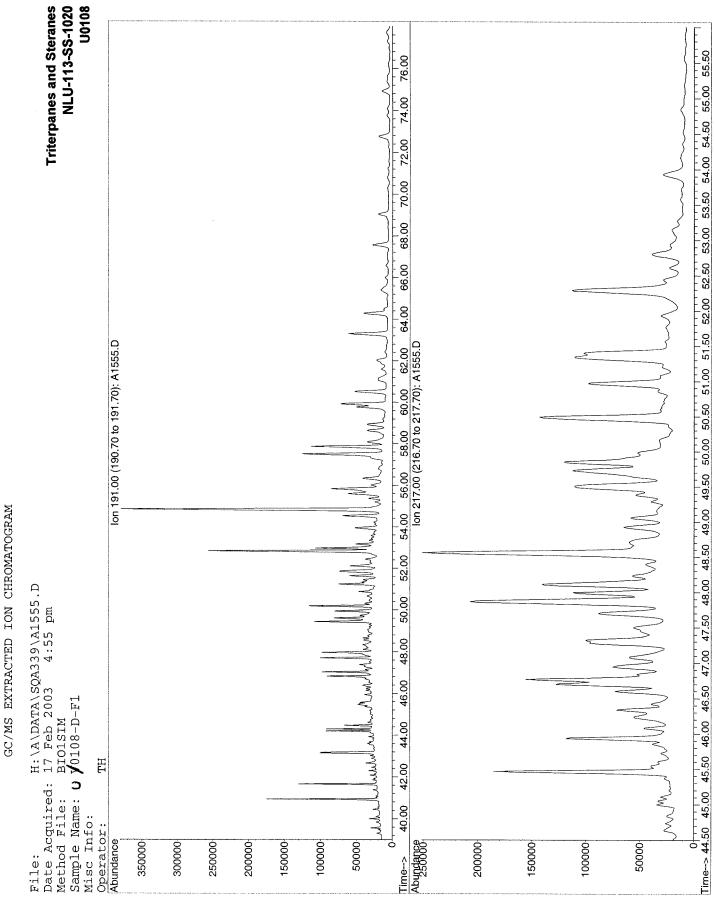
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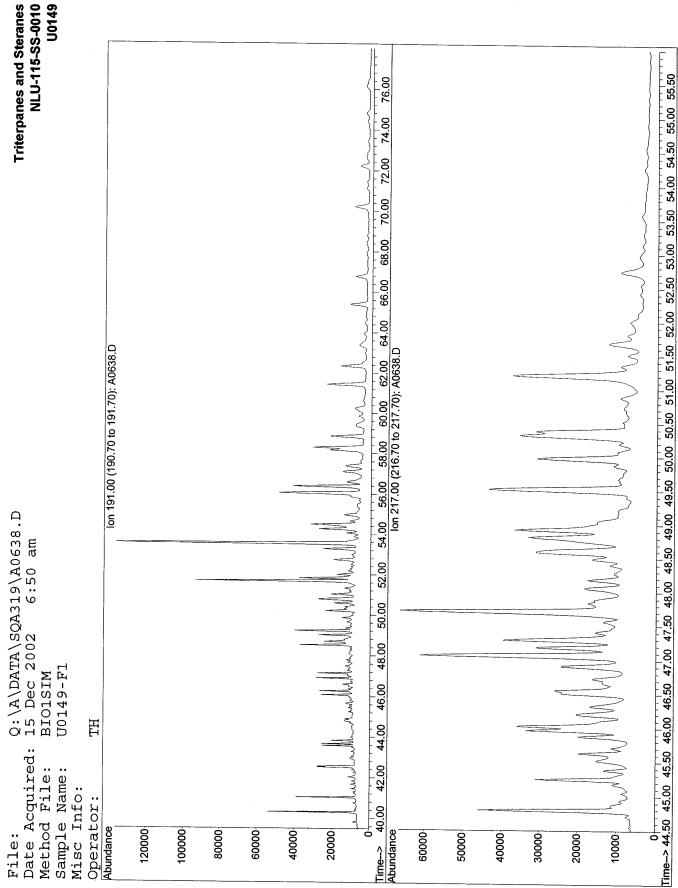




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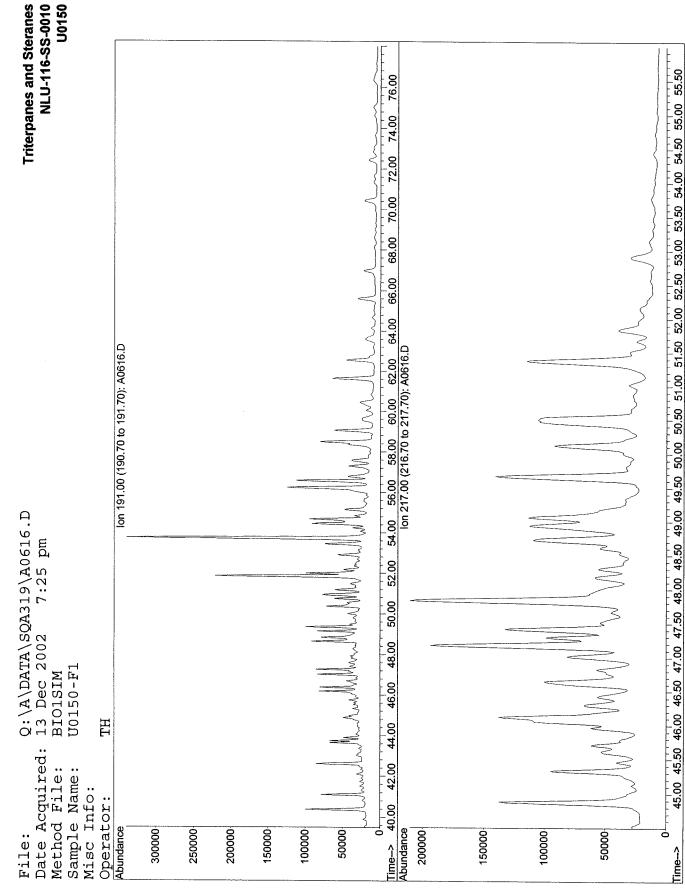


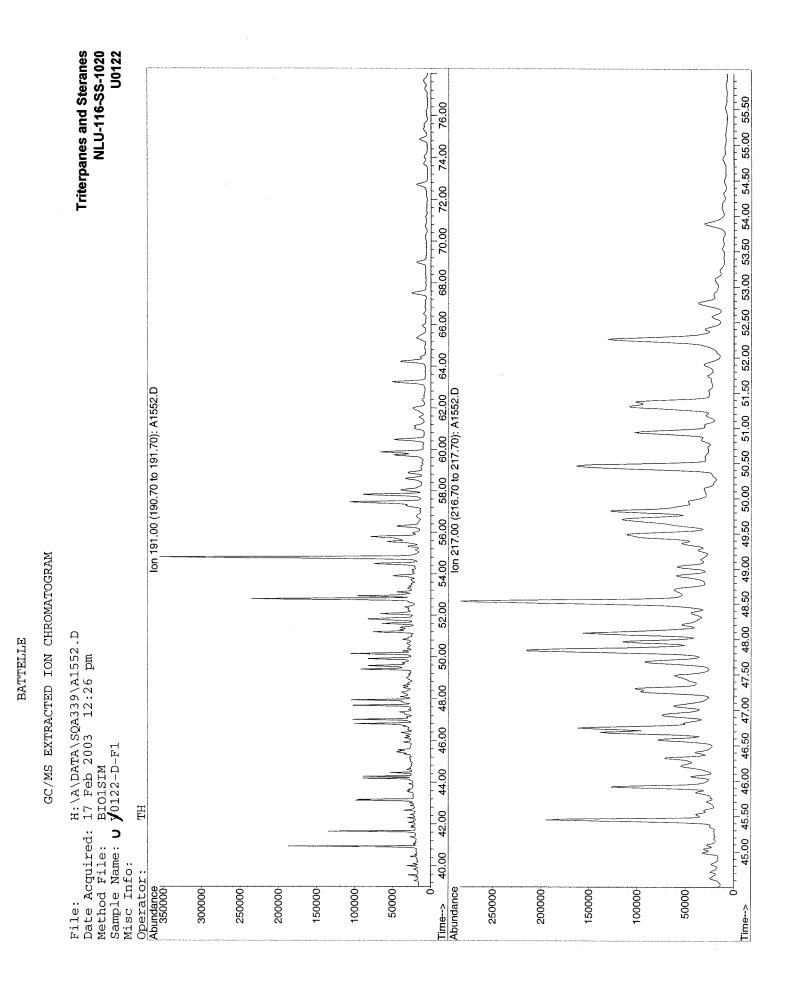
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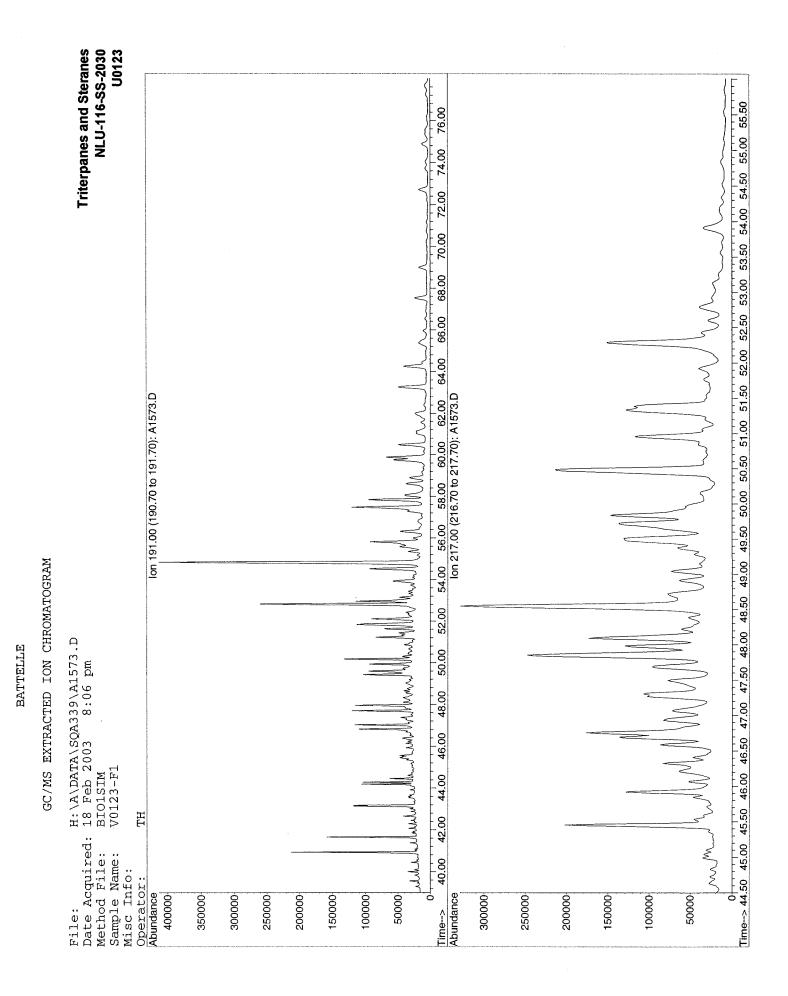
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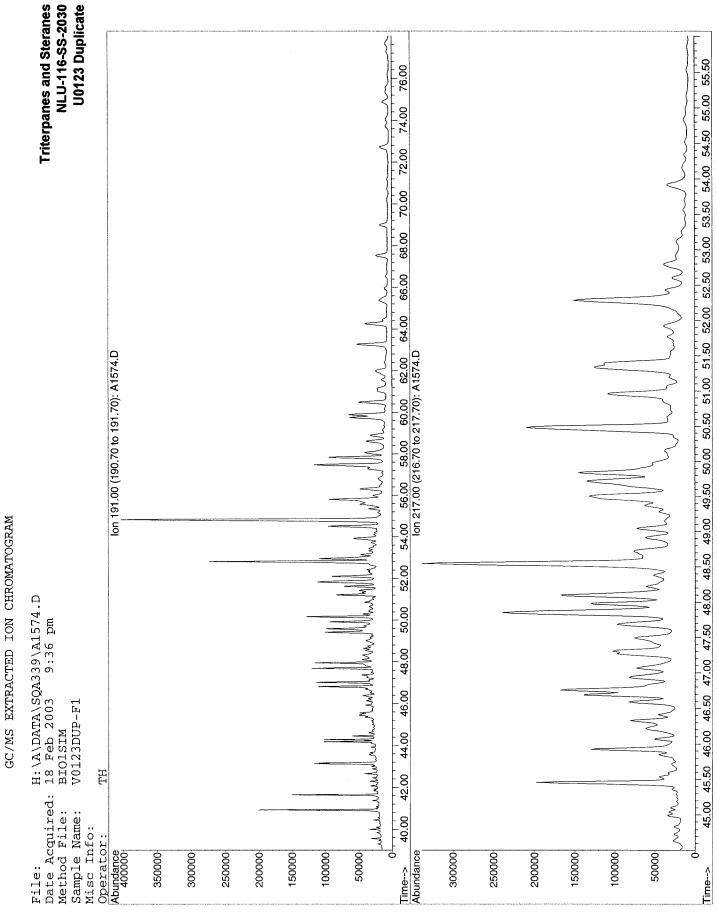
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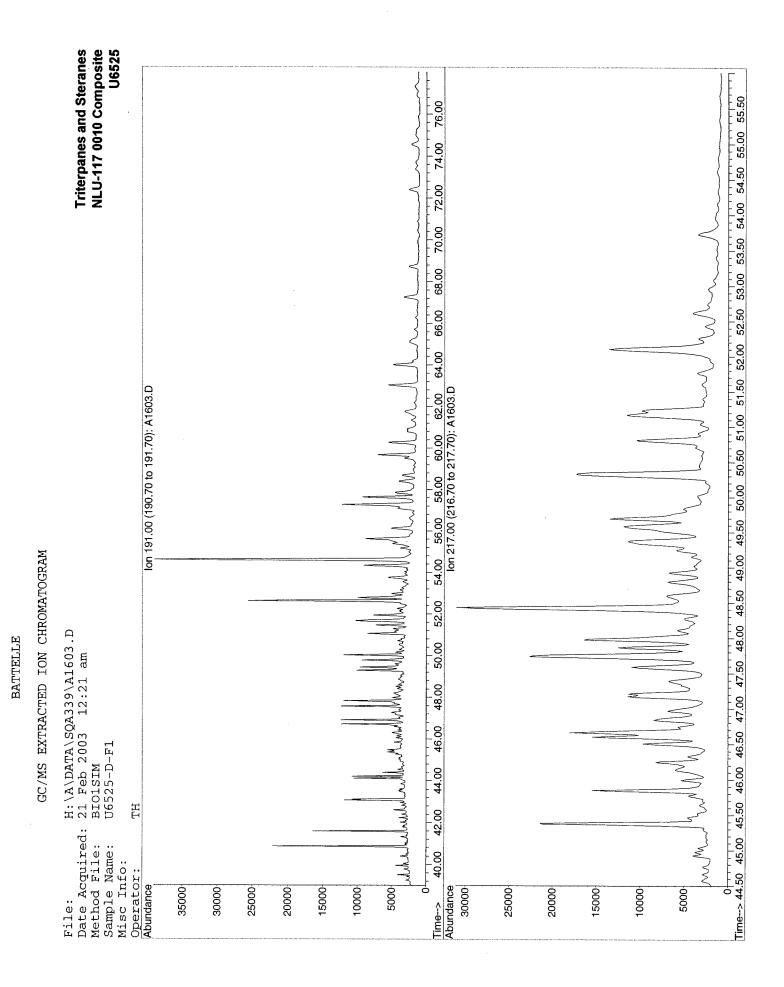
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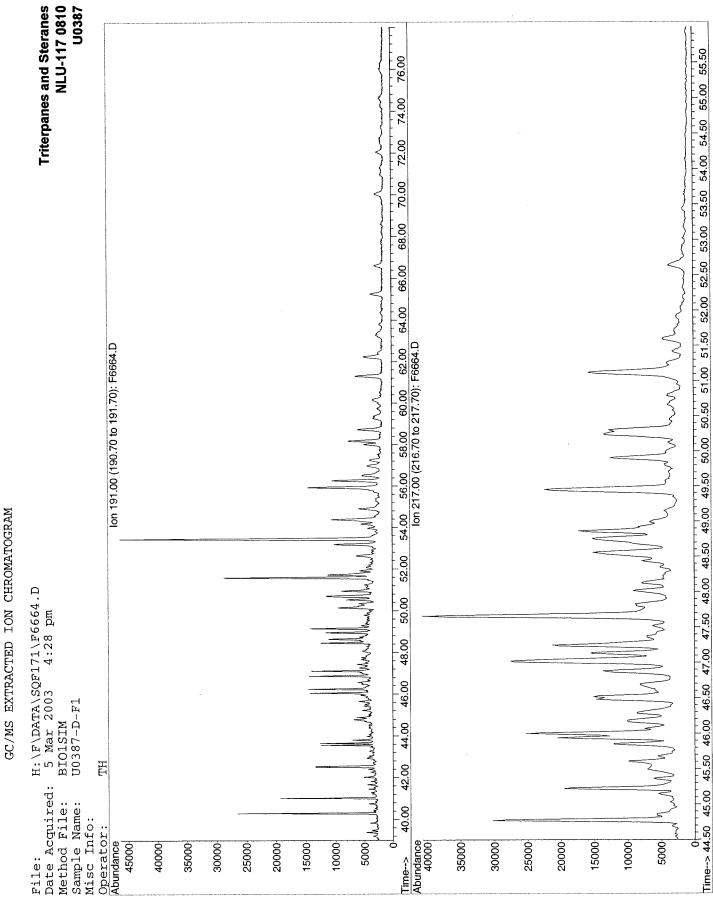


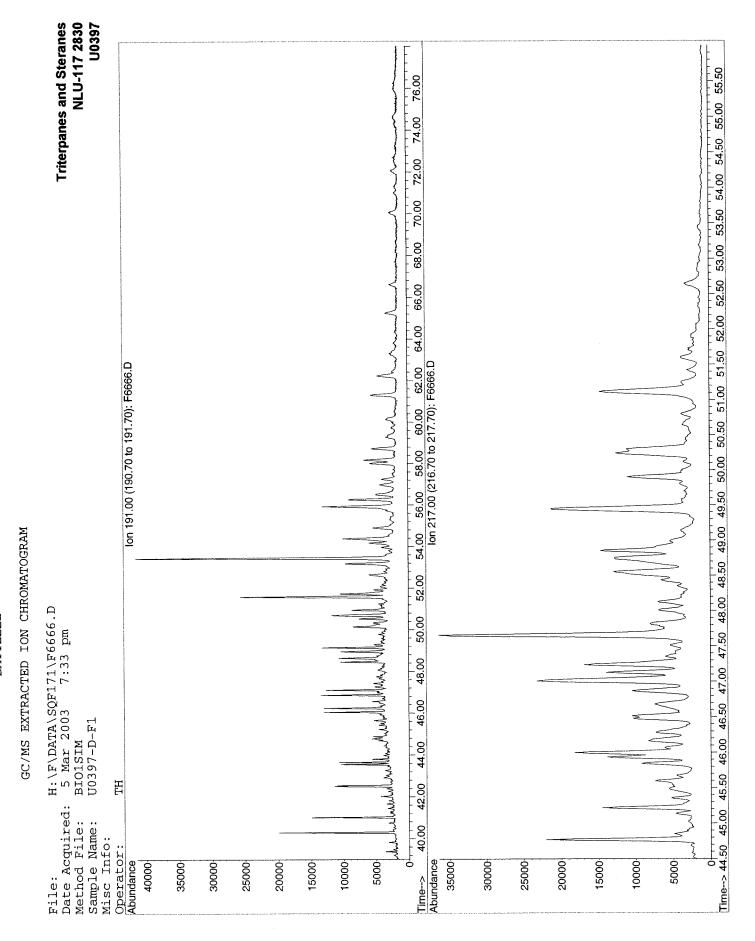


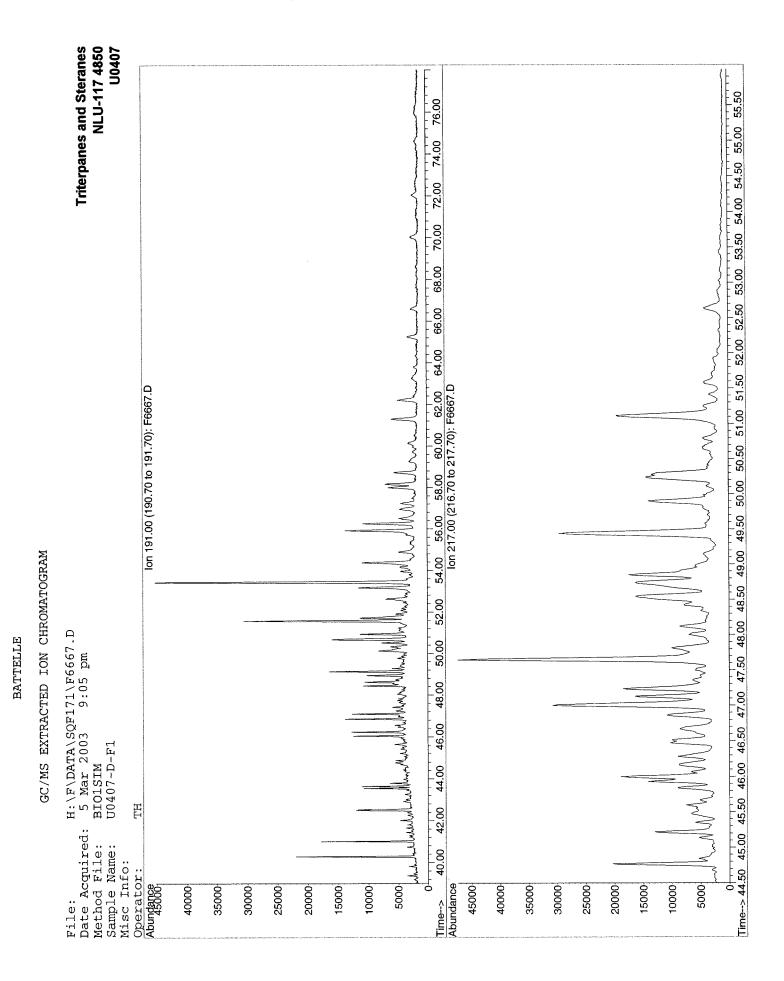


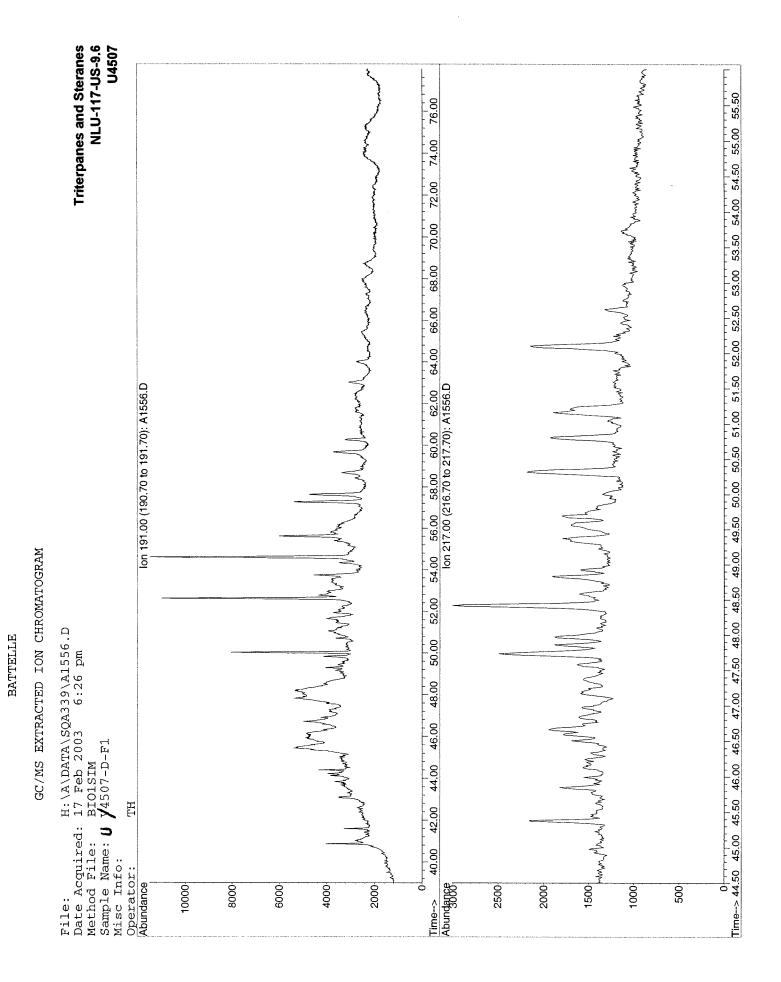


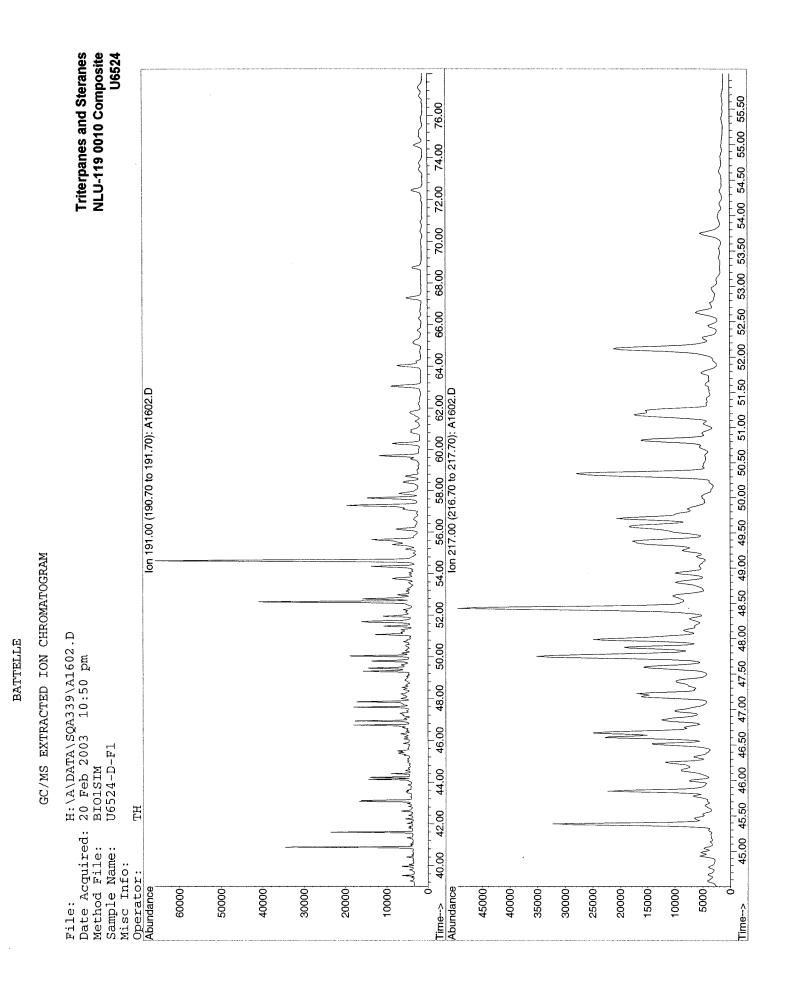


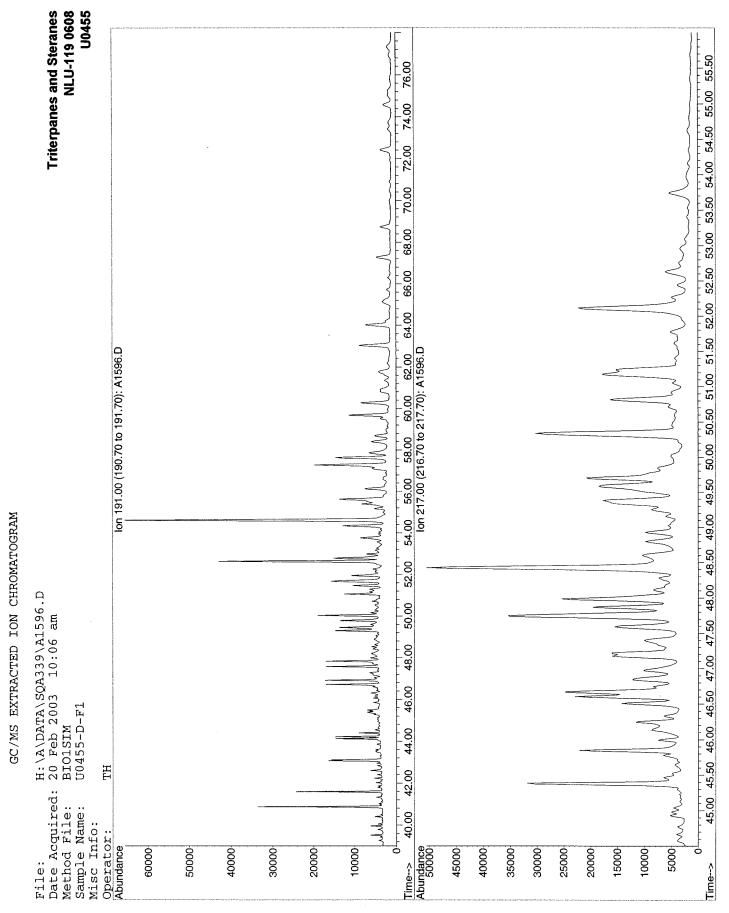




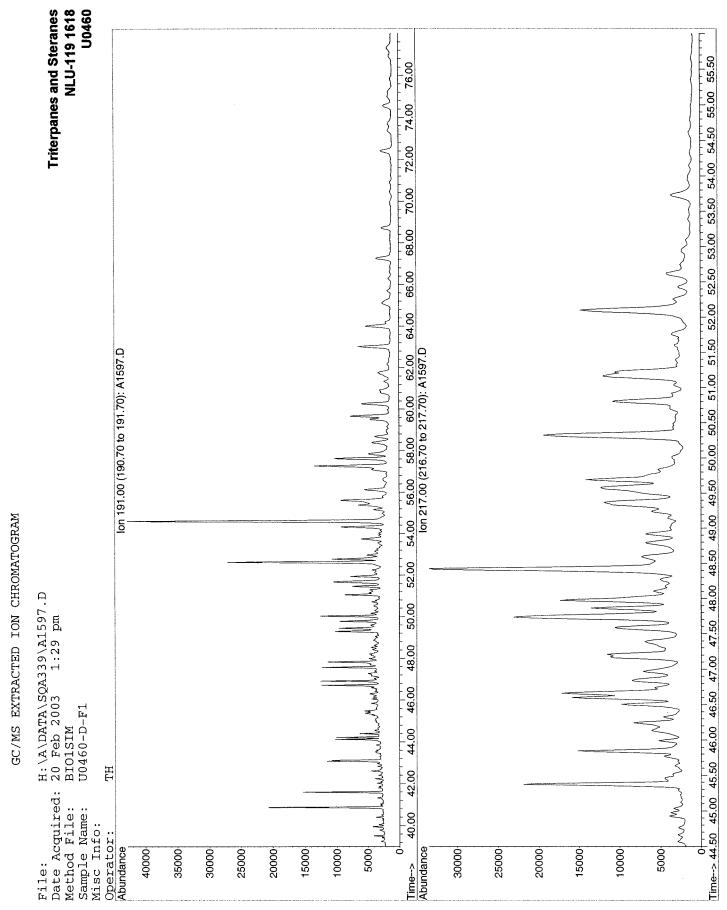




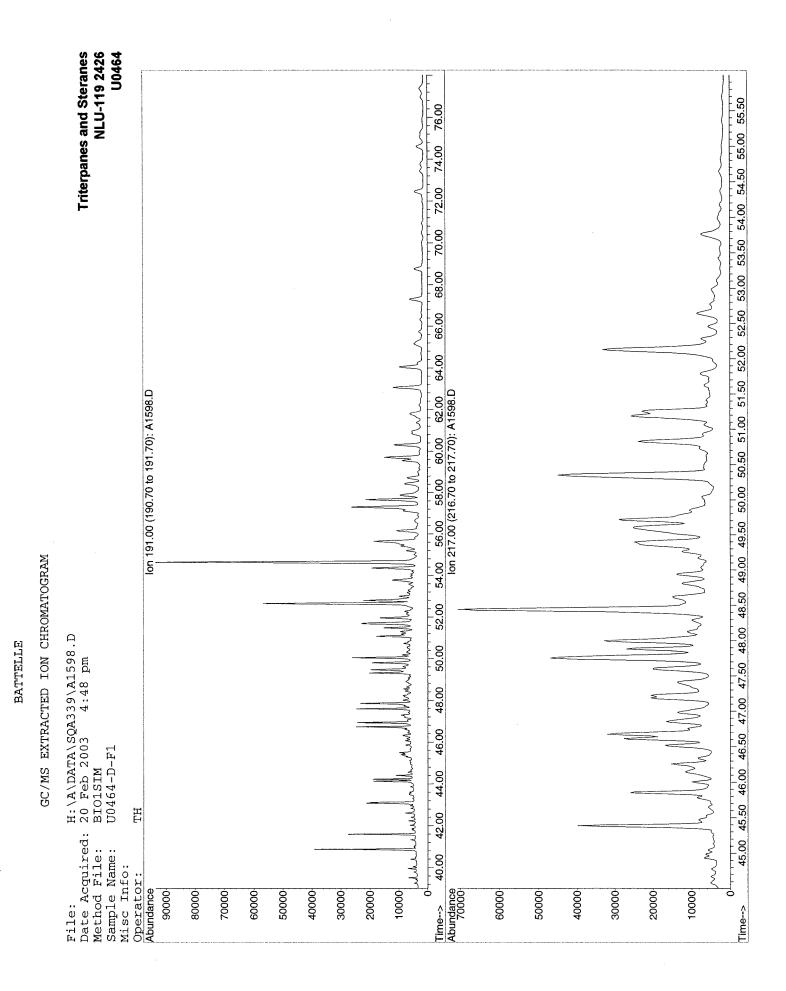


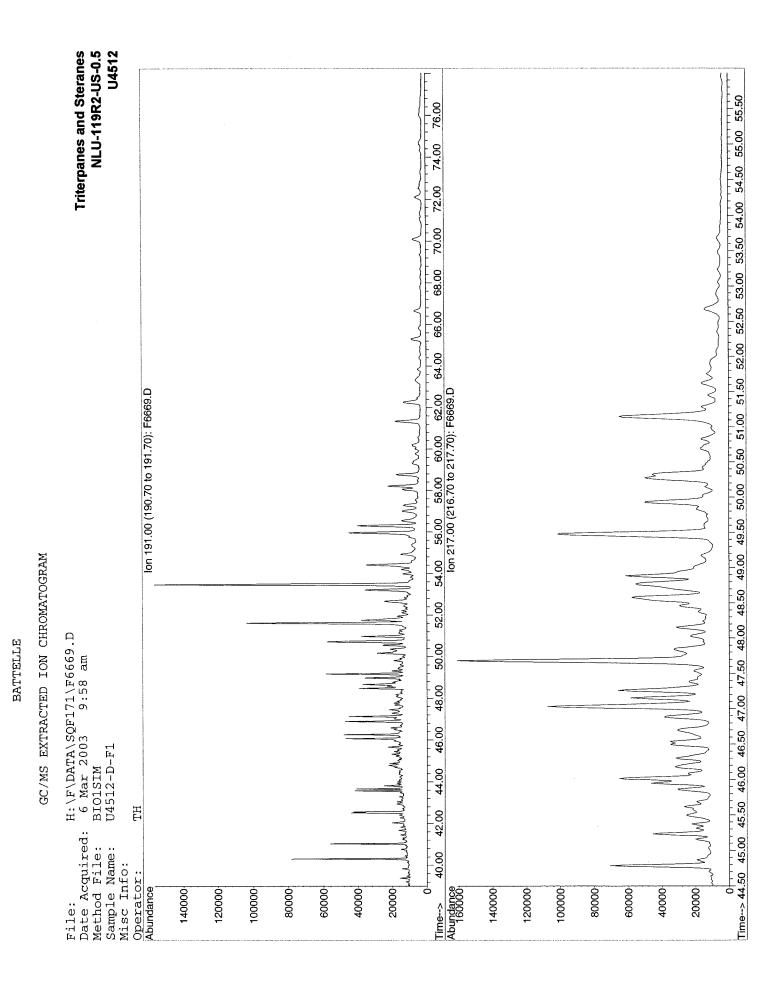


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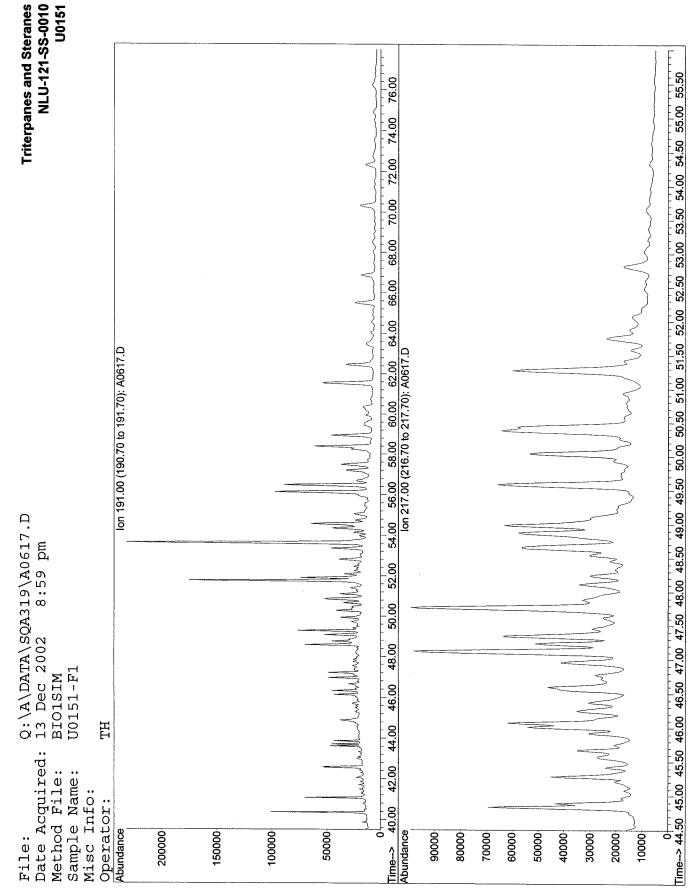
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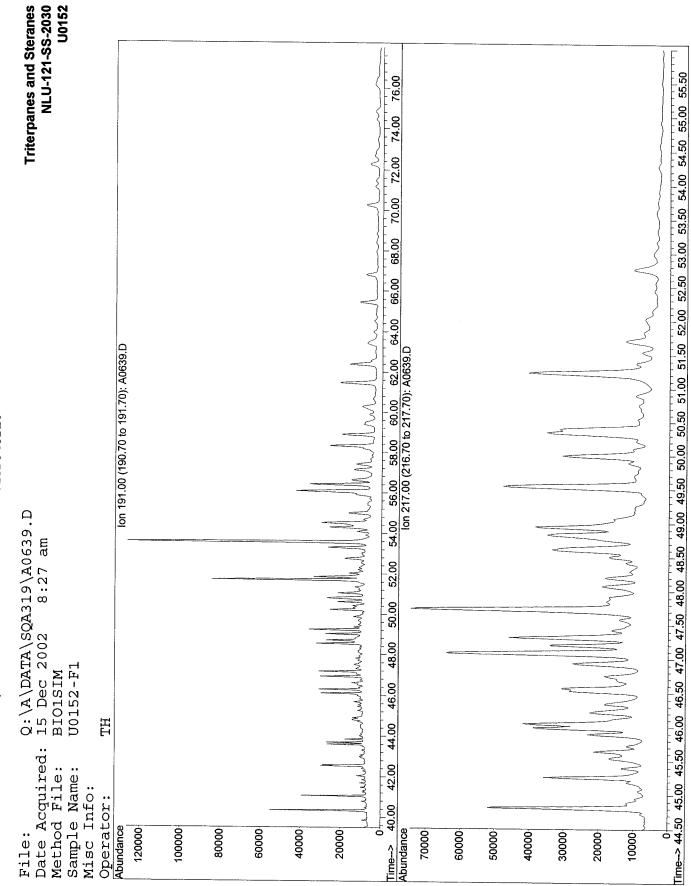


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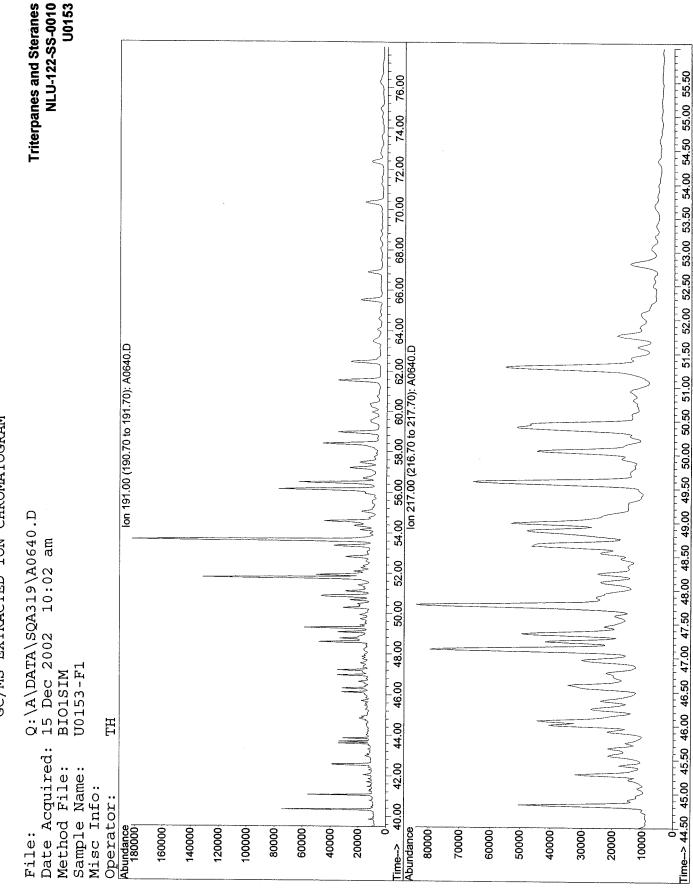
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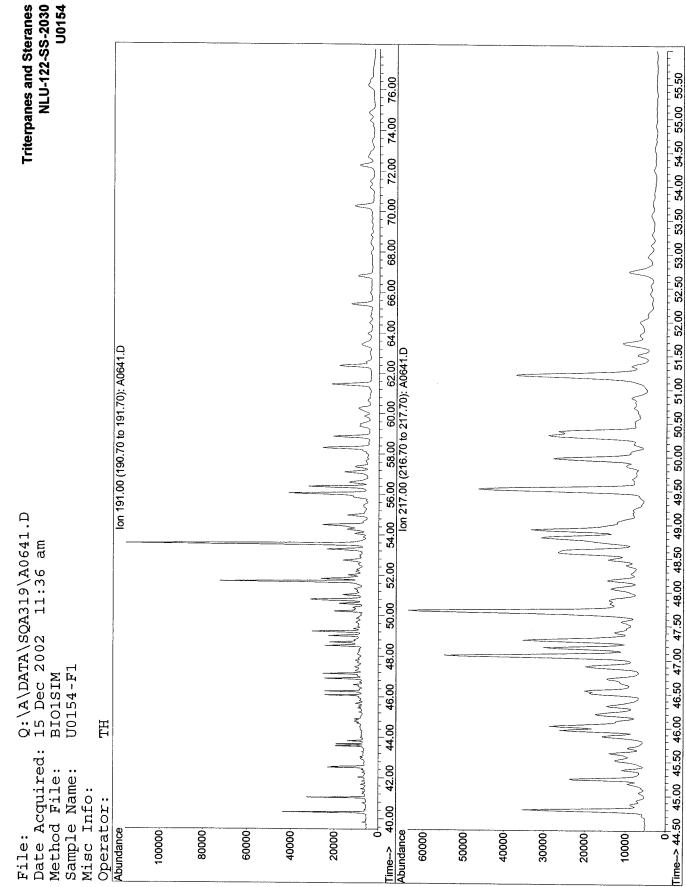
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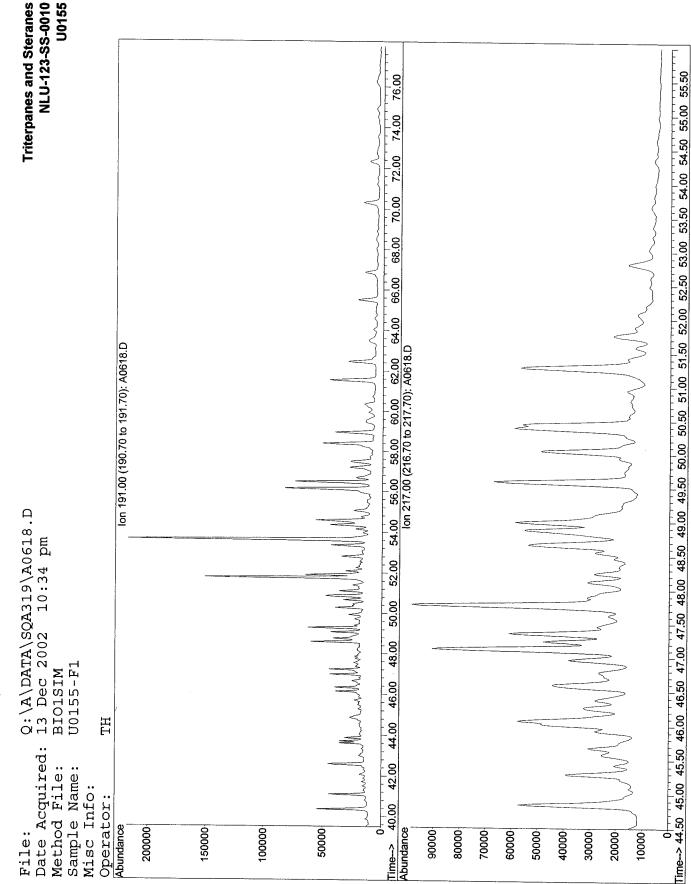
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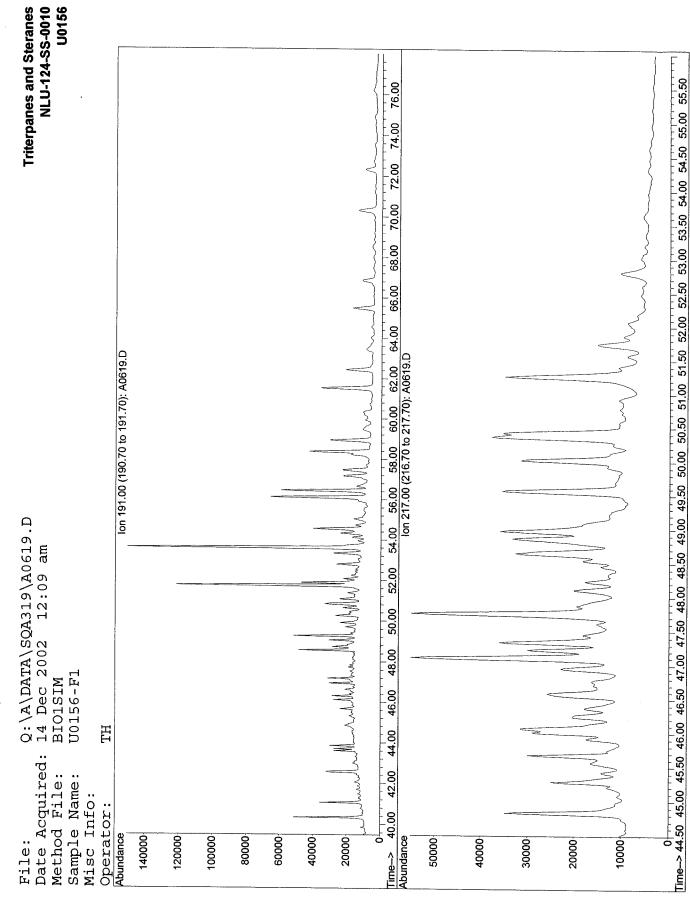


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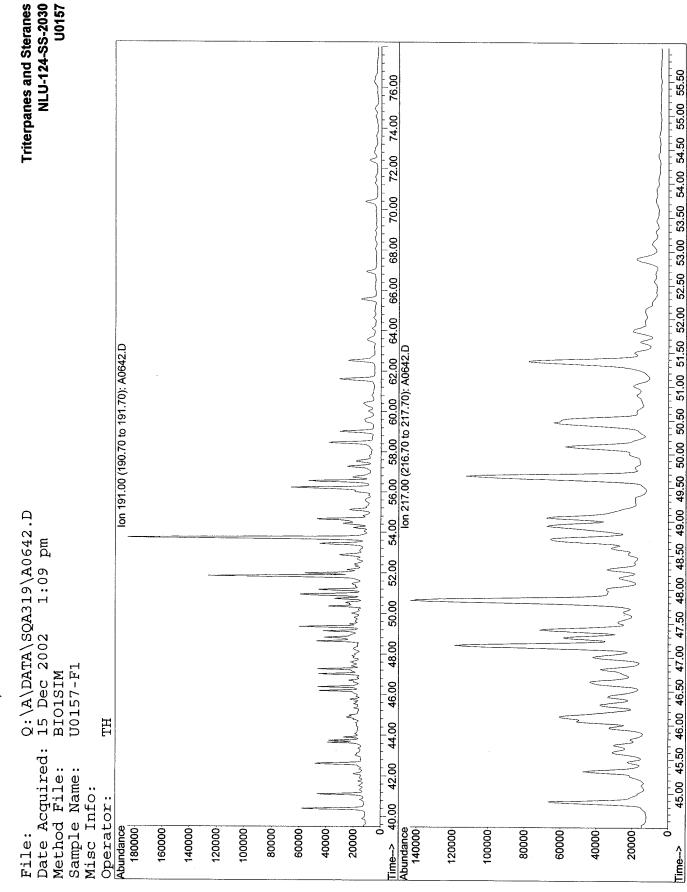


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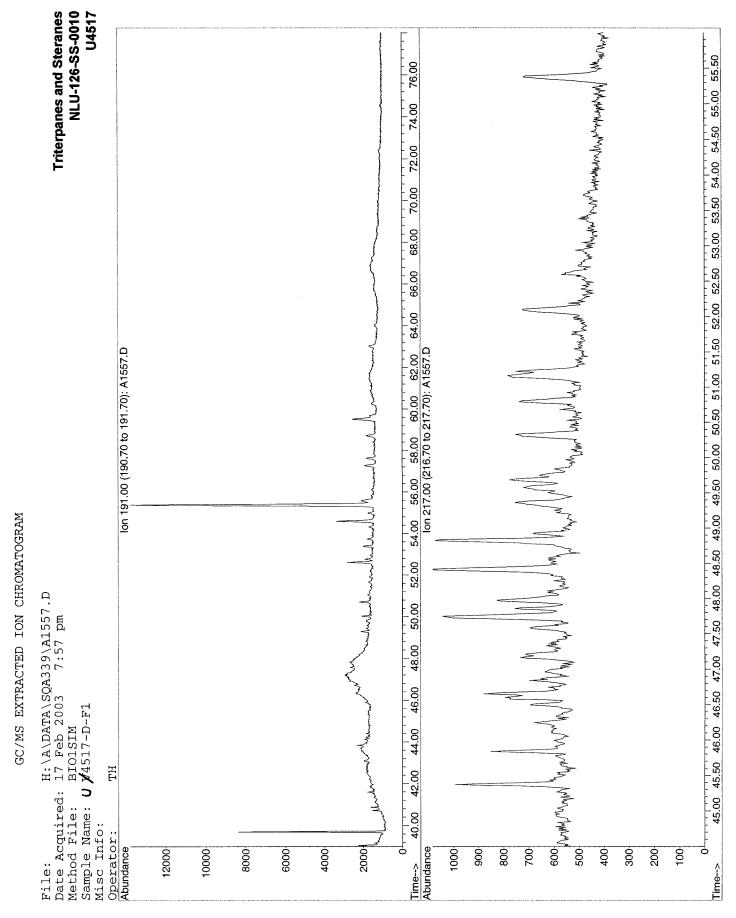
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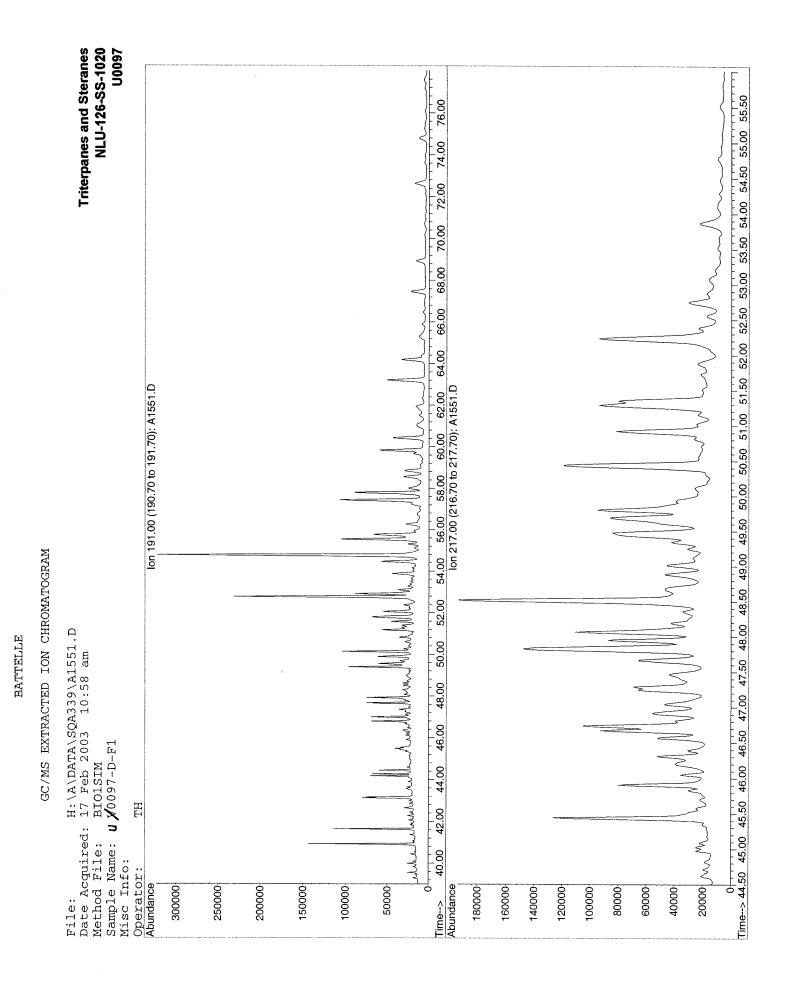
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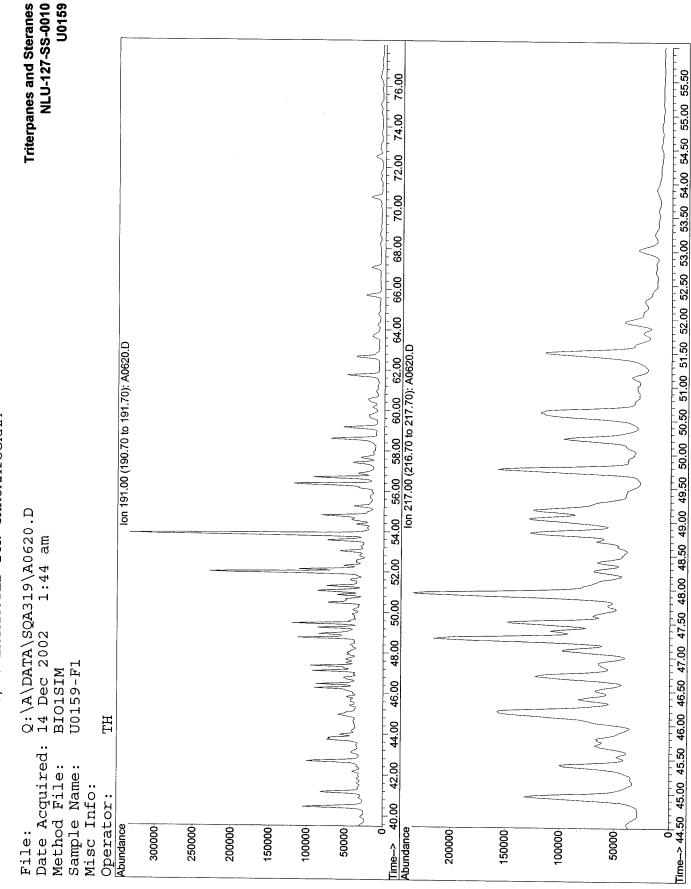
U0158 **Triterpanes and Steranes** NLU-126-SS-0010 45.00 45.50 46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00 50.50 51.00 51.50 52.00 52.50 53.00 53.50 54.00 54.50 55.00 55.50 76.00 74.00 72.00 70,00 68.00 66.00 54.00 56.00 58.00 60.00 62.00 64.00 lon 217.00 (216.70 to 217.70): A0643.D lon 191.00 (190.70 to 191.70): A0643.D Q:\A\DATA\SQA319\A0643.D 15 Dec 2002 2:43 pm BIO1SIM 52.00 50.00 48.00 U0158-F1 46.00 HT44.00 Date Acquired: 40.00 42.00 Method File: Sample Name: Misc Info: Operator: Abundance 80000 30000 20000 10000 70000 60000 50000 40000 6 Abundance 35000 30000 25000 20000-15000 10000 5000 6 File: Time-> Time->





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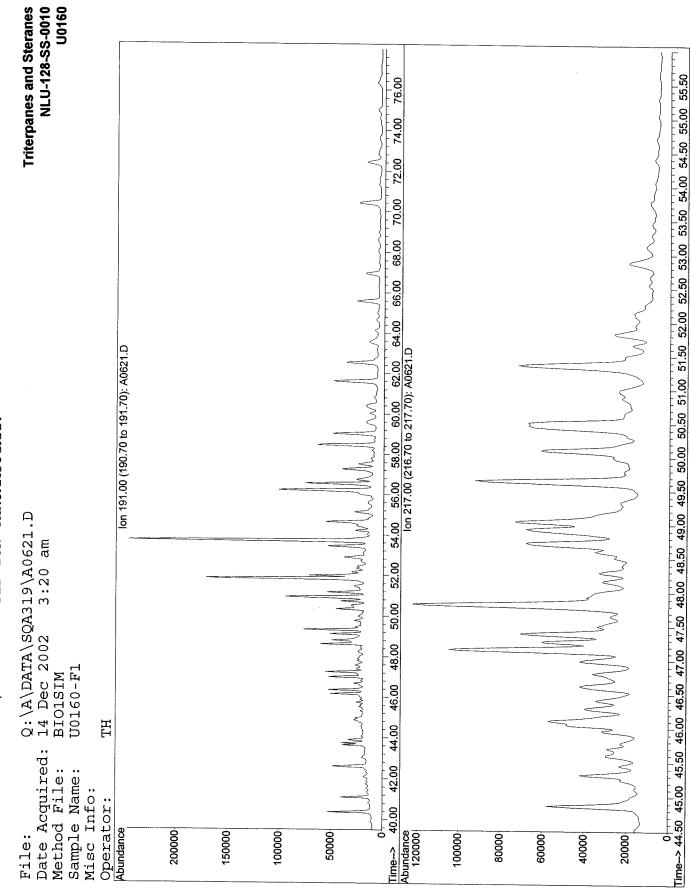
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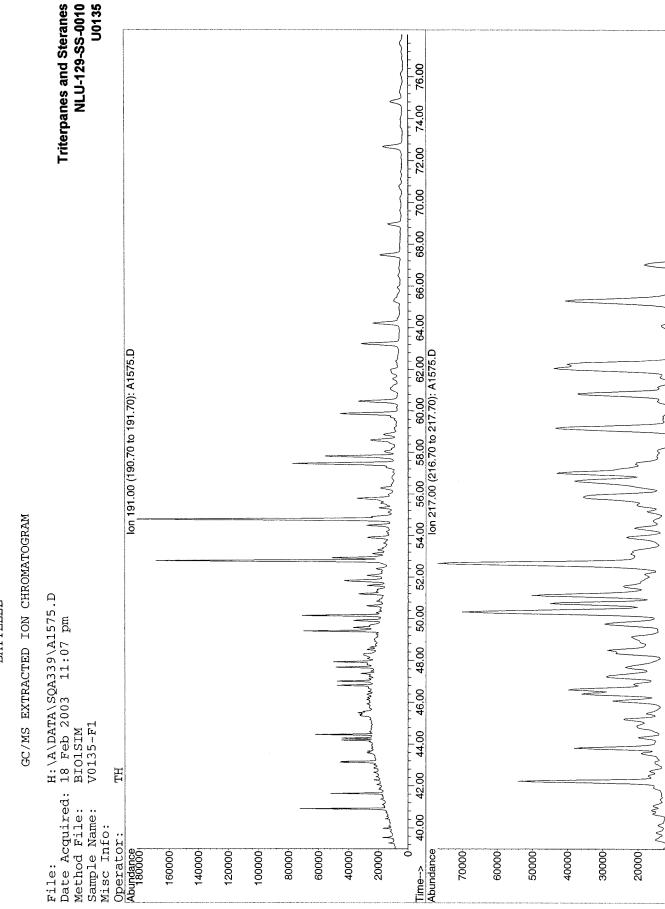
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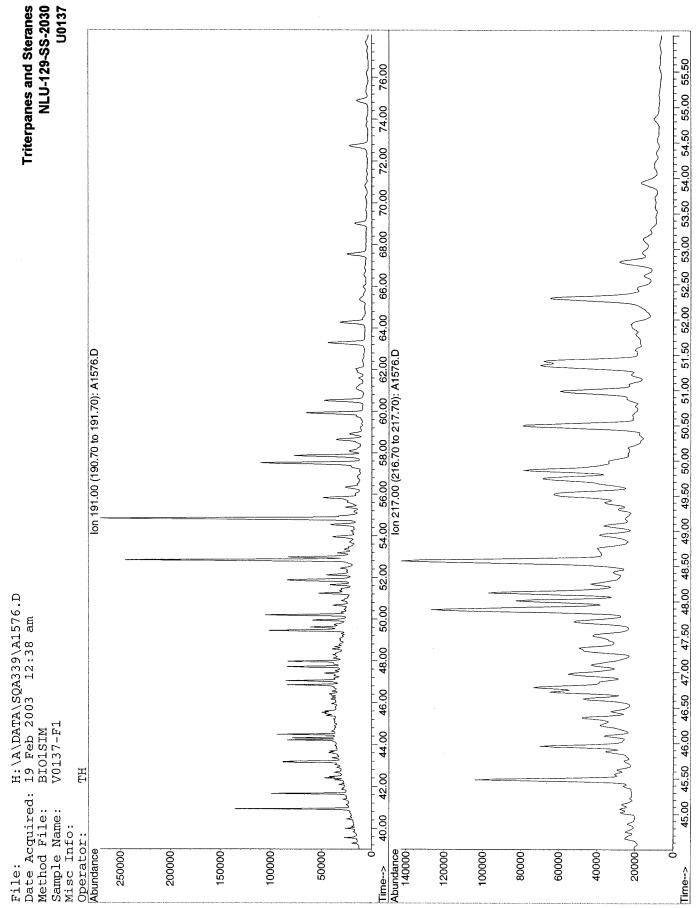
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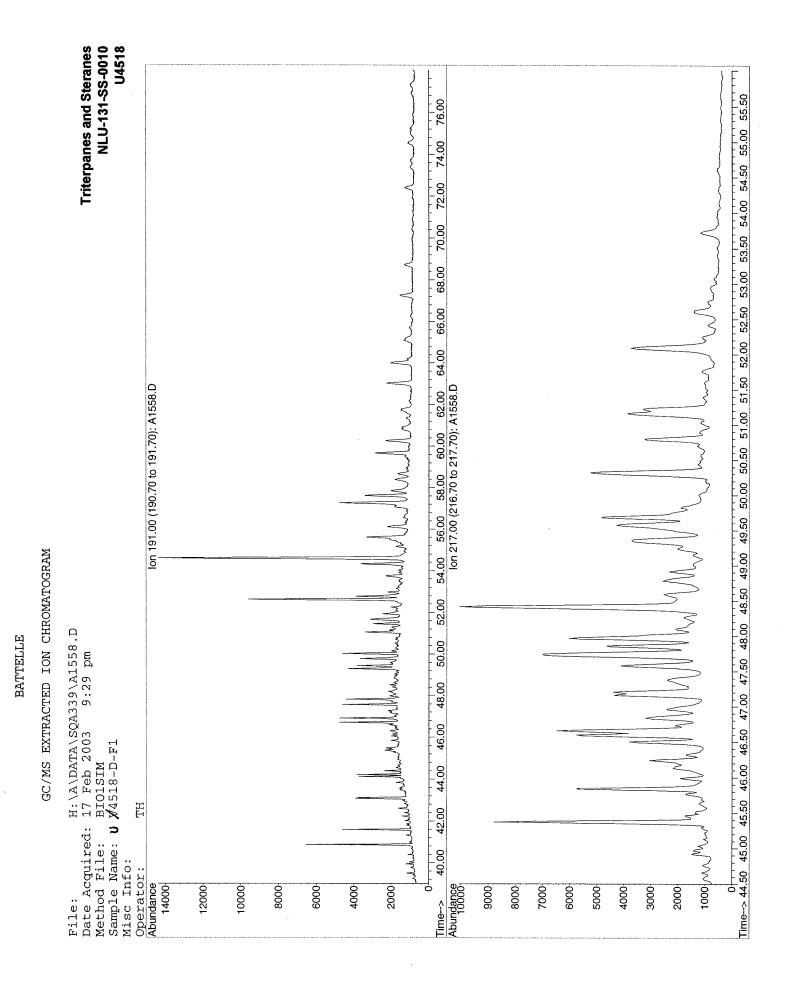
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Triterpanes and Steranes NLU-130-SS-0010 Trime-> 44.50 45.00 45.50 46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00 50.50 51.00 51.50 52.00 52.50 53.00 53.50 54.00 54.50 55.00 55.50 76.00 74.00 72.00 70,00 68.00 66.00 54.00 56.00 58.00 60.00 62.00 64.00 lon 217.00 (216.70 to 217.70); A0644.D lon 191.00 (190.70 to 191.70): A0644.D ξ JUM Q:\A\DATA\SQA319\A0644.D 15 Dec 2002 4:16 pm BIO1SIM 52.00 50.00 שן ההיאוטריועה המתועה לעה אוניני 48.00 U0161-F1 46.00 $_{\rm HL}$ 42.00 44.00 Date Acquired: Method File: מיתואעומומיווייוניי Sample Name: Misc Info: Operator: Abundance Time--> 40.00 70000 60000 낭 50000 40000 20000 10000 30000 30000 Abundance 25000 20000 15000 5000 File: 10000 ò

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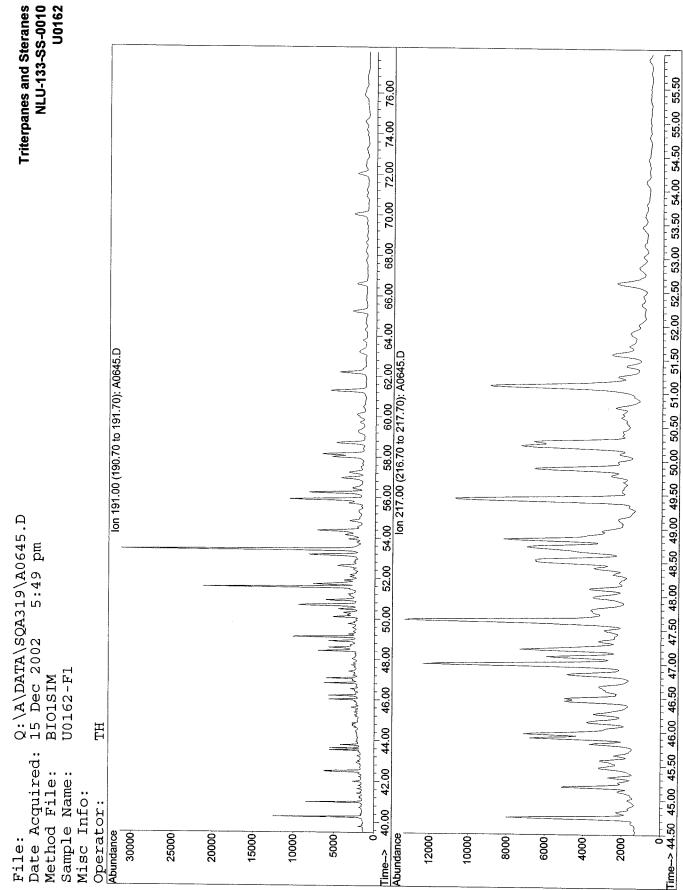
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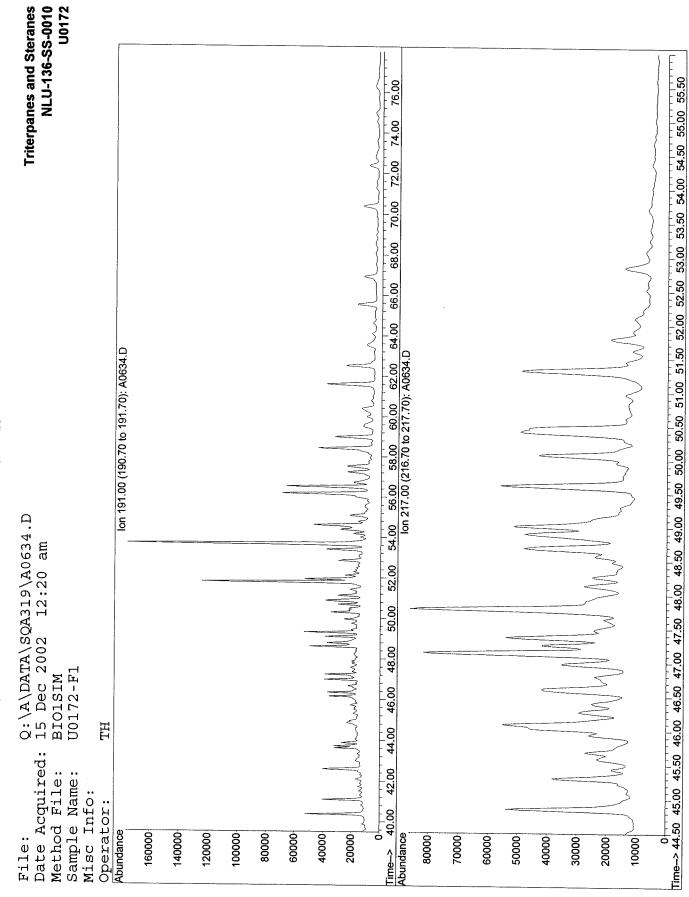
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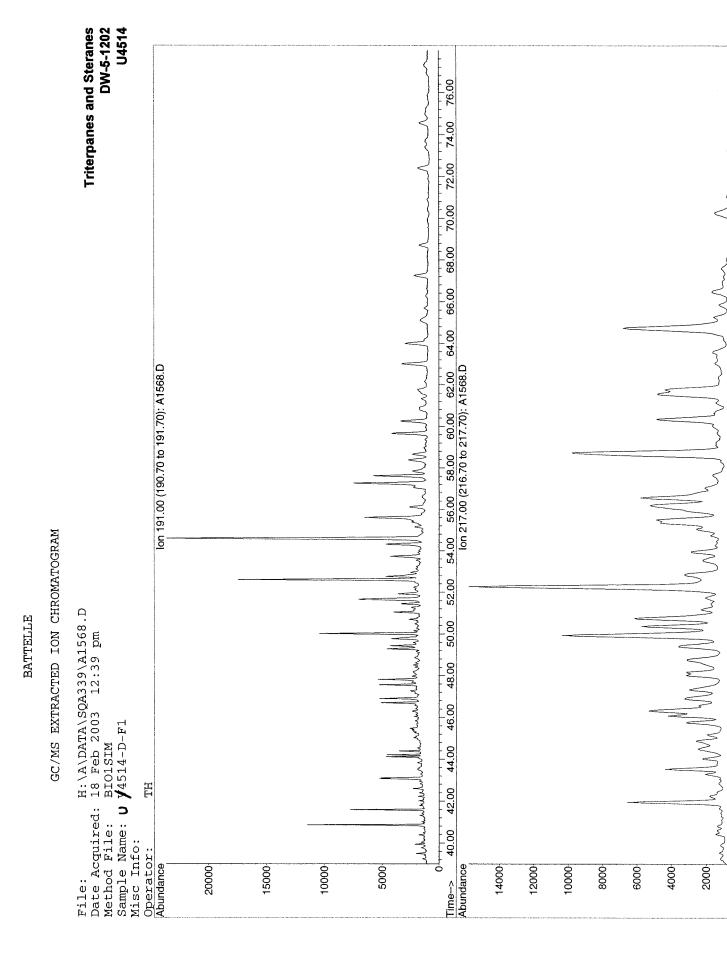
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U0163 **Triterpanes and Steranes** NLU-133-SS-1020 45.00 45.50 46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00 50.50 51.00 51.50 52.00 52.50 53.00 53.50 54.00 54.50 55.00 55.50 76.00 74.00 72.00 70.00 68.00 66.00 54.00 56.00 58.00 60.00 62.00 64.00 lon 217.00 (216.70 to 217.70): A0622.D Ion 191.00 (190.70 to 191.70): A0622.D Q:\A\DATA\SQA319\A0622.D 14 Dec 2002 4:55 am 52.00 50.00 48.00 U0163-F1 BIOISIM 46.00 ΗT 44.00 Date Acquired: Method File: lime--> 40.00 42.00 Sample Name: مدالدوروالديا Misc Info: Operator: Abundance 1 80000 70000 60000 30000 20000 10000 50000 40000 6 35000 30000 20000 5000 Abundance 25000 15000 10000 File: ò Time-->

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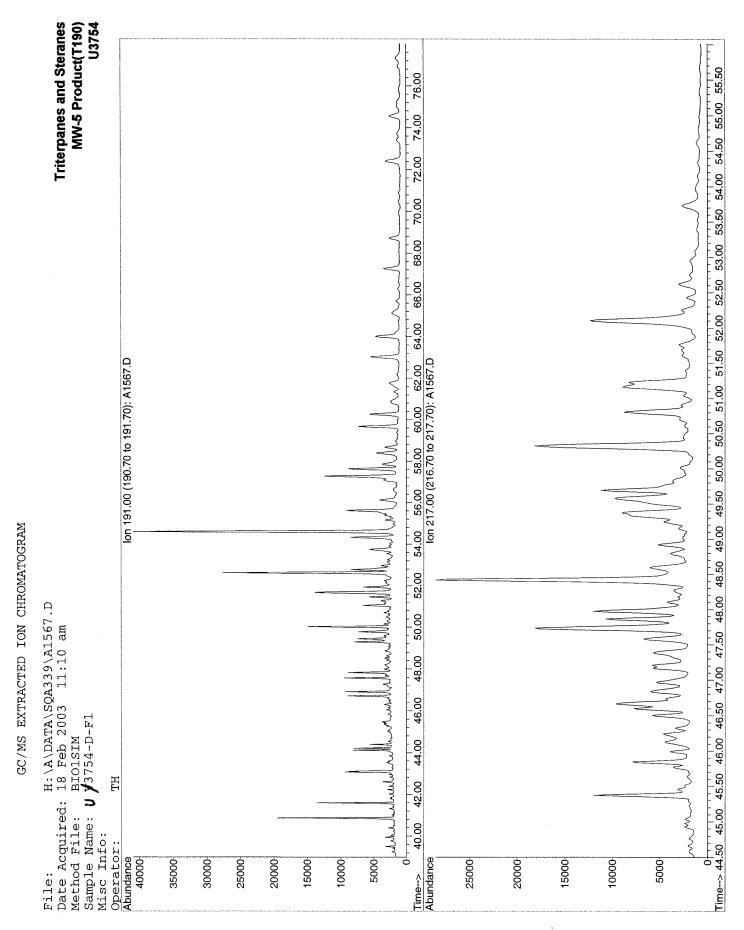
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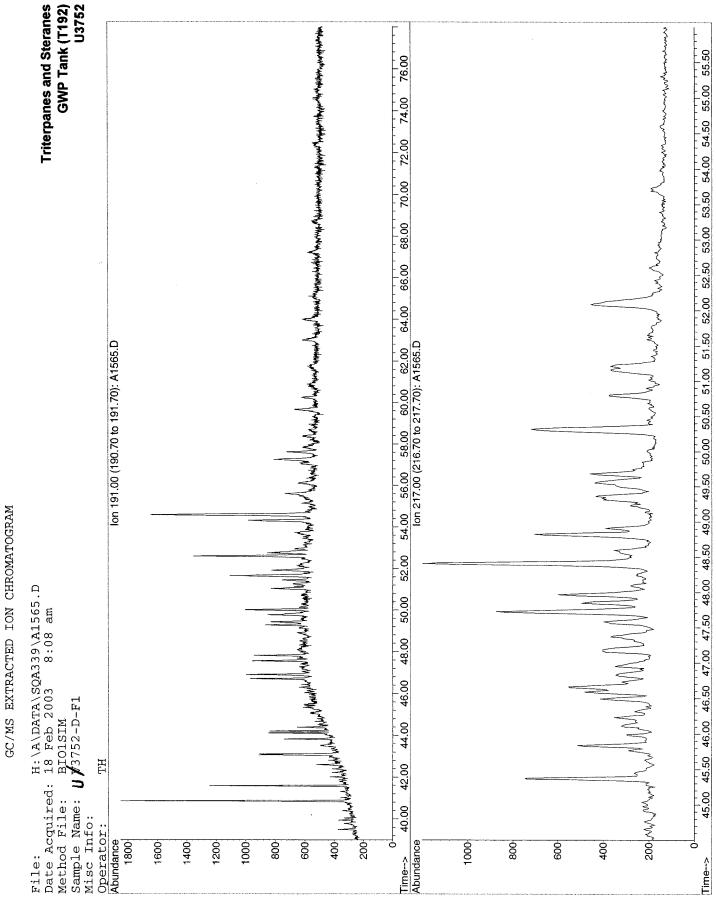
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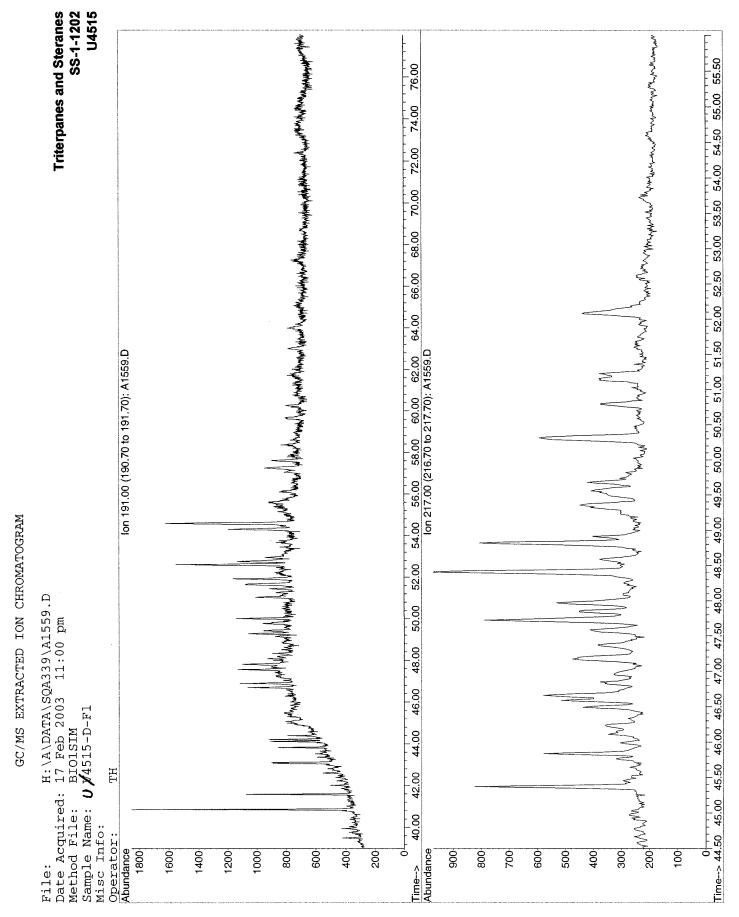
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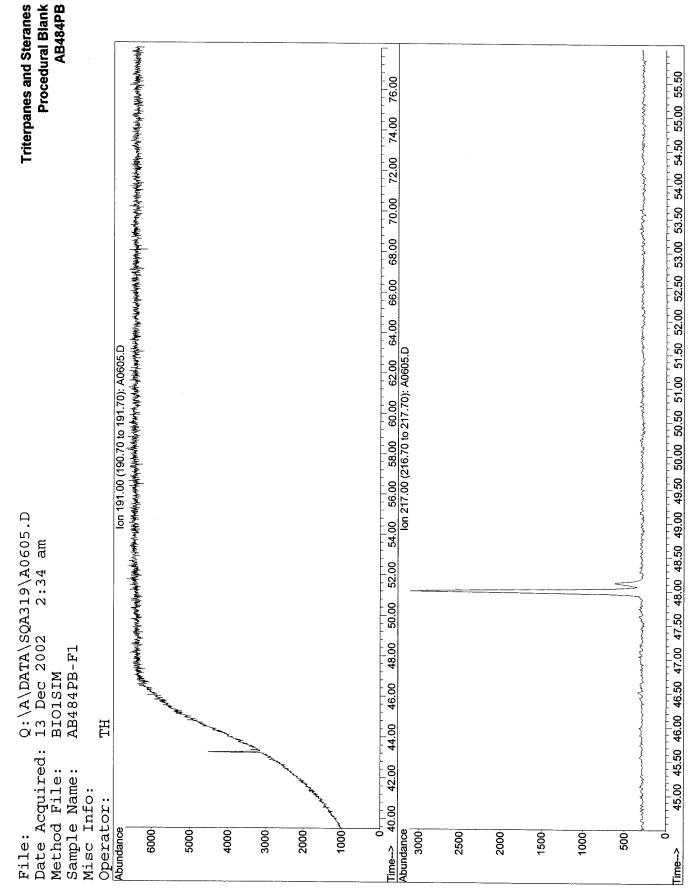




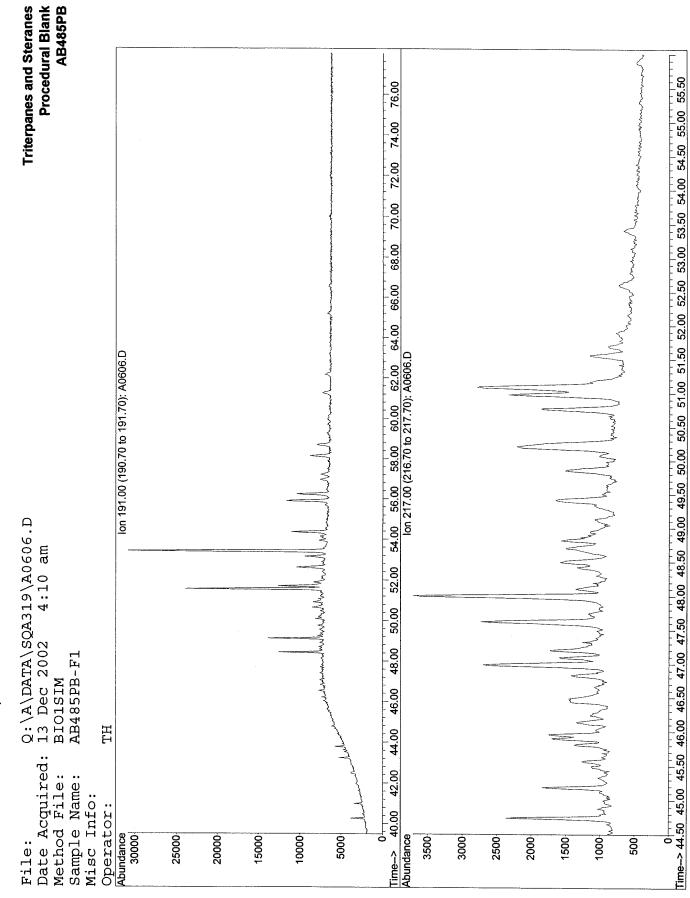


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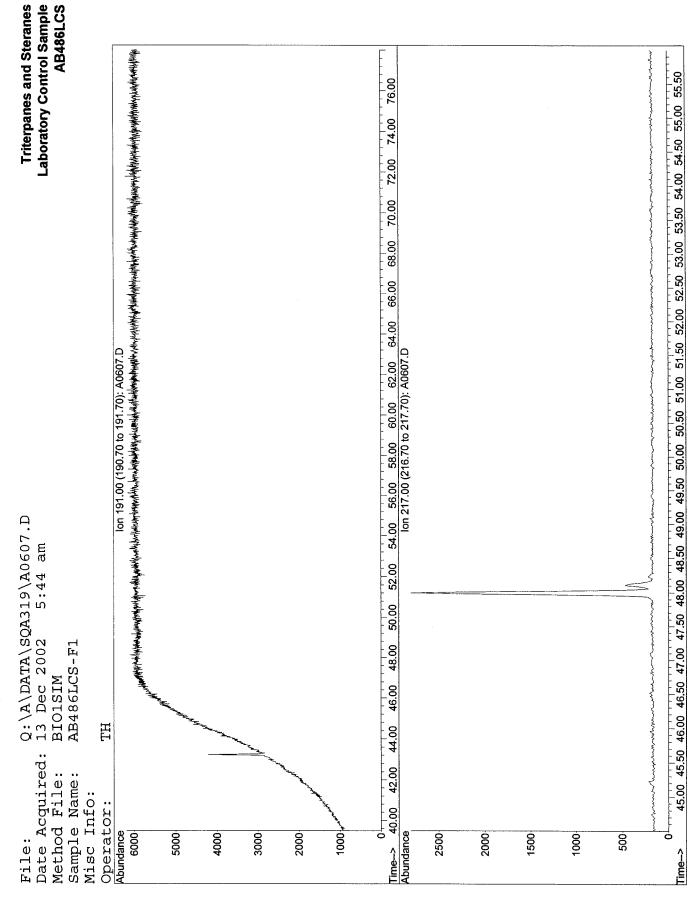


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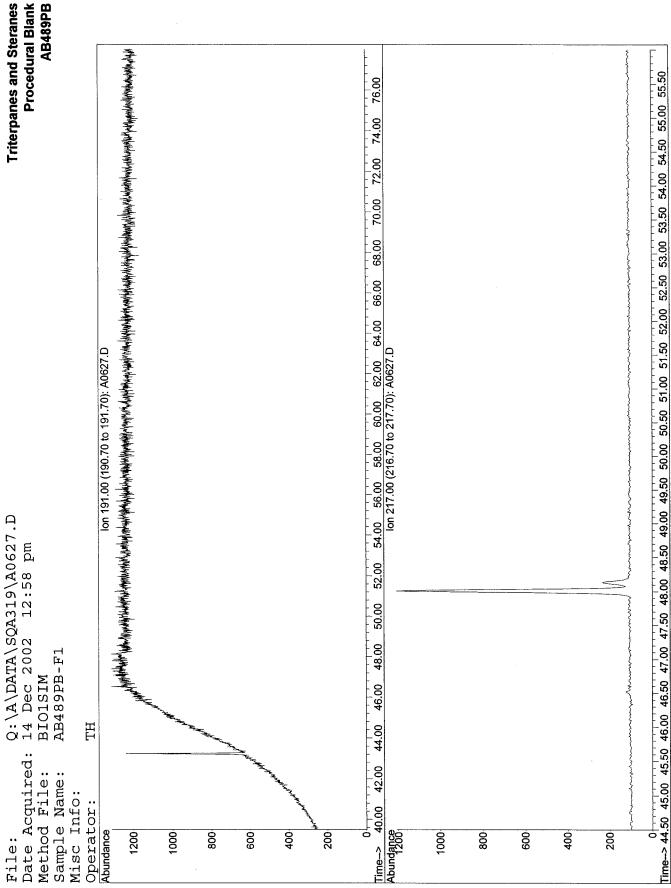
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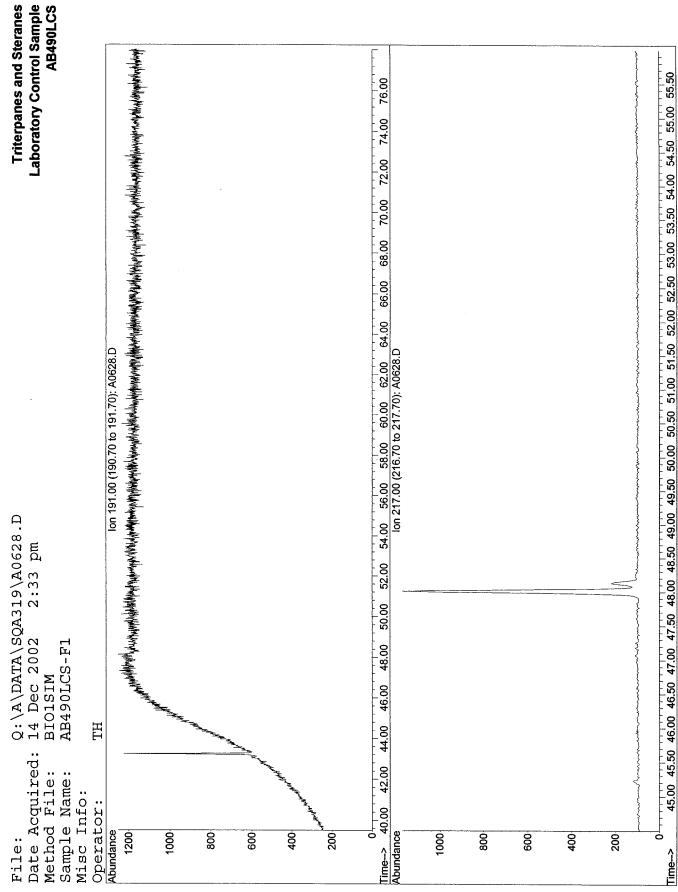
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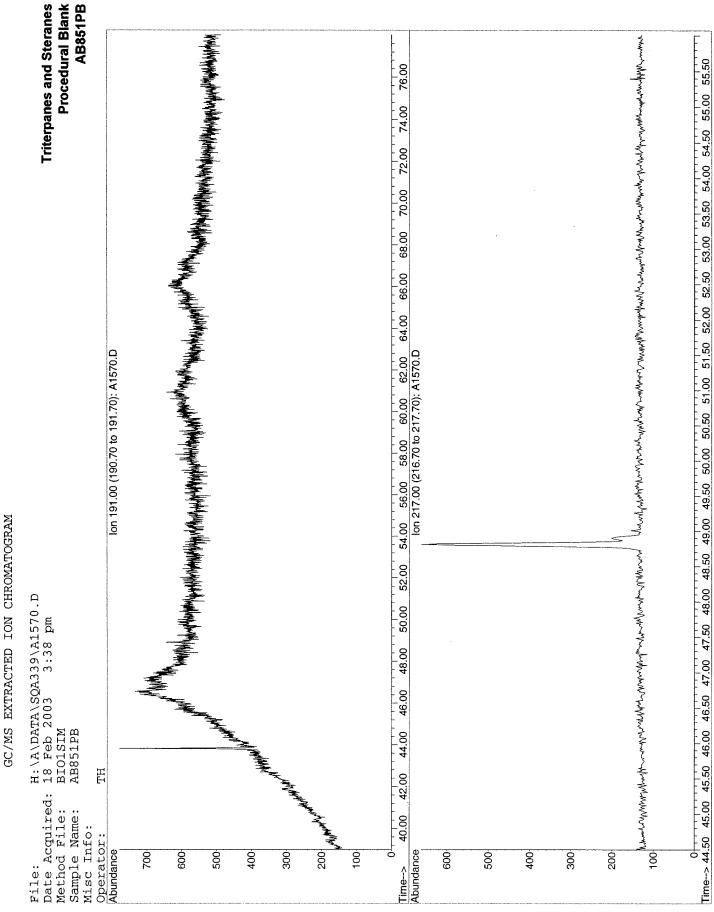
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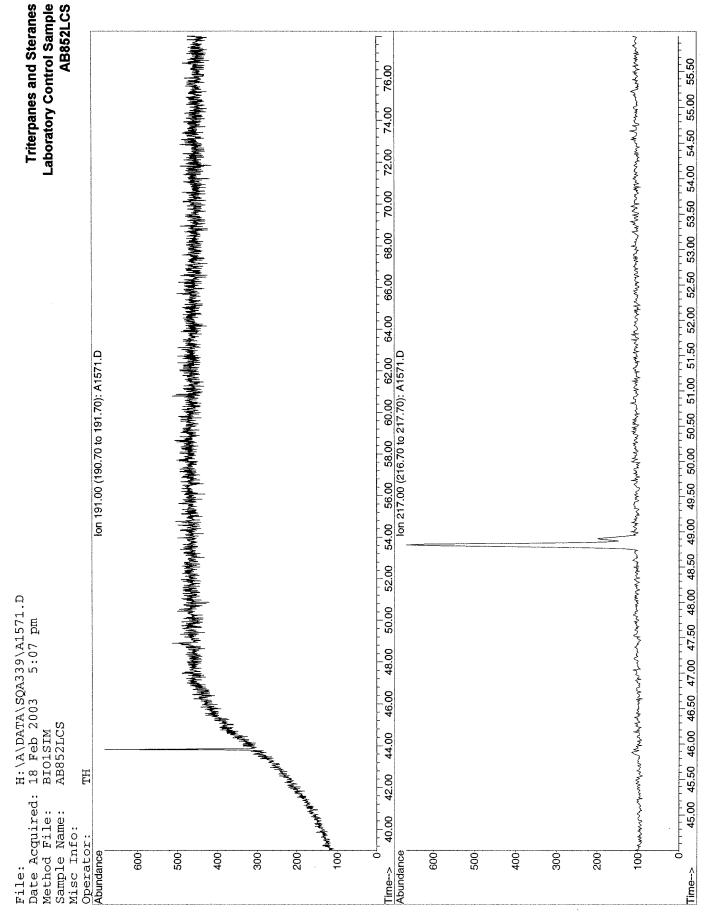


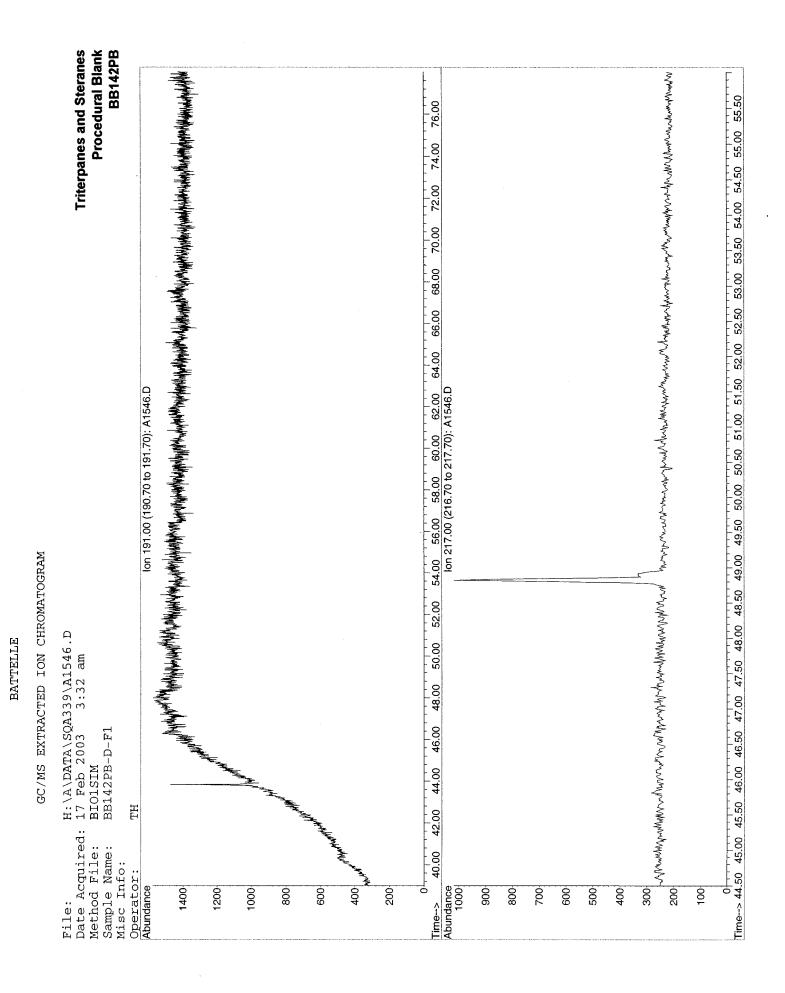
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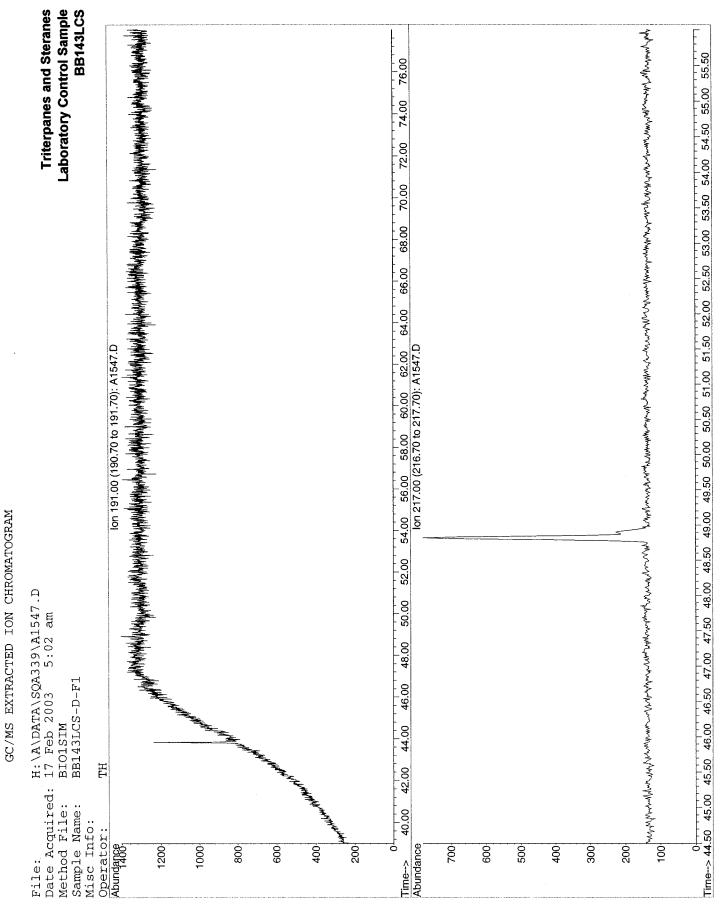


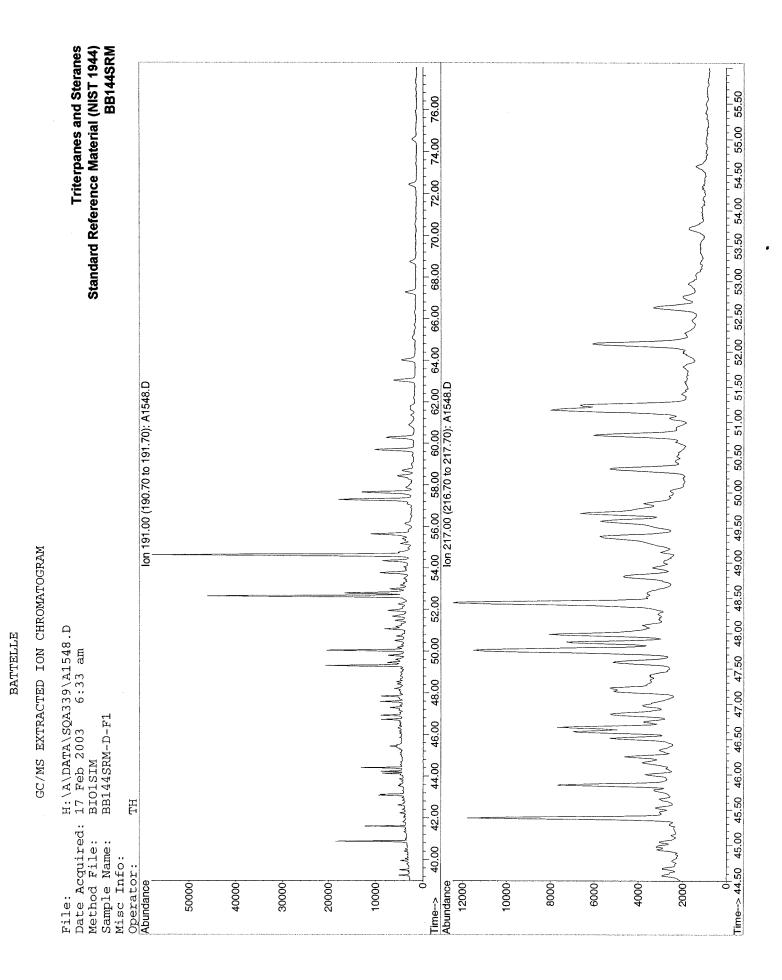


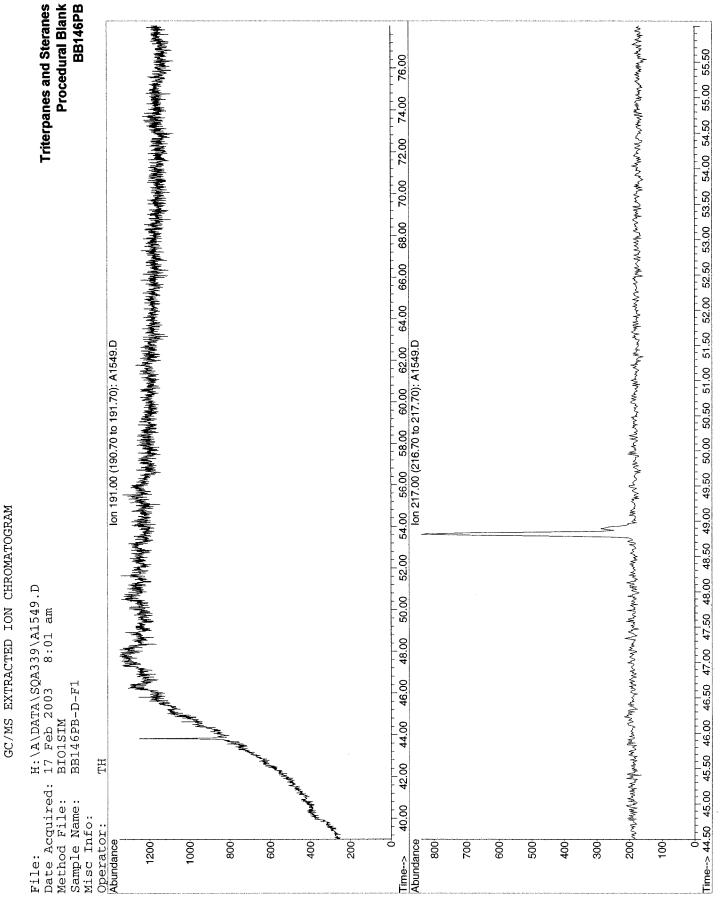


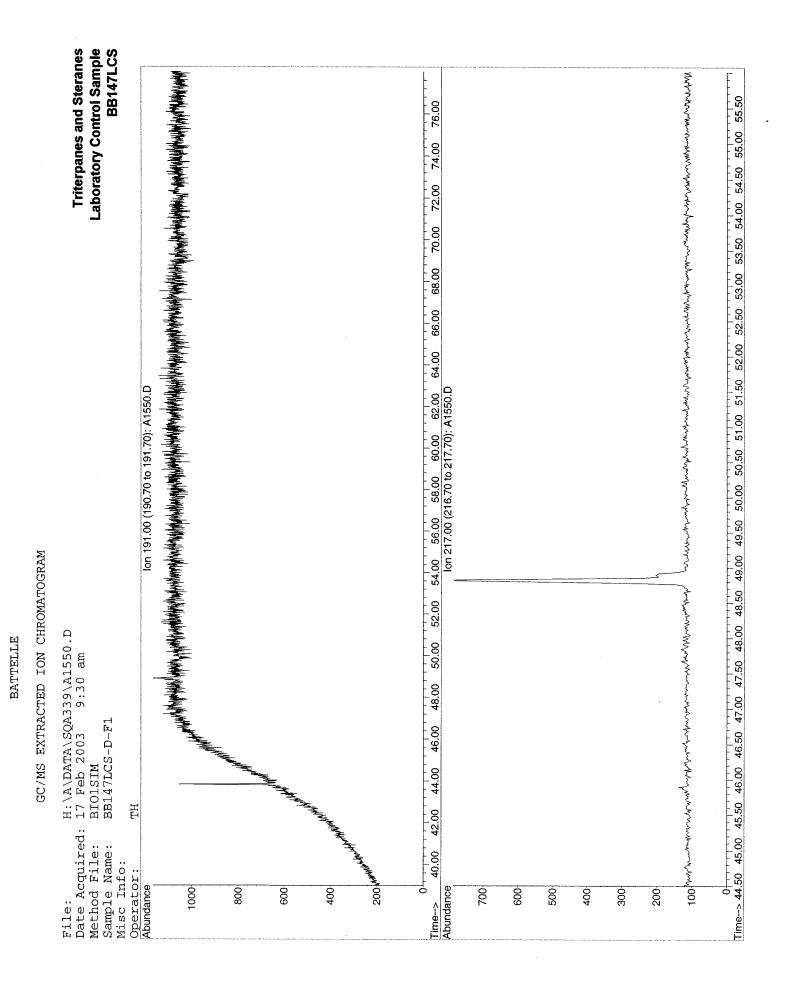


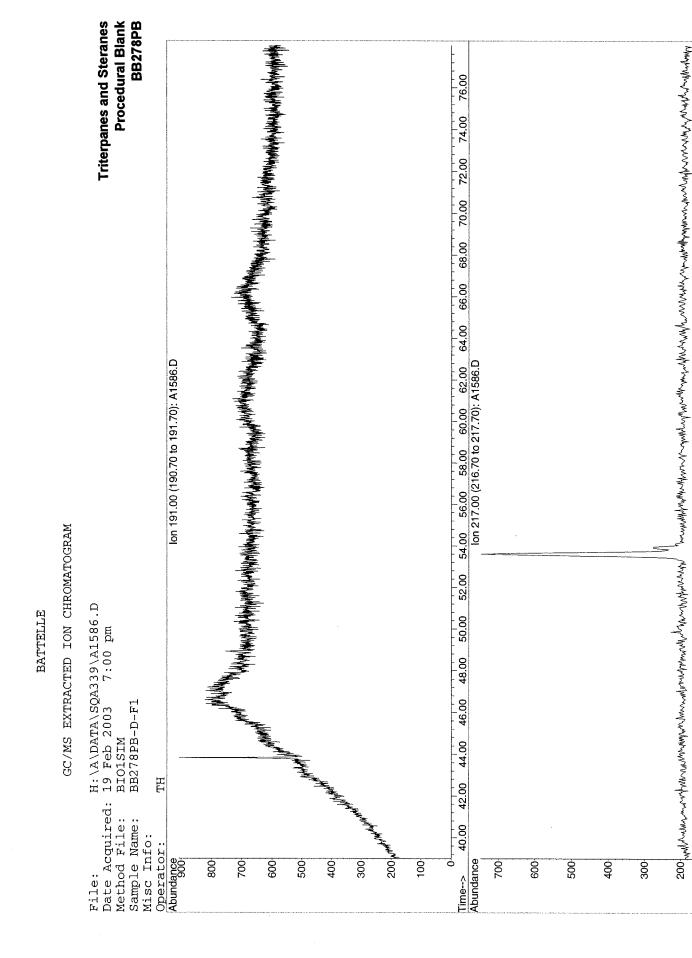












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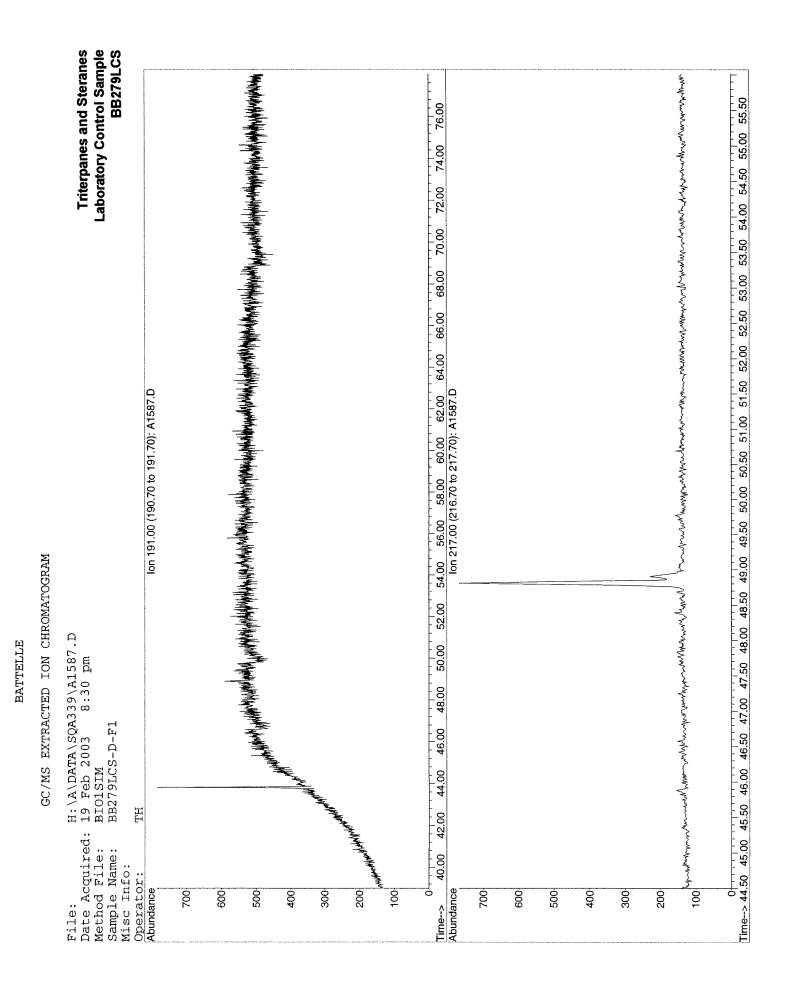
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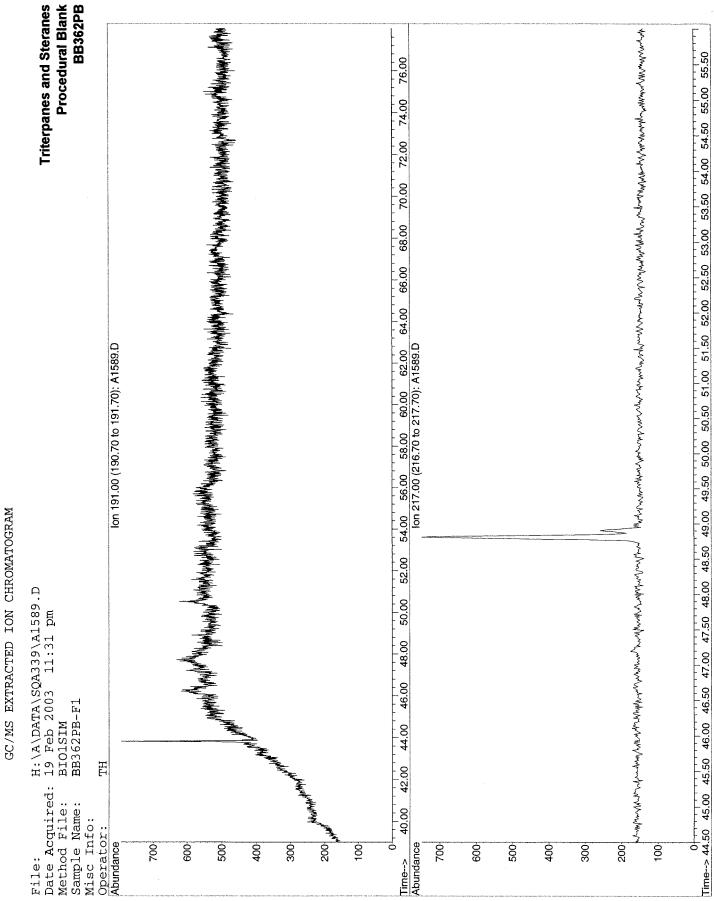
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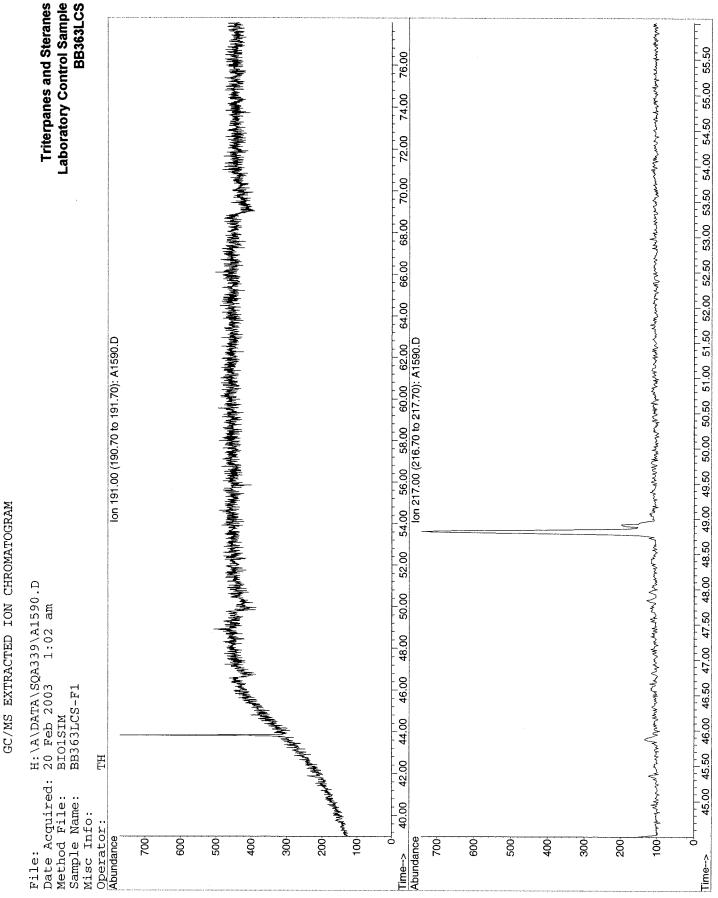
Time--> 44.50

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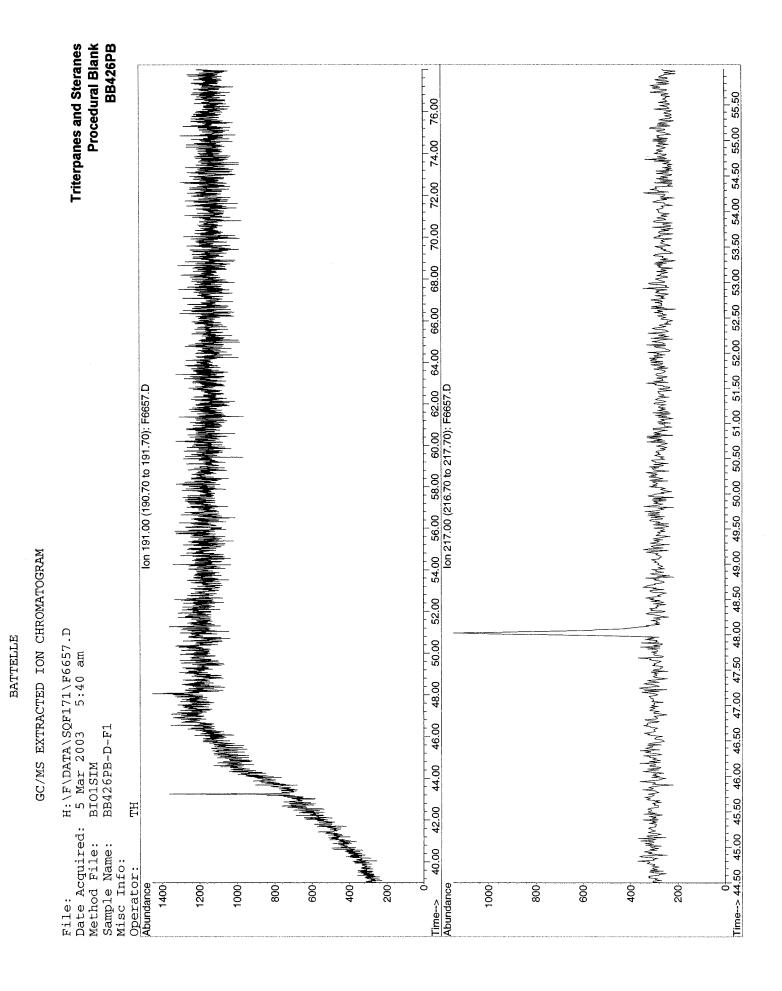
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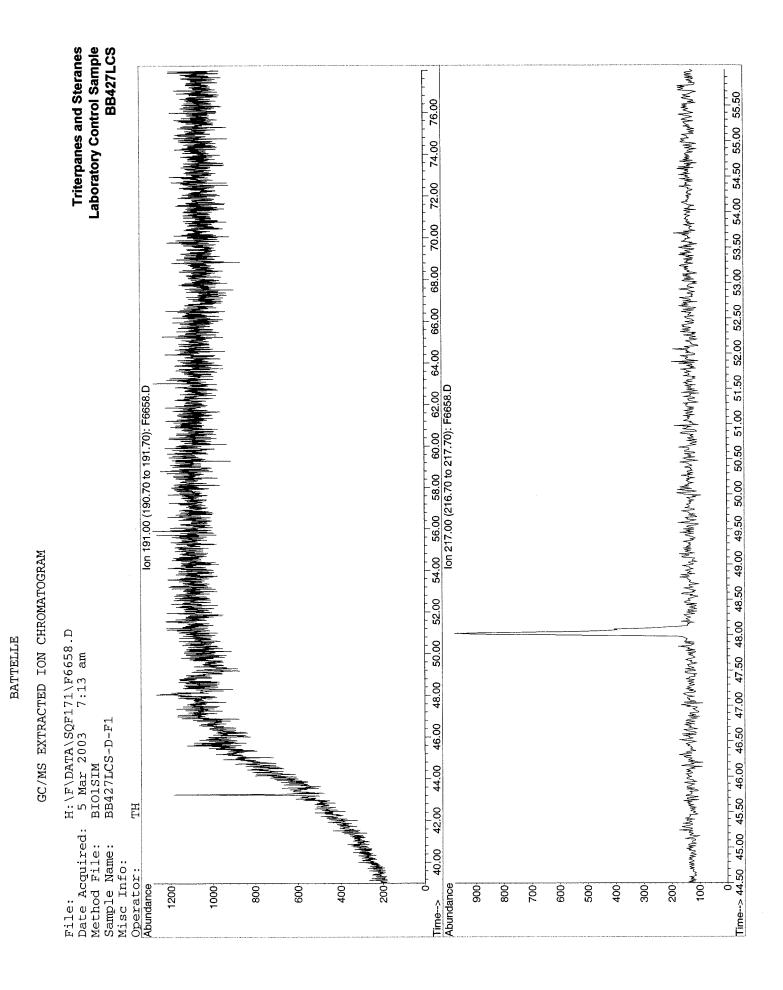


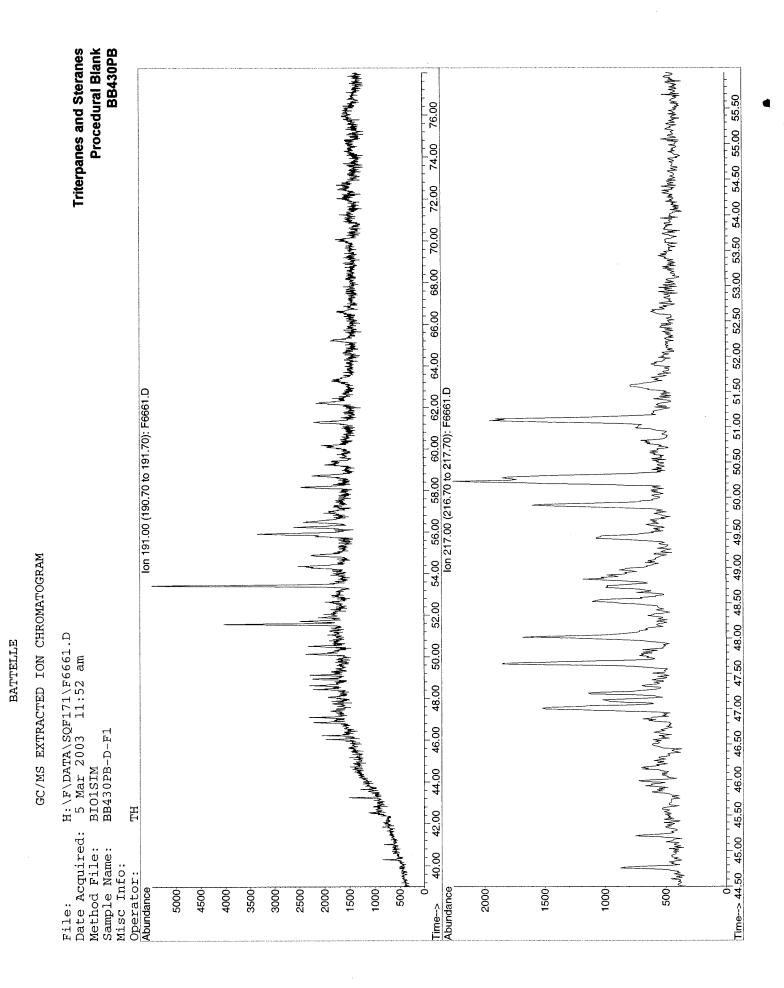


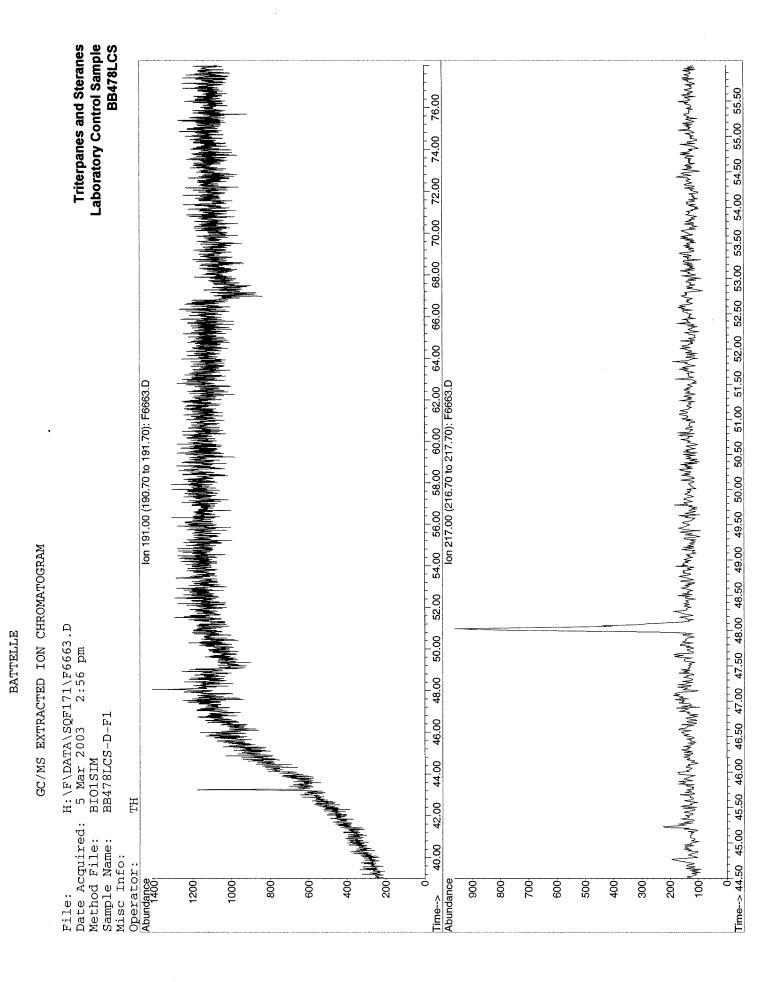


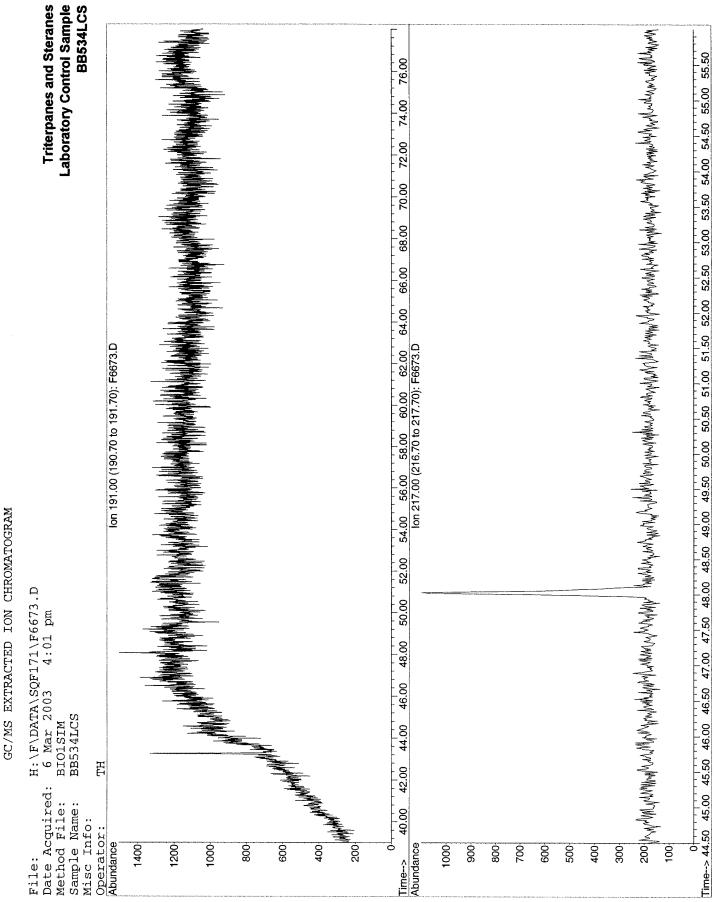
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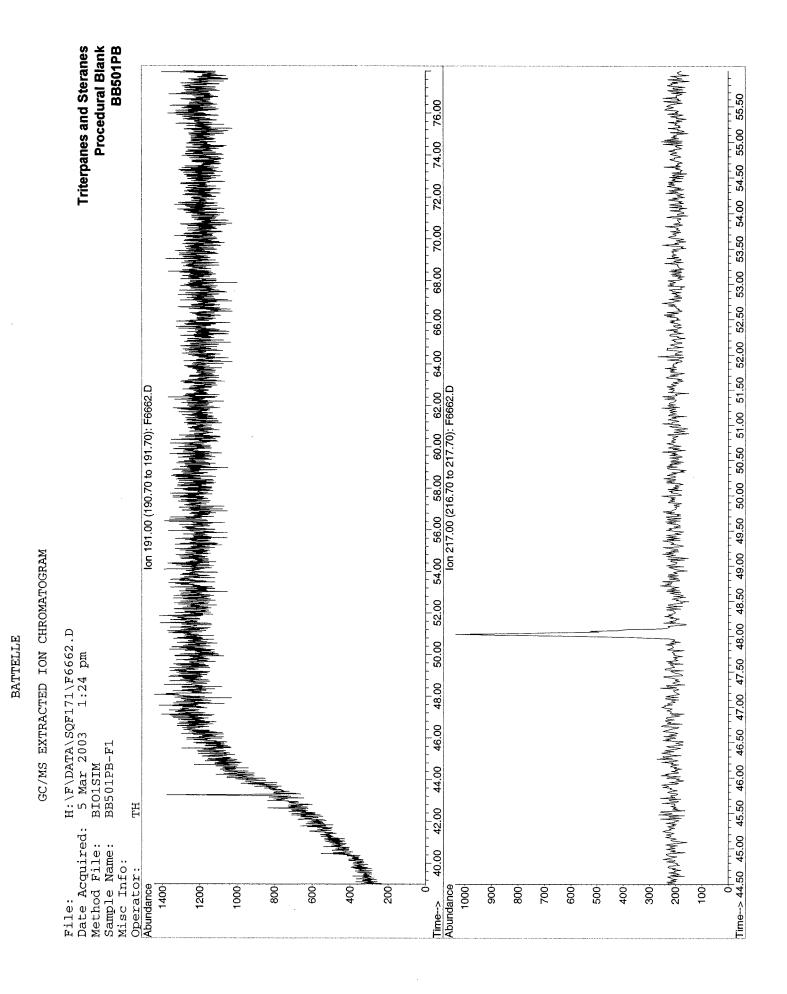








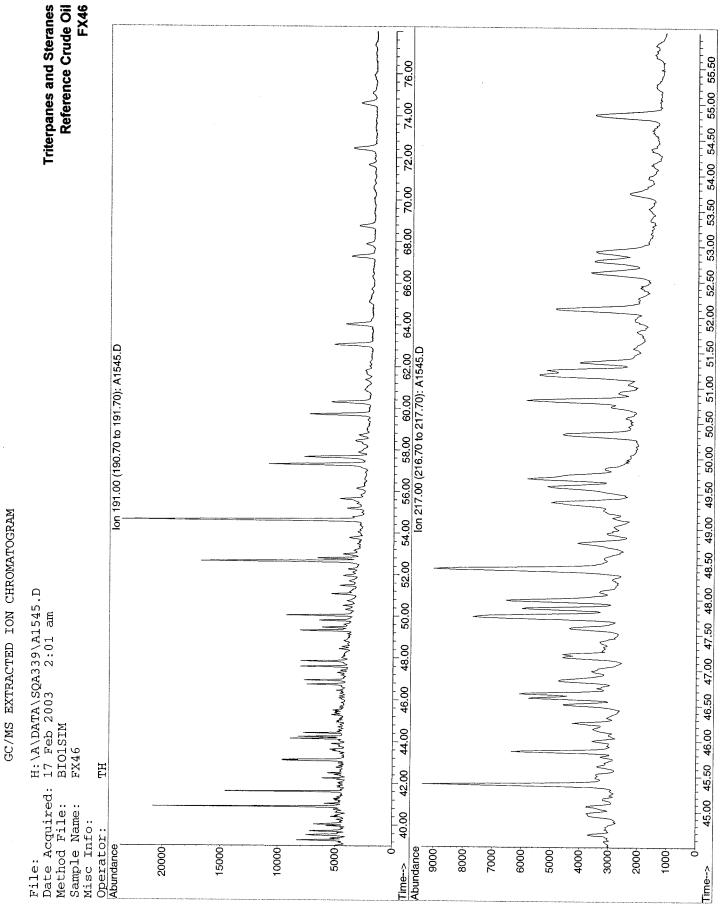


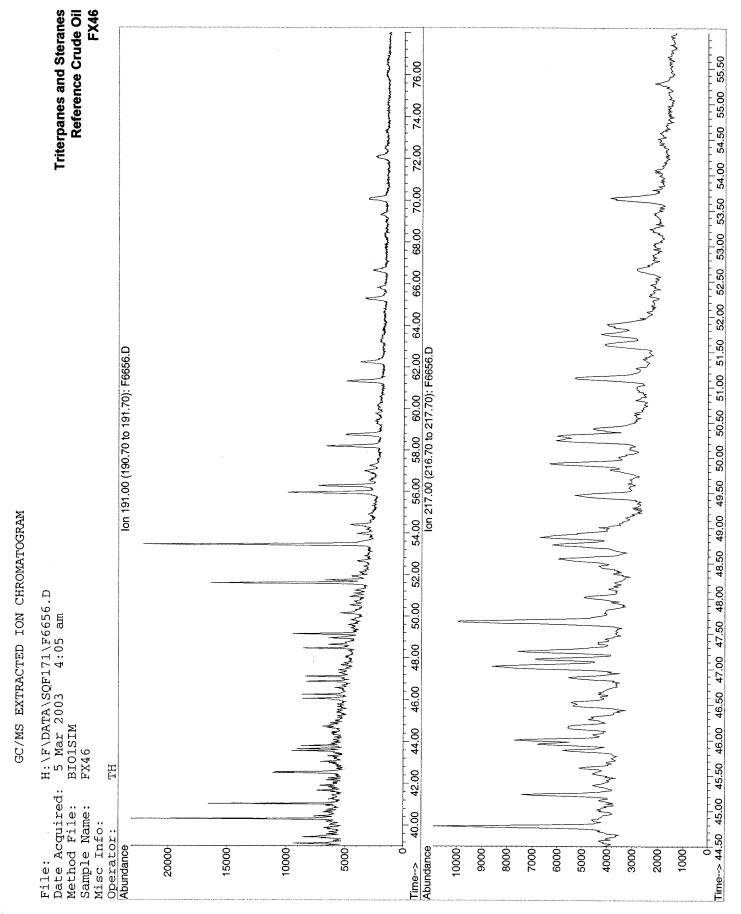


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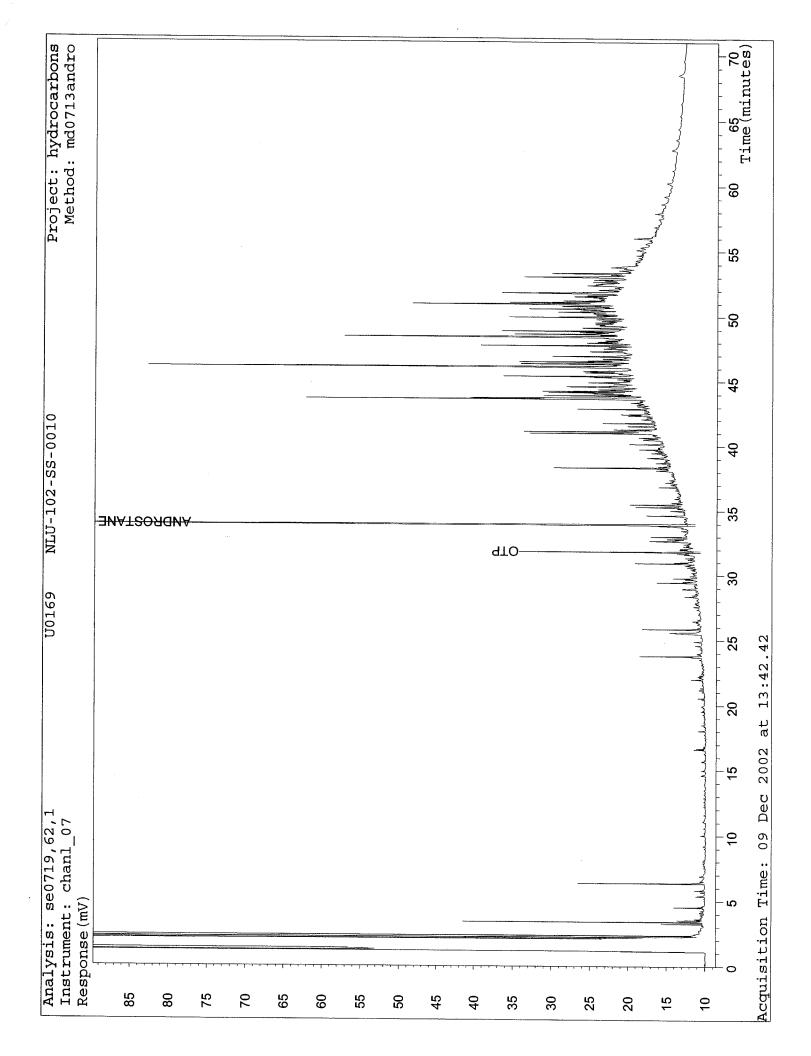
Reference Crude Oil FX46 **Triterpanes and Steranes** Time-> 44.50 45.00 45.50 46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00 50.50 51.50 52.00 52.50 53.00 53.50 54.00 54.50 55.00 55.50 76.00 74.00 72.00 70,00 68.00 66.00 64.00 lon 191.00 (190.70 to 191.70): A0603.D Ion 217.00 (216.70 to 217.70): A0603.D 62.00 54.00 56.00 58.00 60.00 G:\A\DATA\SQA319\A0603.D 12 Dec 2002 11:23 pm 11:23 pm 52.00 50.00 48.00 www.Www.Www. FX46 NSC BIOISIM 46.00 ΗT 44.00 Date Acquired: Method File: Sample Name: 42.00 Misc Info: WWWWW Operator: 40.00 10000 Abundance 90000 5 80000 70000 60000 50000 40000 30000 20000 10000 30000 25000 20000 Abundance 15000 5000 File: ċ Time->

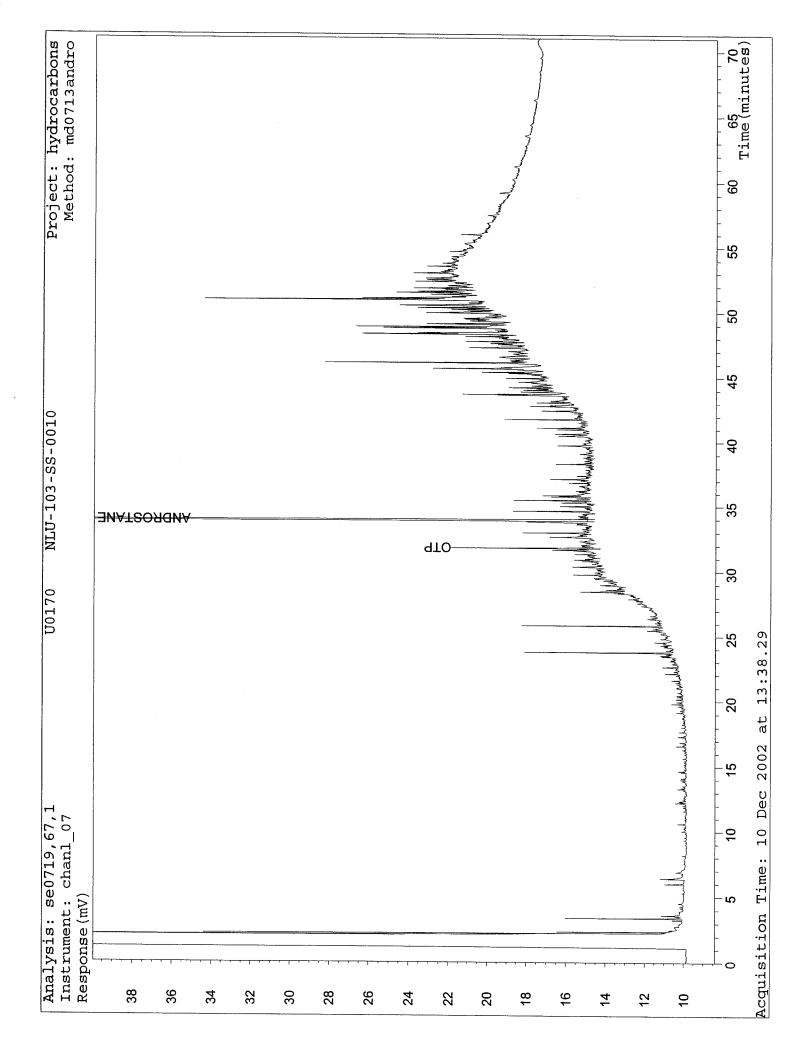
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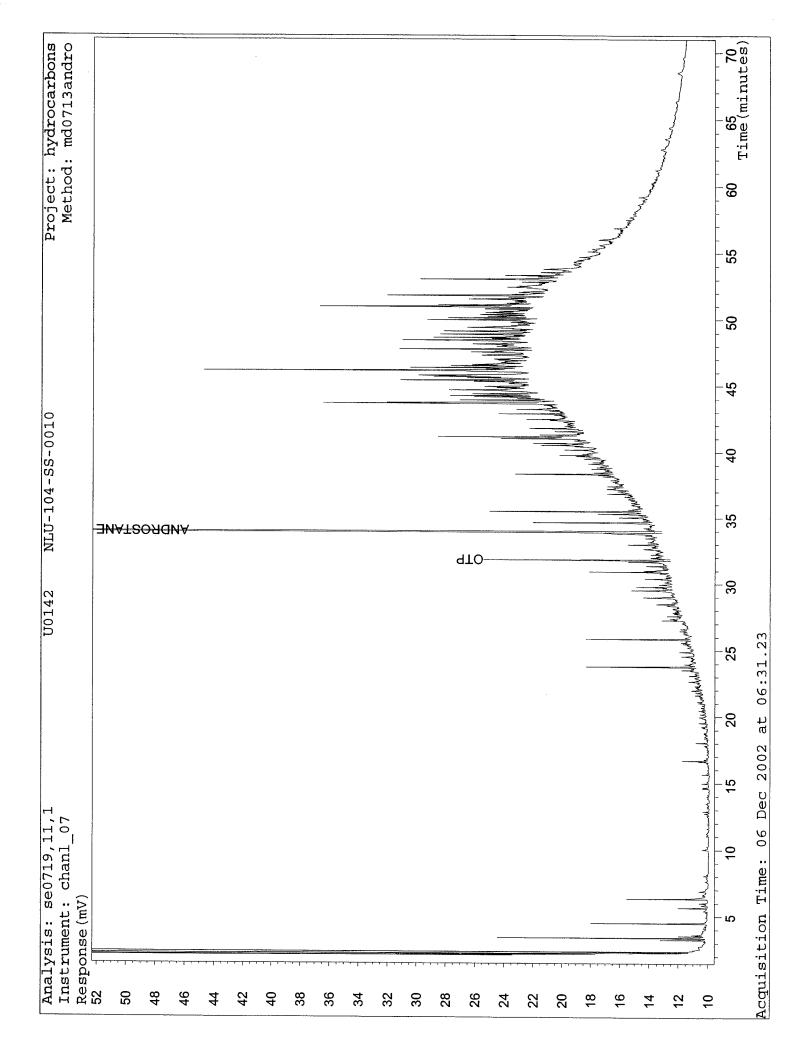


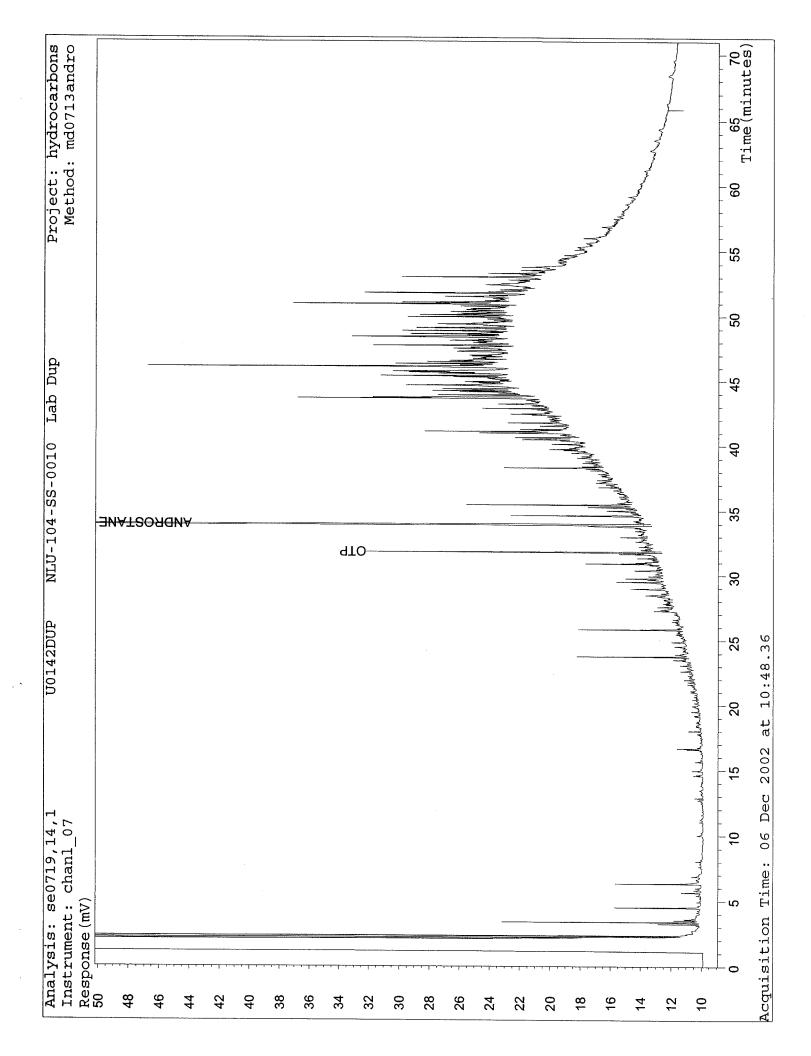


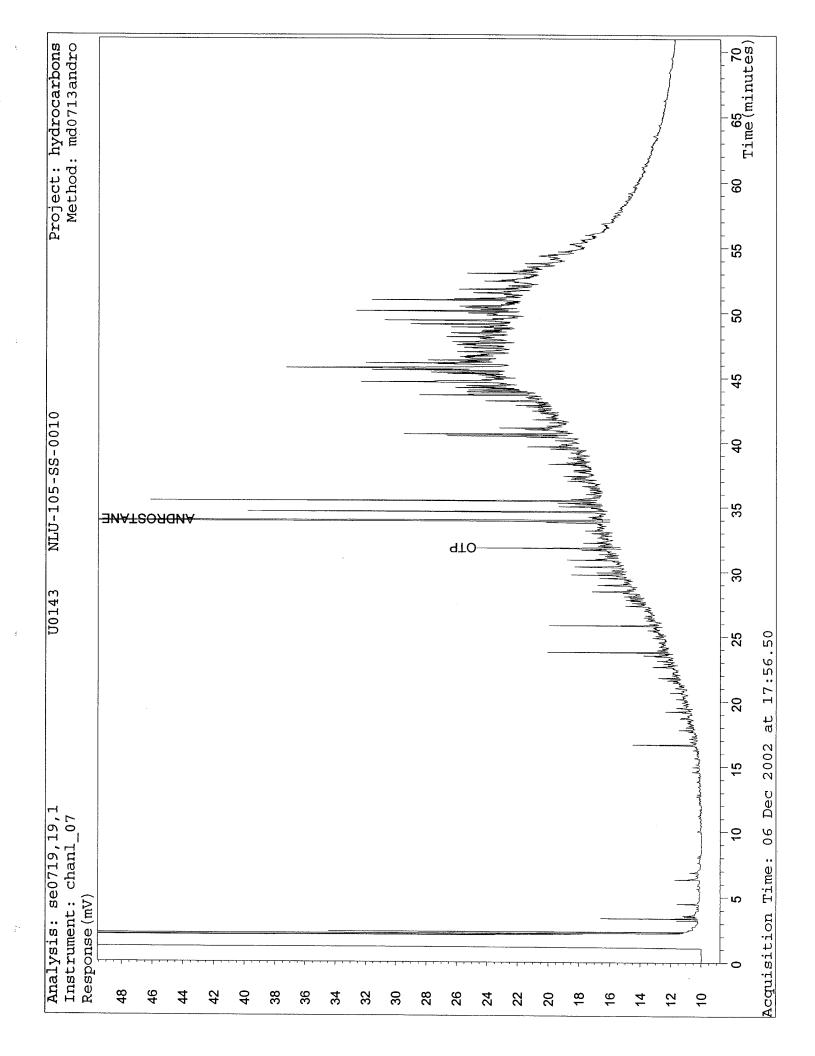
Attachment 1 High Resolution Hydrocarbon Fingerprints (GC/FID)

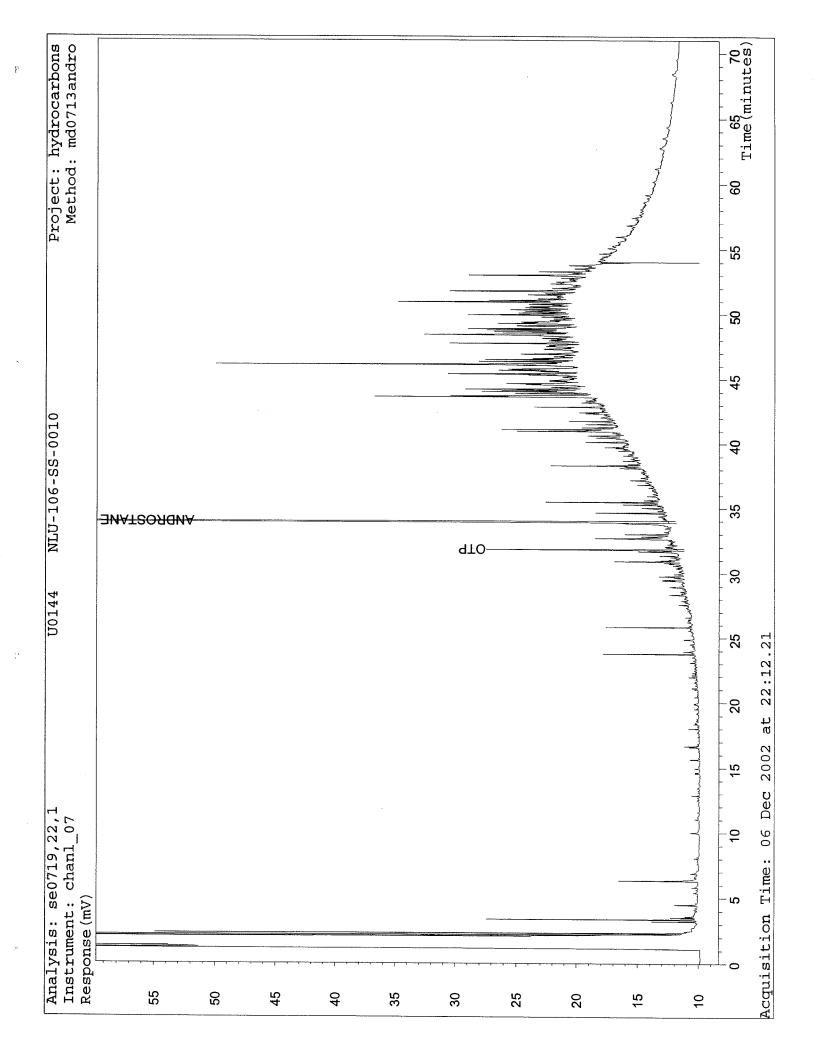


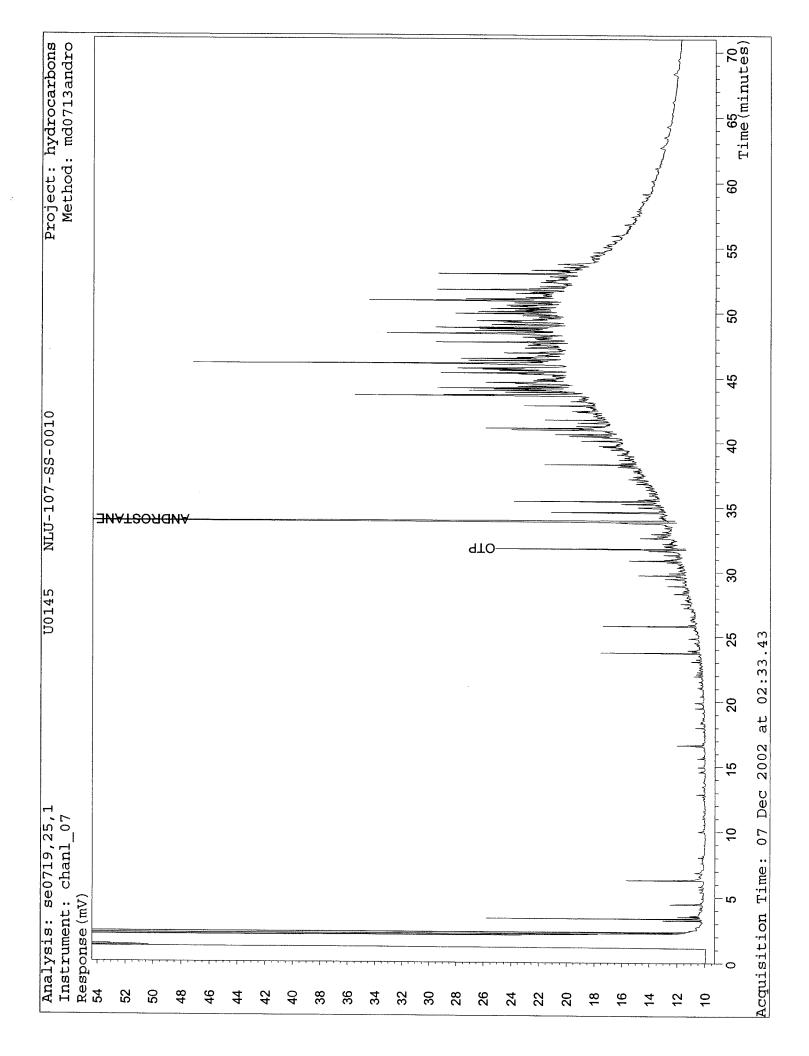


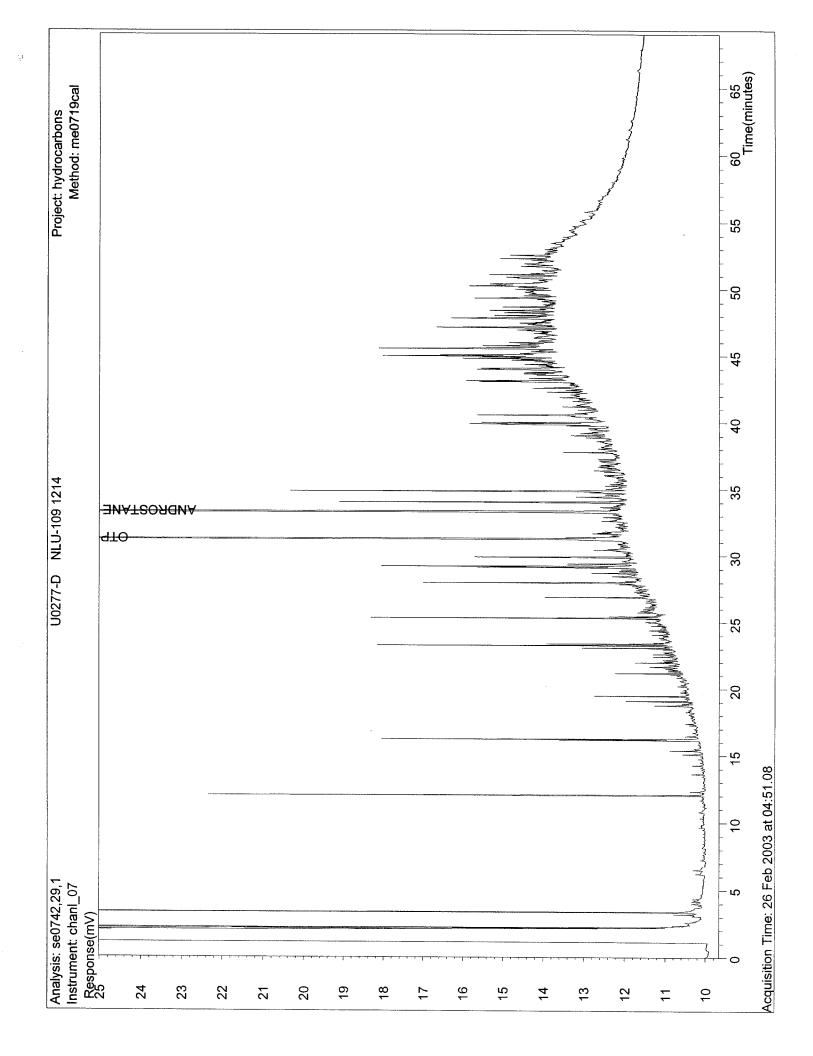


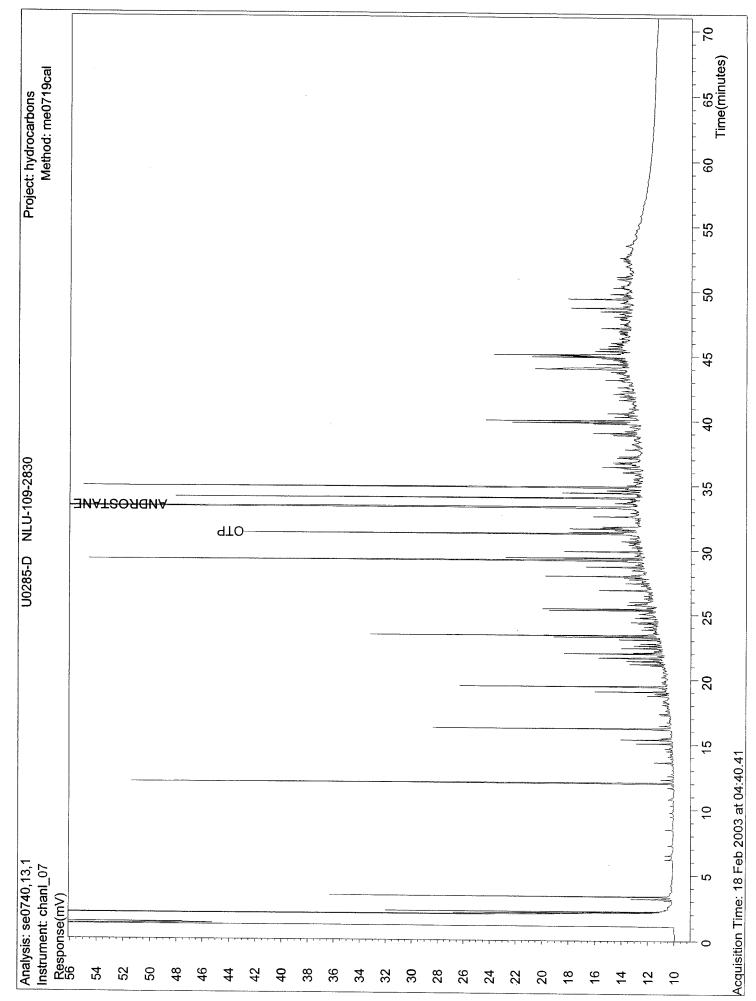


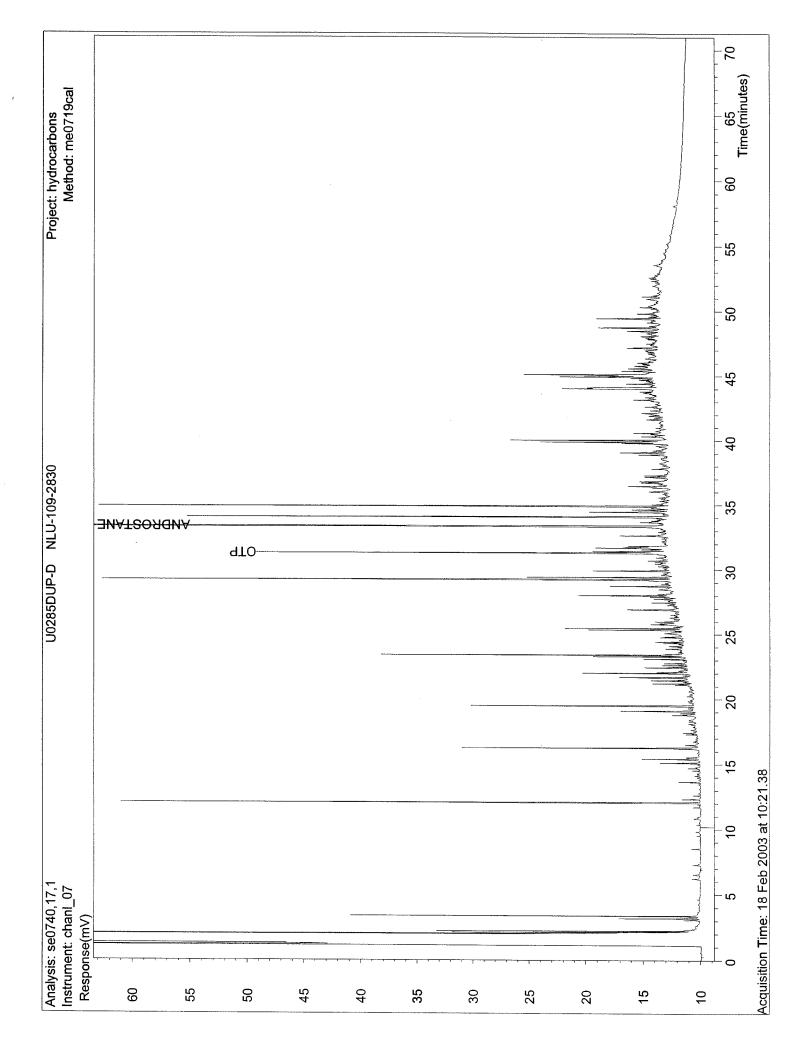


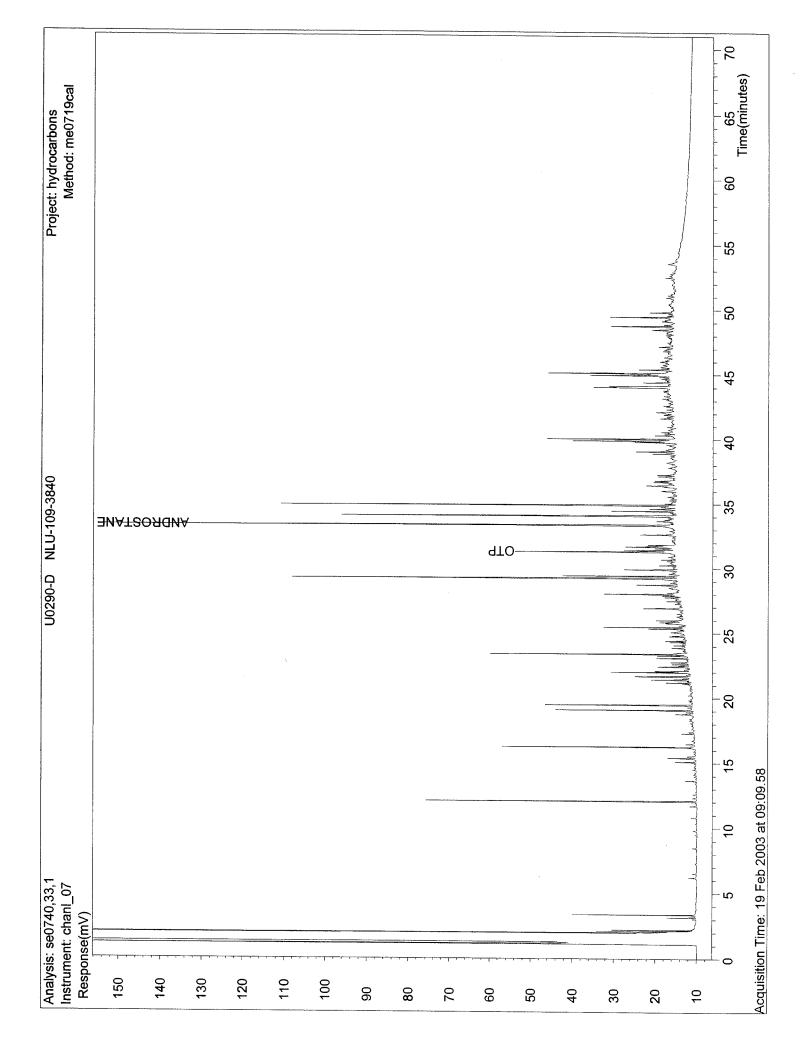


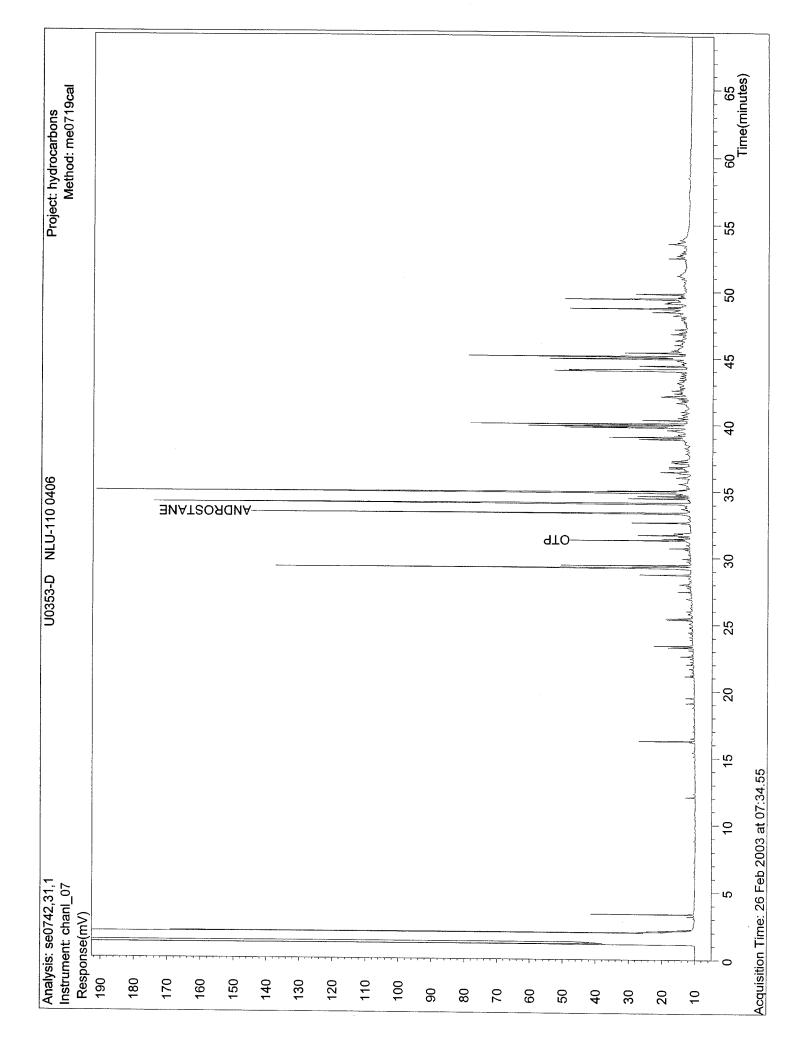


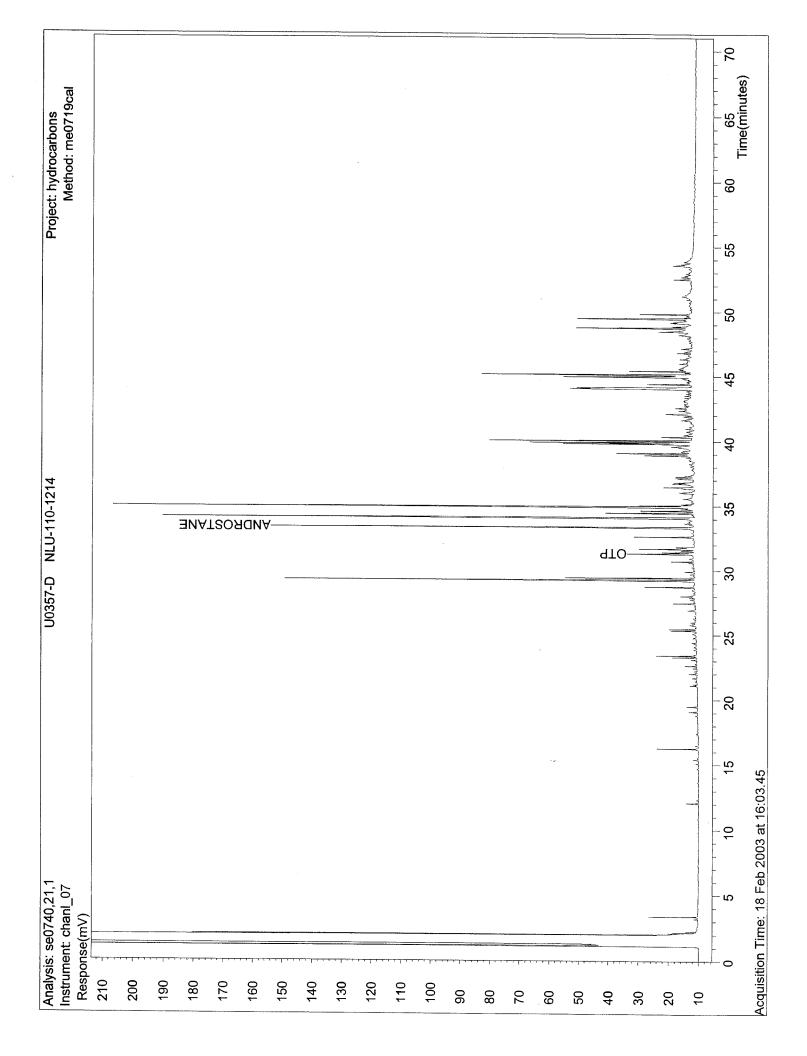


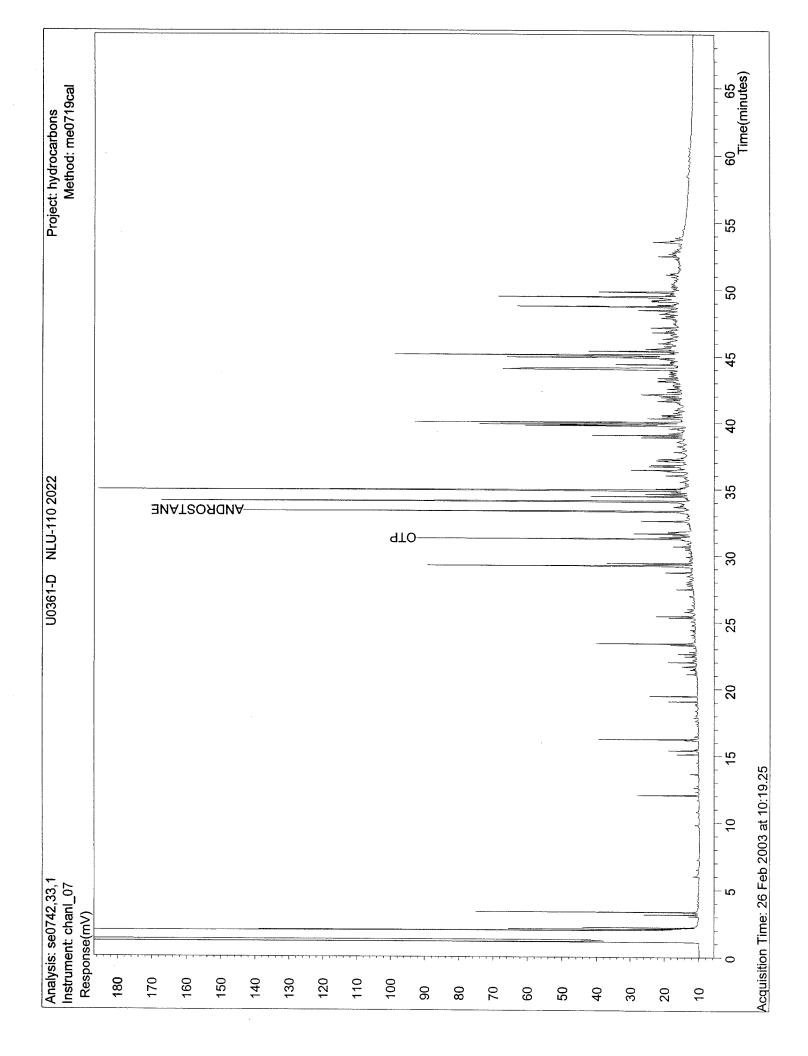


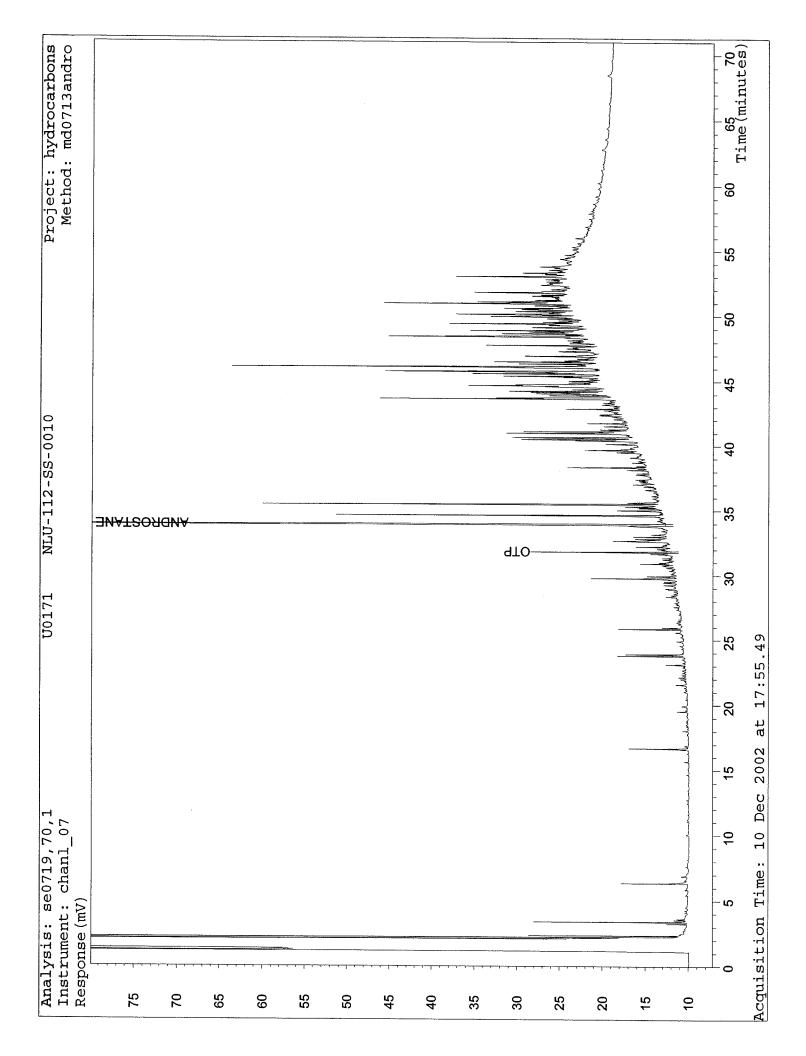


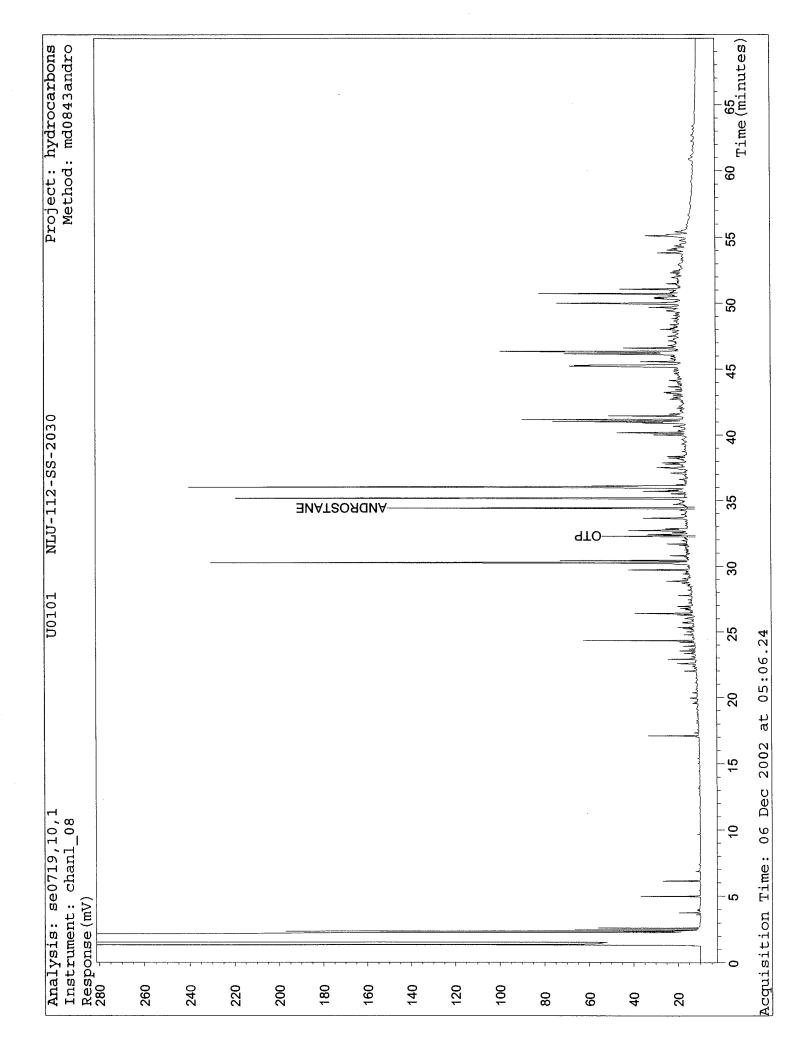


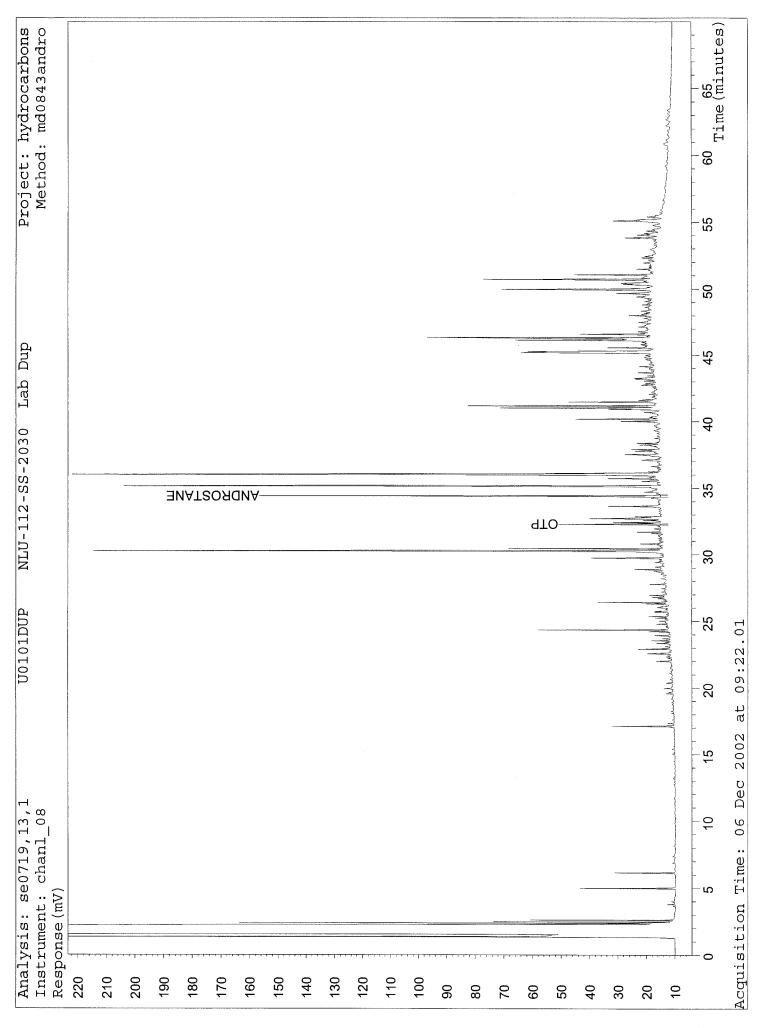


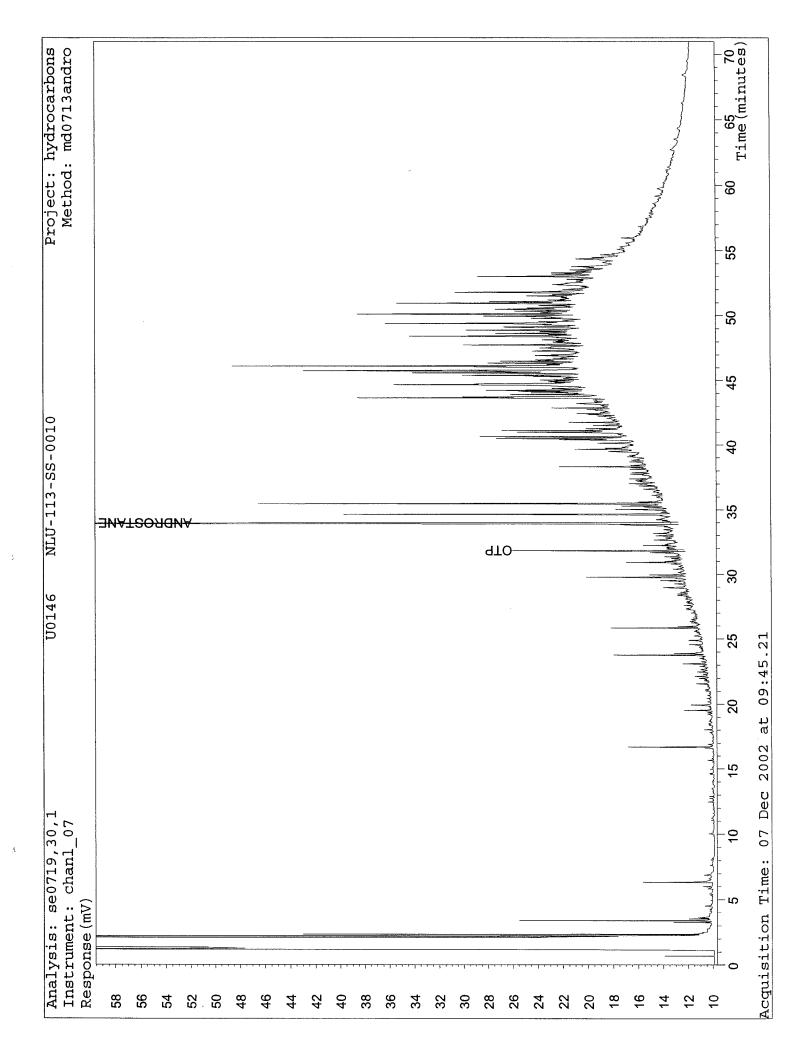


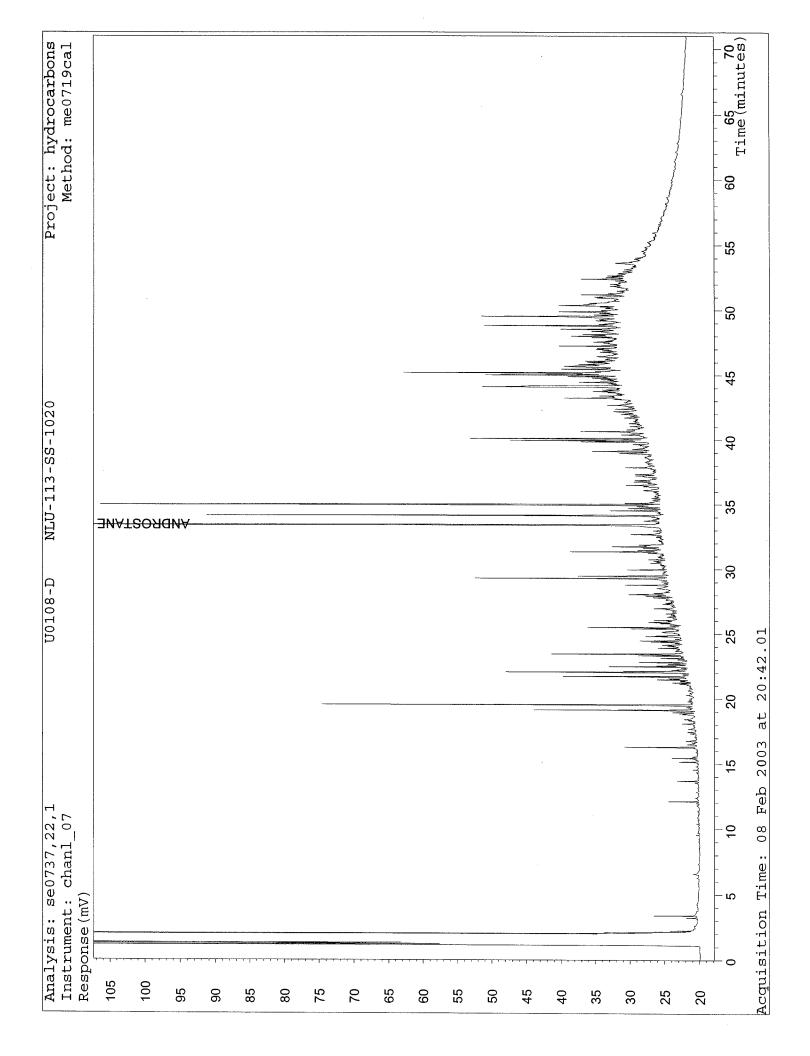


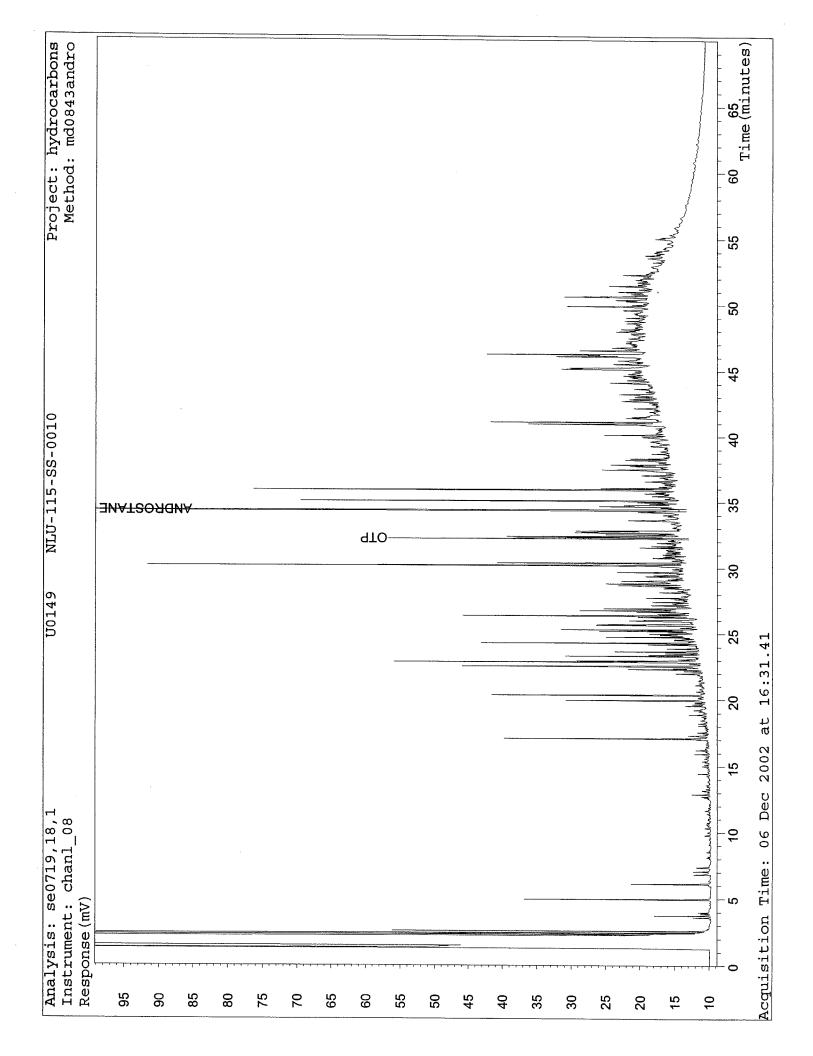


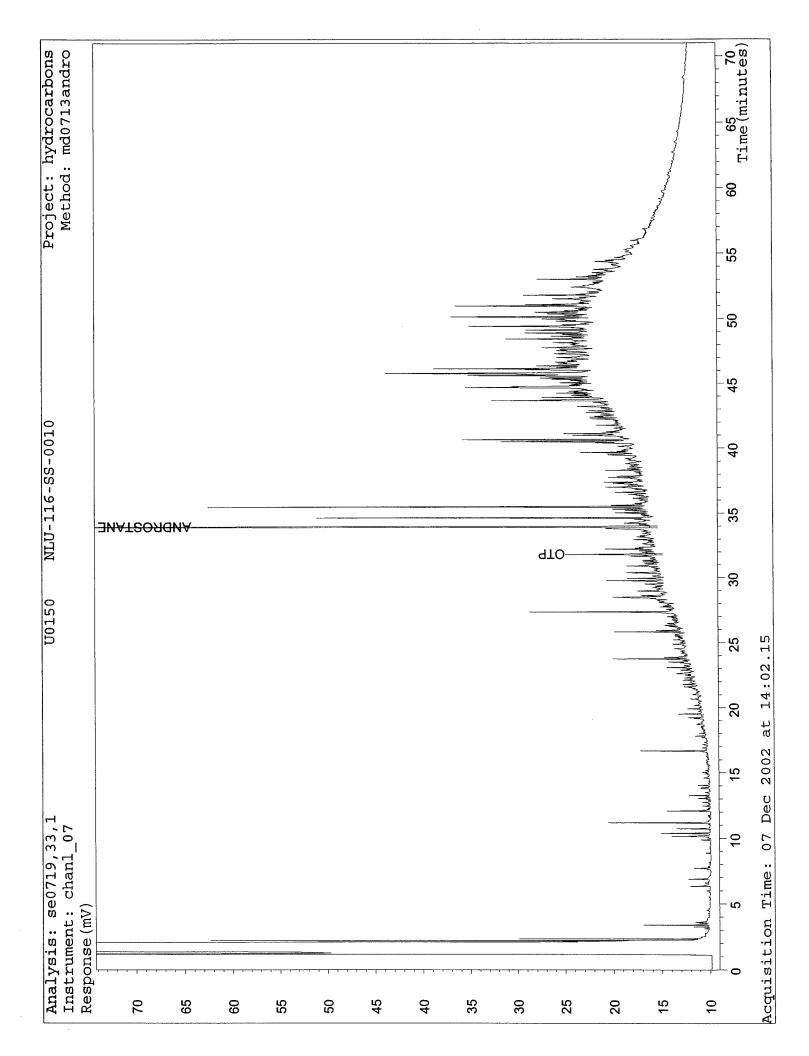


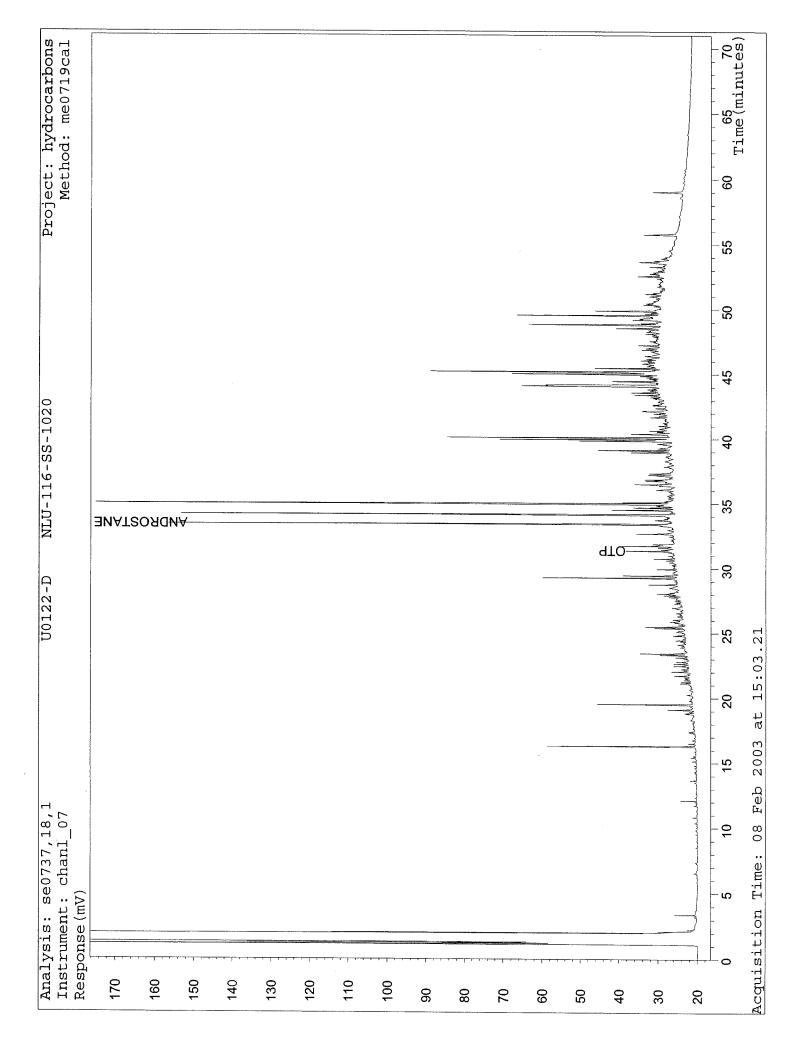


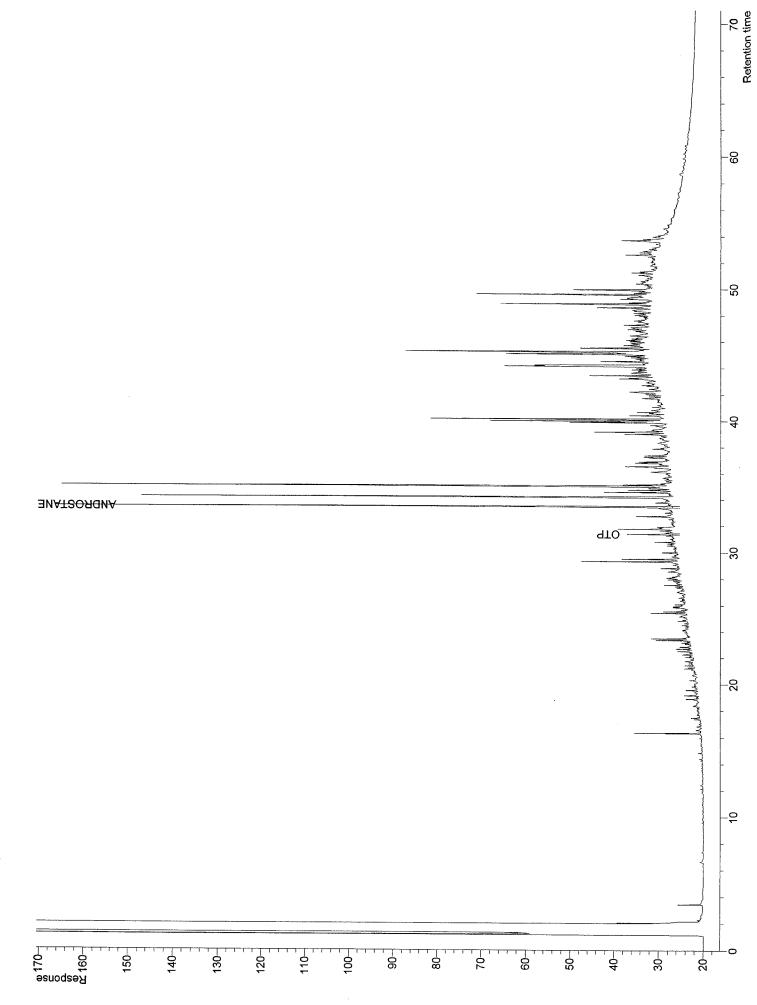




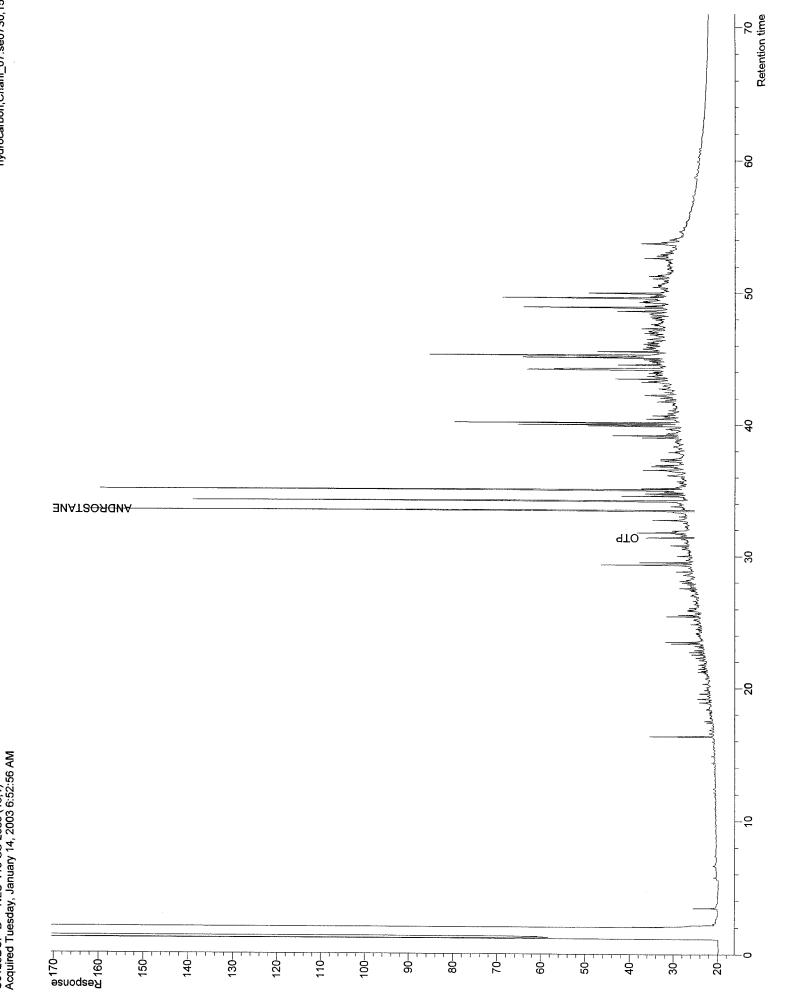


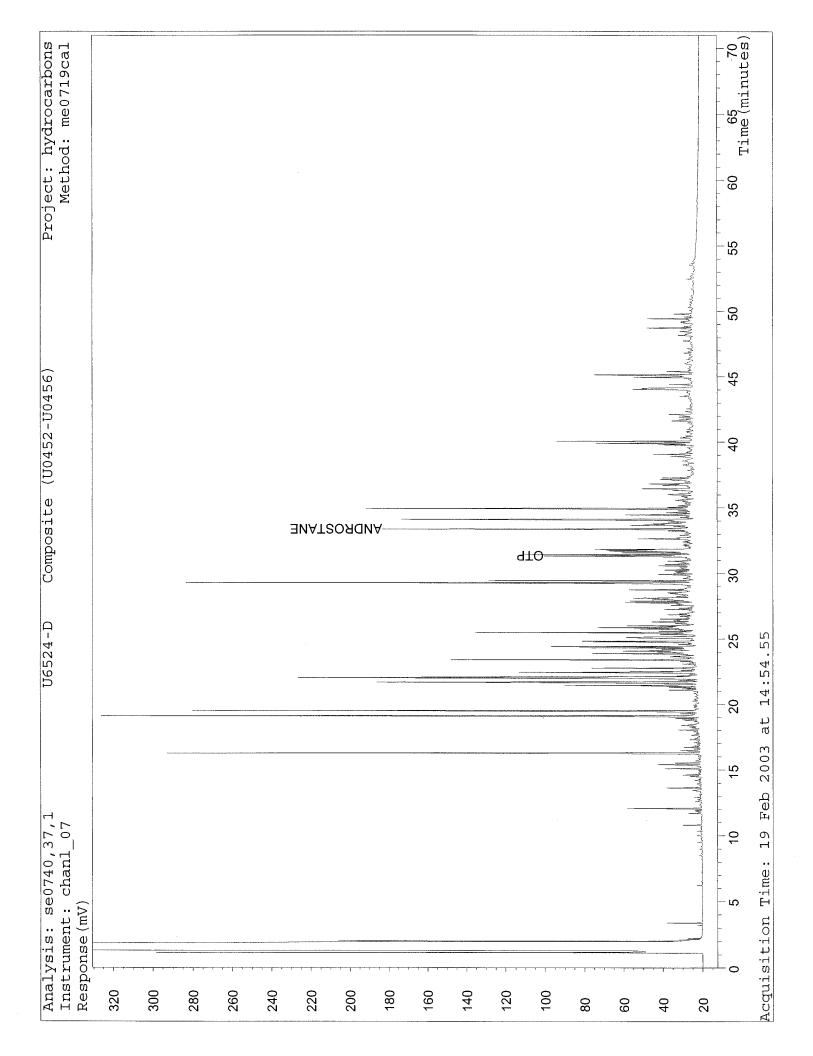


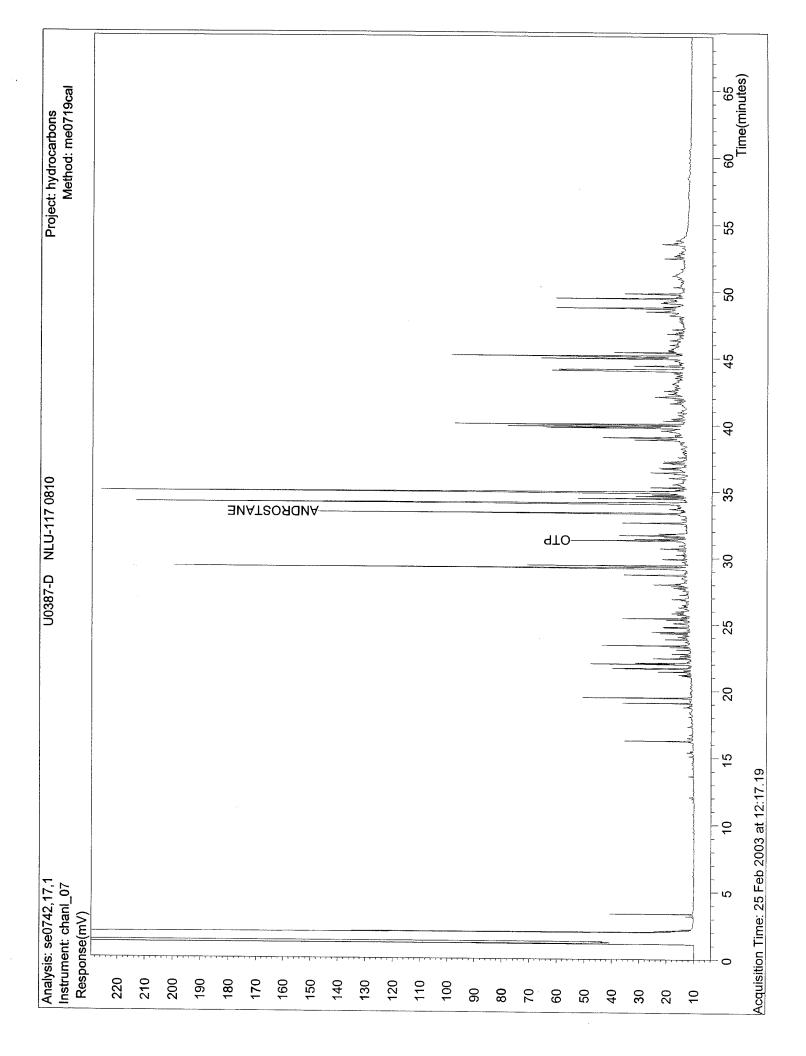


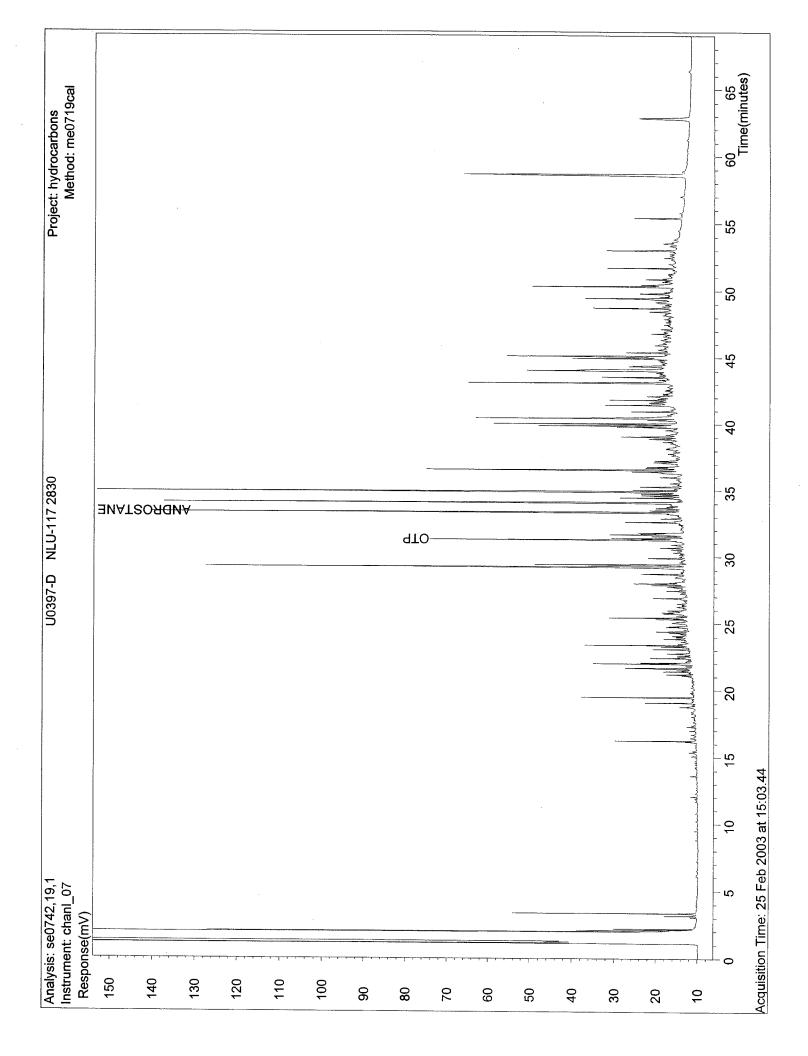


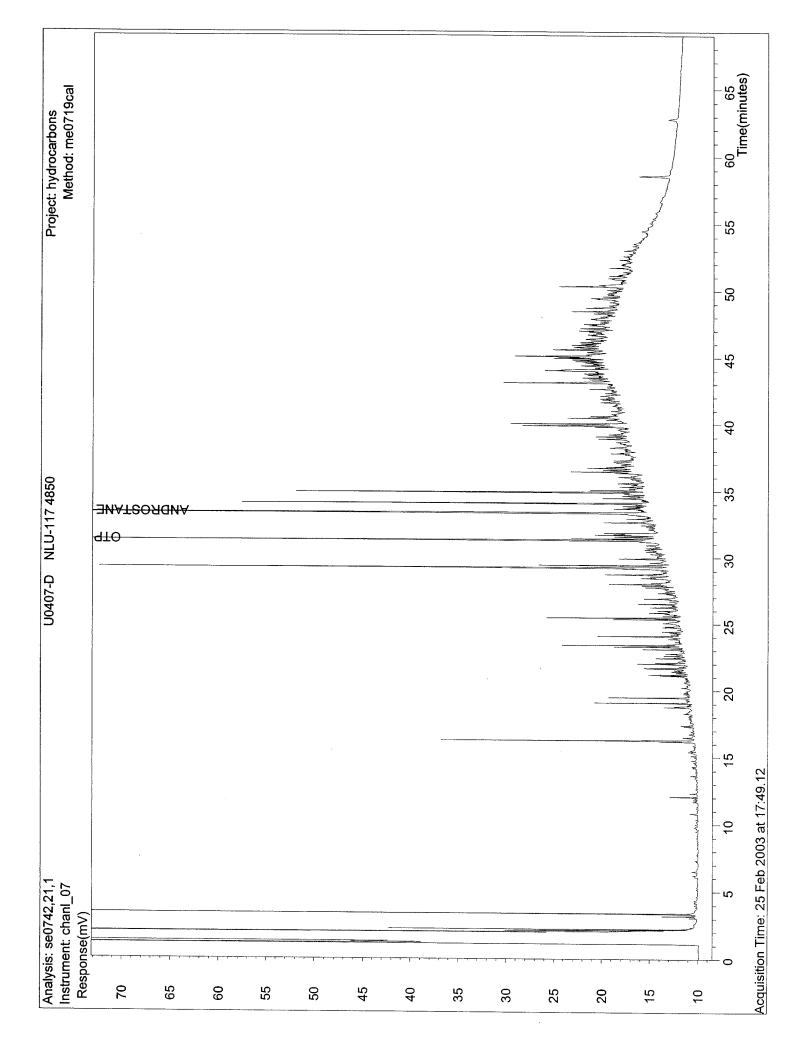
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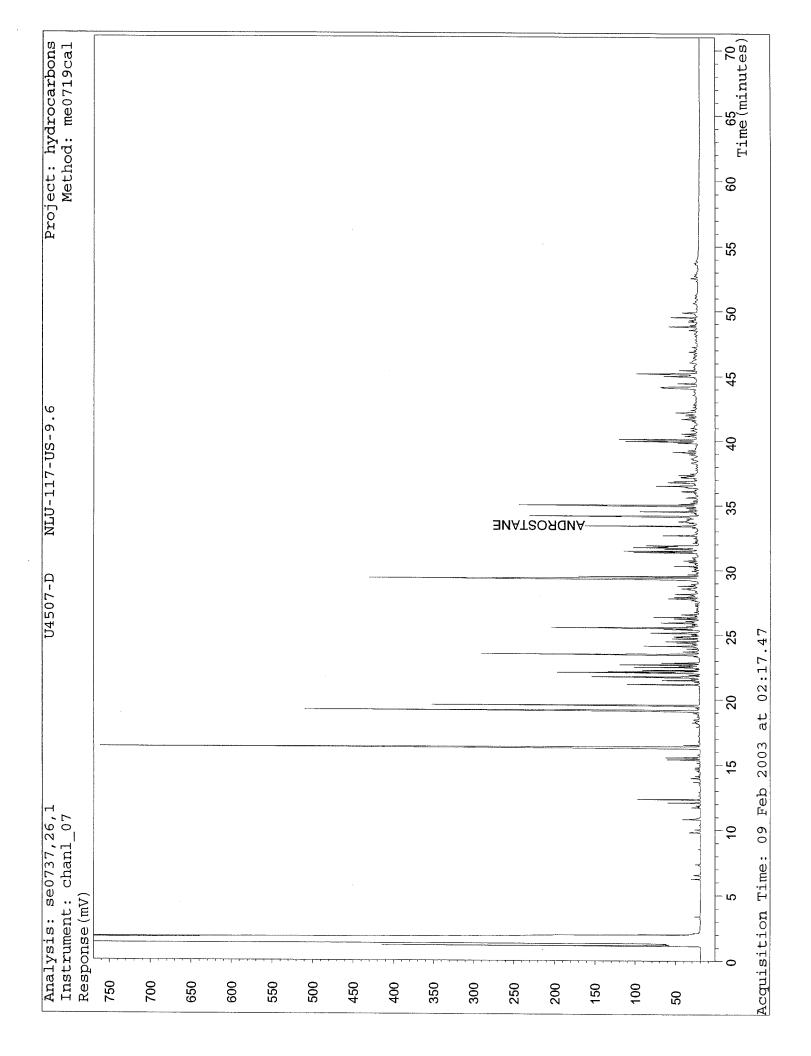


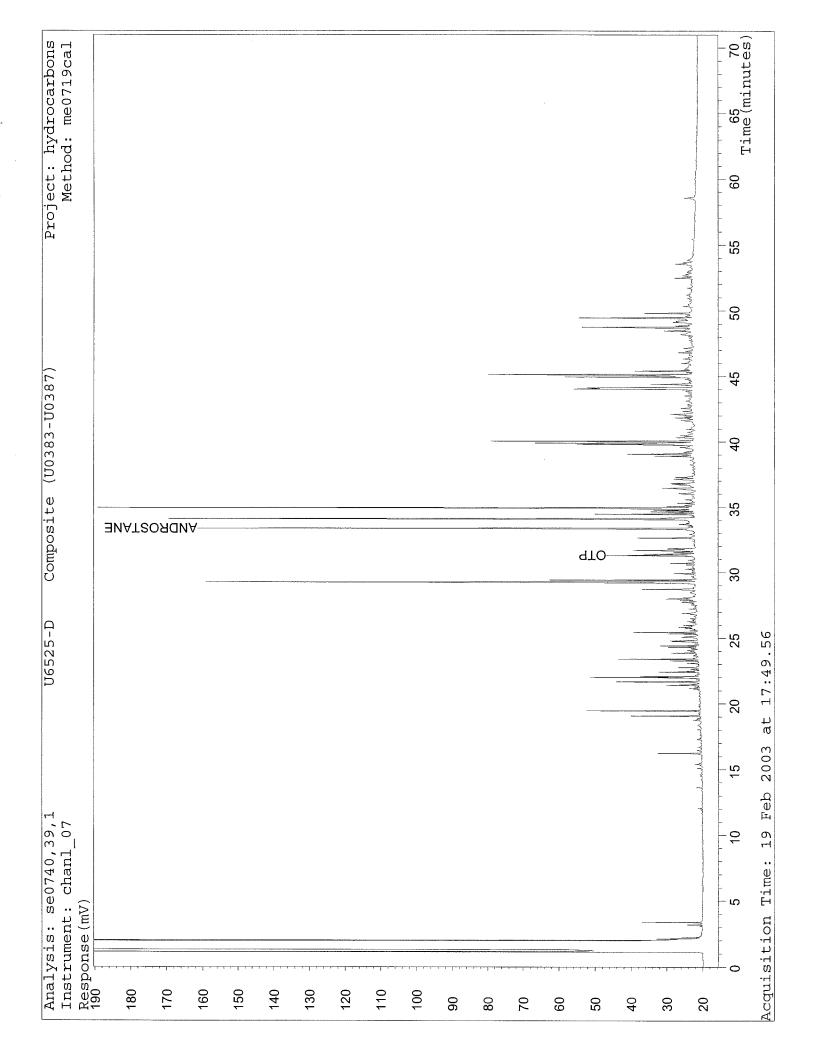


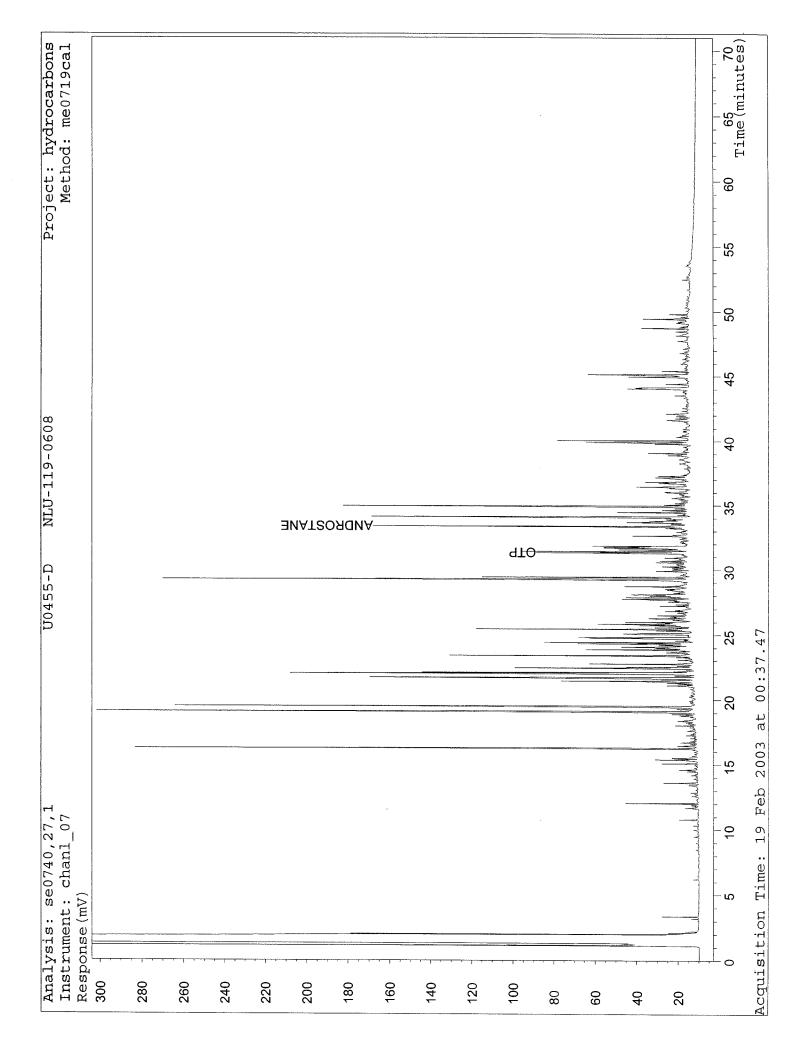


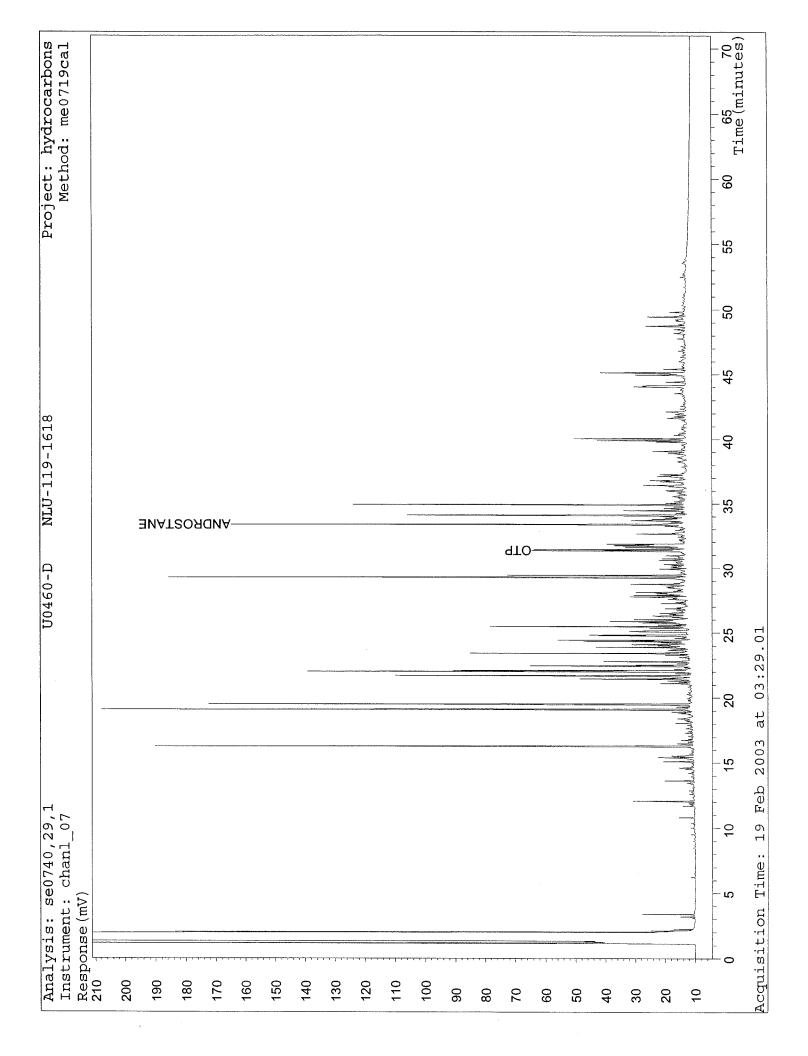


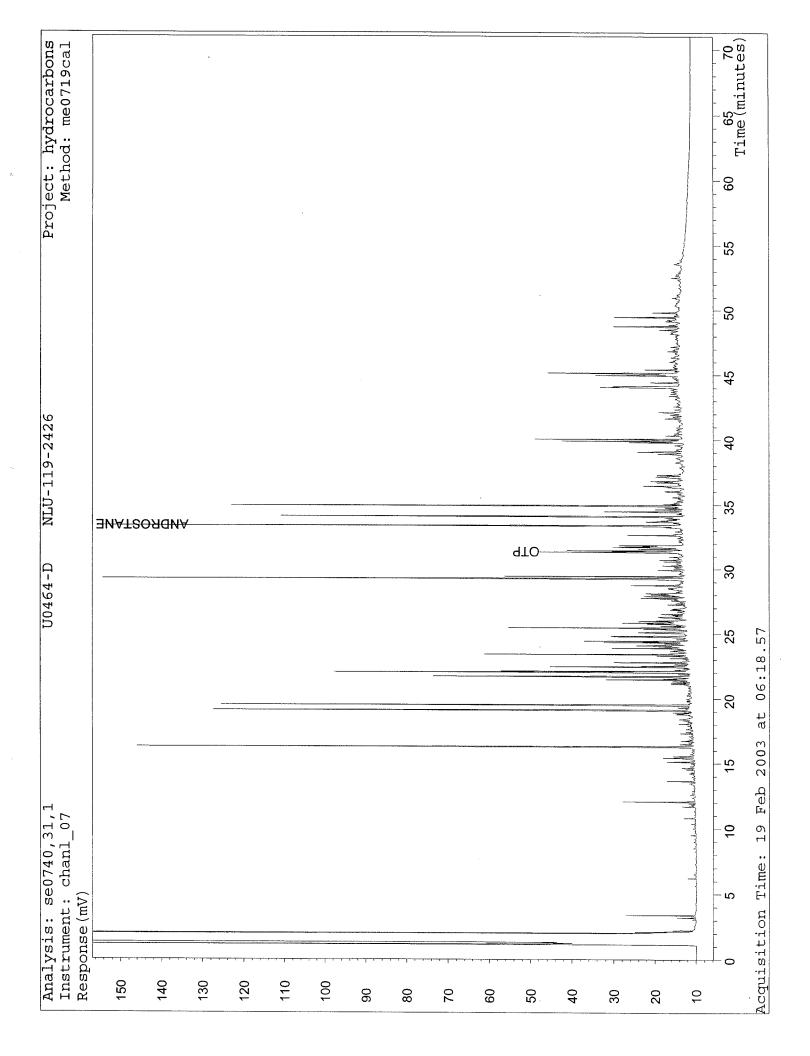


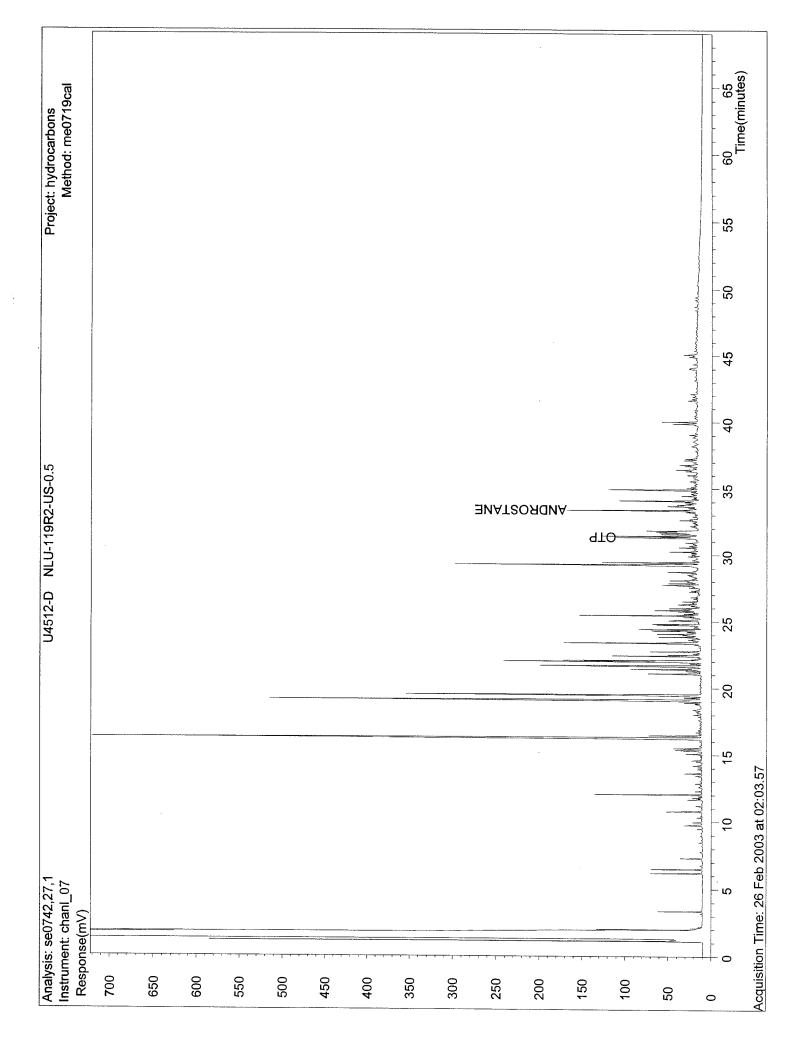


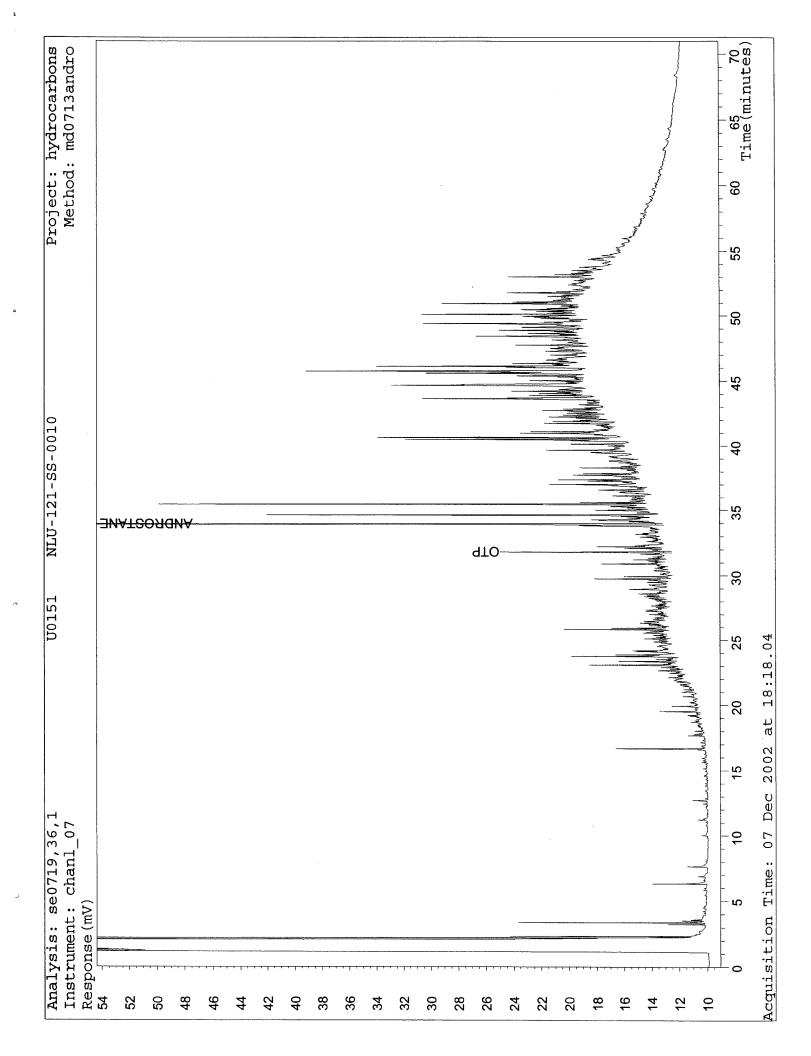


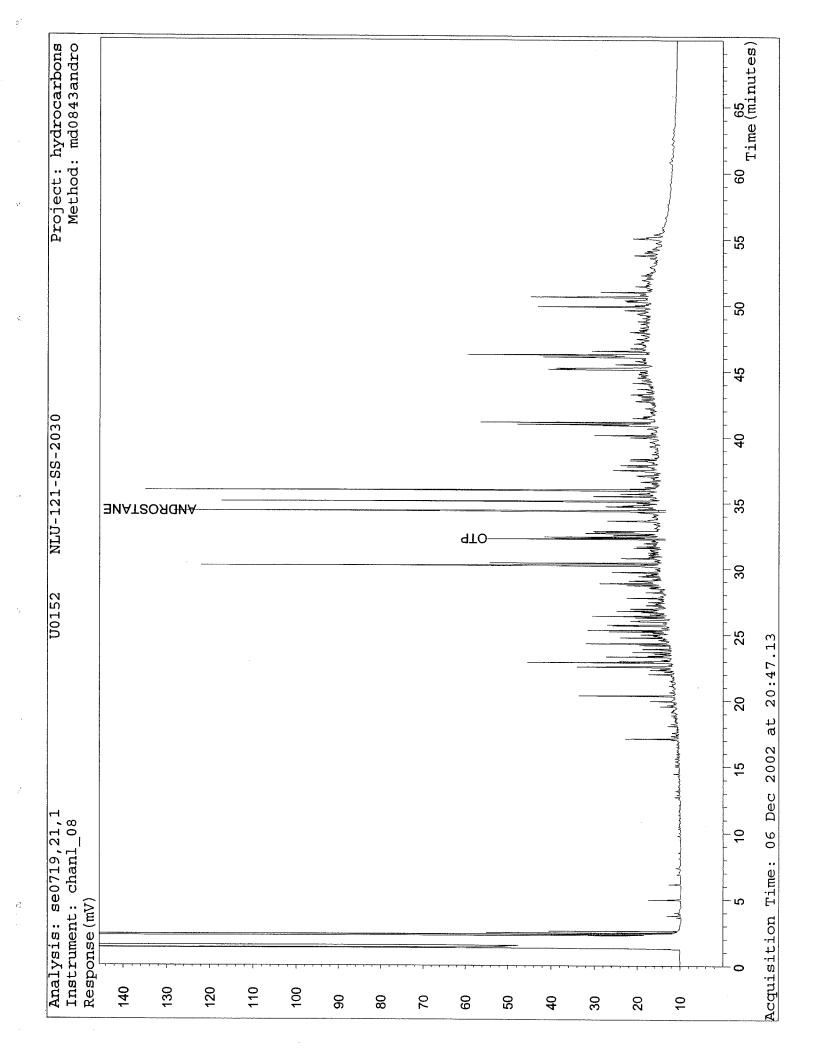


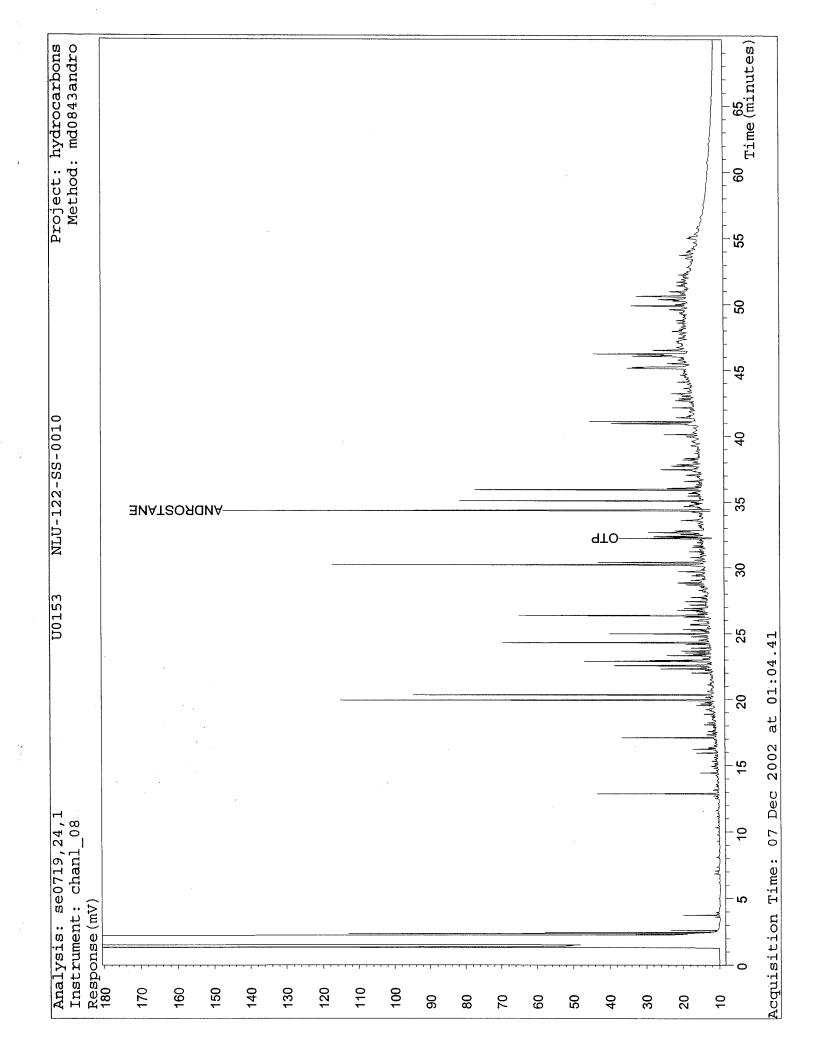


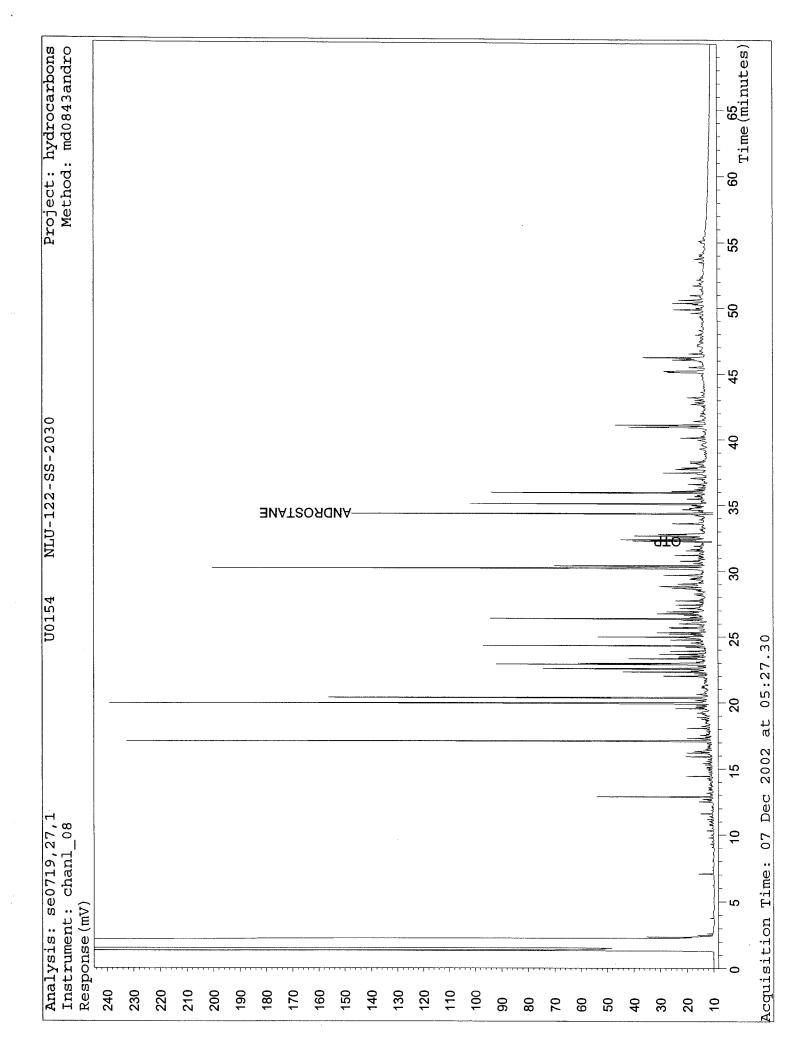


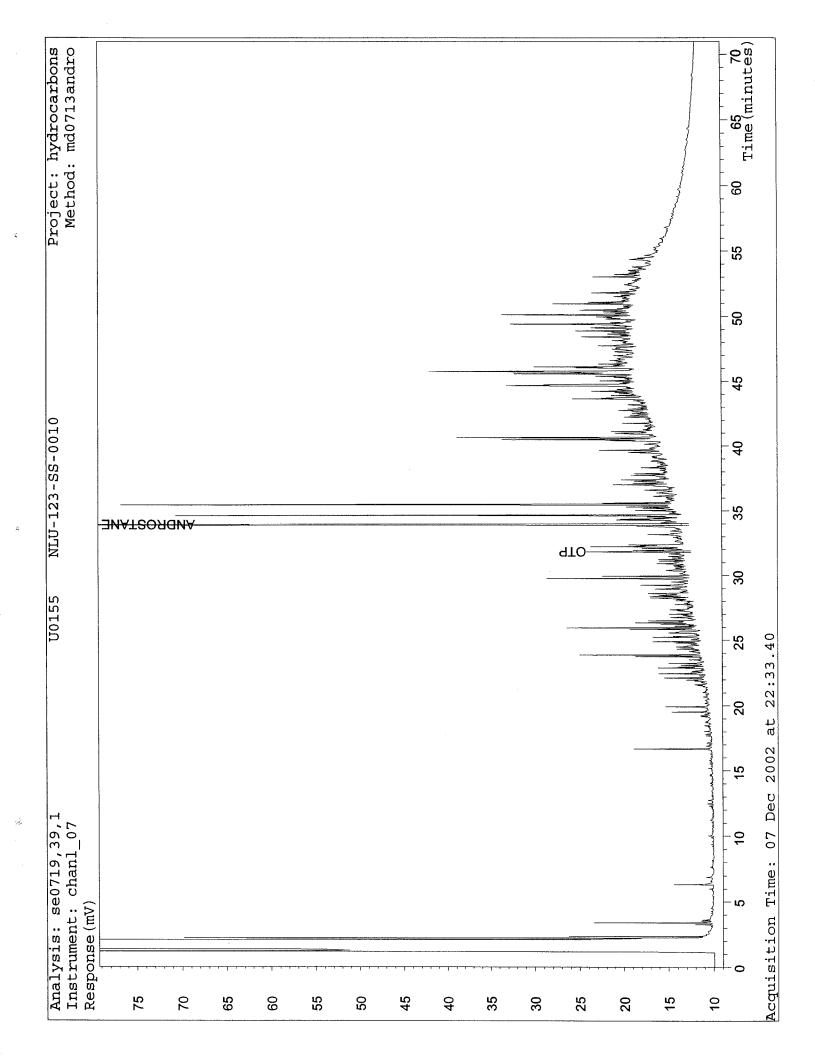


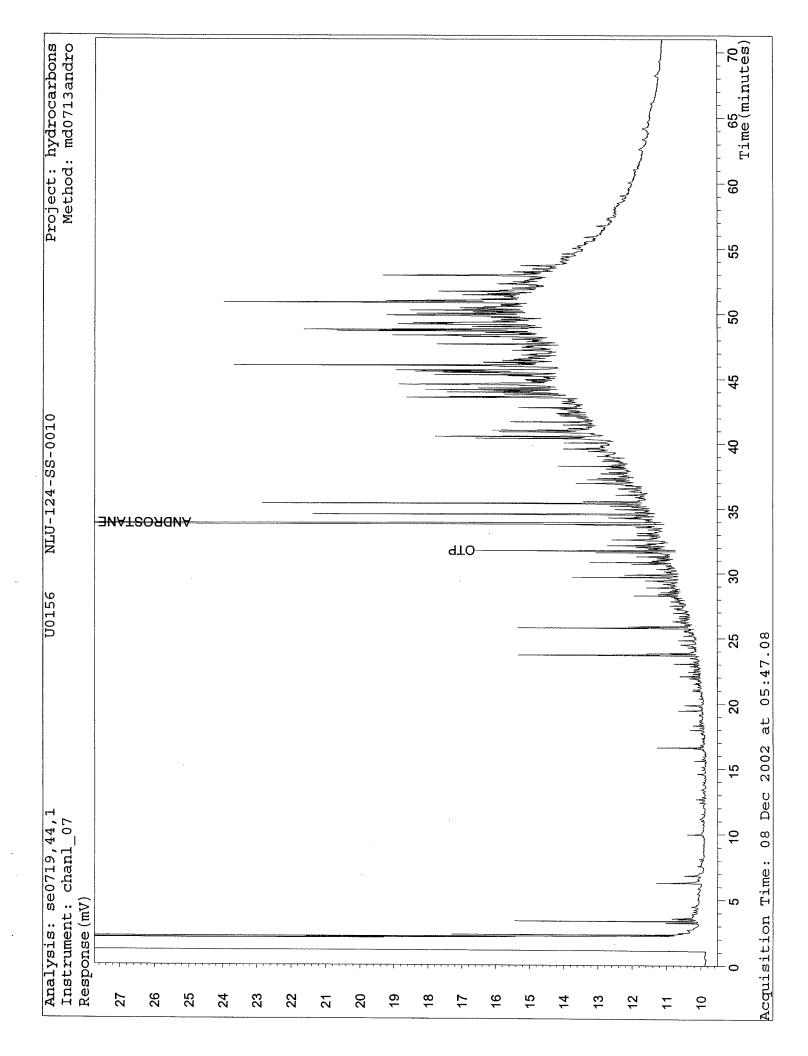


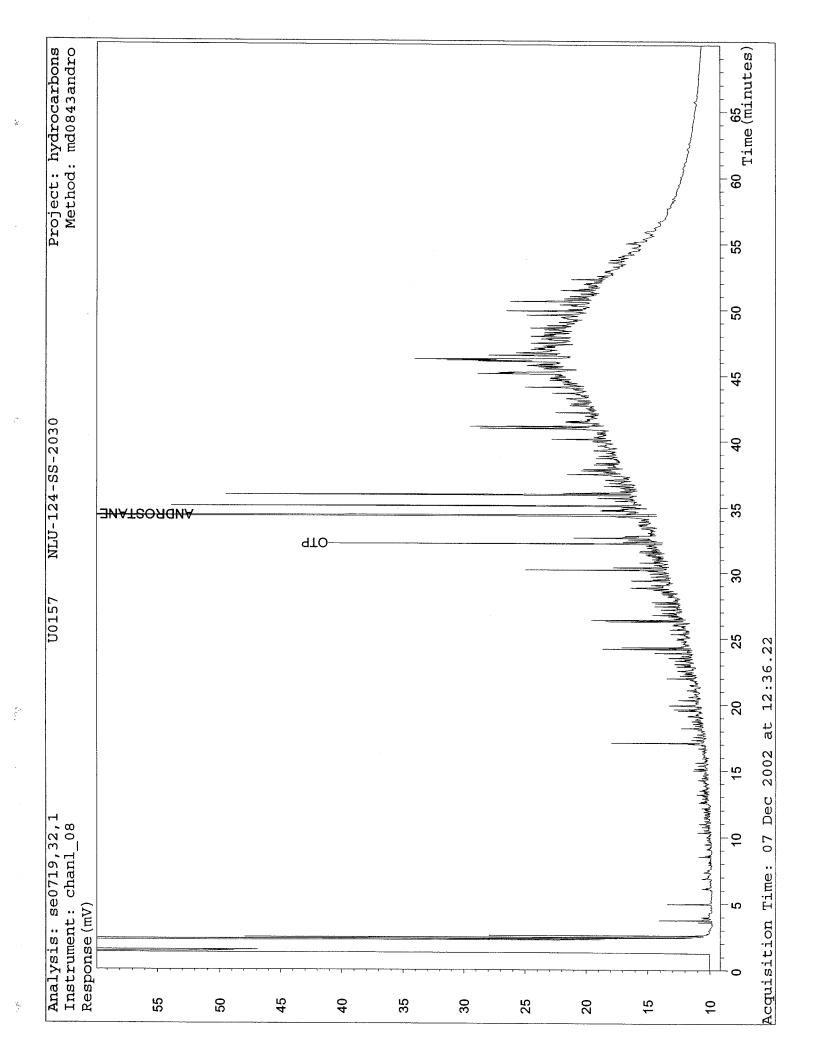


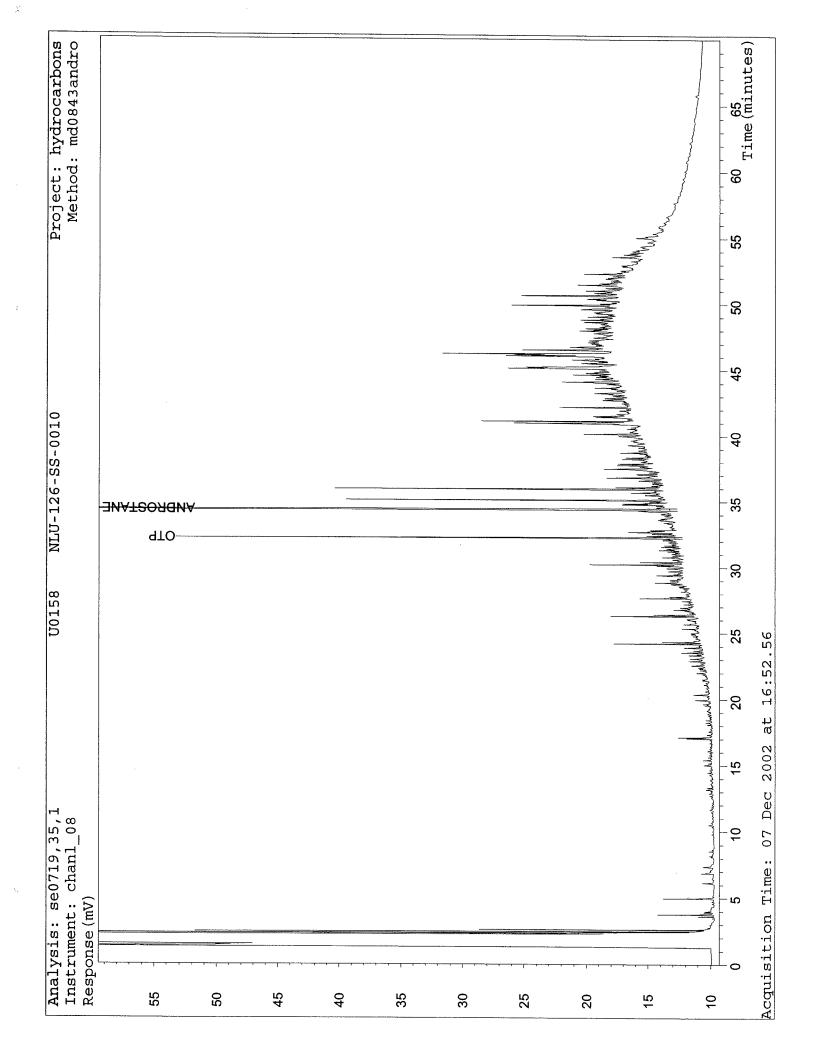


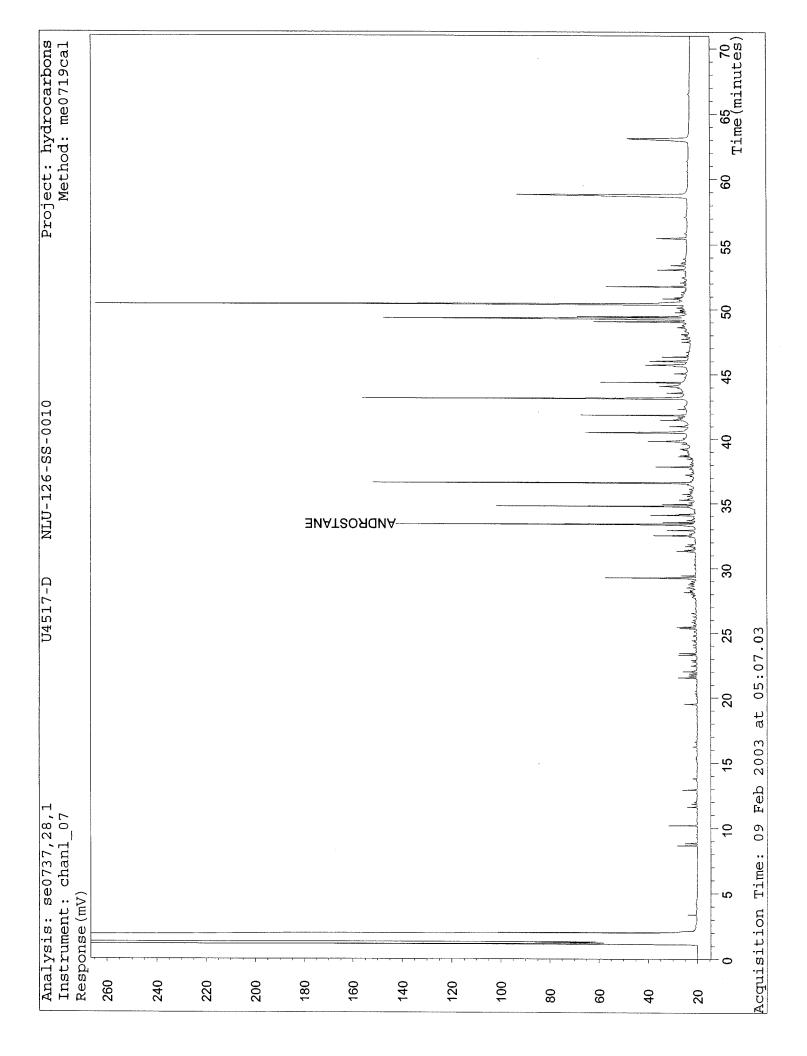


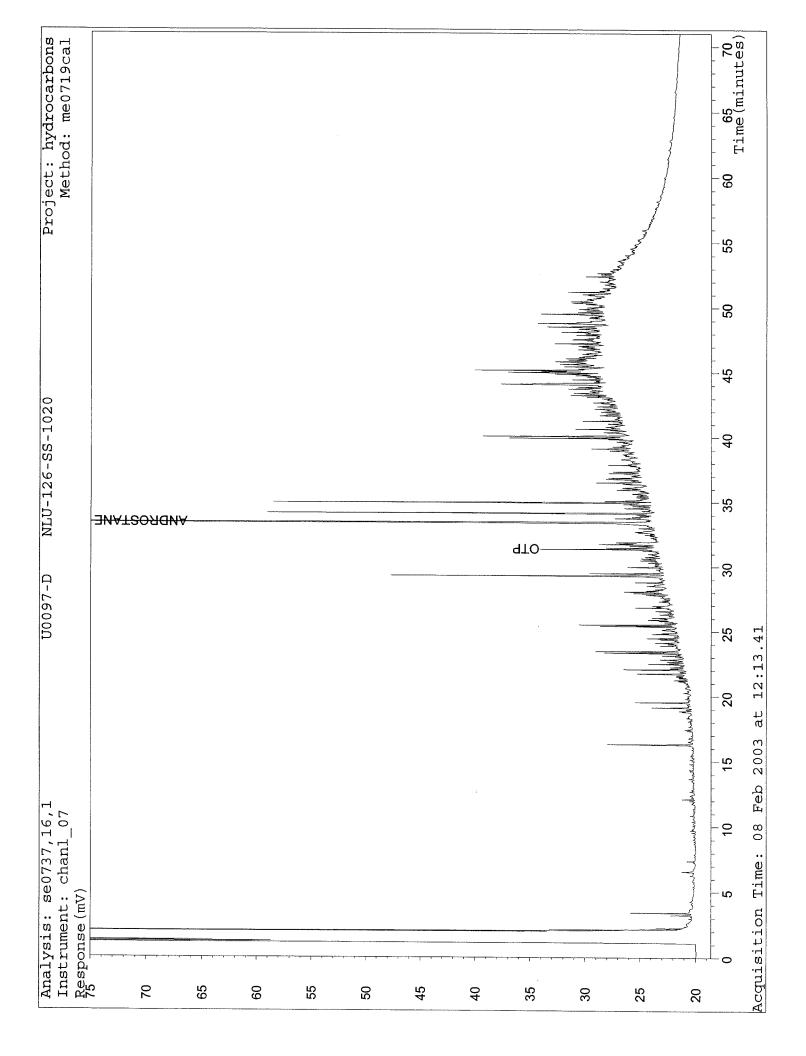


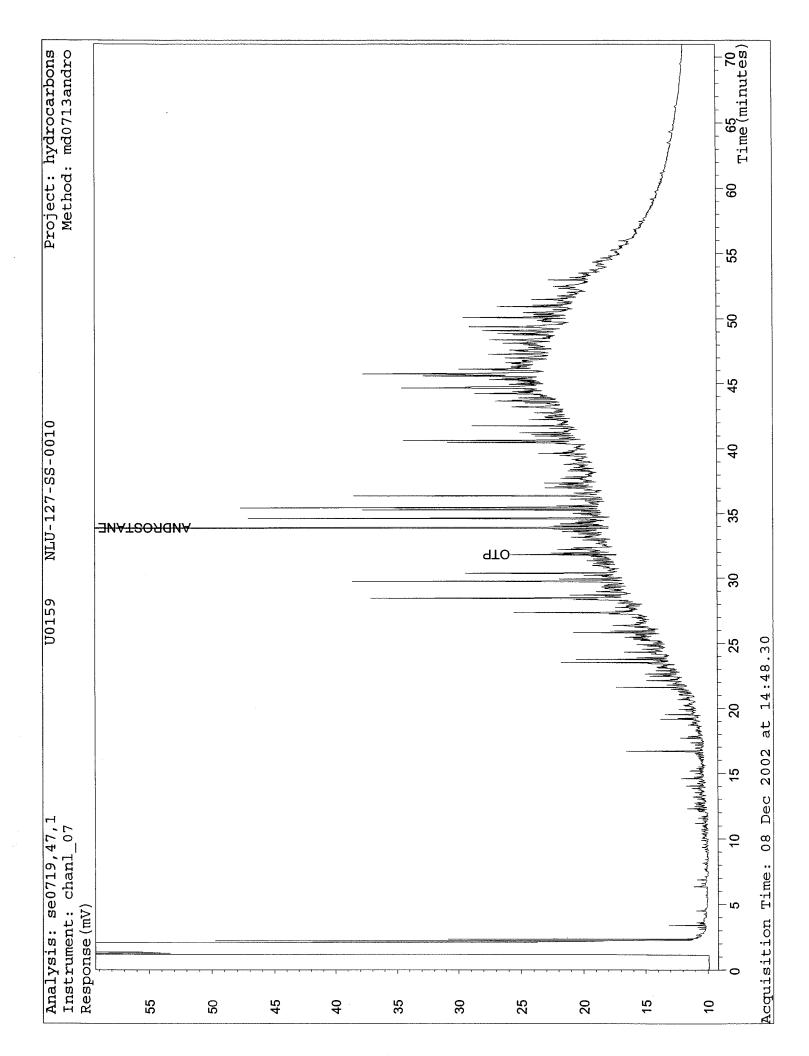


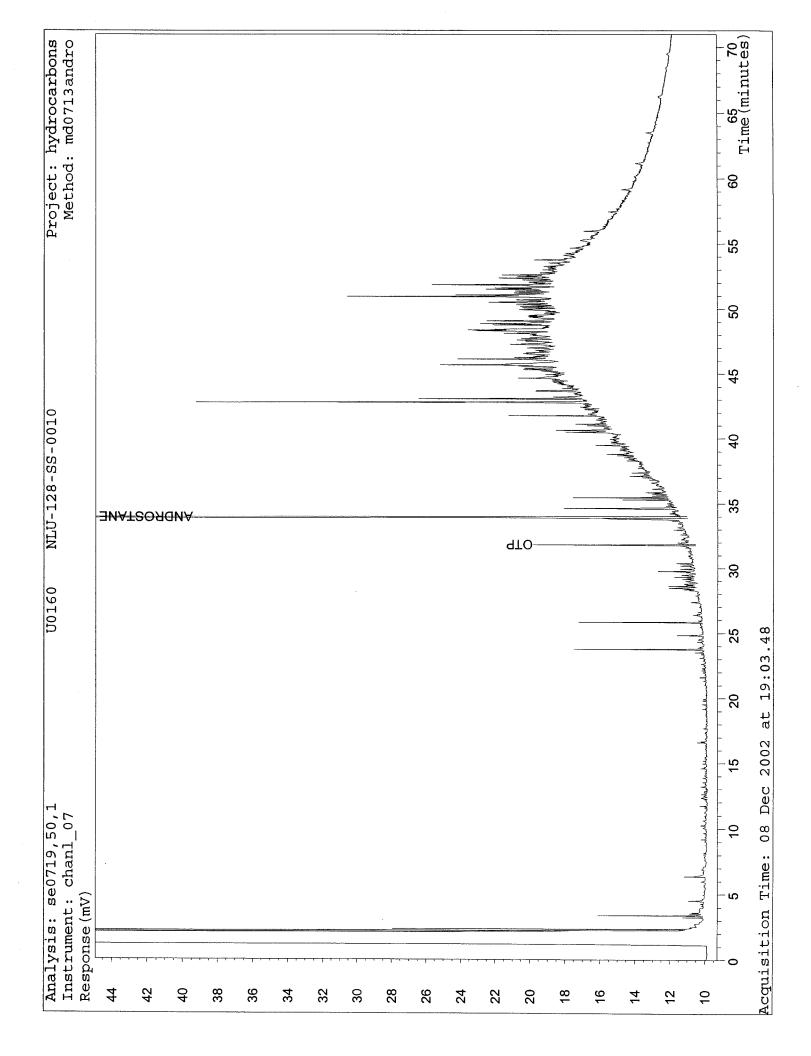




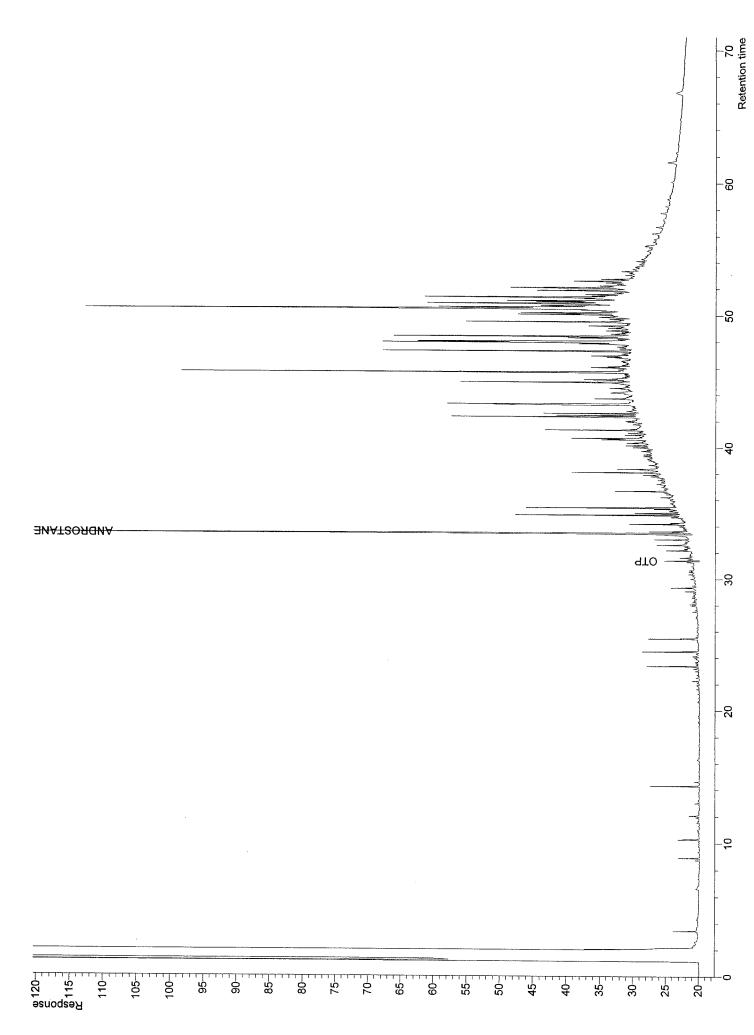


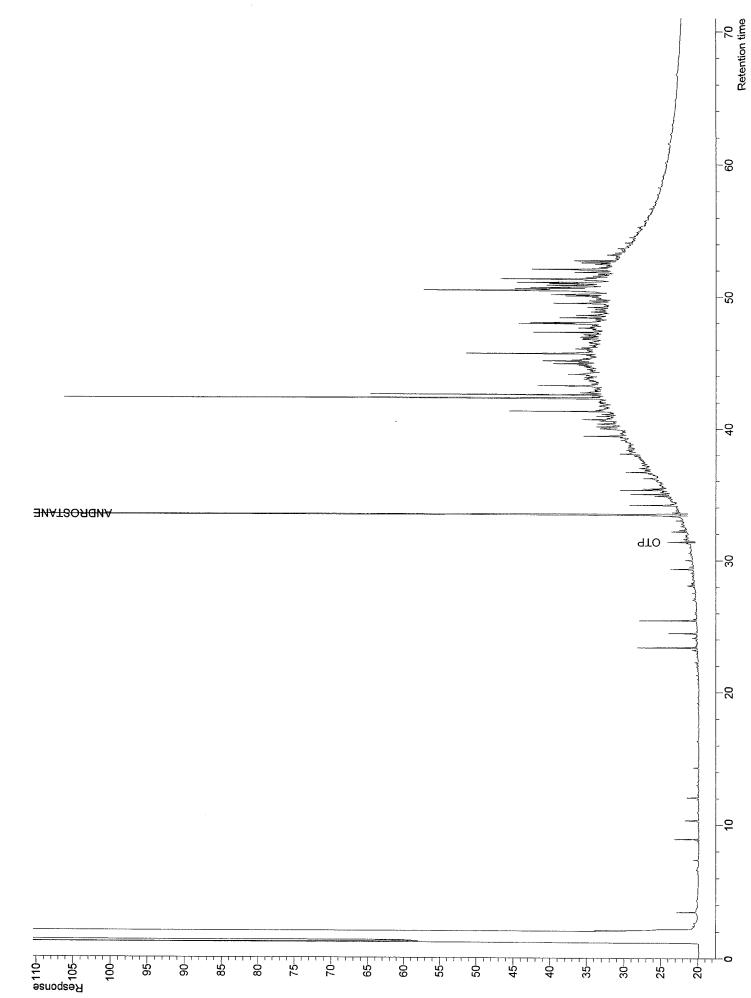


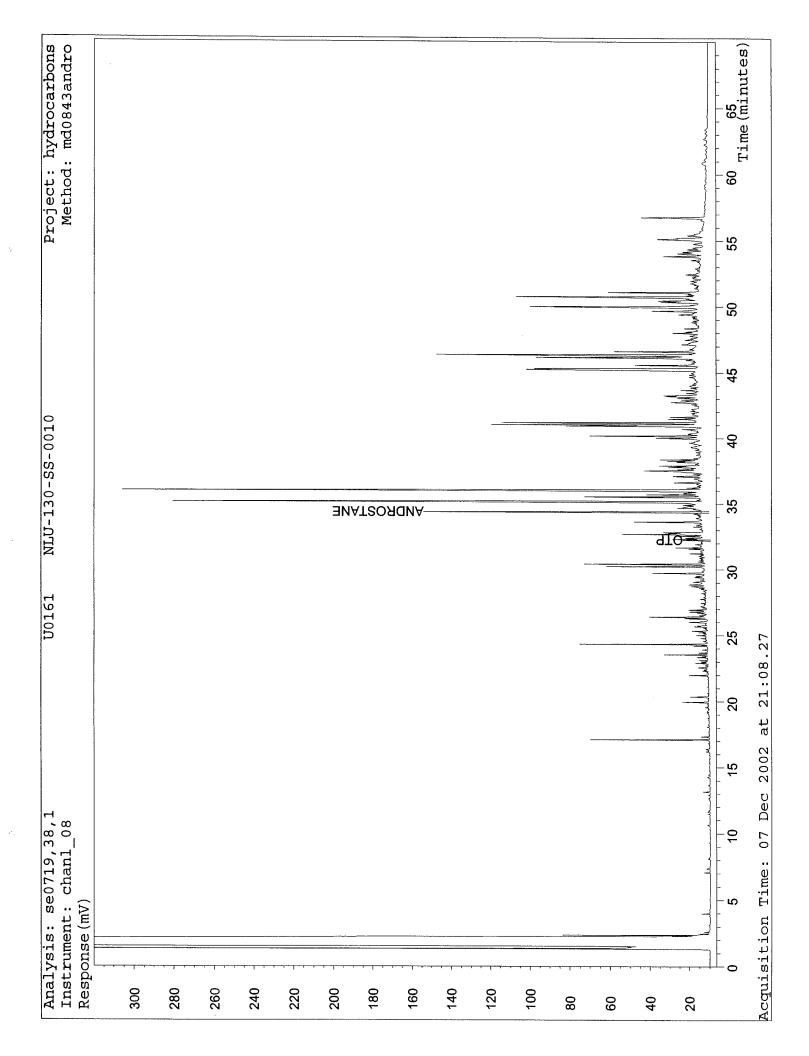


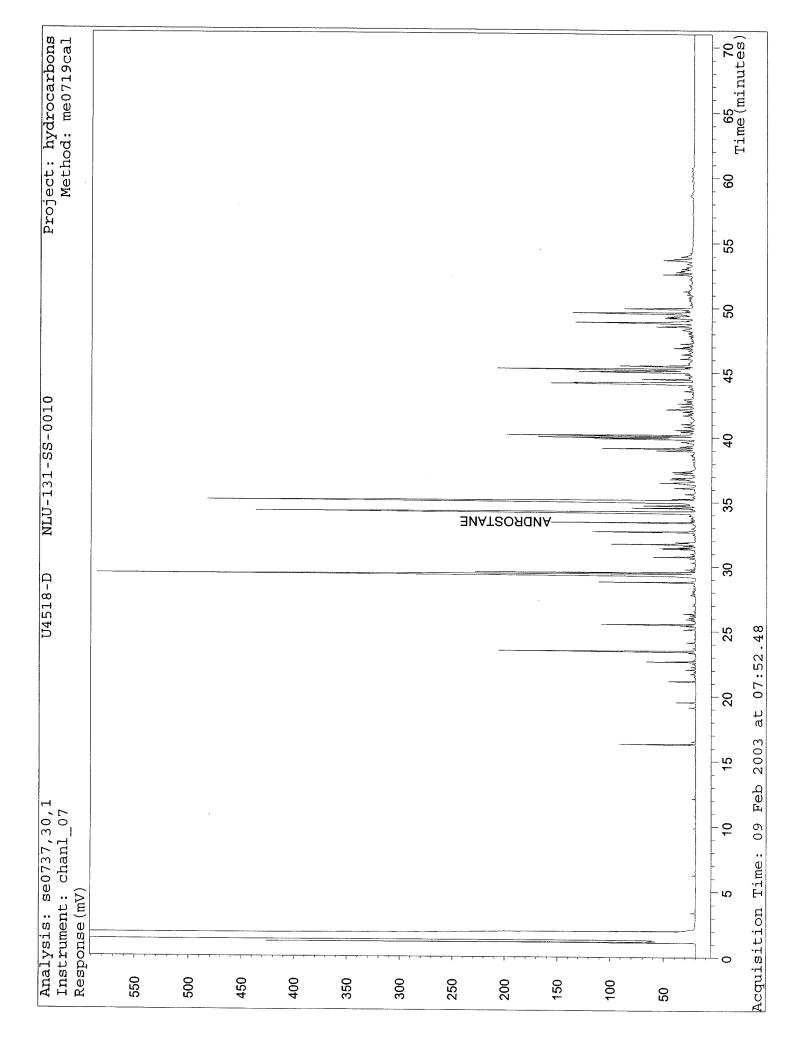


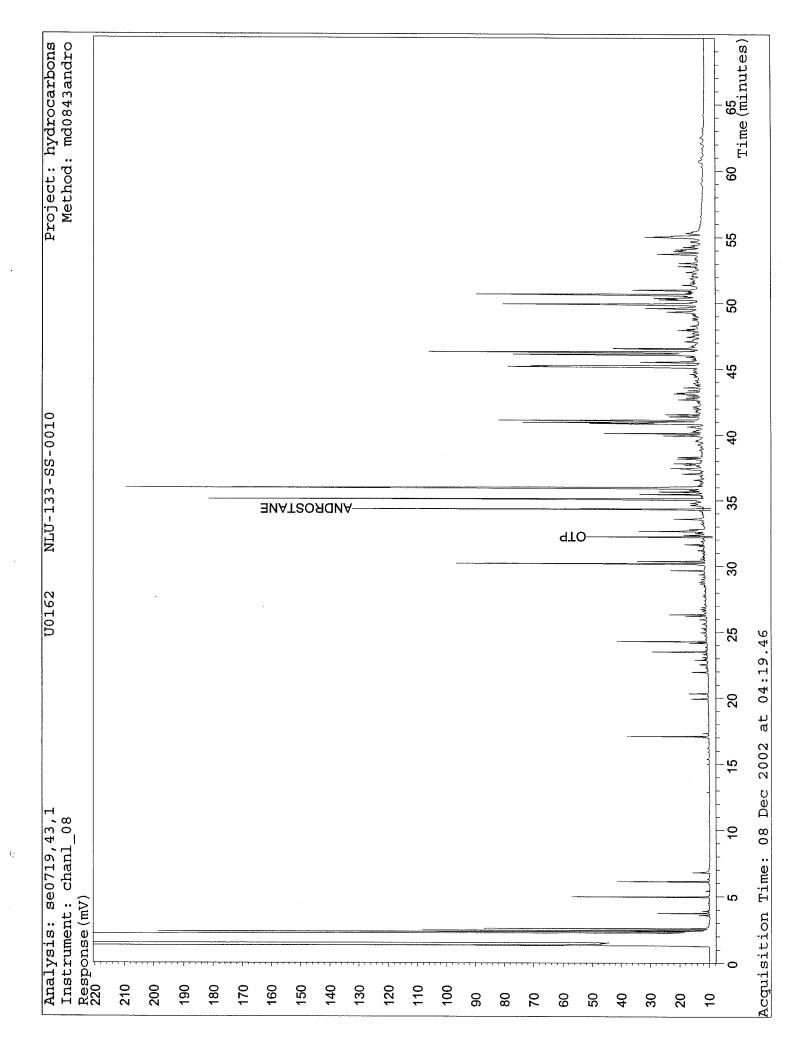


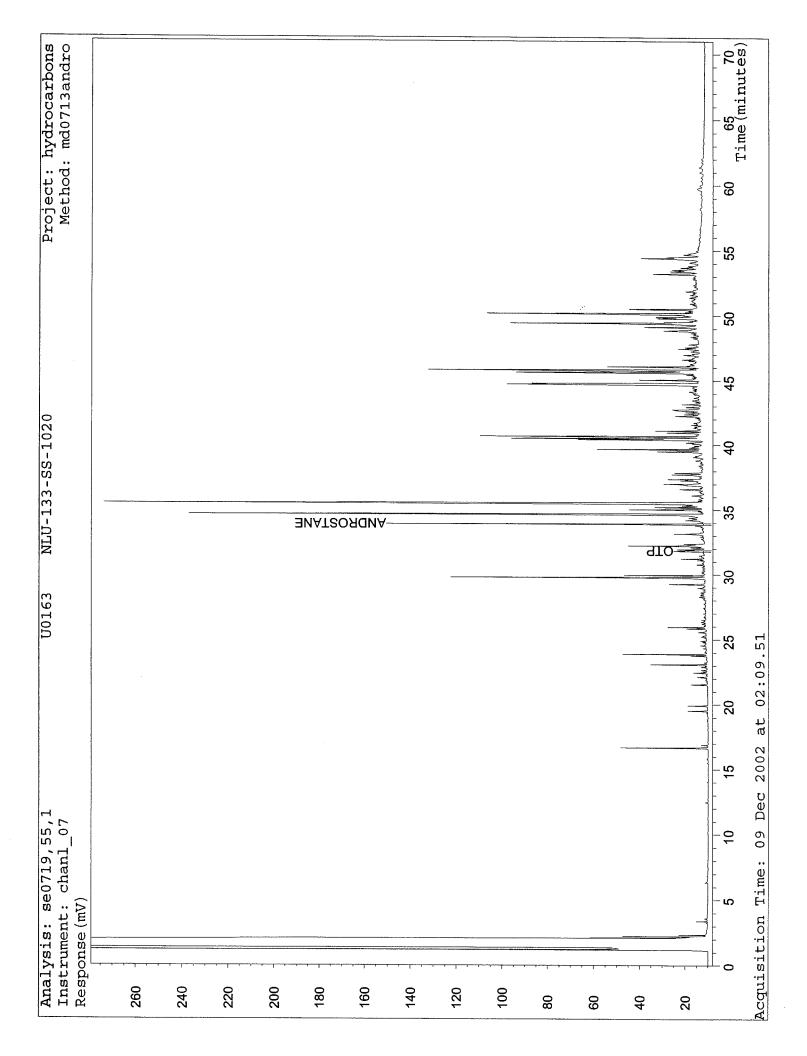


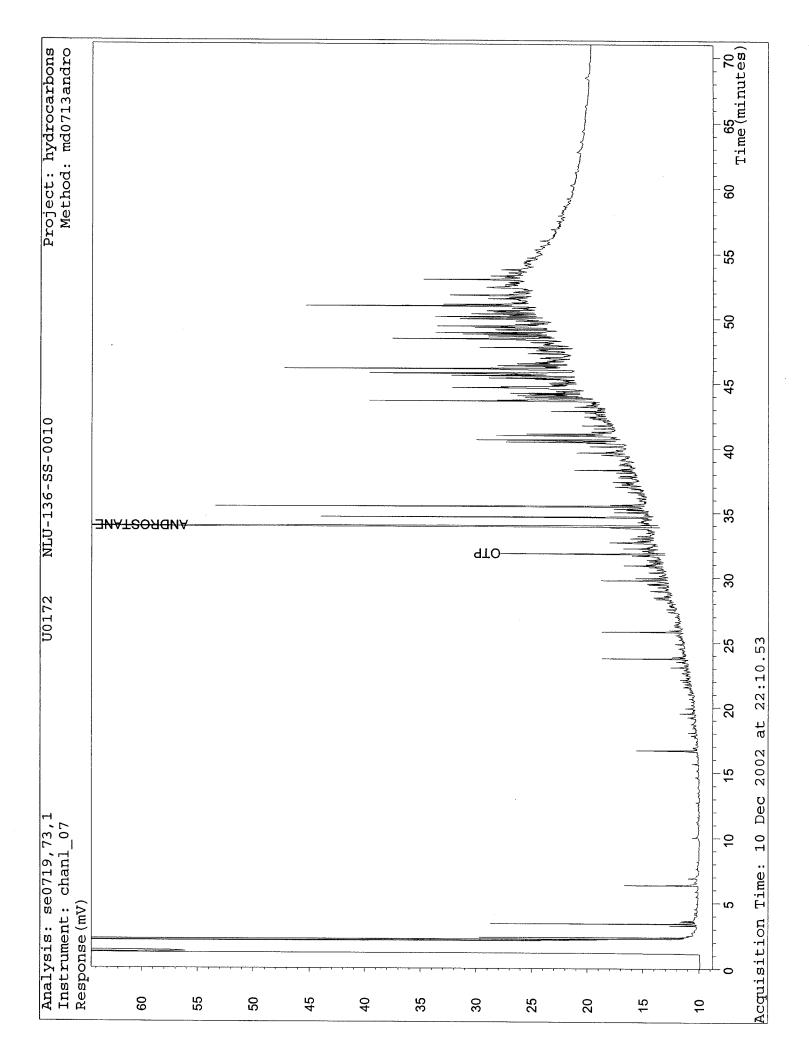


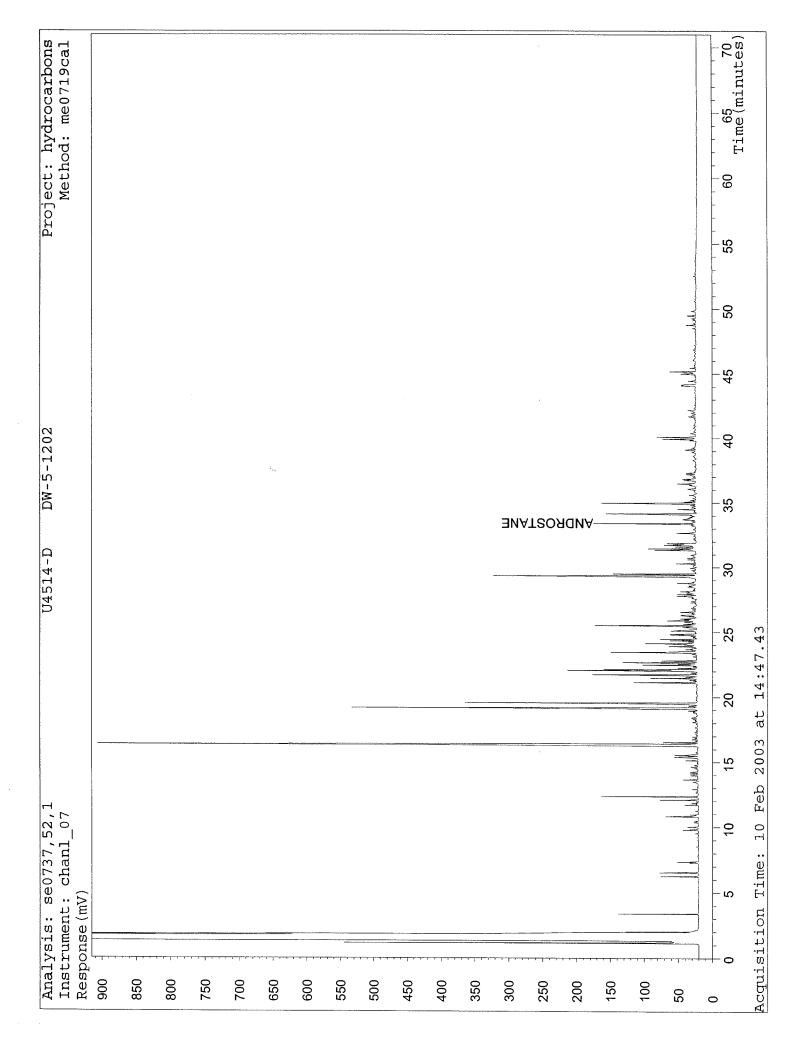


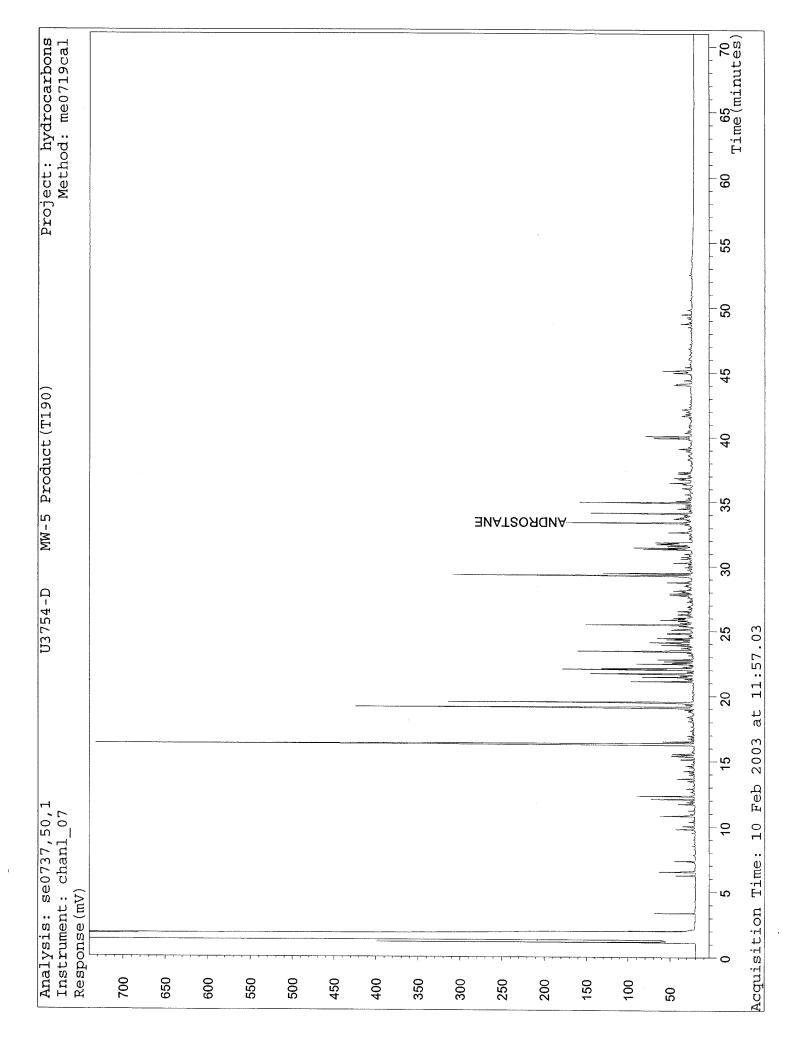


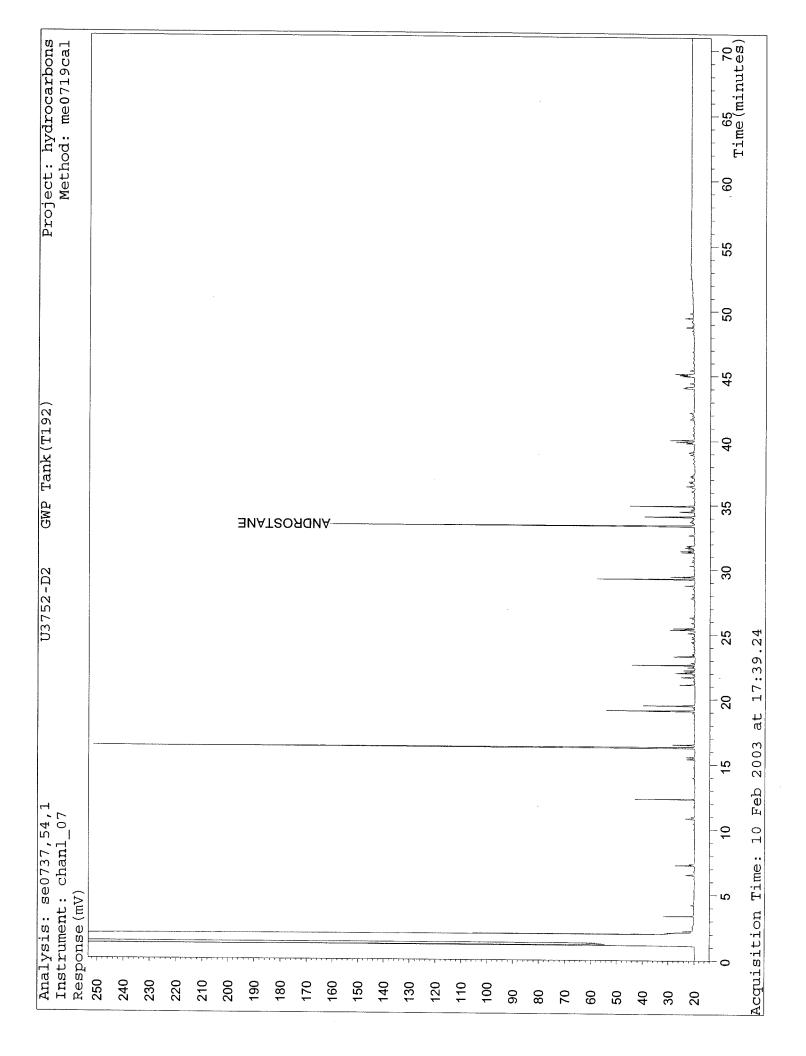


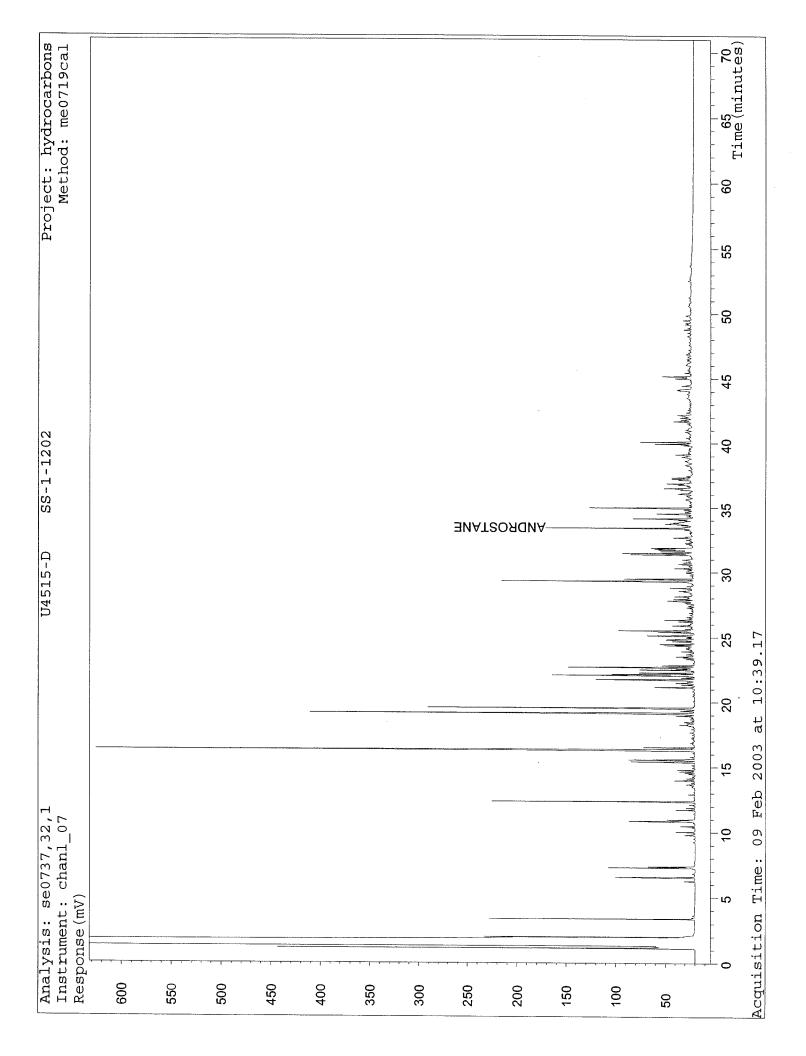


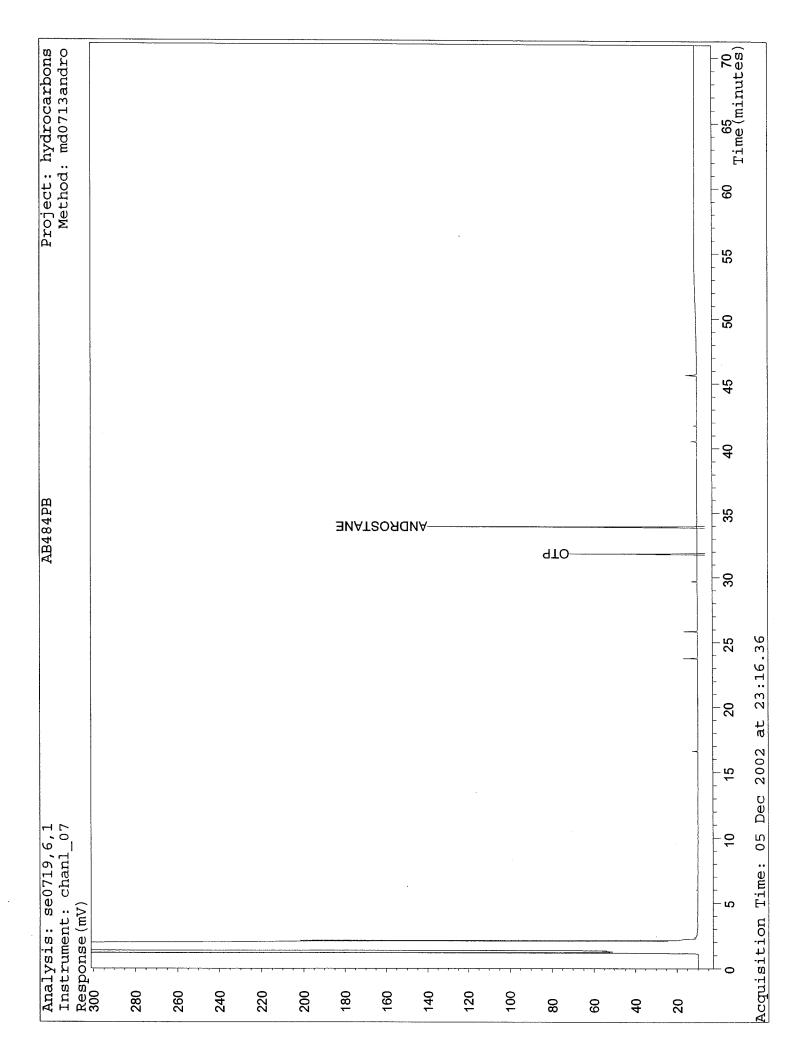


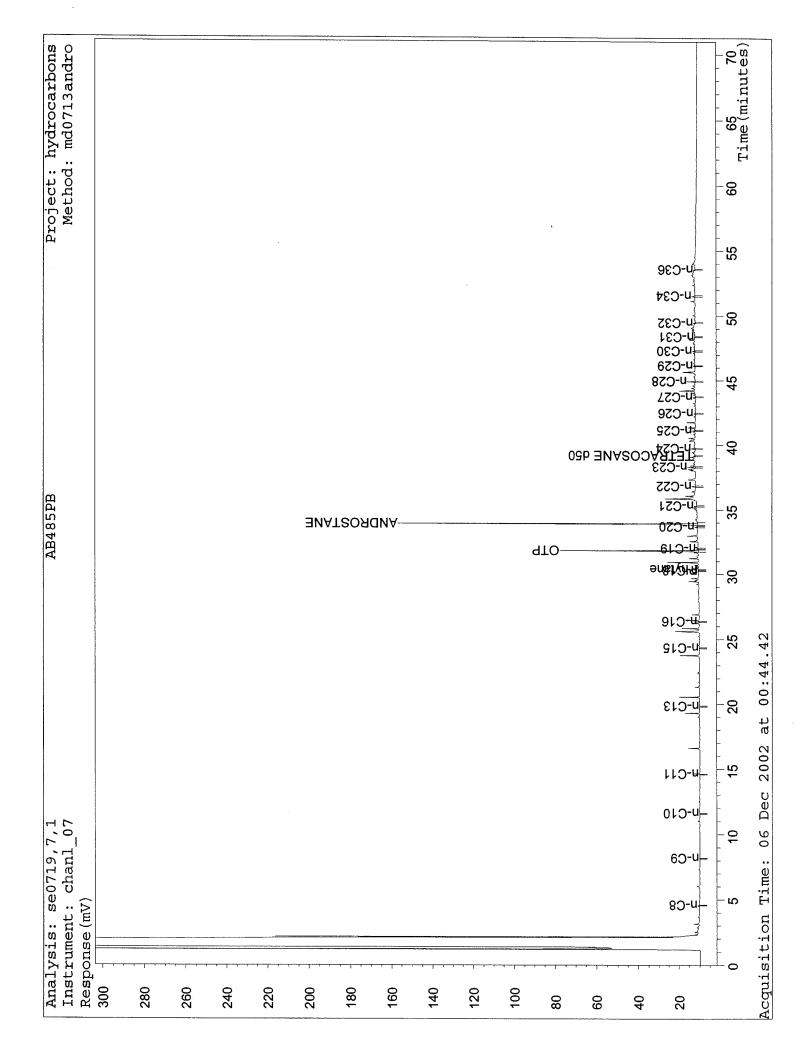


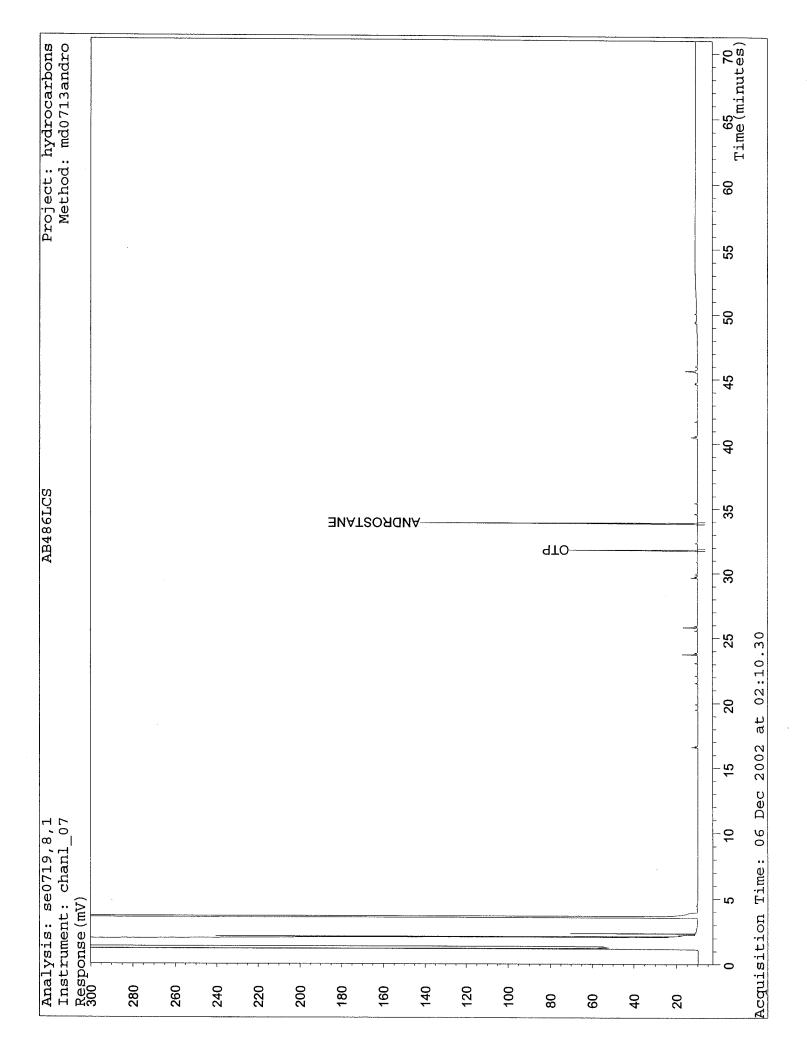


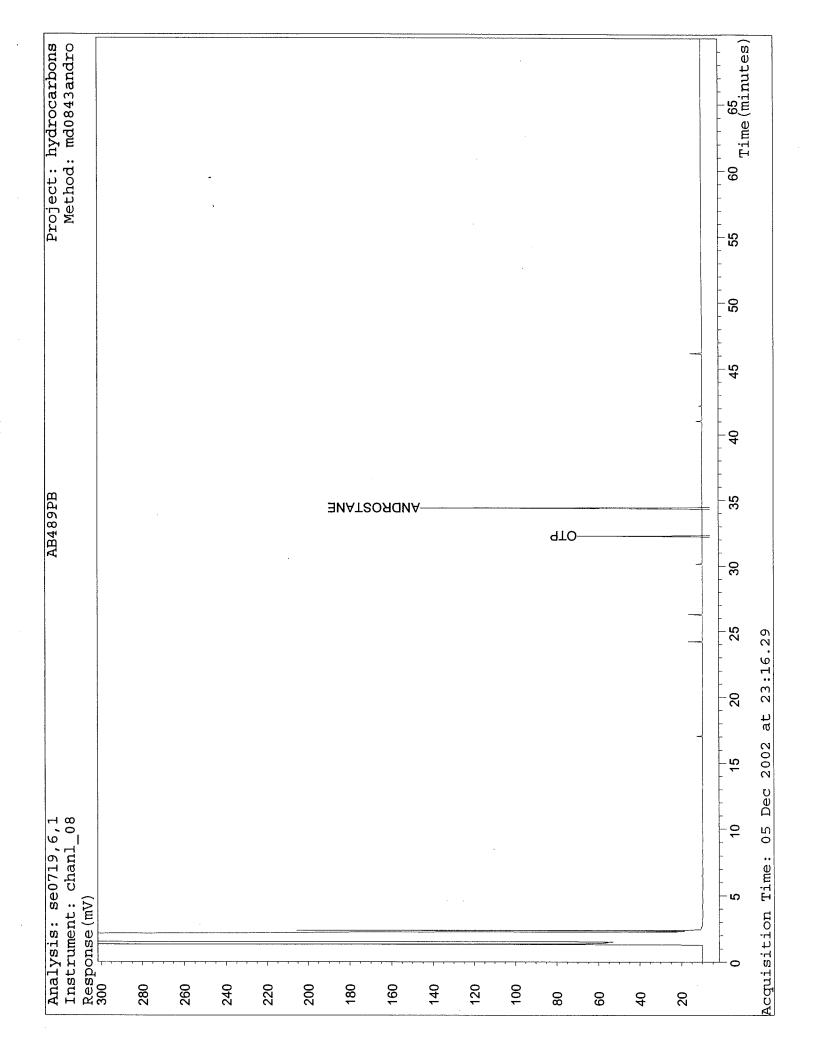


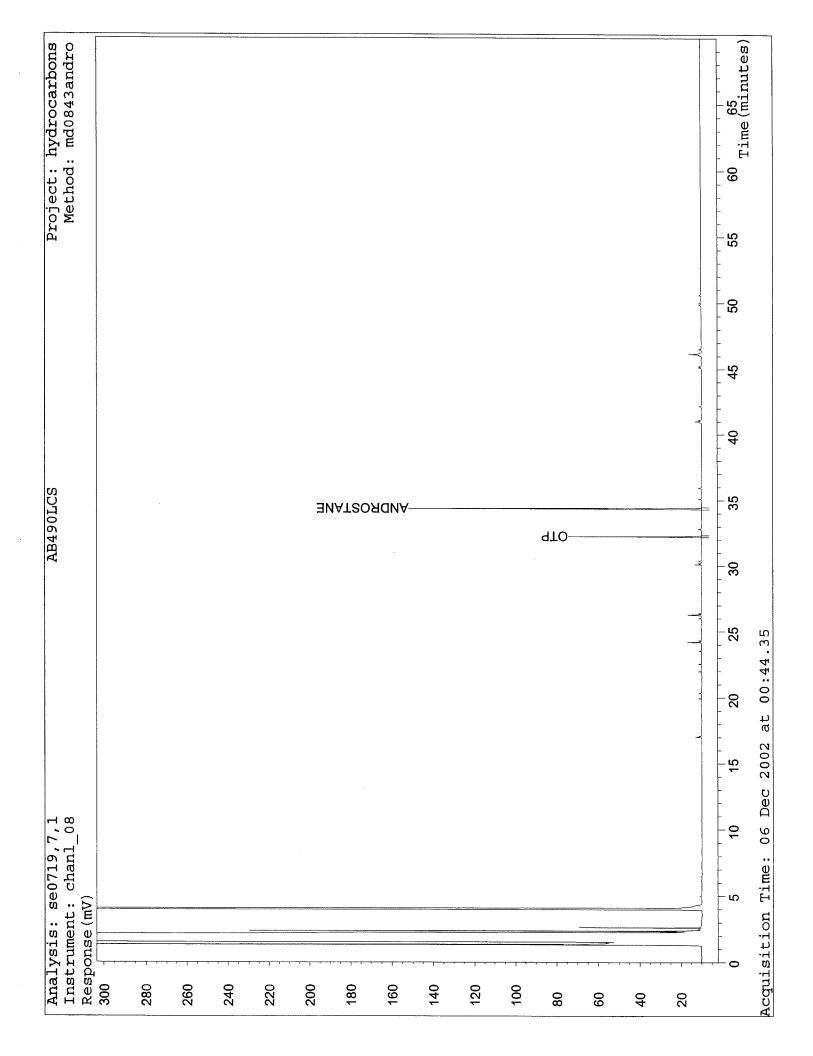






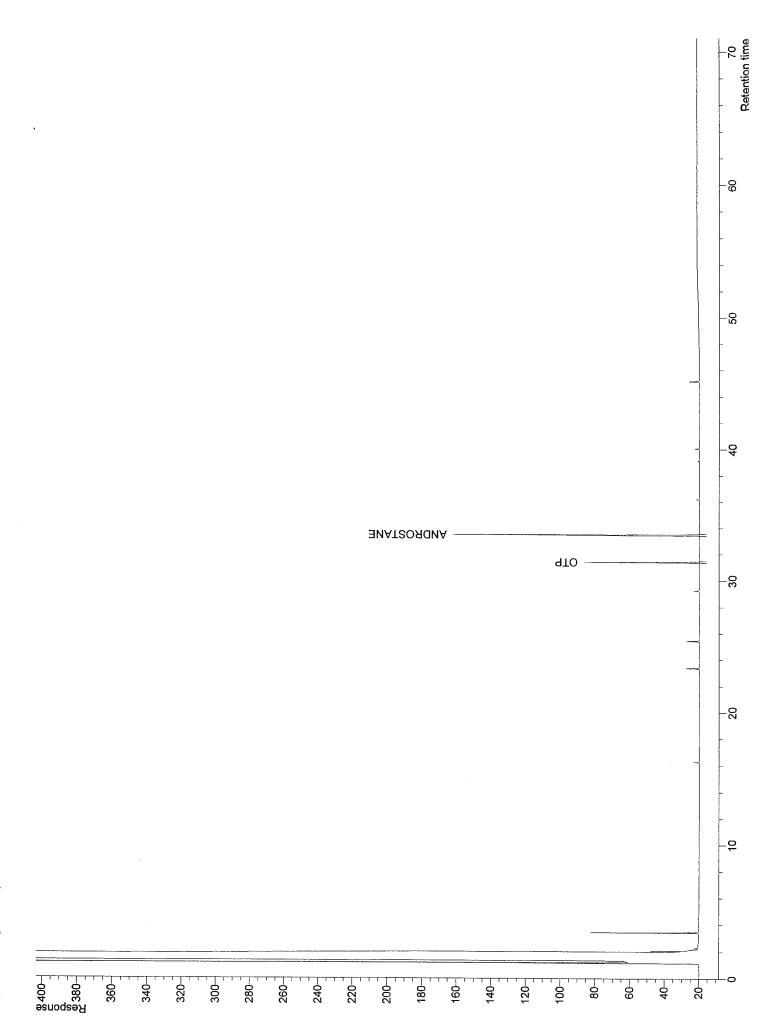


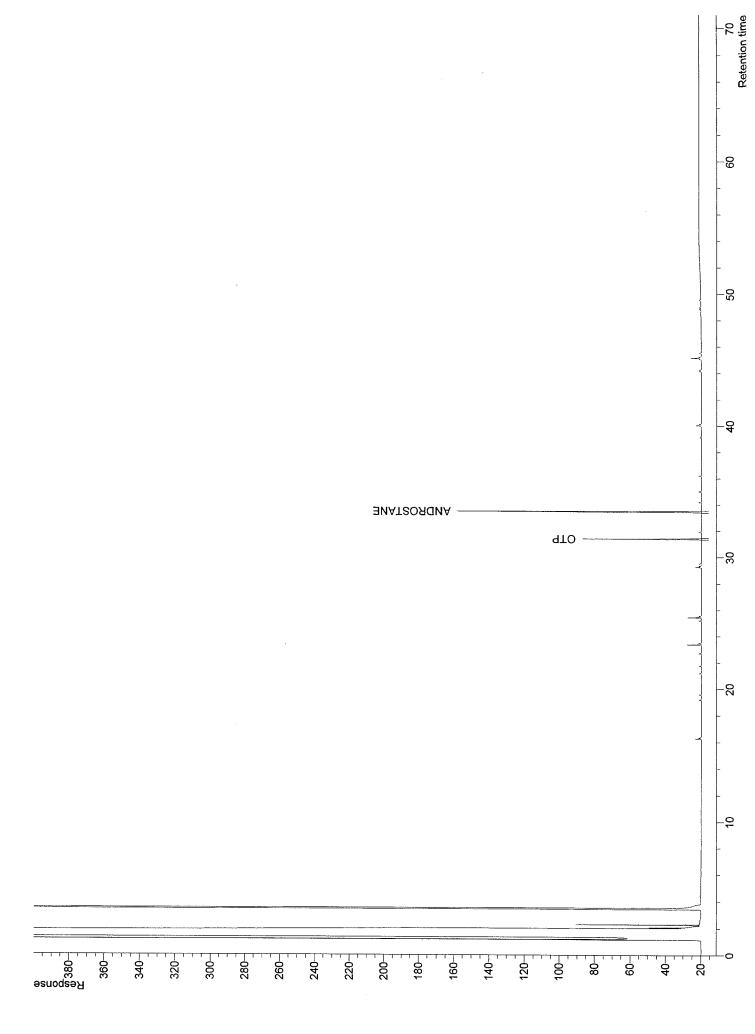


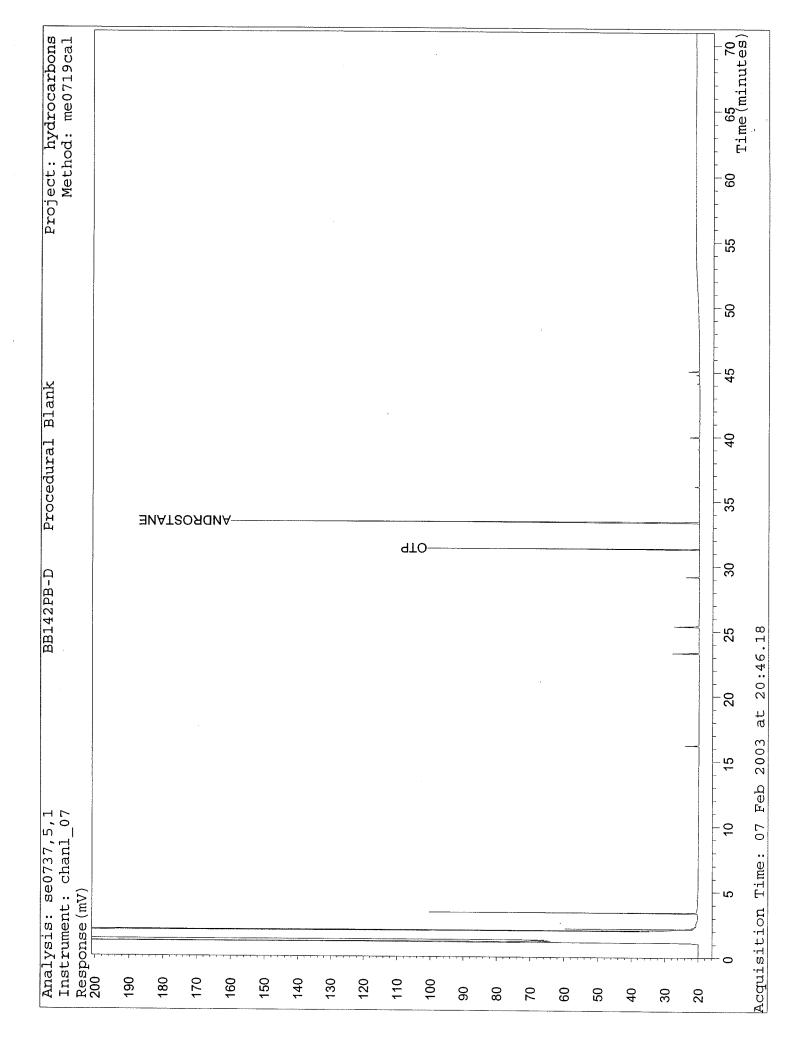


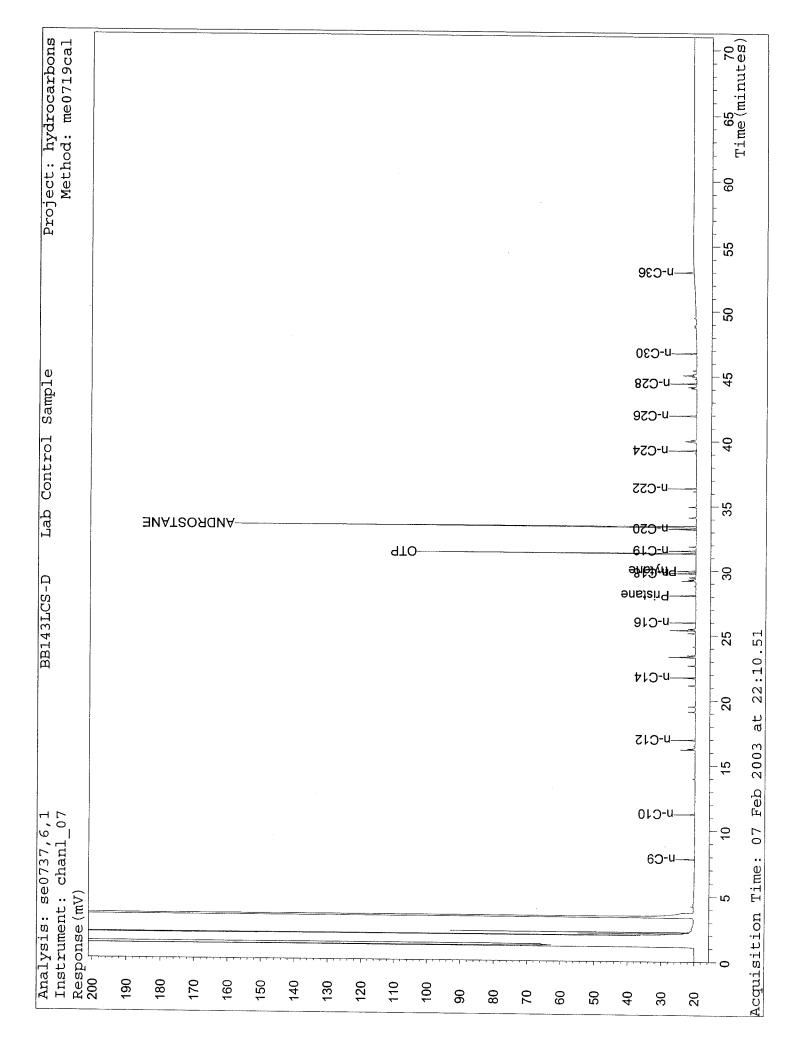


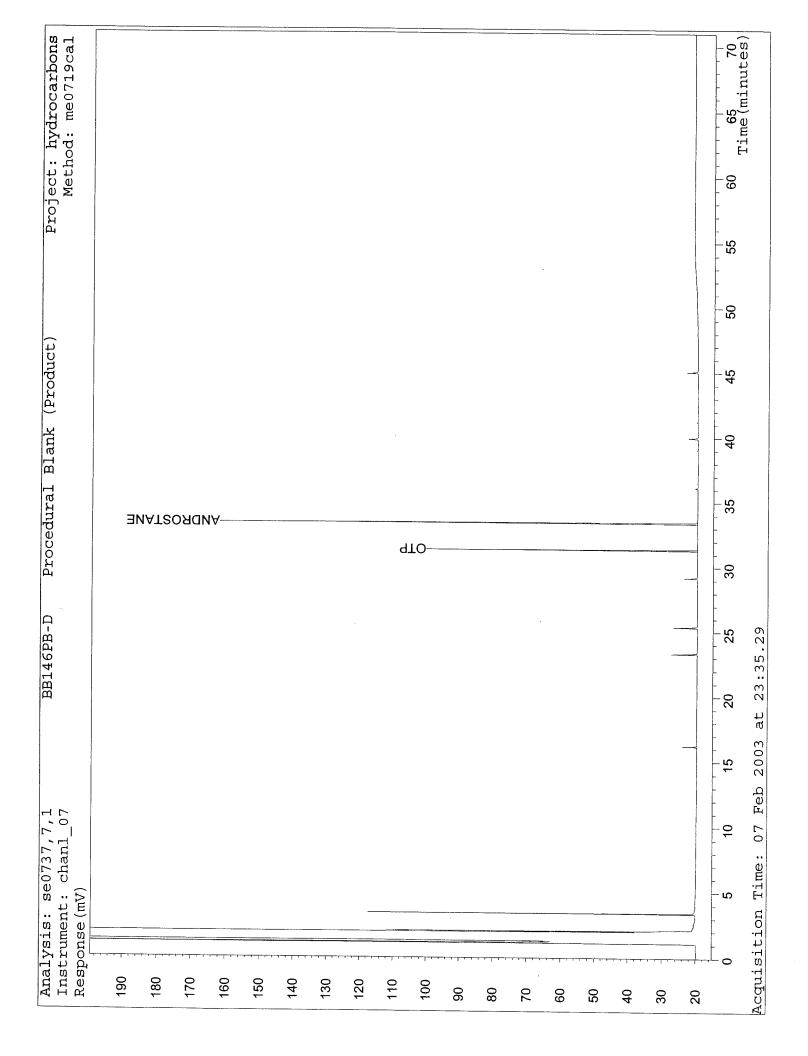
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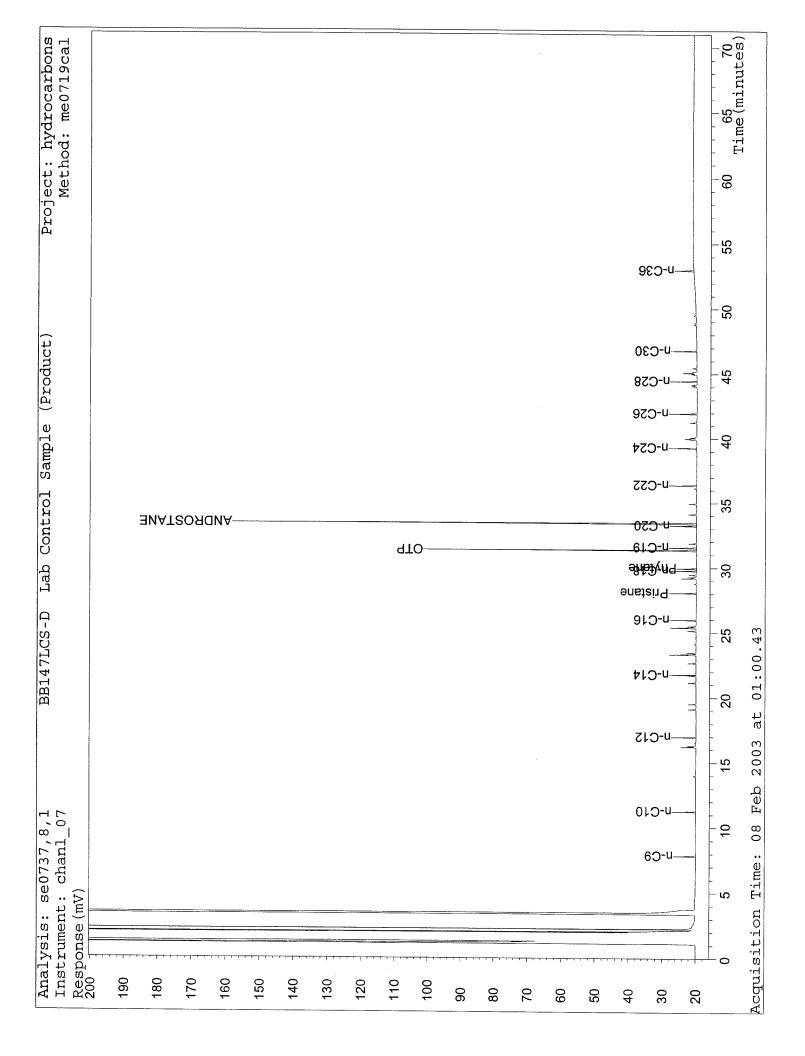


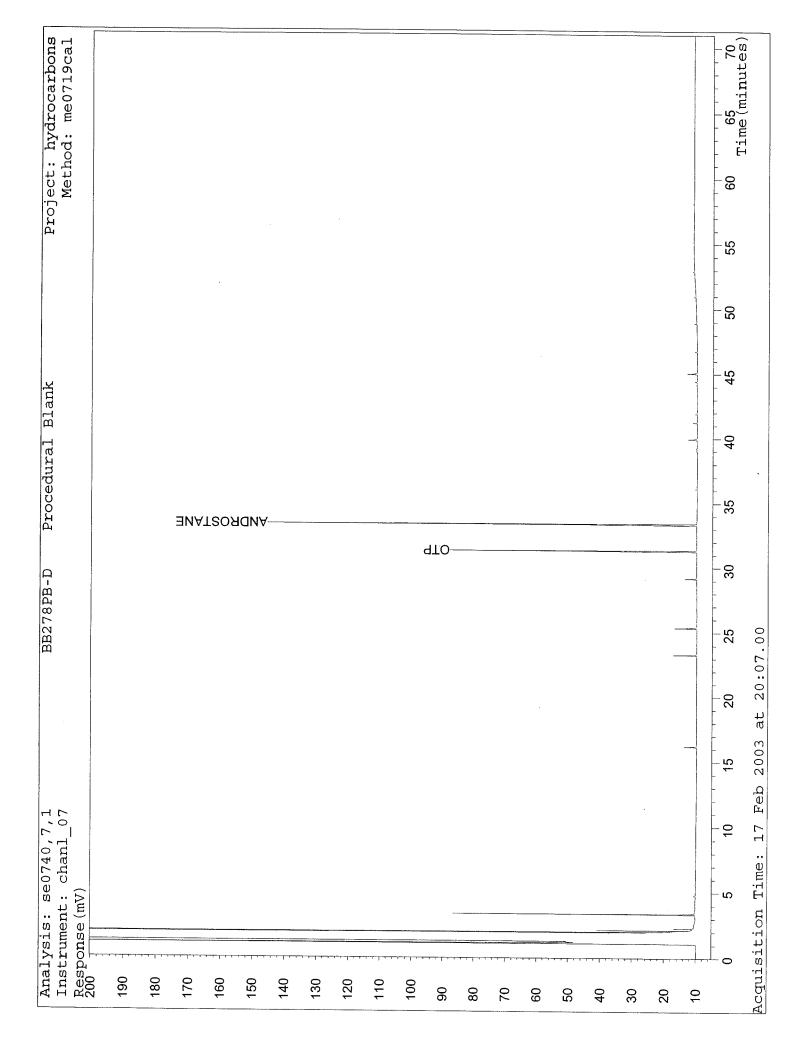


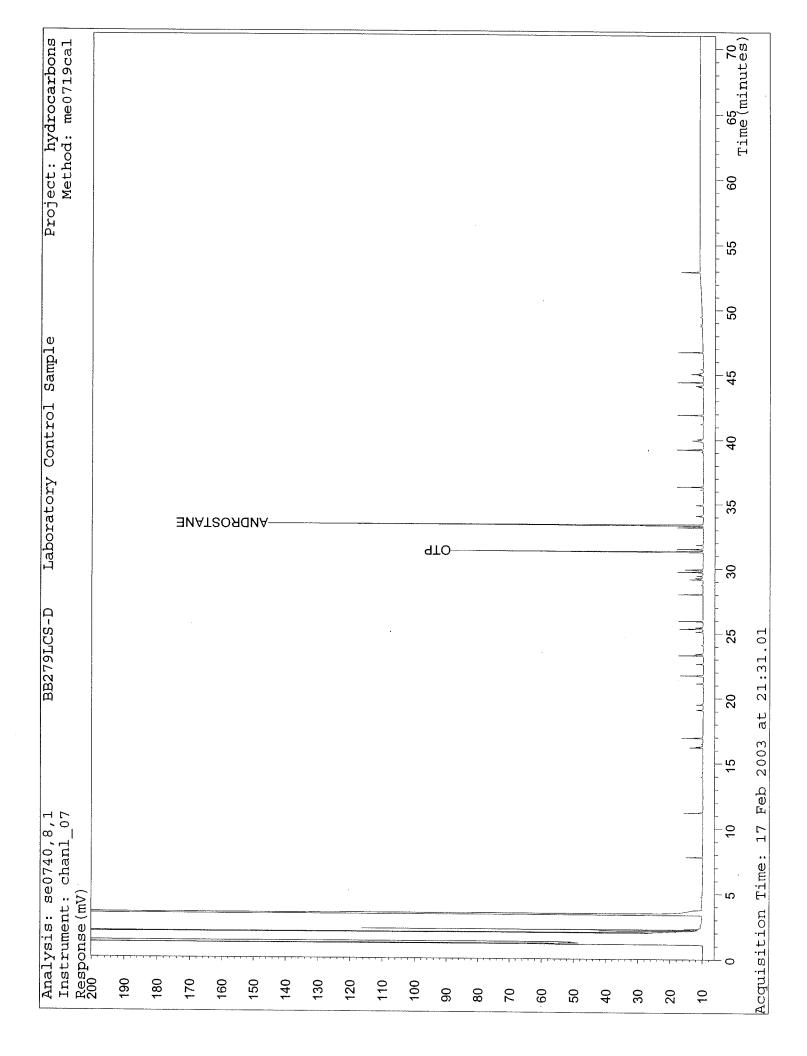


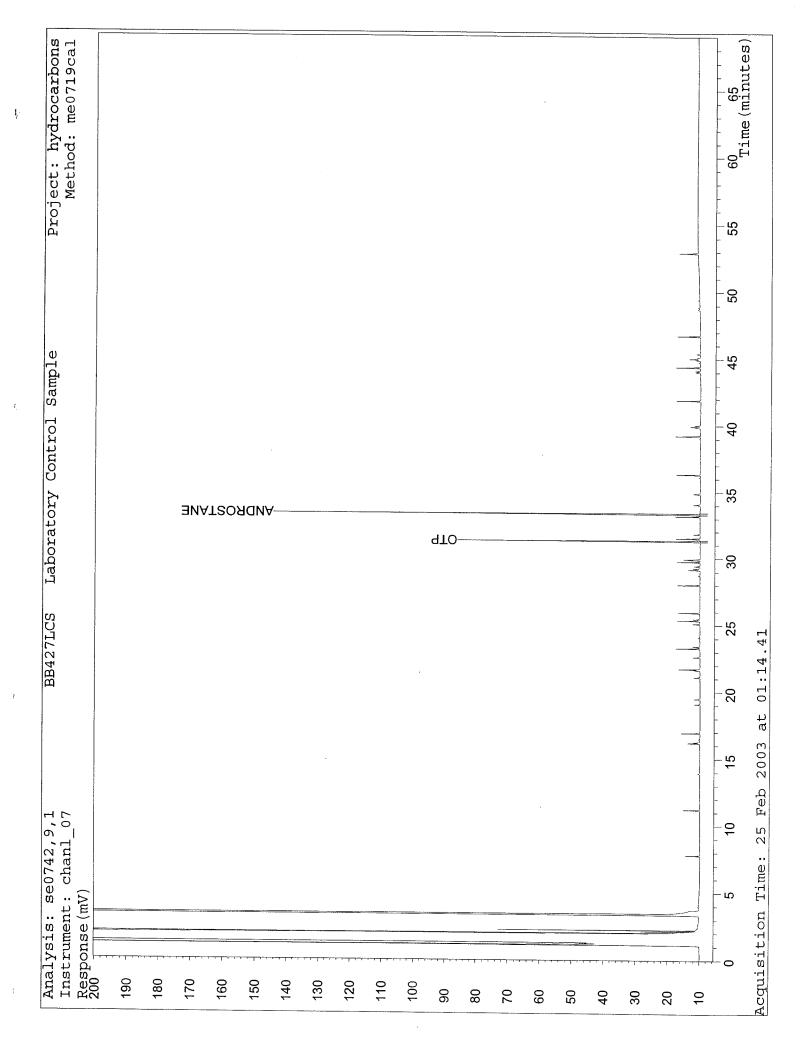


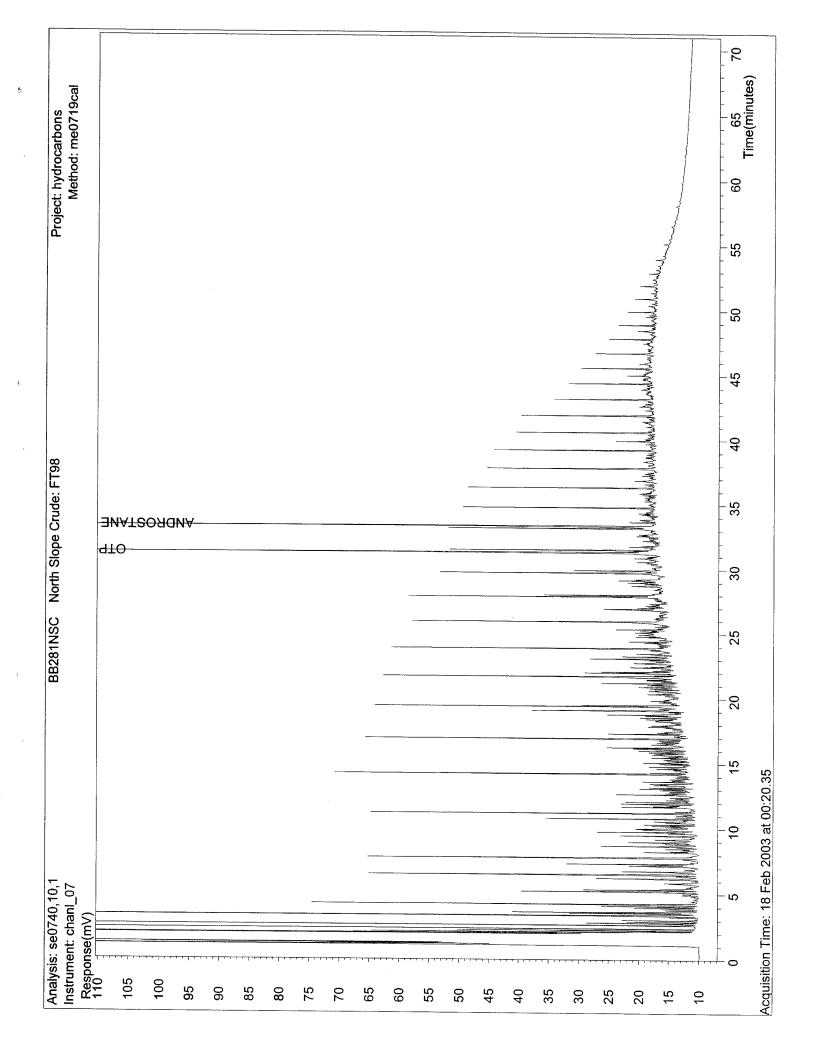


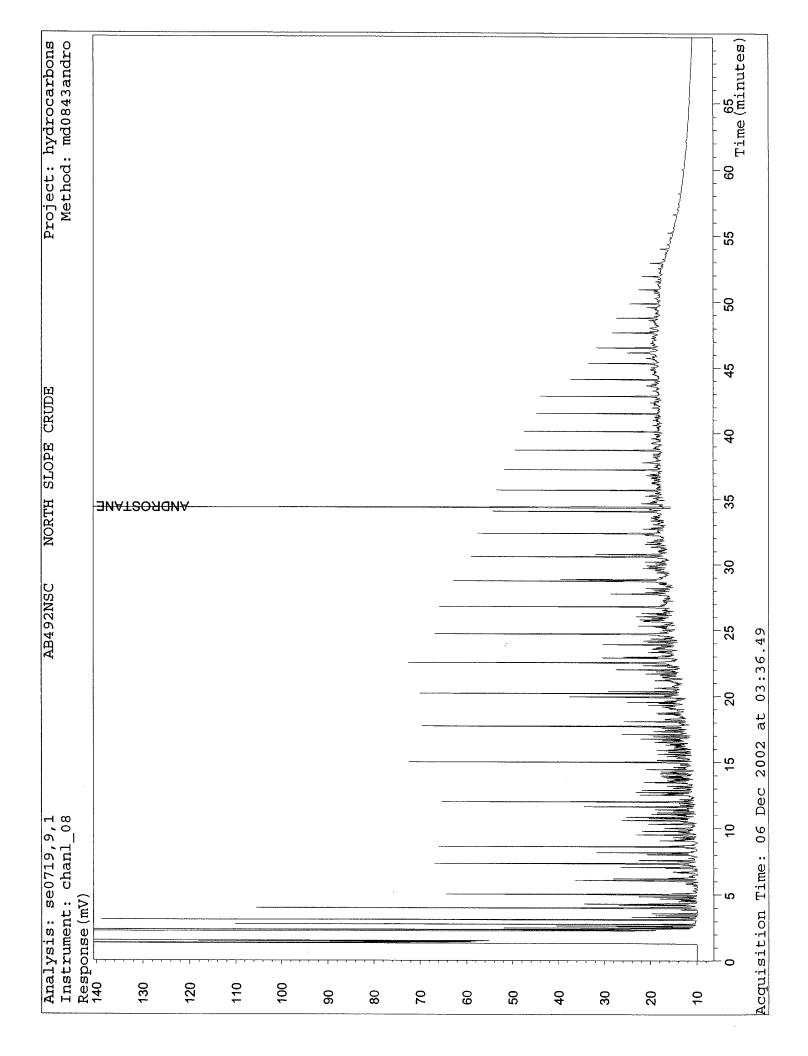












Attachment 2 PAH Concentrations (GC/MS)

Construction of the second sec

Client Sample ID	NLU-102-SS-0010	NLU-103-SS-0010	NLU-104-SS-0010	NLU-105-SS-0010	NLU-106-SS-0010
Battelle Sample ID					
	U0169	U0170	U0142	U0143	U0144
Battelle Batch ID	02-667	02-667	02-667	02-667	02-667
Associated Blank	AB484PB	AB484PB	AB484PB	AB484PB	AB484PB
Field Date	11/14/02	11/14/02	11/12/02	11/12/02	11/12/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	
Extraction Date	11/22/02				11/15/02
Acquired Date		11/22/02	11/22/02	11/22/02	11/22/02
Analytical Method	12/18/02	12/18/02	12/14/02	12/14/02	12/14/02
	8270M	8270M	8270M	8270M	8270M
Percent Solids	14.6 %	70.9 %	13.3 %	20 %	10.9 %
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Size	4.65 g	23.79 g	4.02 g	6.36 g	3.6 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	14.9	8.77	25.9	24.8	24.8
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	μg/kg
N					
Naphlhalene C1-Naphthalenes	371	21.6 18.4	1010 269	2110	693
C2-Naphthalenes	280	125	334	353	207
C3-Naphihalenes				496	449
C4-Naphthalenes	260	151	308	515	433
	224	222	355	990	280
2-Methylnaphthalene	80.6	7.9 J	172	232	125
1-Methylnaphthalene	45.6	9.08	90.1	114	74.7
2-Ethylnaphthalene	14 J	1.43 J	13.1 J	20.5 J	12.6 J
1-Ethylnaphthalene	4.95 J	1.25 J	5.19 J	20.5 J 9.88 J	6 34 J
2,6/2,7-Dimethylnaphthalene	96.4	52.5	149		
1,5-Dimethylnaphthalene	13 J			244	207
Acenaphthylene	13 J	6.8 J	13.1 J	21 J	17.1 J
	113	77.5	451	620	353
Acenaphthene	160	16.7	272	287	185
Biphenyl	50.2	7.53 J	163	271	114
Dibenzofuran	100	15.8	120	146	89.1
Cadalene	10.2 J	29.6	7.06 J	20.5 J	5.65 J
Fluorene	176	29.0	7.00 J		
C1-Fluorenes			213	351	195
	145	37.2	151	334	219
C2-Fluorenes	186	148	278	596	213
C3-Fluorenes	193 ME	244 ME	390 ME	823 ME	178 ME
2-Methylfluorene	29.6	3.91 J	34.9	68.9	48.1
1-Methylfluorene	31.3	7.97 J	33.1	94.6	40.1
Anthracene	356	139	677	94.0 1240	
Phenanthrene	1050				568
C1-Phenanthrenes/Anthracenes		348	1560	1870	1190
CO Deservices AntiAracenes	528	262	730	927	761
C2-Phenanthrenes/Anthracenes	507	314	829	1550	703
C3-Phenanthrenes/Anthracenes	337	290	588	1200	442
C4-Phenanthrenes/Anthracenes	228	255	503	710	376
3-Methylphenanthrene	114	57.4	139	181	168
2/4-Methylphenanlhrene	136	56.2	152	128	100
2-Methylanthracene	78.6	55.4	152		
9-Methylphenanthrene		35.1	98.4	198	111
	128	56	188	250	178
1-Methylphonanthrene	83.4	45.1	103	114	109
2,7-Dimethylphonanthrene	58.2	26.9	91,6	144	92.6
1,7-Dimethylphenanthrene	56	44	56.1	94.3	50.9
Dibenzothiophene	92.2	22.8	220	465	177
C1-Dibenzothiophenes	109	64.5	194	418	
C2-Dibenzothiophenes	134	216	301		171
C3-Dibenzothiophenes	134			660	188
	150	302	423	680	212
C4-Dibenzothiophenes	127	218	338	361	172
4-Methyldibenzothiophene	34.1	23.5	56.8	176	52.9
2/3-Methyldibenzothiophene	49.4	19,7	59.4	105	69.2
1-Methyldibenzothiophene	9.54 J	5.97 J	17.6 J	41.6	14.4 J
Dehydroabietin(e)	ND	ND	ND	41.0 ND	14.4 J ND
Relene	67.9	122	57.5		
Fluoranthene	1930			69.7	47.2
riuorantnene Pyrene		902	5390	14000	3540
	2150	767	6720	16400	4370
Benzo(b)fluorene	176	41.1	253	527	150
C1-Fluoranthenes/Pyrenes	1080	368	2120	4510	1490
C2-Fluoranthenes/Pyrenes	474 ME	184 ME	994	1340	850
C3-Fluoranthenes/Pyrenes	308	154	596	683	454
Benzo(a)anthracene	1040	468	2500	5980	
Chrysene	1360	500	2800		1750
C1-Chrysenes				7890	2250
C2-Chrysenes	524	219	1060	1680	849
C2-On ysenes	374	175	770	1020	664
C3-Chrysenes	294	155	722	628	508
C4-Chrysenes	ND	ND	295	511	434
Benzo(b)fluoranthene	1100	438	3730	7060	2580
Benzo(j/k)fluoranthene	1060	446	3530	7100	2410
Benzo(a)fluoranthene	188	97.6	816	1100	
Benzo(e)pyrene				1850	606
	892	341	3940	7510	2620
Benzo(a)pyrene	1100	474	5100	11200	3520
Perviene	618	136	1810	3250	1270
Indeno(1,2,3-c,d)pyrene	696	280	4350	6660	3160
Dibenz(a,h)anthracene	148	69,2	612	1160	438
Benzo(g,h,i)perylene	688	251	4860	9170	3320
Surrogate Recoveries (%) Naphthalene-d8	20		_		
	83	96	76	77	77
Phenan(hrene-d10	87	89	66	72	73
Chrysene-d12	96	99	78	87	86
5b(H)-Cholane	91	105	110	119	93
J≕Result < Sample RL. ND≕ Not Detected					

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix interference. Estimated Value.

Aning Technology To Work ... Malag Technology To Work Lake Union Sediment Project Name Investigation Project Number N005443

Client Sample ID Battelle Sample ID	NLU-107-SS-0010	NLU-109 1214	NLU-109-2830	NLU-109-3840	NLU-110 0406
Baltelle Batch ID	U0145 02-667	U0277-D 03-0159	U0285-D 03-0137	U0290-D2	U0353-D2
Associated Blank	AB484PB	BB426PB	BB276PB	03-0137	03-0159
Field Date	11/11/02	11/15/02	11/15/02	BB278PB 11/15/02	BB426PB
Receipt Date	11/15/02	11/21/02	11/21/02	11/21/02	11/15/02 11/21/02
Extraction Date	11/22/02	02/21/03	02/11/03	02/11/03	02/21/03
Acquired Date	12/14/02	03/05/03	02/26/03	02/27/03	02/21/03
Analytical Method	6270M	8270M	8270M	8270M	8270M
Percent Solids	12.1 %	21.36 %	23.08 %	28.21 %	28.61 %
Matrix	Sediment	Solid	Solid	Solid	Solid
Sample Size	3.97 g	0.24 g	0.51 g	0.61 g	0.36 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	26.2	105	124	1030	1750
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthaiene C1-Naphthaienes	1270	19000	44300	105000	62100
C2-Naphthalenes	480	6020	34100	95600	11700
C3-Naphthalenes	602 402	4340	32900	77900	13800
C4-Naphthalenes	402 353	2840 1930	17100	35900	16200
2-Melhyinaphthalene	353 254	1930	7650	14500	6080
1-Methylnaphthalene	254 222	2440	8540	45900	5650
2-Ethvinaphthalene	222 29.2	265	25500	49700	5690
1-Ethvinaphthalene	28.2 12 J	265 72.2 J	2430 499	6690 1150	654 J 350 J
2,6/2,7-Dimethylnaphthalene	256	1280	9360	21100	350 J 3560
1,5-Dimethylnaphthalene	21.2 J	199	1280	21100	3560 877 J
Acenaphthylene	546	1490	6450	10400	14500
Acenaphthene	387	7660	58800	116000	44200
Biphenyl	184	762	2610	4470	10200
Dibenzofuran	204	633	3480	8020	4370
Cadalene	10.5 J	ND	ND	ND	ND
Fluorene	442	3330	24300	47000	32300
C1-Fluorenes	294	1100	8100	18800	11200
C2-Fluorenes	267	1210	5440	10800	7630
C3-Fluorenes	244 ME	1200 ME	3100 ME	8700	4840 ME
2-Methylfluorene	45.8	213	1860	2950	2090
1-Methylfluorene Anthracene	60,4	312	2150	4220	2840
Anthracene Phenanthrene	911 2140	4490	31700	68900	151000
C1-Phenanthrenes/Anthracenes		16100	122000 D	249000	568000
C2-Phenanthrenes/Anthracenes	1070 1070	5550 4030	37100 16500	71600	84200
C3-Phenanthrenes/Anthracenes	555	2500	16500 6950	35500 15600	35600
C4-Phenanthrenes/Anthracenes	399	941	2120	5100	14400 5810
3-Methylphenanthrene	220	1300	9460	16400	18500
2/4-Methylphenanthrene	220	1440	9650	19600	23600
2-Melhylanthracene	158	619	4280	8490	9040
9-Melhylphenanthrene	252	1260	6650	15800	19100
1-Melhylphenanthrene	139	827	5160	10800	13000
2,7-Dimethylphenanthrene	104	413	976	3770	5260
1,7-Dimethylphenan(hrene	78.3	404	1420	3050	3180
Dibenzothiophene	308	2070	15600	29300	75500
C1-Dibenzolhiophenes	244	1120 ME	7170	13400	18600
C2-Dibenzothiophenes	304	1160	4820	9240	9160
C3-Dibenzothiophenes	296	1120	2810	5600	4870
C4-Dibenzothiophenes	217	578	1020	2240	2040
4-Melhyldibenzothiophene	60.6	392	2360	4390	5650
2/3-Methyldibenzothiophene	68.5	431	2640	4840	6360
1-Melhyldibenzothiophene Dehydroabietin(e)	23.6 J	117	771	1540	1800
Retene	ND 65.1	ND 955	ND	ND	ND
Fluoranthene	65,1 5610	955 18400	1940	5000	11900
Pyrene	6560	22600	92900 134000 D	223000 280000	828000 978000
Benzo(b)fluorene	281	22600	134000 D 3860	280000 6220	
C1-Fluoranthenes/Pyrenes	2580	6890	33200	68300	13700 125000
C2-Fluoranthenes/Pyrenes	1260	2430	8580	18500	20600
C3-Fluoranthenes/Pyrenes	669	790	2170	4240	5210
Benzo(a)anthracene	3010	7350	32000	72400	236000
Chrysene	3570	8860	37500	83500	294000
C1-Chrysenes	1350	2620	10200	21000	32300
C2-Chrysenes	913	1400	3720	7180	7960 ME
C3-Chrysenes	742	748	1470	2410	2880
C4-Chrysenes	520	ND	ND	ND	ND
Benzo(b)fluoranthene	4380	6380	25800	58300	196000
Benzo(j/k)/luoranthene Benzo(a)fluoranthene	4260	6640	30100	87200	236000
Benzo(e)byrene	1070 4860	1960	9660	21300	66900
Benzo(a)pyrene Benzo(a)pyrene	4850 6410	6840 9490	29100	64400	230000
Perviene	6410 2140	9490 2640	42500 11800	101000	371000
Indeno(1,2,3-c,d)pyrene	5470	2840		26200	93200
Dibenz(a,h)anthracene	782	979	31800 4280	73200 9840	280000
Benzo(g,h,i)perviene	5640	8720	37000	9840 64700	27800 310000
Surrogale Recoveries (%)					
Naphthalene-d8	80	78	74	114	114
Phenanthrene-d10	76	85	78	86	79
Chrysene-d12	91	84	77	94	67
5b(H)-Cholane	92	78	83	85	77
J=Result < Sample RL.					

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference, Estimated Value.

Battelle
 Lake Union Sediment
 Investigation
 Project Number N005443

Client Sample ID	NLU-110-1214	NLU-110 2022	NLU-112-SS-0010	NLU-112-SS-2030	NLU-113-SS-0010
Battelle Sample ID	U0357-D	U0361-D2	U0171	U0101	U0146
Battelle Batch ID	03-0137	03-0159	02-667	02-668	02-667
Associated Blank	BB278PB	BB426PB	AB484PB	AB489PB	AB484PB
Field Date Receipt Date	11/15/02	11/15/02	11/14/02	11/14/02	11/14/02
Extraction Date	11/21/02 02/11/03	11/21/02 02/21/03	11/15/02 11/22/02	11/15/02	11/15/02
Acquired Date	02/27/03	03/06/03	12/18/02	11/22/02 12/23/02	11/22/02 12/17/02
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	30.97 %	24.27 %	11.3 %	16.29 %	12.8 %
Malrix Sample Size	Solid	Solid	Sediment	Sediment	Sediment
Weight Basis	0.83 g DRY	0.47 g DRY	3.5 g DRY	1.93 g DRY	4.34 g
Min Reporting Limit	200	537	25.5	40.50	DRY 24
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	55000	30100	3820	22600	3750
C1-Naphthalenes C2-Naphthalenes	17300	14200	874	4000	1360
C2-Naphinalenes C3-Naphihalenes	19800	11800	955	21600	1270
C4-Naphthalenes	20500 10400	4660 1960	636	24400	1010
2-Methylnaphthalene	7510	5260	569 456	10300 2310	920 798
1-Methylnaphthalene	9790	8890	211	1660	798 544
2-Ethylnaphthalene	1160	584	59,3	426	59.6
1-Ethylnaphthalene	421	312 J	28.4	376	34.2
2,8/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene	5460 890	2700	380	7090	447
Acenaphthylene	17800	671 5350	57.7 1440	1000	73.4
Acenaphthene	55400	32700	1440	7330 52400	1160
Biphenyl	10400	2980	716	3900	1450 579
Dibenzofuran	5160	1660	246	3330	307
Cadalene Filuorene	ND	ND	12.5 J	90	19,5 J
Huorene C1-Fluorenes	39700	13200	1490	28000	1090
C2-Fluorenes	17000 12600	3700 2630	567 536	10200 7900	915
C3-Fluorenes	6710 ME	1780 ME	457 ME	7900 5490	662 641 ME
2-Methylfluorene	3720	704	103	1890	163
1-Methylfluorene	4160	888	117	2440	164
Anthracene Phenanthrene	188000	28200	2490	54400 D	1910
C1-Phenanthrenes/Anthracenes	715000 D 123000	95500	6150	271000 D	4980
C2-Phenanthrenes/Anthracenes	47700	29400 17100	2170 1820	55500 25400	2140
C3-Phenanthrenes/Anthracenes	17700	6490	837	8810	1990 1020
C4-Phenanthrenes/Anthracenes	5810	2250	371	3160	403
3-Methylphenanthrene	29700	5680	462	14200	405
2/4-Methylphenanthrene 2-Methylanthracene	33000	7410	412	14700	388
9-Methylphenanthrene	15100 28200	3690 7280	369	6590	345
1-Methylphenanthrene	17700	4980	608 308	12000 7200	578
2,7-Dimethylphenanthrene	2470	1960	150	1940	259 158
1,7-Dimethylphenanthrene	4010	1710	133	2000	131
Dibenzothiophene	02100	11600	1210	38100	900
C1-Dibenzothiophenes	23100	5160	526	10600	548
C2-Dibenzothiophenes C3-Dibenzothiophenes	13100 6080	4320	566	7490	620
C4-Dibenzothiophenes	2010	2360 1000	430 250	3980 1210	508
4-Methyldibenzothlophene	8000	1690	168	3590	243 200
2/3-Methyldibenzothiophene	8760	1910	205	3990	180
1-Methyldibenzothiophene	2320	551	53.4	1040	54.6
Dehydroabietin(e) Retene	ND 5570	ND	ND	ND	ND
Fluoranthene	5570 1060000 D	3930 232000	96.6	1020	81.1
Pyrene	1240000 D	285000	24400 30100	294000 D 358000 D	15700 20100
Benzo(b)fluorene	21400	7260	819	7930	20100
C1-Fluoranthenes/Pyrenes	181000	63400	6750	62000	5540
C2-Fluoranthenes/Pyrenes C3-Fluoranthenes/Pyrenes	29800	13800	1810	11600	2010
Benzo(a)anthracene	6540 316000 D	2890	784	3580	718
Chrysene	318000 D 386000 D	84700 109000	10500 11100	62400 D	7010
C1-Chrysenes	45700	20600	2650	79400 D 17600	7980 1960
C2-Chrysenes	10600 ME	5080 ME	1210	6490	993
C3-Chrysenes	3800	1580	724	2190	560
C4-Chrysenes Benzo(b)fluoranthene	ND 268000 D	ND	676	ND	497
Benzo(j/k)fluoranthene	268000 D	79700 84200	13700	50800 D	10500
Benzo(a)fluoranthene	98700	25700	. 11800 3290	60300 D 19700	6310
Benzo(e)pyrene	298000 D	87900	13200	62400 D	2560 10600
Benzo(a)pyrene	490000 D	143000	20100	106000 D	15500
Perviene	124000	40100	6110	34000	4900
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)an(hracene	359000 D	103000	13800	79100 D	13200
Benzo(g,h,i)perviene	44600 410000 D	9100 136000	1750 14200	3690 94700 D	1470 13600
Surrogate Recoveries (%) Naphthalene-d8					
Naphinalene-dB Phenanthrene-d10	69 84	87	80	86	79
Chrysene-d12	84 87	74 81	81 95	90	81
5b(H)-Cholane	87	74	95	101 91	81 95
J≖Result < Sample RL.					

J=Resull < Sample RL, ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO, ME≖ Matrix Interference. Estimated Value.

Battelle
 Lake Union Sediment
 Project Name Investigation
 Project Number N005443

					
Client Sample ID	NLU-113-SS-1020	NLU-115-SS-0010	NLU-116-SS-0010	NLU-118-SS-1020	NLU-116-SS-2030
Battelle Sample ID	U0108-D	U0149	U0150	U0122-D	U0123-D
Battelle Batch ID Associated Blank	03-0100 BB142PB	02-668	02-667	03-0100	03-0023
Field Date	11/14/02	AB489PB 11/12/02	AB484PB 11/11/02	BB142PB	AB851PB
Receipt Date	11/15/02	11/15/02	11/15/02	11/11/02 11/15/02	11/11/02 11/15/02
Extraction Date	01/31/03	11/22/02	11/22/02	01/31/03	01/09/03
Acquired Date	03/01/03	12/19/02	12/17/02	02/18/03	02/25/03
Analylical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	18.34 %	15.88 %	19.4 %	18.36 %	18.31 %
Matrix Sample Size	Solid	Sediment	Sediment	Solid	Sediment
Weight Basis	5.87 g	1.67 g	6.37 g	5.55 g	5.76 g
Min Reporting Limit	DRY 30.7	DRY 41.60	DRY 24.5	DRY	DRY
Amount Units	µg/kg	41.60 µg/kg	24.6 µg/kg	45,5 μg/kg	43.8
				PB/vg	µg/kg
Naphthalene C1-Naphthalenes	7090 33400	30000	3500	37400	12200
C2-Naphthalenes	33400	34900 95900	1280 1760	22100	3040
C3-Naphthalenes	13200	68700	2370	12800 13300	5540
C4-Naphthalenes	4160	25000	3160 ME	8650	7150 5010
2-Methylnaphthalene	10000	13700	777	4420	1510
1-Methylnaphthalene	23400	21100	494	17700	1510
2-Ethylnaphthalene	1060	3850	89.8	538	189
1-Elhyinaphthalene	563	1310	58.1	449	283
2,6/2,7-Dimethylnaphthalene	6780	28800	570	3110	1420
1,5-Dimethylnaphthalene Acenaphthylene	1610	4550	100	691	419
Acenaphihene	2330	5770	1620	4460	3860
Biphenvi	14200 1050	35000 1390	1500	12800	6530
Dibenzofuran	1050	1390	485 419	2950	1950
Cadalene	ND	8100 ND	419 46.7	2740 ND	1570 ND
Fluorene	10100	35600	1590	11700 NU	5500 ND
C1-Fluorenes	3960	25600	1970	6580	4350
C2-Fluorenes	2370	17500	2280	5190	3570
C3-Fluorenes	1430	8250	1650	3260	2720
2-Methylfluorene 1-Methylfluorene	910	7100	483	1740	1170
Anthracene	1030 10600	6310 31400	503	1650	1170
Phenanthrene	20600	31400 84800 D	2410 3700	13600	13200
C1-Phenanthrenes/Anthracenes	10300	61400	3660	33200 19300	20900 14600
C2-Phenanthrenes/Anthracenes	6460	44400	5560	15200	11600
C3-Phenanthrenes/Anthracenes	2640	15500	3180	5420	6150
C4-Phenanthrenes/Anthracenes	992	4130	1090	1660	2330
3-Methylphenanthrene	2860	21200	534	5860	4240
2/4-Methylphenanthrene	1850	20200	391	2390	1590
2-Methylanthracene 9-Methylphenanthrene	1560 2450	10300	772	3050	2530
1-Methylphenanthrene	2450 1620	16800 10700	1180	5070	3940
2,7-Dimethylphenanthrene	411	2700	808 461	3150	2310
1,7-Dimethylphenanthrene	468	3140	338	1090 1030	554
Dibenzothiophene	5030	12900	1150	9500	926 5800
C1-Dibenzothiophenes	2500	14500	1520	5500	4110
C2-Dibenzothiophenes	1870	11000	1980	4420	3870
C3-Dibenzothiophenes	1170	5820	1390	2180	2610
C4-Dibenzothiophenes 4-Methyldibenzothiophene	526	1760	625	629	1190
2/3-Methyldibenzothiophene	923	5030	629	2070	1800
1-Methyldibenzothiophene	657 251	4810	428	1670	1270
Dehydroabielin(e)	251 ND	1430 ND	187 ND	527 ND	424
Retene	806	397	NU 127	ND 1590	ND 2850
Fluoranthene	54400 D	61900 D	21000	176000 D	181000 D
Pyrene	69700 D	78100 D	27600	222000 D	226000 D
Benzo(b)fluorene	1550	5020	1100	3780	4850
C1-Fluoranthenes/Pyrenes	13400	45800	10100	32100	36500
C2-Fluoranthenes/Pyrenes C3-Fluoranthenes/Pyrenes	3390	17800	3870	8050	9000
Benzo(a)anthracene	860 15500	6150	1490	1840	2300
Chrysene	15500 19400	25900	8880	64100 D	59200 D
C1-Chrysenes	4040	29700 17800	10900	72900 D 9750	75200 D
C2-Chrysenes	1680	9200	4020	9750 3440	11700 4030
C3-Chrysenes	798	3980	1180	3440 1280	4030
C4-Chrysenes	ND	1470	530	ND	ND
Benzo(b)fluoranthene	17100	18600	9680	43400	54200 D
Benzo(i/k)fluoranthene	18200	17800	6340	46900	39900
Benzo(a)fluoranthene Benzo(e)pyrene	5720	5380	2480	16100	15300
Benzo(a)pyrene Benzo(a)pyrene	18900 28500	17200	8460	45200	57800 D
Perviene	28500 8640	27900 7050	14500	90200 D	91500 D
Indeno(1,2,3-c,d)pyrene	23600	16400	4170 10800	20500 73500 D	19500
Dibenz(a,h)anthracene	2850	3030	1590	73500 D 6780	71500 D 6990
Benzo(g,h,i)perviene	27000	14800	11100	74600 D	6990 64500 D
Surrogate Recoveries (%)					
Surrogate Recoveries (%) Naphthalene-d8	95	~			
Phenanthrene-d10	86	70 81	86	90	101
Chrysene-d12	92	81 93	84 87	70 75	90
5b(H)-Cholane	96	104	107	75 96	101 103
I-David a Oracita Di					103
J≂Result < Sample RL.					

J≂Result < Sample RL, ND≍ Not Detected, D= Values reported using secondary ditution factor, &= Outside of OQO, ME= Matrix Interference, Estimated Value,

Adding Inducting To Work Lake Union Sediment Project Name Project Number N005443

	NLU-117-0010				
Dient Sample ID	Composite (U0383, U0384, U0385, U0386, U0387)	NLU-117 0810	NLU-117 2830	NLU-117 4850	NLU-117-US-9.6
Battelle Sample ID	U6525-D2	U0387-D2			
Battelle Batch ID	03-0137	03-0159	U0397-D2 03-0159	U0407-D2	U4507-D3
Associated Blank	BB278PB	BB426PB	BB426PB	03-0159 BB426PB	03-0100 BB142PB
Field Date	11/15/02	11/15/02	11/15/02	11/15/02	11/18/02
Receipt Date	11/21/02	11/21/02	11/21/02	11/21/02	01/29/03
Extraction Date	02/11/03	02/21/03	02/21/03	02/21/03	01/31/03
Acquired Date	02/27/03	03/05/03	03/05/03	03/05/03	03/03/03
Analytical Method	8270M	8270M	6270M	6270M	8270M
Percent Solids	32.43 %	27.62 %	22.52 %	26.72 %	67.86 %
Matrix	Solid	Solid	Solid	Solid	Solid
Sample Size	0.88 g	0.33 g	0.3 g	0.39 g	10.10 g
Veight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit Amount Units	1860 /kg	1913 µg/kg	1200 µg/kg	647 µg/kg	6250 µg/kg
laphihalene	53000	100000	51200	37600	3210000
C1-Naphthalenes	140000	175000	67300	16500	1800000
C2-Naphihalenes	241000	289000	116000	15700	835000
C3-Naphthalenes	119000	155000	65400	12100	224000
24-Naphihalenes	39100	51800	23500	8260	36700
2-Methylnaphthalene	52400	66700	20000	8730	1140000
I-Methylnaphthalene	87000	108000	47100	7660	657000
2-Ethylnaphthalene	12300	15800	5900	687	31000
I-Ethylnaphthalene	2450	2910	1800	253 J	5900 J
2,6/2,7-Dimethylnaphthalene	75200	91500	32200	4500	247000
5-DimethyInaphthalene	7650	9000	4860	778	29300
cenaphlhytene	11900	17900	10000	3600	208000
cenaphthene	102000	140000	71800	19200	766000
Biphenyl	7140	13800	6380	4070	203000
Dibenzofuran	14100	19200	12500	15600	203000
Cadalene	ND	ND	12500 ND	19600 ND	187000 ND
luorene	81000	108000	56800	22400 NU	526000 ND
C1-Fluorenes	33700	42000	24700		
C2-Fluorenes	21700	28500	16900	7260 5620	148000
C3-Fluorenes	11000	13800	9450		50100
-Methylfluorene	6160	7980	5200	4020	10600
-Methylfluorene	9380	11700	6520	1220 2050	22800
Anthracene	200000	263000	102000		35600
henanthrene	716000	961000	366000	21600 95800	350000
C1-Phenanthrenes/Anthracenes	163000	210000	125000	35500	1650000
22-Phenanthrenes/Anthracenes	7340	92400	56900		558000
C3-Phenanthrenes/Anthracenes	23800	32900	19000 ME	21800	172000
24-Phenanthrenes/Anthracenes	7210	9540	86700 ME	11200	32400
-Methylphenanthrene	37500	48400		5580	6460
2/4-Methylphenanthrene	48000	58900	26000 34000	8040	132000
2-Methylanthracene	19500			9920	156000
-Methylphenanthrene	35700	24500 45600	14000	4660	51500
-Methytphenanthrene	24200	31100	27600	6860	116000
2,7-Dimelhylphenanthrene	7470		20400	5550	89200
,7-Dimelhylphenanthrene	5080	8320 6880	4560 5440	2260	18500
Dibenzolhiophene	89000			2620	19100
21-Dibenzothiophenes		130000	37600	12000	69100
22-Dibenzothiophenes	28600	37300	21500	6600	40800
C3-Dibenzothiophenes	17500	23200	15600	5100	20400
24-Dibenzothiophenes	8300	11700	6030	3230	6600
	2550	4180	3160	1850	ND
-Melhytdibenzothiophene	10200	13300	7470	2170	14500
2/3-Methyldibenzothiophene	10500	13600	7570	2700	13900
-Melhyldibenzolhiophene	2920	3730	2480	682	5070 J
Dehydroabielin(e)	ND	ND	34000	ND	ND
Relene	10300	12400	357000	10900	6760
luoranthene	884000	1160000	406000	70200	727000
Pyrene	1060000	1370000	513000	61900	762000
Benzo(b)fluorene	19500	26300	12300	4740	41000
21-Fluoranthenes/Pyrenes	161000	228000	113000	28200	324000
22-Fluoranthenes/Pyrenes	28400	40300	26200	9460	67500
3-Fluoranthenes/Pyrenes	5940	9050	6370	3260	11900
Benzo(a)anthracene	258000	364000	108000	18700	238000
Chrysene	311000	445000	138000	20600	243000
C1-Chrysenes	38700	59800	31400	7020	81800
22-Chrysenes	9800	14800 ME	10100	3220	19500
C3-Chrysenes	3320	5620	3230	1750	ND
24-Chrysenes	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	210000	313000	76400	9850	102000
Benzo(j/k)fluoranthene	246000	341000	91000	12100	154000
Benzo(a)fluoranthene	73700	112000	26900	3800	33600
enzo(e)pyrene	236000	343000	86600	9590	100000
Benzo(a)pyrene	386000	555000	141000	14500	193000
Pervlene	96100	143000	37400	4070	34400
	284000	419000	92900	9040	75700
ndeno(1,2,3-c,d)pyrene		48400	9650	1420 10800	12700 82700
	33800 328000				
ndeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	33800 328000	487000	121000	10000	62700
ndeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	328000	487000			
ndemo(1,2,3-c,d)pyrene)ibenz(a,h,i)anthracene eenzo(a,h,i)pervlene Surrogate Recoveries (%) laphthalene-d8	328000	487000	99	92	1895 &
ndeno(1,2,3-c,d)pyrene biberz(a,h)anthracene Benzo(g,h,l)perviene	328000	487000			

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside O DQO. ME= Matrix Interference, Estimated Value.

The Battelle ... Rative Technology To West Lake Union Sediment Project Name Investigation Project Number N005443

	NLU-119-0010				
Client Sample ID	Composile (U0452, U0453, U0454, U0455, U0456)	NLU-119-0608	NLU-119-1618	NLU-119-2426	NLU-119R2-US-0.5
Battelle Sample ID					
Battelle Batch ID	U6524-D2 03-0137	U0455-D2 03-0137	U0460-D2 03-0137	U0464-D2 03-0137	U4512-D2 03-0159
Associated Blank	BB278PB	88278PB	BB278PB	BB278PB	BB426PB
Field Date Receipt Date	11/18/02 11/21/02	11/18/02	11/18/02	11/18/02	11/21/02
Extraction Date	02/11/03	11/21/02 02/11/03	11/21/02 02/11/03	11/21/02 02/11/03	01/28/03 02/21/03
Acquired Date	02/27/03	02/27/03	02/27/03	02/27/03	03/05/03
Analylical Method Percent Solids	8270M 21.3 %	8270M 17.92 %	8270M 21.01 %	8270M	8270M
Matrix	Solid	Solid	Solid	22.77 % Solid	45.79 % Solid
Sample Size Weight Basis	0.45 g	0.37 g	0.26 g	0.5 g	1.01 g
Min Reporting Limit	DRY 2810	DRY 3410	DRY 4860	DRY 2530	DRY 634
Amount Units	µg/kg	µg/kg	hð\kð	µg/kg	µg/kg
Naphthalene C1-Naphthalene s	2290000 3340000	2210000	2020000	789000	2860000 D
C2-Naphthalenes	3340000	3100000 3320000	2650000 2700000	841000 873000	1400000 993000
C3-Naphthalenes	1720000	1620000	1300000	410000	402000
C4-Naphthalenes 2-Melhylnaphthalene	454000 1860000	420000	350000	104000	91000
1-Melhylnaphthalene	1480000	1710000 1380000	1470000 1180000	427000 413000	863000 518000
2-Ethylnaphthalene	174000	158000	124000	34500	52100
1-Elhyinaphthalene 2,6/2,7-Dimethyinaphthalene	35400 1060000	33100 989000	26700	9410	8550
1,5-Dimethylnaphthalene	119000	110000	803000 88800	260000 29400	300000 33500
Acenaphthylene	82700	81200	62400	27200	20900
Acenaphthene Biphenyl	1060000 103000	980000 88400	808000	284000	335000
Dibenzofuran	293000	267000	99200 218000	23100 76500	117000 102000
Cadalene Fluorene	ND	ND	ND	ND	ND
C1-Fluorenes	952000 538000	867000 487000	713000 401000	247000 122000	303000 158000
C2-Fluorenes	321000	305000	248000	68500	63500
C3-Fluorenes 2-Methylfluorene	140000 112000	119000	100000	28500	31700
1-Methylfluorene	148000	97100 134000	75900	22200 32200	28400 40100
Anthracene	000868	880000	705000	274000	239000
Phenanthrene C1-Phenanthrenes/Anthracenes	2710000 1840000	2580000 1720000	2250000 1420000	930000	708000
C2-Phenanthrenes/Anthracenes	878000	809000	674000	427000 183000	536000 234000
C3-Phenanthrenes/Anthracenes C4-Phenanthrenes/Anthracenes	286000	251000	215000	59000	71500
3-Methylphenanthrene	51000 479000	47900 436000	42100 350000	13300 104000	15200 137000
2/4-Methylphenanthrene	512000	480000	410000	122000	156000
2-Melhylanthracene 9-Melhylphenanthrene	212000 373000	201000	162000	48600	62200
1-Methylphenanthrene	253000	340000 240000	280000 206000	85900 64800	102000 74600
2,7-Dimethylphenanthrene	53100	49700	48700	14400	14800
1,7-Dimethylphenanthrene Dibenzothiophene	66000 314000	59800 299000	49400 248000	14700	19100
C1-Dibenzolhiophenes	308000	284000	228000	94100 65300	88500 96200
C2-Dibenzothiophenes	214000	198000	158000	40300	60400
C3-Dibenzothiophenes C4-Dibenzothiophenes	97400 26100	83600 21100	68900 19900	18600	24200
4-Methyldibenzothiophene	102000	95100	77200	6010 22700	6370 31300
2/3-Methyldibenzothiophene 1-Methyldibenzothiophene	109000	101000	81800	23900	33900
Dehydroabielin(e)	33200 ND	30700 ND	24700 ND	7260 ND	10200 ND
Relene	20000	21800	13800	12300	16900
Fluoranthene Pyrene	1360000 1710000	1350000 1700000	1210000 1520000	638000	181000
Benzo(b)(luarene	76500	72800	58100	784000 22800	231000 17900
C1-Fluoranthenes/Pyrenes C2-Fluoranthenes/Pyrenes	790000	768000	610000	229000	181000
C3-Fluoranthenes/Pyrenes	251000 56800	234000 52600	190000 43300	61400 15000	63600 14800
Benzo(a)an(hracene	476000	468000	399000	210000	61700
Chrysene C1-Chrysenes	572000 229000	559000	478000	244000	73100
C2-Chrysenes	87700	220000 80900	184000 65100	67000 24000	53700 22500
C3-Chrysenes	27600	25000	17600	6760	7920
C4-Chrysenes Benzo(b)fluoranthene	ND 289000	ND 273000	ND	ND	ND
Benzo(j/k)fluoranthene	359000	348000	233000 292000	141000 174000	18900 27900
Benzo(a)fluoranthene	119000	113000	91300	53600	11100
Benzo(e)pyrene Benzo(a)pyrene	315000 540000	302000 521000	250000 438000	158000	19200
Perylene	130000	124000	103000	268000 63900	36600 7710
Indeno(1,2,3-c,d)pyrene Dibenz(a,h)anthracene	350000	332000	271000	178000	14600
Benzo(g,h,i)perylene	51200 376000	48400 361000	40200 298000	23900 199000	4330 14600
	*				
Surrogate Recoveries (%) Naphthalene-d6	176 &	155 &			
Phenanihrene-d10	107	90	155 & 69	153 & 84	127 & 84
Chrysene-d12 5b(H)-Cholane	117	93	104	94	90
50(H)-Cholane	69	89	87	84	87

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Autor Investigation Project Name Investigation Project Number N005443

Client Sample ID	NLU-121-SS-0010	NLU-121-SS-2030	NLU-122-SS-0010		
Battelle Sample ID	U0151			NLU-122-SS-2030	NLU-123-SS-0010
Baitelle Batch ID	00151 02-667	U0152	U0153	U0154	U0155
Associated Blank	AB484PB	02-668 AB489PB	02-668 AB489PB	02-668 AB489PB	02-667
Field Date	11/13/02	11/13/02	11/13/02	11/13/02	AB484PB 11/13/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	11/22/02	11/22/02
Acquired Date Analytical Method	12/17/02	12/19/02	12/19/02	12/19/02	12/17/02
Percent Solids	8270M	6270M	8270M	6270M	8270M
Matrix	11.9 % Sediment	19.2 % Sediment	43.46 %	29.53 %	14.8 %
Sample Size	3.86 g	1.02 g	Sediment 4.62 a	Sediment 1.68 g	Sediment 4.56 g
Weight Basis	DRY	DRY	DRY	DRY	4.56 g DBY
Min Reporting Limit	34.2	87.50	27.10	376.00	34.3
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	4920	25900	17200	2440000 D	6640
C1-Naphthalenes C2-Naphthalenes	2240	41400	85700	2330000	4480
C2-Naphinalenes C3-Naphihalenes	2730	144000	51500	1570000	11400
C4-Naphthalenes	2840 4330	140000 51300	19200	584000	15000
2-Methylnaphthalene	1290	8600	742 52400 D	170000 1730000 D	9100 2010
1-Methylnaphthalene	956	32800	40600 D	982000 D	2010
2-Ethyinaphthalene	175	3680	3110	96900	271
1-Ethylnaphthalene 2.6/2.7-Dimethylnaphthalene	119	1920	601	16400	459
2,0/2,7-Dimethylnaphthalene	745 210	40100	15500	394000 D	2430
Acenaphthylene	210 4280	6400 9660	1900 6040	47100 107000	1060 2570
Acenaphthene	2840	46400	43800 D	808000 D	11900
Biphenyl	539	3740	861	68200	726
Dibenzofuran Cadalene	545	10900	22200	394000	1230
Fluorene	52.1 3350	417	186	956	47.2
C1-Fluorenes	3350	39000	41900 8460	838000 D 241000	12800 9760
C2-Fluorenes	4140	33500	5110	127000	8820
C3-Fluorenes	2610 ME	17400	4000	66300	3190 ME
2-Methylfluorene 1-Methylfluorene	778	12100	1760	52500	2480
Anthracene	816 3370	10200 92900	1740 23700	51600	2250
Phenanthrene	4560	259000 D	81700 D	529000 D 2150000 D	9550 14000
C1-Phenanthrenes/Anthracenes	6780	106000	29300	838000	22200
C2-Phenanthrenes/Anthracenes C3-Phenanthrenes/Anthracenes	12600	81400	18200	339000	16600
C3-Phenanthrenes/Anthracenes	7270 1930	29500 6940	6550	99600	6520
3-Methylphenanthrene	803	47000	1920 7740	20300 227000	2700 5600
2/4-Methylphenanthrene	625	45200	7530	227000	3740
2-Methylanthracene 9-Methylopenanthrene	2020	20900	4020	100000	3360
1-Methylphenanthrene	1940 884	38300 21700	5960 3790	153000	5250
2,7-Dimethylphenanthrene	808	5930	3790	108000 20800	3040 1090
1,7-Dimethylphenanthrene	861	6190	1360	27600	1080
Dibenzothiophene	1390	33000	7210	180000	6290
C1-Dibenzothiophenes C2-Dibenzothiophenes	1990 3910	30500	4790	137000	5560
C3-Dibenzothiophenes	2770	23600 11400	4260 2780	80600 43700	4590
C4-Dibenzothiophenes	957	3310	1180	12400	2410 836
4-Methyldibenzolhiophene	809	10500	1570	45100	2090
2/3-Methyldibenzothiophene 1-Methyldibenzothiophene	553	10900	1720	48900	1730
Dehydroabielin(e)	240 ND	2950 ND	483	13900	566
Retene	244	800	ND 560	ND 2810	ND 1280
Fluoranthene	24200	259000 D	52900 D	921000 D	55400 D
Pyrene Benzo(b)/luorene	30700	321000 D	50900 D	861000 D	65500 D
C1-Fluoranthenes/Pyrenes	2610 23500	12700 106000	4450 28200	87300	2540
C2-Fluoranthenes/Pyrenes	9970	27700	28200	528000 132000	21500 7030
C3-Fluoranthenes/Pyrenes	3130	8690	3670	37800	2350
Benzo(a)anthracene	15200	90400	21200	348000	17400
Chrysene C1-Chrysenes	16600 10100	107000	23800	348000	20400
C2-Chrysenes	5360	31500 11700	11300 5700	171000 66800	7070 3300
C3-Chrysenes	2420	5360	2650	28000	3300 1840
C4-Chrysenes	1010	2020	1150	6660	770
Benzo(b)fluoranthene Benzo(j/k)fluoranthene	13600 12100	73800	16200	179000	15800
Benzo(a)fluoranthene	4200	74200 20300	17100 4430	228000 59800	14100
Benzo(e)pyrene	12900	73900	13600	145000	4210 15100
Benzo(a)pyrene	20800	102000 D	22300	264000	24000
Perviene Indeno(1,2,3-c,d)pyrene	5340	32200	5570	63100	8700
Dibenz(a,h)anthracene	13100 2520	79100 10200	14000 2840	143000	16400
Benzo(g,h,i)perviene	12900	74000	11700	36300 103000	2570 16800
					10000
Surrogate Recoveries (%)					
Naphihalene-d8	82	100	91	113	77
Phenanthrene-d10 Chrysene-d12	83	97	85	91	77
5b(H)-Cholane	87 100	114 103	98	99	83
	100	103	105	97	108
J=Result < Sample Ri					

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME≃ Matrix Interference. Estimated Value.

Battelle

Lake Union Sediment Lake Union Sediment Project Name Investigation Project Number N005443

0 " 10 1 10					
Client Sample ID	NLU-124-SS-0010	NLU-124-SS-2030	NLU-126-\$S-0010	NLU-126-SS-0010 Roofing Material	NLU-126-SS-1020
Battelle Sample ID	U0156	U0157	U0156	U4517-D	U0097-D2
Battelle Batch ID Associated Blank	02-667 AB484PB	02-668	02-868	03-0100	03-0100
Field Date	11/13/02	AB489PB	AB489PB	BB142PB	BB142PB
Receipt Date	11/15/02	11/13/02 11/15/02	11/13/02 11/15/02	11/13/02 01/29/03	11/13/02
Extraction Date	11/22/02	11/22/02	11/22/02	01/20/03	01/31/03
Acquired Date	12/17/02	12/23/02	12/19/02	03/02/03	02/18/03
Analytical Method	6270M	6270M	8270M	6270M	8270M
Percent Solids	11.3 %	24.16 %	18.66 %	24.92 %	30.91 %
Matrix	Sediment	Sediment	Sediment	Solid	Solid
Sample Size Weight Basis	3.58 g	2.62 g	2.00 g	7.57 g	9.48 g
Min Reporting Limit	DRY	DRY	DRY	DRY	DRY
Amount Units	43.6 µg/kg	39.70 µg/kg	31.30 µg/kg	41.7 µg/kg	266
			pg/vg	pg/kg	µg/kg
Naphthalene C1-Naphthalenes	1890 1040	7010	1990	428	4740
C2-Naphthalenes	1550	2790 3840	1180 2390	3180 8280	3470
C3-Naphihalenes	1550	5130	2390	5740	7190 5590
C4-Naphthalenes	1360	5710	3130	1480	3250
2-Methylnaphthalene	611	1650	579	194	1360
1-Methylnaphthalene	417	1090	574	2960	2090
2-Ethylnaphthalene	66.3	150	61	160	206 J
1-Ethylnaphlhalene	29.7 J	111	78.7	147	162 J
2,6/2,7-Dimethylnaphthalene	592	1040	836	2230	2120
1,5-Dimethylnaphthalene	98.5	293	191	492	432
Acenaphthylene Acenaphthene	1190	1740	1410	99.4	1100
Biphenvi	2130 272	5800 599	2540	6720	4980
Dibenzofuran	272 504	599 1050	300 526	52.7	517
Cadalene	48.7	113	526	1680 ND	1480
Fluorene	2980	8340	45.9 2800	ND 8040	ND 5770
C1-Fluorenes	1260	4270	2110	3970	2600
C2-Fluorenes	1200	4430	2460	1480	2460
C3-Fluorenes	1120 ME	3600	2270	723 ME	1720 ME
2-Methylfluorene	394	954	497	775	606
1-Methylfluorene	305	1110	593	772	758
Anthracene Phenanthrene	2840	4740	3190	5960	4870
C1-Phenanthranes/Anthracenes	5040 4330	12800	6260	37200	17000
C2-Phenanthranes/Anthracenes	4330	10800	7020	11700	10400
C3-Phenanthrenes/Anthracenes	1860	10900 6090	8150 4090	3440	8500
C4-Phenanthrenes/Anthracenes	760	3020	1360	1120 ME 45900	3270
3-Methylphenanthrene	821	2570	1470	3260	1190 2480
2/4-Methylphenanthrene	789	1910	1180	3420	2480
2-Methylanthracene	1020	1930	1310	771	1330
9-Methylphenanthrene	986	2790	1920	2220	2510
1-Melhylphenanthrene	596	1480	1050	1920	1660
2,7-Dimethylphenanthrene	306	744	494	236	908
1,7-Dimelhylphenanlhrene Dibenzothiophene	348	863	568	376	617
C1-Dibenzothiophenes	914 867	2110	1190	2590	2060
C2-Dibenzothiophenes	1070	2880 3420	2150	1560	2510
C3-Dibenzothiophenes	799	2750	3000 2340	863	2890
C4-Dibenzothiophenes	373	1320	1060	410 ND	1840 848
4-Methyldibenzothiophene	290	1070	818	484	953
2/3-Melhyldibenzolhiophene	302	1100	709	536	836
1-Methyldibenzothiophene	91.4	324	270	184	334
Dehydroabielin(e)	ND	ND	ND	11900	ND
Retene	183	364	142	24500 D	976
Fluoranthene Pyrene	15200 16100	42400	20600	17100	25600
Pyrene Benzo(b)fluorene	16100 1470	40200 2630	24000	13300	27000
C1-Fluoranthenes/Pyrenes	9290	18400	1600 12600	459	1510
C2-Fluoranthenes/Pyrenes	3710	6430	4990	4430 521 ME	11300 3820
C3-Fluoranthenes/Pyrenes	1560	3070	2230	116	1340
Benzo(a)anthracene	7170	13000	10000	1020	8790
Chrysena	6890	13600	12000	1170	10500
C1-Chrysenes	3640	6080	5310	249	3940
C2-Chrysenes C3-Chrysenes	1990	3390	2770	ND	1790
C3-Chrysenes C4-Chrysenes	1040 626	2160	1490	ND	697
Benzo(b)fluoranthene	6160	923 10300	499 8670	ND 202	ND
Benzo(j/k)Ruoranthene	6890	9710	8870	202 203	7170
Benzo(a)(luoranthene	1630	2300	2060	203 32,2 J	8450 2150
Benzo(e)pyrene	6800	9260	8430	32.2 J 180	2150 7010
Benzo(a)pyrene	9010	13300	12500	227	10400
Perviene	2740	3620	3190	48.8	2650
Indeno(1,2,3-c,d)pyrene	5690	9450	8140	54	7080
Dibenz(a,h)anthracene	1060	1490	1310	ND	1030
Benzo(g,h,i)perviene	5990	9100	7720	61.6	8020
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Surrogate Recoveries (%) Naphthalene-d8	70	90	-		
Phenanlhrene-d10	70	90	72 72	84 63	226 8
Chrysene-d12	72	96	82	66	93 109
бb(H)-Cholane	99	118	97	83	109
J=Result < Sample RL.					

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. 8= Outside of DQO. ME= Matrix Interference. Estimated Value.

Project Number N005443

Client Sample ID	NLU-127-SS-0010	NLU-128-SS-0010			
Battelle Sample ID	U0159	U0160	NLU-129-SS-0010	NLU-129-SS-2030	NLU-130-SS-0010
Batterie Batch ID	02-667	02-667	U0135-D 03-0023	U0137-D 03-0023	U0161
Associated Blank	AB484PB	AB484PB	AB851PB	AB851PB	02-666 AB489PB
Field Date	11/12/02	11/13/02	11/11/02	11/11/02	11/12/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	01/09/03	01/09/03	11/22/02
Acquired Date Analytical Method	12/17/02	12/17/02	02/25/03	02/26/03	12/19/02
Percent Solids	6270M	8270M 81.3 %	8270M	8270M	8270M
Matrix	75 % Sediment	81.3 % Sediment	20.2 %	24.34 %	61.73 %
Sample Size	23.62 g	27.45 g	Sediment 6.45 g	Sediment 7.72 a	Sediment
Weight Basis	DRY	DRY	DRY	DRY	6.46 g DRY
Min Reporting Limit	8.84	5.69	65.2	81.6	36.70
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
A1 10 1.					
Naphthalene C1-Naphthalenes	1140	40	429	414	59600 D
C2-Naphthalenes	455 1140	29.8	213	335	13800
C3-Naphihalenes	1600	33.4 45.2	566 419	572	16800
C4-Naphthalenes	1530	58.5	513	518 578	23400 13000
2-Melhyinaphthelene	271	18	130	213	6170
1-Methylnaphthalene	179	10.6	78.9	116	5660
2-Ethylnaphthalene	55	2.05 J	13.9 J	16.6 J	932
1-Ethylnaphthalene	13.6	0.474 J	4.25 J	5.49 J	605
2,6/2,7-Dimethylnaphthalene 1,5-Dimethylnaphthalene	347 47.2	8.27 1.37 J	262	229	3350
Acenaphlhylene	47.2	1.37 J 51.6	17.3 J 279	16.6 J 232	1360 21600
Acenaphthene	613	46.4	310	232	21600 66800 D
Biphenyl	130	9.47	102	113	8620
Dibenzofuran	422	20	364	297	5600
Cadalene Fluorene	45.1	2.44 J	560	438	75.4
Fluorene C1-Fluorenes	807 548	31.9	510	615	28200
C2-Fluorenes	548 876	20.4 52.7	263 628	310 699	19200
C3-Fluorenes	891 ME	83.1 ME	856 ME	1060 ME	14800
2-Methylfluorene	143	4.11 J	45.2 J	55.8 J	8380 3200
1-Methylfluorene	170	5.67 J	70.3	85.7	4390
Anthracene Phenanthrene	1310	130	1180	1260	58200 D
C1-Phenanthrenes/Anthracenes	4980	311	5790	5830	47800 D
C2-Phenanthrenes/Anthracenes	2870 2530	206 235	2510 3000	2530	58300
C3-Phenanthrenes/Anthracenes	1550	183	2300 ME	2940 2540 ME	52000 25000
C4-Phenanthrenes/Anthracenes	785	118	5060	3570	10700
3-Methylphenanthrene	622	41.1	713	631	12200
2/4-Methylphenanthrene	719	52.3	721	710	6890
2-Methylan(hracene 9-Methylphenan(hrene	309	33.3	211	213	11600
1-Methylphenanthrene	676 439	46.4	532	509	14600
2,7-Dimethylphonanthrene	137	31.6 24.1	358 272	392 308	12700
1,7-Dimethylphenanthrene	278	29.5	268	308	2620 7880
Dibenzolhiophene	494	20.2	308	371	31700
C1-Dibenzothiophenes	709	34	366	447	14600
C2-Dibenzothiophenes	1100	66.4	901	1070	11700
C3-Dibenzothiophenes C4-Dibenzothiophenes	1030 584	90.4	1240	1740	6210
4-Methyldibenzothiophene	289	66.6 11.2	867 141	1240	1960
2/3-Methyldibenzothiophene	249	12.9	136	178 165	5140 5000
1-Methyldibenzothiophene	94.7	3.61 J	40.9 J	61 J	1410
Dehydroabielin(e)	ND	ND	7520	2540	ND
Retene	255	59.5	23800	13900	4240
Fluoranthene Pyrene	6460 6920	910	11700	11800	450000 D
Benzo(b)fluorene	6920 413	644 45.3	10100 717	10200	523000 D
C1-Fluoranthenes/Pyrenes	3330	45.3	4770	819 4820	13700
C2-Fluoranthenes/Pyrenes	1520	177 ME	2130 ME	4820 2470 ME	118000 32400
C3-Fluoranthenes/Pyrenes	759	135	1210	1340	12100
Benzo(a)anthracene	2550	430	4110	4270	126000 D
Chrysene C1-Chrysenes	3180	500	5680	6120	126000 D
C1-Chrysenes C2-Chrysenes	1370 624	251 179	2520 1340	4160	40900
C3-Chrysenes	537	1/9	1340	1900 1670	18000
C4-Chrysenes	234	106	670	1070	7860 3240
Benzo(b)fluoranthene	2750	416	3790	4910	3240 108000 D
Benzo(i/k)fluoranthene	2360	376	3860	4920	114000 D
Benzo(a)fluoranthene Benzo(e)pyrene	540	84.4	657	826	36400
Benzo(a)pyrene Benzo(a)pyrene	2400 3420	322 433	2910	3990	126000 D
Perviene	3420	433 127	3440	4640	203000 D
Indeno(1,2,3-c,d)pyrene	2420	127	911 2620	1300 3800	43100 D 151000 D
Dibenz(a,h)anthracene	386	65.8	592	3800	151000 D 6470
Benzo(g,h,i)perviene	2470	276	2630	3940	167000 D
	·····		·····		
Surrogale Recoveries (%) Naphthalene-d8	. .	-			
Naphlhalene-d8 Phenanlhrene-d10	91 68	86 80	116	133 &	72
Chrysene-d12	84	80 81	93 96	. 95	61
5b(H)-Cholane	108	114	82	106 97	62 93
I=Result < Sample Rt			52	Ør	83

J=Result < Sample RL. ND= Not Detected, D= Values reported using secondary dilution factor, &= Cutside of DQO, ME= Matrix Interference, Estimated Value,

Battelle

Lake Union Sediment Project Name Investigation Project Number N005443

Client Sample ID	NLU-131-SS-0010	NLU-133-SS-0010	NLU-133-SS-1020	NLU-138-SS-0010
Battelle Sample ID	U4518-D2	U0162	U0183	10470
Battelle Batch ID	03-0100	02-668	02-667	U0172 02-667
Associated Blank	BB142PB	AB489PB	AB484PB	AB484PB
Field Date	11/14/02	11/14/02	11/14/02	11/14/02
Receipt Date	01/29/03	11/15/02	11/15/02	11/15/02
Extraction Date	01/31/03	11/22/02	11/22/02	11/22/02
Acquired Dale	03/02/03	12/19/02	12/18/02	12/19/02
Analytical Method	8270M	8270M	8270M	6270M
Percent Solids	36.45 %	86.06 %	68 %	12.6 %
Matrix	Solid	Sediment	Sediment	Sediment
Sample Size	4.06 g	8.90 g	28.69 g	4,18 g
Weight Basis	DRY	DRY	DRY	DRY
Min Reporting Limit	1550	7.02	5.45	24.9
Amount Units	µg/kg	hâykâ	µg/kg	µg/kg
Naphthalene				
	243000	5060	4510	2950
C1-Naphihalenes C2-Naphihalenes	54300	1550	1410	732
C3-Naphthalenes	44500	1490	1370	940
C4-Naphihalenes	14200 3630	1110	1040	603
2-Methylnaphthalene	13600	698 721	670	1040
1-Methylnaphthalene	40500	721 828	715 697	466
2-Ethylnaphthalene	1760	55.9	32.8	260
1-Elhyinaphthalene	1490 .1	27.8	22.7	46.5 21.8 J
2,6/2,7-Dimethylnaphthalene	10900	435	402	403
1,5-Dimethylnaphthalene	2240	67.7	57.6	403
Acenaphthylene	166000	3760	3360	1060
Acenaphthene	780000	6180	5040	751
Biphanyl	87000	1080	943	403
Dibenzofuran	34100	461	414	235
Cadalene	ND	6.22 J	4.5 J	28
Fluorene	327000	2600	2310	750
C1-Fluorenes	31400	912	915	694
C2-Fluorenes	7200	746	771	772
C3-Fluorenes	ND	517 ME	467 ME	642 ME
2-Methylfluorene 1-Methylfluorene	5400	123	129	156
Anthracene	6560	186	165	168
Phenanthrene	791000 6850000 D	5560 17700 D	5640	1970
C1-Phenanthrenes/Anthracenes	288000	17700 D 4910	17300 D 5460	3720
C2-Phenanthrenes/Anthracenes	36400	3280	5460 3410	2000
C3-Phenanthrenes/Anthracenes	7540	1620	1440	2480 1590
C4-Phenanthrenes/Anthracenes	1890	547	479 -	632
3-Methylphenanthrene	76500	1080	1180	394
2/4-Methylphenanthrene	84100	1060	1260	350
2-Methylanthracene	23300	605	706	422
9-Methylphenanthrene	58800	1400	1460	560
1-Methylphenanthrene	42000	689	787	277
2,7-Dimethylphenanthrene	4570	208	215	203
1,7-Dimethylphenanthrene	2630	273	262	162
Dibenzothiophene	476000	3070	2750	667
C1-Dibenzothlophenes	49400	938	1040	689
C2-Dibenzothiophenes	11200	855	886	842
C3-Dibenzolhiophenes C4-Dibenzolhiophenes	3500 ME	602	581	712
4-Methyldibenzothiophene	ND	216	124	326
2/3-Methyldibenzothiophene	15800 19100	315	358	267
1-Methyldibenzothiophene	5180	350	367	227
Dehydroabietin(e)	5160 ND	99.1	106	61.9
Refere	2550	ND 85.3	ND 91.4	ND 91.1
Fluoranthene	5280000 D	49700 D	51400 D	91.1 18400
Pyrene	6540000 D	64400 D	67100 D	24000
Benzo(b)fluorene	56400	931	975	769
C1-Fluoranthenes/Pyrenes	436000	10900	10400	6730
C2-Fluoranthenes/Pyrenes	29800 ME	2310 ME	3610	2400
C3-Fluoranthenes/Pyrenes	4750	1320	1020	952
Benzo(a)anthracene	715000	13700 D	13600	6750
Chrysene C1-Chrysenes	895000	16600 D	17000 D	10500
C1-Chrysenes C2-Chrysenes	77000	4630	4150	2810
C3-Chrysenes	ND	1790	1550	1300
C4-Chrysenes	ND	696 384	578	764
Benzo(b)fluoranthene	ND 696000	384 14500 D	458	531
Benzo(i/k)fluoranthene	731000	14500 D 16700 D	18700 D 15300 D	10000
Benzo(a)fluoranthene	216000	4980	4300 D	8660 2470
Benzo(e)pyrene	746000	17900 D	4300 17700 D	2470
Benzo(a)pyrene	1210000	26600 D	25600 D	10100
Perytene	328000	8520	6600 D	4410
Indeno(1,2,3-c,d)pyrene	902000	24900 D	27200 D	10000
Dibenz(a,h)anlhracene	95000	959	2960	1420
Benzo(g,h,i)perylane	1000000	29000 D	28400 D	10500
Surrogate Recoveries (%)				
Naphthalene-d8	223 &	84	89	83
Phenanthrene-d10	223 a 53	84	89 86	83 82
Chrysene-d12	81	99	89	99
5b(H)-Cholane	79	65	81	116
J≖Result < Sample RL.				

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference, Estimated Value.

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Client Sample ID	MW-5 Product (T190)	DW-5-1202	GWP Tank (T192)	SS-1-1202
Battelle Sample ID	112754 02			
Battelle Batch ID	U3754-D3 03-0100	U4514-D3	U3752-D2	U4515-D2
Associated Blank	BB146PB	03-0100	03-0100	03-0100
Field Date	01/14/03	BB146PB 12/06/02	BB146PB 01/14/03	BB146PB
Receipt Date	01/15/03	01/29/03	01/15/03	12/06/02 01/29/03
Extraction Date	01/31/03	01/31/03	01/31/03	01/31/03
Acquired Date	03/03/03	03/03/03	02/19/03	03/02/03
Analytical Method	8270M	8270M	8270M	8270M
Percent Solids	N	N	N	N
Matrix	Oily Material	Oily Material	Oily Material	Oily Material
Sample Size Weight Basis	506.80 mg OlL	517.80 mg Oli	427.20 mg	447.20 mg
Min Reporting Limit	249	244	OIL 29.6	OIL 28.2
Amount Units	mg/kg	mg/kg	mg/kg	mg/kg
Naphthalene C1-Naphthalenes	63500 39900	117000	176000 D	59200 D
C2-Naphthalenes	21400	53000 26500	22800	34600
C3-Naphthalenes	7510	8880	8860 2630	17600 6390
C4-Naphthalenes	1940	2170	571	1310
2-Methylnaphthalene	24600	34000	14300	21300
1-Methylnaphthalene	15200	19000	8430	13300
2-Elhyinaphthalene 1-Elhyinaphthalene	1170	1280	200	384
2.6/2.7-Dimethylnaphthalene	260 5950	290 7700	67.8	133
1,5-Dimethylnaphthalene	768	907	2490 296	5000 625
Acenaphthylene	2130	6720	15000	625 8850
Acenaphthene	9580	8420	656	645
Biphenyl	4850	5990	3670	2570
Dibenzofuran Cadalene	3760	5390	696	600
Cadalene Fluorene	ND 9110	ND 10800	ND	ND
C1-Fluorenes	9110 2870	10800 2880	5280 2070	5220
C2-Fluorenes	1320	1250	2070	3500 1900
C3-Fluorenes	534	397	372	590
2-Methylfluorene	487	949	332	563
1-Methylfluorene	739	735	434	800
Anthracene Phenanthrene	6870	7770	6160	4640
C1-Phenanthrenes/Anthracenes	26900 10800	29700 10400	23100	15500
C2-Phenanthrenes/Anthracenes	4700	4230	10000 4370	13000
C3-Phenanthrenes/Anthracenes	1240	992	1100	5600 1590
C4-Phenanthrenes/Anthracenes	296	184 J	214	274
3-Melhylphenanthrene	2610	2530	2350	3080
2/4-Methylphenanthrene	3120	3000	2620	3570
2-Melhylanlhracene 9-Melhylphenanlhrene	1080	1110	1260	1540
1-Methylphenanthrene	2140 1810	2000 1720	2110	2640
2,7-Dimethylphenanthrene	613	632	1430 268	1900 316
1,7-Dimethylphenanthrene	392	373	327	386
Dibenzothiophene	2330	1990	3340	1960
C1-Dibenzothiophenes	1720	1330	1960	2220
C2-Dibenzolhiophenes C3-Dibenzolhiophenes	1060	712	1300	1410
C4-Dibenzothiophenes	455 137 J	281 74.6 J	488	546
4-Methyldibenzothiophene	137 J 590	74.6 J 486	116 619	123
2/3-Methyldibenzothiophene	571	456	697	650 748
1-Methyldibenzothiophene	213 J	145 J	234	256
Dehydroabietin(e)	ND	ND	ND	ND
Relene	259	178 J	ND	ND
Fluoranihene Pyrene	8840 10600	9890 10700	12700	3940
Benzo(b)fluorene	421	516	17100 688	7780 536
C1-Fluoranthenes/Pyrenes	4870	4540	8620	7840
C2-Fluoranthenes/Pyrenes	1430	1110	2520	2580
C3-Fluoranthenes/Pyrenes	307	216 J	594	586
Benzo(a)enthracene Chrysene	2060	3040	5520	2760
C1-Chrysenes	3410 1510	3330 1190	6620 2980	3210
C2-Chrysenes	500	327	2980	2840 1050
C3-Chrysenes	ND	ND	330	307
C4-Chrysenes	ND	ND	ND	ND
Benzo(b)fluoranthene	1170	1070	3340	776
Benzo(j/k)fluoranthene Benzo(a)fluoranthene	1600	1780	4060	1450
Benzo(e)pyrene	338 1290	342 1140	1680 3700	664
Benzo(a)pyrene	2270	2320	3700	1220 2290
Perviene	344	337	1530	353
Indeno(1,2,3-c,d)pyrene	705	510	4430	544
Dibenz(a,h)anlhracene	138 J	112 J	650	201
Benzo(g,h,i)pervlene	812	623	4600	714
Surrogate Recoveries (%)				
Surrogate Recoveries (%) Naphthalene-d8	7021 &	7045 &	814 &	
Phenanthrene-d10	235 &	183 &	814 & 106	808 & 128 &
Chrysene-d12	824 &	1054 &	165 &	128 &
5b(H)-Cholane	80	75	75	79
J=Result < Sample RL.				

J=Result < Sample RL, ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference. Estimated Value,

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 Lake Union Sediment
 Project Name Investigation
 Project Number N005443

Client Sample ID	NLU-VV2	NLU-VV3	NLU-VV4	NLU-VV5
Battelle Sample ID	U0165			
Battelle Balch ID		U0166	U0167	U0168
Associated Blank	02-667	02-667	02-687	02-667
Field Date	AB484PB	AB484PB	AB484PB	AB484PB
	11/11/02	11/12/02	11/13/02	11/14/02
Receipt Date	11/15/02	11/15/02	11/15/02	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	11/22/02
Acquired Date	12/18/02	12/18/02	12/18/02	12/18/02
Analylical Method	8270M	8270M	8270M	8270M
Percent Solids	NA	NA	NA	NA
Matrix	Wipe	Wipe		NA MA
Sample Size	10 g	10 g	Wipe 10 g	Wipe
Weight Basis	NA			10 g
Min Reporting Limit	2.5	NA	NA	NA
Amount Units	2.5 µg/kg	2.5 µg/kg	2.5 µg/kg	2.5 µg/kg
Naphthalene	5.18	5.4	5.22	5.57
C1-Naphihalenes	2.98	2.72	3.62	3.17
C2-Naphihalenes	6.96	7.61	6.24	14.1
C3-Naphthalenes	10.1	12 7	9,1	
C4-Naphihalenes	ND	11.2		24.7
2-Methylnaphthalene	1.43 J		ND	14.9
1-Methylnaphthalene		1,58 J	2.18 J	1.76 J
1-Meinyinaphinalene	0.8 J	0.908 J	1.15 J	1 J
2-Ethylnaphthalene	ND	ND	ND	0.632 J
1-Ethylnaphthalene	ND	ND	ND	0.254 J
2,6/2,7-Dimethylnaphthalene	0.706 J	0.974 J	1.01 J	2.41 J
1,5-Dimethylnaphthalene	ND	ND	ND	0.772 J
Acenaphthylene	3.14	1.54 J	1.49 J	0.772 J ND
Acenaphthene	1.44 J	1.65 J	1.49 J 1.21 J	
Biphenvi	2.43 J			ND
	2.43 J	2.6	2.3 J	3.47
Dibenzofuran	2.46 J	2.69	2.35 J	4.32
Cadalene	ND	ND	ND	ND
Fluorene	1.73 J	1.79 J	1.58 J	3.21
C1-Fluorenes	4.22	3.65	6.17	31
C2-Fluorenes	10	ND	ND	ND.
C3-Fluorenes	ND	ND	ND	ND
2-Melhylfluorene	1.35 J	0.78 J	1.11 J	
1-Melhylfiuorene	0.398 J	0.46 J		ND
Anthracene				0.792 J
Phenanthrene	ND	ND	ND	ND
C1-Phenanihrenes/Anihracenes	4.25	3.74	3.44	8,9
	1.95 J	ND	2.23 J	ND
C2-Phenanthrenes/Anthracenes	ND	ND	ND	ND
C3-Phenanthrenes/Anthracenes	ND	ND	ND	ND
C4-Phenanthrenes/Anthracenes	ND	ND	ND	ND
3-Methylphenanthrene	0.38 J	ND	0.32 J	ND
2/4-Methylphenanthrene	0.351 J	ND	0.332 J	ND
2-Methylanthracene	ND	ND	ND	ND
9-Methylphenanthrene	0.461 J	ND	0.614 J	ND
1-Methylphenanthrene	0,288 J	ND		ND
2,7-Dimethylphenanthrene	0.200 V		0.324 J	
1,7-Dimethylphenanthrene		ND	ND	ND
Dibenzolhiophene	ND	ND	ND	ND
	0.48 J	0.366 J	0.411 J	ND
C1-Dibenzolhiophenes	ND	ND	ND	ND
C2-Dibenzathiophenes	4.89	ND	ND	ND
C3-Dibenzothiophenes	ND	ND	ND	ND
C4-Dibenzothiophenes	ND	- ND	ND	ND
4-Methyldibenzothiophene	0.34 J	ND	ND	ND
2/3-Methyldibenzothiophene	ND	ND	ND	ND
1-Methyldibenzothiophene	ND	ND	ND	
Dehydroabietin(e)	ND			ND
Retene		ND	ND	ND
Fluoranthene	0.712 J	0.966 J	0.802 J	1.04 J
Pyrene	2.64	0.8 J	0.562 J	1.0B J
	2.4 J	0.802 J	0.662 J	1.14 J
Benzo(b)fluorene	ND	ND	ND	ND
C1-Fluoranthenes/Pyrenes	6.88	ND	ND	ND
C2-Fluoranthenes/Pyrenes	ND	ND	ND	ND
C3-Fluoranthenes/Pyrenes	ND	ND	ND	ND
Benzo(a)anthracene	0.76 J	ND	ND	ND
Chrysene	2.6	ND		
C1-Chrysenes	2.8 ND	ND	ND	ND
C2-Chrysenes			ND	ND
C3-Chrysenes	ND	ND	ND	ND
	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND
Benzo(b)fluoranthene	1.58 J	ND	ND	ND
Benzo(j/k)fluoran(hene	1.11 J	ND	ND	ND
Benzo(a)fluoranthene	0.472 J	ND	ND	ND
Benzo(e)pyrene	1.63 J	ND	ND	
Benzo(a)pyrene	1.03 J			
Pervlene		ND	ND	ND
	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrane	1.04 J	0.426 J	ND	ND
Dibenz(a,h)anthracene Benzo(g,h,i)perytene	ND 1.11 J	ND 0.616 J	ND ND	ND ND
Surrogate Recoveries (%) Naphthalene-dß	87	90	90	
Phenanihrene-d10	87			92
Chrysene-d12		68	80	90
5b(H)-Cholane	86	93	99	85
	81	81	77	80

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

Battelle

Lake Union Sediment Project Name Investigation Project Number N005443

Client Sample ID

Battelle Sample ID Battelle Sample ID Battelle Batch ID Associated Blank Fleid Date Receipt Date Extraction Dale Acquired Date Analytical Method Percent Solids Matrix Sample Size Weight Basis Min Reporting Limit Amount Units

Naphthalene
C1-Naphthalenes
C2-Naphthalenes
C3-Naphthalenes
C3-Naphthalenes
C3-Naphthalenes
2-Methytaphthalene
1-Methytaphthalene
2-Ethytaphthalene
2-Ethyta

Surrogate Recoveries (%) Naphthalene-d8 Phenanthrene-d10 Chrysene-d12 5b(H)-Cholane

J=Result < Sample RL. ND= Not Detected. D= Values reported using secondary dilution factor. &= Outside of DQO. ME= Matrix Interference. Estimated Value.

SUB-ATTACHMENT 2D-3.2 ARI Data Packages



Analytical Resources, Incorporated

Analytical Chemists and Consultants

10 April 2003

Ben Howard Retec, Inc 1011 S.W. Klickitat Way Suite 207 Seattle, WA 98134

RE: Client Project: GWPSS/GJRW1-04403-963 ARI Project: FJ19

Dear Ben:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Analytical Resources, Inc received two soil samples and one liquid sample on April 2, 2003. The samples were analyzed for semivolatiles as requested.

No analytical complications were encountered during these analyses.

A copy of these reports will be kept on file with ARI. Should you have any questions or problems, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

MODE

Mark D. Harris Project Manager 206/695-6210 <mark@arilabs.com>

Enclosures

cc: File FJ19

MDH/esj

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy



ORGANIC COMPOUND DATA REPORTING QUALIFIERS

- U Indicates the compound was undetected at the reported concentration. (Same as ND).
- J Indicates an estimated concentration when the value is less than the calculated reporting limit.
- D Indicates the surrogate/spike(s) was not detected, due to dilution of extract.
- NR Indicates the surrogate recovery cannot be reported due to matrix interference.
- E Indicates a value above the linear range of the detector. Sample dilution required.
- S Indicates no value reported due to saturation of the detector. Sample dilution required.
- NA Indicates compound not analyzed for.
- M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
- B Indicates possible/probable blank contamination. Flagged when the analyte is detected in the blank as well as the sample.
- Y Indicates raised reporting limit due to background interference or to activity on the instrument. Compound is still not detected at or above the raised level.
- C Indicates a probable hit that cannot be confirmed due to matrix interference (GC).
- P Indicates a high RPD for dual column GC analyses without obvious interference.

ANALYTICAL RESOURCES

ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 1 of 2

Lab Sample ID: MB-040303 LIMS ID: 03-3957 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/04/03 20:08 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

Sample ID: MB-040303 METHOD BLANK

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 0.25 g Final Extract Volume: 10. mL Dilution Factor: 1.00

pH: NA

CAS Number	Analyte	µg/kg
108-95-2	Phenol	80,000 U
111-44-4	Bis-(2-Chloroethyl) Ether	80,000 U
95-57-8	2-Chlorophenol	40,000 U
541-73-1	1,3-Dichlorobenzene	40,000 U
106-46-7	1,4-Dichlorobenzene	40,000 U
100-51-6	Benzyl Alcohol	200,000 t
95-50-1	1,2-Dichlorobenzene	40,000 0
95-48-7	2-Methylphenol	40,000 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	40,000 U
106-44-5	4-Methylphenol	40,000 U
621-64-7	N-Nitroso-Di-N-Propylamine	80,000 U
67-72-1	Hexachloroethane	80,000 L
98-95-3	Nitrobenzene	40,000 1
78-59-1	Isophorone	40,000 0
88-75-5	2-Nitrophenol	200,000 t
105-67-9	2,4-Dimethylphenol	120,000 U
65-85-0	Benzoic Acid	400,000 t
111-91-1	bis(2-Chloroethoxy) Methane	40,000 U
120-83-2	2,4-Dichlorophenol	120,000 t
120-82-1	1,2,4-Trichlorobenzene	40,000 t
91-20-3	Naphthalene	40,000 t
106-47-8	4-Chloroaniline	120,000 U
87-68-3	Hexachlorobutadiene	80,000 t
59-50-7	4-Chloro-3-methylphenol	80,000 t
91-57-6	2-Methylnaphthalene	40,000 t
77-47-4	Hexachlorocyclopentadiene	200,000 1
88-06-2	2,4,6-Trichlorophenol	200,000 1
95-95-4	2,4,5-Trichlorophenol	200,000 t
91-58-7	2-Chloronaphthalene	40,000 L
88-74-4	2-Nitroaniline	200,000 1
131-11-3	Dimethylphthalate	40,000 t
208-96-8	Acenaphthylene	40,000 0
99-09-2	3-Nitroaniline	240,000 l
83-32-9	Acenaphthene	40,000 1
51-28-5	2,4-Dinitrophenol	400,000 1
100-02-7	4-Nitrophenol	200,000 1
132-64-9	Dibenzofuran	40,000 t
606-20-2	2,6-Dinitrotoluene	200,000 t
121-14-2	2,4-Dinitrotoluene	200,000 1
84-66-2	Diethylphthalate	40,000 1
7005-72-3	4-Chlorophenyl-phenylether	40,000 t
86-73-7	Fluorene	40,000 L
100-01-6	4-Nitroaniline	200,000 t
534-52-1	4,6-Dinitro-2-Methylphenol	400,000 0



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 2 of 2

Sample ID: MB-040303 METHOD BLANK

Lab Sample ID: MB-040303 LIMS ID: 03-3957 Matrix: Solid Date Analyzed: 04/04/03 20:08 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

CAS Number	Analyte	μg/kg
86-30-6	N-Nitrosodiphenylamine	40,000 U
101-55-3	4-Bromophenyl-phenylether	40,000 U
118-74-1	Hexachlorobenzene	40,000 U
87-86-5	Pentachlorophenol	200,000 U
85-01-8	Phenanthrene	40,000 U
86-74-8	Carbazole	40,000 U
120-12-7	Anthracene	40,000 U
84-74-2	Di-n-Butylphthalate	40,000 U
206-44-0	Fluoranthene	40,000 U
129-00-0	Pyrene	40,000 U
85-68-7	Butylbenzylphthalate	40,000 U
91-94-1	3,3'-Dichlorobenzidine	200,000 U
56-55-3	Benzo(a) anthracene	40,000 U
117-81-7	bis(2-Ethylhexyl)phthalate	40,000 U
218-01-9	Chrysene	40,000 U
117-84-0	Di-n-Octyl phthalate	40,000 U
205-99-2	Benzo(b)fluoranthene	40,000 U
207-08-9	Benzo(k)fluoranthene	40,000 U
50-32-8	Benzo(a)pyrene	40,000 U
193-39-5	Indeno (1, 2, 3-cd) pyrene	40,000 U
53-70-3	Dibenz(a,h) anthracene	40,000 U
191-24-2	Benzo(g,h,i)perylene	40,000 U

Semivolatile Surrogate Recovery

d5-Nitrobenzene	85.7%	2-Fluorobiphenyl	92.8%
d14-p-Terphenyl	92.6%	d4-1,2-Dichlorobenzene	88.2%
d5-Phenol	88.9%	2-Fluorophenol	89.5%
d5-Phenol 2,4,6-Tribromophenol	88.94 86.5%	d4-2-Chlorophenol	84.8%



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 1 of 2

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Data Release Authorized: Reported: 04/09/03

Date Extracted: 04/03/03 Date Analyzed: 04/09/03 11:28 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

CAS Number

Analyte

Sample ID: SS-4-0403 SAMPLE

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 1.05 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 2.00

pH: 6.6

µg/kg-as-rec

CAS Number	Analyte	µg/ kg-as-1
108-95-2	Phenol	38,000 U
111-44-4	Bis-(2-Chloroethyl) Ether	38,000 U
95-57-8	2-Chlorophenol	19,000 U
541-73-1	1,3-Dichlorobenzene	19,000 U
106-46-7	1,4-Dichlorobenzene	19,000 U
100-51-6	Benzyl Alcohol	95,000 U
95-50-1	1,2-Dichlorobenzene	19,000 U
95-48-7	2-Methylphenol	19,000 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	19,000 U
106-44-5	4-Methylphenol	19,000 U
521-64-7	N-Nitroso-Di-N-Propylamine	38,000 U
67-72-1	Hexachloroethane	38,000 U
98-95-3	Nitrobenzene	19,000 U
78-59-1	Isophorone	19,000 U
88-75-5	2-Nitrophenol	95,000 U
105-67-9	2,4-Dimethylphenol	57,000 U
65-85-0	Benzoic Acid	190,000 U
111-91-1	bis(2-Chloroethoxy) Methane	19,000 U
120-83-2	2,4-Dichlorophenol	57,000 U
120-82-1	1,2,4-Trichlorobenzene	19,000 U
91-20-3	Naphthalene	90,000
106-47-8	4-Chloroaniline	57,000 U
87-68-3	Hexachlorobutadiene	38,000 U
59-50-7	4-Chloro-3-methylphenol	38,000 U
91-57-6	2-Methylnaphthalene	190,000
77-47-4	Hexachlorocyclopentadiene	95,000 U
88-06-2	2,4,6-Trichlorophenol	95,000 U
95-95-4	2,4,5-Trichlorophenol	95,000 U
91-58-7	2-Chloronaphthalene	19,000 U
88-74-4	2-Nitroaniline	95,000 U
131-11-3	Dimethylphthalate	19,000 U
208-96-8	Acenaphthylene	98,000
99-09-2	3-Nitroaniline	110,000 U
83-32-9	Acenaphthene	37,000
51-28-5	2,4-Dinitrophenol	190,000 U
100-02-7	4-Nitrophenol	95,000 U
132-64-9	Dibenzofuran	32,000
606-20-2	2,6-Dinitrotoluene	95,000 U
121-14-2	2,4-Dinitrotoluene	95,000 U
84-66-2	Diethylphthalate	19,000 U
7005-72-3	4-Chlorophenyl-phenylether	19,000 U
86-73-7	Fluorene	130,000
100-01-6	4-Nitroaniline	95,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	190,000 U



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 2 of 2

Sample ID: SS-4-0403 SAMPLE

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Date Analyzed: 04/09/03 11:28 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

CAS Number Analyte		μ g/kg-as-rec
86-30-6	N-Nitrosodiphenylamine	19,000 U
101-55-3	4-Bromophenyl-phenylether	19,000 U
118-74-1	Hexachlorobenzene	19,000 U
87-86-5	Pentachlorophenol	95,000 U
85-01-8	Phenanthrene	3,000,000 E
86-74-8	Carbazole	290,000
120-12-7	Anthracene	600,000
84-74-2	Di-n-Butylphthalate	19,000 U
206-44-0	Fluoranthene	2,000,000 E
129-00-0	Pyrene	3,900,000 E
85-68-7	Butylbenzylphthalate	19,000 U
91-94-1	3,3'-Dichlorobenzidine	95,000 U
56-55-3	Benzo(a) anthracene	2,400,000 E
117-81-7	bis(2-Ethylhexyl)phthalate	19,000 U
218-01-9	Chrysene	2,800,000 E
117-84-0	Di-n-Octyl phthalate	19,000 U
205-99-2	Benzo(b) fluoranthene	780,000
207-08-9	Benzo(k)fluoranthene	950,000
50-32-8	Benzo(a) pyrene	980,000
193-39-5	Indeno(1,2,3-cd)pyrene	380,000
53-70-3	Dibenz (a, h) anthracene	250,000
191-24-2	Benzo(g,h,i)perylene	510,000

Semivolatile Surrogate Recovery

d5-Nitrobenzene	77.9%	2-Fluorobiphenyl	90.1%
d14-p-Terphenyl	91.2%	d4-1,2-Dichlorobenzene	84.7%
d5-Phenol	94.6%	2-Fluorophenol	89.5%
2,4,6-Tribromophenol	85.1%	d4-2-Chlorophenol	87.9%



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 1 of 2

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/05/03 01:45 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

Sample ID: SS-4-0403 SAMPLE

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 1.05 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 5.00

рН: б.б

CAS Number	Analyte	μ g/kg-as-rec
108-95-2	Phenol	95,000 U
111-44-4	Bis-(2-Chloroethyl) Ether	95,000 U
95-57-8	2-Chlorophenol	48,000 U
541-73-1	1,3-Dichlorobenzene	48,000 U
106-46-7	1,4-Dichlorobenzene	48,000 U
100-51-6	Benzyl Alcohol	240,000 U
95-50-1	1,2-Dichlorobenzene	48,000 U
95-48-7	2-Methylphenol	48,000 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	48,000 U
106-44-5	4-Methylphenol	48,000 U
621-64-7	N-Nitroso-Di-N-Propylamine	95,000 U
67-72-1	Hexachloroethane	95,000 U
98-95-3	Nitrobenzene	48,000 U
78-59-1	Isophorone	48,000 U
88-75-5	2-Nitrophenol	240,000 U
105-67-9	2,4-Dimethylphenol	140,000 U
65-85-0	Benzoic Acid	480,000 U
111-91-1	bis(2-Chloroethoxy) Methane	48,000 U
	2,4-Dichlorophenol	140,000 U
120-83-2	1,2,4-Trichlorobenzene	48,000 U
120-82-1	Naphthalene	91,000
91-20-3	4-Chloroaniline	140,000 U
106-47-8	Hexachlorobutadiene	95,000 U
87-68-3	4-Chloro-3-methylphenol	95,000 U
59-50-7	2-Methylnaphthalene	190,000
91-57-6		240,000 U
77-47-4	Hexachlorocyclopentadiene 2,4,6-Trichlorophenol	240,000 U
88-06-2		240,000 U
95-95-4	2,4,5-Trichlorophenol 2-Chloronaphthalene	48,000 U
91-58-7	사람이 있는 것은 것은 것은 것은 것이 있는 것이 같은 것이 같은 것이 있는 것이 있다. 것이 있는 것이 없이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 없는 것이 있는 것이 없는 것이 있는 것이 없는 것이 없는 것이 없이 없이 있는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없이 없이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없이 없이 없는 것이 없 있는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없다. 것이 없는 것이 없이 않는 것이 없 않이 않는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없이 없는 것이 없다. 것이 없는 것 않이 않이 않이 않이 않이 않이 않이 않이 않이 않이 않이 않이 않이	240,000 U
88-74-4	2-Nitroaniline	48,000 U
131-11-3	Dimethylphthalate	99,000
208-96-8	Acenaphthylene	290,000 U
99-09-2	3-Nitroaniline	48,000 U
83-32-9	Acenaphthene	
51-28-5	2,4-Dinitrophenol	480,000 U
100-02-7	4-Nitrophenol	240,000 U
132-64-9	Dibenzofuran	48,000 U
606-20-2	2,6-Dinitrotoluene	240,000 U 240,000 U
121-14-2	2,4-Dinitrotoluene	48,000 U
84-66-2	Diethylphthalate	48,000 U
7005-72-3	4-Chlorophenyl-phenylether	
86-73-7	Fluorene	120,000
100-01-6	4-Nitroaniline	240,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	480,000 U



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 2 of 2

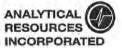
Sample ID: SS-4-0403 SAMPLE

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Date Analyzed: 04/05/03 01:45 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

CAS Number	Analyte	μ g/kg-as-rec
86-30-6	N-Nitrosodiphenylamine	48,000 U
101-55-3	4-Bromophenyl-phenylether	48,000 U
118-74-1	Hexachlorobenzene	48,000 U
87-86-5	Pentachlorophenol	240,000 U
85-01-8	Phenanthrene	3,800,000
86-74-8	Carbazole	280,000
120-12-7	Anthracene	600,000
84-74-2	Di-n-Butylphthalate	48,000 U
206-44-0	Fluoranthene	2,200,000
129-00-0	Pyrene	4,700,000 E
85-68-7	Butylbenzylphthalate	48,000 U
91-94-1	3,3'-Dichlorobenzidine	240,000 U
56-55-3	Benzo (a) anthracene	2,400,000
117-81-7	bis(2-Ethylhexyl)phthalate	48,000 U
218-01-9	Chrysene	3,500,000
117-84-0	Di-n-Octyl phthalate	48,000 U
205-99-2	Benzo(b) fluoranthene	730,000
207-08-9	Benzo(k) fluoranthene	1,100,000
50-32-8	Benzo(a)pyrene	980,000
193-39-5	Indeno(1,2,3-cd)pyrene	360,000
53-70-3	Dibenz(a, h) anthracene	240,000
191-24-2	Benzo(g,h,i)perylene	480,000

Semivolatile Surrogate Recovery

d5-Nitrobenzene	79.0%	2-Fluorobiphenyl	85.6%
d14-p-Terphenyl	90.2%	d4-1,2-Dichlorobenzene	86.0%
d5-Phenol	83.2%	2-Fluorophenol	84.9%
2,4,6-Tribromophenol	68.0%	d4-2-Chlorophenol	82.0%



ORGANICS ANALYSIS DATA SHEET Semivolatiles by GC/MS Page 1 of 2

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/07/03 12:16 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO Sample ID: SS-4-0403 DILUTION

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 1.05 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 10.0

pH: 6.6

µg/kg-as-rec CAS Number Analyte 190,000 U 108-95-2 Phenol Bis-(2-Chloroethyl) Ether 190,000 U 111-44-4 95,000 U 95-57-8 2-Chlorophenol 95,000 U 541-73-1 1,3-Dichlorobenzene 95,000 U 106-46-7 1,4-Dichlorobenzene 480,000 U 100-51-6 Benzyl Alcohol 95,000 U 95-50-1 1,2-Dichlorobenzene 95,000 U 95-48-7 2-Methylphenol 95,000 U 2,2'-Oxybis(1-Chloropropane) 108-60-1 95,000 U 106-44-5 4-Methylphenol 190,000 U 621-64-7 N-Nitroso-Di-N-Propylamine 190,000 U 67-72-1 Hexachloroethane 95,000 U 98-95-3 Nitrobenzene 95,000 U Isophorone 78-59-1 480,000 U 88-75-5 2-Nitrophenol 105-67-9 2,4-Dimethylphenol 290,000 U 65-85-0 Benzoic Acid 950,000 U 95,000 U 111-91-1 bis(2-Chloroethoxy) Methane 290,000 U 120-83-2 2,4-Dichlorophenol 95,000 U 120-82-1 1,2,4-Trichlorobenzene 95,000 U 91-20-3 Naphthalene 106-47-8 4-Chloroaniline 290,000 U 190,000 U 87-68-3 Hexachlorobutadiene 190,000 U 4-Chloro-3-methylphenol 59-50-7 2-Methylnaphthalene 180,000 91-57-6 480,000 U 77-47-4 Hexachlorocyclopentadiene 480,000 U 88-06-2 2,4,6-Trichlorophenol 95-95-4 2,4,5-Trichlorophenol 480,000 U 91-58-7 2-Chloronaphthalene 95,000 U 88-74-4 2-Nitroaniline 480,000 U 95,000 U 131-11-3 Dimethylphthalate 95,000 U 208-96-8 Acenaphthylene 570,000 U 99-09-2 3-Nitroaniline 83-32-9 Acenaphthene 95,000 U 950,000 U 51-28-5 2,4-Dinitrophenol 480,000 U 100-02-7 4-Nitrophenol 95,000 U 132-64-9 Dibenzofuran 480,000 U 606-20-2 2,6-Dinitrotoluene 121-14-2 2,4-Dinitrotoluene 480,000 U 95,000 U 84-66-2 Diethylphthalate 95,000 U 4-Chlorophenyl-phenylether 7005-72-3 120,000 86-73-7 Fluorene 4-Nitroaniline 480,000 U 100-01-6 4,6-Dinitro-2-Methylphenol 950,000 U 534-52-1



Sample ID: SS-4-0403 DILUTION

Lab Sample ID: FJ19A LIMS ID: 03-3957 Matrix: Solid Date Analyzed: 04/07/03 12:16 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

µg/kg-as-rec CAS Number Analyte 95,000 U 86-30-6 N-Nitrosodiphenylamine 95,000 U 4-Bromophenyl-phenylether 101-55-3 95,000 U 118-74-1 Hexachlorobenzene 480,000 U 87-86-5 Pentachlorophenol 4,800,000 Phenanthrene 85-01-8 280,000 86-74-8 Carbazole 120-12-7 Anthracene 640,000 95,000 U 84-74-2 Di-n-Butylphthalate 2,600,000 206-44-0 Fluoranthene 6,400,000 129-00-0 Pyrene 95,000 U Butylbenzylphthalate 85-68-7 480,000 U 3,3'-Dichlorobenzidine 91-94-1 2,500,000 Benzo(a) anthracene 56-55-3 bis(2-Ethylhexyl)phthalate 95,000 U 117-81-7 4,100,000 218-01-9 Chrysene Di-n-Octyl phthalate 95,000 U 117-84-0 205-99-2 Benzo(b)fluoranthene 1,000,000 207-08-9 Benzo(k)fluoranthene 830,000 1,100,000 50-32-8 Benzo(a)pyrene 350,000 193-39-5 Indeno(1,2,3-cd)pyrene 260,000 53-70-3 Dibenz(a,h) anthracene 191-24-2 Benzo(g,h,i)perylene 500,000

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.6%	2-Fluorobiphenyl	99.28
d14-p-Terphenyl	96.0%	d4-1,2-Dichlorobenzene	83.28
d5-Phenol	84.5%	2-Fluorophenol	82.9%
2,4,6-Tribromophenol	59.5%	d4-2-Chlorophenol	74.9%

Lab Sample ID: FJ19B LIMS ID: 03-3958 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/05/03 02:33 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

CAS Number

Analyte

Sample ID: SS-5-0403 SAMPLE

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 0.51 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 5.00

pH: 6.8

µg/kg-as-rec

CAS Number	Analyte	μg/1	cg-as
108-95-2	Phenol	200,000	
111-44-4	Bis-(2-Chloroethyl) Ether	200,000	U
95-57-8	2-Chlorophenol	98,000	U
541-73-1	1,3-Dichlorobenzene	98,000	
106-46-7	1,4-Dichlorobenzene	98,000	U
100-51-6	Benzyl Alcohol	490,000	
95-50-1	1,2-Dichlorobenzene	98,000	
95-48-7	2-Methylphenol	98,000	
108-60-1	2,2'-Oxybis(1-Chloropropane)	98,000	
106-44-5	4-Methylphenol	98,000	
621-64-7	N-Nitroso-Di-N-Propylamine	200,000	
67-72-1	Hexachloroethane	200,000	
98-95-3	Nitrobenzene	98,000	
78-59-1	Isophorone	98,000	U
88-75-5	2-Nitrophenol	490,000	
105-67-9	2,4-Dimethylphenol	290,000	U
65-85-0	Benzoic Acid	980,000	U
111-91-1	bis(2-Chloroethoxy) Methane	98,000	U
120-83-2	2,4-Dichlorophenol	290,000	U
120-82-1	1,2,4-Trichlorobenzene	98,000	U
91-20-3	Naphthalene	9,700,000	E
106-47-8	4-Chloroaniline	290,000	U
87-68-3	Hexachlorobutadiene	200,000	U
59-50-7	4-Chloro-3-methylphenol	200,000	U
91-57-6	2-Methylnaphthalene	4,300,000	
77-47-4	Hexachlorocyclopentadiene	490,000	U
88-06-2	2,4,6-Trichlorophenol	490,000	U
95-95-4	2,4,5-Trichlorophenol	490,000	U
91-58-7	2-Chloronaphthalene	98,000	U
88-74-4	2-Nitroaniline	490,000	U
131-11-3	Dimethylphthalate	98,000	U
208-96-8	Acenaphthylene	2,200,000	
99-09-2	3-Nitroaniline	590,000	U
83-32-9	Acenaphthene	180,000	
51-28-5	2,4-Dinitrophenol	980,000	U
100-02-7	4-Nitrophenol	490,000	
132-64-9	Dibenzofuran	230,000	
606-20-2	2,6-Dinitrotoluene	490,000	U
121-14-2	2,4-Dinitrotoluene	490,000	U
84-66-2	Diethylphthalate	98,000	
7005-72-3	4-Chlorophenyl-phenylether	98,000	
86-73-7	Fluorene	1,800,000	
100-01-6	4-Nitroaniline	490,000	U
534-52-1	4,6-Dinitro-2-Methylphenol	980,000	



Sample ID: SS-5-0403 SAMPLE

Lab Sample ID: FJ19B LIMS ID: 03-3958 Matrix: Solid Date Analyzed: 04/05/03 02:33 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

ICWI 04405 205

CAS Number	Analyte	μ g/kg-as-rec
86-30-6	N-Nitrosodiphenylamine	98,000 U
101-55-3	4-Bromophenyl-phenylether	98,000 U
118-74-1	Hexachlorobenzene	98,000 U
87-86-5	Pentachlorophenol	490,000 U
85-01-8	Phenanthrene	7,900,000 E
86-74-8	Carbazole	370,000
120-12-7	Anthracene	1,400,000
84-74-2	Di-n-Butylphthalate	98,000 U
206-44-0	Fluoranthene	4,300,000
129-00-0	Pyrene	5,700,000
85-68-7	Butylbenzylphthalate	98,000 U
91-94-1	3,3'-Dichlorobenzidine	490,000 U
56-55-3	Benzo(a) anthracene	1,600,000
117-81-7	bis(2-Ethylhexyl)phthalate	98,000 U
218-01-9	Chrysene	2,000,000
117-84-0	Di-n-Octyl phthalate	98,000 U
205-99-2	Benzo(b) fluoranthene	1,100,000
207-08-9	Benzo(k) fluoranthene	1,200,000
50-32-8	Benzo(a) pyrene	1,600,000
193-39-5	Indeno(1,2,3-cd)pyrene	1,000,000
53-70-3	Dibenz(a,h)anthracene	200,000
191-24-2	Benzo(g,h,i)perylene	1,100,000

Semivolatile Surrogate Recovery

d5-Nitrobenzene d14-p-Terphenyl	77.28 83.68	2-Fluorobiphenyl d4-1,2-Dichlorobenzene	87.48 87.48
d5-Phenol	77.7%	2-Fluorophenol	79.5%
2,4,6-Tribromophenol	64.3%	d4-2-Chlorophenol	76.9%



Lab Sample ID: FJ19B LIMS ID: 03-3958 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/07/03 13:02 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

CAS Number Analyte

Sample ID: SS-5-0403 DILUTION

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 0.51 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 10.0

pH: 6.8

µg/kg-as-rec

CAS Number	Analyte	μg/ κg	-ap-1
108-95-2	Phenol	390,000 U	1.
111-44-4	Bis-(2-Chloroethyl) Ether	390,000 U	
95-57-8	2-Chlorophenol	200,000 U	
541-73-1	1,3-Dichlorobenzene	200,000 U	
106-46-7	1,4-Dichlorobenzene	200,000 U	
100-51-6	Benzyl Alcohol	980,000 U	
95-50-1	1,2-Dichlorobenzene	200,000 U	
95-48-7	2-Methylphenol	200,000 U	
108-60-1	2,2'-Oxybis(1-Chloropropane)	200,000 U	
106-44-5	4-Methylphenol	200,000 U	
621-64-7	N-Nitroso-Di-N-Propylamine	390,000 U	
67-72-1	Hexachloroethane	390,000 U	
98-95-3	Nitrobenzene	200,000 U	
78-59-1	Isophorone	200,000 U	
88-75-5	2-Nitrophenol	980,000 U	
105-67-9	2,4-Dimethylphenol	590,000 U	
65-85-0	Benzoic Acid	2,000,000 U	
111-91-1	bis(2-Chloroethoxy) Methane	200,000 U	
120-83-2	2,4-Dichlorophenol	590,000 U	
120-82-1	1,2,4-Trichlorobenzene	200,000 U	
91-20-3	Naphthalene	13,000,000	
106-47-8	4-Chloroaniline	590,000 U	
87-68-3	Hexachlorobutadiene	390,000 U	
59-50-7	4-Chloro-3-methylphenol	390,000 U	
91-57-6	2-Methylnaphthalene	4,800,000	
77-47-4	Hexachlorocyclopentadiene	980,000 U	
88-06-2	2,4,6-Trichlorophenol	980,000 U	
95-95-4	2,4,5-Trichlorophenol	980,000 U	
91-58-7	2-Chloronaphthalene	200,000 U	
88-74-4	2-Nitroaniline	980,000 U	
131-11-3	Dimethylphthalate	200,000 U	
208-96-8	Acenaphthylene	2,200,000	
99-09-2	3-Nitroaniline	1,200,000 U	
83-32-9	Acenaphthene	200,000 U	
51-28-5	2,4-Dinitrophenol	2,000,000 U	
100-02-7	4-Nitrophenol	980,000 U	
132-64-9	Dibenzofuran	220,000	
606-20-2	2,6-Dinitrotoluene	980,000 U	
121-14-2	2,4-Dinitrotoluene	980,000 U	
84-66-2	Diethylphthalate	200,000 U	
7005-72-3	4-Chlorophenyl-phenylether	200,000 U	
86-73-7	Fluorene	1,800,000	
100-01-6	4-Nitroaniline	980,000 U	
534-52-1	4,6-Dinitro-2-Methylphenol	2,000,000 U	



Sample ID: SS-5-0403 DILUTION

Lab Sample ID: FJ19B LIMS ID: 03-3958 Matrix: Solid Date Analyzed: 04/07/03 13:02 QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963

CAS Number	Analyte	μ g/kg-as-rec
86-30-6	N-Nitrosodiphenylamine	200,000 U
101-55-3	4-Bromophenyl-phenylether	200,000 U
118-74-1	Hexachlorobenzene	200,000 U
87-86-5	Pentachlorophenol	980,000 U
85-01-8	Phenanthrene	10,000,000
86-74-8	Carbazole	360,000
	Anthracene	1,500,000
84-74-2	Di-n-Butylphthalate	200,000 U
206-44-0	Fluoranthene	5,000,000
129-00-0	Pyrene	6,700,000
85-68-7	-	200,000 U
91-94-1	3,3'-Dichlorobenzidine	980,000 U
56-55-3	Benzo (a) anthracene	1,600,000
117-81-7	bis(2-Ethylhexyl)phthalate	200,000 U
218-01-9	Chrysene	2,100,000
117-84-0	Di-n-Octyl phthalate	200,000 U
205-99-2	Benzo(b) fluoranthene	1,200,000
207-08-9	Benzo(k) fluoranthene	1,100,000
50-32-8	Benzo(a)pyrene	1,700,000
193-39-5	Indeno (1,2,3-cd) pyrene	1,100,000
53-70-3	Dibenz(a,h)anthracene	200,000 U
191-24-2	Benzo(g,h,i)perylene	1,100,000

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.2%	2-Fluorobiphenyl	83.6%
d14-p-Terphenyl	84.4%	d4-1,2-Dichlorobenzene	78.0%
d5-Phenol	81.1%	2-Fluorophenol	85.3%
2,4,6-Tribromophenol	56.8%	d4-2-Chlorophenol	76.8%

Lab Sample ID: FJ19C LIMS ID: 03-3959 Matrix: Liquid Data Release Authorized: Reported: 04/08/03

Date extracted: 04/03/03 Date analyzed: 04/05/03 03:21 Instrument: FINN4 Sample No: MW-9 20'

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 01/16/03 Date Received: 04/02/03

> Sample Amount: 0.25 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 1:5

CAS Number	Analyte	ug/l	g
108-95-2	Phenol	400,000	U
111-44-4	Bis-(2-Chloroethyl) Ether	400,000	U
95-57-8	2-Chlorophenol	200,000	U
541-73-1	1,3-Dichlorobenzene	200,000	U
106-46-7	1,4-Dichlorobenzene	200,000	U
100-51-6	Benzyl Alcohol	1,000,000	U
95-50-1	1,2-Dichlorobenzene	200,000	U
95-48-7	2-Methylphenol	200,000	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	200,000	U
106-44-5	4-Methylphenol	200,000	U
621-64-7	N-Nitroso-Di-N-Propylamine		U
67-72-1	Hexachloroethane	400,000	υ
98-95-3	Nitrobenzene	200,000	U
78-59-1	Isophorone	200,000	U
88-75-5	2-Nitrophenol	1,000,000	U
105-67-9	2,4-Dimethylphenol	600,000	U
65-85-0	Benzoic Acid	2,000,000	U
111-91-1	bis(2-Chloroethoxy) Methane	200,000	U
120-83-2	2,4-Dichlorophenol	600,000	U
120-82-1	1,2,4-Trichlorobenzene		U
91-20-3	Naphthalene	44,000,000	E
106-47-8	4-Chloroaniline	600,000	U
87-68-3	Hexachlorobutadiene	400,000	U
59-50-7	4-Chloro-3-methylphenol	400,000	U
91-57-6	2-Methylnaphthalene	37,000,000	E
77-47-4	Hexachlorocyclopentadiene	1,000,000	U
88-06-2	2,4,6-Trichlorophenol	1,000,000	U
95-95-4	2,4,5-Trichlorophenol	1,000,000	U
91-58-7	2-Chloronaphthalene	200,000	U
88-74-4	2-Nitroaniline	1,000,000	U
131-11-3	Dimethylphthalate	200,000	U
208-96-8	Acenaphthylene	7,600,000	
99-09-2	3-Nitroaniline	1,200,000	U
83-32-9	Acenaphthene	1,300,000	
51-28-5	2,4-Dinitrophenol	2,000,000	U
100-02-7	4-Nitrophenol	1,000,000	U
132-64-9	Dibenzofuran	560,000	
606-20-2	2,6-Dinitrotoluene	1,000,000	U

Lab Sample ID: FJ19C LIMS ID: 03-3959 Matrix: Liquid Data Release Authorized Reported: 04/08/03

Date extracted: 04/03/03 Date analyzed: 04/05/03 03:21 Instrument: FINN4 Sample No: MW-9 20'

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 01/16/03 Date Received: 04/02/03

> Sample Amount: 0.25 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 1:5

CAS Number	Analyte	ug/l	
121-14-2	2,4-Dinitrotoluene	1,000,000	U
34-66-2	Diethylphthalate	200,000	U
7005-72-3	4-Chlorophenyl-phenylether	200,000	U
86-73-7	Fluorene	6,200,000	
100-01-6	4-Nitroaniline	1,000,000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2,000,000	U
86-30-6	N-Nitrosodiphenylamine	200,000	U
101-55-3	4-Bromophenyl-phenylether	200,000	U
118-74-1	Hexachlorobenzene	200,000	U
87-86-5	Pentachlorophenol	1,000,000	U
85-01-8	Phenanthrene	12,000,000	
36-74-8	Carbazole	300,000	
120-12-7	Anthracene	2,600,000	
34-74-2	Di-n-Butylphthalate	200,000	U
206-44-0	Fluoranthene	2,900,000	
129-00-0	Pyrene	4,500,000	
85-68-7	Butylbenzylphthalate	200,000	U
91-94-1	3,3'-Dichlorobenzidine	1,000,000	U
56-55-3	Benzo(a) anthracene	1,700,000	
117-81-7	bis(2-Ethylhexyl)phthalate	200,000	U
218-01-9	Chrysene	1,800,000	
117-84-0	Di-n-Octyl phthalate	200,000	U
205-99-2	Benzo(b) fluoranthene	490,000	
207-08-9	Benzo(k) fluoranthene	730,000	
50-32-8	Benzo (a) pyrene	1,100,000	
193-39-5	Indeno (1, 2, 3-cd) pyrene	360,000	
53-70-3	Dibenz(a,h)anthracene	200,000	U
191-24-2	Benzo(g,h,i)perylene	360,000	

Semivolatiles Surrogate Recovery

d5-Nitrobenzene	85.0%	d5-Phenol	80.0%
2-Fluorobiphenyl	87.2%	2-Fluorophenol	74.8%
d14-p-Terphenyl	89.2%	2,4,6-Tribromophenol	67.1%
d4-1,2-Dichlorobenzene	79.8%	d4-2-Chlorophenol	74.8%

Lab Sample ID: FJ19C-DL LIMS ID: 03-3959 Matrix: Liquid Data Release Authorized: Reported: 04/08/03

Date extracted: 04/03/03 Date analyzed: 04/07/03 13:51 Instrument: FINN4 Sample No: MW-9 20' DILUTION QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 01/16/03 Date Received: 04/02/03

> Sample Amount: 0.25 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 1:30

CAS Number	Analyte	ug/l	
108-95-2	Phenol	2,400,000	U
111-44-4	Bis-(2-Chloroethyl) Ether	2,400,000	U
95-57-8	2-Chlorophenol	1,200,000	U
541-73-1	1,3-Dichlorobenzene	1,200,000	U
106-46-7	1,4-Dichlorobenzene	1,200,000	U
100-51-6	Benzyl Alcohol	6,000,000	U
95-50-1	1,2-Dichlorobenzene	1,200,000	U
95-48-7	2-Methylphenol	1,200,000	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1,200,000	U
106-44-5	4-Methylphenol	1,200,000	U
621-64-7	N-Nitroso-Di-N-Propylamine	2,400,000	U
67-72-1	Hexachloroethane	2,400,000	υ
98-95-3	Nitrobenzene	1,200,000	Ų
78-59-1	Isophorone	1,200,000	υ
88-75-5	2-Nitrophenol	6,000,000	U
105-67-9	2,4-Dimethylphenol	3,600,000	U
65-85-0	Benzoic Acid	12,000,000	U
111-91-1	bis(2-Chloroethoxy) Methane	1,200,000	τ
120-83-2	2,4-Dichlorophenol	3,600,000	U
120-82-1	1,2,4-Trichlorobenzene	1,200,000	U
91-20-3	Naphthalene	89,000,000	
106-47-8	4-Chloroaniline	3,600,000	U
87-68-3	Hexachlorobutadiene	2,400,000	υ
59-50-7	4-Chloro-3-methylphenol	2,400,000	Ų
91-57-6	2-Methylnaphthalene	53,000,000	
77-47-4	Hexachlorocyclopentadiene	6,000,000	τ
88-06-2	2,4,6-Trichlorophenol	6,000,000	Ľ
95-95-4	2,4,5-Trichlorophenol	6,000,000	τ
91-58-7	2-Chloronaphthalene	1,200,000	Ľ
88-74-4	2-Nitroaniline	6,000,000	τ
131-11-3	Dimethylphthalate	1,200,000	Ţ,
208-96-8	Acenaphthylene	9,000,000	
99-09-2	3-Nitroaniline	7,200,000	τ
83-32-9	Acenaphthene	1,400,000	
51-28-5	2,4-Dinitrophenol	12,000,000	τ
100-02-7	4-Nitrophenol	6,000,000	τ
132-64-9	Dibenzofuran	1,200,000	T,
606-20-2	2,6-Dinitrotoluene	6,000,000	τ

Lab Sample ID: FJ19C-DL LIMS ID: 03-3959 Matrix: Liquid Data Release Authorized: Reported: 04/08/03

Date extracted: 04/03/03 Date analyzed: 04/07/03 13:51 Instrument: FINN4 Sample No: MW-9 20' DILUTION QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 01/16/03 Date Received: 04/02/03

> Sample Amount: 0.25 g-as-rec Final Extract Volume: 10. mL Dilution Factor: 1:30

CAS Number	Analyte	ug/l	
121-14-2	2,4-Dinitrotoluene	6,000,000	
84-66-2	Diethylphthalate	1,200,000	U
7005-72-3	4-Chlorophenyl-phenylether	1,200,000	U
86-73-7	Fluorene	7,300,000	
100-01-6	4-Nitroaniline	6,000,000	U
534-52-1	4,6-Dinitro-2-Methylphenol	12,000,000	U
86-30-6	N-Nitrosodiphenylamine	1,200,000	U
101-55-3	4-Bromophenyl-phenylether	1,200,000	U
118-74-1	Hexachlorobenzene	1,200,000	U
87-86-5	Pentachlorophenol	6,000,000	U
85-01-8	Phenanthrene	17,000,000	
86-74-8	Carbazole	1,200,000	U
120-12-7	Anthracene	3,100,000	
84-74-2	Di-n-Butylphthalate	1,200,000	U
206-44-0	Fluoranthene	3,500,000	
129-00-0	Pyrene	5,600,000	
85-68-7	Butylbenzylphthalate	1,200,000	U
91-94-1	3,3'-Dichlorobenzidine	6,000,000	U
56-55-3	Benzo (a) anthracene	1,800,000	
117-81-7	bis(2-Ethylhexyl)phthalate	1,200,000	U
218-01-9	Chrysene	2,000,000	
117-84-0	Di-n-Octyl phthalate	1,200,000	U
205-99-2	Benzo(b)fluoranthene	1,200,000	U
207-08-9	Benzo(k) fluoranthene	1,200,000	υ
50-32-8	Benzo(a)pyrene	1,200,000	U
193-39-5	Indeno(1,2,3-cd)pyrene	1,200,000	
53-70-3	Dibenz(a,h)anthracene	1,200,000	
191-24-2	Benzo(g,h,i)perylene	1,200,000	U

Semivolatiles Surrogate Recovery

d5-Nitrobenzene	D	d5-Phenol	D
2-Fluorobiphenyl	D	2-Fluorophenol	D
d14-p-Terphenyl	D	2,4,6-Tribromophenol	D
d4-1,2-Dichlorobenzene	D	d4-2-Chlorophenol	D



Lab Sample ID: LCS-040303 LIMS ID: 03-3957 Matrix: Solid Data Release Authorized: Reported: 04/07/03

Date Extracted: 04/03/03 Date Analyzed: 04/04/03 20:56 Instrument/Analyst: FINN4/LJR GPC Cleanup: NO

Sample ID: LCS-040303 LAB CONTROL

QC Report No: FJ19-The Retec Group Project: GWPSS GJRW1-04403-963 Date Sampled: 04/02/03 Date Received: 04/02/03

Sample Amount: 0.25 g Final Extract Volume: 10. mL Dilution Factor: 1.00

pH: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	187000	150000	125%
2-Chlorophenol	182000	150000	1218
1,4-Dichlorobenzene	109000	100000	109%
N-Nitroso-Di-N-Propylamine	110000	100000	110%
1,2,4-Trichlorobenzene	963000	100000	96.38
4-Chloro-3-methylphenol	144000	150000	96.0%
Acenaphthene	105000	100000	105%
4-Nitrophenol	123000	150000	82.0%
2,4-Dinitrotoluene	944000	100000	94.48
Pentachlorophenol	152000	150000	101%
Pyrene	956000	100000	95.6%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	93.0%	
2-Fluorobiphenyl	98.1%	
d14-p-Terphenyl	96.4%	
d4-1,2-Dichlorobenzene	1028	
d5-Phenol	106%	
2-Fluorophenol	1048	
2,4,6-Tribromophenol	97.8%	
d4-2-Chlorophenol	101号	

Results reported in $\mu g/kg$

White: Lab Copy Yellow: PM Copy Pink: Fie		ivamiquiation of: (originature)			Relinquished by: (Signature)	Su las	Relinquished by: (Signature)	2								MW-9 20'	E0400 - 5 - 55	5040-4-0403	Field Sample ID	Fax: (206)674-2839	Phone (206)674-9349	Santike, WH 78134	Suite 207	Address: 1311 SNJ KI. dic 1 ct hum	Send Report To: Ben Howard	Project Name: GUISS	Chain of Custody Record
Pink: Field Copy G		Neverveu by. (Jugitature)	Deceived hur /Sin		Received by: (Signature)		Received by: (Signature)									1/16/03	H	4/2/03	Sample Date		Laboratory Receiving:	Airbill Number:	Shipment Method:	Sampler (Print Name):	Sampler (Print Name):	Project Num	Reco
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	Temperature?	Received Containers Intact?	COC Seals Intact?	COC Seals Present?	Total # Containers Received?	Sample Receipt	boratory):												Comments, Special Instructions, etc.		Order #:	Durchase	//	1 1	///	111	2
						leceipt													Lab Sample ID (to be completed by lab)						Pageof		RETEO



Analytical Resources, Incorporated

Analytical Chemists and Consultants

10 April 2003

Mark Larsen Retec, Inc. 1011 S.W. Klickitat Way Suite 207 Seattle, WA 98134

RE: Client Project: Lake Union Sediment Investigation/ N005443 ARI Project: FJ41

Dear Mark:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Twenty sediment samples were received on April 4, 2003. The samples were received intact and there were no discrepancies in the paperwork. The samples were analyzed for metals as requested.

There were no analytical complications noted for this analysis.

A copy of these reports will be kept on file with ARI. Should you have any questions or problems, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mal D. Dame

Mark D. Harris Project Manager 206/695-6210 mark@arilabs.com

Enclosures

cc: file FJ41

MDH/esj

Battelle

03-4111-38

Shipment No: SHP-030403-03

3.5

Chain of Custody

SAMPLERS: Singature DATE/TIME BATTELLE ID 11/13/02 14:40 U0097		Lake Union Sediment Investigation					1	Jac		ARI	ARI Metals Analysis	5 5		
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inen (1444)	NLU-116-SS-2030		S	SEDIMENT				at such safety			7			1
11/11/02 15:13 U0150	NLU-116-SS-0010		S	SEDIMENT		>		>			7			-
11/13/02 14:27 U0158	NLU-126-SS-0010		S	SEDIMENT		>	>	****			7			-
11/15/02 11:32 U0276	NLU-109 1012		S	SEDIMENT		(10000) (10000)					2			
11/15/02 11:32 U0277	NLU-109 1214		S	SEDIMENT							7			-
11/15/02 11:32 U0284	NLU-109 2628		S	SEDIMENT							7			-
11/15/02 11:32 U0285	NLU-109 2830		S	SEDIMENT							5			1
11/15/02 11:32 U0289	NLU-109 3638		S	SEDIMENT							2			-
11/15/02 11:32 U0290	NLU-109 3840		S	SEDIMENT							7			-
11/15/02 13:40 U0352	NLU-110 0204		S	SEDIMENT							2			-
11/15/02 13:40 U0353	NLU-110 0406		S	SEDIMENT							2			_
11/15/02 13:40 U0356	NLU-110 1012		S	SEDIMENT							7			
11/15/02 13:40 U0357	NLU-110 1214		S	SEDIMENT							7			-
11/15/02 13:40 U0360	NLU-110 1820		S	SEDIMENT							7			
11/15/02 13:40 U0361	NLU-110 2022		S	SEDIMENT							7			
11/15/02 14:50 U0386	NLU-117 0608		S	SEDIMENT							7			
11/15/02 14:50 U0387	NLU-117 0810		S	SEDIMENT	Lateriane						2			
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Printed on 4/3/2003

Page 1 of 2



Sample ID: METHOD BLANK

Lab Sample ID: FJ41MB LIMS ID: 03-4111 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: NA Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	0.2	0.2	U
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	2	2	U
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	0.6	0.6	U



Sample ID: NLU-126-SS-1020 SAMPLE

Lab Sample ID: FJ41A LIMS ID: 03-4111 Matrix: Sediment Data Release Authorized Reported: 04/09/03

QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/13/02 Date Received: 04/04/03

Percent Total Solids: 45.9%

Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
04/04/03	6010B	04/08/03	7440-50-8	Copper	2	1,400	
04/04/03	6010B	04/08/03	7439-92-1	Lead	20	1,580	
04/04/03	6010B	04/08/03	7440-66-6	Zinc	6	4,800	
	Date 04/04/03 04/04/03	Date Method 04/04/03 6010B 04/04/03 6010B	Date Method Date 04/04/03 6010B 04/08/03 04/04/03 6010B 04/08/03	Date Method Date CAS Number 04/04/03 6010B 04/08/03 7440-50-8 04/04/03 6010B 04/08/03 7439-92-1	Date Method Date CAS Number Analyte 04/04/03 6010B 04/08/03 7440-50-8 Copper 04/04/03 6010B 04/08/03 7439-92-1 Lead	Date Method Date CAS Number Analyte RL 04/04/03 6010B 04/08/03 7440-50-8 Copper 2 04/04/03 6010B 04/08/03 7439-92-1 Lead 20	Date Method Date CAS Number Analyte RL mg/kg-dry 04/04/03 6010B 04/08/03 7440-50-8 Copper 2 1,400 04/04/03 6010B 04/08/03 7439-92-1 Lead 20 1,580



Sample ID: NLU-126-SS-1020 DUPLICATE

Lab Sample ID: FJ41A LIMS ID: 03-4111 Matrix: Sediment Data Release Authorized JU Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/13/02 Date Received: 04/04/03

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Copper	6010B	1,400	1,450	3.5%	+/- 20%	
Lead	6010B	1,580	1,560	1.3%	+/- 20%	
Zinc	6010B	4,800	4,730	1.5%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met L-RPD Invalid, Limit = Detection Limit



Sample ID: NLU-126-SS-1020 MATRIX SPIKE

Lab Sample ID: FJ41A LIMS ID: 03-4111 Matrix: Sediment Data Release Authorized Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/13/02 Date Received: 04/04/03

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Copper	6010B	1,400	1,730	104	317%	Ĥ
Lead	6010B	1,580	2,120	420	129%	N
Zinc	6010B	4,800	5,100	104	288%	Н

Reported in mg/kg-dry

N-Control Limit Not Met H-% Recovery Not Applicable, Sample Concentration Too High NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%



Sample ID: NLU-116-SS-1020 SAMPLE

Lab Sample ID: FJ41B LIMS ID: 03-4112 Matrix: Sediment Data Release Authorized DK Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/11/02 Date Received: 04/04/03

Percent Total Solids: 25.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	4	421	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	40	440	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	10	790	



Sample ID: NLU-116-SS-2030 SAMPLE

Lab Sample ID: FJ41C LIMS ID: 03-4113 Matrix: Sediment Data Release Authorized; Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/11/03 Date Received: 04/04/03

Percent Total Solids: 25.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	4	171	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	40	360	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	10	460	



Sample ID: NLU-116-SS-0010 SAMPLE

Lab Sample ID: FJ41D LIMS ID: 03-4114 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/11/03 Date Received: 04/04/03

Percent Total Solids: 29.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	3	705	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	30	510	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	10	1,130	



Sample ID: NLU-126-SS-0010 SAMPLE

Lab Sample ID: FJ41E LIMS ID: 03-4115 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/13/02 Date Received: 04/04/03

Percent Total Solids: 31.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	3	2,170	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	30	1,360	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	9	4,580	

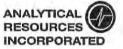


Sample ID: NLU-109 1012 SAMPLE

Lab Sample ID: FJ41F LIMS ID: 03-4116 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 18.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	5	194	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	50	460	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	20	420	



Sample ID: NLU-109 1214 SAMPLE

Lab Sample ID: FJ41GQC Report No: FJ41-The Retec GroupLIMS ID: 03-4117Project: Lake Union Sediment InvestigationMatrix: SedimentN005443Data Release Authorized:Date Sampled: 11/15/02Reported: 04/09/03Date Received: 04/04/03

Percent Total Solids: 96.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	1	174	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	10	350	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	3	341	



Sample ID: NLU-109 2628 SAMPLE

Lab Sample ID: FJ41H QC Report LIMS ID: 03-4118 Proj Matrix: Sediment Data Release Authorized AC Date S Reported: 04/09/03 Date Re

QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 18.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	5	216	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	50	320	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	20	570	



Sample ID: NLU-109 2830 SAMPLE

Lab Sample ID: FJ41I LIMS ID: 03-4119 Matrix: Sediment Data Release Authorized: MC Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 95.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	1	141	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	10	220	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	3	318	



Sample ID: NLU-109 3638 SAMPLE

Lab Sample ID: FJ41J LIMS ID: 03-4120 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 28.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	3	160	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	30	240	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	10	360	



Sample ID: NLU-109 3840 SAMPLE

Lab Sample ID: FJ41K LIMS ID: 03-4121 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 97.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	1	100	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	10	210	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	3	277	



Sample ID: NLU-110 0204 SAMPLE

Lab Sample ID: FJ41L LIMS ID: 03-4122 Matrix: Sediment Data Release Authorized M Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 23.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	2	125	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	20	150	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	6	222	



Sample ID: NLU-110 0406 SAMPLE

Lab Sample ID: FJ41M LIMS ID: 03-4123 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 97.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	1	104	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	10	140	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	3	195	



Page 1 of 1

Sample ID: NLU-110 1012 SAMPLE

Lab Sample ID: FJ41N LIMS ID: 03-4124 Matrix: Sediment Data Release Authorized: Reported: 04/09/03

QC Report No: FJ41-The Retec Group ' Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 29.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	3	106	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	30	170	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	10	230	

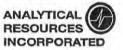


Sample ID: NLU-110 1214 SAMPLE

Lab Sample ID: FJ410 LIMS ID: 03-4125 Matrix: Sediment Data Release Authorized: M Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 97.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	1	77	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	10	110	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	3	153	



Sample ID: NLU-110 1820 SAMPLE

Lab Sample ID: FJ41P LIMS ID: 03-4126 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation . N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 25.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	2	81	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	20	150	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	6	210	



Sample ID: NLU-110 2022 SAMPLE

Lab Sample ID: FJ41Q LIMS ID: 03-4127 Matrix: Sediment Data Release Authorized Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 97.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	0.5	77.8	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	5	130	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	1	186	



Sample ID: NLU-117 0608 SAMPLE

Lab Sample ID: FJ41R LIMS ID: 03-4128 Matrix: Sediment Data Release Authorized: Reported: 04/09/03

QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 29.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	D4/04/03	6010B	04/08/03	7440-50-8	Copper	2	125	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	20	90	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	5	130	



Sample ID: NLU-117 0810 SAMPLE

Lab Sample ID: FJ41S LIMS ID: 03-4129 Matrix: Sediment Data Release Authorized Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 96.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	0.5	111	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	5	95	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	2	128	



Sample ID: NLU-117 2628 SAMPLE

Lab Sample ID: FJ41T LIMS ID: 03-4130 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ41-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 24.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/04/03	6010B	04/08/03	7440-50-8	Copper	2	183	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	20	410	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	6	324	



Sample ID: LAB CONTROL

Lab Sample ID: FJ41LCSQC Report No: FJ41-The Retec GroupLIMS ID: 03-4111Project: Lake Union Sediment InvestigationMatrix: SedimentN005443Data Release Authorized:Date Sampled: NAReported: 04/09/03Date Received; NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Copper	6010B	50.0	50.0	100%	
Lead	6010B	202	200	101%	
Zinc	6010B	48.2	50.0	96.4%	
Reported in mg	/kg				

N-Control limit not met Control Limits: 80-120%



Analytical Resources, Incorporated Analytical Chemists and Consultants

10 April 2003

Mark Larsen Retec, Inc. 1011 S.W. Klickitat Way Suite 207 Seattle, WA 98134

RE: Client Project: Lake Union Sediment Investigation/ N005443 ARI Project: FJ42

Dear Mark:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Eight sediment samples were received on April 4, 2003. The samples were received intact and there were no discrepancies in the paperwork. The samples were analyzed for metals as requested.

A matrix spike (MS) was prepared and analyzed in conjunction with sample NLU-117-2830. The percent recovery for lead was slightly low following the initial analysis of the MS. Since the percent recovery for lead was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the low recovery. No corrective actions were taken based on the MS results.

A copy of these reports will be kept on file with ARI. Should you have any questions or problems, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

n a D. Jani

Mark D. Harris Project Manager 206/695-6210 mark@arilabs.com

Enclosures

cc: file FJ42

MDH/esj

Battelle

Chain of Custody

Shipment No: SHP-030403-03

Proj. No: N005443	Proj. Name: Lake Unior	Proj. Name: Lake Union Sediment Investigation					A	M	¥	ARI Metals Analysis	sis sis	
SAMPLERS: Singature	ature		ANALYSIS "NUMBER O	REQUE F CONT	STED -	FID_T	PAR.	BIOM	- and the state of			Con
DATE/TIME	BATTELLE ID	CLIENT ID	FIELD LOC	MATRIX	OIL	S LKANE	THER 3	ARKER	 nanosianina majimp	مومع -	and a	tainers
11/15/02 14:50	U0397	NLU-117 2830		SEDIMENT						7		Ò
11/15/02 14:50	U0406	NLU-117 4648		SEDIMENT						7		
11/18/02 15:40	U0454	NLU-119 0406		SEDIMENT						7		
11/18/02 15:40	U0455	NLU-119 0608		SEDIMENT						2		
11/18/02 15:40	U0459	NLU-119 1416		SEDIMENT						2		
11/18/02 15:40	U0460	NLU-119 1618		SEDIMENT						3		
11/18/02 15:40	U0463	NLU-119 2224		SEDIMENT						2		
11/18/02 15:40	U0464	NLU-119 2426		SEDIMENT						2		



Printed on 4/3/2003

Page 2 of 2



Sample ID: METHOD BLANK

Page 1 of 1

Lab Sample ID: FJ42MB LIMS ID: 03-4131 Matrix: Sediment Data Release Authorized M Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: NA Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	0.2	0.2	U
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	2	2	U
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	0.6	0.6	U



Page 1 of 1

Sample ID: NLU-117 2830 SAMPLE

Lab Sample ID: FJ42A LIMS ID: 03-4131 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 95.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	1	175	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	10	250	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	3	278	



Page 1 of 1

Lab Sample ID: FJ42A LIMS ID: 03-4131 Matrix: Sediment Data Release Authorized Reported: 04/09/03

Sample ID: NLU-117 2830 DUPLICATE

QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Copper	6010B	175	157	10.8%	+/- 20%	
Lead	6010B	250	240	4.18	+/- 20%	
Zinc	6010B	278	287	3.2%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

FORM-VI



Page 1 of 1

Lab Sample ID: FJ42A LIMS ID: 03-4131 Matrix: Sediment Data Release Authorized Reported: 04/09/03

Sample ID: NLU-117 2830 MATRIX SPIKE

QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

MATRIX SPIKE QUALITY CONTROL REPORT

and the second	Analysis	according to	14	Spike	8	
Analyte	Method	Sample	Spike	Added	Recovery	Q
Copper	6010B	175	213	50	76.0%	
Lead	6010B	250	390	200	70.0%	N
Zinc	6010B	278	327	50	98.0%	H

Reported in mg/kg-dry

N-Control Limit Not Met H-% Recovery Not Applicable, Sample Concentration Too High NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%



Page 1 of 1

Sample ID: NLU-117 4648 SAMPLE

Lab Sample ID: FJ42B LIMS ID: 03-4132 Matrix: Sediment Data Release Authorized: Acc Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/15/02 Date Received: 04/04/03

Percent Total Solids: 27.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	3	156	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	30	240	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	10	490	



Sample ID: NLU-119 0406 SAMPLE

Lab Sample ID: FJ42C LIMS ID: 03-4133 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled; 11/18/02 Date Received: 04/04/03

Percent Total Solids: 21.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	4	207	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	40	280	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	10	400	



Sample ID: NLU-119 0608 SAMPLE

Lab Sample ID: FJ42D LIMS ID: 03-4134 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/18/02 Date Received: 04/04/03

Percent Total Solids: 94.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	1	235	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	10	280	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	3	388	



Sample ID: NLU-119 1416 SAMPLE

Lab Sample ID: FJ42E LIMS ID: 03-4135 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/18/02 Date Received: 04/04/03

Percent Total Solids: 17.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	6	215	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	60	280	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	20	440	



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Sample ID: NLU-119 1618 SAMPLE

Lab Sample ID: FJ42F LIMS ID: 03-4136 Matrix: Sediment Data Release Authorized Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/18/02 Date Received: 04/04/03

Percent Total Solids: 94.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	1	216	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	10	250	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	з	386	



Sample ID: NLU-119 2224 SAMPLE

Lab Sample ID: FJ42G LIMS ID: 03-4137 Matrix: Sediment Data Release Authorized: Reported: 04/09/03 Percent Total Solids: 18.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	3	212	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	30	230	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	В	343	



Page 1 of 1

Sample ID: NLU-119 2426 SAMPLE

Lab Sample ID: FJ42H LIMS ID: 03-4138 Matrix: Sediment Data Release Authorized Reported: 04/09/03 QC Report No: FJ42-The Retec Group Project: Lake Union Sediment Investigation N005443 Date Sampled: 11/18/02 Date Received: 04/04/03

Percent Total Solids: 96.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/07/03	6010B	04/08/03	7440-50-8	Copper	1	252	
3050B	04/07/03	6010B	04/08/03	7439-92-1	Lead	10	260	
3050B	04/07/03	6010B	04/08/03	7440-66-6	Zinc	3	410	



Sample ID: LAB CONTROL

Lab Sample ID: FJ42LCS LIMS ID: 03-4131 Matrix: Sediment Data Release Authorized Autorized Au

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	* Recovery	Q
Copper	6010B	49.4	50.0	98.8%	
Lead	6010B	204	200	102%	
Zinc	6010B	50.1	50.0	100%	

Reported in mg/kg

N-Control limit not met Control Limits: 80-120%

SUB-ATTACHMENT 2D-3.3 Battelle Sedimentation Rates

Core NLU 109 (Confirmed 1/7/03)

S = 0.16

		Segment Depth	Mean	% Dry	Sediment	Date of Deposition	Sediment Accumulation
a 1 "	~ .	•	Depth	•	Age	1	
Sample #	Sponsor code	(cm)	(cm)	Weight	(Years)	(Year)	Rate (cm/yr)
1920*1	NLU-109-0-2	0-2	1.0	11.7	1.17	2001	0.853
1920*2	NLU-109-2-4	2-4	3.0	13.7	3.81	1998	0.786
1920*3	NLU-109-4-6	4-6	5.0	13.6	7.90	1994	0.633
1920*4	NLU-109-6-8	6-8	7.0	13.7	12.3	1990	0.569
1920*5	NLU-109-8-10	8-10	9.0	14.3	16.8	1985	0.537
1920*7	NLU-109-12-14	12-14	13.0	17.7	21.9	1980	0.595
1920*9	NLU-109-16-18	16-18	17.0	18.7	29.5	1972	0.575
1920*11	NLU-109-20-22	20-22	21.0	16.4	37.9	1964	0.554
1920*13	NLU-109-24-26	24-26	25.0	18.6	46.3	1956	0.540
1920*15	NLU-109-28-30	28-30	29.0	20.0	54.9	1947	0.528
1920*17	NLU-109-32-34	32-34	33.0	23.6	65.0	1937	0.508
1920*20	NLU-109-38-40	38-40	39.0	21.8	76.0	1926	0.513
1920*25	NLU-109-48-50	48-50	49.0	19.8	90.1	1912	0.544
1920*30	NLU-109-58-60	58-60	59.0	22.5	109	1893	0.543

F = sample selected for forensic hydrocarbon analyses

S = sedimentation rate in g/cm2/year

Core NLU 110 (Confirmed 1/24/03)

S = 0.14

		Segment Depth	Mean Depth	% Dry	Sediment Age	Date of Deposition	Sediment Accumulation
Sample #	Sponsor code	(cm)	(cm)	Weight	(Years)	(Year)	Rate (cm/yr)
1920*81	NLU-110-0-2	0-2	1.0	22.3	3.26	1999	0.307
1920*82	NLU-110-2-4	2-4	3.0	23.6	10.0	1992	0.299
1920*83	NLU-110-4-6	4-6	5.0	22.7	20.4	1982	0.245
1920*84	NLU-110-6-8	6-8	7.0	24.1	30.7	1971	0.228
1920*85	NLU-110-8-10	8-10	9.0	24.9	41.6	1960	0.216
1920*87	NLU-110-12-14	12-14	13.0	26.7	53.3	1949	0.244
1920*89	NLU-110-16-18	16-18	17.0	29.8	70.6	1931	0.241
1920*91	NLU-110-20-22	20-22	21.0	22.2	88.3	1914	0.238
1920*93	NLU-110-24-26	24-26	25.0	19.0	101	1901	0.248
1920*95	NLU-110-28-30	28-30	29.0	21.7	112	1890	0.260
1920*97	NLU-110-32-34	32-34	33.0	21.6	124	1878	0.266
1920*100	NLU-110-36-38	38-40	39.0	28.5	138	1864	0.282
1920*105	NLU-110-48-50	48-50	49.0	27.2	161	1841	0.305
1920*110	NLU-110-58-60	58-60	59.0	57.2	199	1803	0.297

F = sample selected for forensic hydrocarbon analyses

S = sedimentation rate in g/cm2/year

Core NLU119 (Confirmed 2/3/03)

S = 0.11

		Segment Depth	Mean Depth	% Dry	Sediment Age	Date of Deposition	Sediment Accumulation
~	~ .	•	-		-	1	
Sample #	Sponsor code	(cm)	(cm)	Weight	(Years)	(Year)	Rate (cm/yr)
1920*229	NLU-119-0-2	0-2	1.0	16.5	2.83	1999	0.353
1920*230	NLU-119-2-4	2-4	3.0	16.3	8.46	1994	0.355
1920*231	NLU-119-4-6	4-6	5.0	16.4	16.9	1985	0.296
1920*232	NLU-119-6-8	6-8	7.0	15.9	25.2	1977	0.278
1920*233	NLU-119-8-10	8-10	9.0	15.6	33.4	1969	0.270
1920*235	NLU-119-12-14	12-14	13.0	16.0	41.4	1961	0.314
1920*237	NLU-119-16-18	16-18	17.0	15.7	52.1	1950	0.327
1920*239	NLU-119-20-22	20-22	21.0	16.5	63.0	1939	0.334
1920*241	NLU-119-24-26	24-26	25.0	17.6	74.3	1928	0.336
1920*243	NLU-119-28-30	28-30	29.0	20.6	87.0	1915	0.333
1920*245	NLU-119-32-34	32-34	33.0	24.6	102.3	1900	0.323
1920*248	NLU-119-38-40	38-40	39.0	34.1	123	1879	0.317
1920*253	NLU-119-48-50	48-50	49.0	29.3	154	1848	0.318
1920*258	NLU-119-58-60	58-60	59.0	55.2	211	1791	0.280

F = sample selected for forensic hydrocarbon analyses

S = sedimentation rate in g/cm2/year

Core NLU117 (Confirmed 2/17/03)

S = 0.30

		Segment Depth	Mean Depth	% Dry	Sediment Age	Date of Deposition	Sediment Accumulation
Sample #	Sponsor code	(cm)	(cm)	Weight	(Years)	(Year)	Rate (cm/yr)
1920*113	NLU-117-0-2	0-2	1.0	30.7	2.34	2000	0.428
1920*114	NLU-117-2-4	2-4	3.0	30.8	7.03	1995	0.427
1920*115	NLU-117-4-6	4-6	5.0	26.4	13.6	1988	0.367
1920*116	NLU-117-6-8	6-8	7.0	24.1	19.6	1982	0.358
1920*117	NLU-117-8-10	8-10	9.0	22.6	24.7	1977	0.365
1920*119	NLU-117-12-14	12-14	13.0	23.6	29.5	1972	0.440
1920*121	NLU-117-16-18	16-18	17.0	21.5	35.7	1966	0.476
1920*123	NLU-117-20-22	20-22	21.0	17.1	41.4	1961	0.507
1920*125	NLU-117-24-26	24-26	25.0	18.9	46.3	1956	0.539
1920*127	NLU-117-28-30	28-30	29.0	19.5	51.0	1951	0.568
1920*129	NLU-117-32-34	32-34	33.0	28.1	56.8	1945	0.581
1920*132	NLU-117-38-40	38-40	39.0	24.1	63.5	1939	0.614
1920*137	NLU-117-48-50	48-50	49.0	25.8	70.9	1931	0.691
1920*142	NLU-117-58-60	58-60	49.0	63.1	83.1	1919	0.590

F = sample selected for forensic hydrocarbon analyses

S = sedimentation rate in g/cm2/year

Core NLU125 (Unconfirmed)

S = 0.043

		Segment Depth	Mean Depth	% Dry	Sediment Age	Date of Deposition	Sediment Accumulation
Sample #	Sponsor code	(cm)	(cm)	Weight	(Years)	(Year)	Rate (cm/yr)
1920*181	NLU-125-0-2	0-2	1.00	9.24	3.08	1999	0.325
1920*182	NLU-125-2-4	2-4	3.0	11.3	10.3	1992	0.290
1920*183	NLU-125-4-6	4-6	5.00	8.34	20.2	1982	0.247
1920*184	NLU-125-6-8	6-8	7.0	10.2	30.6	1971	0.229
1920*185	NLU-125-8-10	8-10	9.0	13.2	41.9	1960	0.215
1920*187	NLU-125-12-14	12-14	13.0	10.8	54.6	1947	0.238
1920*189	NLU-125-16-18	16-18	17.0	12.0	72.9	1929	0.233
1920*191	NLU-125-20-22	20-22	21.00	9.34	88.7	1913	0.237
1920*193	NLU-125-24-26	24-26	25.0	12.1	105	1897	0.239
1920*195	NLU-125-28-30	28-30	29.00	9.42	120	1882	0.243
1920*197	NLU-125-32-34	32-34	29.0	19.3	140	1862	0.207
1920*200	NLU-125-38-40	38-40	39.0	12.2	163	1839	0.240
1920*205	NLU-125-48-50	48-50	49.0	11.2	207	1795	0.237
1920*210	NLU-125-58-60	58-60	59.0	10.5	237	1765	0.249

F = sample selected for forensic hydrocarbon analyses

S = sedimentation rate in g/cm2/year

ATTACHMENT 2D-4 Chemical Forensics Sampling Report 2006

Seattle Law Department Gas Works Park

Chemical Forensics Sampling Report

Prepared for City of Seattle

Prepared by FLOYD | SNIDER

August 1, 2006

DRAFT

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1.0 Introduction

1.1 PURPOSE

This data report was prepared by Floyd|Snider to document two sediment investigations conducted in the Gas Works Sediment Western Study Area (GWS-WSA) Area of Investigation (AOI) Figure 1.1. Both sampling events were conducted by Floyd|Snider with assistance from MCS Environmental, Inc. (MCS), and were performed at the request of the City of Seattle.

The first sampling event occurred in August of 2004 and included the collection of dense non-aqueous phase liquid (DNAPL), a tar-like material, from upland monitoring wells located in the City of Seattle Police Department's Harbor Patrol Facility. These wells are downgradient from the historical tar plant located adjacent to the historical manufactured gas plant at Gas Works Park. Sediment samples were collected off-shore from the park in the GWS-WSA. The sediment investigation and well sampling in 2004 were performed in accordance with the Sampling and Analysis Plan (SAP) and Work Plan (MCS 2004a, MCS 2004b). The purpose of this investigation was to gather additional information about the nature and characteristics of the nearshore environment and the DNAPL that has been found in the area.

The second sampling event was conducted in May of 2005 by the City of Seattle as part of the Remedial Investigation and Feasibility Study (RI/FS). The sampling event consisted of surface and subsurface sediment sampling as well as geotechnical investigations. The sediment investigation was performed in accordance with a RI/FS SAP and a RI/FS Quality Assurance Project Plan (QAPP), which are presented in Appendices B and C of the Current Situation Report and RI/FS Work Plan (Floyd|Snider 2005a) and approved by the Washington State Department of Ecology (Ecology) in April 2005. The purpose of this investigation was to further characterize the horizontal and vertical extent of contamination in sediments and to evaluate the geotechnical characteristics of sediments within the GWS-WSA.

1.2 PROJECT BACKGROUND

Gas Works Park is located on the northern shore of Lake Union, a heavily developed urban lake located north of downtown Seattle, Washington. Historical operations at the site have resulted in environmental contamination. The Gas Works Uplands have been investigated and remedial construction is complete, as documented in a formal Consent Decree (CD) between Ecology, Puget Sound Energy (PSE), and the City (State of Washington 1999). The investigation and remediation of Lake Union sediments offshore from the Gas Works Uplands are being addressed in a second scope of work.

Ecology, the City, and PSE have entered into an Agreed Order (AO) (State of Washington 2005) to conduct an RI/FS and associated planning for the Gas Works Sediment Area (GWS). The GWS is delineated by an AOI line. The AOI is the area where the remedial investigations and feasibility studies will be focused. The AO further defines two study areas within the AOI line, the Western Study Area (WSA) and the Eastern Study Area. The Eastern Study Area

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RI/FS process will be completed by PSE. The City is conducting the RI/FS process for the Western Study Area. This document is focused on the GWS-WSA.

2.0 Field Sampling Events

The August 2004 NAPL sampling program included the sampling and collection of sediment samples from 21 core locations and the collection of DNAPL samples from two shoreline monitoring wells. Field activities followed the sampling and analysis procedures described in the SAP (MCS 2004b) and the quality assurance procedures described in the Work Plan (MCS 2004a) with minor deviations. A video survey and diver survey were conducted prior to sampling and was used to refine the locations of sediment sample collection. The SAP and sampling collection completed were conducted in accordance with Ecology's Sediment Sampling and Analysis Plan Appendix (Ecology 2003).

The May 2005 RI sampling program included the collection and testing of sediment from 21 environmental core locations, 16 surface locations, and six geotechnical core locations within the GWS-WSA. Field activities followed the sampling and analysis procedures described in the RI/FS SAP and the quality assurance procedures described in the RI/FS QAPP, which were presented in Appendices B and C of the Current Situation Report and RI/FS Work Plan (Floyd|Snider 2005a).

The sediment and DNAPL sampling locations for both field events are presented in Figure 2.1.

2.1 DNAPL UPLAND COLLECTION

As part of the 2004 investigation, DNAPL samples were collected from two upland monitoring wells (DW-4 and DW-5) located within the Harbor Patrol facility as shown in Figure 2.1. DNAPL samples were collected using a bottom-loading narrow-diameter high density polyethylene (HDPE) disposal bailer that was weighted and lowered to the bottom of the well and then retrieved. DNAPL samples were poured into a 4-oz. glass laboratory supplied jar. The samples were stored on ice in a cooler and transported under chain-of-custody to Zymax Forensics Inc., located in San Louis Obispo, California, for polycyclic aromatic hydrocarbons (PAHs) forensics analysis. The chromatograms and data are presented in Appendix A.

A DNAPL sample was also collected from upland monitoring well DW-4 during the RI/FS sampling program, submitted to PTS Laboratories and tested for kinematic viscosity and specific gravity, interfacial/surface tension, and water content.

2.2 SUBSURFACE SEDIMENT SAMPLING

2.2.1 August 2004 NAPL Investigation

Subsurface sediment cores were collected with the MudMole[™] pneumatic core. The sampler consisted of a 4-inch square aluminum core tube with a pneumatic powered driving assembly attached to the top with a quick release pin. The core sampler was operated by personnel on the sampling vessel in shallow waters, and diver assisted in deeper waters.

Several core locations were moved from the proposed core locations due to field conditions (typically refusal due to debris or barges moored over proposed sampling location) that prohibited sample collection from the initially proposed location. All cores were re-located less than 5 meters away from the proposed location. A core was not collected from one proposed location, sediment station 4-2 due to the presence of wood debris.

The core tubes were processed on site and sediment samples collected from the cores following the procedures described in the SAP (MCS 2004b). A Washington State Licensed Geologist logged each sediment core. In addition to the sediment classification, the presence of organics, evidence of anthropogenic inputs (i.e., debris, wood chips), and the presence of DNAPL were indicated on the core logs. Core logs for the August 2004 sampling event are presented in Appendix B.

Approximately 54 sediment samples were collected from the 21 core locations. In addition to sediment samples collected from subsurface cores, three grab samples (1-1-G, 1-4-G, and 3-1-G) were collected by a diver. Grab sample 1-1-G consisted of a coarse black material with silt/clay sized grains that were relatively soft and crushable. Grab sample 1-4-G consisted of black, stained, wood splinters. Grab sample 3-1-G consisted of fluffy, light-weight organic material, with no visible free product, however additional surface sediment that was collected in the grab contained a relatively large quantity of oil.

In general, one sediment sample was collected from each stratum of the core. The sample intervals were typically less than 0.5 feet in length. The most visibly contaminated (i.e., odor, sheen, DNAPL, oil) portion of the sediment interval was selected for sample collection and forensics analysis. The volume of sediment collected for each sediment sample was one 4-oz glass jar. A total of 54 sediment samples were collected from subsurface cores. The samples were stored on ice in a cooler and transported under chain-of-custody to Zymax Forensics Inc. Sediment samples were held at the laboratory and a subset of 16 sediment core and grab samples were selected for PAHs forensics analysis. The chromatograms and data are presented in Appendix A.

2.2.2 May 2005 Remedial Investigation and Feasibility Study

Subsurface sediment cores were collected from 22 locations, as shown in Figure 2.1. Six core locations (GWS-EC05, GWS-EC06, GWS-EC11, GWS-EC14, GWS-EC15, and GWS-EC20) were moved during sampling due to field conditions (typically, refusal due to debris and/or barges moored over proposed sampling location) that prohibited sample collection from the initially proposed location. In addition, field duplicate cores (GWS-EC24 and GWS-EC23) were collected from two core locations (GWS-EC09 and GWS-EC11, respectively).

A Washington State Licensed Geologist logged each sediment core using the Unified Soil Classification System (USCS) (ASTM D 2488). In addition to the sediment classification, the presence of organics, evidence of anthropogenic inputs (i.e., debris, wood chips), and the presence of DNAPL were indicated on the core logs. Following the results of laboratory grain-size analyses, sediment classifications were updated to reflect the grain-size distribution per ASTM D 2487. Core logs for the May 2005 sampling event are presented in Appendix C.

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Out of the 22 core locations, subsurface sediment samples were collected from 21 cores for analytical testing. Core samples were submitted for chemical analysis on the basis of geologic stratigraphy or physical features, such as odor, sheen, DNAPL, and wood debris. Each sample represented between 0.5 and 4.6 feet *in situ*, with an average *in situ* thickness of approximately 2 feet, depending on the percent recovery and sample volume requirements. In the RI/FS SAP, an *in situ* thickness of approximately 1 foot was proposed but was generally not obtained due to core recoveries and sample volume requirements. Samples were not collected from GWS-EC05 due to poor recoveries; however, geologic information was obtained and a core log was generated for this location. Subsurface sediment samples were submitted to ARI for analytical testing, as described in Section 3.1. In addition, a subset of samples were sent to Zymax Forensics Inc., for supplemental PAHs analysis, as described in Section 3.1.1.

2.3 SURFACE SEDIMENT SAMPLING

As part of the May 2005 RI/FS sampling, surface (0-10 cm) sediment samples were collected from 16 locations, as shown in Figure 2.1. Two initially proposed surface sample locations (GWS-SG05 and GWS-SG16) were moved to be co-located with environmental core locations near the shoreline to increase data density in these areas. A field duplicate sample (GWS-SG17) was collected from the surface location GWS-SG07.

Surface samples were collected using a diver-assisted "cookie-cutter" hand-corer instead of the modified van Veen grab sampler proposed in the RI/FS SAP in the CSR (Floyd|Snider 2005a). This deviation was prompted due to the potential for over-penetration into the soft sediment by the van Veen grab sampler. This over penetration was demonstrated during test deployments performed during field activities. The "cookie-cutter" sampler was successful in collecting the upper 10 cm of surface sediment with minimal disturbance and no observable "losses" of material during sampling.

All surface sediment samples were submitted to Analytical Resources, Inc. (ARI) for analyses, as described in Section 3.1. In addition, a subset of samples were sent to Zymax Forensics Inc. I for supplemental PAHs analysis, as described in Section 3.1.1. The chromatograms and data are presented in Appendix A.

2.4 GEOTECHNICAL INVESTIGATION

As part of the May 2005 RI/FS sampling, geotechnical investigations were performed to characterize the subsurface strength properties of the sediments. The geotechnical investigation program involved completion of hollow stem auger borings (including the Standard Penetration Test [SPT]), vane shear [VS] tests, and cone penetrometer tests [CPT] at the locations shown on Figure 2.1. Sample collection (during hollow stem auger drilling) and *in situ* testing procedures followed the RI/FS SAP (Floyd|Snider 2005a).

A Washington State Licensed Geologist was present during the geotechnical investigations. Subsurface sediment samples were collected during hollow stem auger drilling and classified as shown on the boring logs. Boring logs, descriptions and results of the *in situ* geotechnical investigations (VS and CPTs) are presented in Appendix C of the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

Subsurface sediment samples were additionally sent to ARI for physical testing in order to further characterize the sediment strength properties within the geologic units encountered during hollow stem auger drilling. Detailed descriptions and results of physical laboratory testing are presented in Appendix D of the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

2.5 REPORTING

The 2005 RI/FS Sampling has also been reported in more detail in the Gas Works Sediment Western Study Area Data Report submitted to Ecology on December 7, 2005. No detailed evaluation of the 2004 sampling event or the supplemental PAH analysis in the 2005 RI/FS event has been presented at this time.

3.0 Laboratory Testing

This data report focuses on presenting, but not interpreting, the results of the chemical forensics analyses, while the additional analytical and geotechnical testing conducted as part of the RI/FS sampling program is described in detail in the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b). Sediment samples, collected as part of the August 2004 NAPL investigation, were only submitted for chemical forensics analyses.

3.1 ANALYTICAL TESTING

Surface and subsurface sediment samples collected as part of the May 2005 RI were submitted to ARI and analyzed for the following constituents:

- Conventional parameters: ammonia, total organic carbon (TOC), and sulfide
- Metals: antimony, arsenic, cadmium, copper, lead, mercury, nickel, silver, and zinc
- Tributyltin (TBT)
- Volatile organic compounds (VOCs): benzene, ethylbenzene, and toluene
- Semi-volatile organic compounds (SVOCs)
 - * PAHs
 - * Phthalates: di-n-butyl phthalate and bis(2-ethylhexyl)phthalate (BEHP)
 - * Carbazole
 - * Phenol
- Polychlorinated biphenyls (PCBs)
- Grain-size distribution

3.1.1 Chemical Forensics Analysis

A selected subset of samples collected from both the August 2004 NAPL investigation and the May 2005 RI/FS were submitted to Zymax Forensics Inc. for PAHs forensics analysis. The NAPL investigation and RI samples that were submitted for forensic analysis are presented in Table 3.1.

The samples were subjected to Gas Chromatography/Mass Spectrum (GC/MS) full scan analyses. Sediment samples (25 g) were sonicated with methylene chloride solvent and the solvent extracted to 1 to 5 mL. The DNAPL samples collected from the shoreline monitoring wells were diluted with methylene chloride to the required hydrocarbon concentration. The diluted DNAPL or sediment extract was injected into a gas chromatograph (GS) equipped with a column in order to separate the individual hydrocarbons. The hydrocarbons within the C_8 to C_{40} range were detected and identified with a mass spectrometer (MS). Specific ion fragments were scanned, and a number of hydrocarbon classes were generated and compared and relatively

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quantified based on the respective peak areas. The chromatogram results of the forensic analyses are presented in Appendix A.

3.1.2 DNAPL Physical Properties Analysis

A sample of DNAPL, collected during the RI/FS sampling, from uplands Monitoring Well DW-4, as shown in Figure 2.1, was tested for kinematic viscosity and specific gravity (ASTM D445 and API RP40), interfacial/surface tension (ASTM D971), and water content (ASTM D96). Testing results are discussed in Section 4.3 and Appendix E of the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

3.1.3 Organic Content Analysis

As part of the RI/FS sampling, four sediment samples from two environmental cores (GWS-EC16 and GWS-EC21) were analyzed for ash content using ASTM D 2974-00 in order to determine the organic content of the material. These analytical results are discussed in Section 4.4 and Appendix E of the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

3.2 GEOTECHNICAL TESTING

Physical laboratory tests were performed by ARI on select subsurface samples collected during the RI/FS sampling, using a hollow stem auger. Physical laboratory tests were performed to evaluate the following sediment properties as part of the geotechnical investigation program:

- Moisture content
- Grain-size
- Atterberg Limits
- Specific gravity
- Triaxial unconsolidated undrained (UU) shear strength
- One dimensional consolidation behavior

Detailed descriptions and results of all physical laboratory testing performed under the geotechnical investigation are presented in Appendix D and Section 4.6 of the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

4.0 Results

4.1 PHYSICAL CONDITIONS

The following section presents a discussion of the physical conditions encountered during both sampling events in the GWS-WSA, including the geologic units (stratigraphy), as well as the presence of anthropogenic inputs such as fill and DNAPL. Geologic cross-sections prepared along the lines of section, shown in Figure 4.1, are presented in Figures 4.2, 4.3, and 4.4. Additionally a geologic cross section that extends from the uplands to the sediments depicts the stratigraphy and presence of DNAPL in historical core and well samples. This cross section, Figure 3.2, was obtained from the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b) and is included to provide additional information on the transition of the strata from the uplands of Gas Works Park to the sediments.

4.1.1 Sediment Stratigraphy

The stratigraphy within the GWS-WSA, as observed in sediment cores collected during these and previous investigations, includes glacial deposits from the Vashon stade of the Frasier glaciation, recent post-glacial lake deposits, and shoreline fill material. These deposits can be described as the following geologic units (from youngest to oldest):

Gas Works Fill. This material consists of loose, wet to dry, gray, brown, and black, poorly graded sand with varying amounts of silt, gravel and clay. Material also includes ash, cinders, wood, brick fragments, concrete, and tar.

Upper Recent Deposits (RD_U). These lake deposits consist of very soft, wet, brown to black, sandy silt and organic silt, with wood chunks and debris grading to very soft, wet, gray clay with varying amounts of silt. Deposition of the RD_U generally began during the initiation of industrial practices along the shores of Lake Union; therefore, this material is likely to contain sediment contaminants associated with historical and current industrial practices. This material was found overlying the Gas Works Fill and Lower Recent Deposits (RD_L).

Lower Recent Deposits (RD_L). These deposits consist of very soft, wet, olive brown to dark brown, sandy organic silt with localized thin fine- to medium-grained sand lenses. This material is a Holocene, post-glacial lacustrine deposit that is considered to have been deposited prior to the urbanization of Lake Union.

Vashon Recessional Outwash or Stratified Drift. This deposit consists of loose to medium dense, moist to wet, gray, slightly silty to silty, fine- to medium-grained sand with varying amounts of gravel and sandy silt interbeds. This stratified material was deposited in broad outwash channels during the recession or ablation of the Vashon glacier and, therefore, was not glacially overridden. This material was generally found in nearshore environmental cores (GWS-EC05, GWS-EC06, and GWS-EC07) and two geotechnical borings (GWS-GC03 and GWS-GC04) within the eastern portion of the GWS-WSA.

Vashon Advance Outwash or Stratified Drift. This deposit consists of very dense, moist to wet, gray, fine- to medium-grained sand with trace silt and sandy gravel and silt interbeds. This stratified material was deposited in broad outwash channels ahead of the advancing Vashon glacier and, therefore, is glacially overridden. This deposit was encountered in one nearshore environmental core (GWS-EC05) within the eastern portion of the GWS-WSA and in four (nearshore and offshore) geotechnical borings (GWS-GC01 through GWS-GC04). This deposit is generally distinguished from the recessional stratified drift by a higher density.

Also a Glaciolacustrine Clay was encountered below the RD_L in two deep offshore geotechnical borings (GWS-GC05 and GWS-GC06). This deposit consists of very soft, wet, gray clay with fine-grained sand and silty sand lenses. This material is approximately 20 feet thick and appears to be of glacial origin and was not observed in nearshore geotechnical borings. Field-observed densities indicate this unit is not glacially overridden and is not consistent with the recessional stratified drift material.

4.1.2 DNAPL Occurrence

DNAPL was observed in 19 cores collected during the 2004 NAPL investigation and in 12 cores collected during the 2005 RI/FS investigation. DNAPL was encountered in the RD_U, RD_L, and Stratified Drift units as discontinuous layers at variable depths.

Photographs of the sediment cores collected during the NAPL investigation in August 2004 are presented in Appendix D.

4.1.2.1 Contaminant Transport Pathways

Based on the observed oil and DNAPL contamination seen during both the 2004 NAPL investigation and the 2005 RI/FS sampling event there are multiple transport pathways that can potentially contribute to sediment contamination at the surface as well as at depth. Photographs of the sediment cores collected during the NAPL investigation are presented in Appendix D. The distribution of sediment contamination and transport pathways include the following:

- Sediment Surface and Surface Deposition: There is a black surface layer that exists above or as part of the Gas Works Fill. This surface layer was observed to routinely contain clay, black oil, wood fragments and often had a gelatinous texture. This layer of contamination as seen in NAPL cores 1-1, 1-2, 1-3, 2-2A, and 3-3, among others, is likely representative of recent sedimentation, over-water contaminant releases, and possible discharge of contaminated materials to Lake Union. In localized areas free product was observed, which appeared to penetrate underlying sediment units.
- Recent Lake Deposits and Seepage: The RD_U and RD_L units do not appear to be completely impermeable to DNAPL seepage from surface contamination. In multiple cores (3-3, 3-3 Rep 3, 5-4) carry down of the surface oil and DNAPL material was observed through veins in the organic silt and sand. In core 3-3, DNAPL was observed underlying the RD_L unit, potentially on the surface of the Stratified Drift.

Veins were observed from the bottom of the RD_L unit, extending upwards vertically into the unit. These veins contained DNAPL and oil. The possible transport mechanism for the potentially upward vertical veining of the DNAPL and oil from below is uncertain.

• Stratified Drift and Lateral Transport: Brightly colored sheens, oil staining, and black oil were observed in localized sections of the recessional outwash (or stratified drift) in cores 2-2A and 3-3 Rep 3. The observed contamination is suggestive of lateral transport of PAH-impacted groundwater and/or DNAPL originating from adjacent upland areas, traveling through silt/sand lenses or preferential pathways of the stratified drift and discharging at various depths in the sediments.

4.2 ANALYTICAL RESULTS

The results of the analytical testing and the geotechnical testing performed on sediment samples collected as part of the May 2005 RI/FS sampling program are presented in detail in the Gas Works Sediment Western Study Area Data Report (Floyd|Snider 2005b).

The results of the chemical forensics analyses for both sampling events, presented as relative hydrocarbon quantitation, are shown in Table 4.1 and the chromatograms are presented in Appendix A. No evaluation and interpretation of the forensics results have been prepared at this time.

5.0 References

- Floyd|Snider. 2005a. Gas Works Sediment Western Study Area Current Situation Report and RI/FS Work Plan. Prepared for City of Seattle, Seattle Public Utilities. 21 March.
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- MCS Environmental, Inc. (MCS). 2004b. North Lake Union Sediment Survey, Sampling and Analysis Plan. Prepared for Floyd|Snider. 15 July.
- State of Washington. 1999. State of Washington Superior Court. Consent Decree No. 99-2-52532-9SEA. State of Washington, Department of Ecology, Plaintiff, v. The City of Seattle and Puget Sound Energy, Defendant. December.
- State of Washington. 2005. State of Washington Superior Court. Agreed Order No. DE 2008. March.
- Washington State Department of Ecology (Ecology). 2003. Sediment Sampling and Analysis Plan Appendix. Publication No. 03-09-043. April.

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Chemical Forensics Sampling Report

Tables

DRAFT

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Sample ID	Matrix	Investigation, Date					
3401100-8028	Sediment	NAPL, August 2004					
3401100-8035	Sediment	NAPL, August 2004					
3401100-8043	Sediment	NAPL, August 2004					
3401100-8040	Sediment	NAPL, August 2004					
3401100-8020	Sediment	NAPL, August 2004					
3401100-8017	Sediment	NAPL, August 2004					
3401100-89022	Sediment	NAPL, August 2004					
3401100-8032	Sediment	NAPL, August 2004					
3401100-8030	Sediment	NAPL, August 2004					
3401100-8056	Sediment	NAPL, August 2004					
3401100-8011	Sediment	NAPL, August 2004					
3401100-8001	Sediment	NAPL, August 2004					
3401100-8050	Sediment	NAPL, August 2004					
3401100-8054	Sediment	NAPL, August 2004					
1-1-G	Solid, black, relatively soft sand to gravel sized material	NAPL, August 2004					
3-1-G	"Fluffy" material on surface, that produces oil drops	NAPL, August 2004					
DW-4	DNAPL from well DW-4	NAPL, August 2004					
DW-5	DNAPL from well DW-5	NAPL, August 2004					
GWS-SG05	Sediment	RI/FS, May 2005					
GWS-SG07	Sediment	RI/FS, May 2005					
GWS-SG16	Sediment	RI/FS, May 2005					
GWS-SG12	Sediment	RI/FS, May 2005					
GWS-EC07-0034	Sediment	RI/FS, May 2005					
GWS-EC12-0008	Sediment	RI/FS, May 2005					
GWS-EC14-0008	Sediment	RI/FS, May 2005					
GWS-EC13-0090	Sediment	RI/FS, May 2005					

Table 3.1Chemical Forensics Samples

 Table 4.1

 Chemical Forensics Chromatogram Relative Quantitations (Hydrocarbon Peak Areas)

														Area (Counts												
								Sample	s from N	APL Inv	estigatio	n—Augu	ist 2004									Sample	es from R	l/FS—M	ay 2005		i
m/z	Compound	8001	8011	8017	8022	8050	8030	8043	8032	8035	8040	DW-4- FP	8020	3-1-G	8056	8028	1-1-G	DW-5- FP	8054	GWS- SG05	GWS- SG07	GWS- SG16	GWS- EC07	GWS- EC12	GWS- EC14	GWS- EC13	GWS- SG12
120	C ₃ -alkylbenzenes	163	140	1049	1336	7613	222	2543	10570	840	456	9786	5461	7983	207	255	2	9976	47		15	81	8636	1495	12	191	
134	C ₄ -alkylbenzenes	678	557	1385	3678	11242	100	3126	4337	2333	2225	11601	4233	10064	112	883	0	10536	89	160	51	533	6650	199	0	29	0
148	C ₅ -alkylbenzenes	317	259	329	1379	3323	0	322	532	771	270	2319	511	2703	0	249	0	2290	0		0	320	873	0	0	0	0
162	C ₆ -alkylbenzenes	146	116	161	547	1114	0	11	94	162	20	677	48	922	0	59	0	612	0	0	0	187		0	0	0	0
128	C ₀ -naphthalene	3683	1322	45843	5225	385662	51169	404700	563167	5765	416479	696735	512596	268550	23229	3897	3817	688597	24765	2003	824	1597	623574	59592	126	12910	447
142	C ₁ -naphthalenes	26850	18047	57556	101453	342601	21462	187558	266727	53255	202421	315356	275274	230227	8584	12953	913	311699	19542	4719	1658	30752	399414	4349	89	2296	282
156	C ₂ -naphthalenes	41536	30832	22990	103152	271684	9455	108011	150226	124960	128989	166797	156842	184511	1938	11406	1149	177743	12564	7089	1944	52305	205479	511	86	85	383
170	C ₃ -naphthalenes	19909	15978	10860	44262	116942	2725	31478	43808	54013	36611	59296	41664	75700	339	4517	1169	66886	3726	3740	1370	33626	50113	143	94	2	792
184	C ₄ -naphthalenes	4346	3651	2930	9579	23750	423	4463	6362	8913	5144	10941	5715	14942	6	1102	535	12902	394	1137	642	8718	6116	3	17	0	845
166	C ₀ -fluorene	783	834	535	1654	31543	636	6776	42246	37480	27899	24598	30103	3652	31	595	191	17524	651	2726	1171	12351	77572	68	44	20	594
180	C1-fluorenes	4907	4832	2974	9792	39553	2767	27467	37453	37441	28392	23686	35046	23782	53	3374	1469	21695	2656	1615	695	9411	38331	26	52	0	718
194	C ₂ -fluorenes	2566	2230	1402	3656	16216	529	6594	9129	12306	6865	6504	8250	10092	0	1128	806	7035	586	1058	727	5686	9884	0	18	0	776
208	C ₃ -fluorenes	864	865	611	1500	4862	244	1107	1765	2427	1481	1901	1809	2935	0	591	802	1790	98	488	429	2125	2138	0	9	0	538
222	C ₄ -fluorenes	328	247	394	381	1217	19	354	623	613	536	468	784	634	0	184	253	675	2	194	218	421	790	0	0	0	221
154	C ₀ -biphenyl	93	153	1539	389	25985	3306	19076	27098	1362	25798	36891	31605	16434	385	423	555	32154	1983	343	115	213	33044	72	3	40	64
168	C1-biphenyls + dibenzofuran	911	748	714	2059	14303	1117	9377	12927	5263	11766	13108	14315	8856	67	408	128	12519	1032	202	87	1297	16777	20	2	0	35
182	C ₂ -biphenyls + C ₁ -dibenzofuran	4087	3611	2304	6981	23585	2223	14251	17703	18626	20107	21409	19940	16233	31	1038	350	19812	1567	807	524	6660	18811	9	9	0	440
178	C ₀ -phenanthrene	31557	35278	21610	102088	168137	42620	189452	202454	213872	251707	186995	240096	126657		96822	19118	166747	24433	24835	4628	39329	249684				
178	C ₀ -anthracene	9468	11264	6153	29762	55383	6610	52715	65891	73291	68251	52316	58049	45213		19924	6096	48382	4596	7018	1855	16581	84937				
178	C ₀ -phenanthrene/anthracene														928									371	596	80	4333
192	C1-phenanthrenes/anthracenes	16750	17350	9964	31241	119776	8319	69029	88827	117008	83262	65017	96218	84650	298	12300	6852	67985	6899	8842	4269	35710	103432	108	641	6	2428
206	C2-phenanthrenes/anthracenes	7632	7701	4961	11678	53516	2324	20054	20027	39281	23081	21371	29361	35674	18	4751	4632	23900	1925	5505	3490	19790	32023	13	432	0	4098
220	C ₃ -phenanthrenes/anthracenes	3258	2355	3219	3246	14971	517	4297	6028	8242	4702	4932	6548	9912	0	3038	2192	5866	323	2150	1514	6189	7577	0	98	0	2429
234	C ₄ -phenanthrenes/anthracenes	2327	813	4292	724	2221	87	1000	886	1029	847	948	1423	1359	0	3979	548	1007	22	1346	607	1152	1895	0	24	0	596
202	C ₀ -fluoranthene	16107	26066	17482	91459	53071	17046	87916	89450	114754	112014	67518	107551	43428		95974	69448	59469	7771	48804	16161	50138	110367				12645
202	C ₀ -pyrene	20760	30655	24318	110891	54289	18362	92142	95261	124679	110183	67743	120168	44163		136037	92433	59865	8004	58201	17061	58626	121353				13954
202	C ₀ -pyrene/fluoranthene														377									126	2801	51	
216	C ₁ -pyrenes/fluoranthenes	8254	9826	7248	19317	49810	4733	48327	59469	77575	53953	33039	60964	29461	13	16044	15995	32599	3578	11301	7629	24489	68423	8	1072	0	7416
230	C ₂ -pyrenes/fluoranthenes	2871	2849	2917	3876	20701	1075	13294	12945	19001	14875	10905	13273	10890	0	4103	4553	11139	802	2956	2558	8008	17867	0	305	0	3144
244	C ₃ -pyrenes/fluoranthenes	847	691	702	1078	4026	197	2545	3212	4979	3432	2270	4449	2901	0	1055	1151	2481	100	720	897	1787	3195	0	18	0	1023
258	C ₄ -pyrenes/fluoranthenes	364	365	391	1066	1085	94	870	689	923	788	746	751	560	0	698	1420	579	6	389	443	682	844	0	0	0	393
228	C ₀ -chrysene	11168	15964	13139	51543	36800	7511	52928	58832	79793	60287	38390	64546	25645	43	41276	46020	34219	3816	27689	13330	32184	63046	26	1257	11	11549

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														Area C	Counts												
								Sample	es from N	IAPL Inv	estigatio	n—Augı	ıst 2004									Sample	es from F	RI/FS—M	ay 2005		
m/z	Compound	8001	8011	8017	8022	8050	8030	8043	8032	8035	8040	DW-4- FP	8020	3-1-G	8056	8028	1-1-G	DW-5- FP	8054	GWS- SG05	GWS- SG07	GWS- SG16	GWS- EC07	GWS- EC12	GWS- EC14	GWS- EC13	GWS- SG12
242	C ₁ -chrysenes	3346	3649	2943	5716	19082	1466	14929	19116	27518	16300	10915	20413	10007	0	4862	6967	11253	835	4067	3898	7442	19799	0	421	0	4283
256	C ₂ -chrysenes	1146	1210	1046	1736	7137	353	3859	5094	7121	3761	2869	5385	3316	0	1312	2331	3335	218	1420	1366	2146	5332	0	76	0	1656
270	C ₃ -chrysenes	359	224	308	463	1447	18	796	811	617	611	519	1045	795	0	357	603	697	0	298	452	736	1003	0	0	0	516
284	C ₄ -chrysenes	90	172	144	270	169	0	101	150	151	142	173	154	177	0	226	277	202	0	153	156	197	228	0	0	0	154
148	C ₁ -benzothiophenes	1450	1425	1927	6254	25926	550	4942	7764	2072	5916	15587	9271	17160	474	1042	66	15509	452	602	294	2805	8695	405	0	188	5
162	C ₂ -benzothiophenes	3397	2925	1804	9275	30589	327	4164	6564	4635	5014	12139	6295	20797	87	1042	92	14662	457	781	217	4983	6849	27	0	0	17
176	C ₃ -benzothiophenes	2301	1918	1221	4981	16322	101	1883	2828	3250	2007	5726	2372	10600	0	551	95	6946	142	396	128	4017	2524	4		4	119
190	C ₄ -benzothiophenes	634	541	463	1356	3907	2	301	477	676	341	1451	317	2585	0	147	46	1720	3	130	63	1238	387	0	0	0	85
204	C₅-benzothiophenes	85	71	91	242	550	0	0	5	27	0	178	0	318	0	3	0	211	0	2	2	263	5	0	0	0	4
184	C ₀ -dibenzothiophene	2618	3117	1778	10798	17034	2065	7402	9656	8731	12268	11947	11886	12793	46	8756	2499	11729	931	2772	531	6142	12168	19		0	373
198	C1-dibenzothiophenes	2515	2479	1405	4589	18113	701	4796	6377	7880	5961	7171	7073	13273	7	1652	1135	8223	493	1438	567	5980	7428	9		0	576
212	C ₂ -dibenzothiophenes	1510	1752	931	2037	10772	186	1766	3032	4059	2428	3252	2743	7321	0	974	1064	3898	173	1295	795	4028	3454	0		0	1034
226	C ₃ -dibenzothiophenes	806	696	612	926	4221	60	719	1004	1442	920	1120	901	2999	23	578	669	1410	53	607	531	1681	968	0	0	0	690
240	C ₄ -dibenzothiophenes	183	192	217	240	1065	0	166	225	338	200	309	281	679	0	115	138	326	0	115	162	414	165	0	0	0	148
234	C ₀ -naphthobenzothiophene	1534	2317	1920	9677	4818	754	3269	3717	4857	4329	3307	4702	3571	0	5712	8431	3157	184	4441	1887	4664	3817	0	48	0	1524
248	C ₁ -naphthobenzothiophenes	673	611	591	1294	3014	113	1101	1351	2067	1382	1347	1678	2072	0	887	1547	972	13	870	602	1553	1407	0	2	0	804
262	C2-naphthobenzothiophenes	315	420	329	422	1378	0	400	563	787	337	549	321	508	0	344	573	587	0	321	473	727	488	0	0	0	445
276	C ₃ -naphthobenzothiophenes	307	461	434	1002	960	48	747	810	1179	658	576	1050	545	0	943	1143	569	9	611	496	804	865	0	8	0	366
290	C ₄ -naphthobenzothiophenes	2	74	89	13	186	0	43	79	172	34	27	102	42	0	10	17	29	0	5	90	130	63	0	0	0	24
253	Monoaromatic steranes	645	1012	1324	7685										0	6343								0		0	
239	Monoaromatic steranes														0									0		0	
231	Triaromatic steranes	1141	2169	2539	1207	3664								1934	0	1386				414	1085	1331	1172	0			567
245	Triaromatic steranes	434	845	1079	463									1192	0	525			0	273	572	701	529	0			327
TIC	Pristane	7002	4211	8986	12275											3280				3633	ND	2417	ND	ND	ND	ND	ND
TIC	Phytane	3926	2041	5688	7318											1685				2742	ND						
TIC	Retene	8239	CO	15450	CO	СО		СО								16410				со	CO	СО	СО	ND	ND	ND	СО
TIC	C30 hopane	1150 ^{est}	2110	2197	ND	ND														ND							

Notes

est Estimated Value

CO Co-elutes with another compound. NAPL Non-aqueous phase liquid ND Not Detected TIC Total Ion Chromatograph

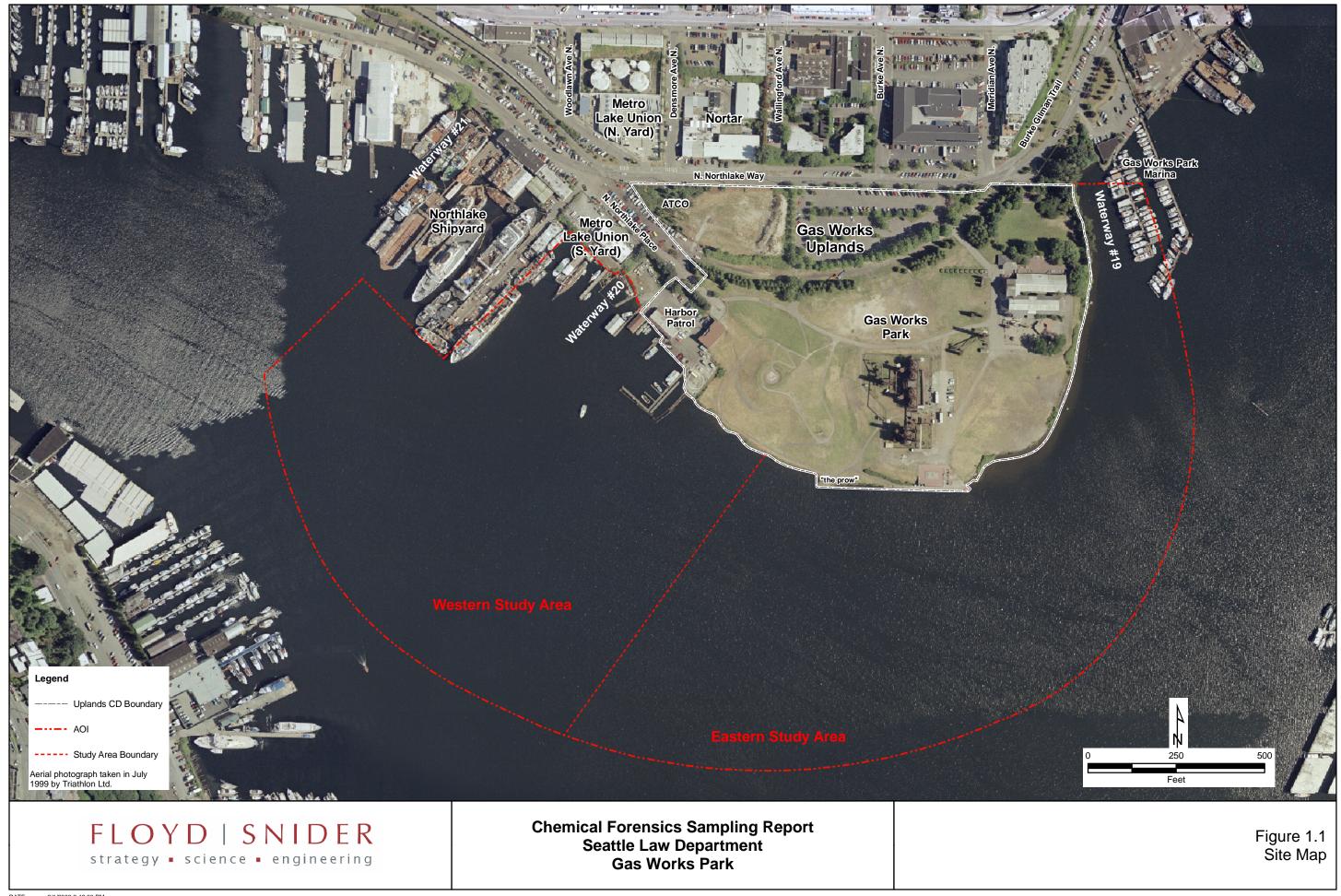
Seattle Law Department Gas Works Park

Chemical Forensics Sampling Report

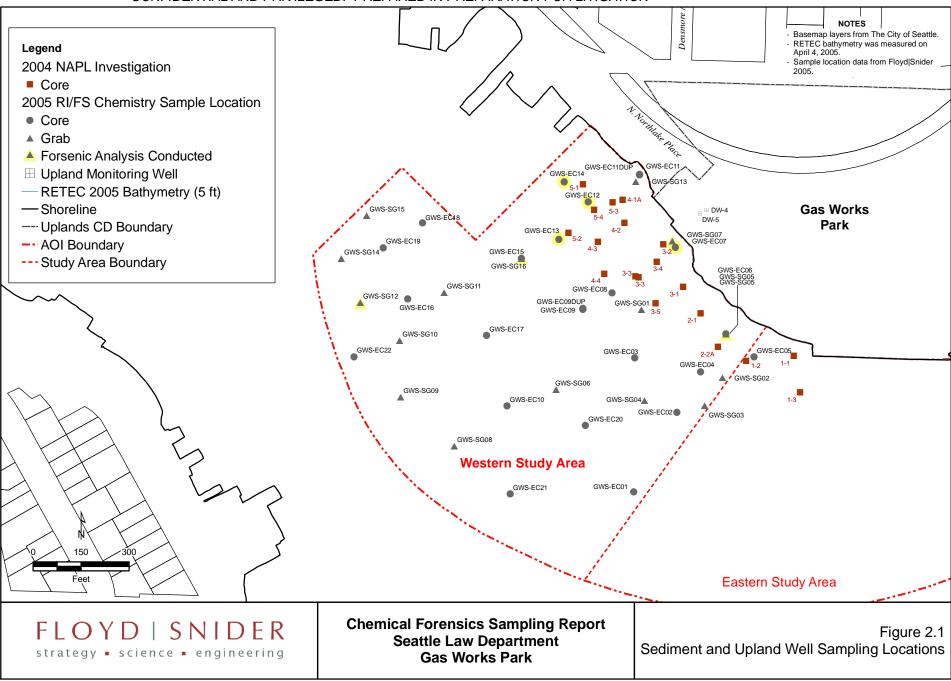
Figures

DRAFT

CONFIDENTIAL AND PRIVILEGED: PREPARED IN PREPARATION FOR LITIGATION

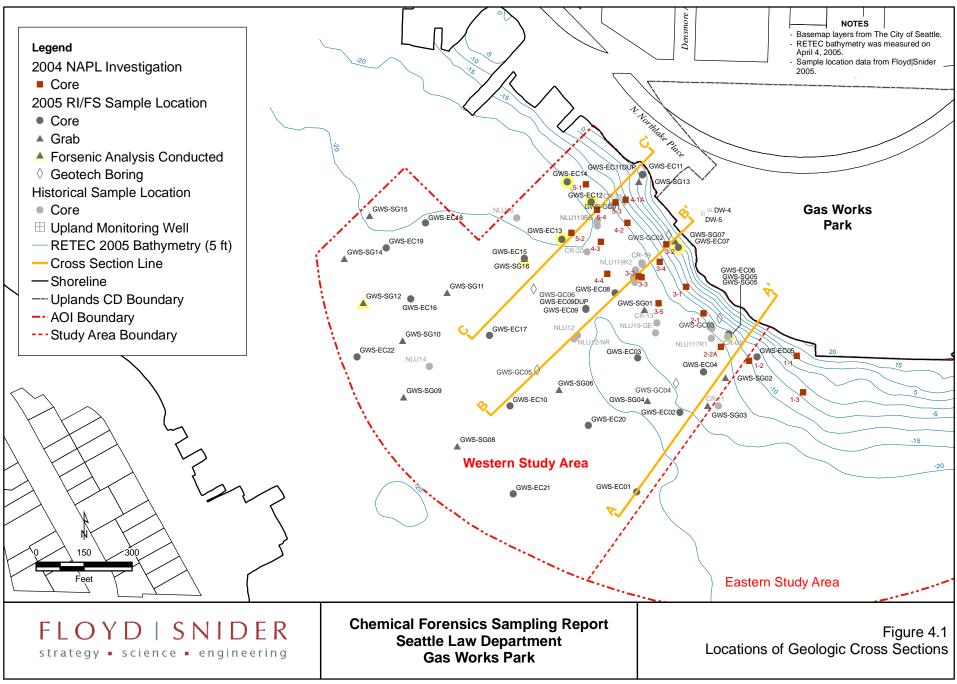


DATE: 8/1/2006 2:42:00 PM MXD NAME: F:\projects\COS-LCES\GIS\Paul Boehm Briefing Package\Fig 1.1 - Site Map.mxd



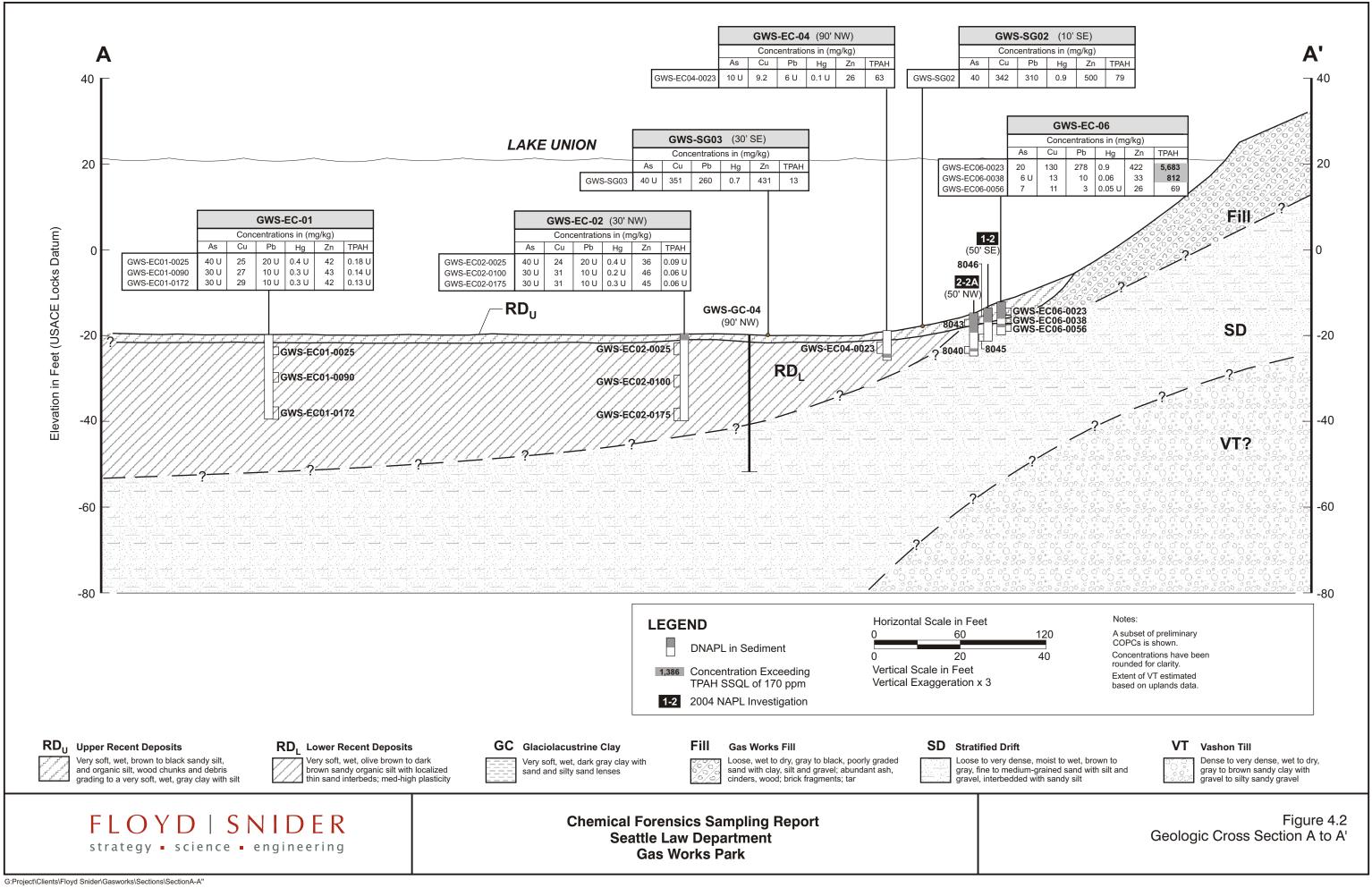
CONFIDENTIAL AND PRIVILEGED: PREPARED IN PREPARATION FOR LITIGATION

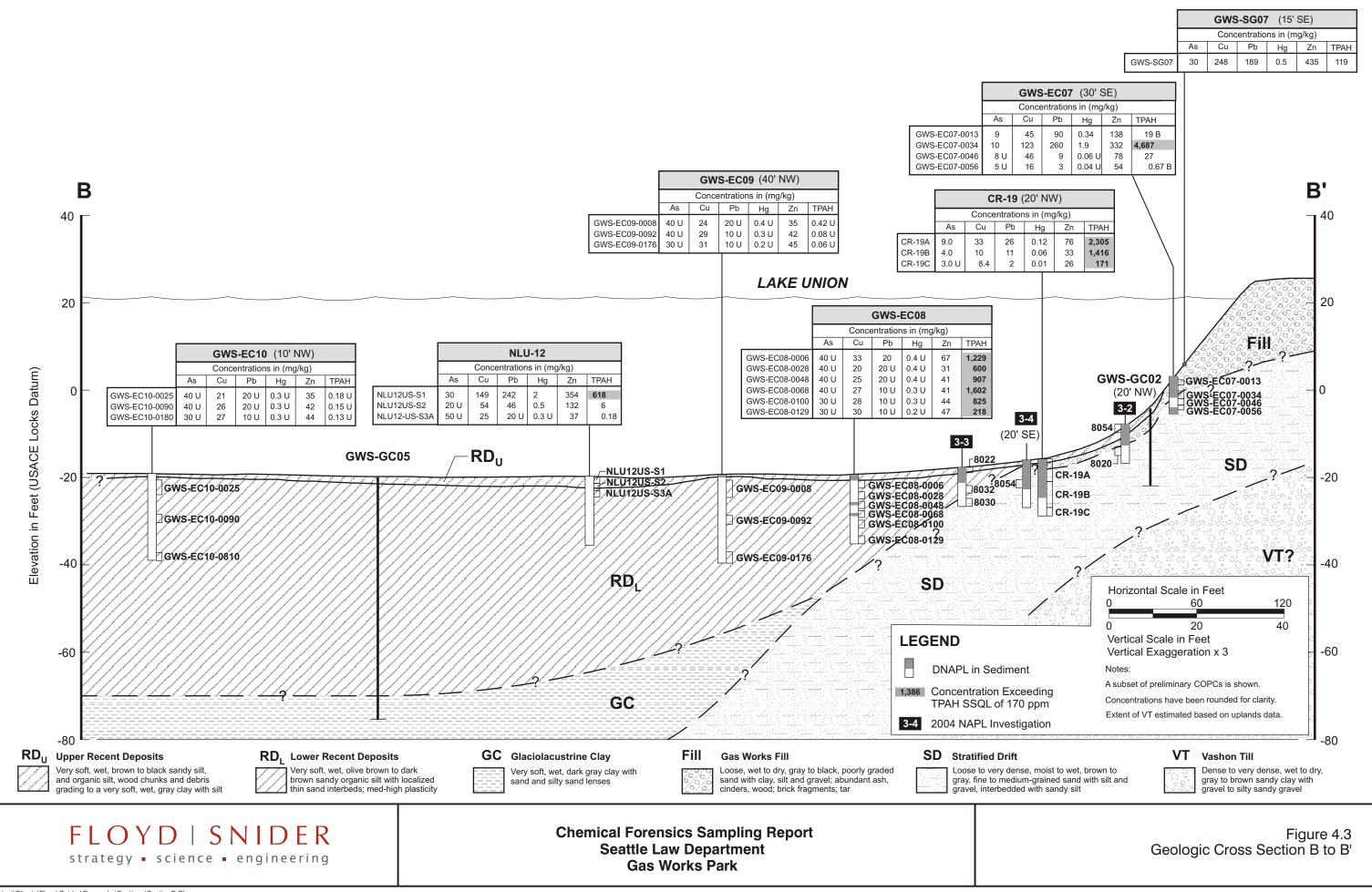
DATE: 8/1/2006 2:43:30 PM MXD NAME: F:\projects\COS-LCES\GIS\Paul Boehm Briefing Package\Fig 2.1 - Sample Locations.mxd



CONFIDENTIAL AND PRIVILEGED: PREPARED IN PREPARATION FOR LITIGATION

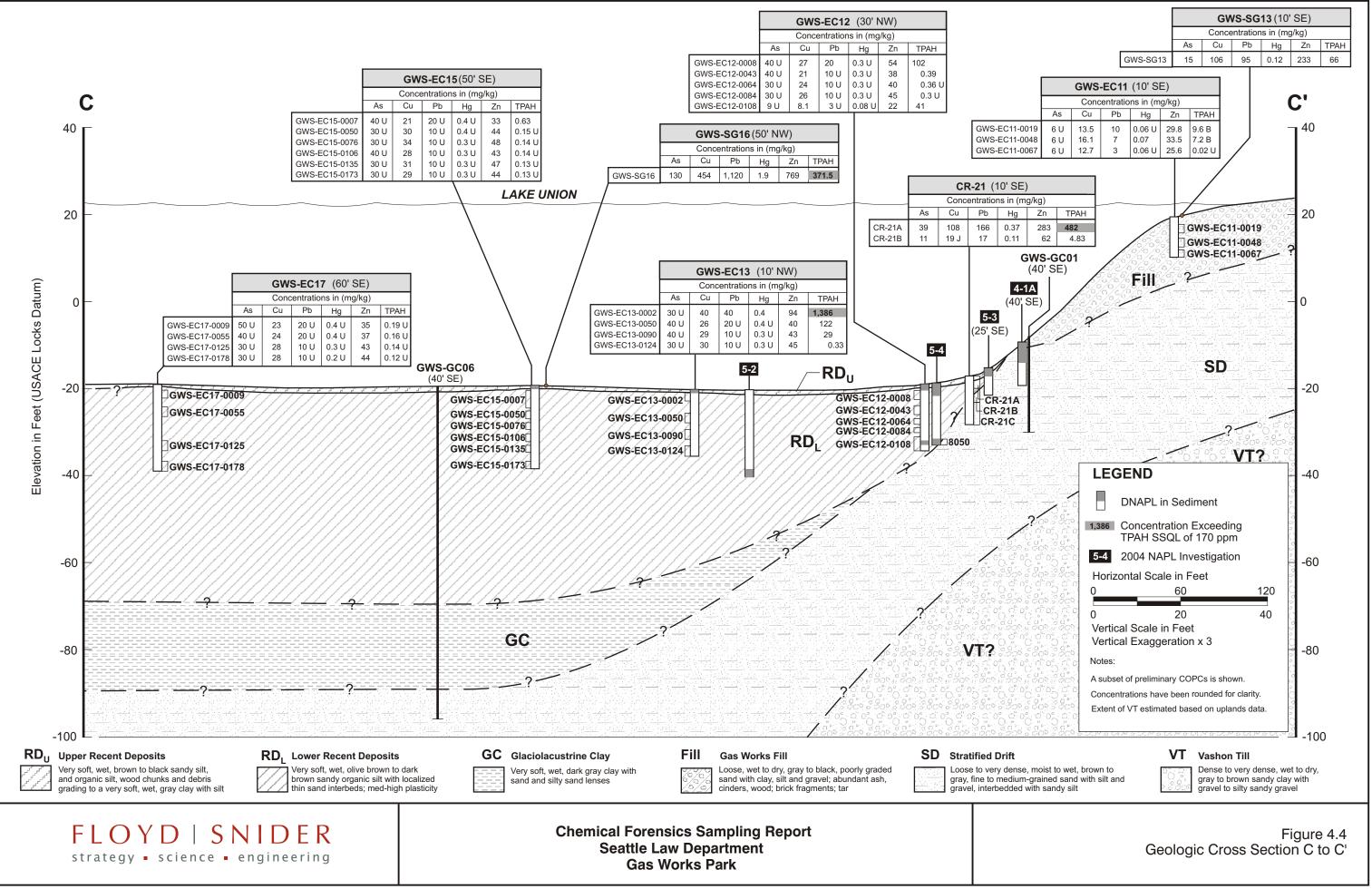
DATE: 8/1/2006 2:43:52 PM MXD NAME: F:\projects\COS-LCES\GIS\Paul Boehm Briefing Package\Fig 4.1 - Loc Geo Cross Sections.mxd





G:Project\Clients\Floyd Snider\Gasworks\Sections\SectionB-B

CONFIDENTIAL AND PRIVILEGED: PREPARED IN PREPARATION FOR LITIGATION



G:Project/Clients/Flovd Snider/Gasworks/Sections/SectionC-C

SUB-ATTACHMENT 2D-4.1 Chemical Forensics Analysis Chromatograms

Seattle Law Department Gas Works Park

Chemical Forensics Sampling Report

Appendix A Chemical Forensic Analyses Chromatograms

DRAFT



September 14, 2005

Ms. Jessi Satterberg Floyd & Snider, Inc. 601 Union Street, Suite 600 Seattle, WA. 98101-2341

RE: North Lake Union Gas Works Park sediments Project No.: 34011008

Dear Ms Satterberg,

Enclosed are analytical results for sediment and tar samples received at Zymax on August 11 and 16, 2004 and June 30, 2005. The data were obtained from GC/MS full scan analysis of the sediment extracts and tars.

The project was performed at ZymaX forensics as Laboratory No.36917, 36918, 36919, 36920, 36921, 36922, and 39767.

Sincerely,

Alan Jeffrey, Ph.D. Senior Geochemist

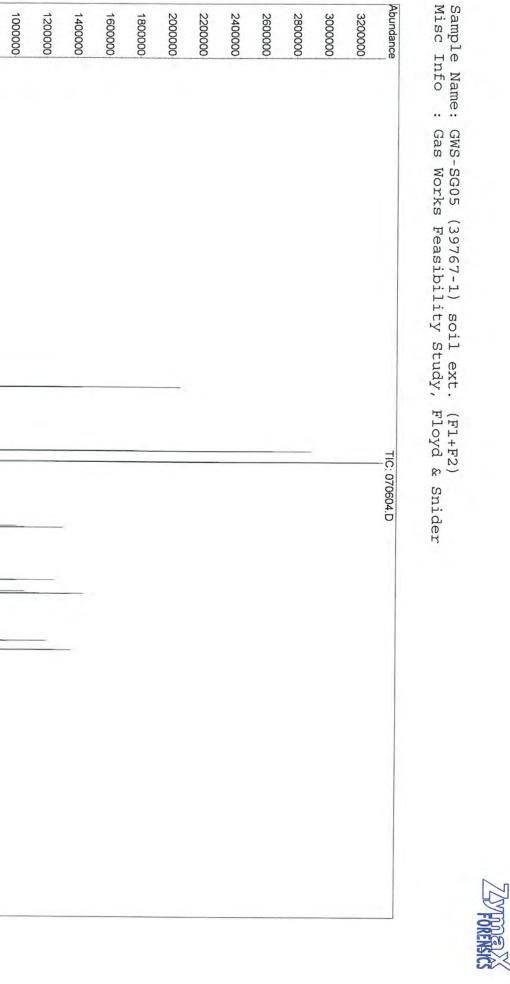


Chain of Custody Rec 0 . 3

		Analytical Danauran Incommental
		Analytical Chemiste and Consultante
ARI Client Company: Flord Snider Phone: Date: 24/05 Present?	129/05	4611 South 134th Place, Suite 100
Client Contact: Jane Fisher Allison Ceisebsecht Coolers: Coolers: Coolers: Temps:		206-695-6200 206-695-6201 (fax)
Codiment-linder Stad An D. A. IT. I	Analysis Requested	Notes/Comments
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GWS-5607 5/33/65 1316 Sed. 1		sav as requesta
GWS-SG16 5/23/05 1510 Sed. 1		dient.
GWS-EC07-00345/165 1007 Sel. 1		
GWS-EC12 - 0034 5/17/05 0846 Sed 1		
GWS-EC14-6008 5/17/05 1335 Sed		
6w5-EC13-0090 5/17/05 0939 Sed 1		
GWS-SG12 5/23/05 0947 Sed 1		
Comments/Special Instructions Relinquished by: (Signature) Received by: (Signature) (Signature) Received by: (Signature) (Signature) (S	Reinquished by:	Received by: (Signature)
Printed Name: BOB (JULIEZON) FACC FULLION Printed Name:	ł	Printed Name:
ARA Company:	Company:	Company:
1445 Date & Time: 1445 6-30-05 1300 Date & Time:		Date & Time:

said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Time-->

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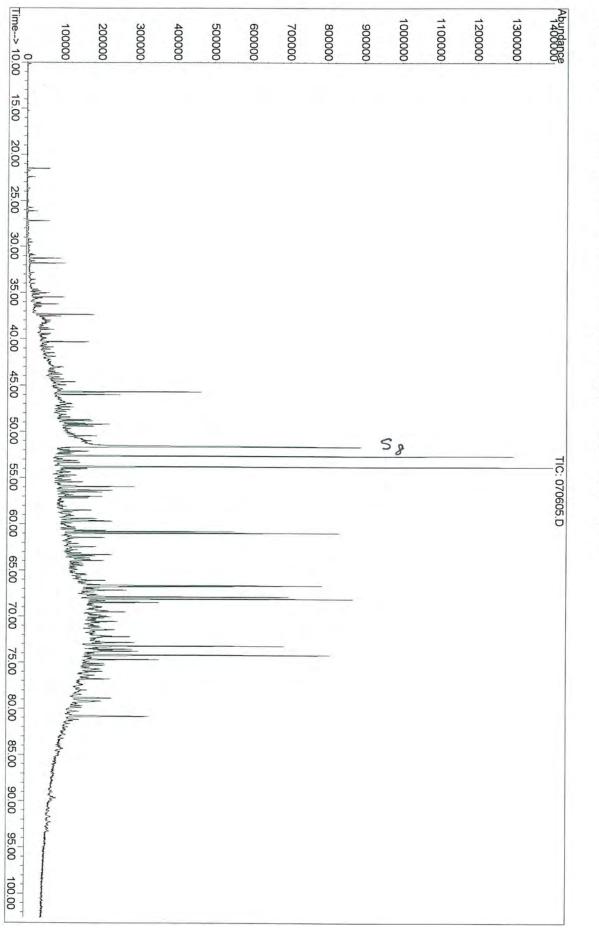
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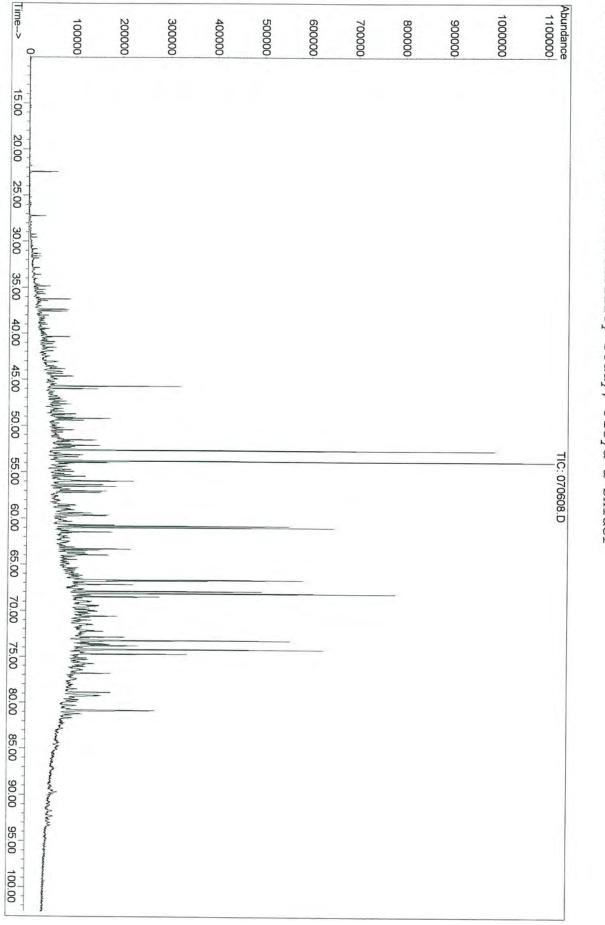
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800000



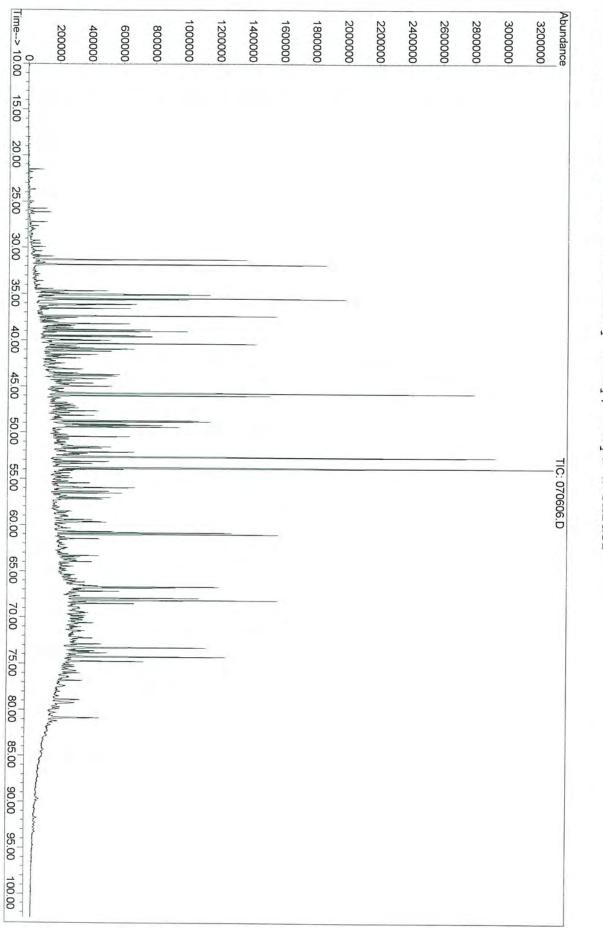
Sample Name: GWS-SG07 (39767-2) soil ext. (F1+F2) Misc Info : Gas Works Feasibility Study, Floyd & Snider





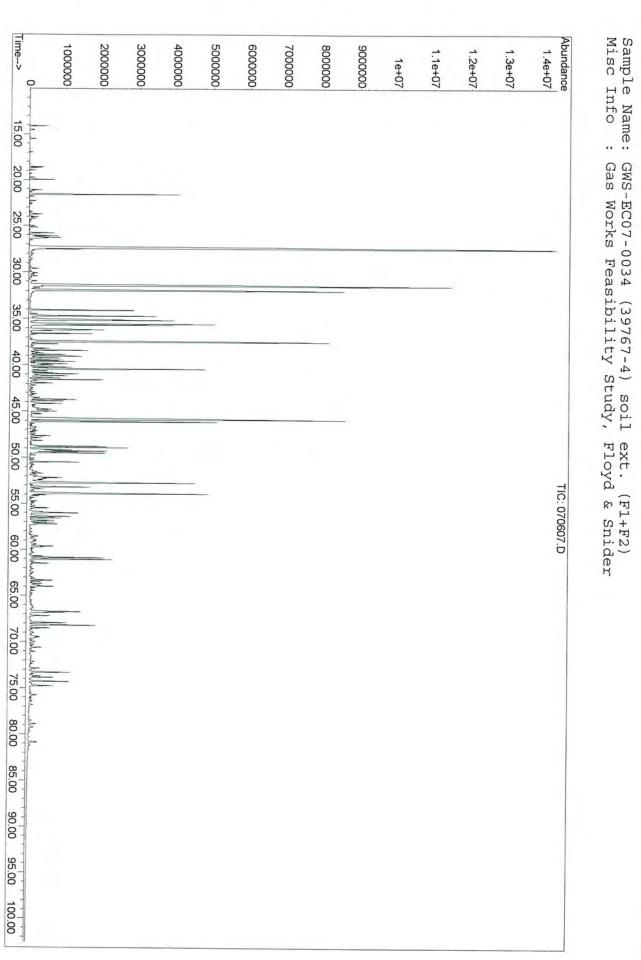
Sample Name: GWS-SG12 (39767-8) soil ext. (F1+F2) Misc Info : Gas Works Feasibility Study, Floyd & Snider



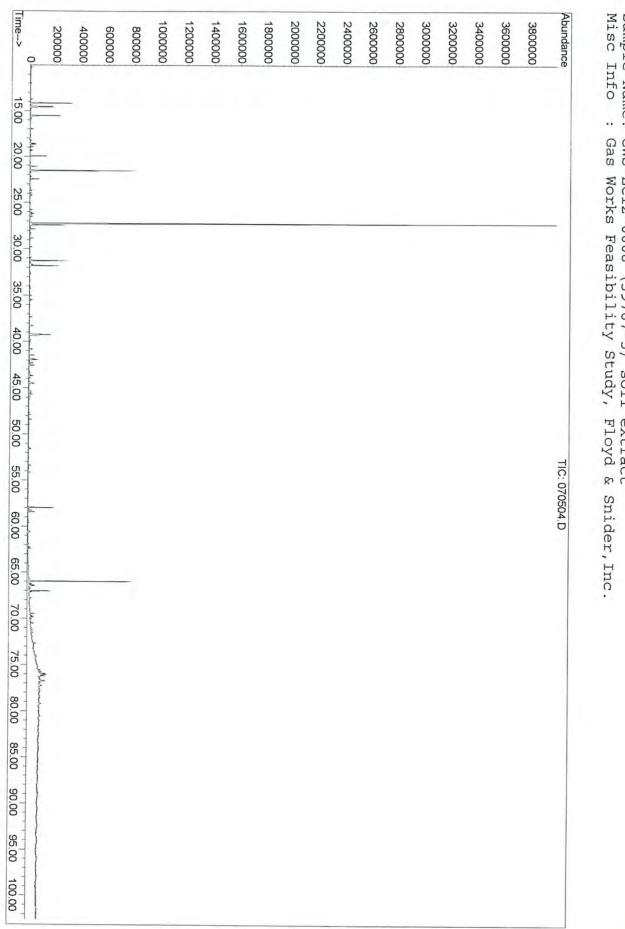


Sample Name: GWS-SG16 (39767-3) soil ext. (F1+F2) Misc Info : Gas Works Feasibility Study, Floyd & Snider





ZY FORENSICS

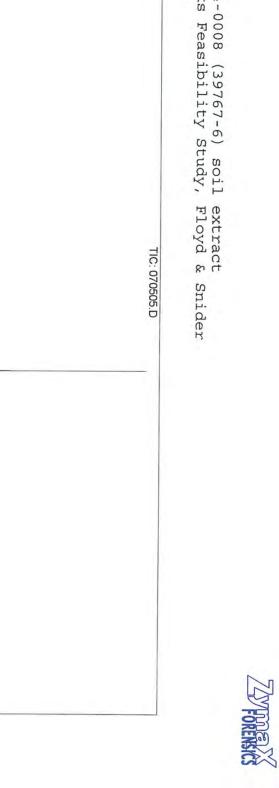


Sample Name: GWS-EC12-0008 (39767-5) soil extract Misc Info : Gas Works Feasibility Study, Floyd & Snider, Inc.

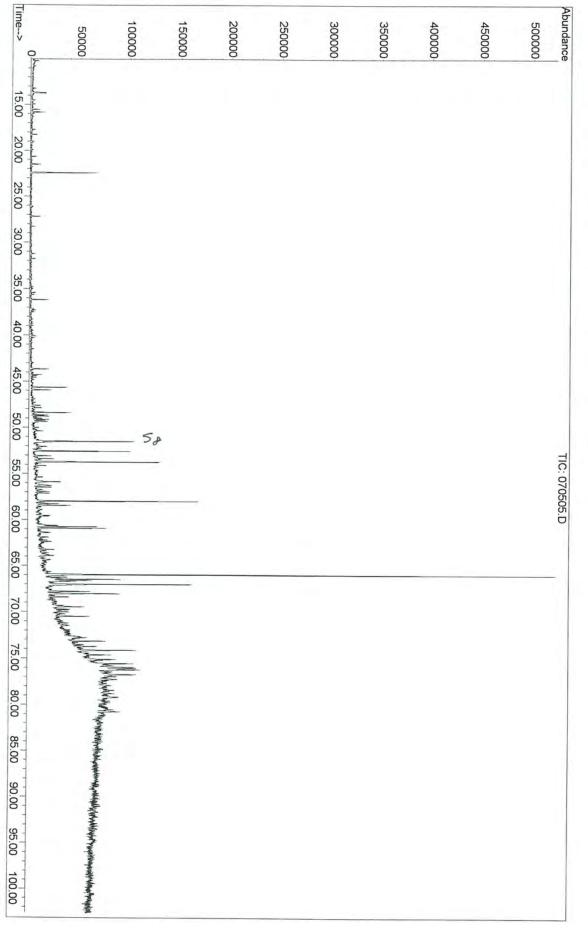


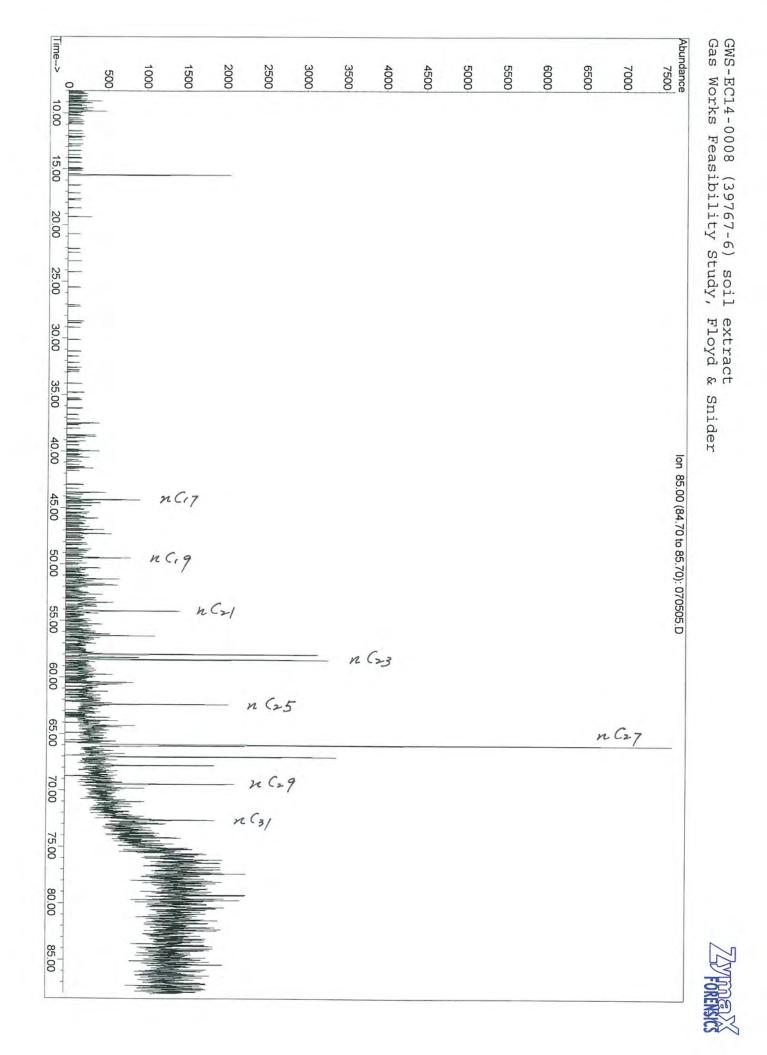
Sample Name: GWS-EC13-0090 (39767-7) soil extract Misc Info : Gas Works Feasibility Study, Floyd & Snider

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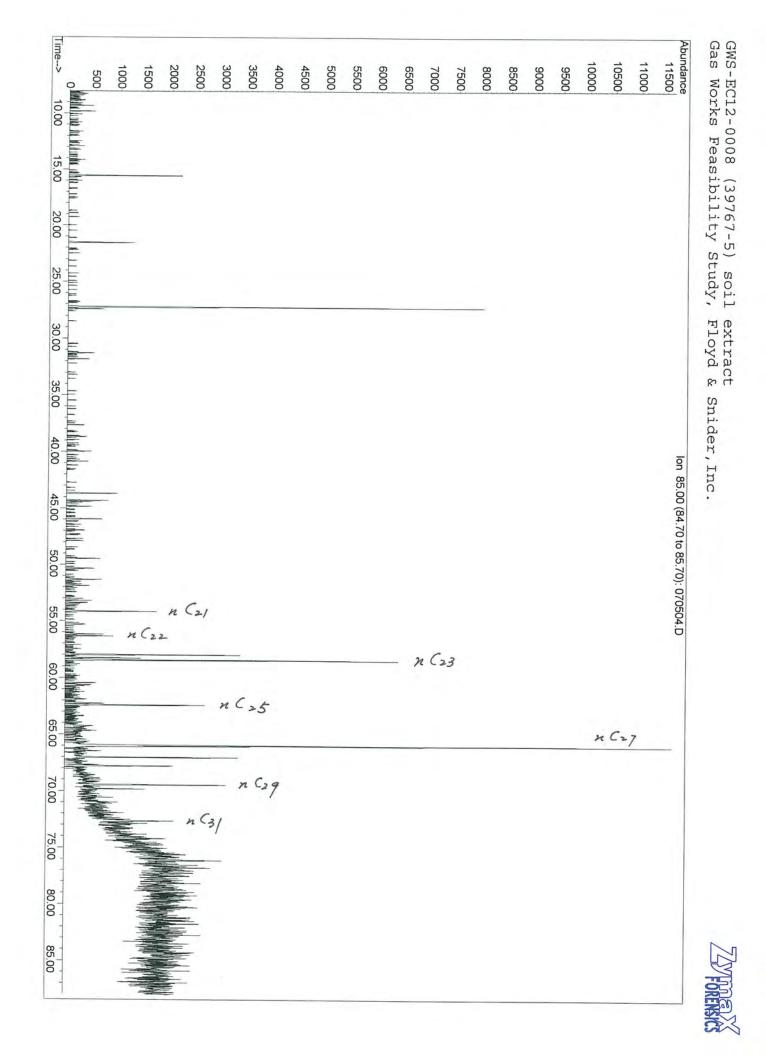


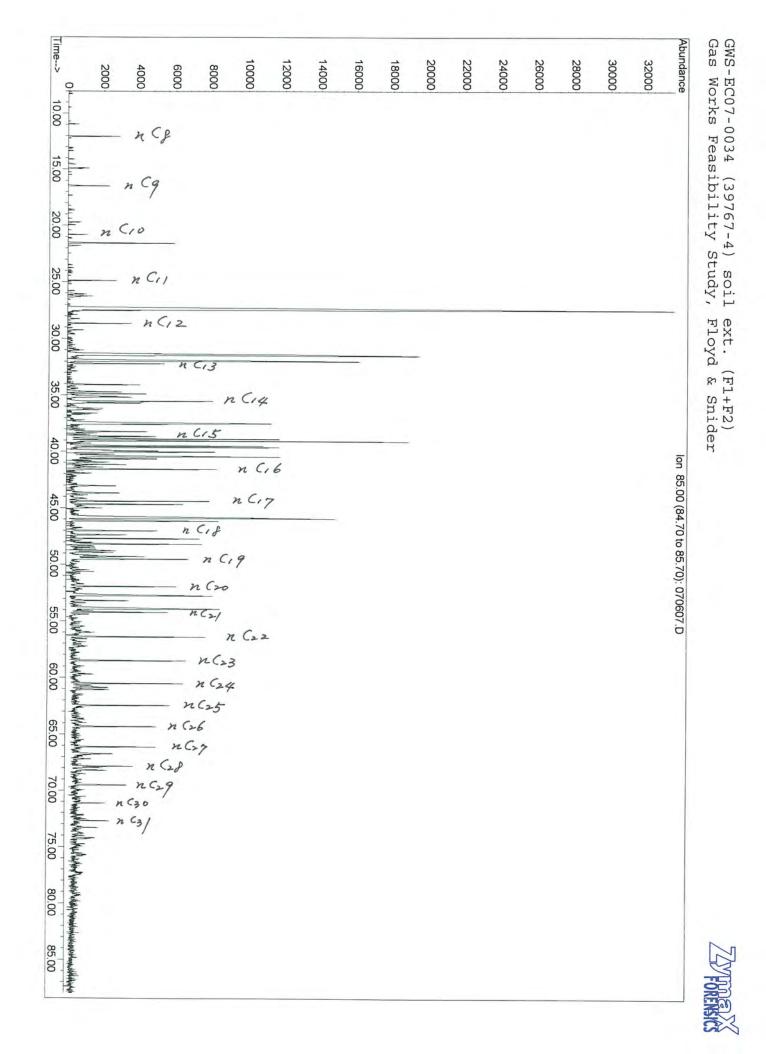
Sample Name: GWS-EC14-0008 (39767-6) soil extract Misc Info : Gas Works Feasibility Study, Floyd & Snider

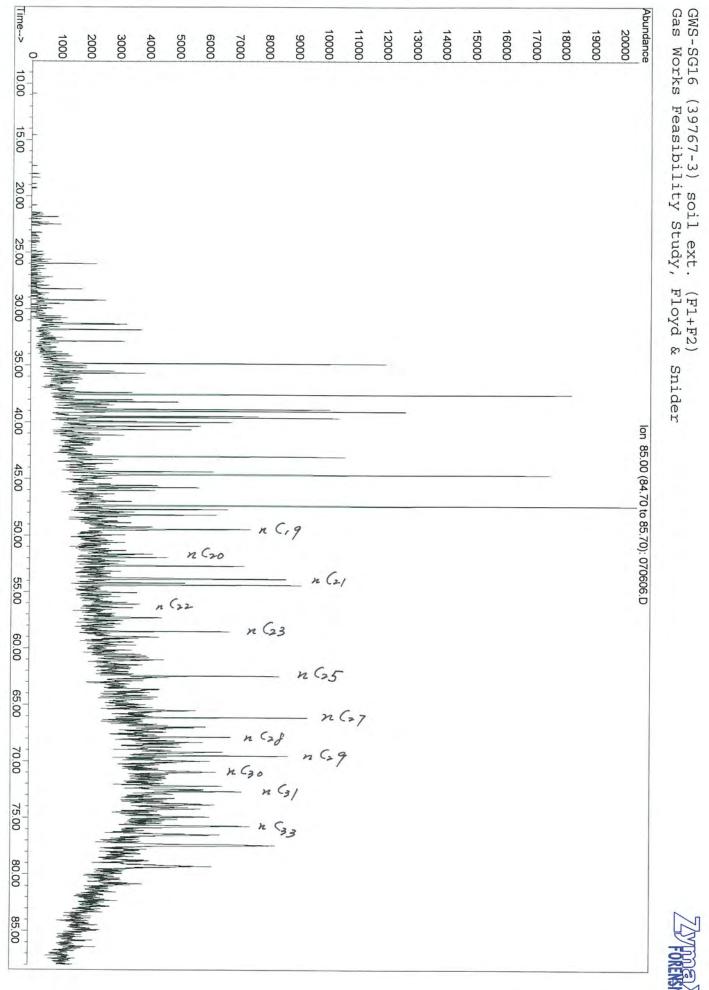


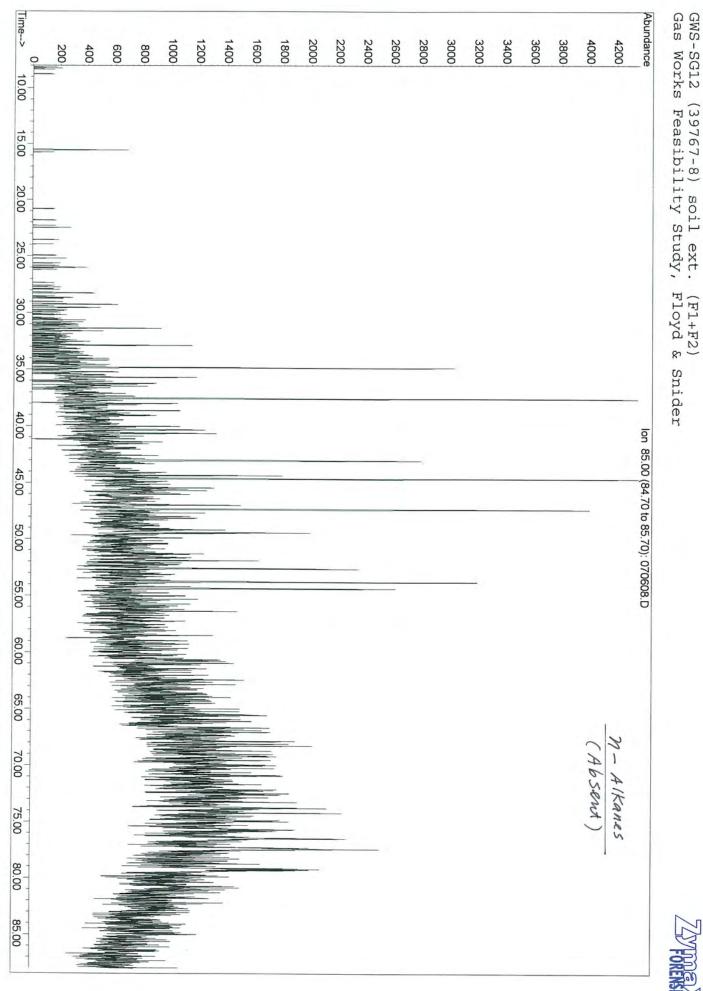


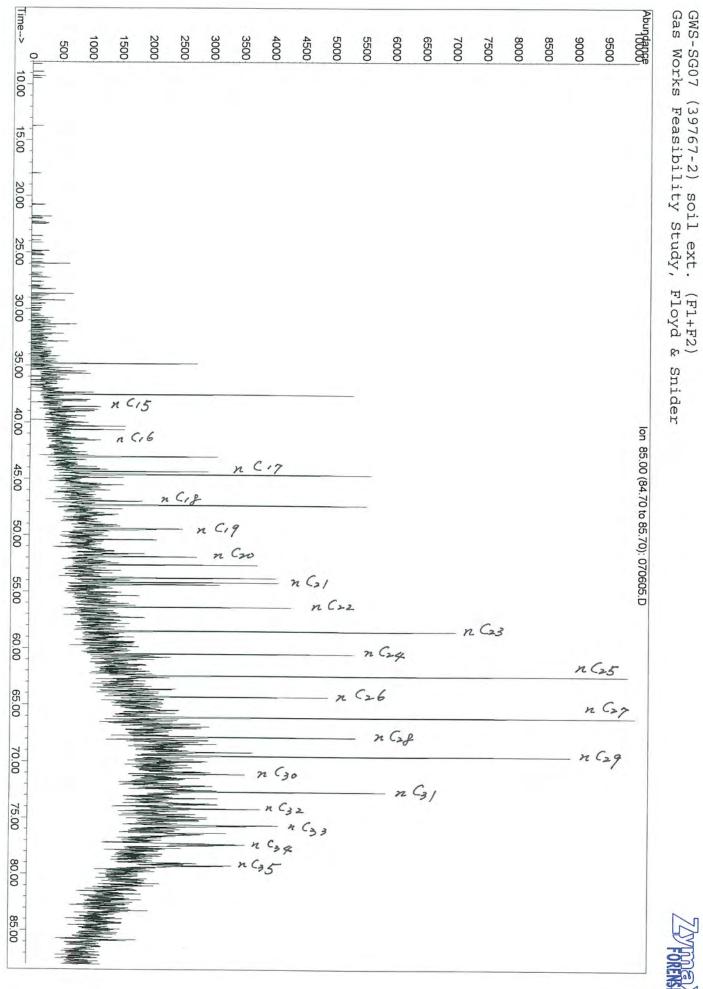
Inn 85.00 (84.70 to 85.70): 070506.D



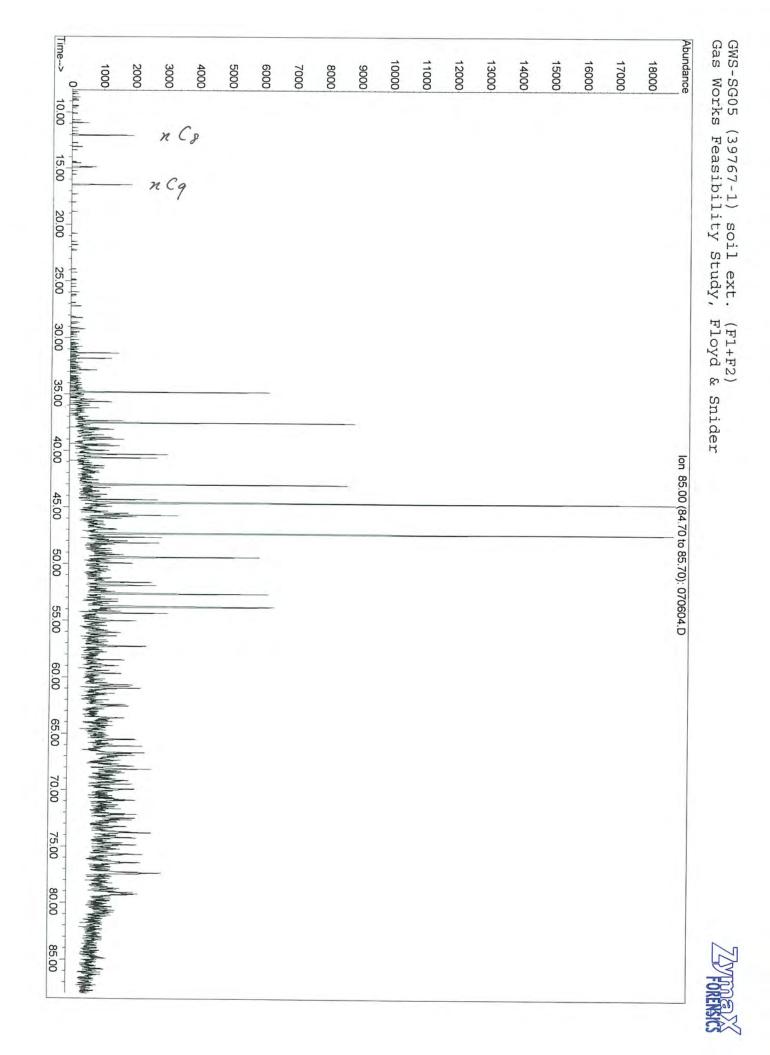














Table

Key for Aromatic Compounds Identification in Bar Diagram

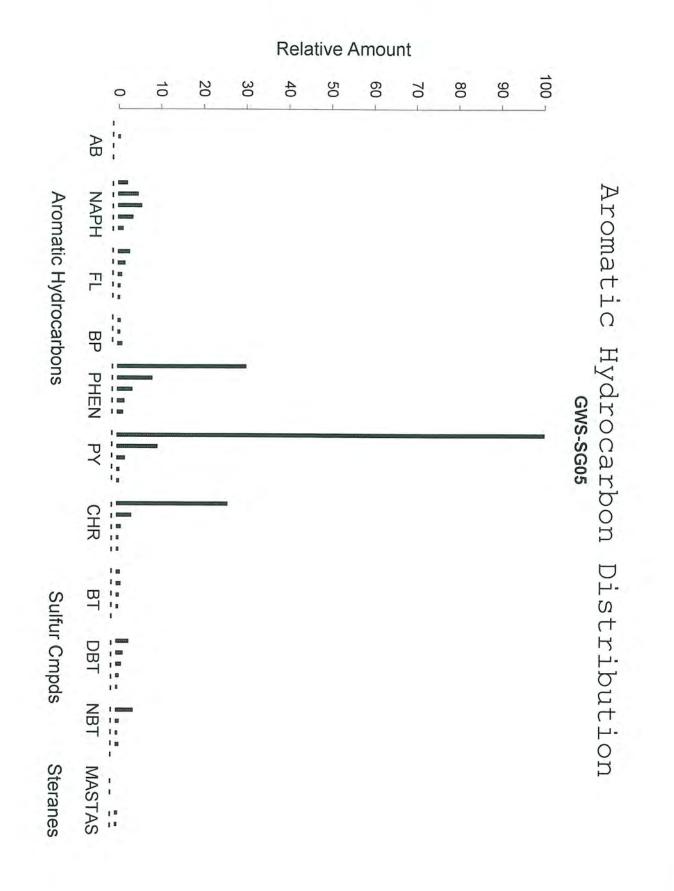
AB:	C ₃ -C ₆ Alkylbenzenes
NAPH:	C ₀ -C ₄ Naphthalenes
FL:	C ₀ -C ₄ Fluorenes
BP:	C ₀ -C ₂ BP Biphenyl/Dibenzofuran
PHEN:	C ₀ -C ₄ Phenanthrenes
PY:	C ₀ -C ₄ Pyrenes/Fluoranthenes
CHR:	C ₀ -C ₄ Chrysenes
BT:	C1-C5 Benzothiophenes
DBT:	C ₀ -C ₄ Dibenzothiophenes
NBT:	C₀-C₄ Naphthobenzothiophenes
MAS:	Monoaromatic Steranes
TAS:	Triaromatic Steranes

Table

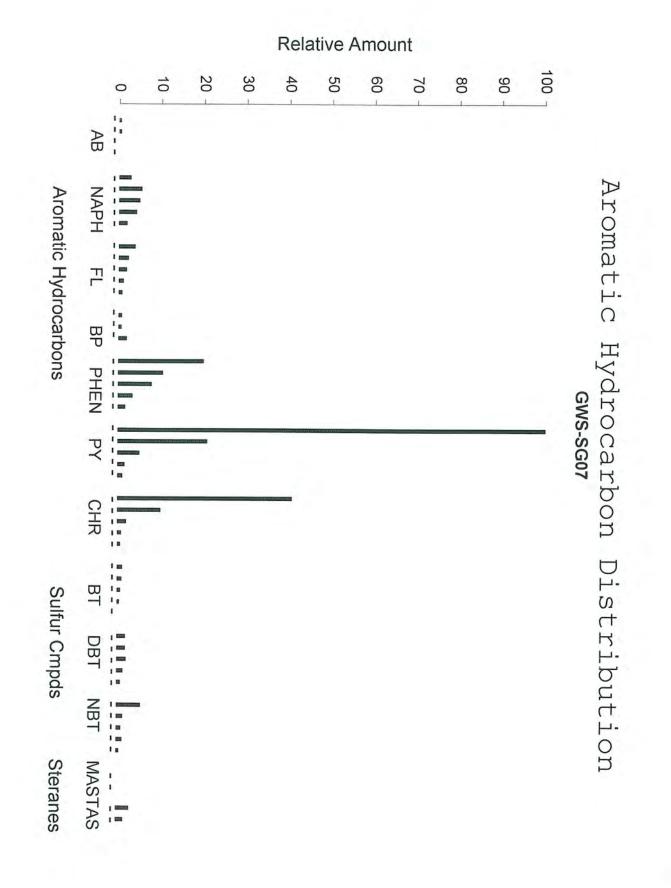


Key for Identifying Aromatic Hydrocarbons at Various m/z Units

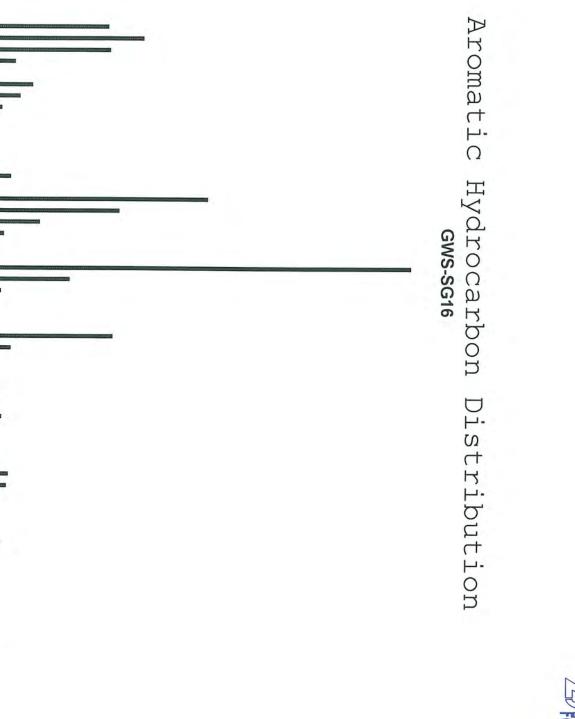
No.	m/z	Compound
1	120	C ₃ -alkylbenzenes
2	134	C ₄ -alkylbenzenes
3	148	C ₅ -alkylbenzenes
4	162	C ₆ -alkylbenzenes
5 6 7	128	C _o -naphthalene
6	142	C ₁ -naphthalenes
7	156	C ₂ -naphthalenes
8	170	C ₃ -naphthalenes
9	184	C₄-naphthalenes
10	166	Co-fluorene
11	180	C ₁ -fluorenes
12	194	C ₂ -fluorenes
13	208	C ₃ -fluorenes
14	222	C ₄ -fluorenes
15	154	C₀-biphenyl
16	168	C_0 -biphenyls + dibenzofuran
17	182	
18		C_2 -biphenyls + C_1 -dibenzofuran
	178	C ₀ -phenanthrene
19	192	C ₁ -phenanthrenes
20	206	C ₂ -phenanthrenes
21	220	C ₃ -phenanthrenes
22	234	C ₄ -phenanthrenes
23	202	C ₀ -pyrene/fluoranthene
24	216	C ₁ -pyrenes/fluoranthenes
25	230	C ₂ -pyrenes/fluoranthenes
26	244	C ₃ -pyrenes/fluoranthenes
27	258	C₄-pyrenes/fluoranthenes
28	228	C ₀ -chrysene
29	242	C ₁ -chrysenes
30	256	C ₂ -chrysenes
31	270	C ₃ -chrysenes
32	284	C ₄ -chrysenes
33	148	C ₁ -benzothiophenes
34	162	C ₂ -benzothiophenes
35	176	C ₃ -benzothiophenes
36	190	C ₄ -benzothiophenes
37	204	C ₅ -benzothiophenes
28	184	C ₀ -dibenzothiophene
39	198	C ₁ -dibenzothiophenes
10	212	C ₂ -dibenzothiophenes
11	226	C ₃ -dibenzothiophenes
2	240	C₄-dibenzothiophenes
3	234	C_0 -naphthobenzothiophene
4	248	C ₁ -naphthobenzothiophenes
5	262	
.6	276	C ₂ -naphthobenzothiophenes
.7		C ₃ -naphthobenzothiophenes
	290	C ₄ -naphthobenzothiophenes
8	253	Monoaromatic steranes
9	267	Monoaromatic steranes
0	239	Monoaromatic steranes
1	231	Triaromatic steranes
2	245	Triaromatic steranes











NAPH Aromatic Hydrocarbons F BP PHEN PΥ CHR BT

Sulfur Cmpds DBT NBT

MASTAS

Steranes

0

AB

10

20

30

40

Relative Amount

60

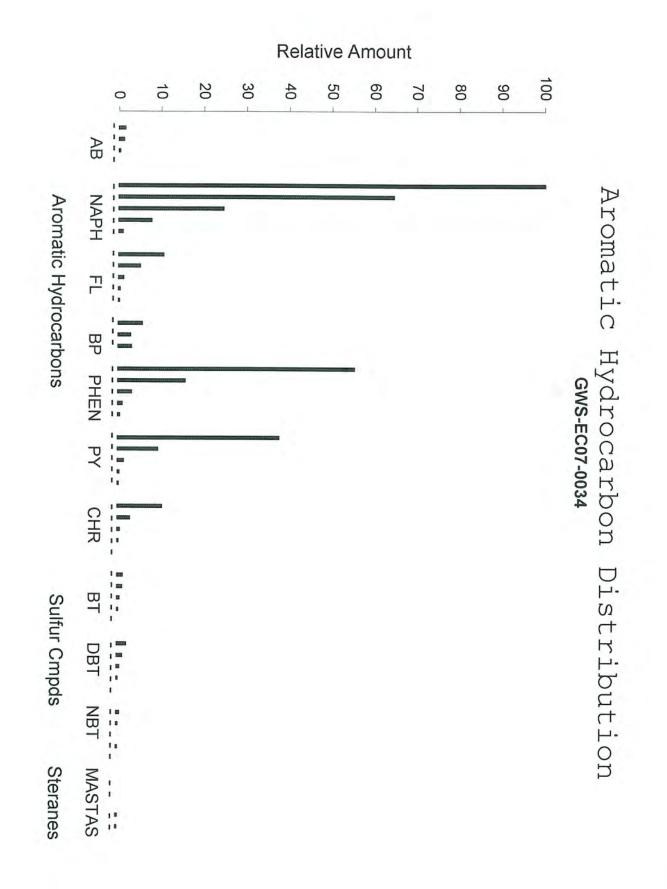
70

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90

50

100 -

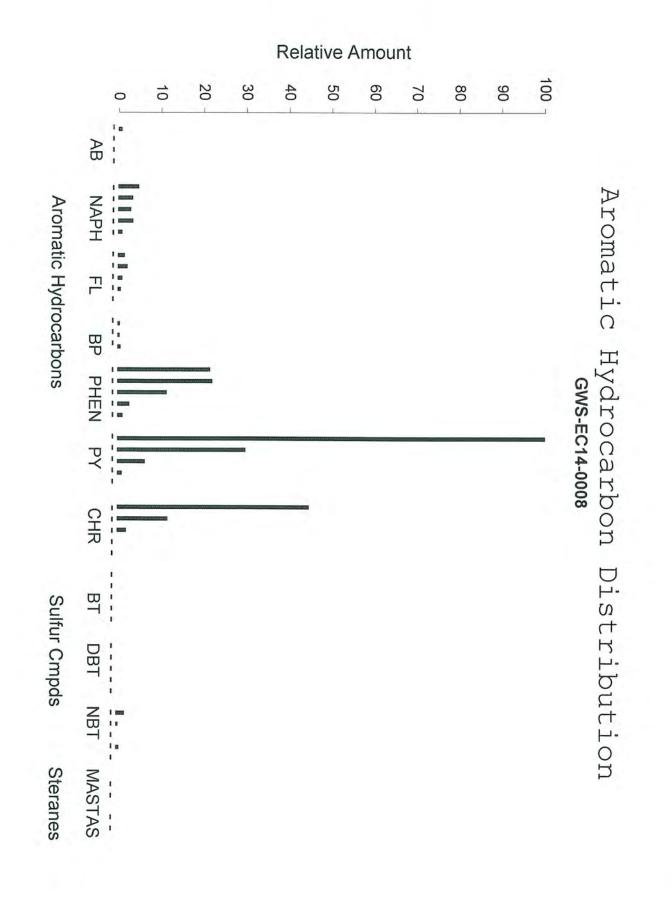




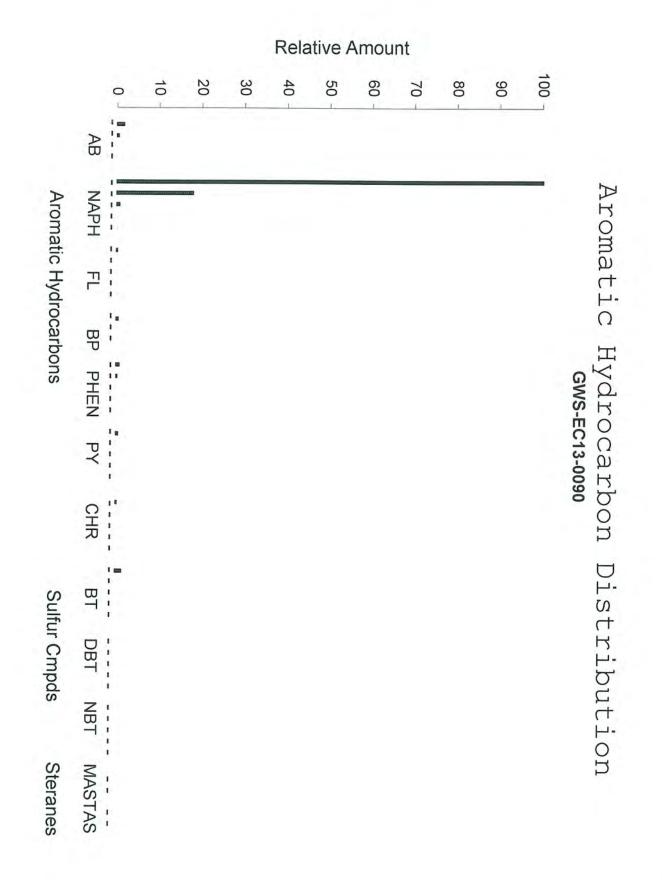




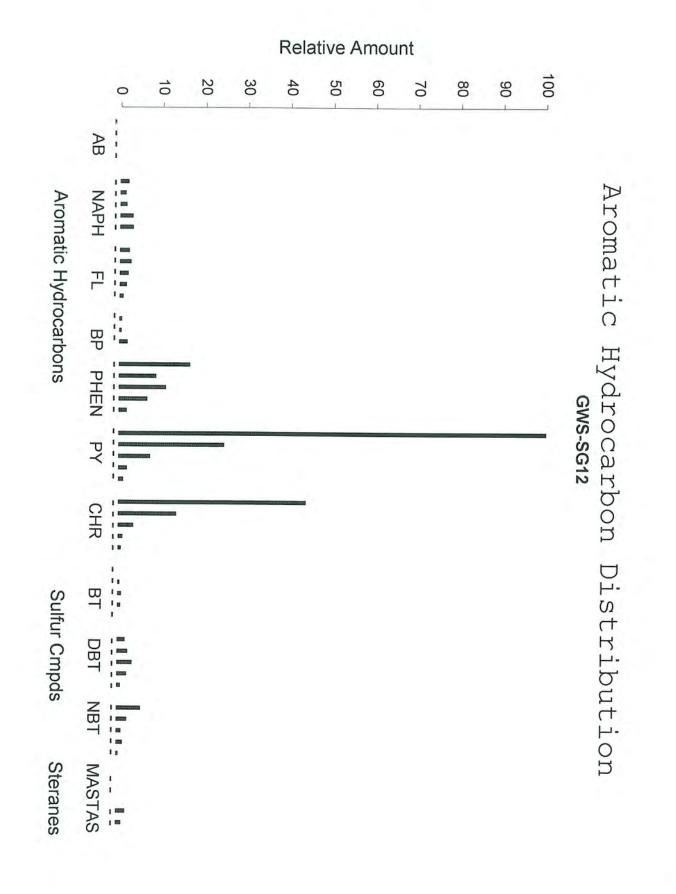
Relative Amount 20 10 30 40 50 60 70 0 AB NAPH Aromatic Hydrocarbons 끈 BP PHEN 11 1.1.1.1 PY CHR 1.0 BT Sulfur Cmpds DBT NBT 1 MASTAS Steranes 1 1 1



ZZYPORERYS







ZVPORENYCS



Table

Key to Chromatogram Symbol Identification for m/z 85 and m/z 113 Paraffins and Isoparaffins

Symbol	Detail
i-10	Iso-alkane with 10 carbon atoms
i-15	Farnesane (isoprenoid with 15 carbon atoms)
i-16	Isoprenoid with 16 carbon atoms
Pr	Pristane (isoprenoid with 19 carbon atoms)
Ph	Phytane (isoprenoid with 20 carbon atoms)
nC ₈	n-C ₈ normal alkane
nC ₁₅	n-C ₁₅ normal alkane
i-8	2,5-(2,4)-Dimethylhexane
i-8'	2,3,4-Trimethylpentane
i-8"	2,3-Dimethylhexane
CH-n	Alkylcyclohexane (where <i>n</i> indicates number of carbon atoms in the side chain)
CH- <i>n</i>	

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	ler, Inc. 1 50 - A / Kanes (Abs	(112.70 to 113.70): 070504 (Kanes & Iso (Absent)	(112.70 to 113.70): 070504 (Kanes & Iso (Absent)
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GWS-EC12-0008 (39767-5) soil extract



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ALC: NO

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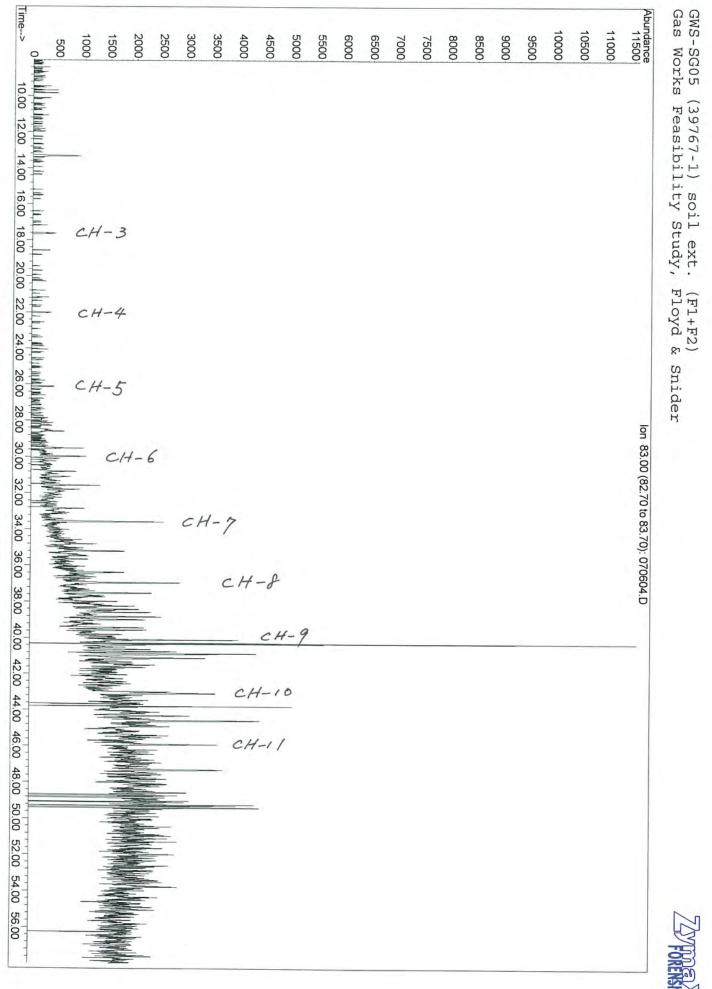
GWS-SG12 (39767-8) soil ext. (F1+F2) Gas Works Feasibility Study. Floyd & St

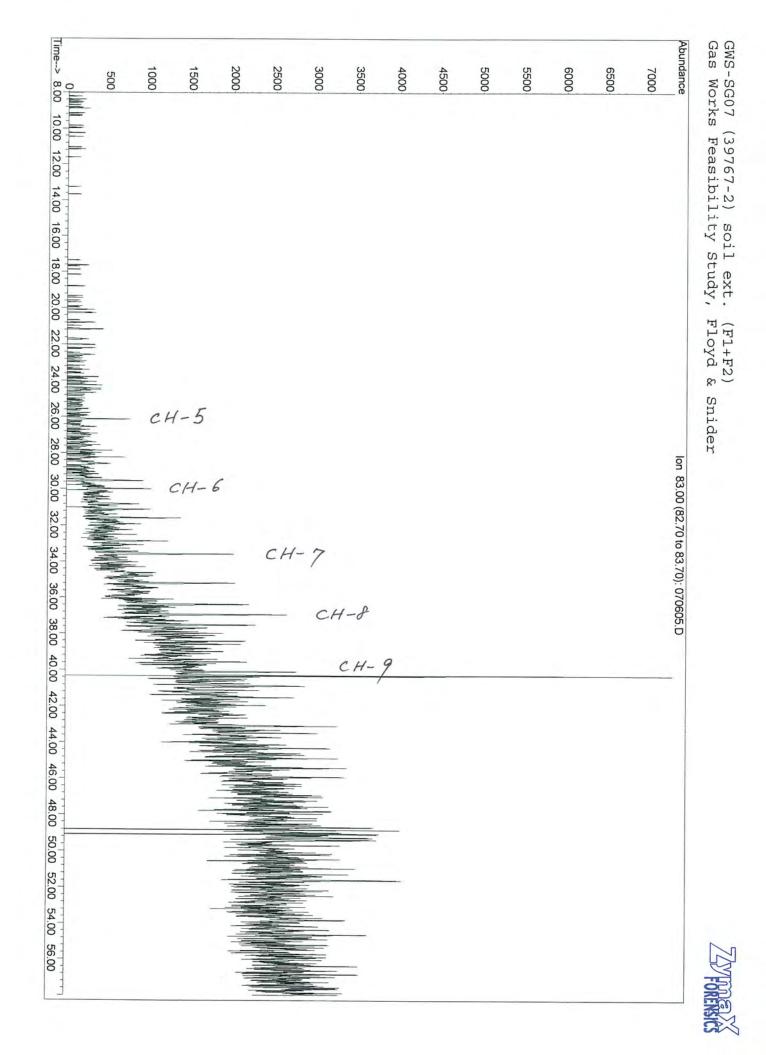


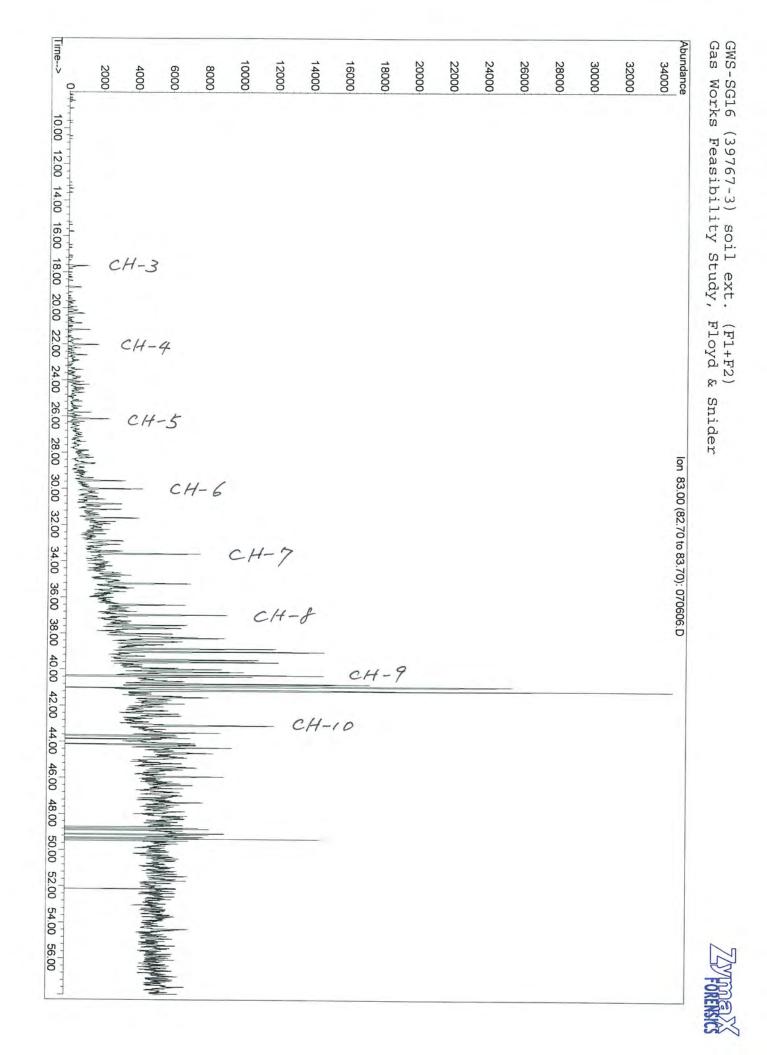
Table

Key for Alkylcyclohexanes at m/z 83

 Symbol	Detail
CH-1:	Methylcyclohexane
CH-2:	Ethylcyclohexane
CH-3:	Propylcylohexane
CH-4:	Butylcyclohexane
CH-5:	Pentylcyclohexane
CH-6:	Hexylcyclohexane
CH-7:	Heptylcyclohexane
CH-8:	Octylcyclohexane
CH-9:	Nonylcyclohexane
CH-10:	Decylcyclohexane
CH-11:	Undecylcyclohexane
CH-12:	Dodecylcyclohexane
CH-13:	Tridecylcyclohexane
CH-14:	Tetradecylcyclohexane







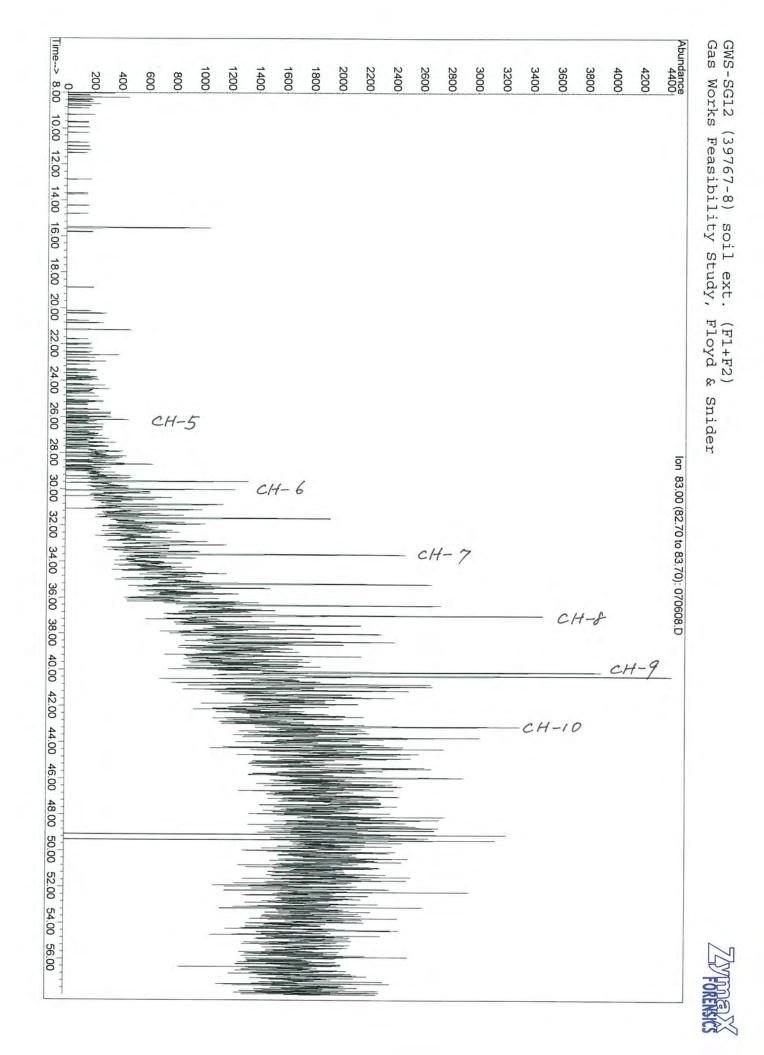
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GWS-EC07-0034 (39767-4) soil ext (F1+F2)

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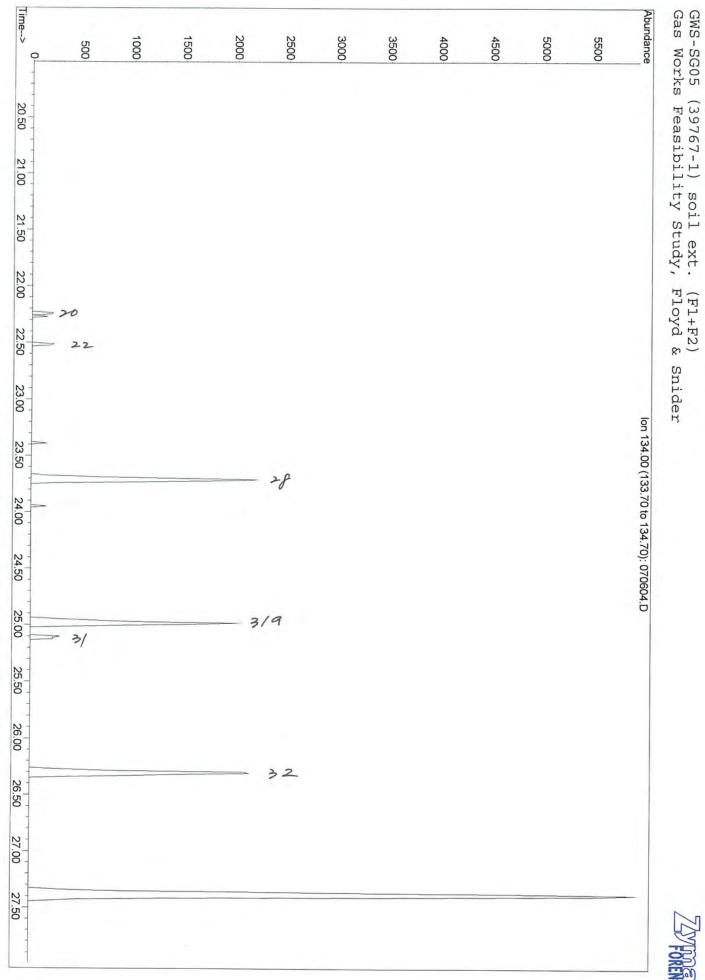
Abundance 9000	lon 83.00 (82.70 to 83.70): 070506.D
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6500	
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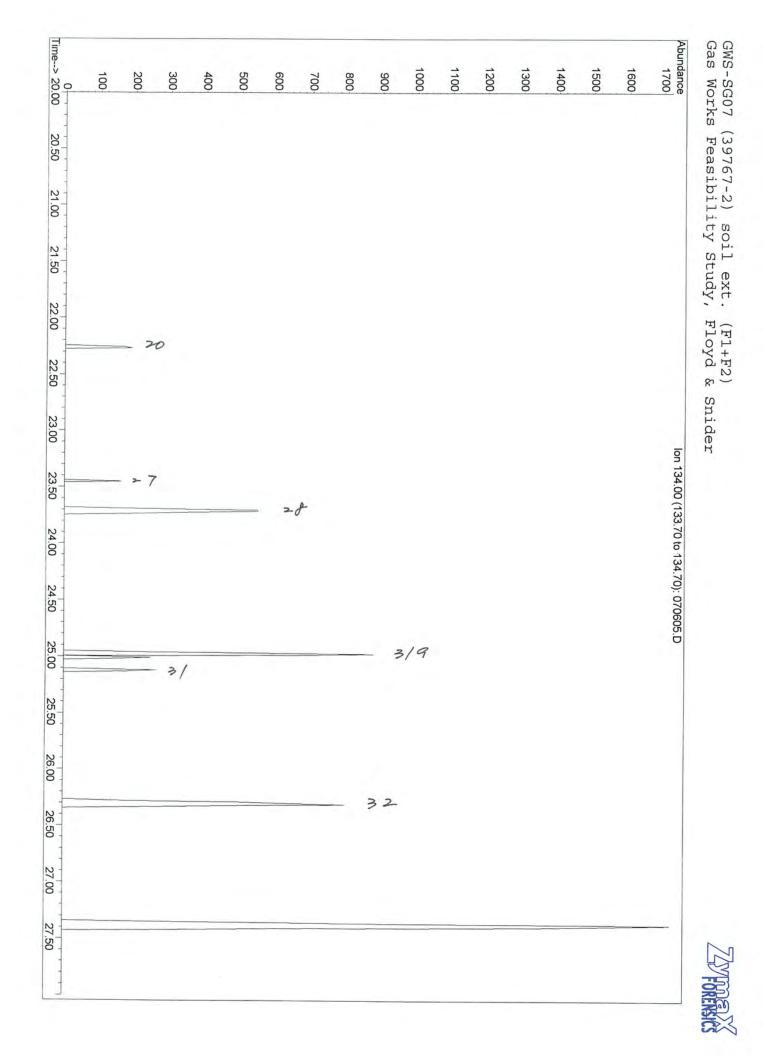


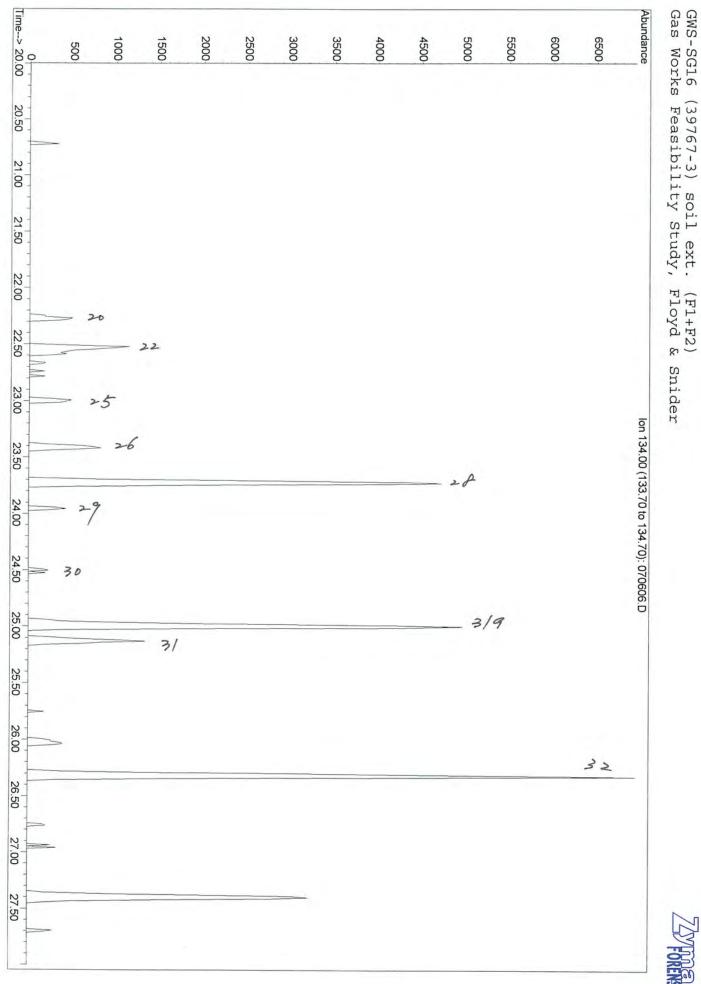


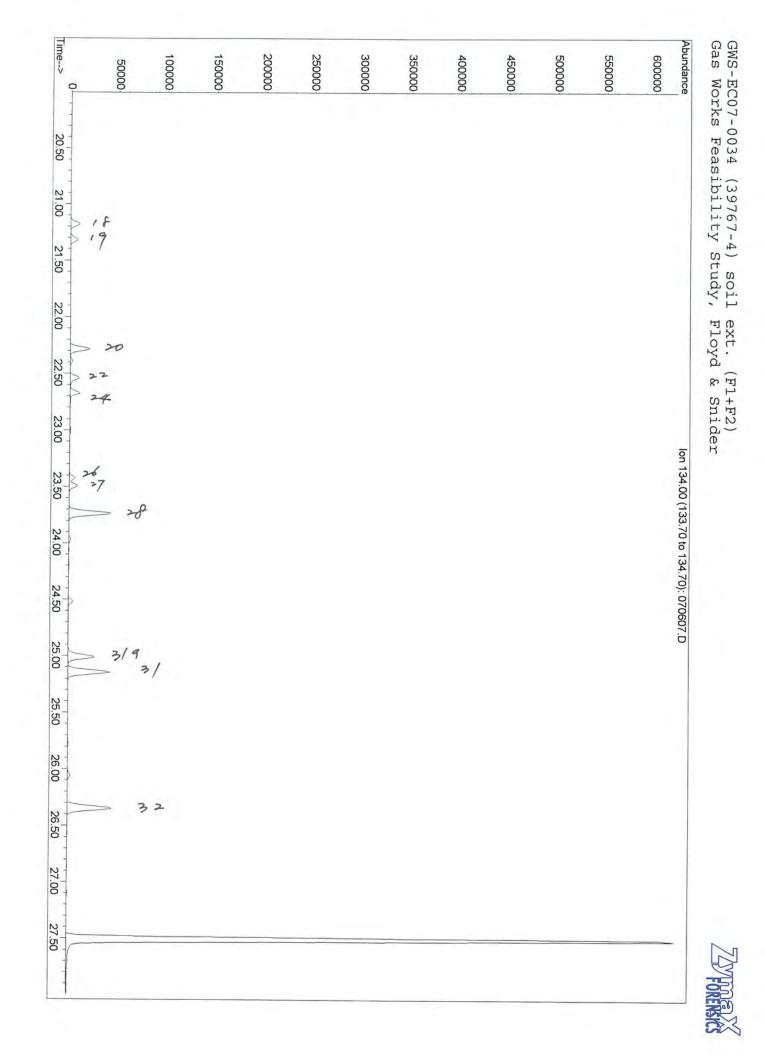
Key for C₄-Alkylbenzenes (m/z 134 mass chromatograms)

#	Compound
16	Sec-Butylbenzene
17	1-Methyl-3-Isopropylbenzene
18	1-Methyl-4-Isopropylbenzene
19	1-Methyl-2-Isopropylbenzene
20	1,3-Diethylbenzene
21	1-Methyl-3-Propylbenzene
22	Butylbenzene
23	1,3-Dimethyl-5-Ethylbenzene
24	1,2-Diethylbenzene
25	1-Methyl-2-Propylbenzene
26	1,4-Dimethyl-2-Ethylbenzene
27	1,3-Dimethyl-4-Ethylbenzene
28	1,2-Dimethyl-4-Ethylbenzene
29	1,3-Dimethyl-2-Ethylbenzene
30	1,2-Dimethyl-3-Ethylbenzene
31a	1,2,4,5-Tetramethylbenzene
31	1,2,3,5-Tetramethylbenzene
32	1,2,3,4-Tetramethylbenzene





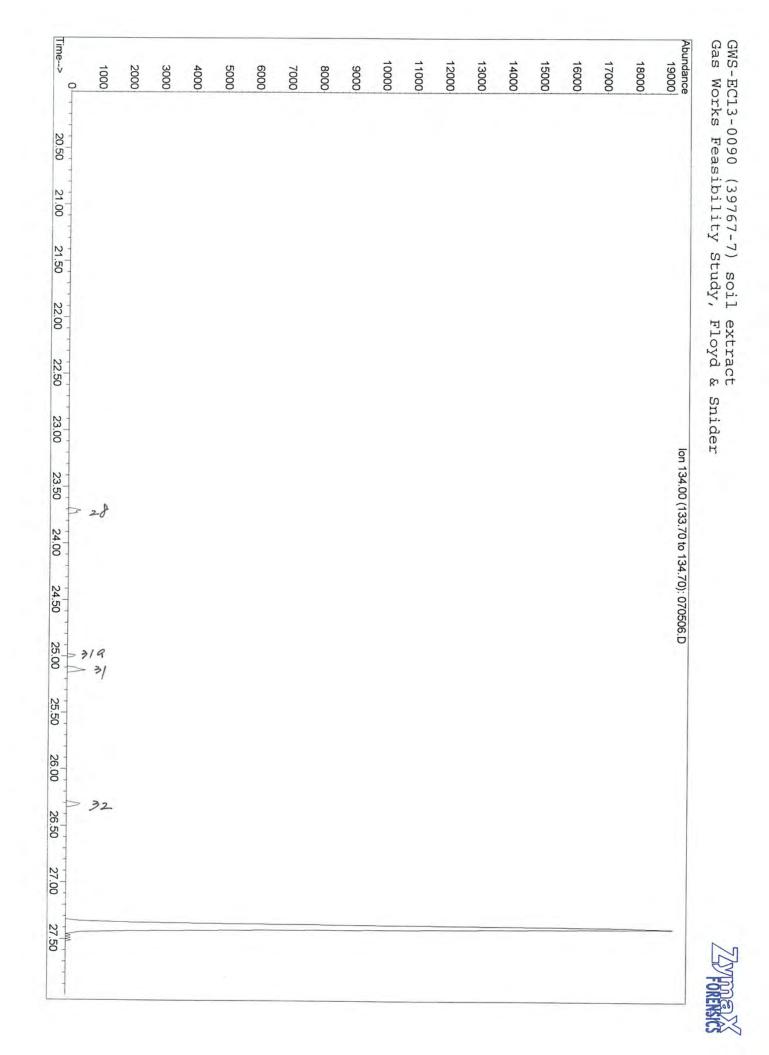




Time>	2	10000	20000	30000	40000	50000	60000-	70000	80000	00006	100000	110000	120000	130000	Abundance
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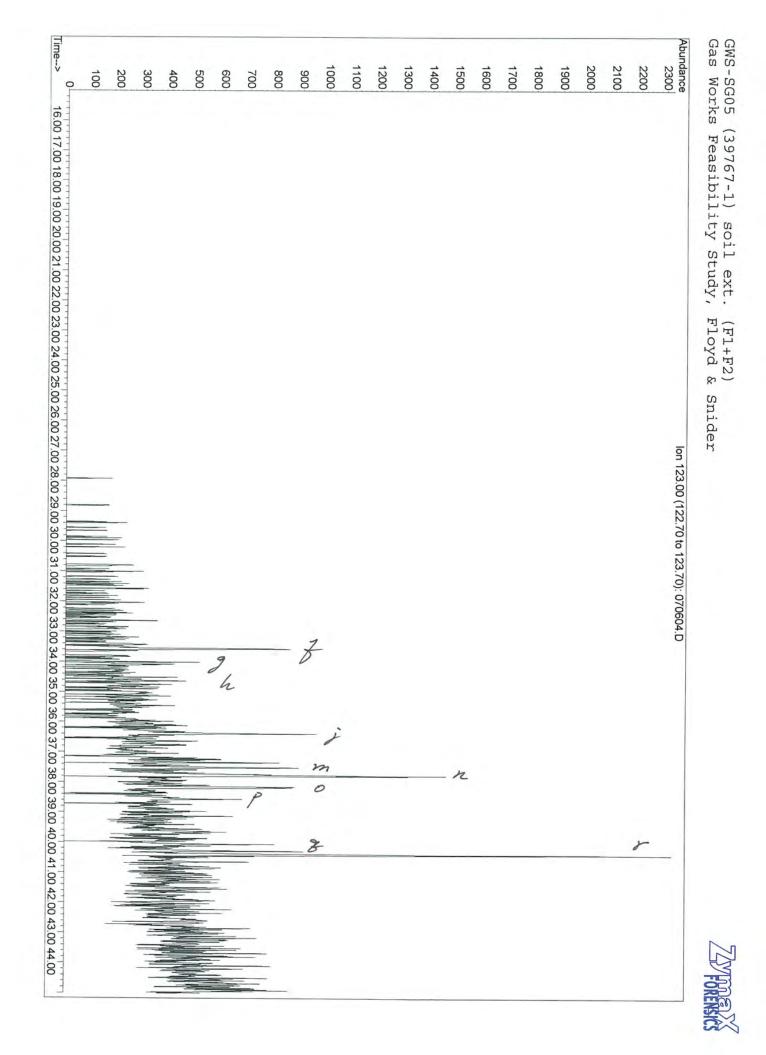


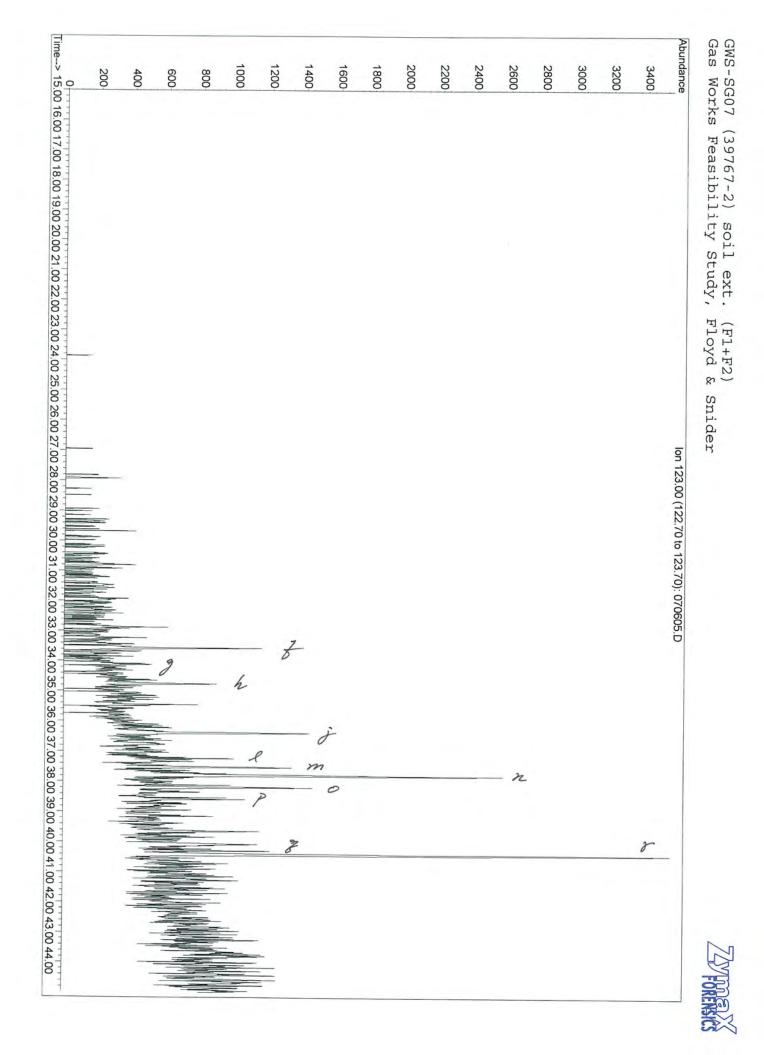


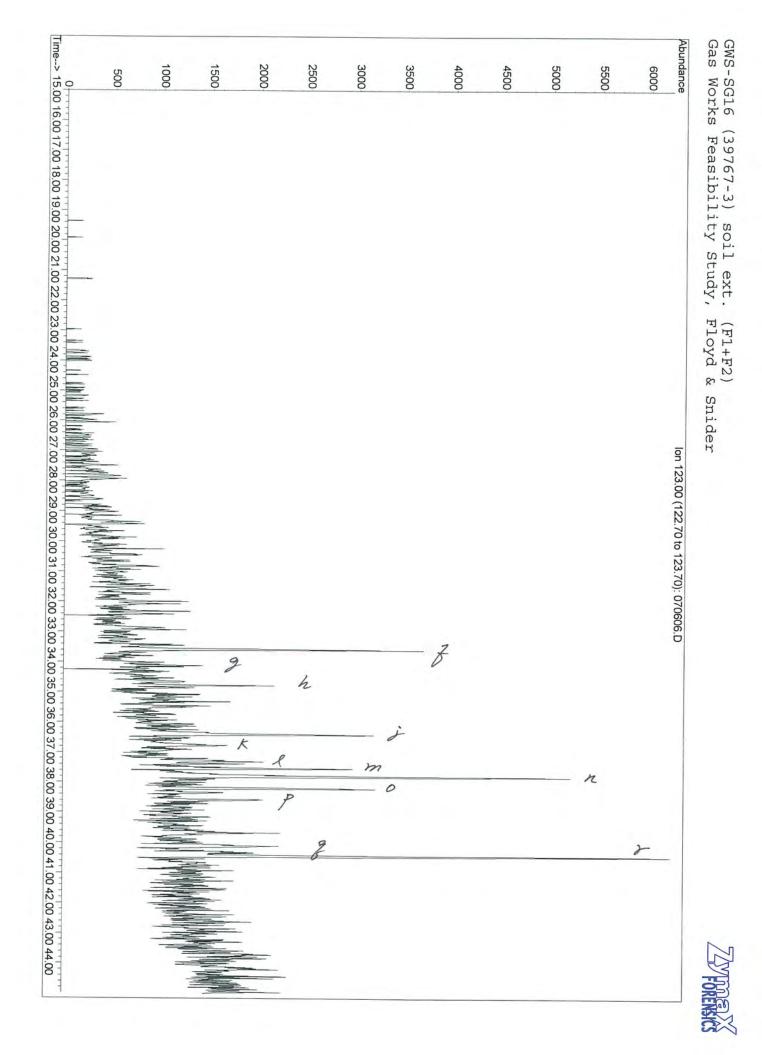
Table

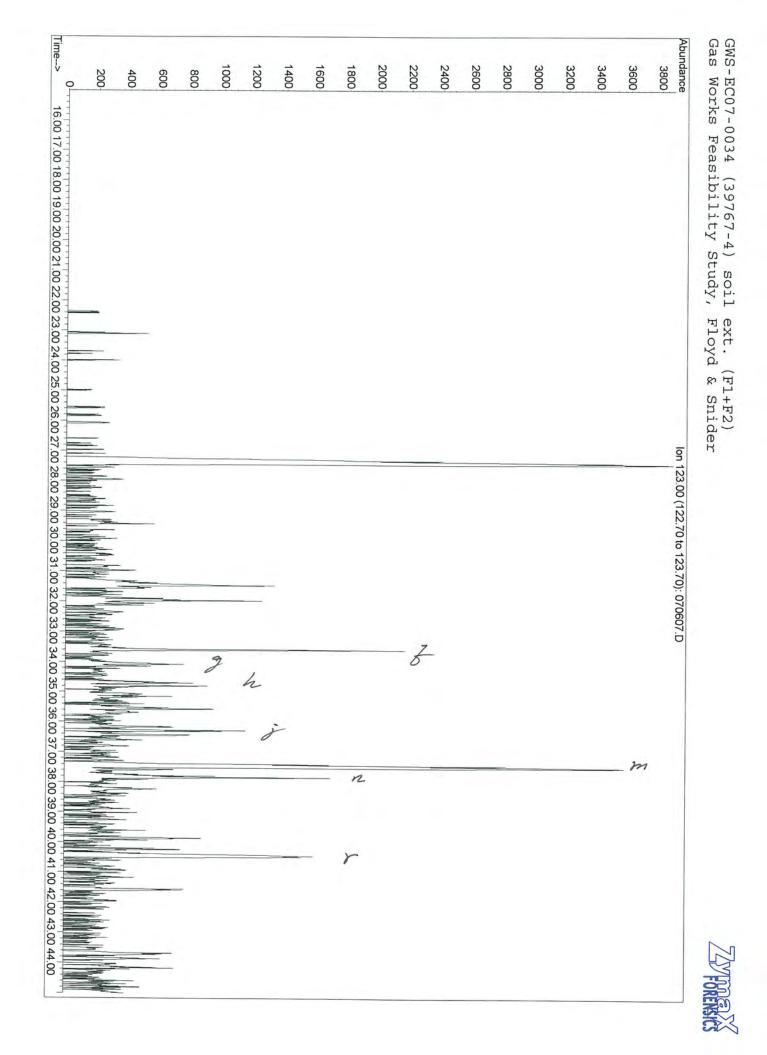
Key for identification of the Bicyclanes (m/z 123 mass chromatograms)

Peak No.	Identity	Formula	M.W.
а	2,2,3-Trimethylbicyloheptane	C ₁₀ H ₁₈	138
b	C ₁₀ bicycloalkane	C ₁₀ H ₁₈	138
с	3,3,7-Trimethylbicycloheptane	C ₁₀ H ₁₈	138
d	C ₁₁ decalin	C ₁₁ H ₂₀	152
f	Nordrimane	C14H26	194
g	Nordrimane	C ₁₄ H ₂₆	194
n	Rearranged drimane	C ₁₅ H ₂₈	208
	Rearranged drimane	C ₁₅ H ₂₈	208
c	Isomer of eudesmane	C ₁₅ H ₂₈	208
	4β(H) Eudesmane	C ₁₅ H ₂₈	208
n	C ₁₅ bicyclic sesquiterpane	C ₁₅ H ₂₈	208
1	8β(H) Drimane	C15H28	208
1	C ₁₅ bicyclic sesquiterpane	C15H28	208
81	C ₁₆ bicyclic sesquiterpane	C ₁₆ H ₃₀	222
	C ₁₆ bicyclic sesquiterpane	C ₁₆ H ₃₀	222
	8β(H) Homodrimane	C ₁₆ H ₃₀	222





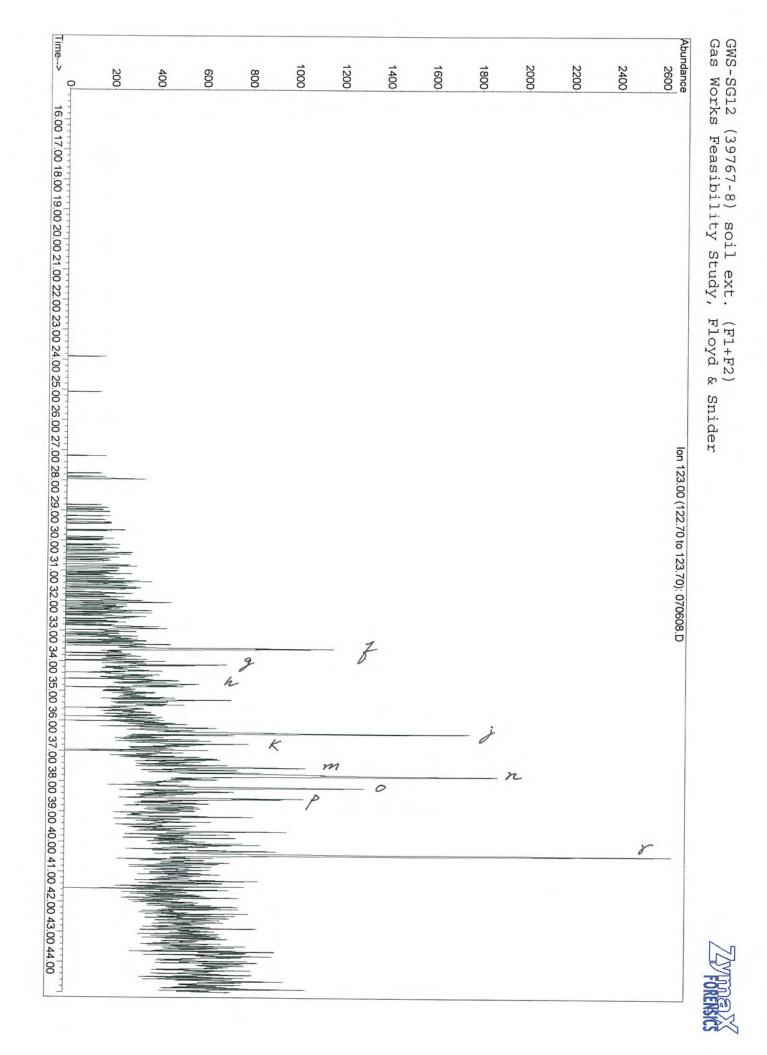


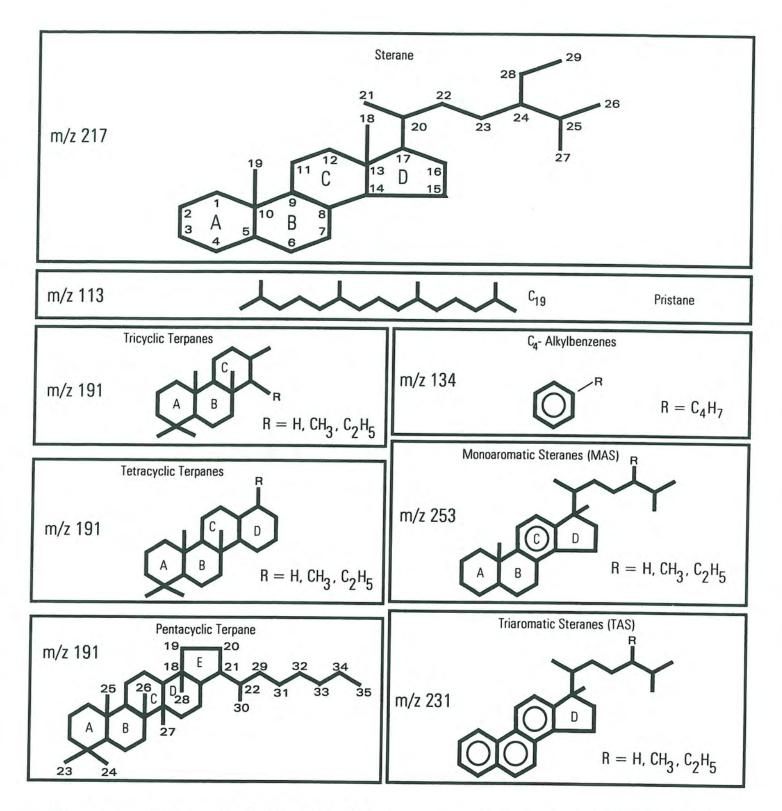


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100 150
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5

Abundance 440
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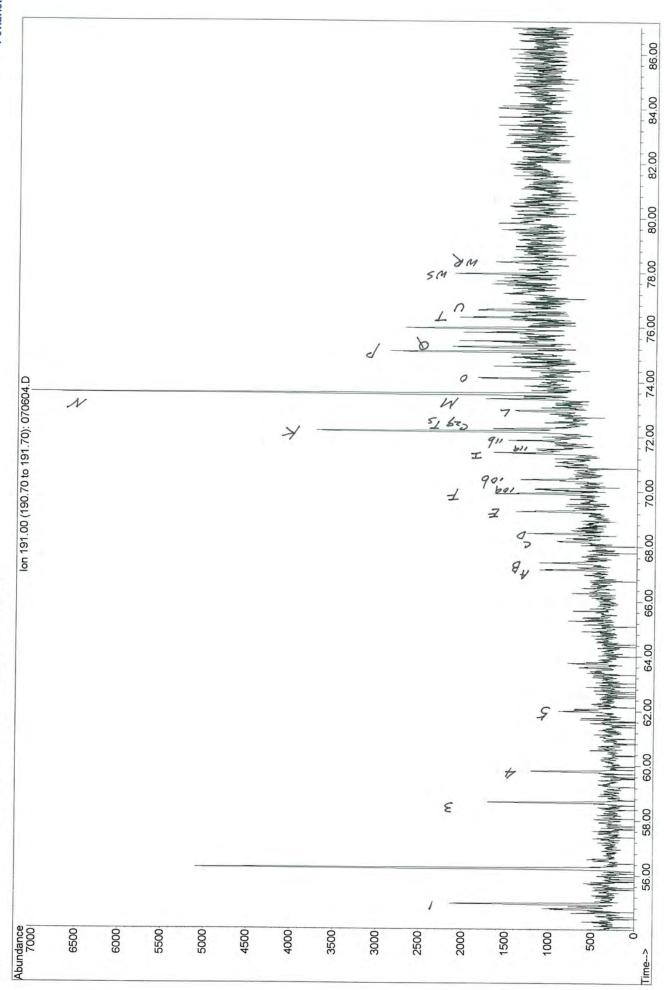
The compound structures of pristane, C₄-alkylbenzenes, sterane; terpanes; monoaromatic and triaromatic steranes



Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes Identification (m/z 191 mass chromatograms)

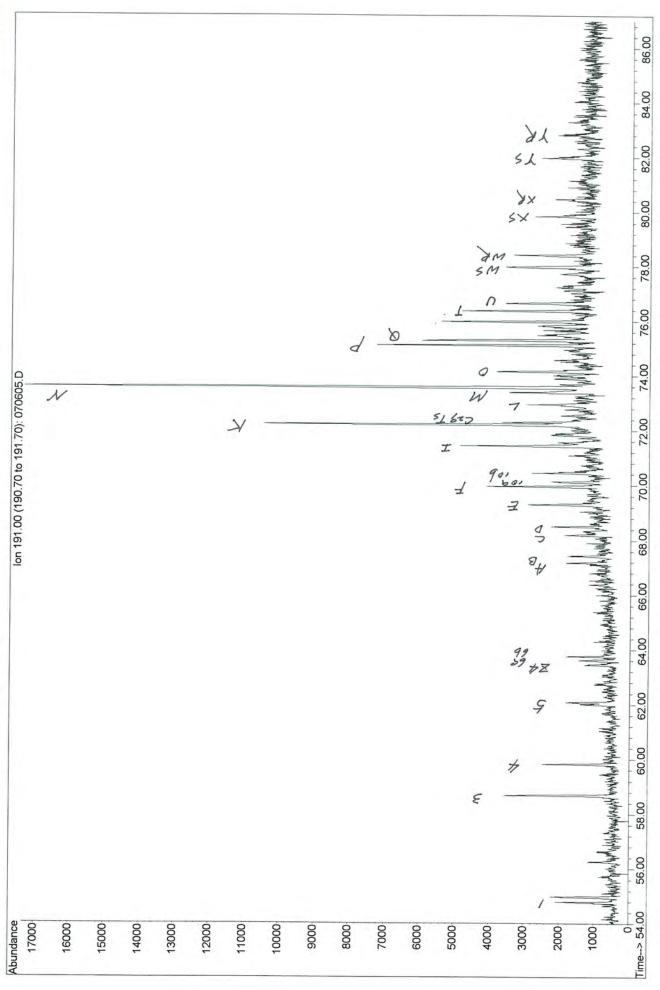
Code	Identity	Carbon #
0	C ₂₀ -Tricyclic Terpane	20
1	C ₂₁ -Tricyclic Terpane	21
2 3	C ₂₂ -Tricyclic Terpane	22
3	C ₂₃ -Tricyclic Terpane	23
4	C ₂₄ -Tricyclic Terpane	24
5	C ₂₅ -Tricyclic Terpane	25
Z4	C24-Tetracyclic Terpane	24
6a	C ₂₆ -Tricyclic Terpane	26
6b	C ₂₆ -Tricyclic Terpane	26
7	C ₂₇ -Tricyclic Terpane	27
A	C ₂₈ -Tricyclic Terpane #1	28
В	C ₂₈ -Tricyclic Terpane #2	28
С	C ₂₉ -Tricyclic Terpane #1	29
D	C ₂₉ -Tricyclic Terpane #2	29
E	18α-22,29,30-Trisnorneohopane (Ts)	27
=	17α -22,29,30-Trisnorhopane (Tm)	27
G	17B-22,29-30-Trisnorhopane	27
H	17α-23,28-Bisnorlupane	28
10a	C_{30} -Tricyclic Terpane #1	30
10b	C_{30} -Tricyclic Terpane #2	30
	17α -28,30-Bisnorhopane	28
11a	C_{31} -Tricyclic Terpane #1	
J	17α -25-Norhopane	31
, 11b	C_{31} -Tricyclic Terpane #2	29
K	17α ,21B-30-Norhopane	31
C ₂₉ Ts	18α -30-Norneohopane	29
		29
2 ₃₀ *	17α-Diahopane	30
<i>N</i> a	17β-21α-30-Normoretane	29
	18α-Oleanane	30
//b	18ß-Oleanane	30
0	17α,21β-Hopane	30
	17ß,21α-Moretane	30
3a	C ₃₃ -Tricyclic Terpane #1	33
3b	C ₃₃ -Tricyclic Terpane #2	33
	22S-17α,21ß-30-Homohopane	- 31
	22R-17α,21β-30-Homohopane	31
	Gammacerane	30
4a	C ₃₄ -Tricyclic Terpane #1	34
2.0	17ß,21α-Homomoretane	31
4b	C ₃₄ -Tricyclic Terpane #2	34
	22S-17α,21ß-30-Bishomohopane	32
V	22R-17α,21ß-30-Bishomohopane	32
5a	C ₃₅ -Tricyclic Terpane #1	35
5b	C ₃₅ -Tricyclic Terpane #2	35
	17β,21α-C ₃₂ -Bishomomoretane	32
S	22S-17a,21B-30,31,32-Trishomohopane	33
'R	22R-17a,21ß-30,31,32-Trishomohopane	33
6a	C ₃₆ -Tricyclic Terpane #1	36
Sb	C ₃₆ -Tricyclic Terpane #2	36
S	22S-17α,21ß-30,31,32,33-Tetrahomohopane	34
2	22R-17a,21ß-30,31,32,33-Tetrahomohopane	34
S	22S-17a,21ß-30,31,32,33,34-Pentahomohopane	35
R	22R-17a,21ß-30,31,32,33,34-Pentahomohopane	35



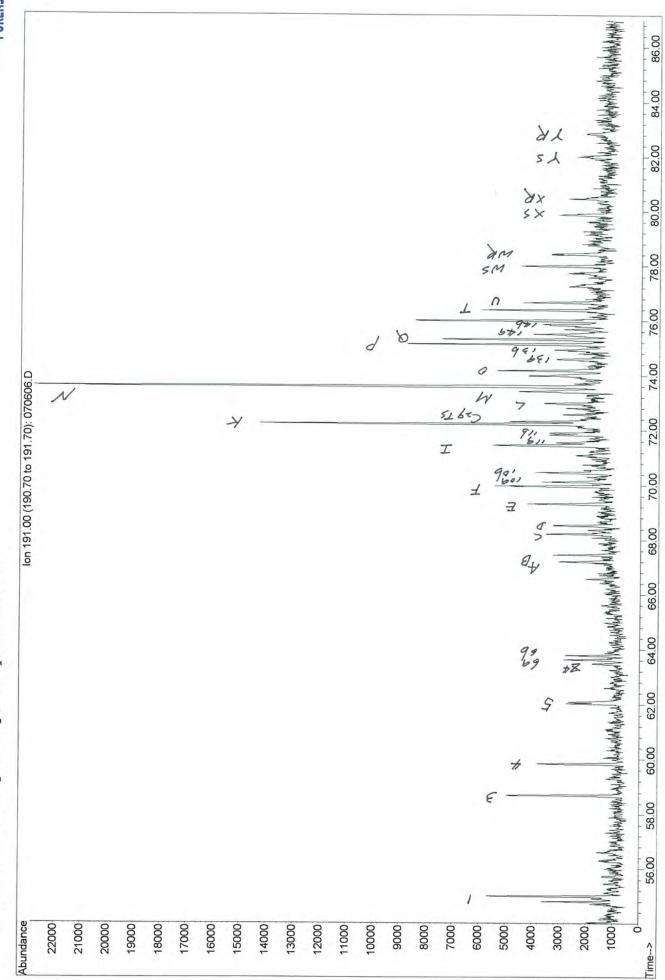


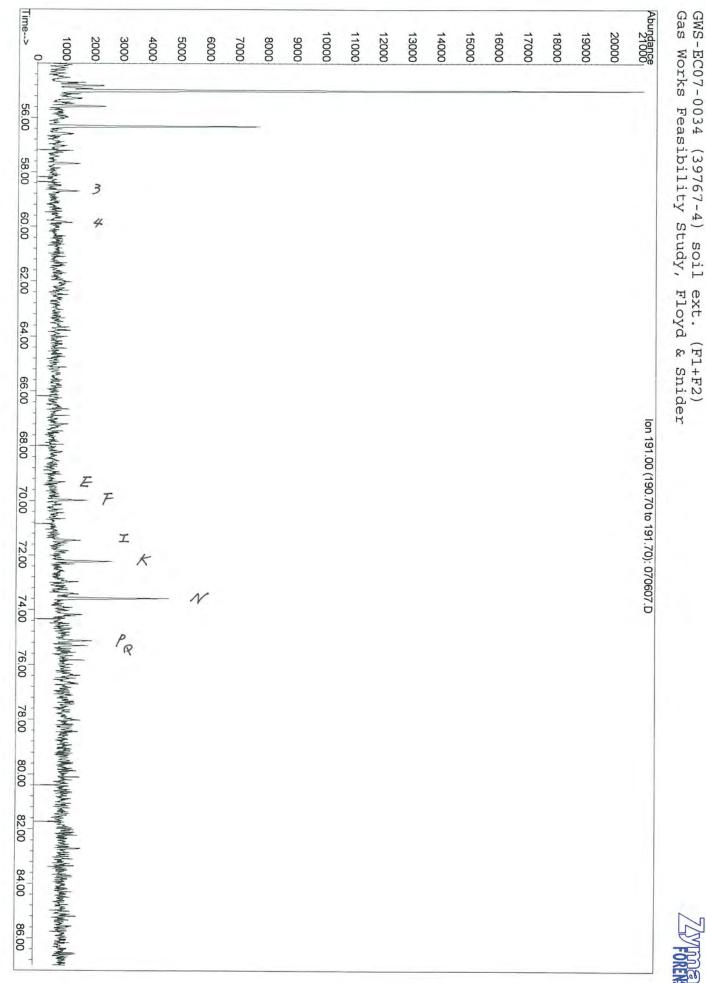


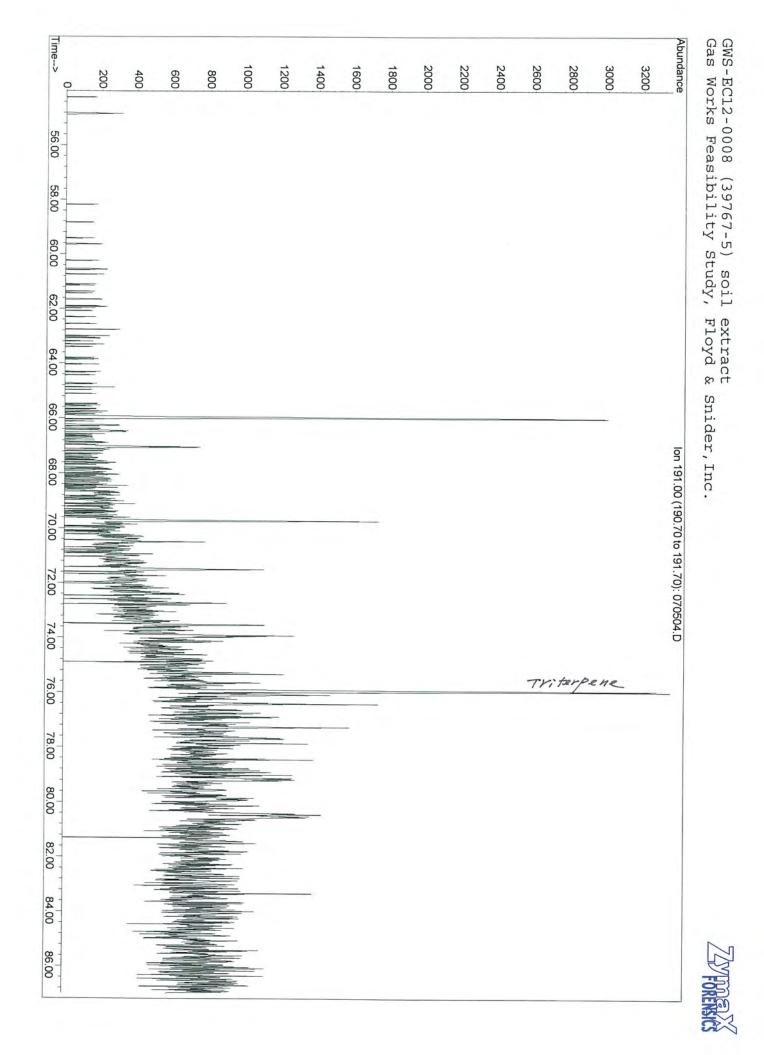


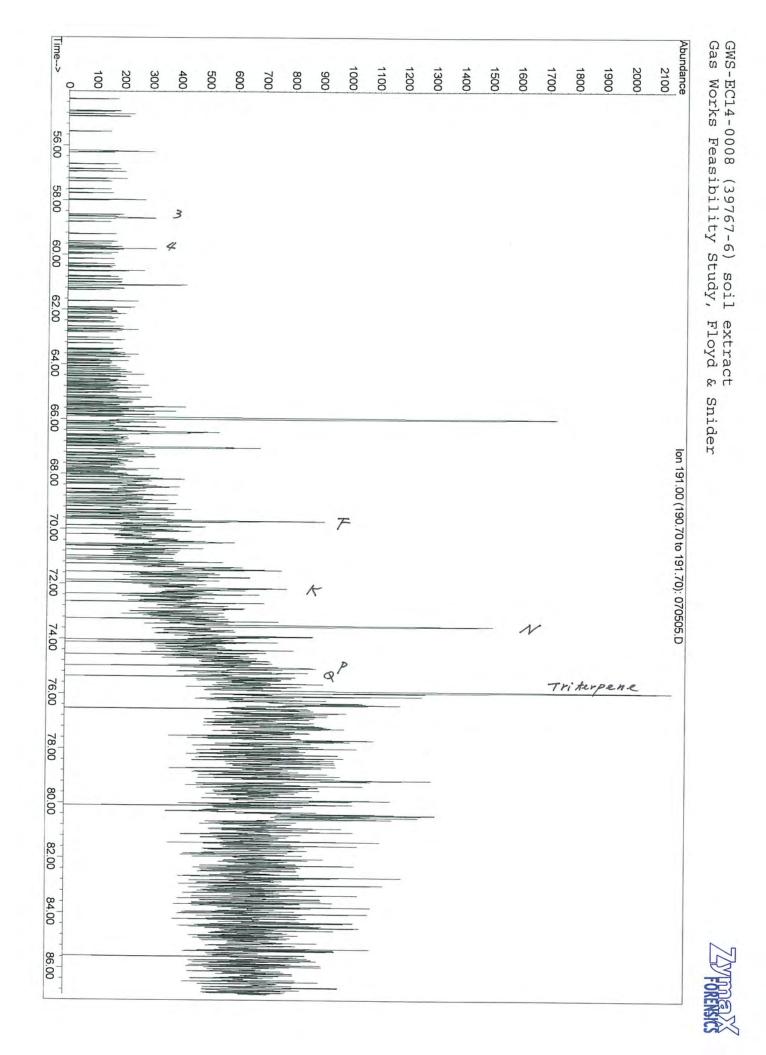


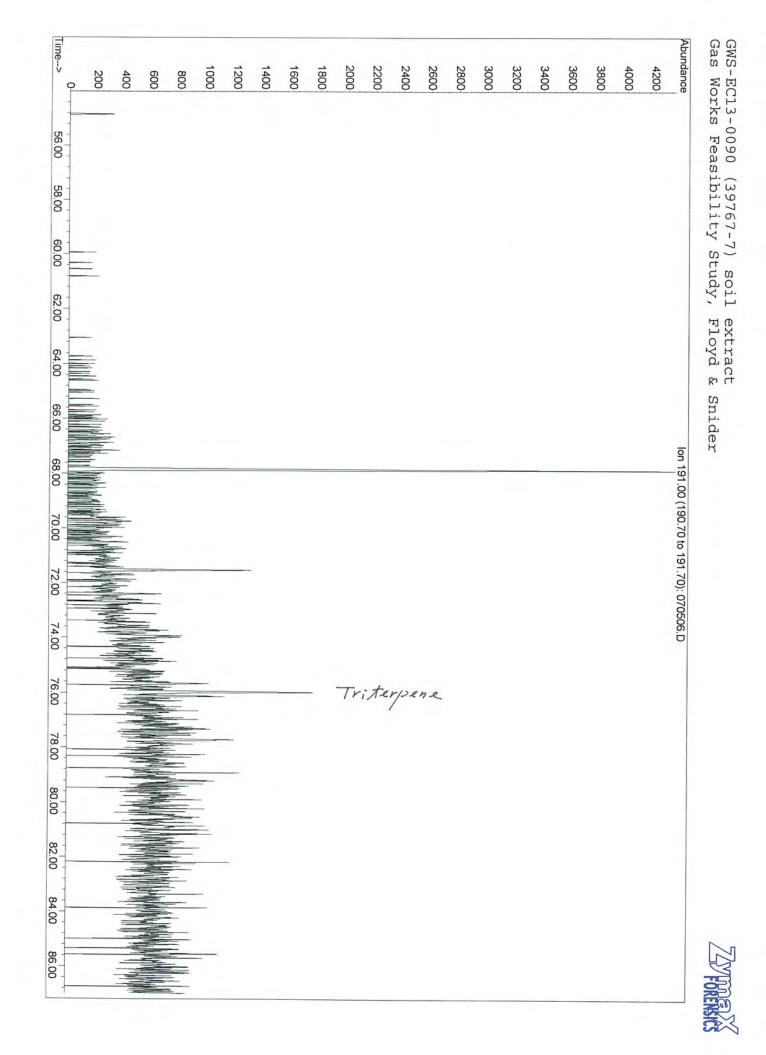
GWS-SG16 (39767-3) soil ext. (F1+F2) Gas Works Feasibility Study, Floyd & Snider

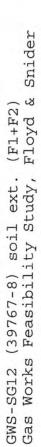




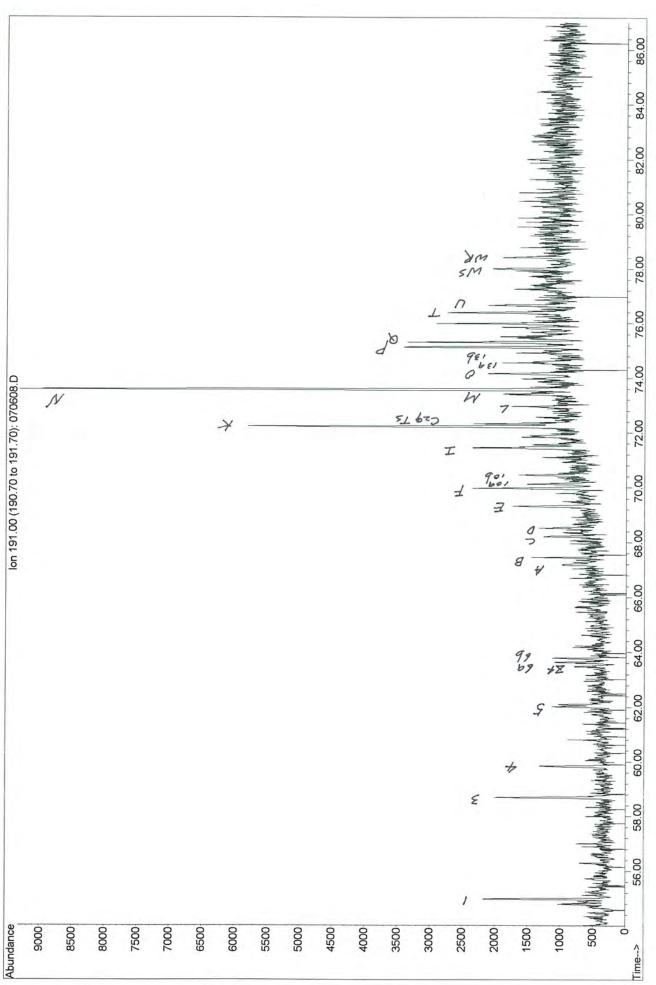










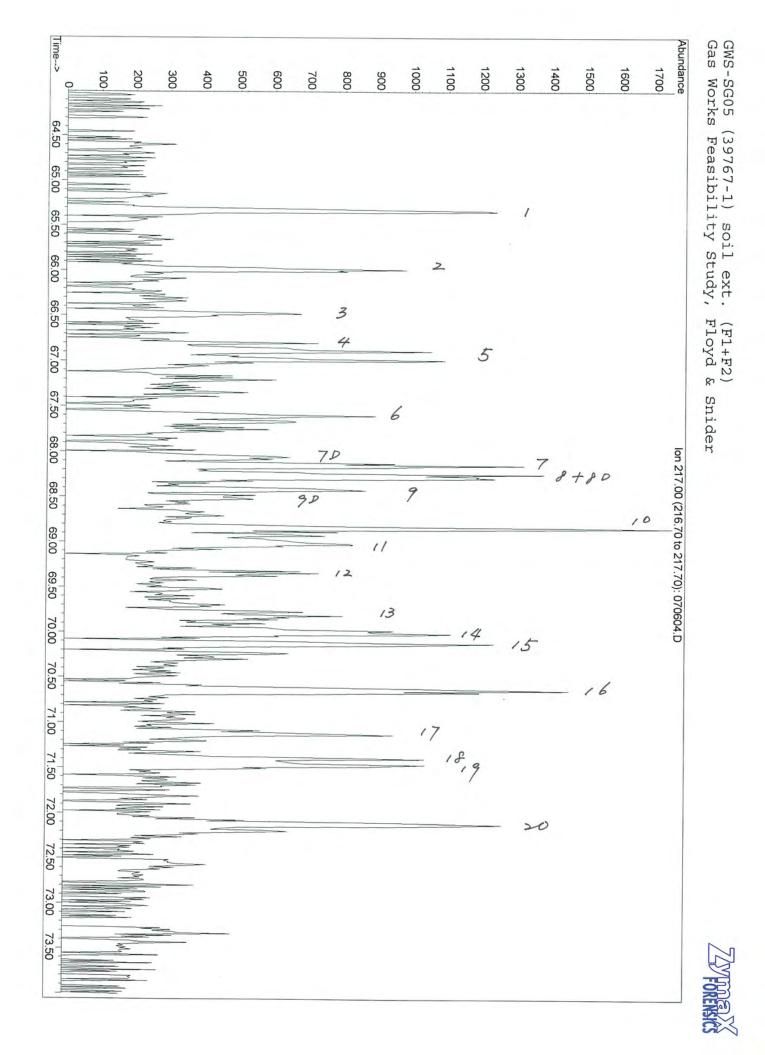


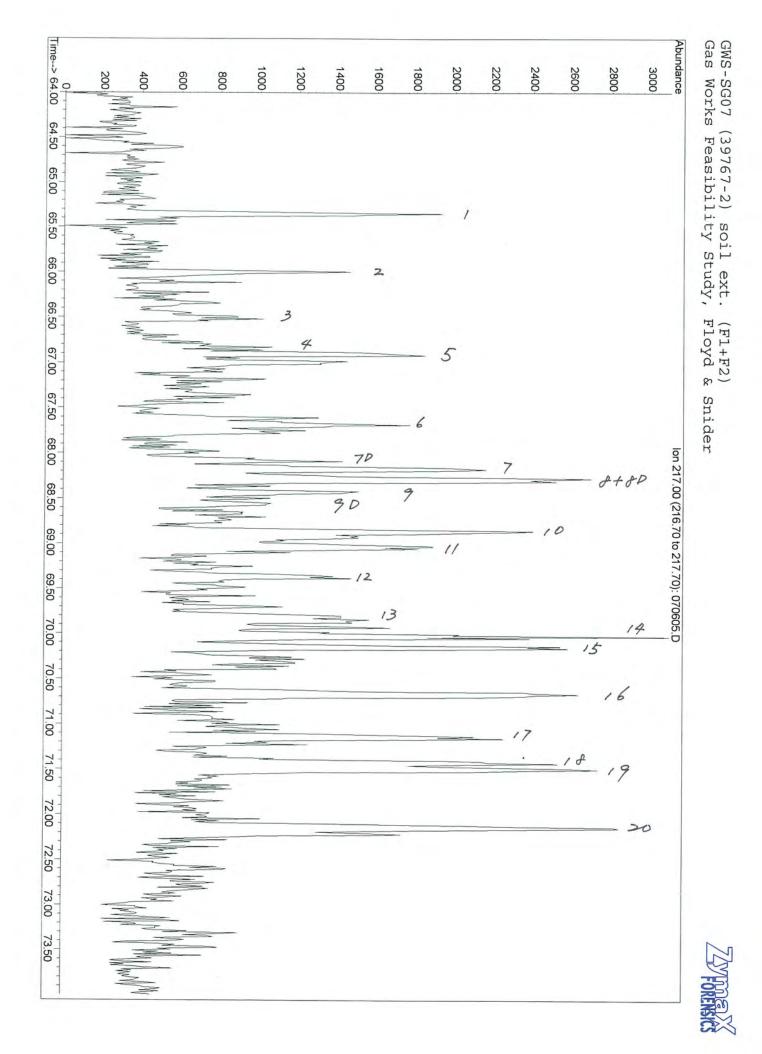
Table

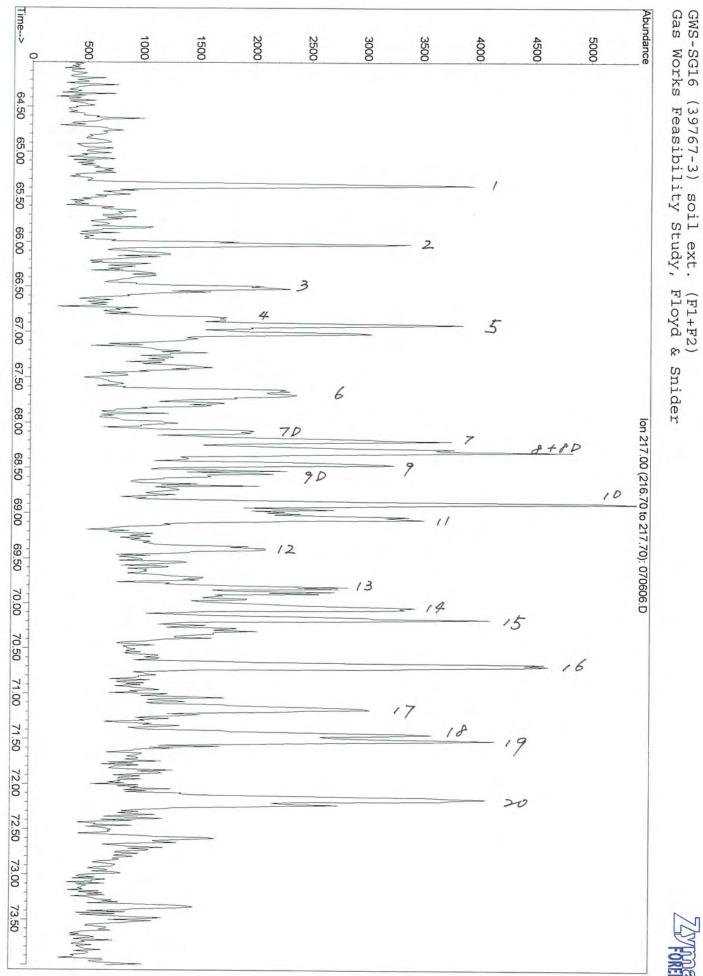


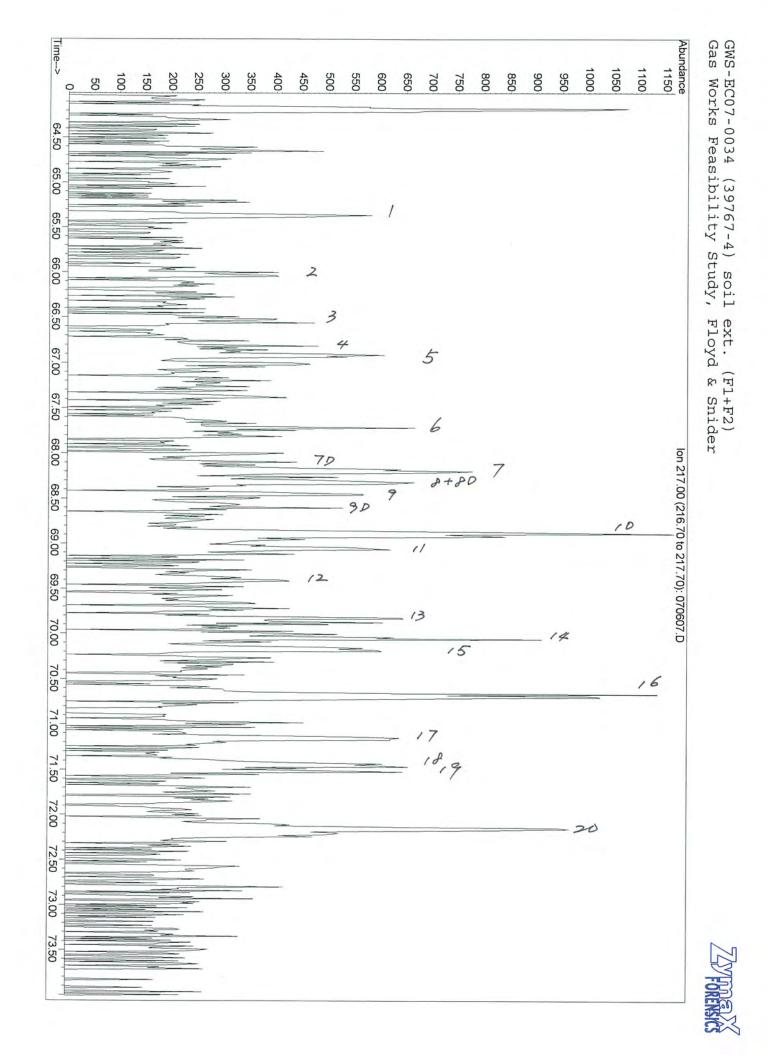
Code Identity Carbon # 1 13ß,17α-diacholestane (20S) 27 2 13ß,17α-diacholestane (20R) 27 3 13α,17ß-diacholestane (20S) 27 4 13α,17β-diacholestane (20R) 27 5 24-methyl-13ß, 17α-diacholestane (20S) 28 6 24-methyl-13ß,17α-diacholestane (20R) 28 7D 24-methyl-13α,17ß-diacholestane (20S) 28 7 14α,17α-cholestane (20S) 27 8D 24-ethyl-13ß, 17α -diacholestane (20S) 29 8 14ß,17ß-cholestane (20R) 27 9 14ß,17ß-cholestane (20S) 27 9D 24-methyl-13α, 17ß-diacholestane (20R) 28 10 14α , 17α -cholestane (20R) 27 11 24-ethyl-13ß, 17α-diacholestane (20R) 29 12 24-ethyl-13a,17ß-diacholestane (20S) 29 13 24-methyl-14α,17α-cholestane (20S) 28 14D 24-ethyl-13α,17β-diacholestane (20R) 29 14 24-methyl-14ß,17ß-cholestane (20R) 28 15 24-methyl-14ß, 17ß-cholestane (20S) 28 16 24-methyl-14 α , 17 α -cholestane (20R) 28 17 24-ethyl-14 α -cholestane (20S) 29 18 24-ethyl-14ß, 17ß-cholestane (20R) 29 19 24-ethyl-14ß, 17ß-cholestane (20S) 29 20 24-ethyl-14α,17α-cholestane (20R) 29 21A 24-n-Propylcholestane (20S) 30 21B 4-methyl-24-ethylcholestane (20S) 30 22A 4α -methyl-24-ethyl-14 β , 17 β -cholestane(20S) 30 22B 24-n-propyl-14β,17β-cholestane (20S) 30 23A 4α -methyl-24-ethyl-14 β , 17 β -cholestane(20R) 30 23B 24-n-propyI-14β,17β-cholestane (20R) 30 24A 4α-methyl-24-ethylcholestane(20R) 30 24B 24-n-propylcholestane (20R) 30

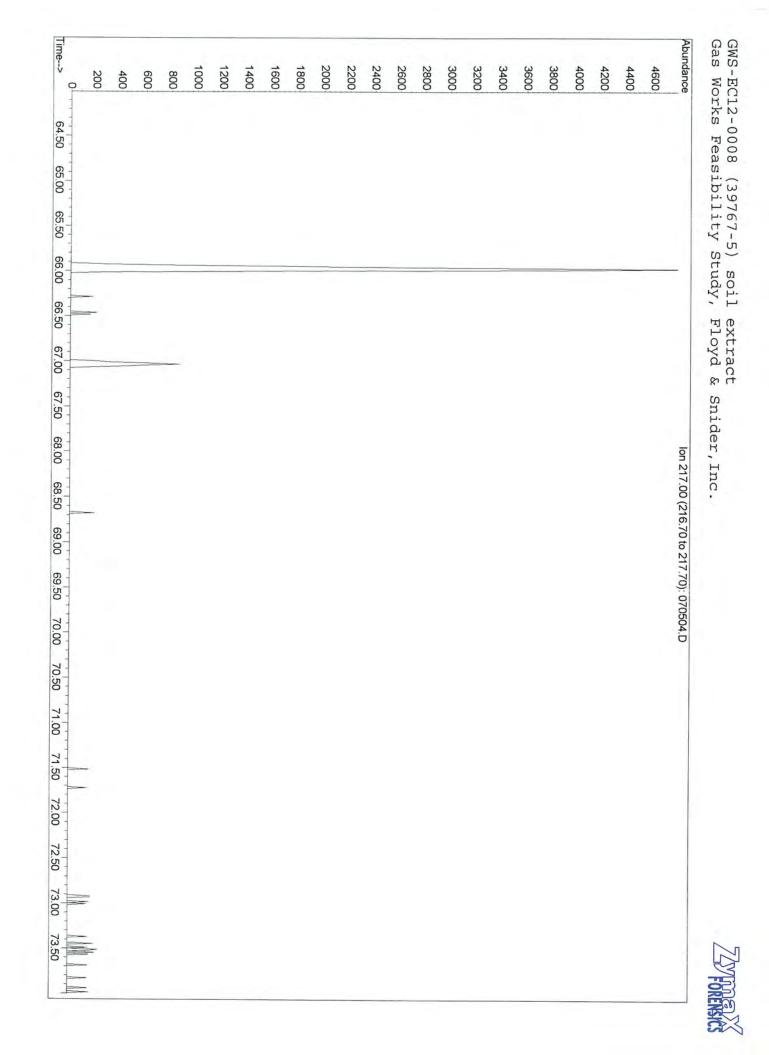
Key for Steranes Identification (m/z 217 Mass Chromatogram)

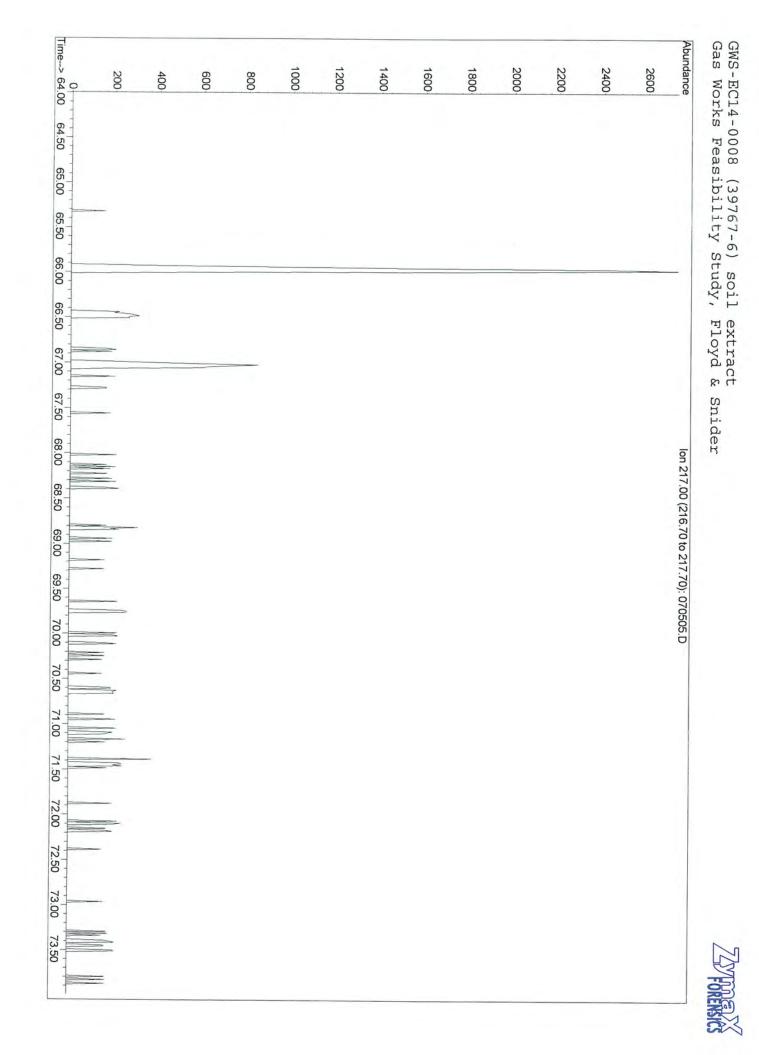


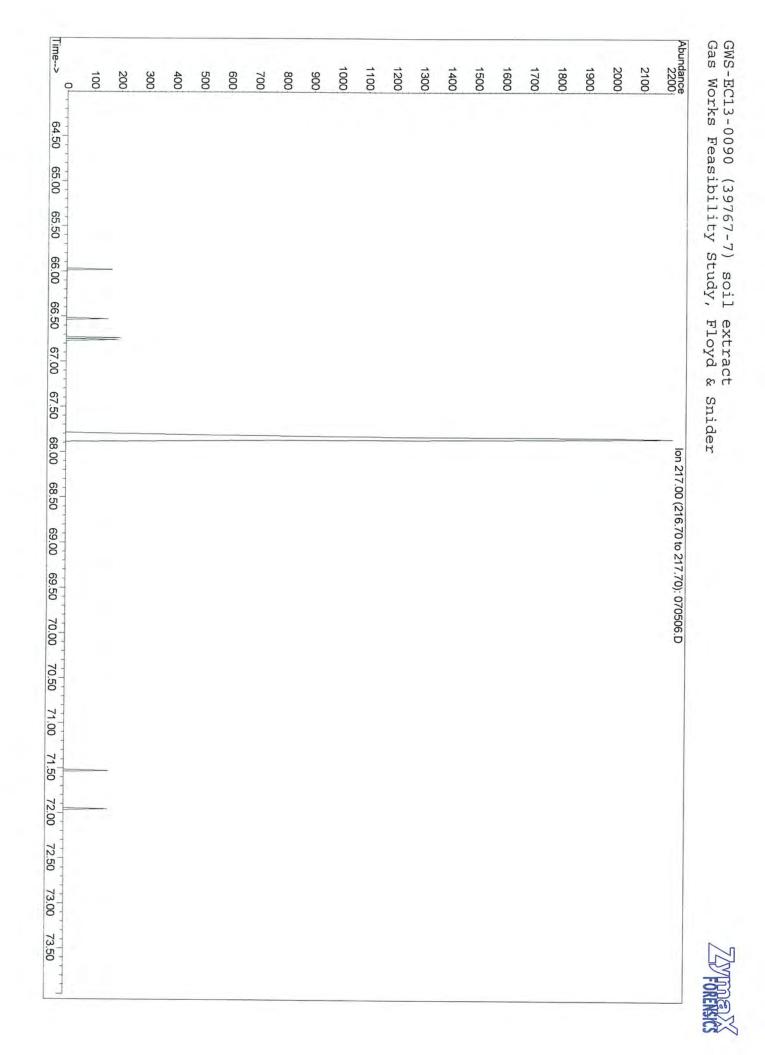


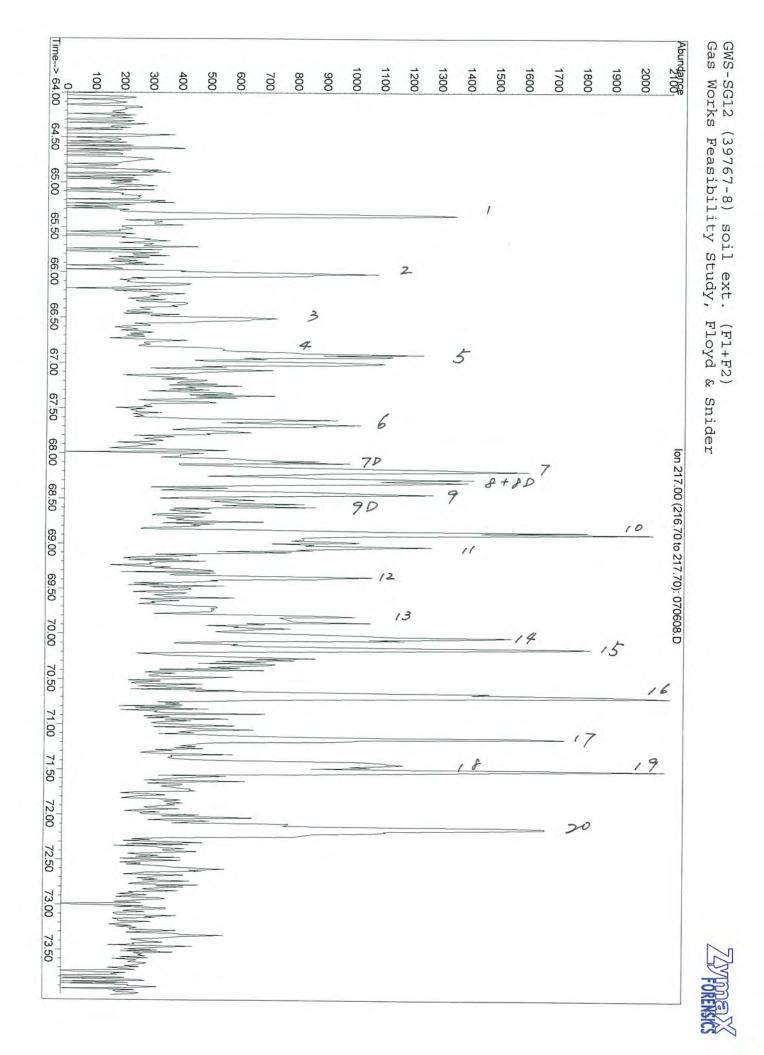












		A. S.					
	Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078			CHA		USTODY	P1/3
	Floyd & Snider, Inc. Job Number 34011008 COC Form # 1	Sample Matrix		iclus fuicing	Analysi	S	Recorded by:
36917-1	Floyd & Snider, Inc. 34011008001 10.2-10.7 COC Form Initials: .]]_	1	Date: 3/10 Time:	8			Number of containers
-2	Initials: <u>JL</u> Date: <u>XIO</u> Time: <u>1:23</u> Floyd & Snider, Inc. 10.7 - [[.6 34011008002		23 Date:				Number of Containers with Custody Seal Intact
~	COC Form Initials: <u>JL</u> Date: <u>SIID/04</u> Time: 1:31	S	Time:				Number of containers Number of Containers ' with Custody Seal Intact
-3	Floyd & Snider, Inc. 34011008003 COC Form Initials: <u>JL</u> Date: <u>6][0]04</u> Time:_ <u>1:35</u>	2	Date: Time:				Number of containers Number of Containers with Custody Seal Intact
-4	Floyd & Snider, Inc. 34011008004 COC Form	C	Date: Time:				Number of containers
-5	Initials: <u>JL</u> Date: <u>(())()</u> Floyd & Snider, Inc. 34011008005	0	Date:				Number of Containers with Custody Seal Intact
	COC Form Initials: <u>)L</u> Date: <u>910/04</u> Time: <u>1:52</u>	3	Time:				Number of Containers with Custody Seal Intact
-6	Floyd & Snider, Inc. 34011008006 COC Form Initials: <u>JU</u> Date: <u>AND</u> Time: <u>1.59</u>	S	îme:				Number of containers Number of Containers with
	Comments/Instructions Hild for INSTructions 89/23/04 pug. Xigin 145			Name: 7.01 Name:	uished By		Custody Seal Intact Received By Name / Salfscharg Date: 8/10/01 Time: 7:0:3 pm Name 2000 pm
•		*		Date: Time: Name: Date: Time:			Date: <u>6/11/64</u> Time: <u>120(2</u>) Name: Date: Time:

Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078		CHAIN OF		P 2/3
Floyd & Snider, Inc. Job Number 34011008 COC Form # 2	Sample Matrix	Analys Analys	is	Recorded by:
Floyd & Snider, Inc. 36.917-7 34011008007 COC Form Initials: 1 Date: $8 10 04$ Time: $2:54$	C Time:			2 Number of containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. - 8 34011008008 COC Form Initials: <u>JL</u> Date <u>SINOY</u> Time: <u>3 50</u>	Time:			Number of containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. - 9 34011008009 COC Form Initials: <u>1</u> Date: <u>{ N 04</u> Time: <u>3:5</u> 7	G Time:			Number of containers Number of Containers `with
Floyd & Snider, Inc. - 10 34011008010 COC Form Initials: <u>し</u> Date: <u>Slicje4</u> Time: <u>4:06</u>	Date: 5 Time:			Custody Seal Intact
Floyd & Snider, Inc. 34011008011 COC Form Initials: <u>JL</u> Date: <u><u><u>S</u>INJOU</u> Time: <u>4</u>:55</u>	Date:			Custody Seal Intact 2 Number of containers With Custody Seal Intact
Floyd & Snider, Inc. 34011008012 COC Form Initials: Date: <u>私</u> 1014 Time: 5:05	Date:			Number of containers Number of Containers with Custody Seal Intact
Comments/Instructions Hold for INSTructions & exactly perg. Leden/.4J		Relipquished By Name: Date: Time: Name: Date: Time: Name: Date: Date: Time:	Da Tir Na Da Tir Na	Received By ame 3.032 me:

	Floyd & Snider 83 S King Street, Sulle 614 Seattle, WA 98104 (206) 292-2078			C	HAIN	OF C		ODY	P3/3
	Floyd & Snider, Inc. Job Number 34011008 COC Form # 3	Sample Matrix		ACLUS HULLING		Analysis			Recorded by:
36917-13	COC Form	<i>w</i>	Date: Time:						Number of containers
-14	Date: <u>8/10/04</u> Time: <u>6:20</u> Floyd & Snider, Inc. 34011008014		Date:						Number of Containers with Custody Seal Intact
	COC Form Initials: <u>JL</u> Date: <u>8/16/04</u> Time: <u>6:24</u>		Time:					+	Number of Containers Number of Containers , with Custody Seal Intact
-15	Floyd & Snider, Inc. 34011008015 COC Form Initials:		Date: Time:						Number of Containers
- 16	Date: <u>XIOJO4</u> Time: <u>6:27</u> Floyd & Snider, Inc. 34011008016 COC Form		Date: Time:						Custody Seal Intact
	Initials: <u>لل</u> Date: <u>کارەل</u> Time: <u>6:53</u> Place Sample ID: Label Here		Date:					~	Number of Containers with Custody Seal Intact
	or Write ID Number Here		Time:						Number of containers Number of Containers with Custody Seal Intact
	Place Sample ID Label Here or Write ID Number Here		Date: Time:						Number of containers
	Comments/Instructions				Relinquishe	ed By	Transp	orted By	Number of Containers with Custody Seal Intact Received By
	Hold for instructions.			Name Date Time Name Date: Name Date:	7:01	Í M			Name: 3 Stilling Date: $5/10/04$ Time: 3 $03/04$ Name: $12/02$ Name: $12/02$ Name: Date: $57/1/04$

梅1/4 CHAIN OF CUSTODY Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078 Analysis Floyd & Snider, Inc. Recorded by: Job Number 34011008 COC Form # 4 Sample Matrix H. Checked by: ____ 1 AC IN (-PA Date: Floyd & Snider, Inc. t 0 36918-1 34011008017 Number of containers COC Form Time: Initials: <u>JL</u> Date: 8/11/04 Time: 10:59 Number of Containers with Custody Seal Intact Date: Floyd & Snider, Inc. 2 34011008018 - 2 Number of containers COC Form Time: Initials: Number of Containers with Date: XINA Time: 11:07 Custody Seal Intact Date: Floyd & Snider, Inc. Number of containers 34011008019 - 3 Time: COC Form Number of Containers Initials: · with Date: 8/11/04 Time: 11:03 Custody Seal Intact Date: Floyd & Snider, Inc. Ø Number of containers 1 34011008020 Time: COC Form Number of Containers Initials: JU with Date: 811104 Time: 11:34 Custody Seal Intact Date: Floyd & Snider, Inc. -5 34011008021 Number of containers COC Form Time: Initials: JL Number of Containers with Date: 8/11/04 Time: 12:50 Custody Seal Intact Date: Floyd & Snider, Inc. -6 34011008022 Number of containers COC Form Time: Ø Number of Containers Initials: JL Date: 811104 Time: 12:52 with Custody Seal Intact Received By Transported By Rettrouished By Comments/Instructions Huid for instructions @8/23/69 pug. Luder/AJ matain -Du Date: (821) Time Name Name Date: 8716/00 Date 1230 Time Time Name: Name Date: Date: Time Time

Confidential—Prepared in Anticipation of Litigation Attorney Work Product—Do Not Disseminate

Floyd & Snider, Inc. Job Number 34011008 COC Form # 5 Time: Floyd & Snider, Inc. Number of Custody S Sd011008023 Custody S COC Form - Initials: JL Initials: JL Date: Slutled Time: 1:06 Floyd & Snider, Inc. Sd011008024 COC Form Initials: JL Date: Slutled Time: 1:06 Floyd & Snider, Inc. Sd011008025 COC Form Initials: JL Number of Custody S Floyd & Snider, Inc. Sd011008025 COC Form Initials: JL Date: Slutled Time: 1:06 Floyd & Snider, Inc. Sd011008025 COC Form Initials: JL Date: Slutled Time: 2:10 Floyd & Snider, Inc. Sd011008026 COC Form Initials: JL Date: Slutled Time: 2:10 Floyd & Snider, Inc. Sd011008026 COC Form Initials: JL Date: Slutled Time: 2:40 Date: Slutled Time: 2:40 Time: Number of Coc Form Initials: JL Date: Slutled Time: 2:40 Date: Slutled Time: 2:40 Time: Number of Coc Form Initials: JL Coc Form Initials: JL Date: Slutled Time: 2:40 Time: Initinial Floyd & Snider		Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078		CH	AIN OF (Y ?₹ =
9/6-7 Stoll1008023 Number of Coc Form Initials: Imme: Number of Coc Form Date: Stoller, Inc. Stoll1008024 COC Form Imme: Number of Coc Form Initials: Imme: Imme: Initia				20			Recorded by:
-8 Floyd & Snider, Inc. 34011008024 COC Form Initials: J Date: Student Time: -9 Floyd & Snider, Inc. 34011008025 COC Form COC Form Initials: Initials: J Date: Student Time: 10 Floyd & Snider, Inc. 34011008025 Number of C COC Form Time: Initials: J Date: Student Time: 10 Floyd & Snider, Inc. 34011008026 J COC Form Time: Initials: J Date: Student Time: 10 Student Time: 11 Student Time: 12 Floyd & Snider, Inc. 34011008027 Student Time: COC Form Initials: 10 Date: 11 Student Time: 12 Floyd & Snider, Inc. 34011008027 Student Time: 12 Floyd & Snider, Inc. 34011008028 I COC Form Initials: 11 Student Time: 12 Student Time: 13 Student Time:	918-7	34011008023 COC Form	C Time:				Number of containe Number of Containe with Custody Seal Intac
-9 Floyd & Snider, Inc. 1 34011008025 COC Form Initials: JL Date: glu/out Time: Number of Construction 10 Floyd & Snider, Inc. Jate: JL 34011008026 COC Form Initials: JL 11 Jate: glu/out Time: JL 12 Floyd & Snider, Inc. Jate: JL 14 Jate: JL Jate: JL 15 Jate: JL Number of Construction 16 State: JL Jate: JL 17 State: JL State: JL 18 Jate: JL Jate: JL 19 Jate: JL Jate: JL 10 Jate: JL Jate: JL 11 State: JL Jate: JL 11 Jate: JL Jate: JL 11 Jate: JL Jate: JL 11 State: JL Jate: JL 12 Floyd & Snider, Inc. Jate: JL 12 State: JL Jate: JL 12 State: JL Jate: JL 12 State: JL Jate: JL 13 Jate: JL Jate: JL 14 Jate: JL Jate: JL 12 Jate: JL Jate: JL 14 Jate: JL	-8	34011008024 COC Form Initials:	0				Number of container
10 Floyd & Snider, Inc. 1 34011008026 COC Form Number of C Initials: J Number of C 0ate: 810/04 Time: Number of C 11 Snider, Inc. Snider, Inc. 1 34011008027 COC Form Initials: 1 12 Floyd & Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 12 Floyd & Snider, Inc. 1 Number of C 12 Floyd & Snider, Inc. 1 Number of C 12 Floyd & Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 12 Snider, Inc. 1 Number of C 13 Snider, Inc. 1 Number of C 14 Snider, Inc. 1 Number of C 15 Time: 1 Number of C 16 Time: 1 Number of C	- 9	Floyd & Snider, Inc. 34011008025 COC Form Initials:					Custody Seal Intac I Number of container Number of Container 'with
Image: Signature Image: Signature <td>10</td> <td>34011008026 COC Form</td> <td>0</td> <td></td> <td></td> <td></td> <td>Number of Container:</td>	10	34011008026 COC Form	0				Number of Container:
Date: SIMM Time: 2:4% Floyd & Snider, Inc. 34011008028 COC Form Initials:	- 11 -	Floyd & Snider, Inc. 34011008027 COC Form	0				Custody Seal Intact
Initials: JL Number of Co with Date: WWIM Time: 3:25	12	Date: \$11114 Time: 2:48 Floyd & Snider, Inc. 34011008028		8			with Custody Seal Intact
Comments/Instructions Refinquished By Transported By Received		Initials: <u>JL</u> Date: <u>BNIM</u> Time: <u>3:25</u> Comments/Instructions		Name	1	Transported	Custody Seal Intact

Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078

CHAIN OF CUSTODY

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				-	Analys	sis		1
	Floyd & Snider, Inc. Job Number 34011008 COC Form # 6	Sample Matrix	Sums Pure					Recorded by: <u>JJ</u> Checked by:
6418-13	Floyd & Snider, Inc. 34011008029 COC Form Initials: <u>JL</u> Date: <u>¥Iulo¥</u> Time: <u>3:30</u>	S Time:						Number of containers Number of Containers with
-14	Floyd & Snider, Inc. 34011008030 COC Form Initials: <u>الل</u> Date: <u>8االالمل</u> Time: <u>4:30</u>	Date:	Ø					Custody Seal Intact Number of containers Number of Containers , with Custody Seal Intact
-15	Floyd & Snider, Inc. 34011008031 COC Form Initials: $$	Time:						Number of containers Number of Containers with Custody Seal Intact
-16	Floyd & Snider, Inc. 34011008032 COC Form Initials: Date:Time:	Time:	8					Number of containers Number of Containers with Custody Seal Intact
-17	Floyd & Snider, Inc. 34011008033 COC Form Initials: <u>JL</u> Date: $g[11]04$ Time: $4:53$	Date:				2		Number of Containers with Custody Seal Intact
-18	Floyd & Snider, Inc. 34011008034 COC Form Initials: Date: <u>& uloy</u> Time: <u>5:56</u>	Time:						Number of Containers with Custody Seal Intact
-	Comments/Instructions Hold for INSTUCTIONS Elizzion pug. Xudury. 95			Name:	quished By	Transpo	ס ד ד ד ע ע	Received By ante: 57(1/04) ate: 51(1/04) arne: 67/16/04) ime: 730 arne: ate: 57/16/04) ime: ate: ime:

	Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078					USTODY	$\sum_{i=1}^{n} i ^2$
	Floyd & Snider, Inc. Job Number 34011008 COC Form # 7	Sample Matrix	Schul S	ACC - PP	Analysis		Recorded by:
36918-19	Floyd & Snider, Inc. 34011008035 COC Form Initials: <u>اللام</u> Time: <u>5:58</u>		X				Number of containers Number of Containers with Custody Seal Intact
- 20	Floyd & Snider, Inc. 34011008036 COC Form Initials: <u> </u>						Number of containers Number of Containers ' with Custody Seal Intact
	Place Sample ID Label Here or Write ID Number Here	Date Time					Number of containers Number of Containers with Custody Seal Intact
	Place Sample ID Label Here or Write ID Number Here	Date:					Number of containers Number of Containers with Custody Seal Intact
	Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers Number of Containers with Custody Seal Intact
	Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers Number of Containers with Custody Seal Intact
	Comments/Instructions Hold for InStruction (8) \$123/04 perg. Xear 1.25	Ś	Nam Date Time Date Time Nam Date Time	8 11 - 0 1 2 12 2 1 1 2 2 1 2 2	1		Received By Received By Date: $S(1/d)$ Time: (222) Name: (222) Name: (222) Time: 1220 Name: Date: Time: 1220

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Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104

CHAIN OF CUSTODY

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(206) 292-2078		n		
Floyd & Snider, Inc. Job Number 34011008 COC Form # 8 Floyd & Snider, Inc.	Sample Matrix	And Ashan	Analysis	Checked by:
3£919-1 COC Form Initials: Date: <u>8[[2]04</u> Time:_ <u>]]:04</u>	S Time:			Number of containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008038 COC Form Initials: <u>JU</u> Date: <u>SII204</u> Time: <u>II:08</u>	Time:			Number of Containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008039 COC Form Initials: <u>JV</u> Date: <u>61264</u> Time: 11:16	Time:			Number of containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. - 7 34011008040 COC Form Initials: <u>JU</u> Date: <u>8112</u> Time: <u>11:58</u> Floyd & Snider, Inc.	S Time:	8		Number of containers Number of Containers with Custody Seal Intact
-5 34011008041 COC Form Initials: <u>-1</u> Date: <u>8 12/04</u> Time: <u>12:07</u>	S Time:			Number of containers Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008042 COC Form Initials: <u>JL</u> 5.1210(5)	Date: Time:			Number of containers
Date: <u>8112101</u> Time: <u>12:09</u> <u>Comments/Instructions</u> HOU FOS INSTRUCTIONS @6/23/04 per g. Locur 1.95	<u> </u>	Relingation Name: Date: Time: Name: Date: Time: Name:	2-01	with Custody Seal Intact orted By Name: A CUCULIC Date: 5/12/04 Time: 10:445 Name: C Date: 6/16/09 Time: 1/230 Name:

Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078			CH/		F CUS	TODY	\$2/
Floyd & Snider, Inc.	1	7	12				-
Job Number 34011008			5				Recorded by:
COC Form # 9	×		15				
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	e S		112				
L	ample Matrix		717				
[Sai	1	CIC)				
		Date:					1
Floyd & Snider, Inc.			$\overline{\mathcal{X}}$				
34011008043	1.5						Number of containers
COC Form	5	Time:			·		
Initials: JL							Number of Containers
Date: 811204 Time: 12:13							with Custody Seal Intact
		Date:					
Floyd & Snider, Inc.							
34011008044	0	-					Number of containers
COC Form	S	Time:					
Initials:							Number of Containers
							with Custody Seal Intact
Floyd & Snider, Inc.	1	Date:					
34011008045							
COC Form							Number of containers
	C	Time:					
Initials: <u>L</u>	10			x			Number of Containers
Date: 8/12/04 Time: 2:242							with Custody Seal Intact
		Date:					1
Floyd & Snider, Inc.							
34011008046	1						Number of containers
COC Form	IS	Time:					
Initials: JL	-						Number of Containers
Initials: <u>JL</u> Date: <u>012/04</u> Time: <u>2:45</u>							with Custody Seal Intact
		Date:					
Floyd & Snider, Inc.							
34011008047	C						Number of containers
COC Form	\mathbf{D}	Time:					
Initials:							Number of Containers
Date: 812104 Time: 3:35							with Custody Seal Intact
		Date:					
Floyd & Snider, Inc.	C						
34011008048	\sum	-					Number of containers
COC Form		Time:					
Initials:							Number of Containers with
Date: (11/04/Time: 3:45			-	140			Custody Seal Intact
Comments/Instructions			Ret	Requished By	/ Tra	nsported By	Received By
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FICICI TOY INSTITUCTIONS			Date:	12-0	1		Date: Shares
Hoid for MSMUGLENS			Name:	019			Name: KBC
Stand programmed			Date:				Date: 5/16-12-1
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			Date:				Date:
			Time:				Time:

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	Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078			CH See	AIN OF	Pg 3/3	
	Floyd & Snider, Inc. Job.Number 34011008 COC Form # 10	Sample Matrix		Company the second		/515	Recorded by:
36919-13	Floyd & Snider, Inc. 34011008049 COC Form Initials: <u> </u>	S	Date:	,			Number of containers Number of Containers with
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	Place Sample ID Label Here or Write ID Number Here		Date: , Time:				Custody Seal Intact Number of containers Number of Containers
	Place Sample ID Label Here or Write ID Number Here		Date: Time:		1.1.1		with Custody Seal Intact Number of containers
	Place Sample ID Label Here or Write ID Number Here		Date:				Number of Containers with Custody Seal Intact Number of containers
	Comments/Instructions Flad for INDAVIENCES			Name:	elinquished By	Transported By	Number of Containers with Custody Seal Intact Received By Nama: Y State 125 Date: S/12/64 Time: 16.65
	+iad for manucials			Time: Name: Date: Time: Name: Date: Time:	1844		Time: 11.43 Name:// 1 Date: 9716/64 Time: 1280 Name: Date:

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Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078

Floyd & Snider, Inc. Job Number 34011008 COC Form # 11

Floyd & Snider, Inc. 34011008050 COC Form Initials:<u>JU</u> Date:<u><u>G</u>1364</u>Time:<u>[0:16</u>

Floyd & Snider, Inc. 34011008051 COC Form Initials: <u>JL</u> Date: **X**1130M Time: 10:44 Floyd & Snider, Inc. 34011008052 COC Form Initials: <u>JS</u> Date: <u>X</u>1130M Time: <u>1:45</u> Floyd & Snider, Inc. 34011008053 COC Form Initials: <u>JS</u> Date: <u>X</u>1130M Time: <u>1:50</u>

Floyd & Snider, Inc. 34011008054 COC Form Initials: <u>5</u> Date: <u>81204</u> Time: <u>12:25</u>

Floyd & Snider, Inc. 34011008055 COC Form Initials: <u>JS</u> Date: **%19104** Time: 12

Date: 813/04 Time: 12:35 Comments/Instruction

	CHAIN OF	CHAIN OF CUSTODY			
	Anal	ysis]		
Sample Matrix	AC MS Full scal		Recorded by: <u>LS</u> Checked by:		
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Date:			Number of containers		
S Time:			Number of Containers with Custody Seal Intact		
Date:			Number of containers		
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tions	Name: Date: 8/13/04 Time: 460	-	Name Date		
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	Name: Date: Time:		Name: Date: Time:		

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	Floyd & Snider 83 S King Street, Suite 614 Seattle, WA 98104 (206) 292-2078		_					19 - 13
	Floyd & Snider, Inc. Job Number 34011008 COC Form # 12	Sample Matrix	Onte	14/12/00		nalysis		Recorded by: <u>JS</u> Checked by:
36926-7	Floyd & Snider, Inc. 34011008056 COC Form Initials:	S Tim	Ø					Number of containers Number of Containers with Custody Seal Intact
5	Floyd & Snider, Inc. 34011008057 COC Form Initials: <u></u> Date: <u></u> Time: <u></u> _	S Tin						Number of containers Number of Containers with Custody Seal Intact
- 7	Floyd & Snider, Inc. 34011008058 COC Form Initials: dS Date: $g(13/64)$ Time: $1:47$	Da						Number of containers Number of Containers with Custody Seal Intact
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Ŧ	Place Sample ID Label Here or Write ID Number Here	Dai						Number of containers Number of Containers with Custody Seal Intact
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	Comments/Instructions + OLD for INStructu & Harley pergetion 145	ms		Name Date: 27 Time: Date: Time: Name: Date: Date: Date:	Elinquishe	d By	Transported B	y Received By Name: Active Date: Active Time: Active Date: Active Active Date: Active Active Date: Active A

	CHAIN of CUSTODY	Turnaround Time	ASAP 48 hr	с 12 hr 🗍 72 hr 🗍	24 hr std	# of col											Time	virotechnology, inc:	han	Time 1230	
		ANALYSIS REQUESTED				-									Received by: Signature	Print Company	Date	Received by ZypaX envirotechnology, inc:	Print DBran	Company Zyunn V Date Elite/07	
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	7 1 zaca tane San Luis Obispo CA 93401	K	11 Smiter	83 S. King St Suite 614	10, ULA 78104	SAMPLE DESCRIPTION	DW-4-FP	DW-5-FP	3-1-6	 -	Q.1.				an instructions	& Blz3log per Jonn Xider AS.		upon receipt: Bill 3rd party:		r types	-
	A W	WOL OT HOM		address 83 5	XOHI	ZymaX use only	36921-1	-2	in the second se		-		-		Comments <u> <u> </u> </u>	88/23/04 pe		Sample integrity upon receipt:	Samples received intact Samples received cold	Custody seals Correct container types	email: loain@ZvmaXusa.com

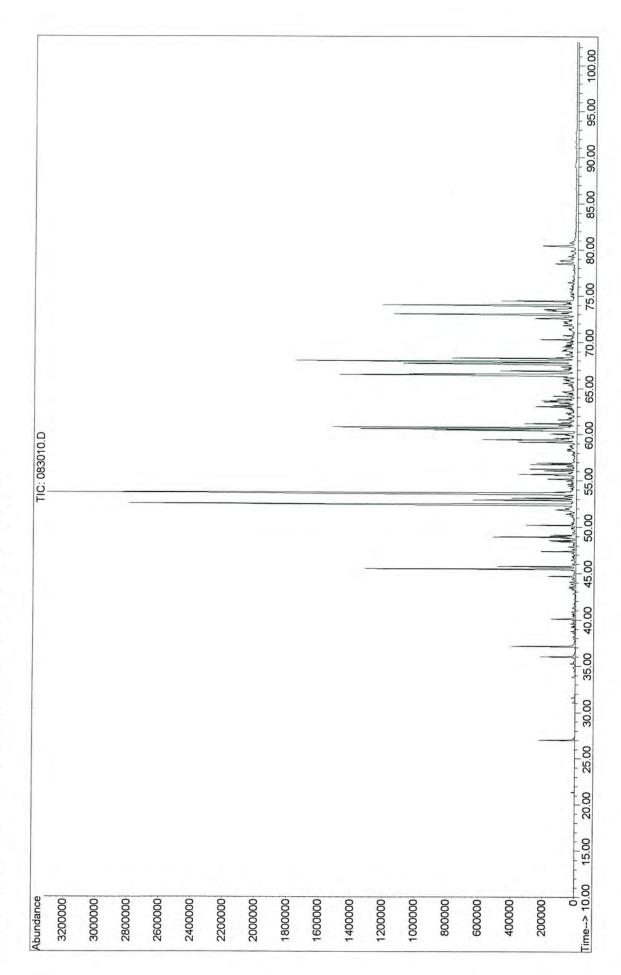
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71 Zaca lane San Luis Obispo CA 93401 fax	vox 805.544.4696 fax 805.544.8226		USTODY
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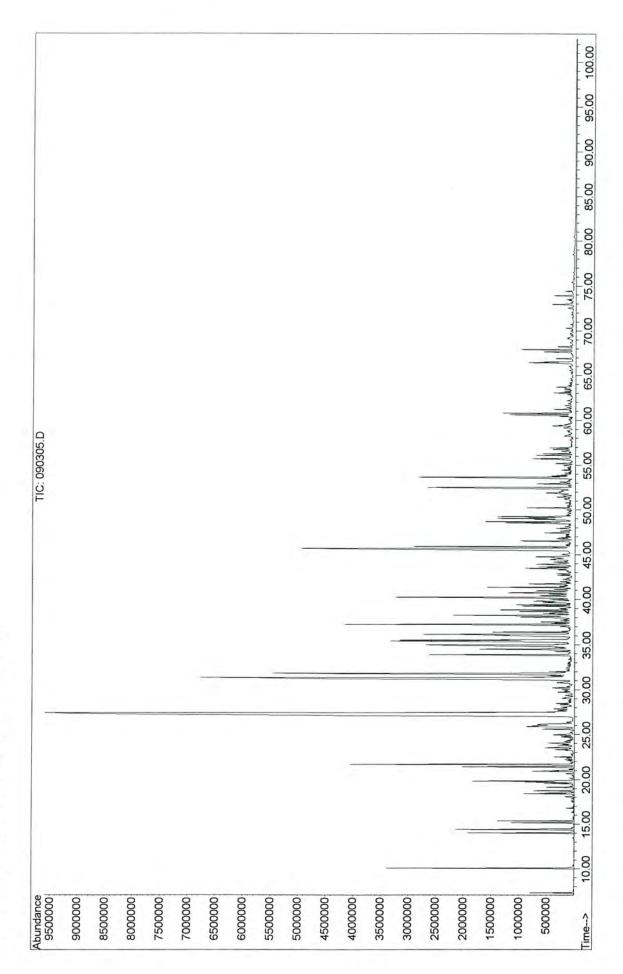


Sample Name: 1-1G (36922-3) soil extract (1:12)
Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml



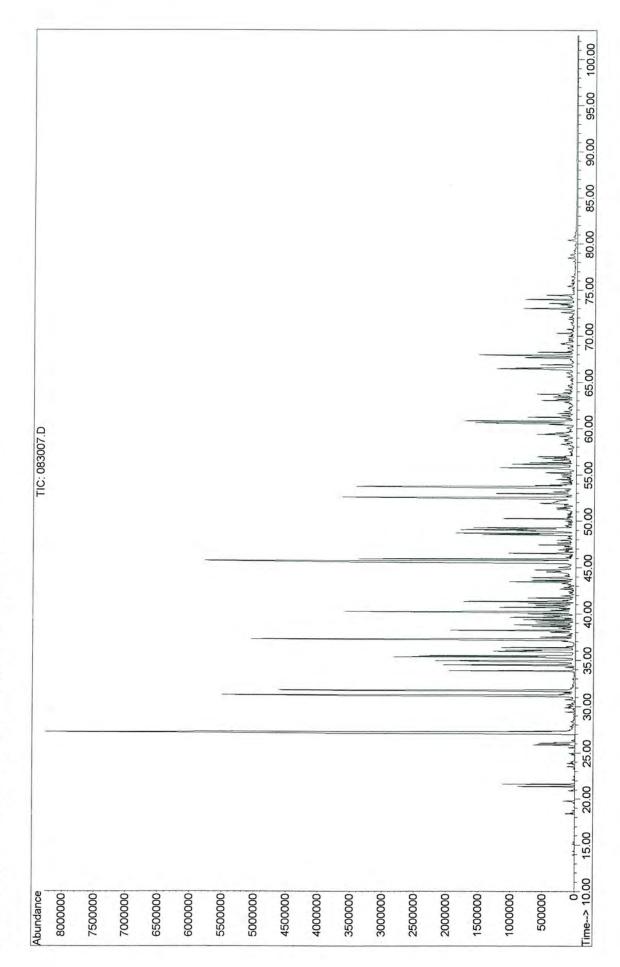


Sample Name: DW-4-FP (36921-1) Product x50 Misc Info : Gas Works Park, Floyd



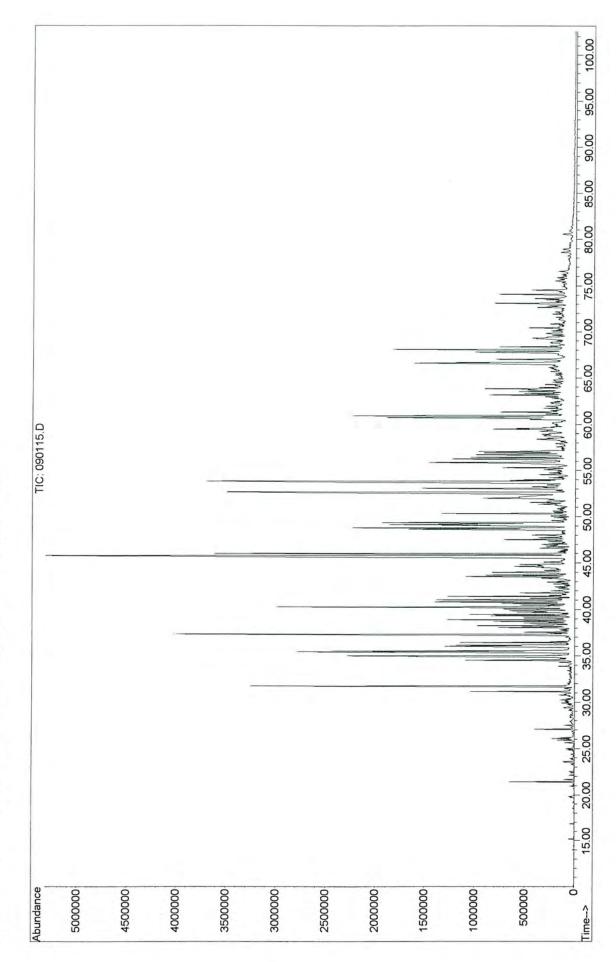


Sample Name: 34011008040 (36919-4) soil extract (1:2) Misc Info : MGP, Floyd Snider, QB SS5318



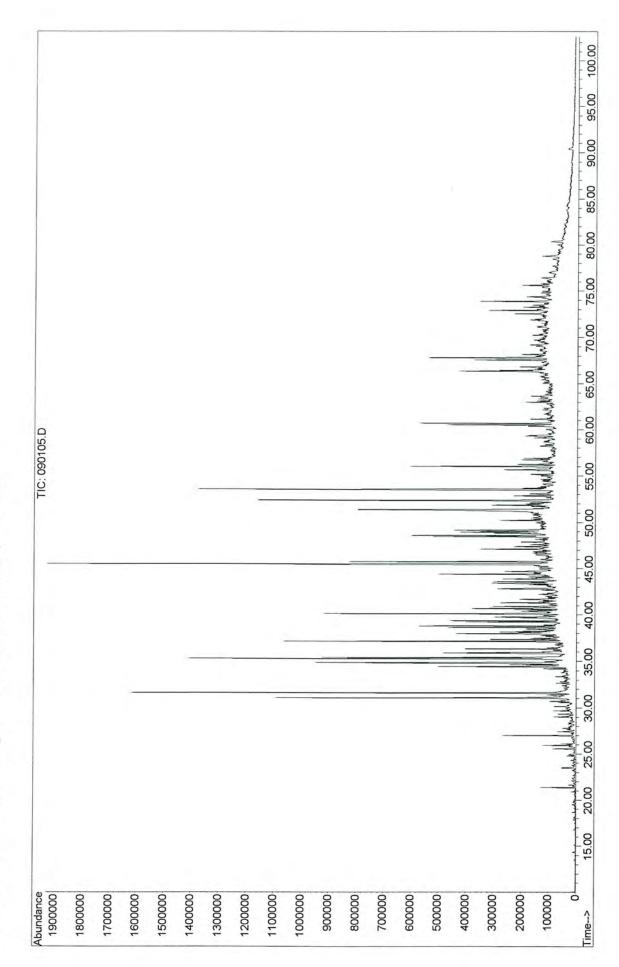


Sample Name: 34011008035 (36918-19) soil ext (4:6) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



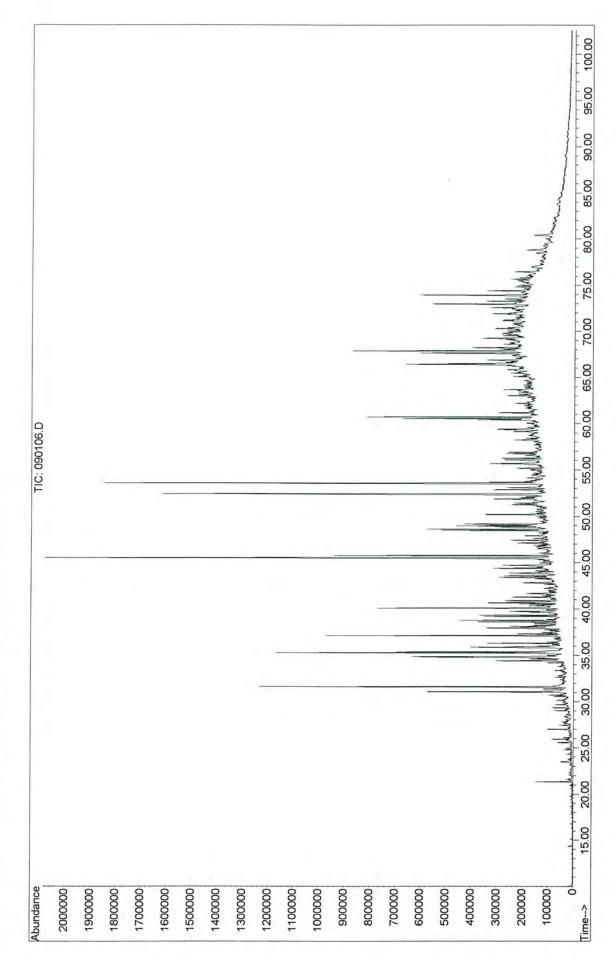


Sample Name: 34011008001 (36917-1) soil extract (1:2) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



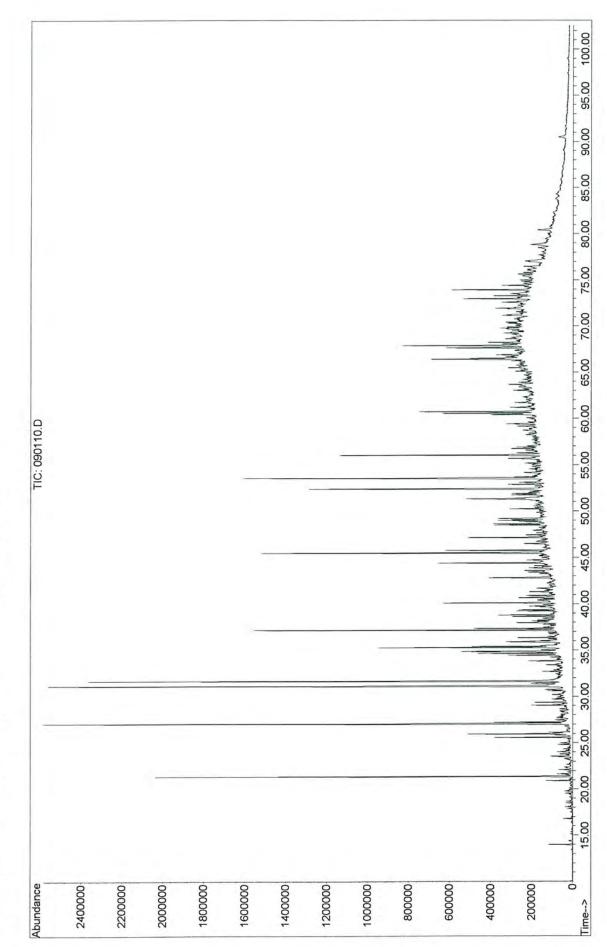


Sample Name: 34011008011 (36917-11) soil extract (1:2) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



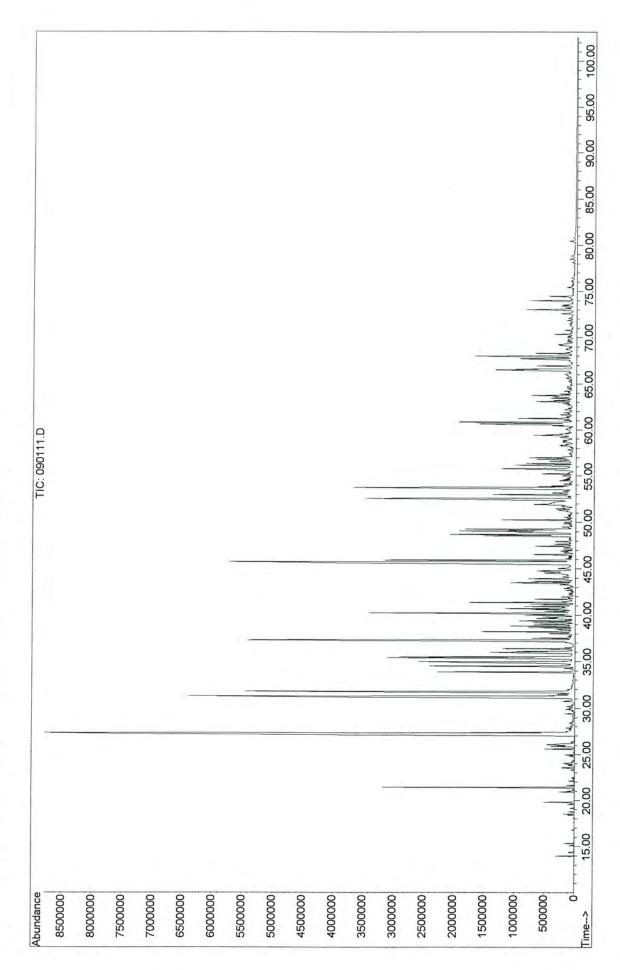


Sample Name: 34011008017 (36918-1) soil extract (3:7)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



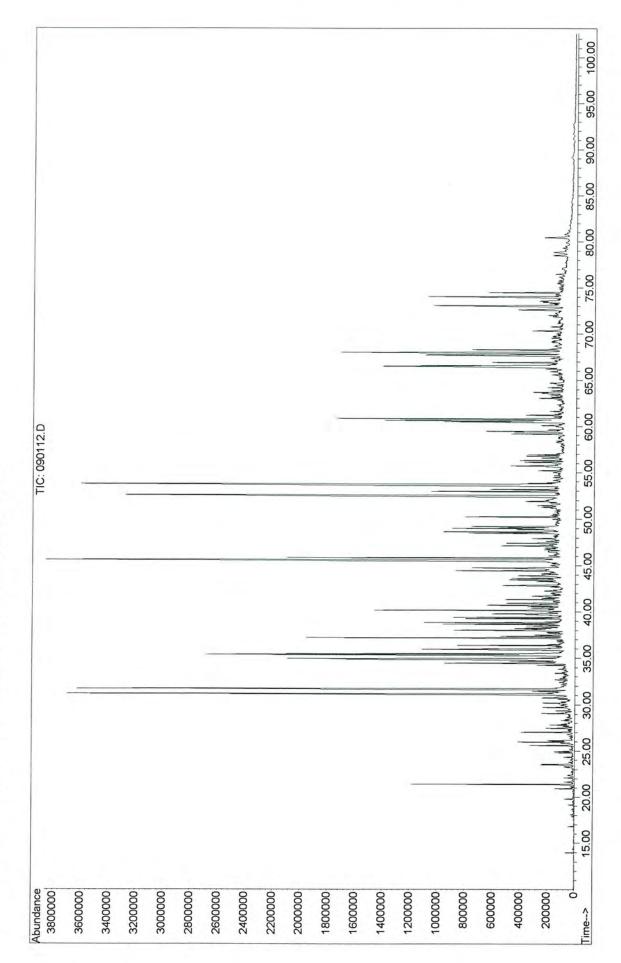


Sample Name: 34011008020 (36918-4) soil extract (1:1.2) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



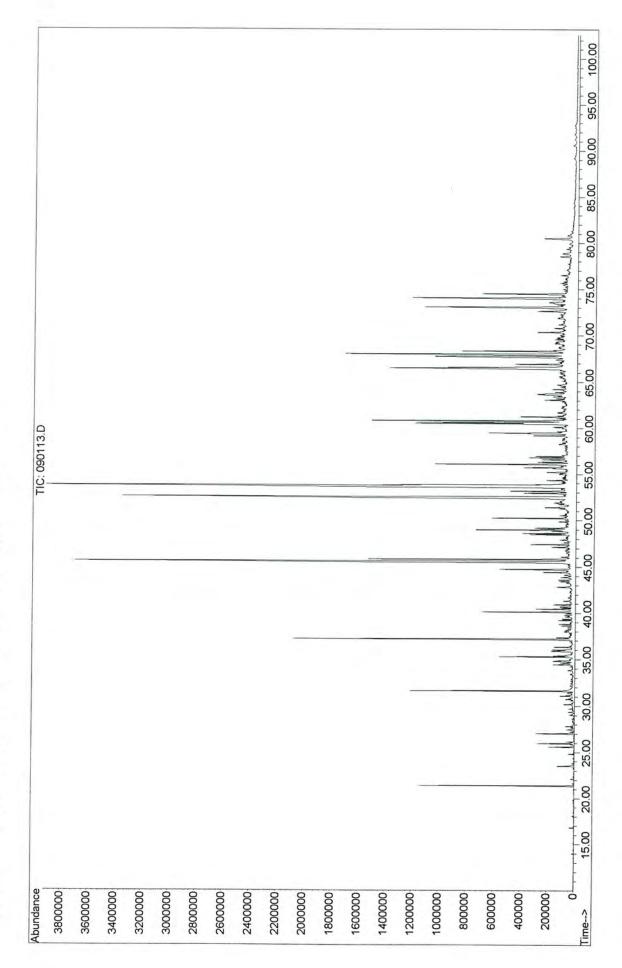


Sample Name: 34011008022 (36918-6) soil extract (3:8) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



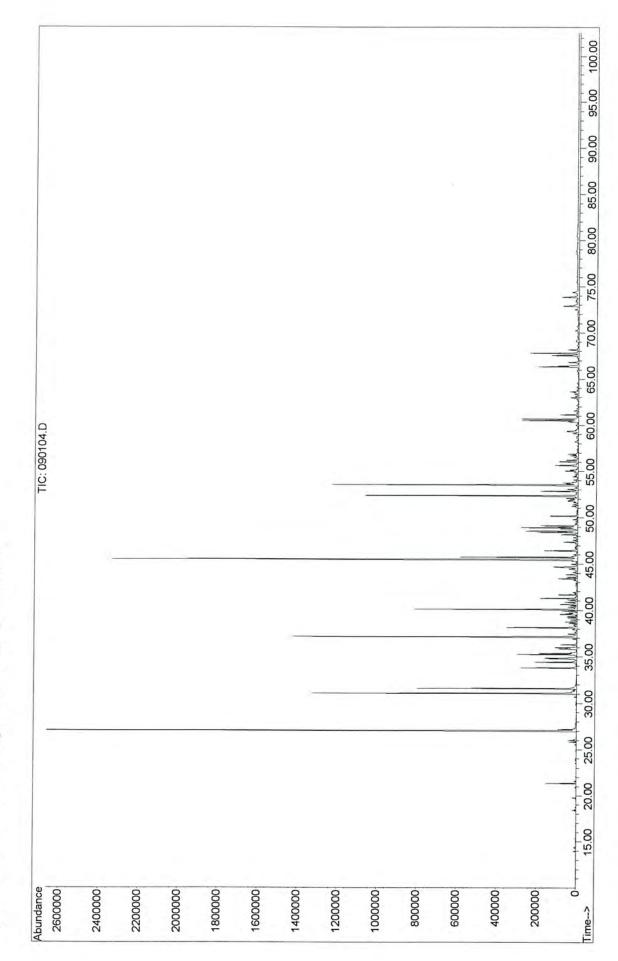


Sample Name: 34011008028 (36918-12) soil extract (1:1))
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



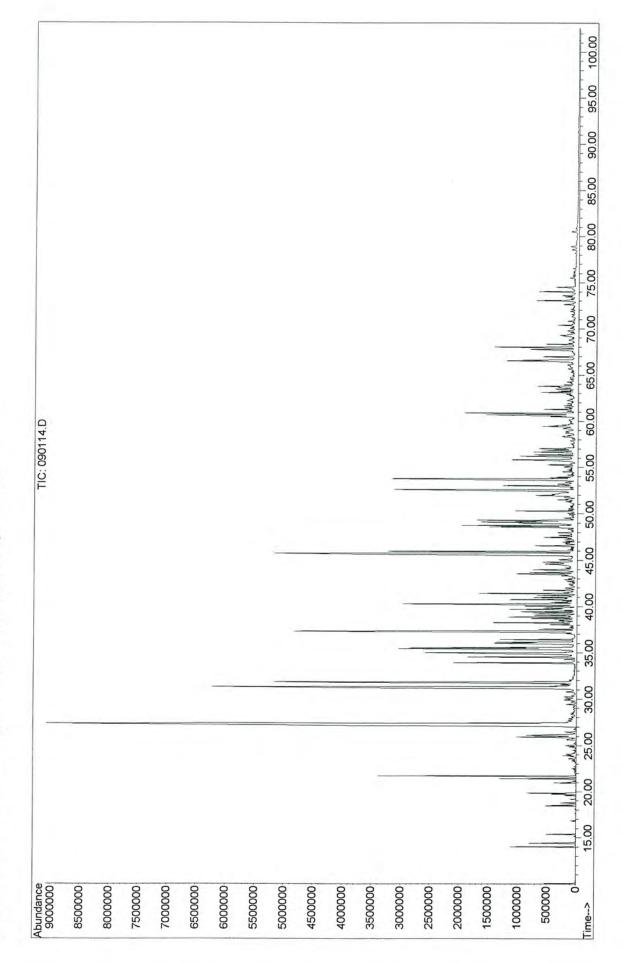


Sample Name: 34011008030 (36918-14) soil extract Misc Info : MGP, Floyd Snider, QB SS5305



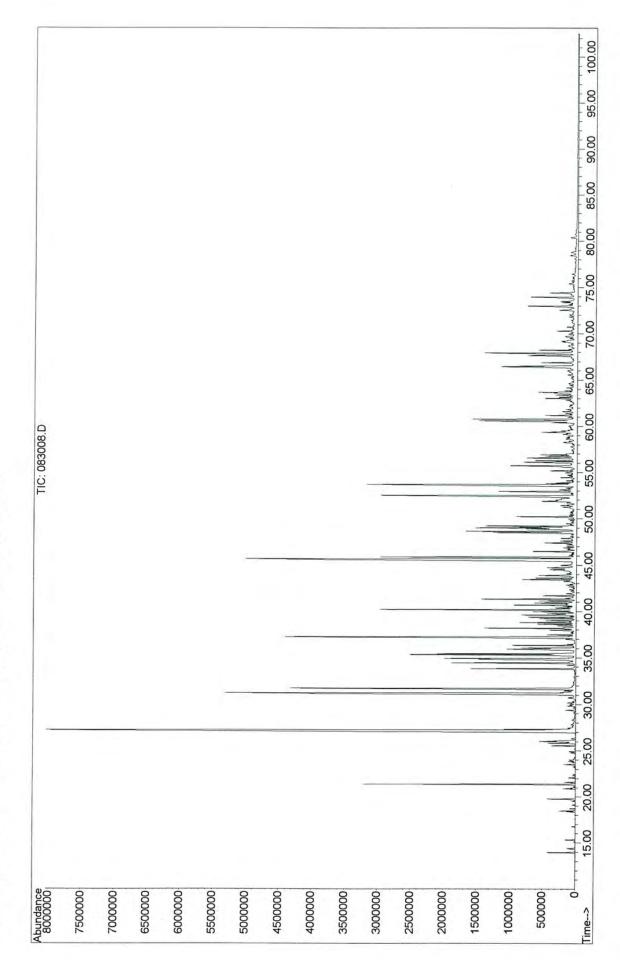


Sample Name: 34011008032 (36918-16) soil ext (3.5:6.5) Misc Info : MGP, Floyd Snider, QB SS5305, Vf=4ml



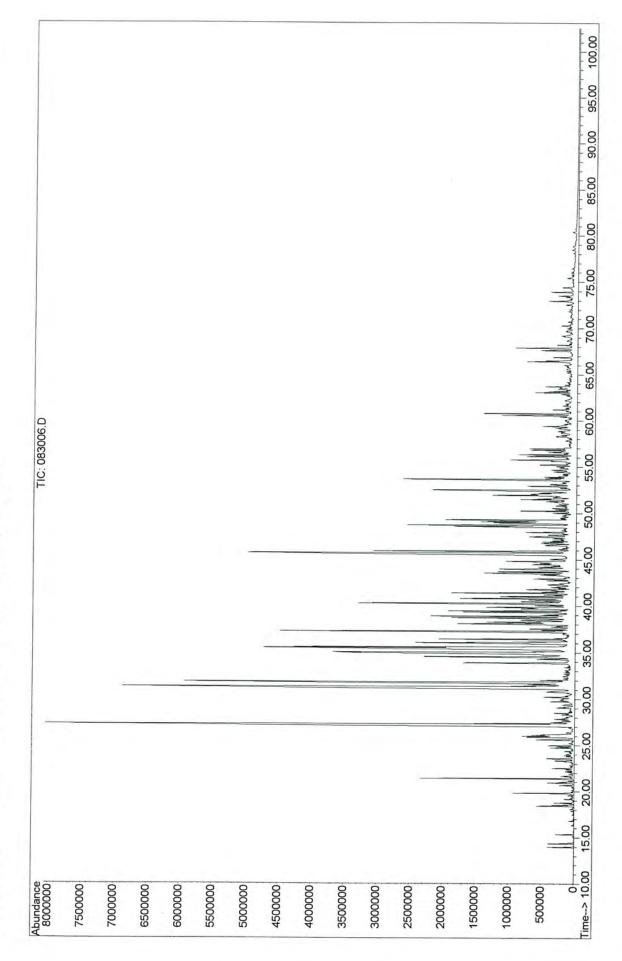


Sample Name: 34011008043 (36919-7) soil extract (1:2) Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml



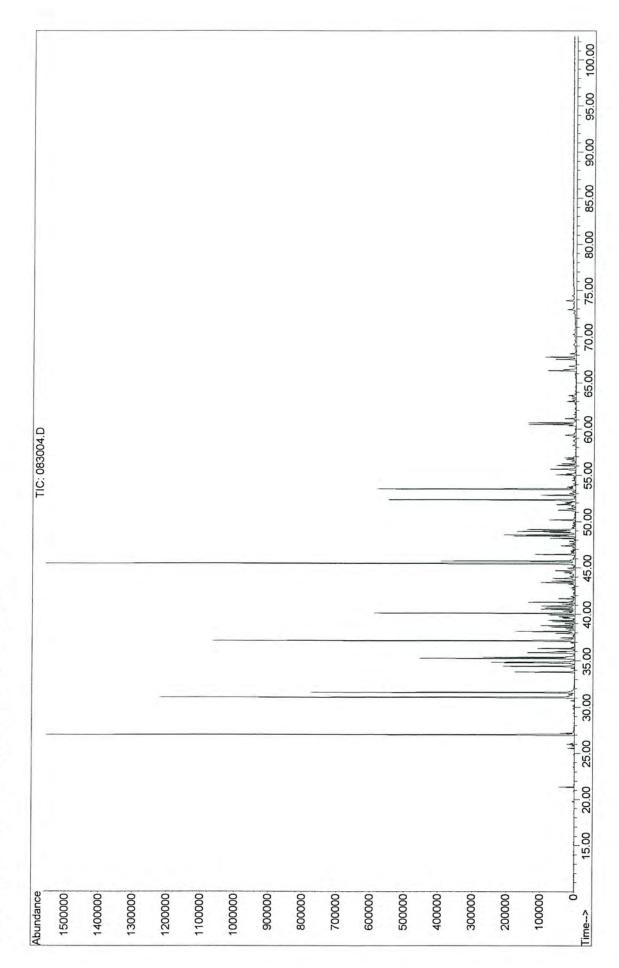


Sample Name: 34011008050 (36920-1) soil extract (1:7) Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml





Sample Name: 34011008054 (36920-5) soil extract Misc Info : MGP, Floyd Snider, QB SS5318



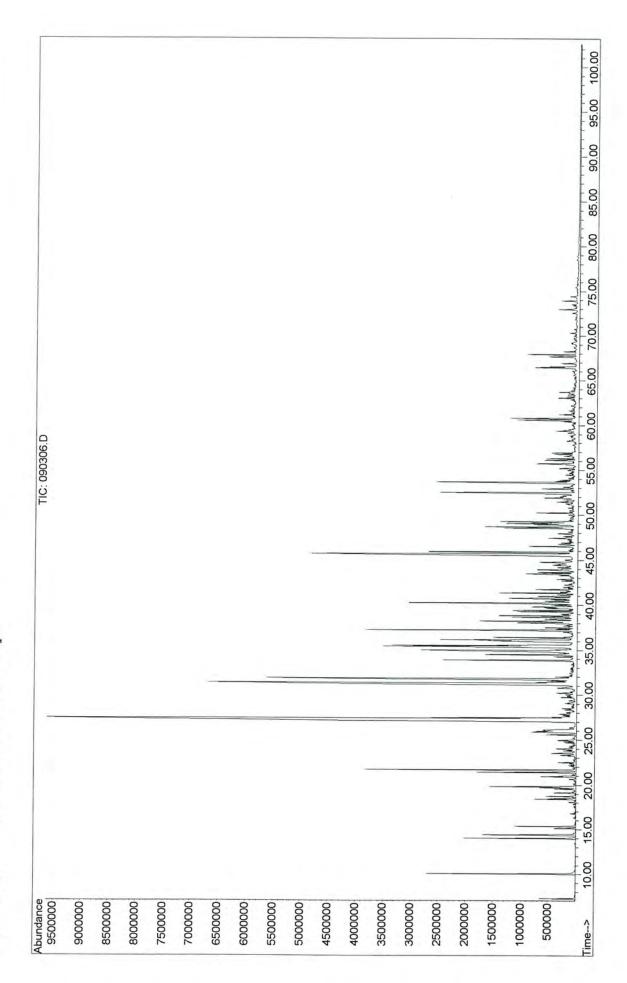


Sample Name: 34011008056 (36920-7) soil extract Misc Info : MGP, Floyd Snider, QB SS5318

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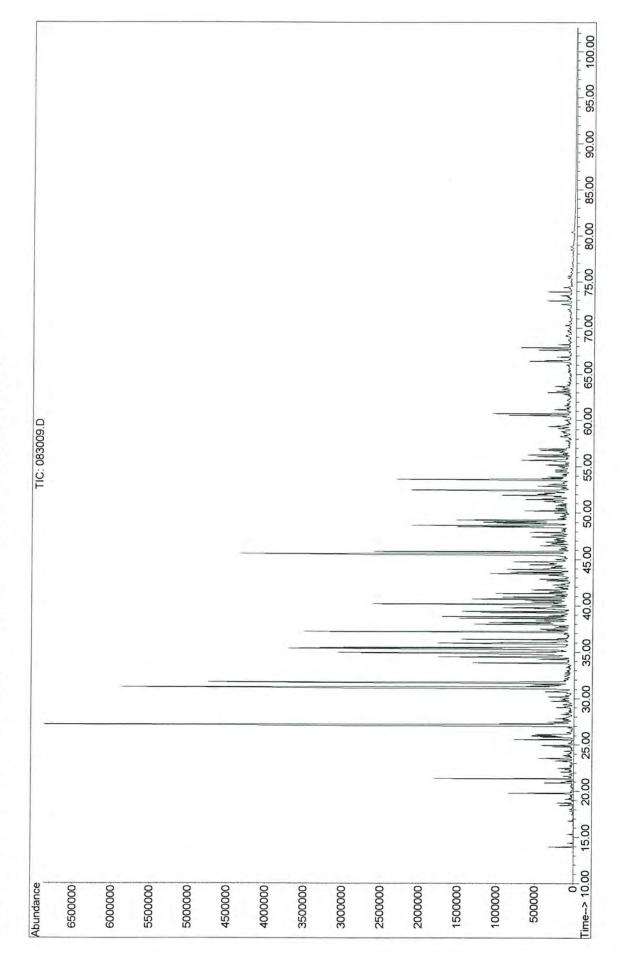


Sample Name: DW-5-FP (36921-2) Product x50
Misc Info : Gas Works Park, Floyd





Sample Name: 3-1-G (36921-3) soil extract (1:10) Misc Info : Gas Works Park, Floyd Snider, QB SS5318, Vf=2m1

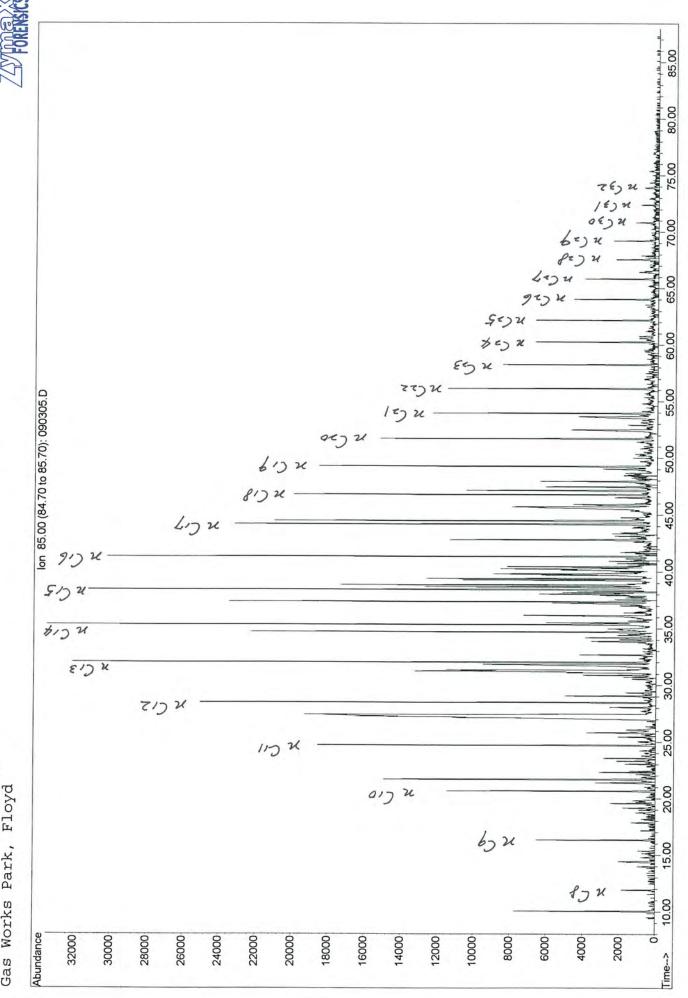




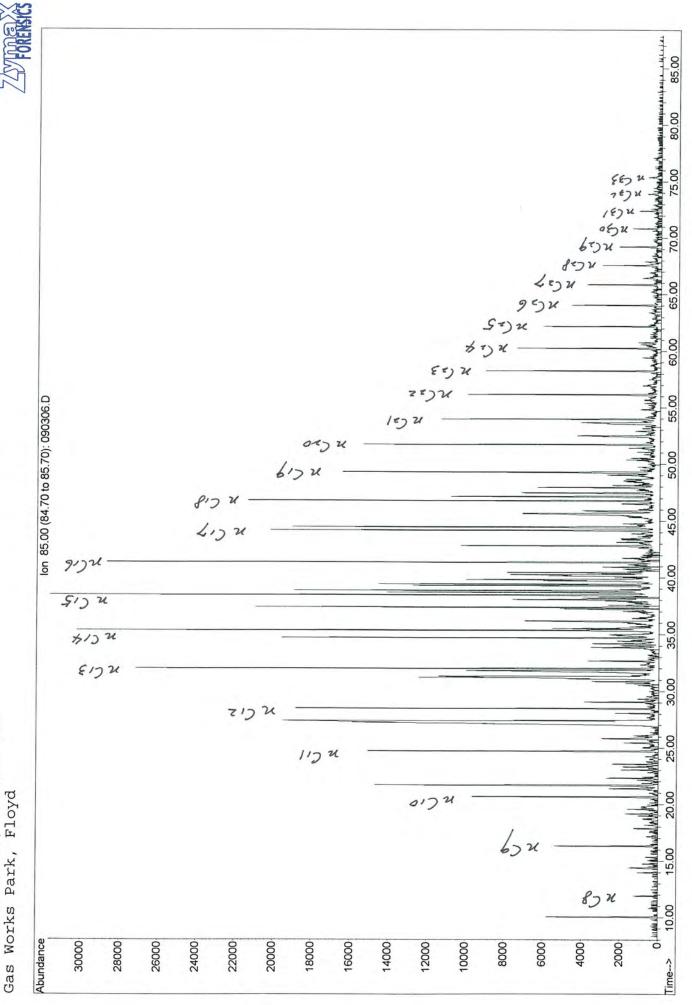
Table

Key to Chromatogram Symbol Identification for m/z 85 and m/z 113 Paraffins and Isoparaffins

Symbol	Detail
i-10	Iso-alkane with 10 carbon atoms
i-15	Farnesane (isoprenoid with 15 carbon atoms)
i-16	Isoprenoid with 16 carbon atoms
Pr	Pristane (isoprenoid with 19 carbon atoms)
Ph	Phytane (isoprenoid with 20 carbon atoms)
nC ₈	n-C ₈ normal alkane
nC ₁₅	n-C ₁₅ normal alkane
i-8	2,5-(2,4)-Dimethylhexane
i-8'	2,3,4-Trimethylpentane
i-8"	2,3-Dimethylhexane
CH-n	Alkylcyclohexane (where <i>n</i> indicates number of carbon atoms in the side chain)

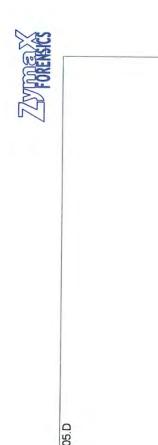


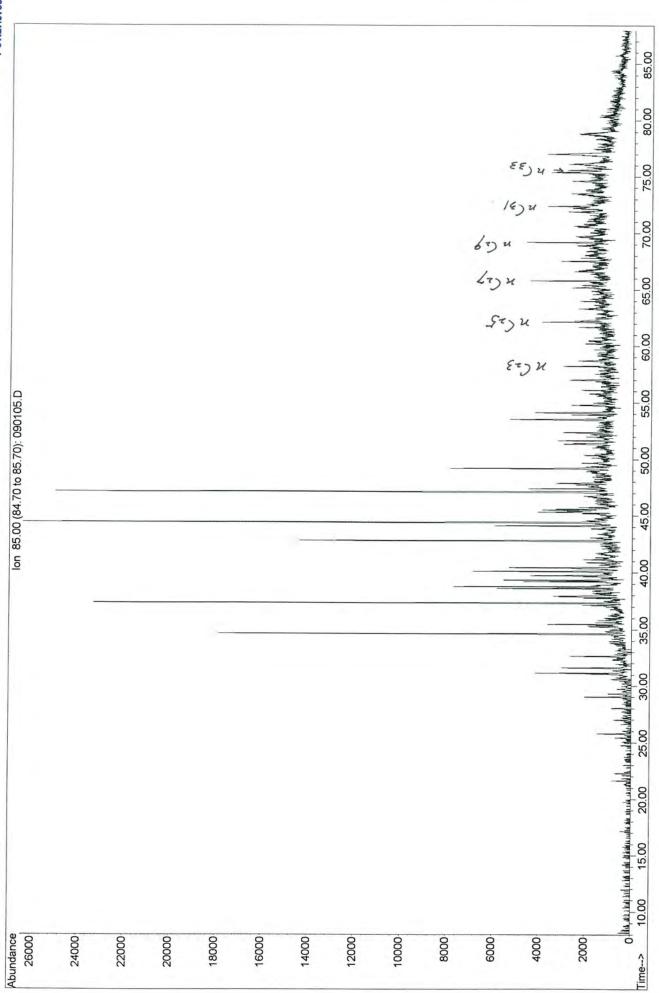
DW-4-FP (36921-1) Product x50 Gas Works Park, Floyd



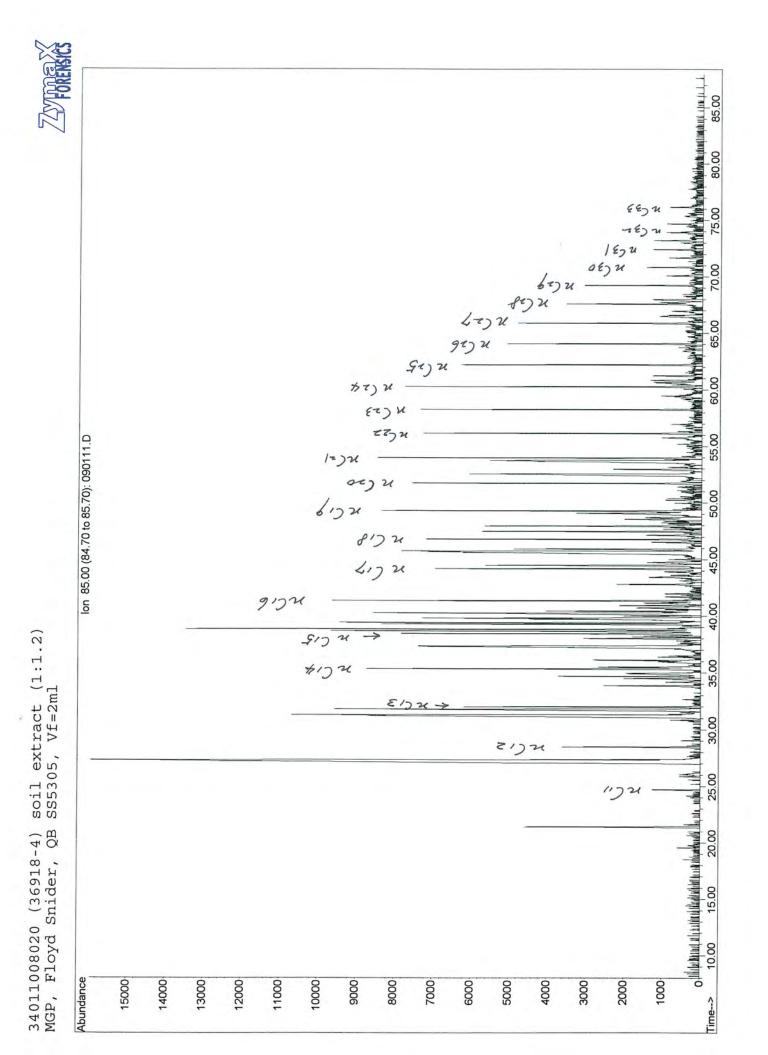
DW-5-FP (36921-2) Product x50 Gas Works Park, Floyd

soil extract (1:2) SS5305, Vf=1ml 34011008001 (36917-1) MGP, Floyd Snider, QB

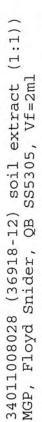


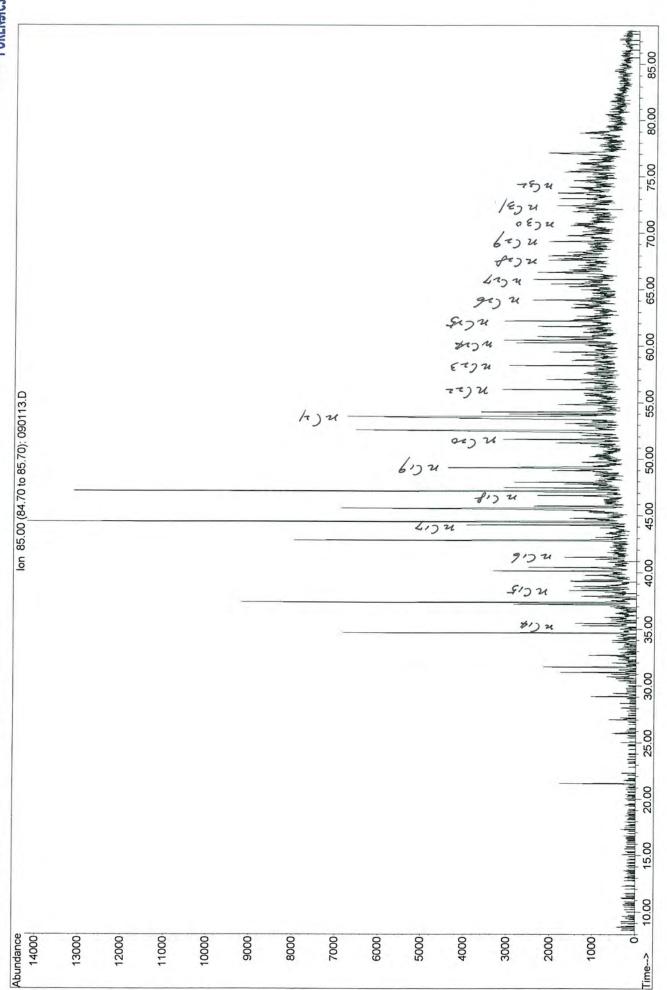


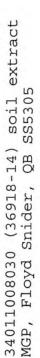
Abundance	lon 85.00 (84.70 to 85.70): 090110.D
38000	
36000	n- Alkanes
34000	(ma5a1))
32000	
30000	
28000-	
26000-	
24000	
22000	
20000	
18000	
16000	
14000	
12000	
10000	
8000	
6000	
4000	
2000	

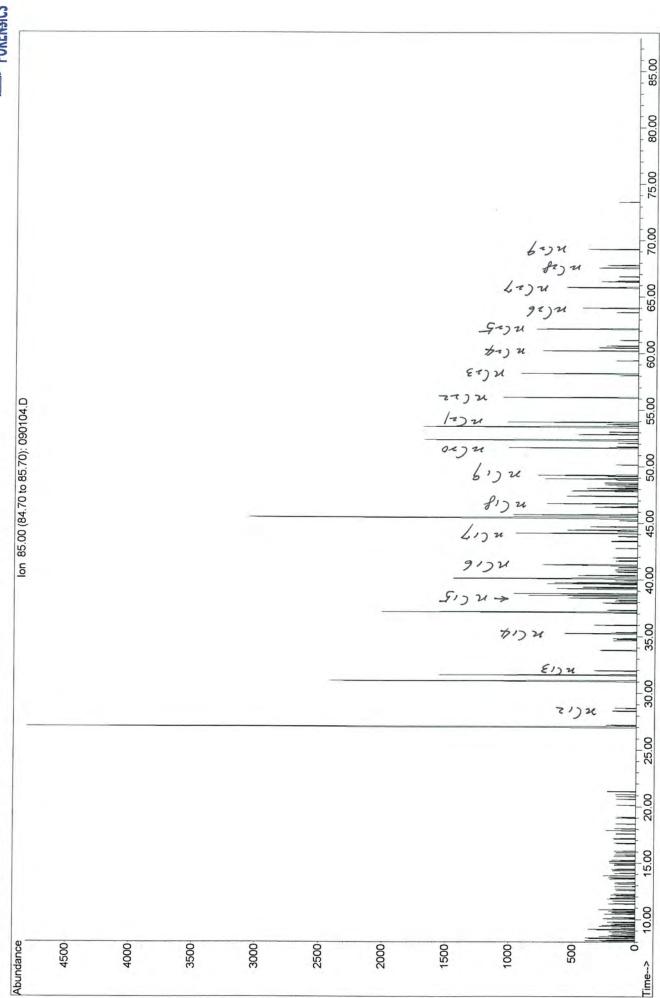


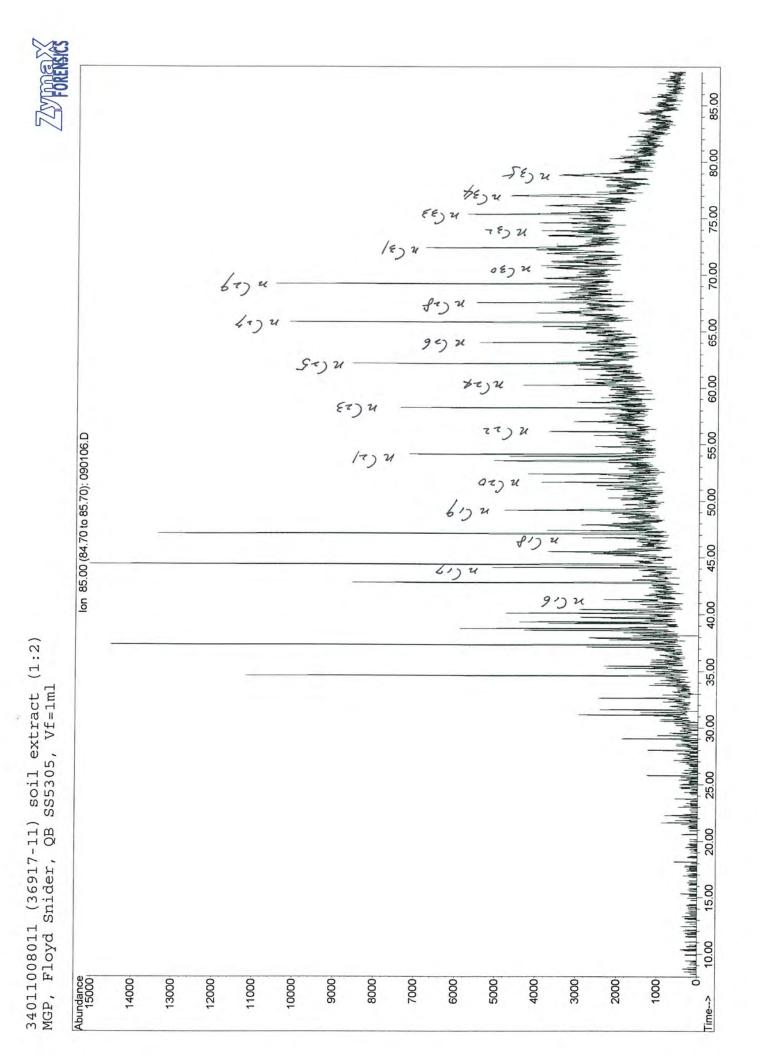
50000	n-Alkanes
45000	(Absent)
40000-	
35000	
30000	
25000-	
20000	
15000-	
10000	
5000-	

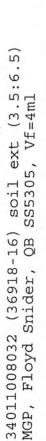


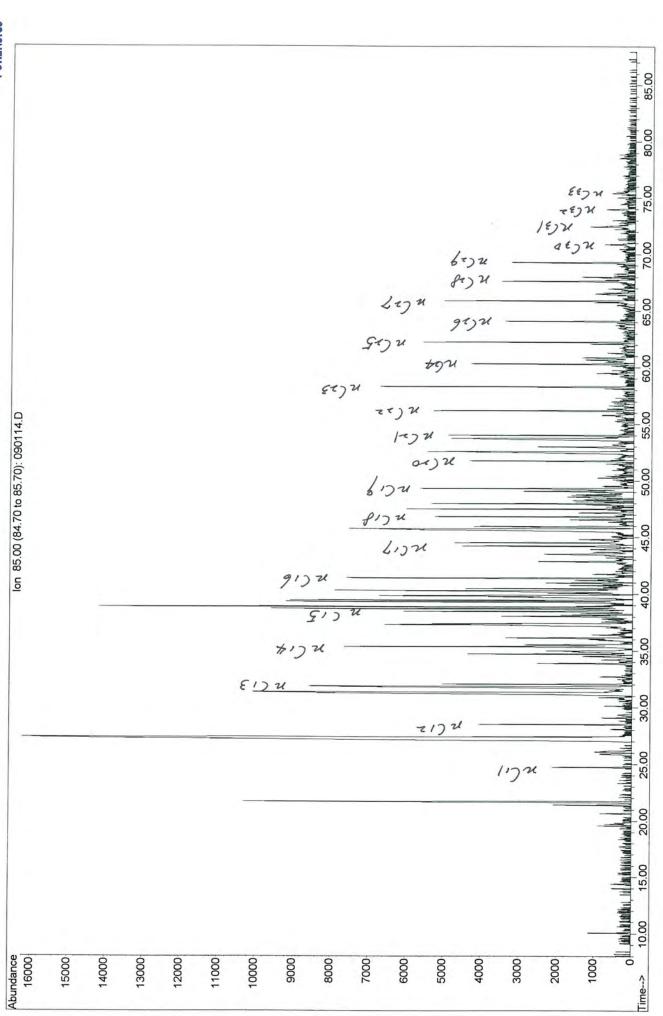


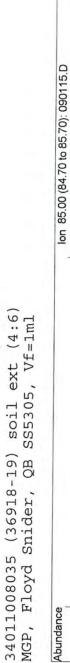


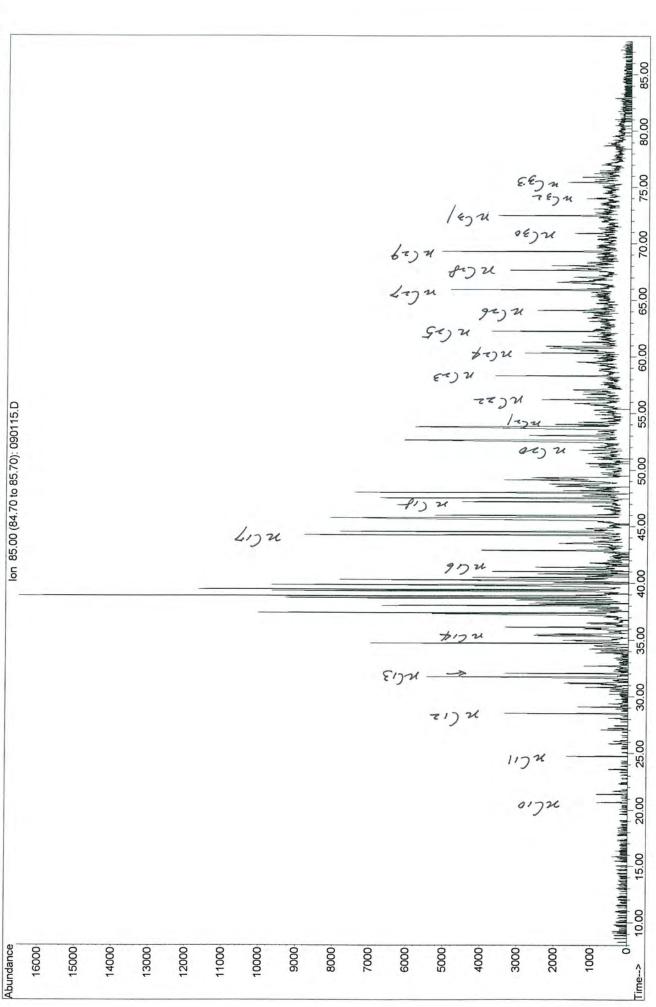


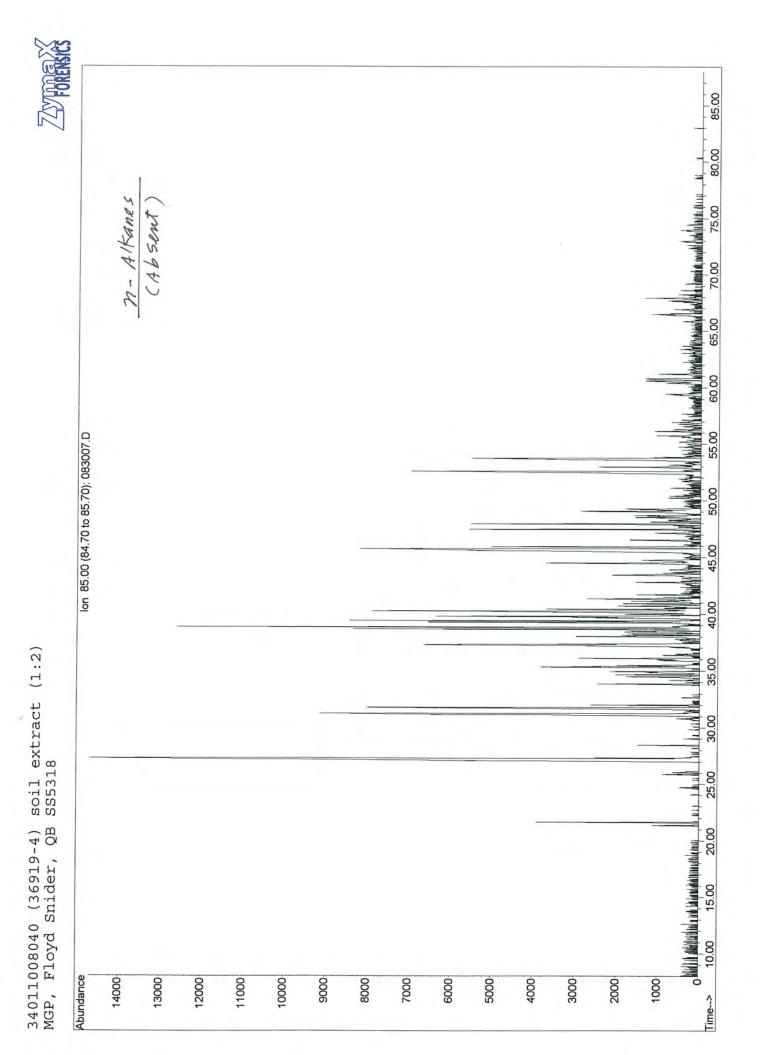












34011008043 (36919-7) soil extract (1:2) MGP, Floyd Snider, QB SS5318, Vf=3ml

