APPENDIX 2D
Special Studies

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ATTACHMENTS

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 samples[2] 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 pyrogenic[3] 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.

[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.

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

- 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.

Battelle. 2003. Laboratory Report RE: Lake Union Sediment Chemistry Study Raw Data Submittal to Riddell Williams P.S.

Battelle. 2007. Data Report, Gas Works Park Soils February 2007.

Floyd|Snider. 2006. Seattle Law Department, Gas Works Park, Chemical Forensics Sampling Report.

Floyd|Snider. 2008. Gas Works Park – NE Corner Investigation Data Report.

Hong, L and RG Luthy. 2005. Draft Final Report II Identification of Black Carbon Material in Sediments from Lake Union. Stanford Univerisity, 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.
49 Clarendon Street
Watertown, MA 02472
TEL: (617) 923-4662
FAX: (617) 923-4610

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.

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

Sincerely,

David M. Mauro
President

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

Lab ID Field ID:	RE980604-01 MW-5 Product		RE980604-02 DW-4 Product		EL980224-01 MLS-4-1-298	
MAHs:						
Benzene	563		2,440		1,760	
Toluene	2,040		6,490		5,540	
Ethylbenzene	1,530		3,130		3,090	
m/p-Xylene	3,520		5,880		5,020	
Styrene	177		2,630		1,600	
o-Xylene	1,620		2,520		2,140	
1,2,4-Trimethylbenzene	3,320		5,460		4,780	
Total MAHs:	**9,450**		**23,100**		**19,100**	
PAHs:						
Naphthalene	84,400	D	131,000	D	117,000	E
2-Methylnaphthalene	38,900	D	49,400	D	47,100	E
1-Methylnaphthalene	23,700	D	27,400	D	25,900	
Acenaphthylene	2,330		7,310		6,910	
Acenaphthene	10,600		10,900		9,930	
Dibenzofuran	3,690		6,000		7,480	
Fluorene	8,680		10,900		11,300	
Phenanthrene	25,700	D	31,900	D	27,500	E
Anthracene	6,460		7,840		7,490	
Fluoranthene	7,560		10,400		9,710	
Pyrene	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	
Indeno(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	
Total PAHs:	**233,000**		**318,000**		**292,000**	
Quantitation Limit:	25.8		29.1		33.3	
Detection Limit:	10.3		11.6		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.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991015-01		RP991015-03		RP991015-04	
Field ID:	CR-01B		CR-8A		CR-10A	
MAHs:						
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	B
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%		I	
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991015-05		RP991015-06		RP991015-07	
Field ID:	CR-13C (108)		CR-14A		CR-18A	
MAHs:						
Benzene	11.8		3.63		1.42	
Toluene	5.58		1.59		2.91	
Ethylbenzene	29.0	B	9.58	B	10.9	B
m/p-Xylene	41.0	B	6.45	B	11.9	B
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		139	
1-Methylnaphthalene	46.3	B	173	B	85.4	B
Acenaphthylene	1.54	U	10.6		3.59	
Acenaphthene	3.87		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		I	157		23.9	
Chrysene	1.54	U	124		24.5	
Benzo(b)fluoranthene	1.54	U	78.8		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	
Detection Limit:	0.62		0.35		0.09	
Fluorobenzene (SS1)	65%		61%		60%	
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991019-SB Soil Blank		RP991019-SBS Soil Blank Spike
MAHs:			
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		
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991015-01 CR-01B		RP991015-01D CR-01B		Laboratory Duplicate Relative Percent Difference
MAHs:					
Benzene	0.23	U	0.17	U	
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		
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991021-01		RP991021-03		RP991021-04	
Field ID:	FP-01		FP-03		ST-01	
MAHs:						
Benzene	0.70	U	8.04		1.19	J
Toluene	1.70		2.11		2.43	
Ethylbenzene	1.06	B	1.15	B	3.38	B
m/p-Xylene	2.86	B	2.15	B	5.12	B
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	B	0.95	B	1.07	JB
Total MAHs:	**6.65**		**14.3**		**12.1**	
PAHs:						
Naphthalene	16.7	B	100	B	8.65	B
2-Methylnaphthalene	15.8	B	32.6	B	5.03	B
1-Methylnaphthalene	96.1	B	15.8	B	11.7	B
Acenaphthylene	7.11		84.9		2.87	
Acenaphthene	36.2		123		14.4	
Dibenzofuran	6.94		19.9		2.83	
Fluorene	22.2		230		12.4	
Phenanthrene	46.4	B	2,360	BD	23.6	B
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		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		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991021-05		RP991021-06		RP991021-10	
Field ID:	ST-02		ST-03		ST-08	
MAHs:						
Benzene	1.93		1.90	U	1.78	U
Toluene	2.25		1.22	J	1.06	J
Ethylbenzene	2.11	B	2.15	B	2.58	B
m/p-Xylene	3.55	B	3.17	B	3.30	B
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:						
Naphthalene	11.0	B	5.88	B	1.69	JB
2-Methylnaphthalene	3.25	B	35.9	B	1.78	U
1-Methylnaphthalene	4.23	B	30.7	B	2.30	B
Acenaphthylene	4.13		1.19	J	0.75	J
Acenaphthene	4.84		14.1		0.97	J
Dibenzofuran	1.70		2.83		1.78	U
Fluorene	3.86		10.9		0.75	J
Phenanthrene	12.2	B	20.6	B	3.48	B
Anthracene	6.94		6.83		1.13	J
Fluoranthene	109		16.4		14.5	
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		1.90	U	1.25	J
Benzo(g,h,i)perylene	51.6		8.80		14.0	
Total PAHs:	**635**		**221**		**118**	
Quantitation Limit:	1.11		1.90		1.78	
Detection Limit:	0.45		0.76		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

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		1.64		1.21	
Ethylbenzene	3.12	B	2.21	B	1.93	B
m/p-Xylene	5.25	B	2.66	B	2.94	B
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:						
Naphthalene	8.73	B	10.6	B	8.46	B
2-Methylnaphthalene	1.21	JB	2.59	B	0.74	JB
1-Methylnaphthalene	2.84	B	4.14	B	1.66	B
Acenaphthylene	1.48	J	4.12		0.82	J
Acenaphthene	1.96		3.43		0.58	J
Dibenzofuran	1.09	J	1.47		0.61	J
Fluorene	2.45		3.38		0.56	J
Phenanthrene	6.25	B	7.27	B	1.89	B
Anthracene	2.09		3.28		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		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		15.2		3.93	
Dibenz(a,h)anthracene	1.69	U	1.68		2.46	
Benzo(g,h,i)perylene	6.72		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%		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	DA991021-SB Soil Blank		DA991021-SBS 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:			
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		

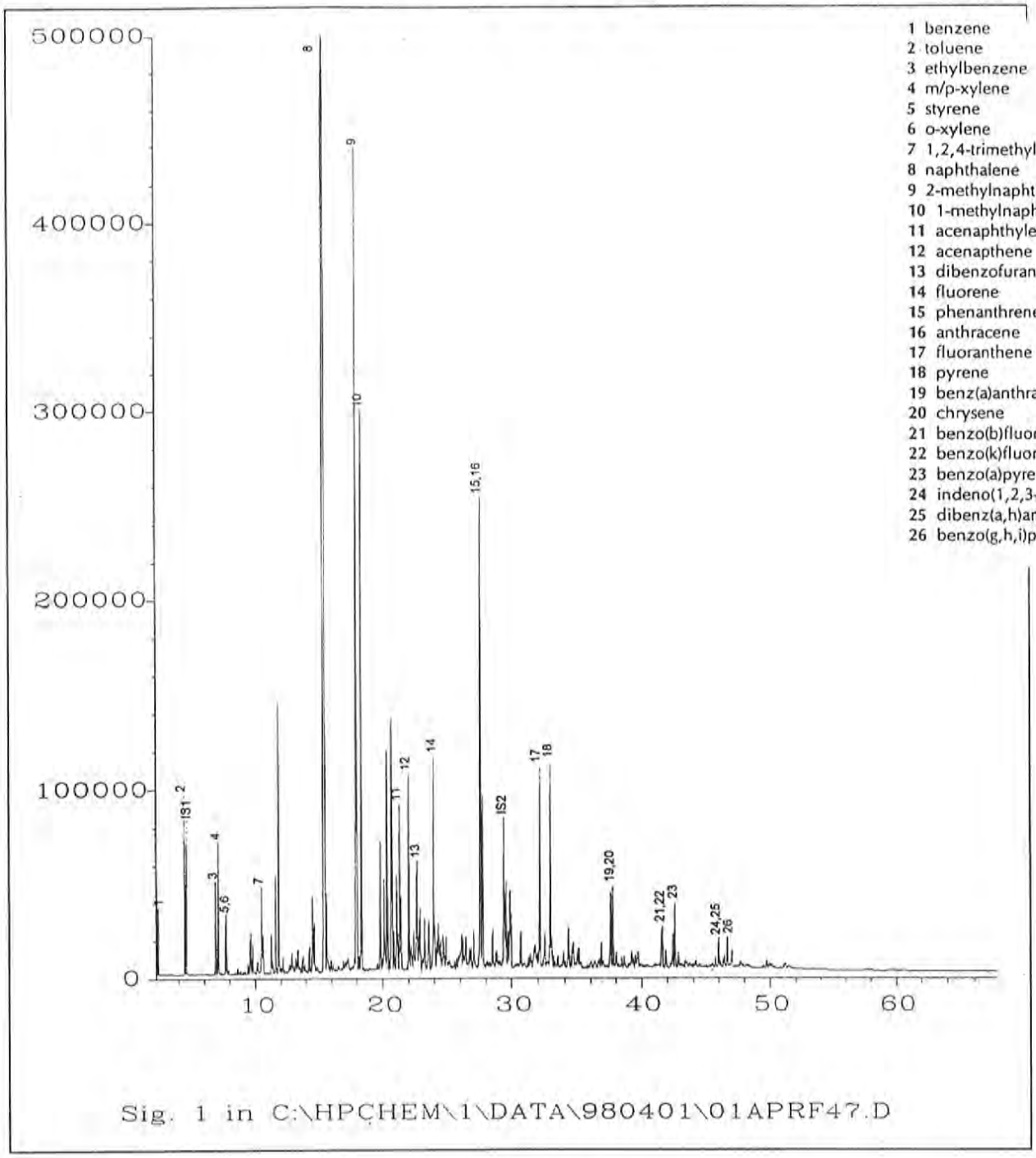
B = Analyte detected in the blank
D = Values from a diluted sample extract
DL = QC compounds diluted out
E = Estimated value, above calibration range
I = Interference
J = Estimated value
L = Coeluted with compound listed above
NM = Not measured
U = Not detected at quantitation limit shown
Total MAHs does not include 1,2,4-Trimethylbenzene.
Total PAHs does not include Dibenzofuran.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991021-16 ST-35	RP991021-16MS 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.
All soil results reported on a dry weight basis.

GC/FID Fingerprint

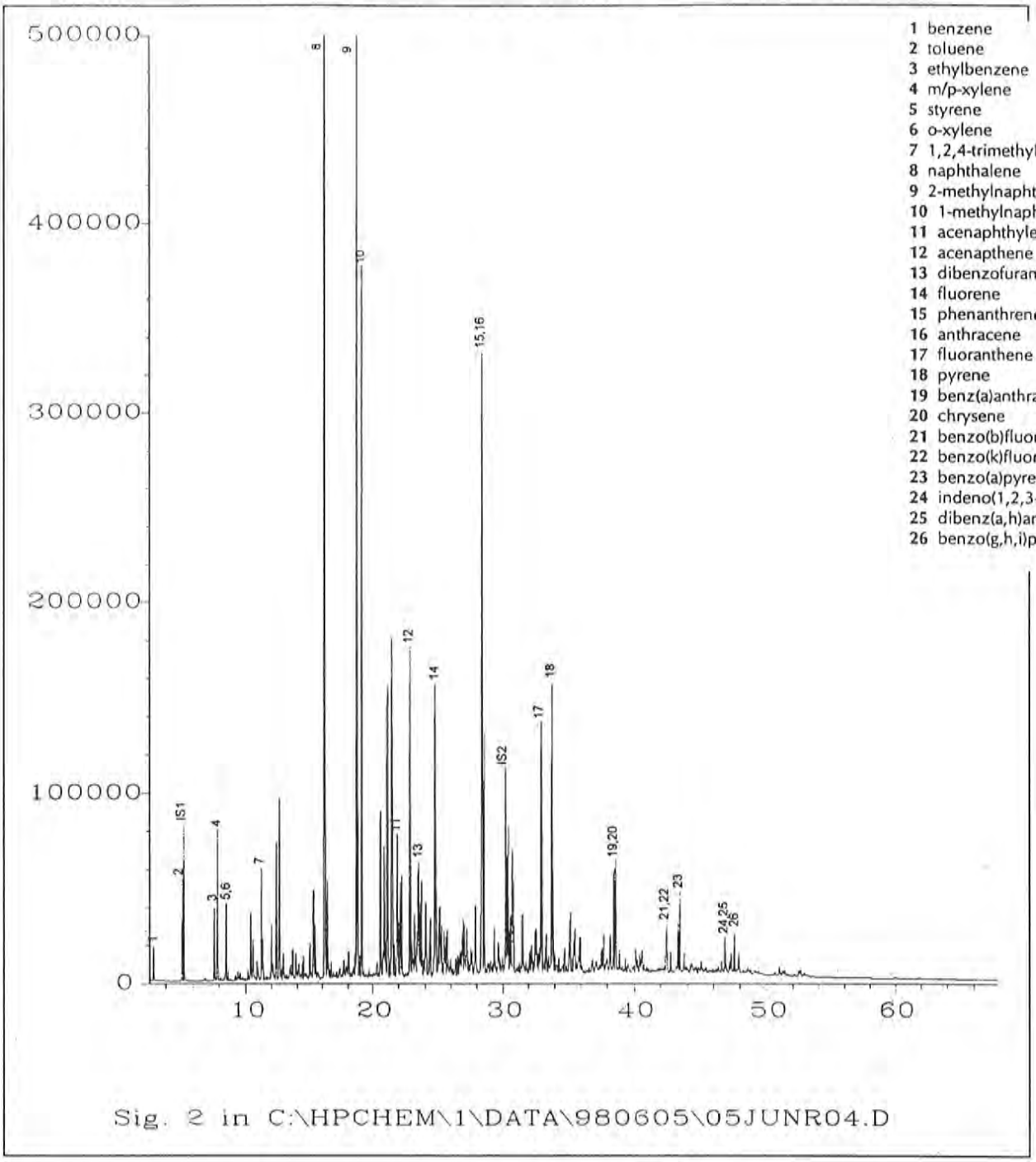


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**MLS-4-1-298**
Laboratory ID:	EL980224-01
Method:	MET4007D

META

GC/FID Fingerprint

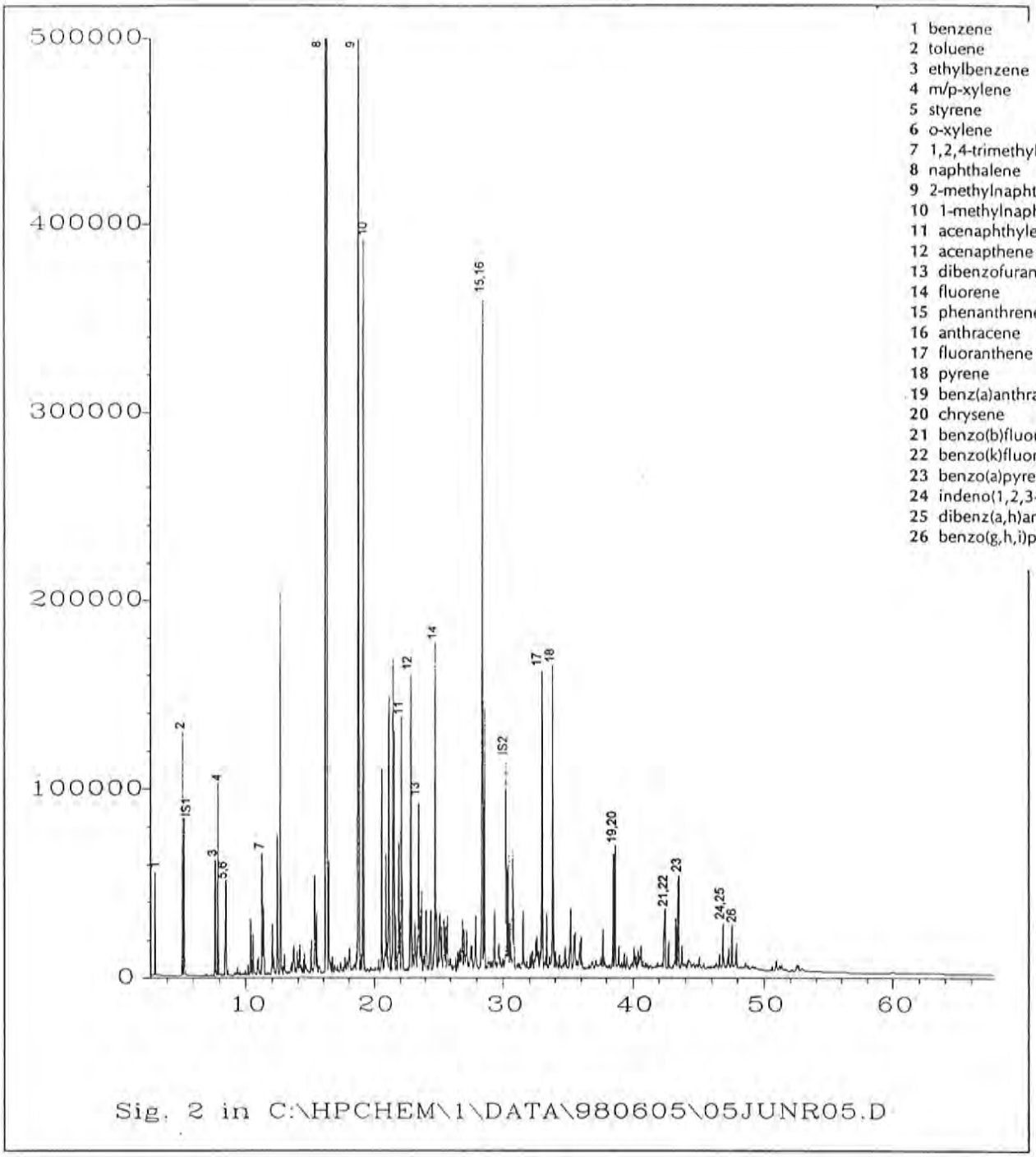


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**MW-5 Product**
Laboratory ID:	RE980604-01
Method:	MET4007D

META

GC/FID Fingerprint

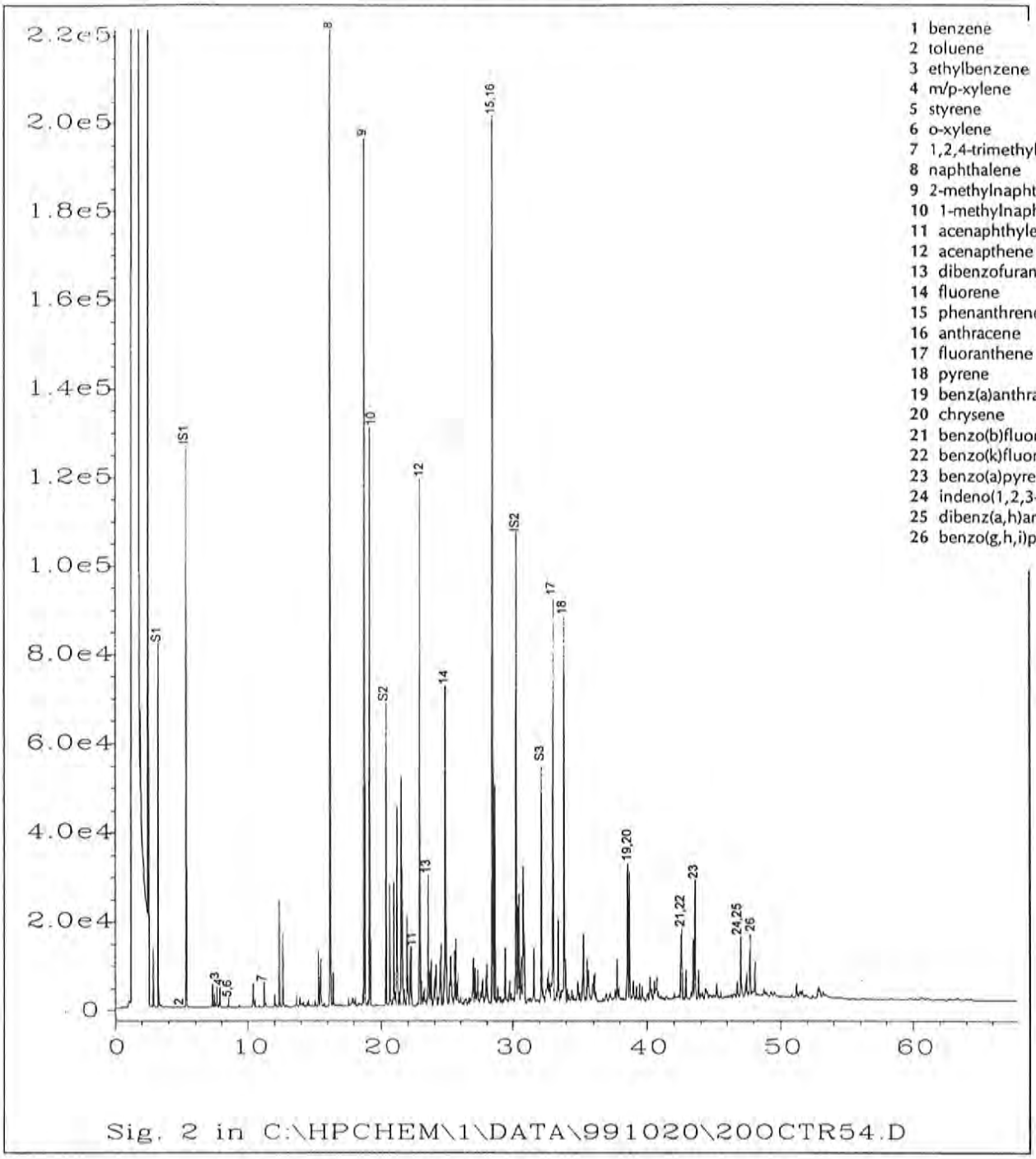


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**DW-4 Product**
Laboratory ID:	RE980604-02
Method:	MET4007D

META

GC/FID Fingerprint

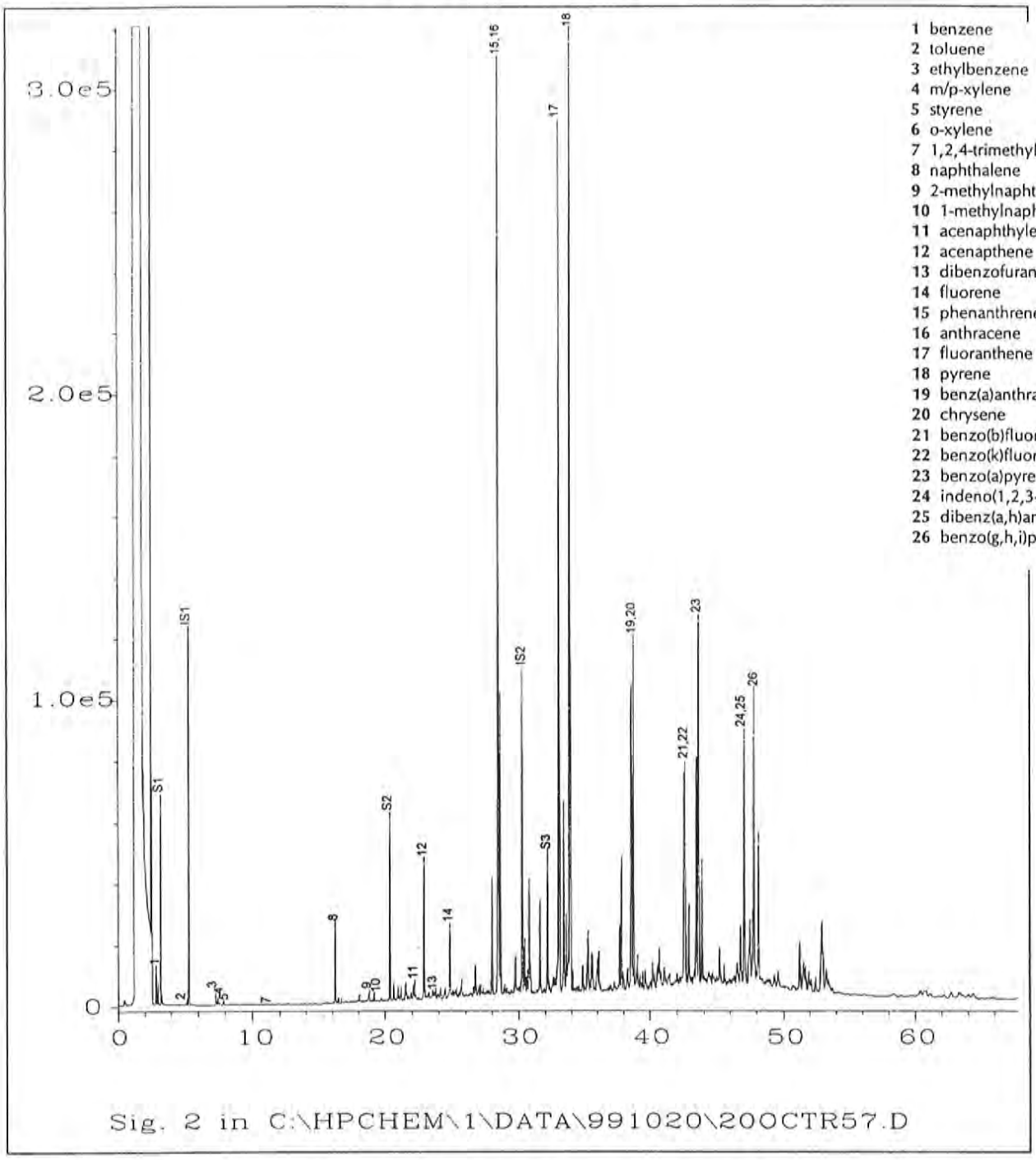


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-01B**
Laboratory ID:	RP991015-01
Method:	MET4007D

META

GC/FID Fingerprint

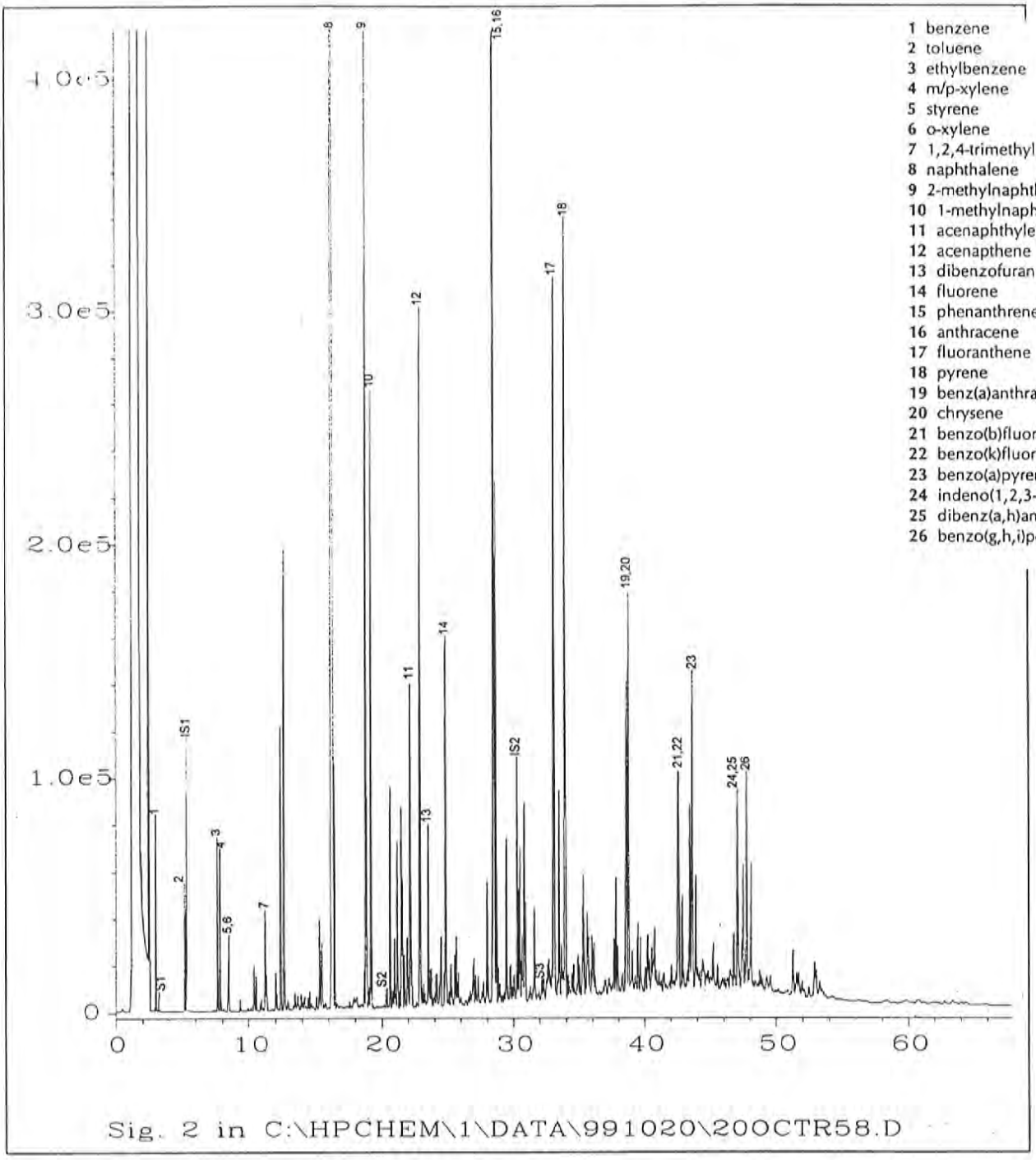


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-8A**
Laboratory ID:	RP991015-03
Method:	MET4007D

META

GC/FID Fingerprint

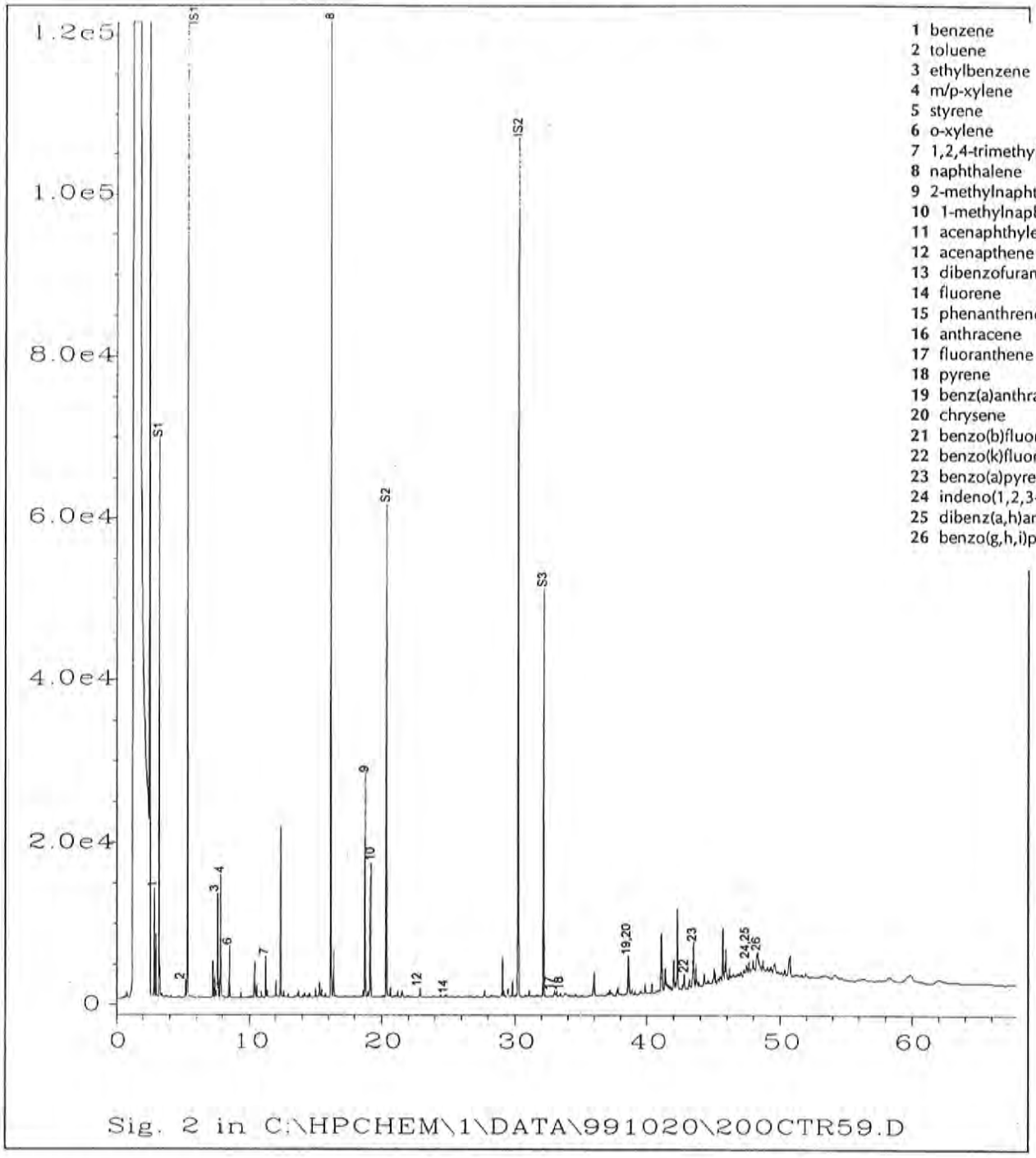


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-10A**
Laboratory ID:	RP991015-04
Method:	MET4007D

META

GC/FID Fingerprint

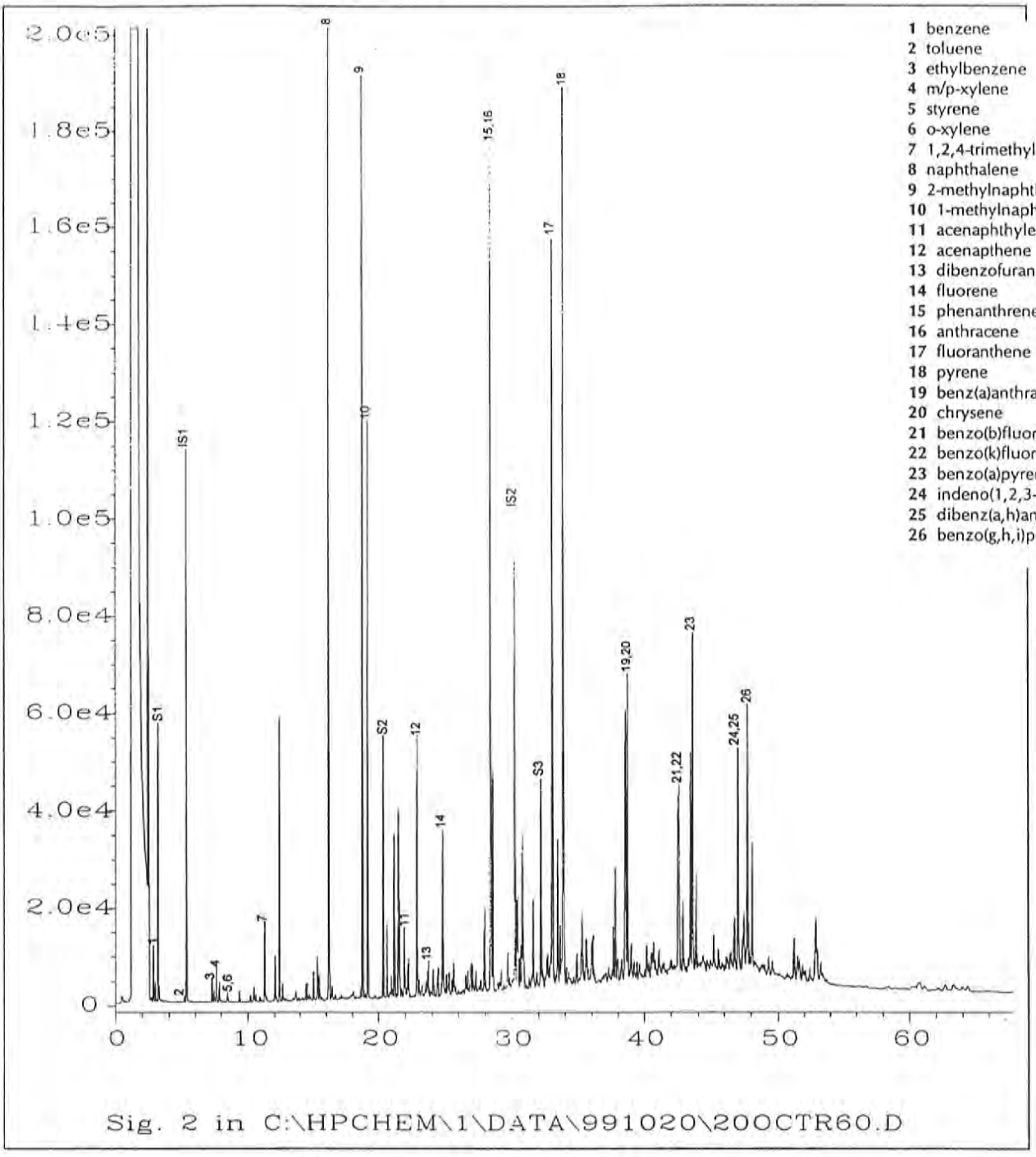


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-13C (108)**
Laboratory ID:	RP991015-05
Method:	MET4007D

META

GC/FID Fingerprint



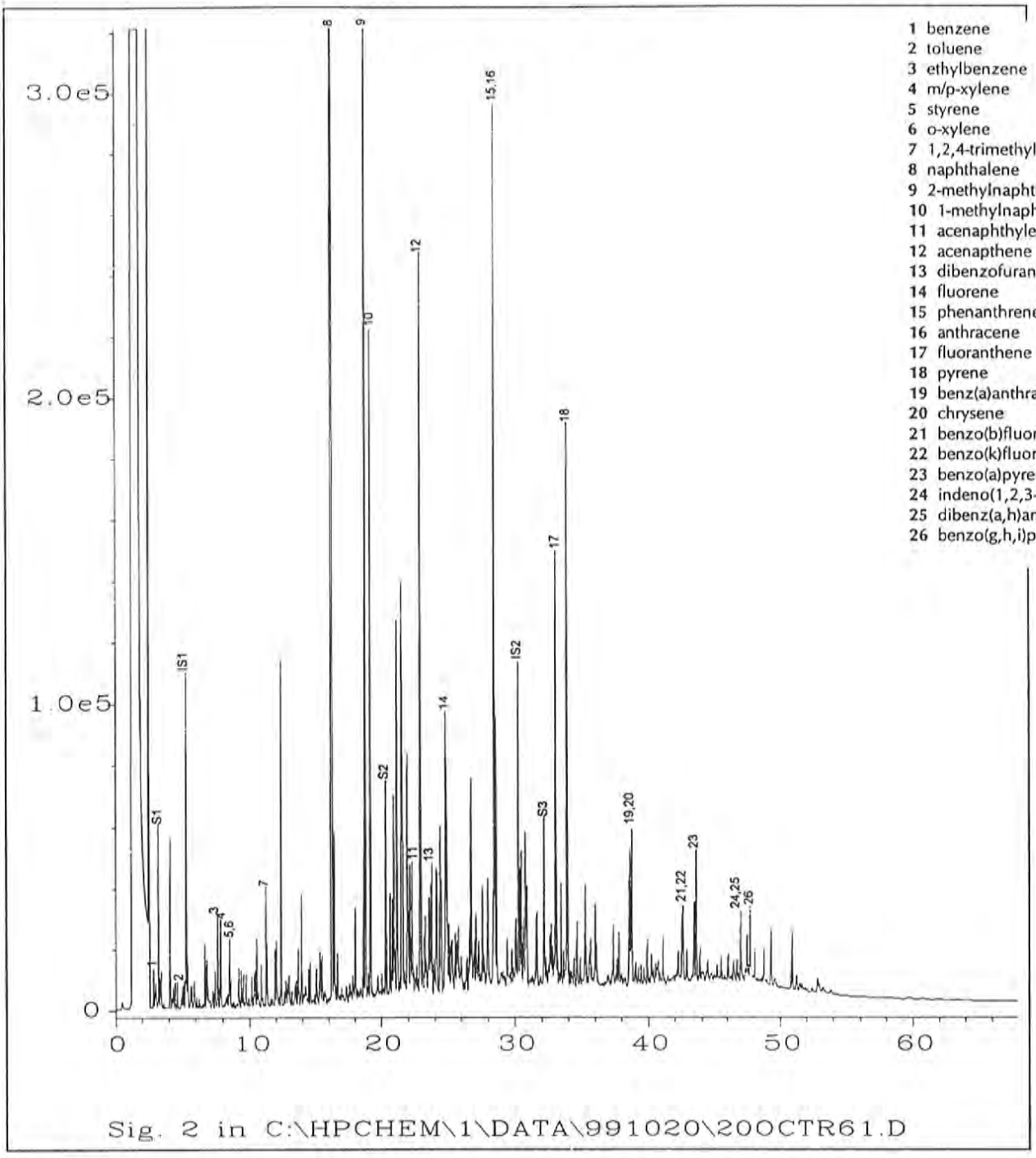
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenapthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-14A**
Laboratory ID:	RP991015-06
Method:	MET4007D

META

GC/FID Fingerprint

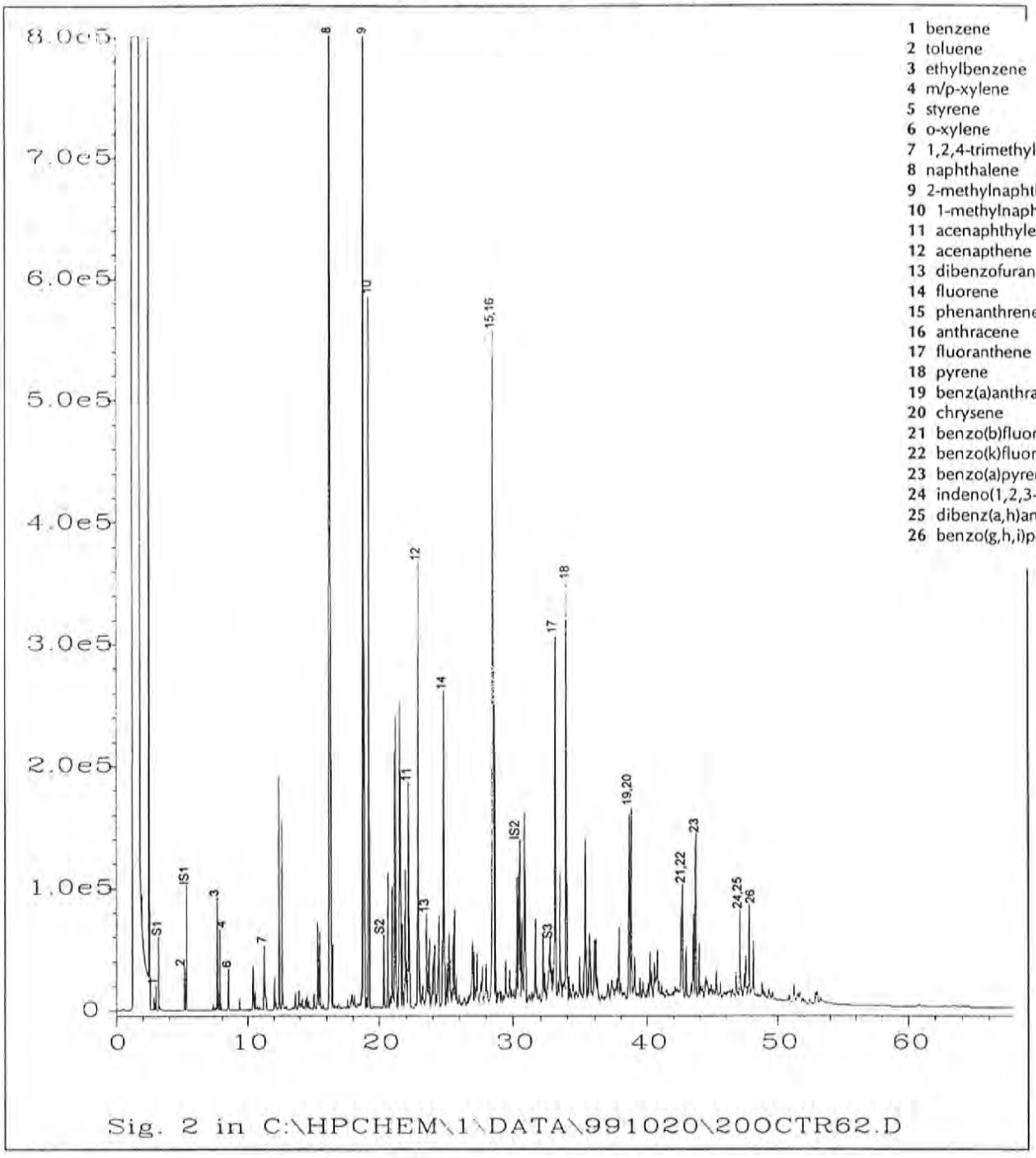


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-18A**
Laboratory ID:	RP991015-07
Method:	MET4007D

META

GC/FID Fingerprint

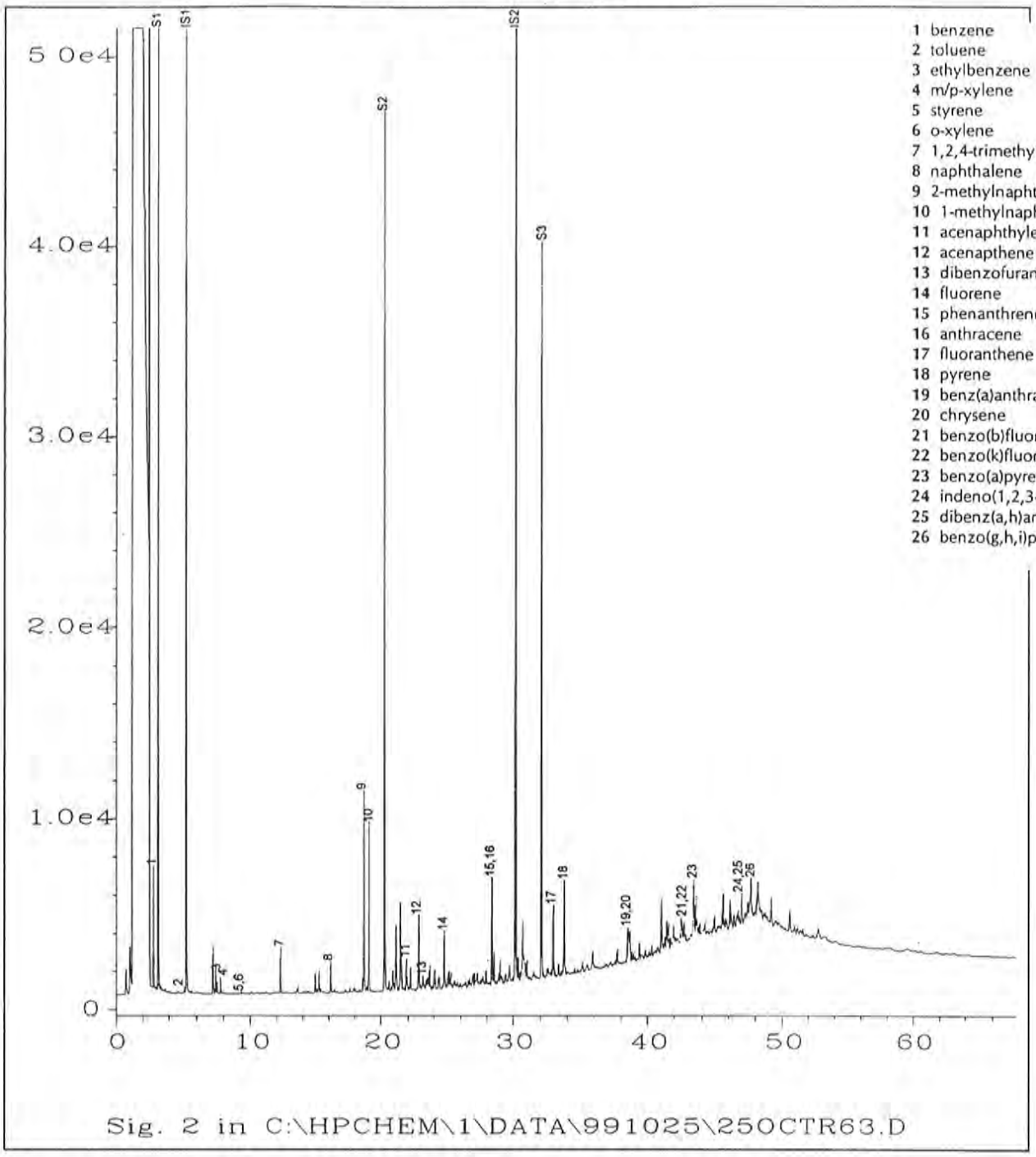


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-19A**
Laboratory ID:	RP991015-08
Method:	MET4007D

META

GC/FID Fingerprint

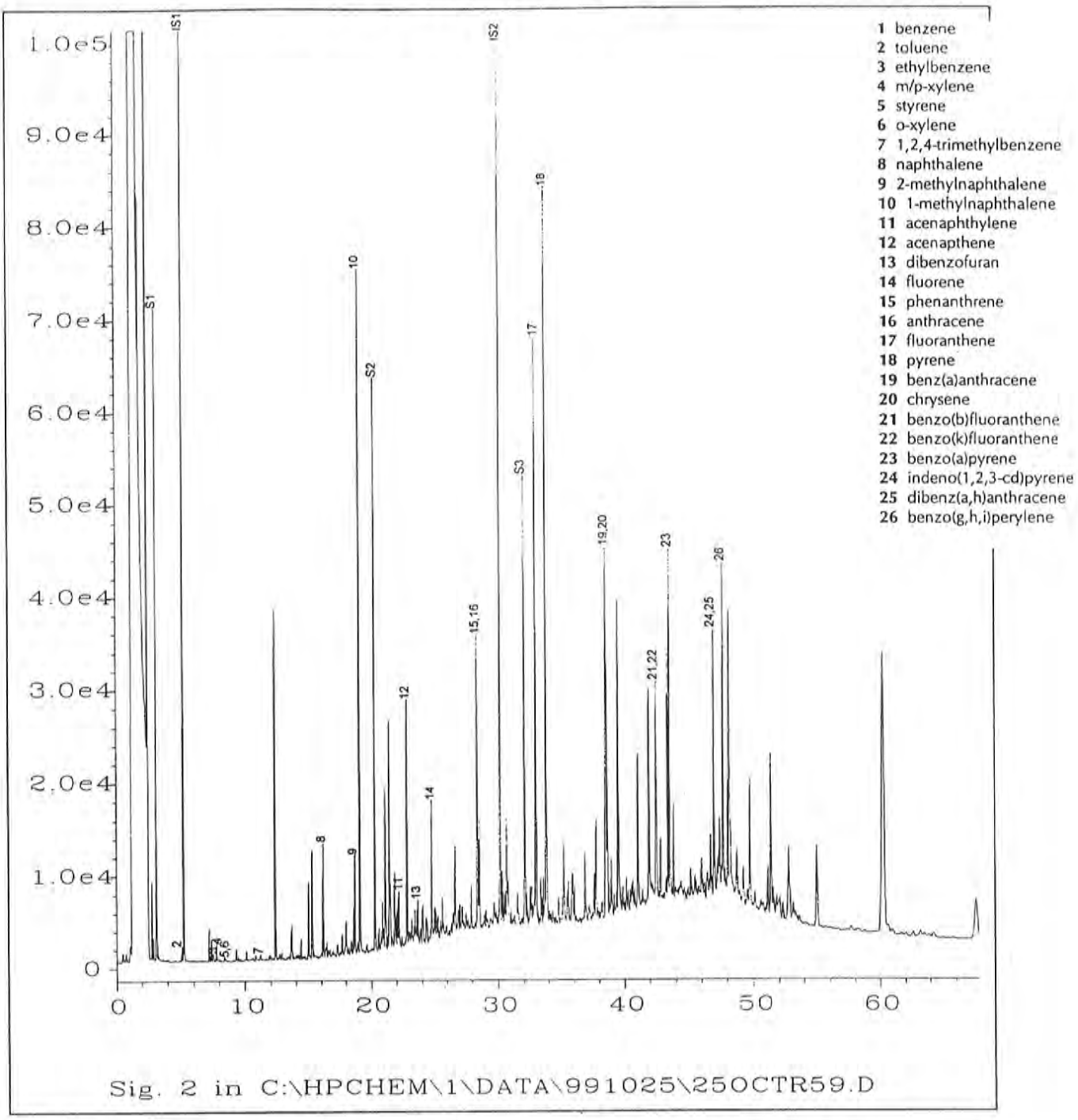


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-21A**
Laboratory ID:	RP991015-09
Method:	MET4007D

META

GC/FID Fingerprint

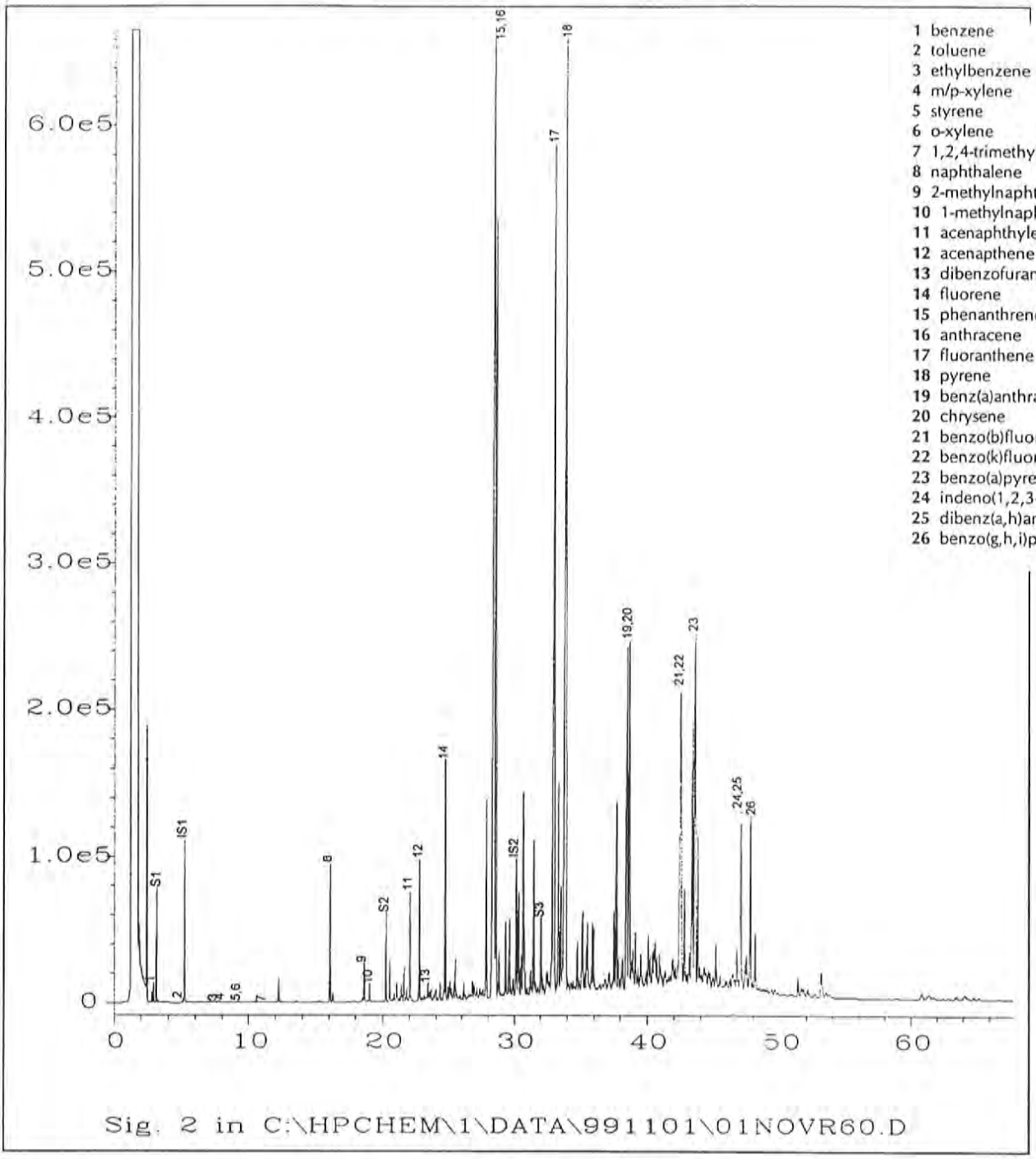


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**FP-01**
Laboratory ID:	RP991021-01
Method:	MET4007D

META

GC/FID Fingerprint

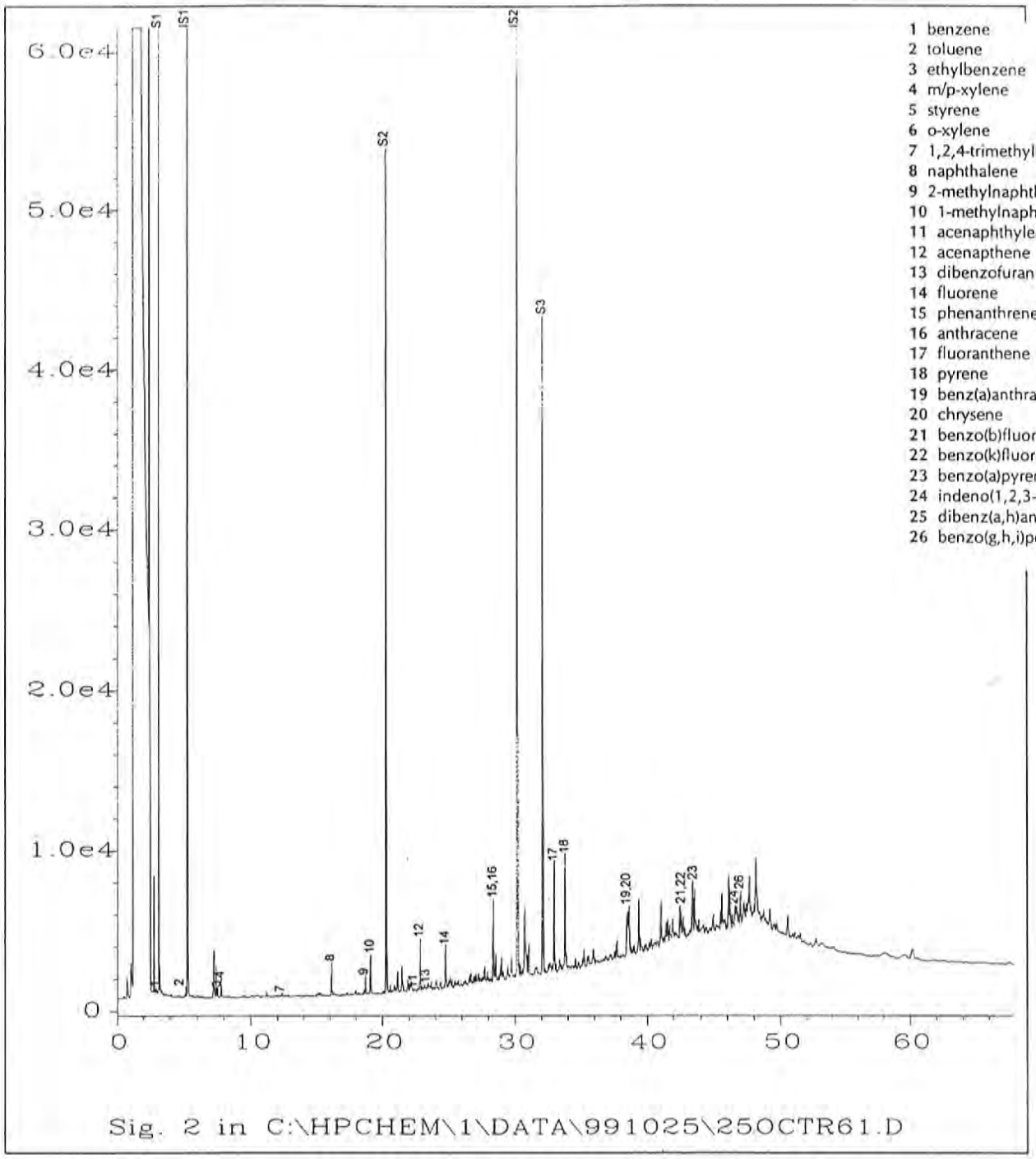


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**FP-03**
Laboratory ID:	RP991021-03
Method:	MET4007D

META

GC/FID Fingerprint



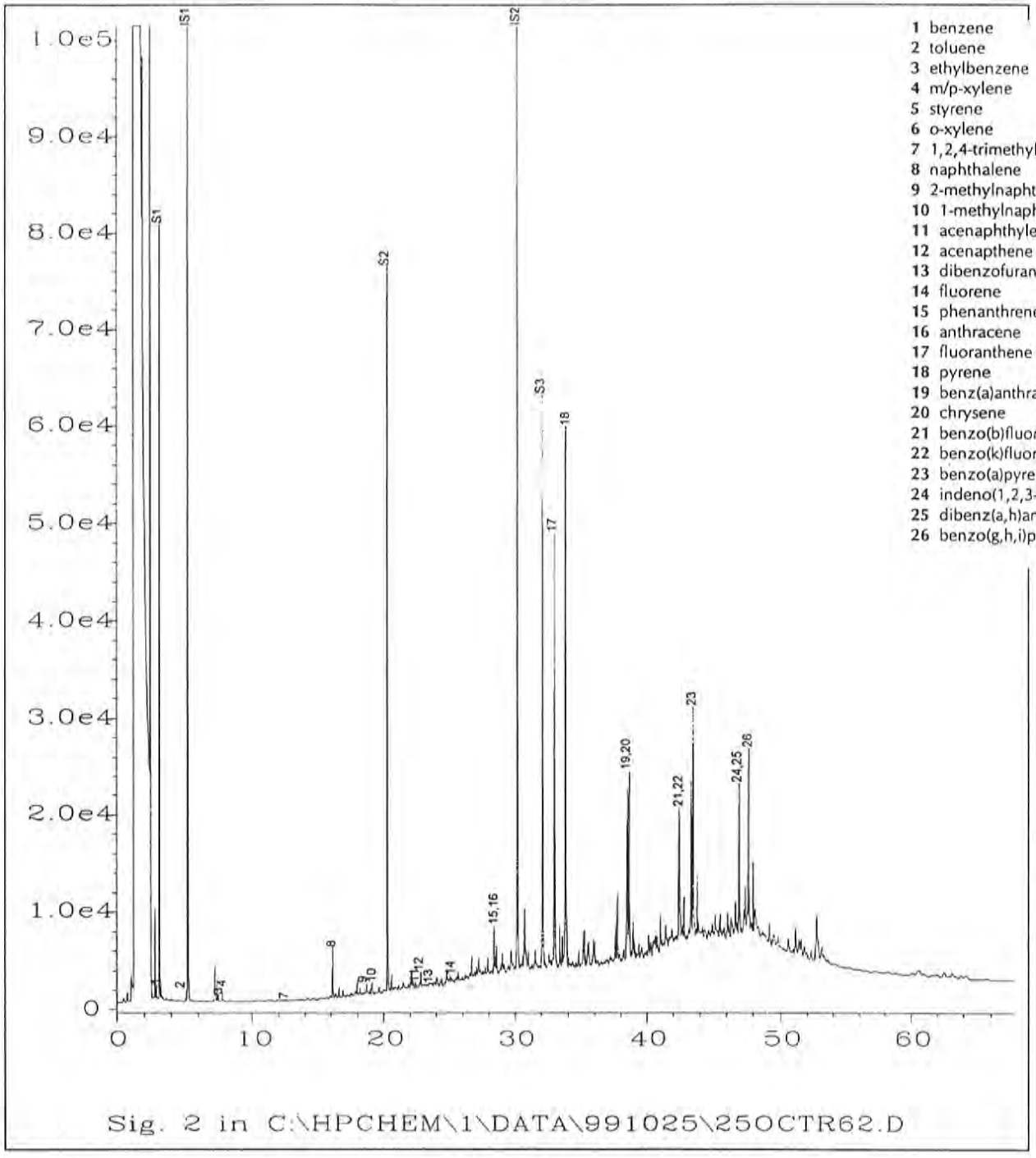
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenapthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-01**
Laboratory ID:	RP991021-04
Method:	MET4007D

META

GC/FID Fingerprint

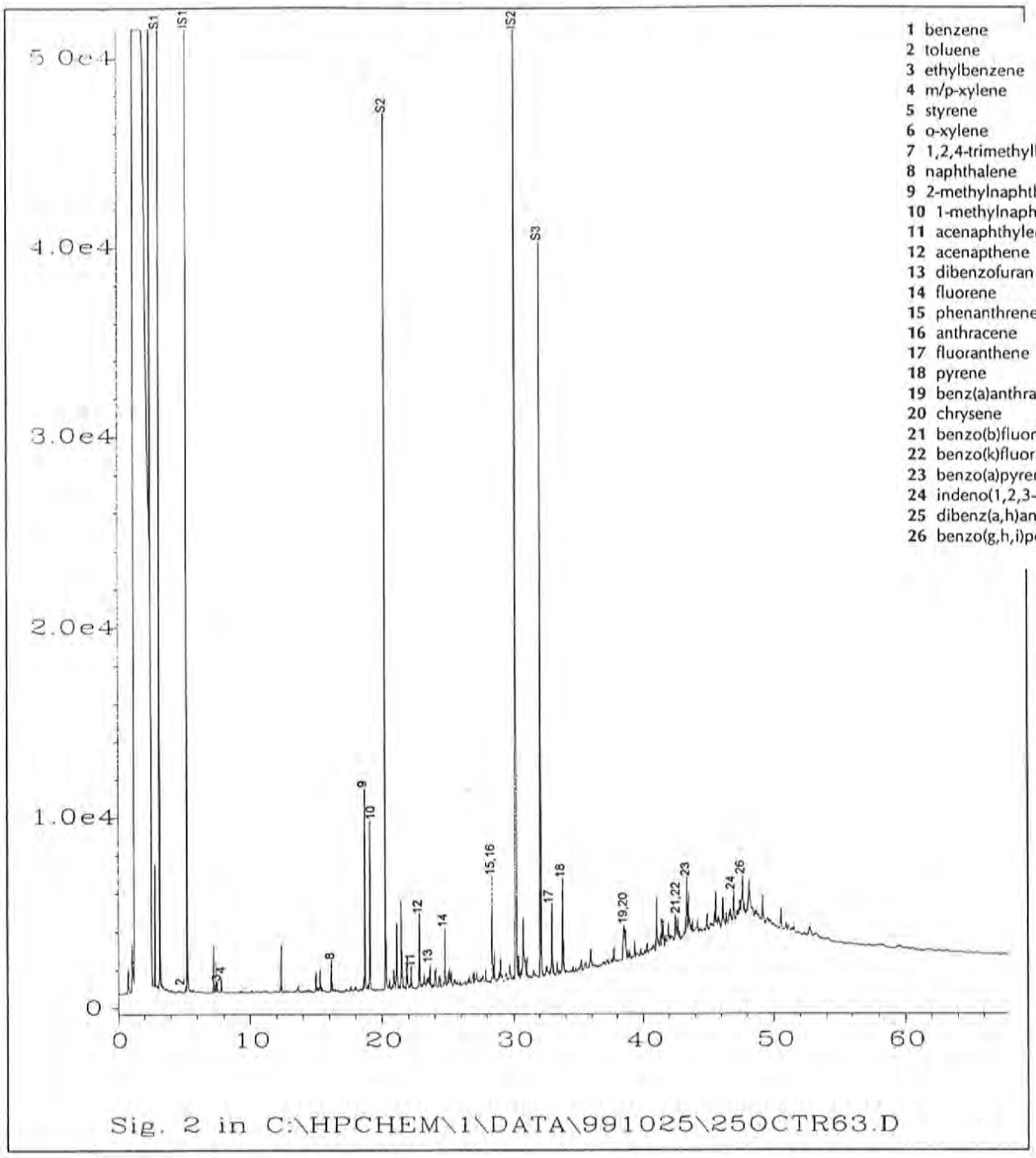


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-02**
Laboratory ID:	RP991021-05
Method:	MET4007D

META

GC/FID Fingerprint

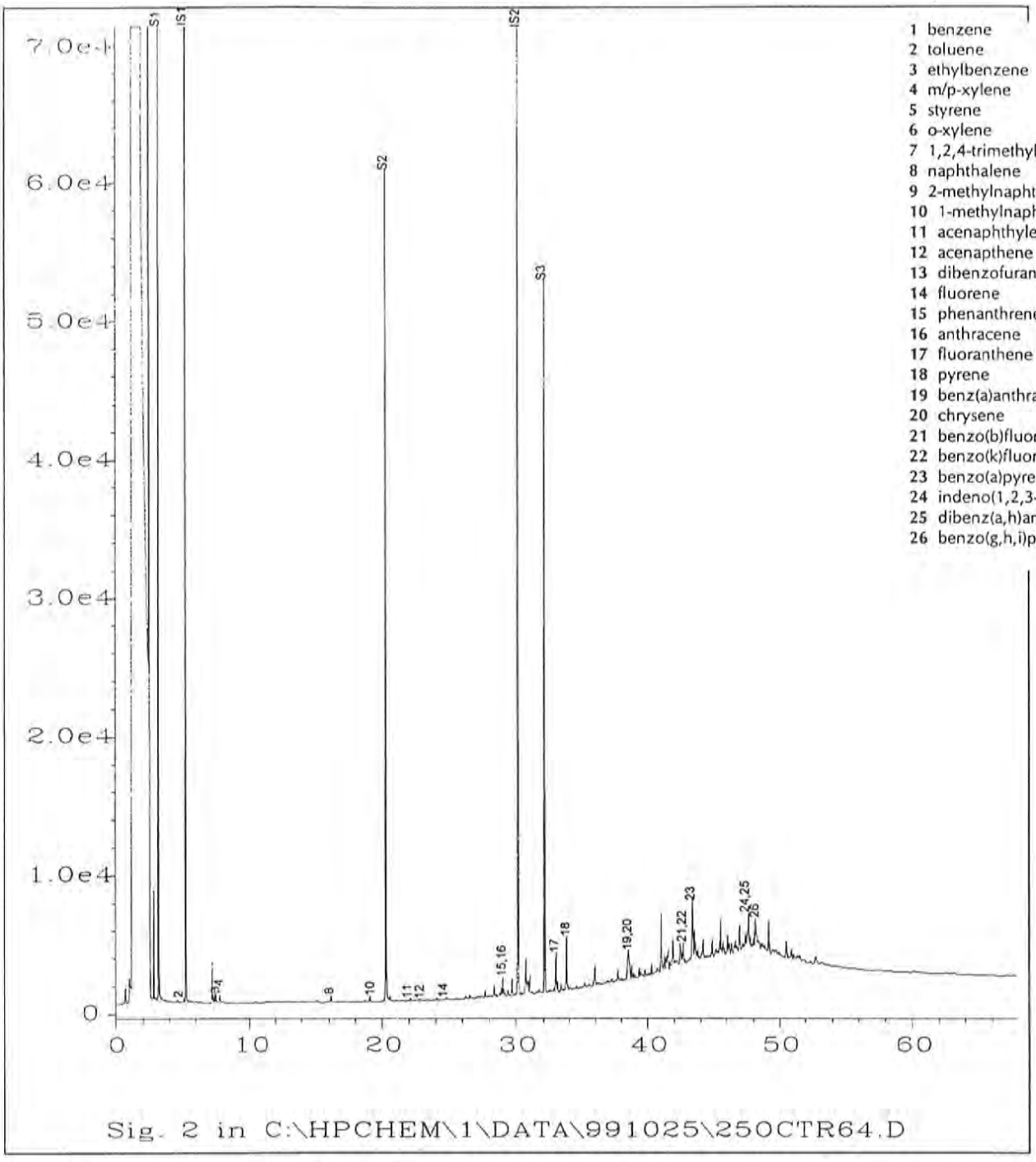


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-03**
Laboratory ID:	RP991021-06
Method:	MET4007D

META

GC/FID Fingerprint

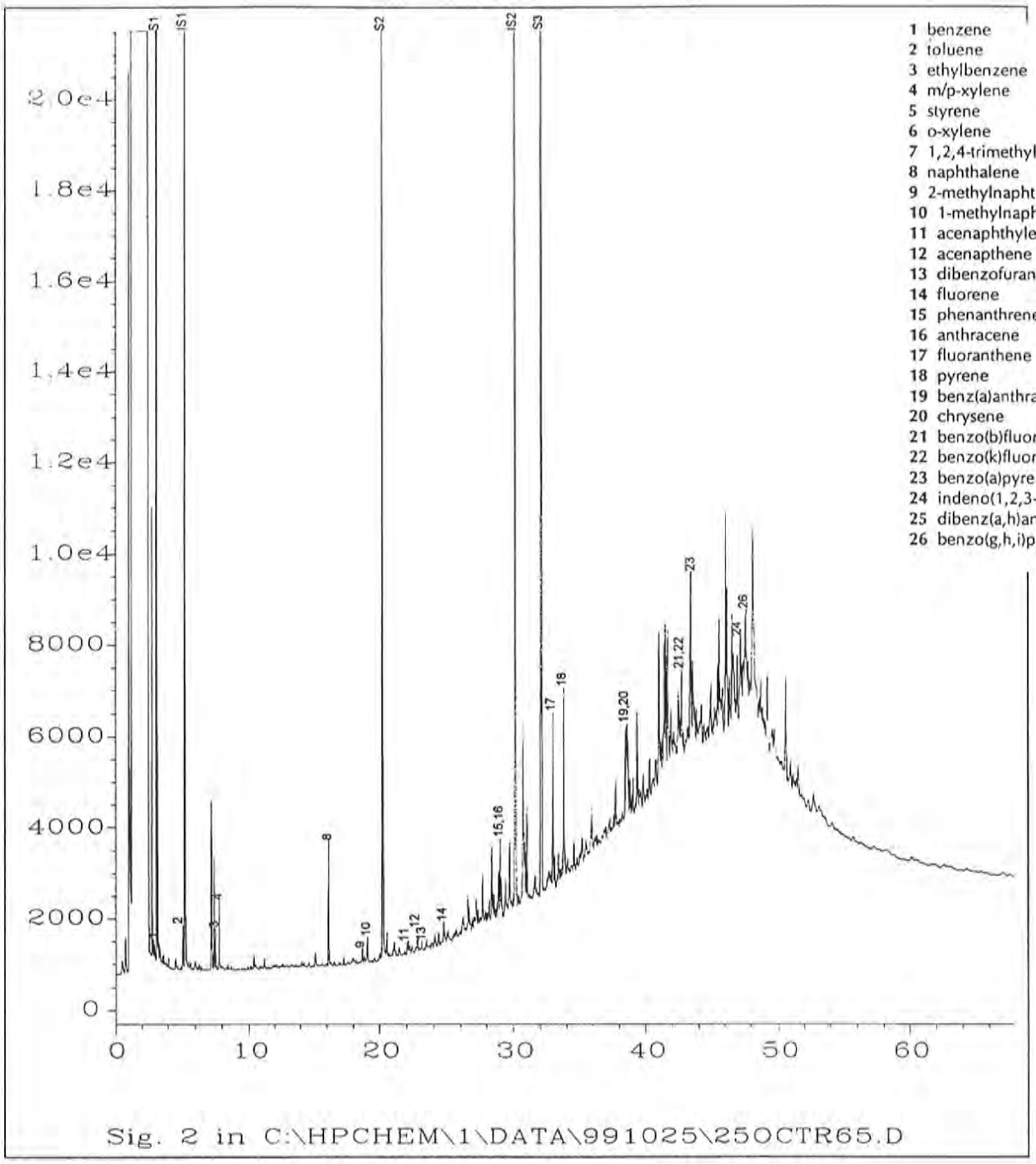


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-08**
Laboratory ID:	RP991021-10
Method:	MET4007D

META

GC/FID Fingerprint

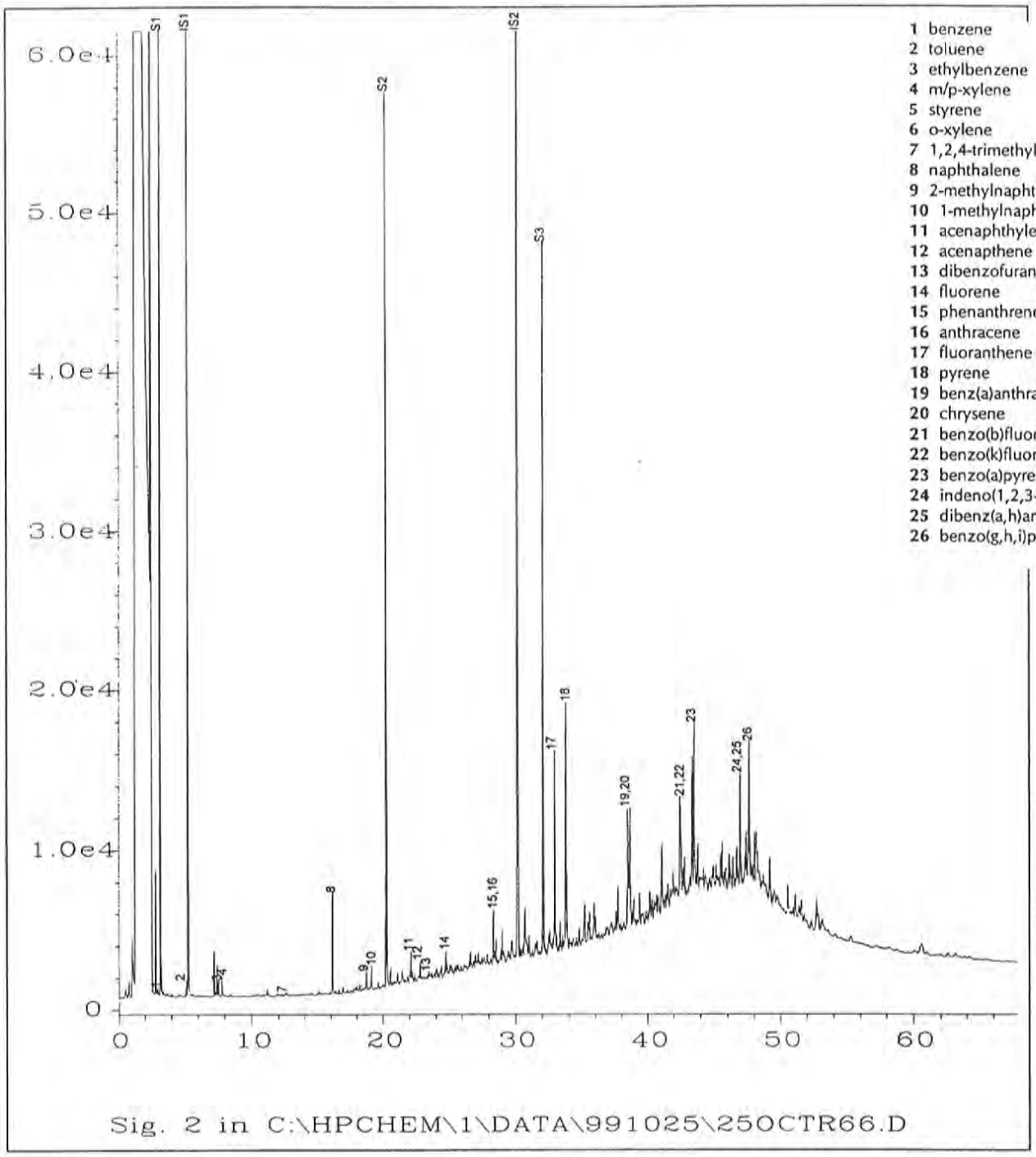


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-34**
Laboratory ID:	RP991021-15
Method:	MET4007D

META

GC/FID Fingerprint

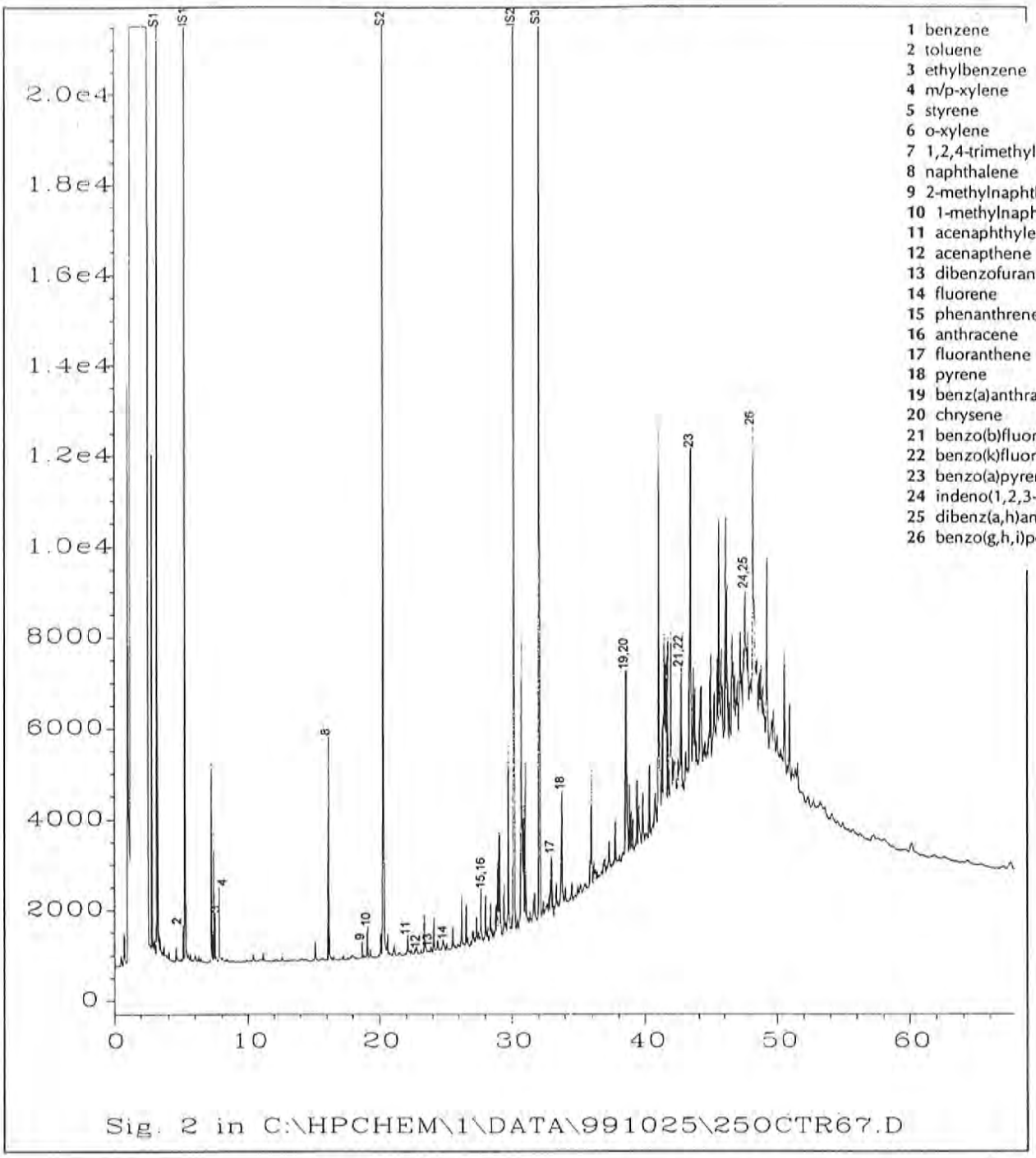


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-35**
Laboratory ID:	RP991021-16
Method:	MET4007D

META

GC/FID Fingerprint

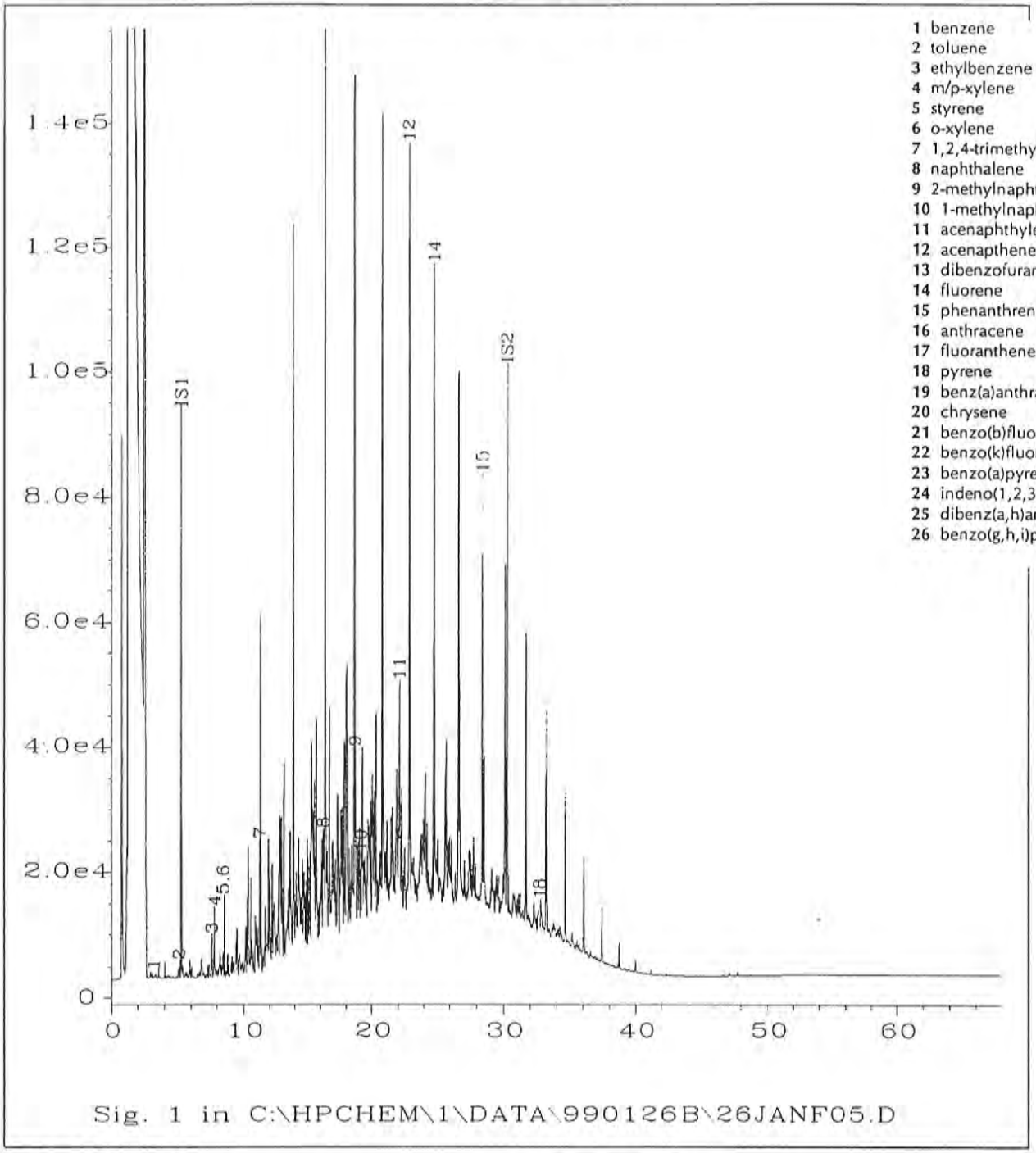


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-37**
Laboratory ID:	RP991021-17
Method:	MET4007D

META

GC/FID Fingerprint

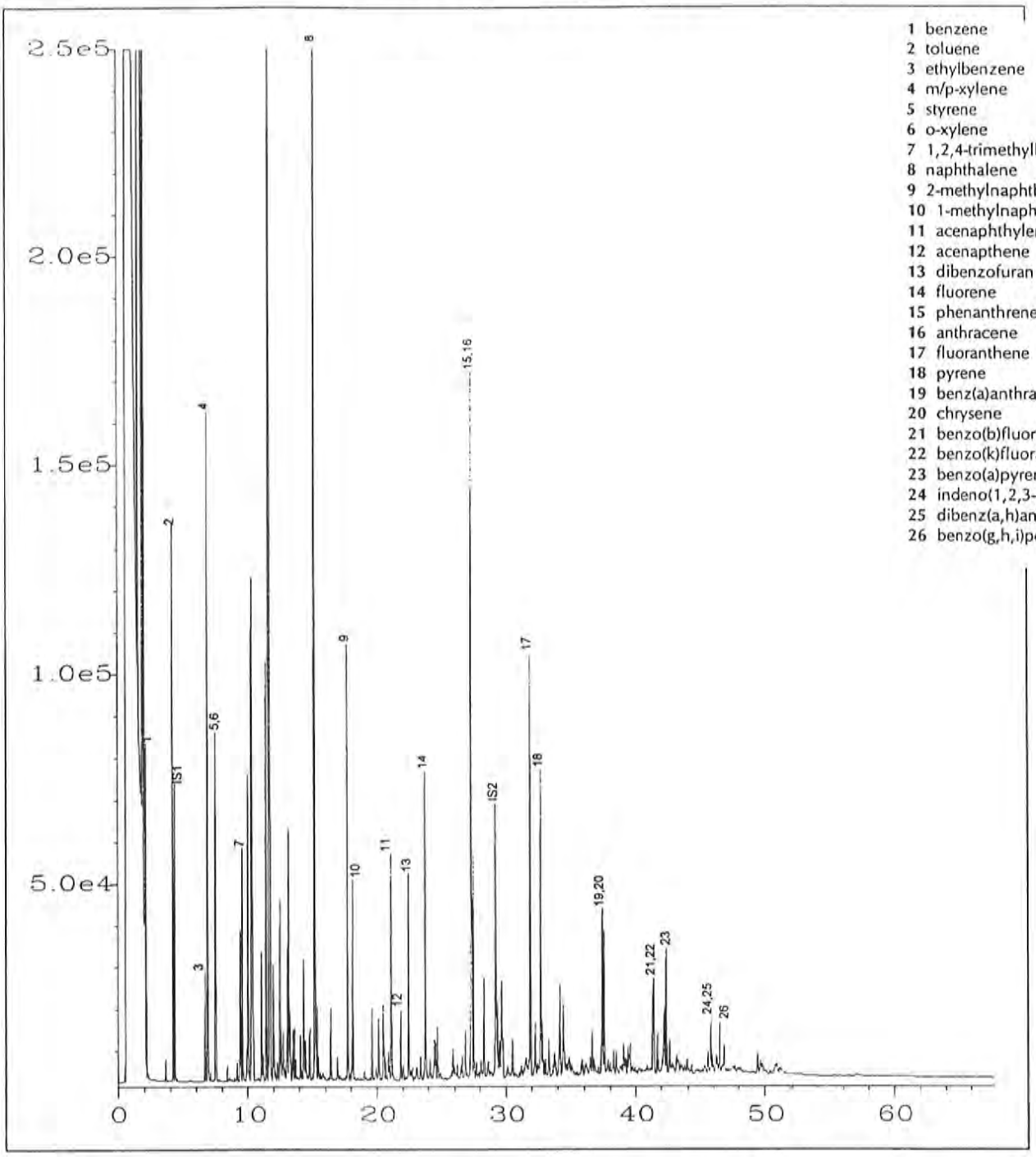


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - Fluorobenzene
S2 - 2-Fluorobiphenyl
S3 - 5a-Androstane

Field ID:	**Unweathered Diesel**
Laboratory ID:	SK990126-RS2
Method:	MET4007D

META

GC/FID Fingerprint



IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - Fluorobenzene
S2 - 2-Fluorobiphenyl
S3 - 5a-Androstane

Field ID:	**Coal Tar**
Laboratory ID:	T125
Method:	MET4007D

META

PROJ. NO.: 5-3434-230

PROJECT NAME: Gasworks Park

SAMPLERS: D. Kinney

RECEIVING LABORATORY: Meta

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Fingerprinting for Source ID	SEND RESULTS TO: / REMARKS
	2/17/98	1220	MLS-4-1-298	1	X	EL980224-01
						12°C upon receipt
						custody seals intact
						sample intact

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Dale Kinney	2/23/98 13:00	Fed Ex			

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		Sarah C. Watty	2/24/98 2:30

Shipper Information

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PROJ. NO.	PROJECT NAME
5-3434-210	GASWORKS PARK

SAMPLERS: D. BAKER, G. SEGA

RECEIVING LABORATORY: META

SEND RESULTS TO: D. BAKER, (RETEC) I. MURAKA

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	ANALYSIS TO BE DETERMINED *	REMARKS
	6/3	1515	MW-5-PRODUCT	1	RE980604-01	* ANALYSES PER
	"	1500	DW-4-PRODUCT	1	-02	ISHWAR MURAKA
				1	-03	

2°C upon receipt
Samples intact upon receipt SW

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	6/3/98 1645			6/4/98 10:00	Sarah C. Watty
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
			SW		

Shipper Information: VIA FED EX

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

SAMPLERS: JZ, YM, JH

RECEIVING LABORATORY: ARI

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Engy	REMARKS
	10/6/99	14:40	CR-01B	1	1	
	10/6/99	17:20	CR-5A	1	1	
	10/1/99	11:00	CR-8A	1	1	
	10/6/99	15:30	CR-10A	1	1	
	10/4/99	11:15	CR-13C (103)	1	1	Confirm with Dan Baker
	10/2/99	11:05	CR-14A	1	1	
	10/4/99	4:25	CR-18A	1	1	
	10/7/99	9:20	CR-19A	1	1	
	10/6/99	10:30	CR-21A	1	1	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
C Y A Z	10/14/99 4:30pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			10/15/99 10:30AM

Shipper Information

* samples in test @ 0.4°C

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PINK COPY - Sampler YELLOW COPY - Laboratory WHITE COPY - RefTeC

04403- | Gas Works Park

SAMPLERS: J. Zwiebel, J. Palmer

RECEIVING LABORATORY: META, Environmental, Inc.

Dan Baker

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Fingerp			REMARKS
	9/16/99	11:20	FP-3	1	1	RP 991021-01		RF 991021-03 12
	9/15/99	15:25	ST-19	1	1	RP 991021-02		16
	9/16/99	9:45	ST-35	1	1	-03		04
	9/14/99	14:50	ST-1	1	1	-04	Confirm with Dan Baker	17
	9/16/99	10:25	ST-37	1	1	-05		02 ~~03~~
	9/15/99	10:50	ST-4	1	1	-06		01
	9/16/99	9:10	FP-1	1	1	-07		08
	9/15/99	12:10	ST-7	1	1	-08		19
	9/16/99	15:50	ST-43	1	1	-09		11 ~~12~~
	9/15/99	12:35	ST-10	1	1	-10		

* Beware of Broken Glass *

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	10/20/99 8:30 pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			10/21/99 11:00 AM

Shipper Information

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PINK COPY - Sampler YELLOW COPY - Laboratory WHITE COPY - ReTeC

META ENVIRONMENTAL SAMPLE RECEIPT

Lab ID	Field ID	Matrix	Analysis	Date Sampled	Date Received	Client/ Project	Container/ Storage
RP991015-01	CR-01B	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-02	CR-5A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-03	CR-8A	Soil	2508/4007	10/01/99	10/15/99	RO1020-60	32 oz. jar
RP991015-04	CR-10A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-05	CR-13C (108)	Soil	2508/4007	10/04/99	10/15/99	RO1020-60	32 oz. jar
RP991015-06	CR-14A	Soil	2508/4007	10/02/99	10/15/99	RO1020-60	32 oz. jar
RP991015-07	CR-18A	Soil	2508/4007	10/04/99	10/15/99	RO1020-60	32 oz. jar
RP991015-08	CR-19A	Soil	2508/4007	10/07/99	10/15/99	RO1020-60	32 oz. jar
RP991015-09	CR-21A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar

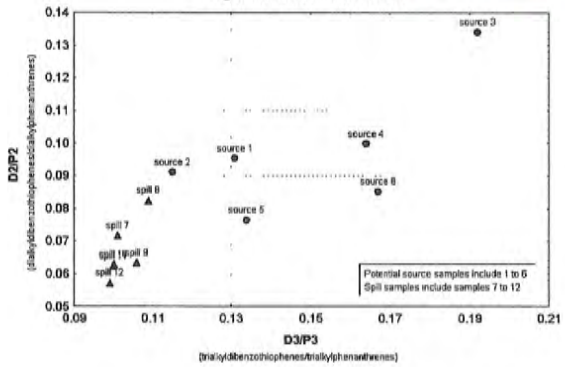
10/15/99

ATTACHMENT 2D-2
META 2001 Laboratory Report

Environmental Laboratory Report

Gas Works Park and Lake Union Sediments, Washington

Figure 1. Double Ratio Plot



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

Cover Page

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.

Date 1/10/01

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 this 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 ± 2℃ prior to analysis.

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 GC/IRMS analyses over the duration of the project was about 1 per mil. The precision of the internal standards and the native compounds was similar to that of the standard mixture.

References

1 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

2 Butler, E., Douglas, G., Steinhauer, W., Prince, R., Aczel, T., Hsu, C., Bronson, M., Clark, J., and Lindstrom, J., "Hopane, a New Chemical Tool for Measuring Oil Biodegradation," On-Site Bioreclamation, Butterworth-Heinemann, Stoneham, MA 1991.

3 Wang, Z., Fingas, M., and Li, K., "Fractionation of a Light Crude Oil and Identification and Quantitation of Aliphatic, Aromatic, and Biomarker Compounds by GC/FID and GC/MS, Parts 1 and 2", J. Chromatogr. Vol. 32: 361-382, 1994

4 Peters, K., and Moldowan, J., "The Biomarker Guide: Interpreting Molecular Fossils in Petroleum and Ancient Sediments", Prentice Hal, Englewood Cliffs, New Jersey, 1993

5 "Chemical Source Attribution at Former MGP Sites," EPRI Report 1000728, December 2000.

6 Hoefs, J., Stable Isotope Geochemistry. 4th edition, Springer-Verlag, Berlin, 1997.

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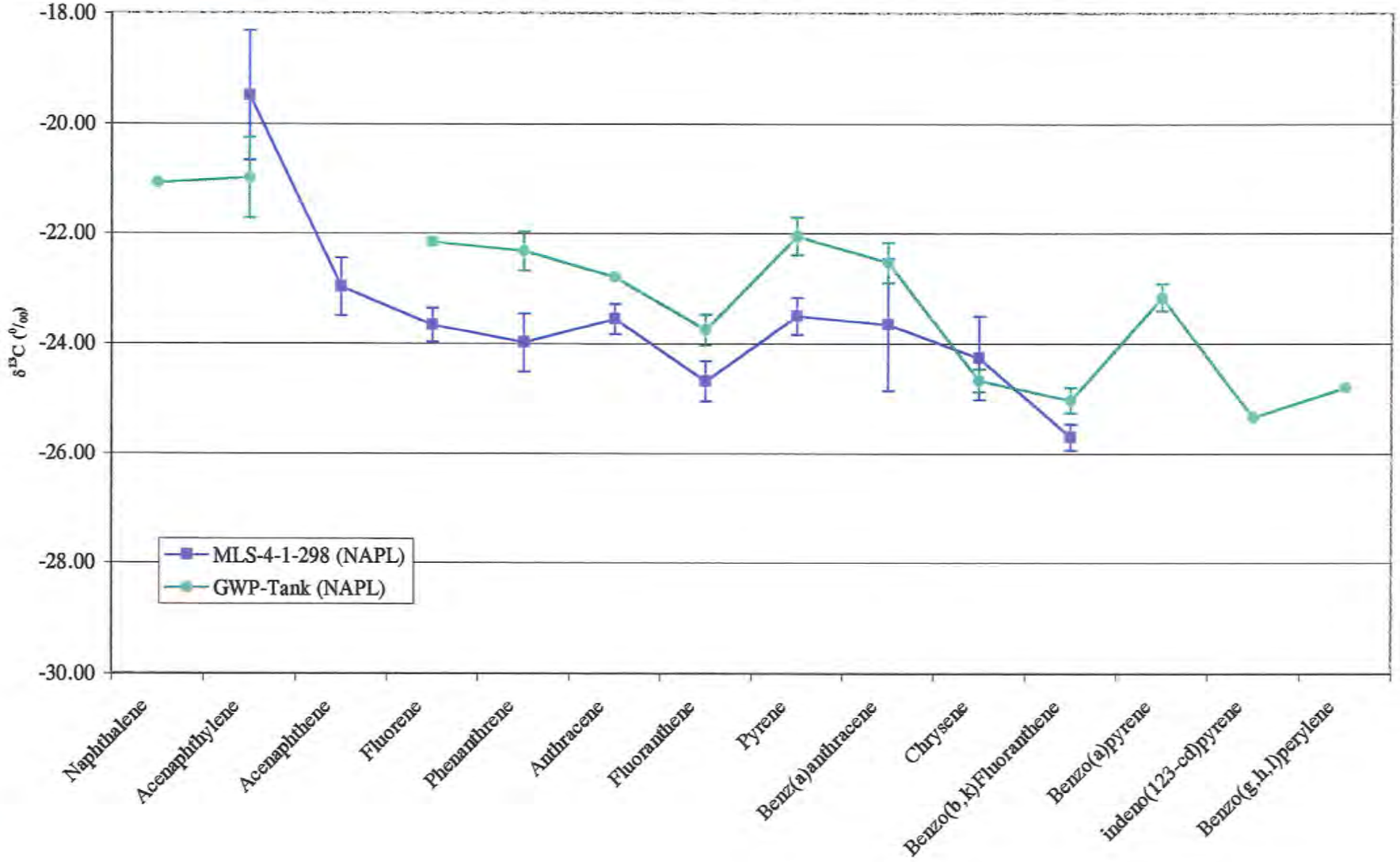
8 Hammer, B., Kelley, C., Coffin, R., Cifuentes, L., and Mueller, J., "$\delta^{13}C$ values of polycyclic aromatic hydrocarbons collected from two creosote-contaminated sites," Chemical Geology, vol. 152, 1998.

9 O'Malley, V., Burke, R., and Schlotzhauer, S., "Using GC-MS/Combustion/IRMS to determine the $^{13}C/^{12}C$ ratios of individual hydrocarbons produced from the combustion of biomass materials – application to biomass burning," Organic Geochemistry, vol. 27, no. 7/8, 1997.

10 O'Malley, V., Abrajano, T., and Hellou, J., "Stable Carbon Isotopic Apportionment of Individual Polycyclic Aromatic Hydrocarbons in St. John's Harbour, Newfoundland," Environmental Science and Technology, Vol. 30, 1996.

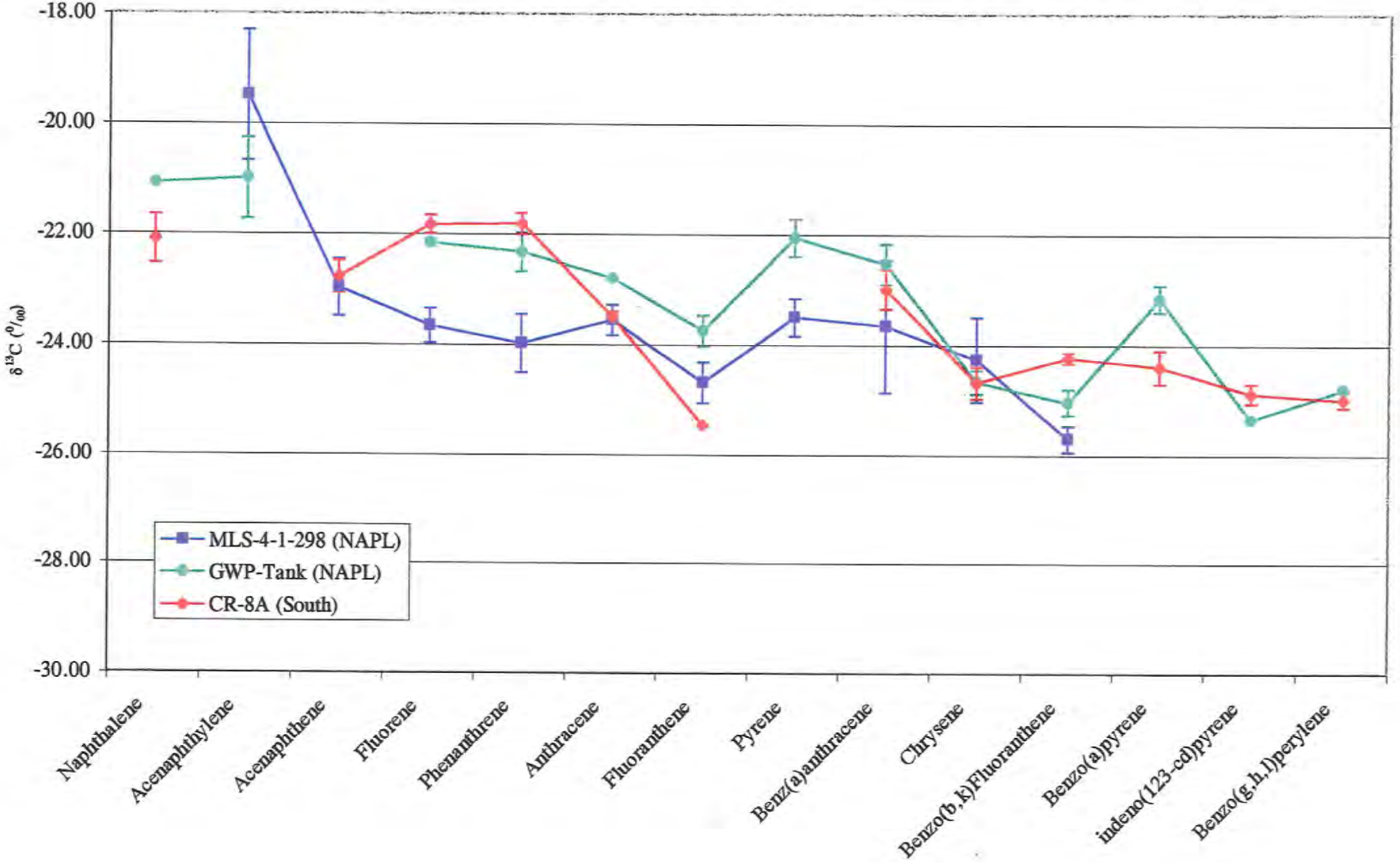
11 Philp, R., "Geochemistry in the Search for Oil," Chemical & Engineering News, American Chemical Society, February 10, 1986.

Figure 1.
Comparison of Stable Carbon Isotope Ratios for Potential Source Materials



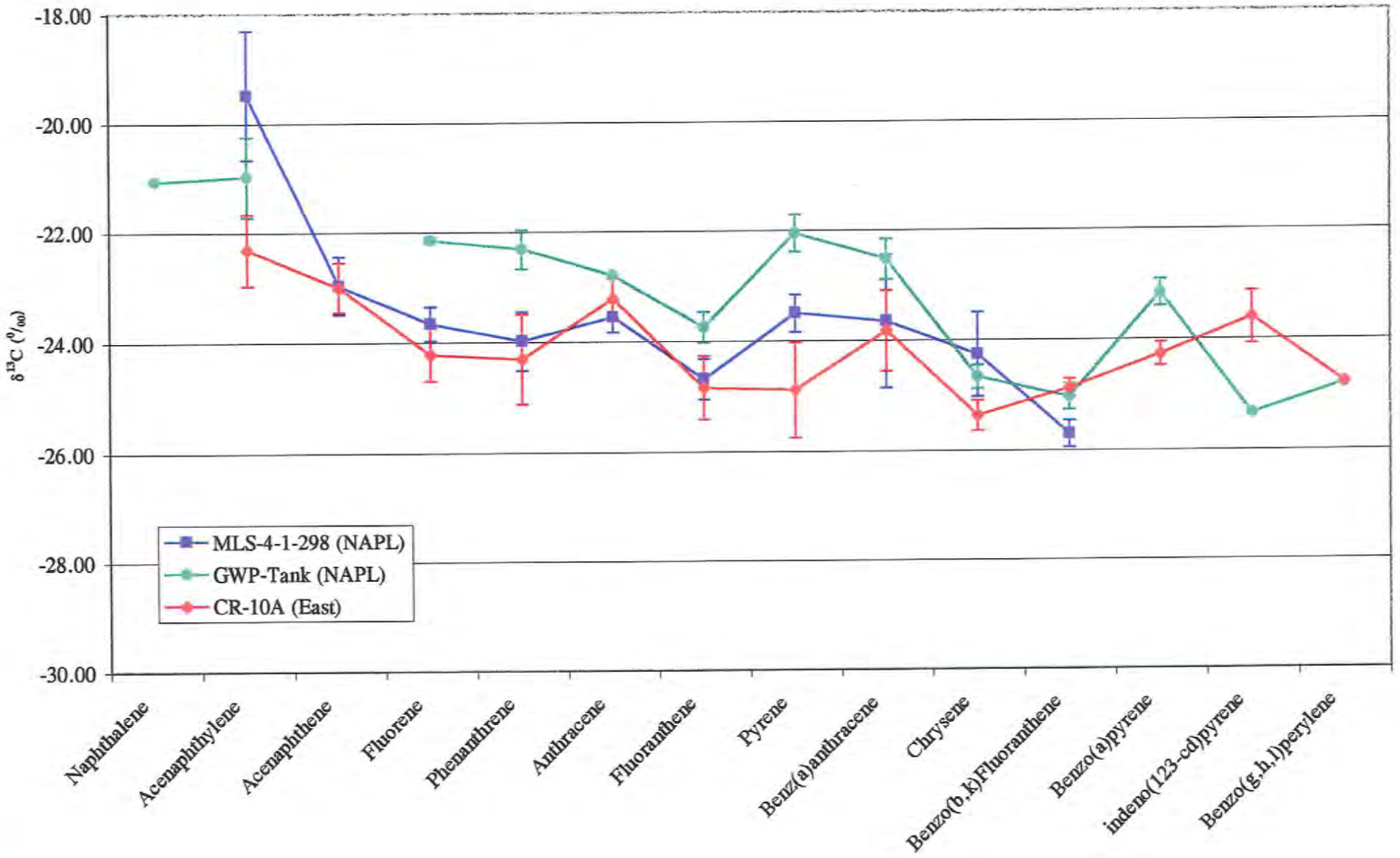
META

Figure 2.
Comparison of Site Sample CR-8A Stable Carbon Isotope Ratios with Potential Source Materials



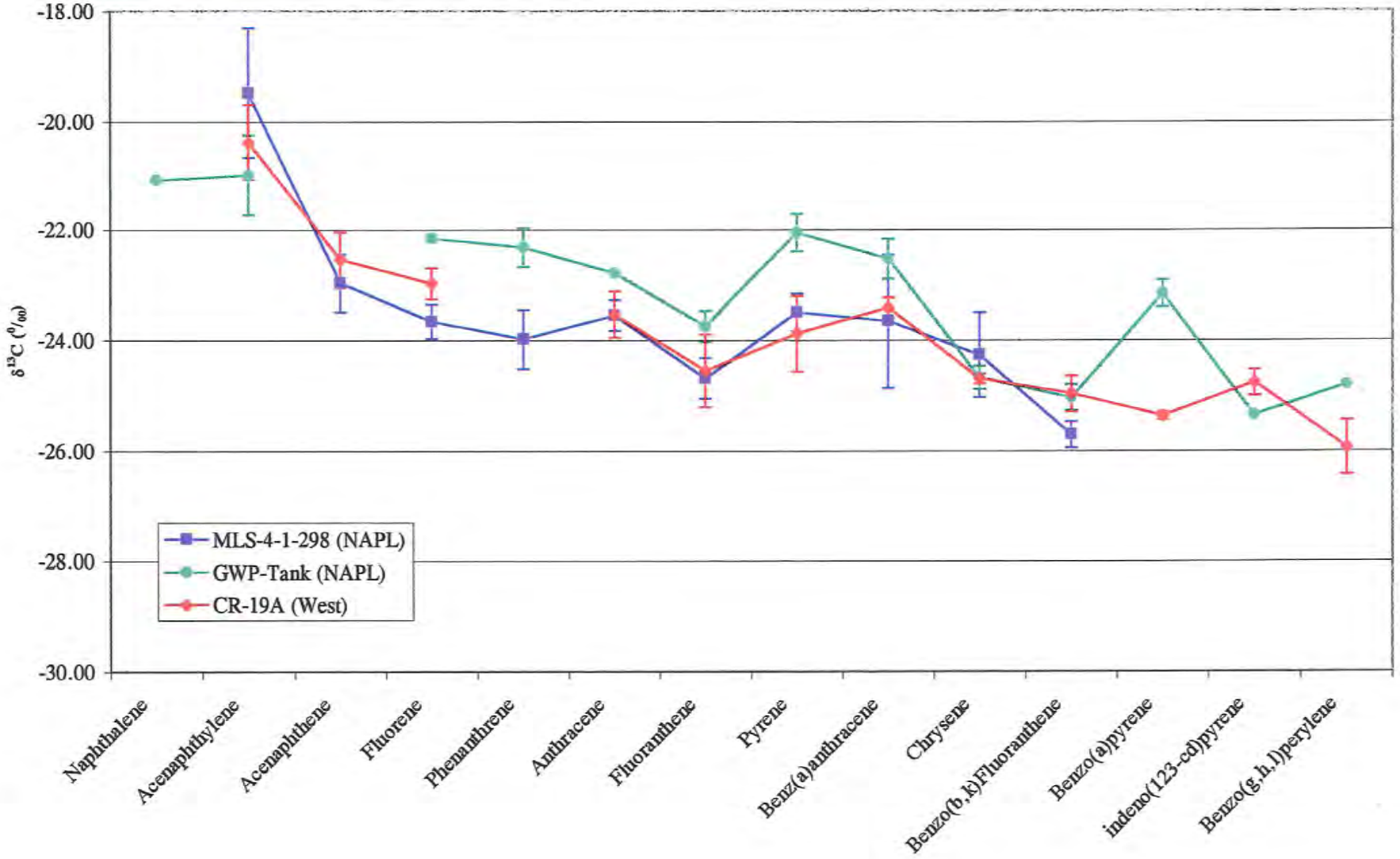
META

Figure 3.
Comparison of Site Sample CR-10A Stable Carbon Isotope Ratios with Potential Source Materials



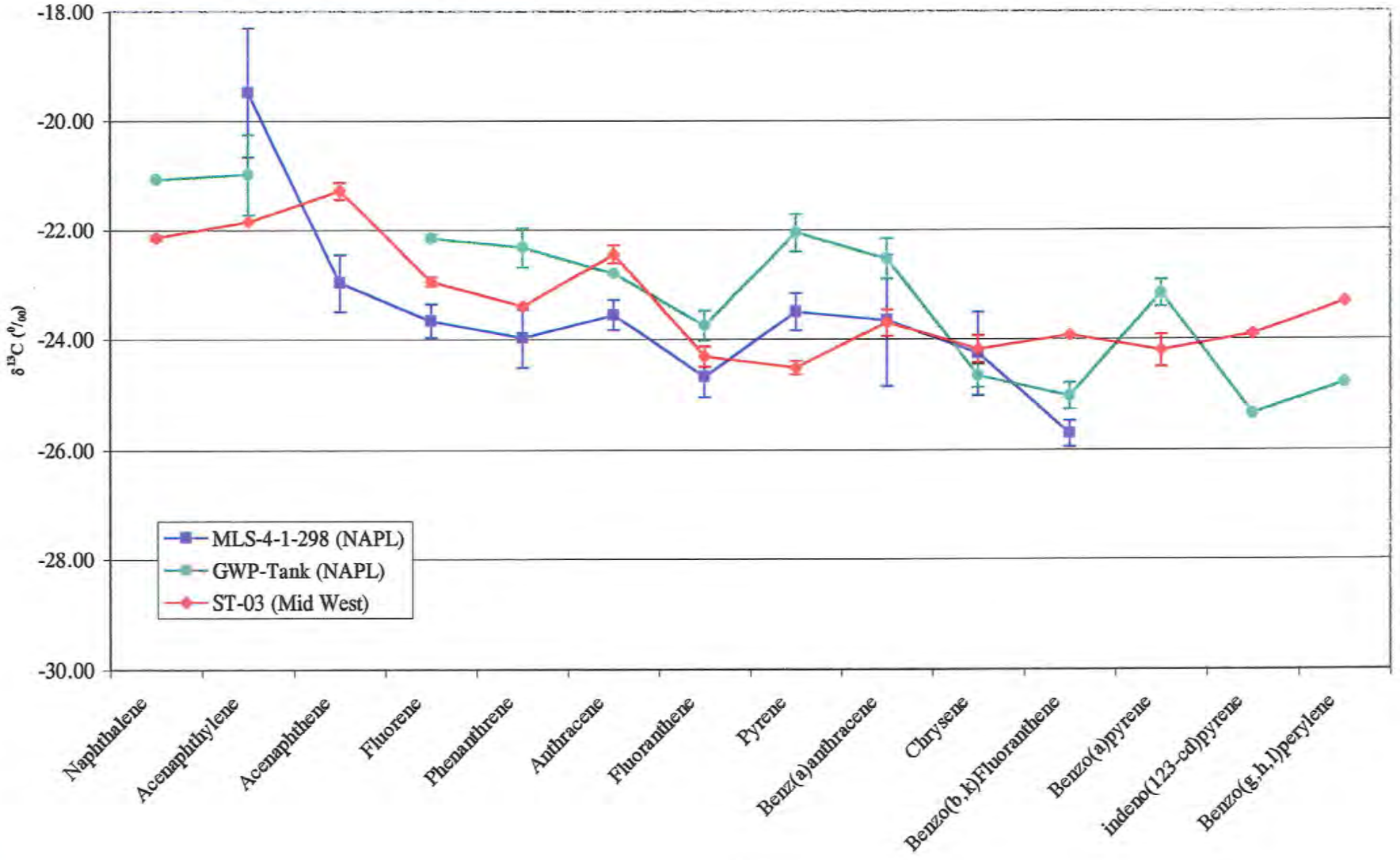
META

Figure 4.
Comparison of Site Sample CR-19A Stable Carbon Isotope Ratios with Potential Source Materials



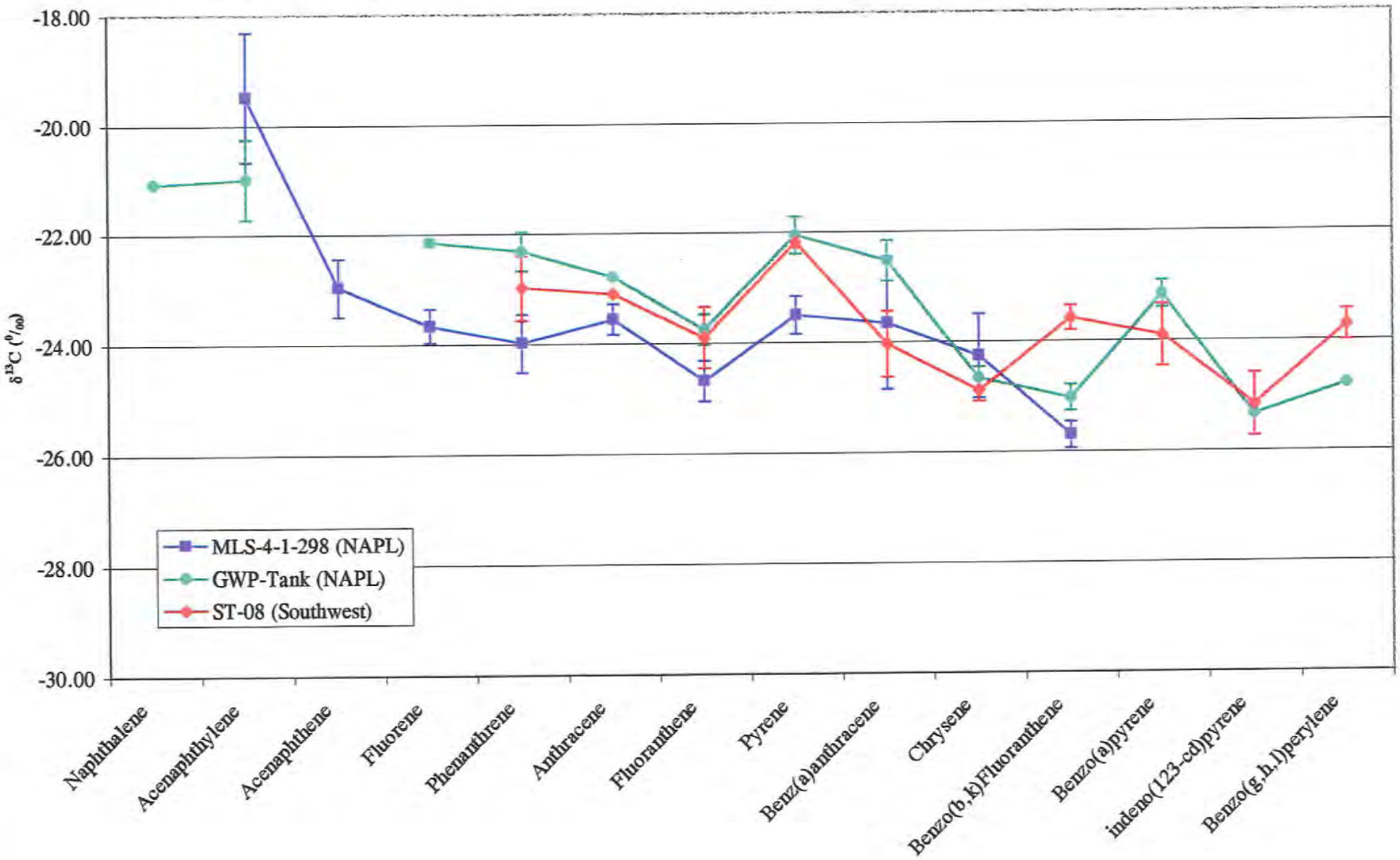
META

Figure 5.
Comparison of Site Sample ST-03 Stable Carbon Isotope Ratios with Potential Source Materials



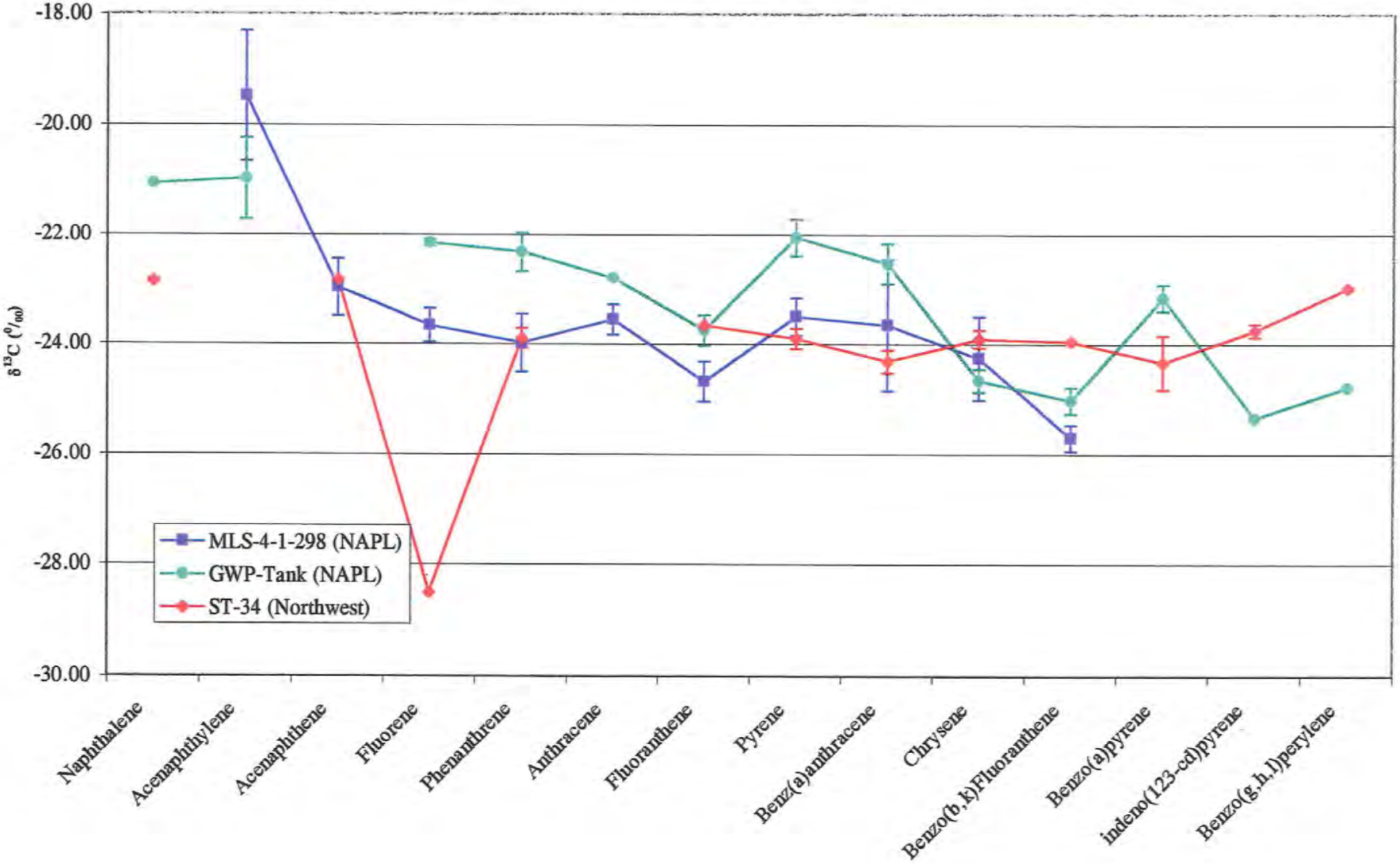
META

Figure 6.
Comparison of Site Sample ST-08 Stable Carbon Isotope Ratios with Potential Source Materials



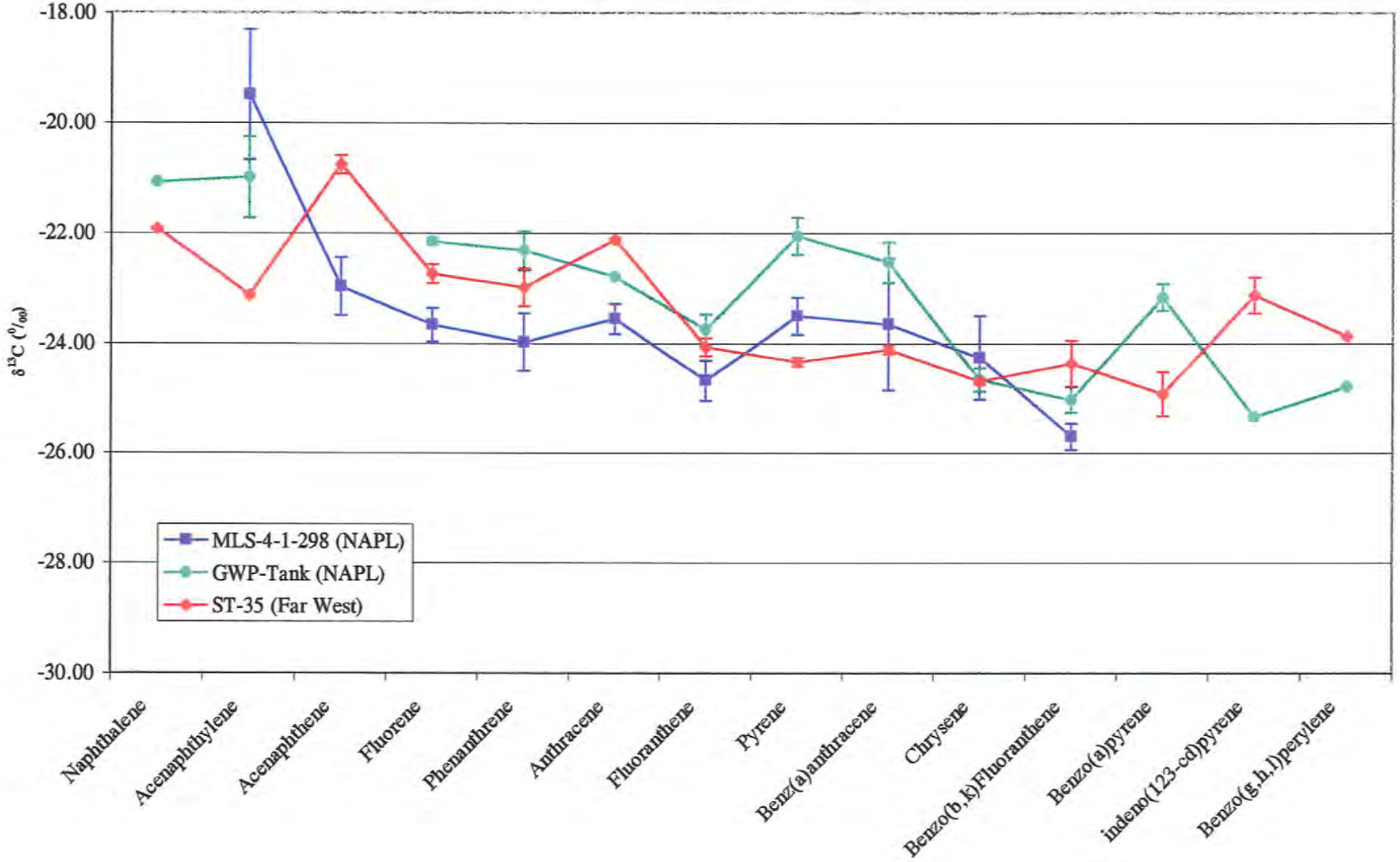
META

Figure 7.
Comparison of Site Sample ST-34 Stable Carbon Isotope Ratios with Potential Source Materials



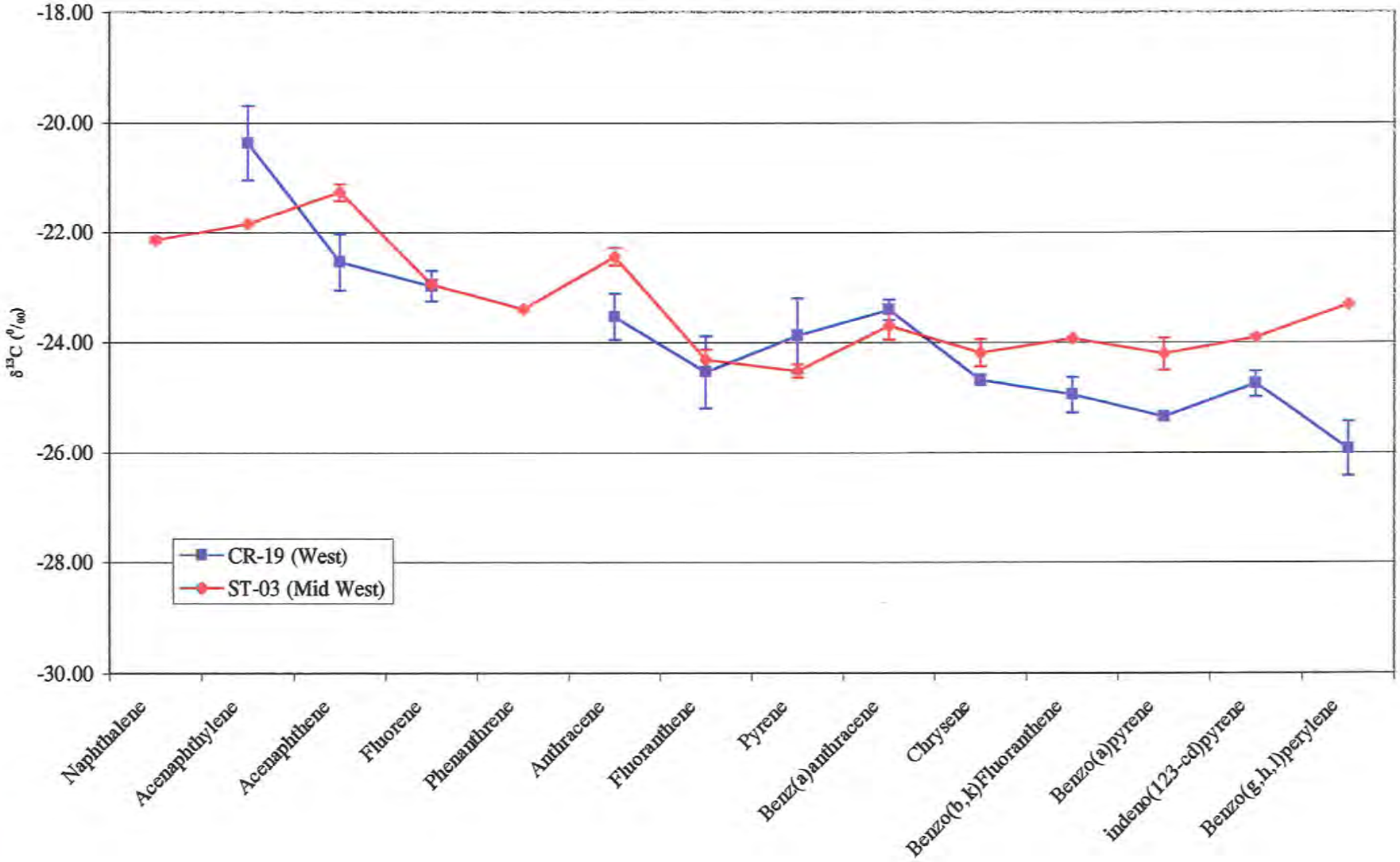
META

Figure 8.
Comparison of Site Sample ST-35 Stable Carbon Isotope Ratios with Potential Source Materials



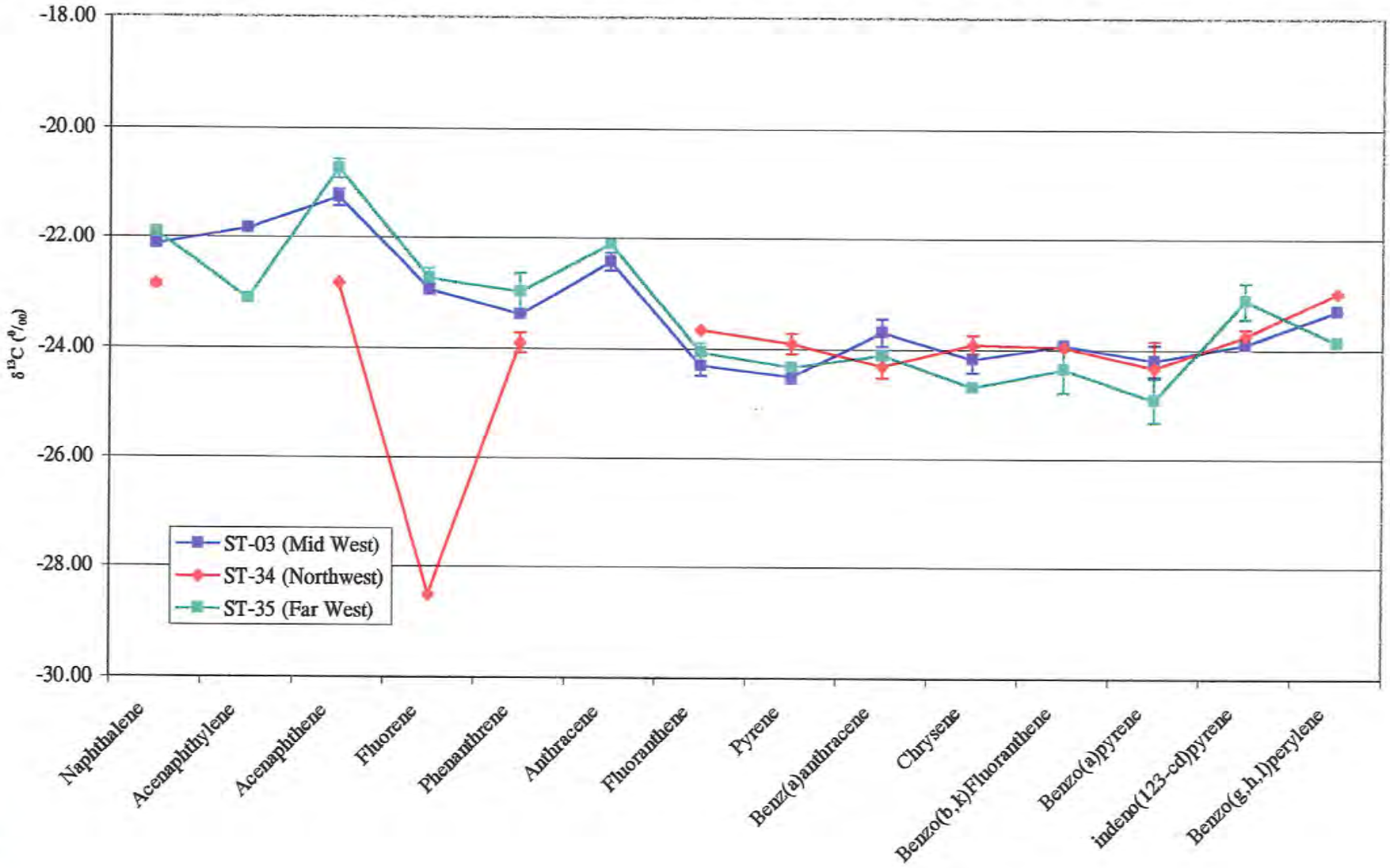
META

Figure 9.
Comparison of Stable Carbon Isotope Ratios for Site Samples CR-19 and ST-03



META

Figure 10.
Comparison of Stable Carbon Isotope Ratios for Site Samples ST-03, ST-34, and ST-35



META

Figure 11.
Comparison of Stable Carbon Isotope Ratios for Internal Standards

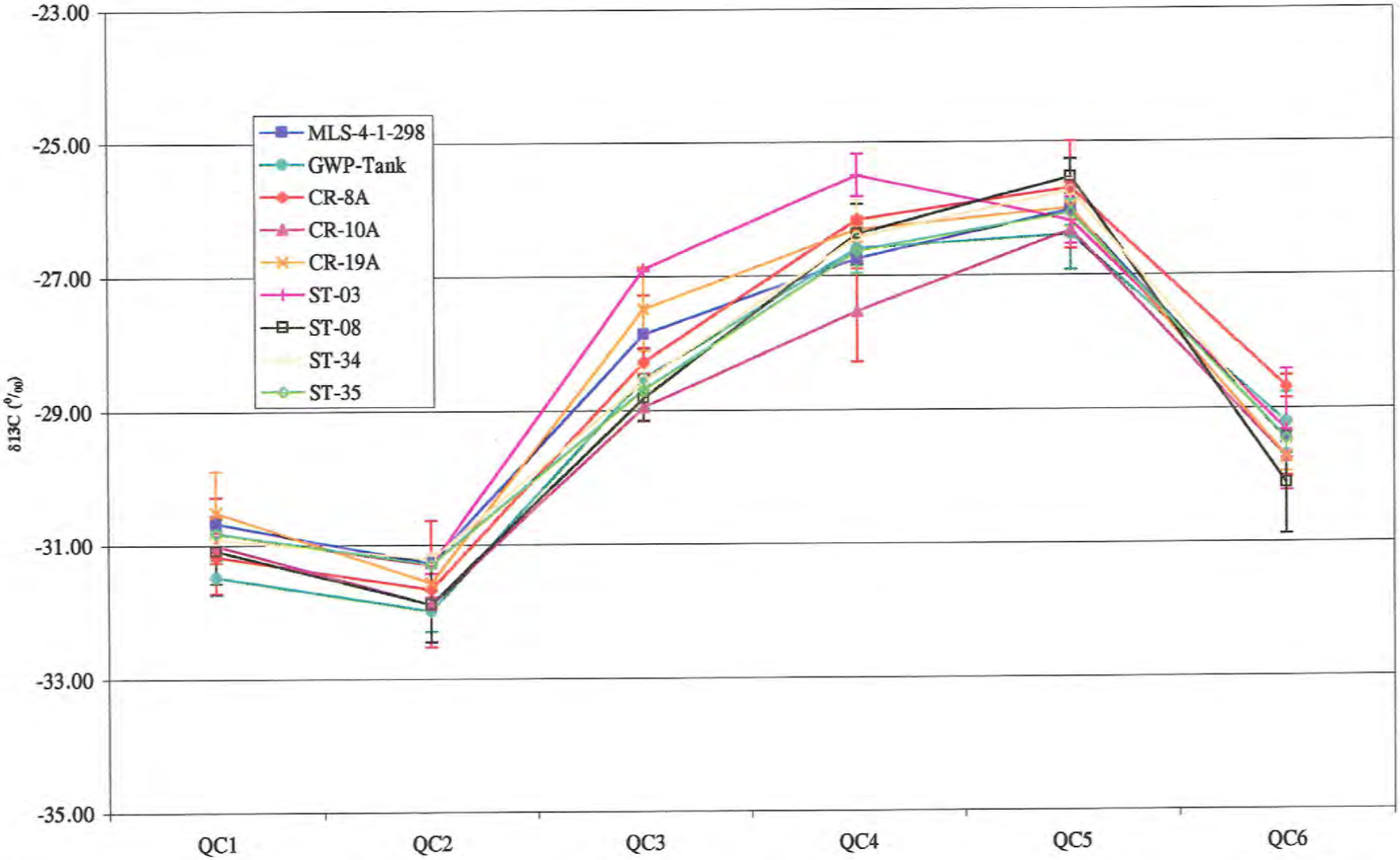
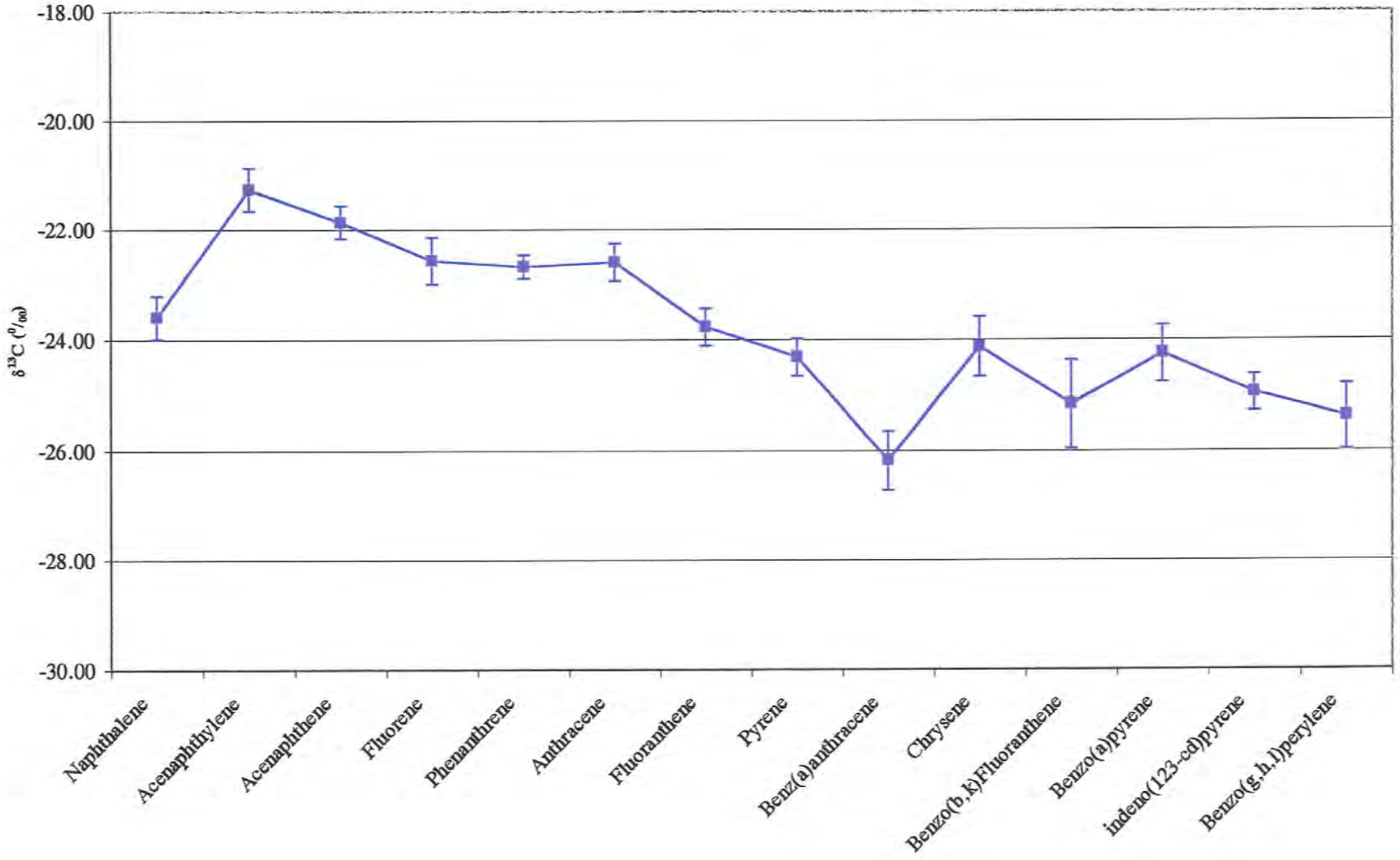


Figure 12.
Stable Carbon Isotope Ratios for PAH Standard



META

SUB-ATTACHMENT 2D-2.1
Chains of Custody

META ENVIRONMENTAL SAMPLE RECEIPT

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	RO1020-60	16 oz. jar
RP000124-02	CR-10A RP991015-04	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar
RP000124-03	CR-19A RP991015-08	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar
RP000124-04	ST-03 RP991021-06	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar
RP000124-05	ST-08 RP991021-10	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar
RP000124-06	ST-34 RP991021-15	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar
RP000124-07	ST-35 RP991021-16	Soil	8270/3009	01/24/00	N/A	RO1020-60	16 oz. jar

01/24/00

META ENVIRONMENTAL SAMPLE RECEIPT

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

SM 10/21/99

PROJ. NO. 6JRW1-04403-

PROJECT NAME: Gas Works Park

SAMPLERS: J Zwiebel, J. Palmer

RECEIVING LABORATORY: META, Environmental, Inc.

SEND RESULTS TO: Dan Baker

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Fingerprint			REMARKS	
	9/16/99	11:20	FP-3	1		1		RP 991021-01	RF 991021-03
	9/15/99	15:25	ST-19	1		1		RP 991021-02	12
	9/16/99	9:45	ST-35	1		1		-03	16
	9/14/99	14:50	ST-1	1		1		-04	04
	9/16/99	10:25	ST-37	1		1		-05	17
	9/15/99	10:50	ST-4	1		1		-06	07 ~~06~~
	9/16/99	9:10	FP-1	1		1		-07	01
	9/15/99	12:10	ST-7	1		1		-08	09
	9/16/99	15:50	ST-43	1		1		-09	19
	9/15/99	12:25	ST-10	1		1		-10	11 ~~08~~

Confirm with Dan Baker

* Beware of Broken Glass *

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	10/20/99 3:30 pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			10/21/99 11:00 am

Shipper Information

REMEDIATION TECHNOLOGIES INC

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PINK COPY - Sampler

YELLOW COPY - Laboratory

WHITE COPY - ReTeC

PROJECT NO: 04403-

PROJECT NAME: Gas Works Park

SAMPLERS: J. Zwiebel, J. Palmer

RECEIVING LABORATORY: META Environmental, Inc.

SEND RESULTS TO: Dan Baker

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Fingerprint	REMARKS
	9/16/99	9:30	ST-34	1	1	RP991021-11
	9/16/99	14:33	ST-42	1	1	-12
	9/15/99	15:40	ST-20	1	1	-13
	9/15/99	14:20	ST-3	1	1	-14
	9/15/99	11:55	ST-6	1	1	-15
	9/15/99	10:15	ST-2	1	1	-16
	9/16/99	1:20	FP-2	1	1	-17
	9/15/99	15:57	ST-21	1	1	-18
	9/15/99	13:50	ST-8	1	1	-19

RP991021-15 19 13 08 07 05 02 14 10

Confirm with Dan Baker

☆ Beware of broken glass ☆

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	10/20/99 3:30 pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		[signature]	10/21/99 11:30

Shipper Information

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PINK COPY - Sampler

YELLOW COPY - Laboratory

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PROJECT NAME

COMPANY META

ADDRESS 49 Clarendon Street, Watertown

PHONE (617) 923-4662

SAMPLED BY Dinsey Berhanu (Print Name) Dinsey Berhanu (Signature)

(Print Name) (Signature)

(Print Name) (Signature)

META Environmental, Inc.

ANALYSES

SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	CONTAINER SIZE	CONTAINER G P	GRAB	COMP	NO. OF CONTAINERS	SAMPLE MATRIX	PRESERVATIVE	PAH GC/LRMS
1	01/18	2000	RP000126 - FBDF	2ml	G				fractionation extracts	4°C	✓
2			" - FBSDF								✓
3			RP000124 - SBDF								✓
4			" - 01DF								✓
5			" - 02 DF								✓
6			" - 03 DF								✓
7			" - 04 DF								✓
8			" - 05 DF								✓
9			" - 06 DF								✓
10			" - 07 DF								✓
11			EL980224 - 01 DF								✓
12			RE980604 - 03 DF								✓

Do Not Analyze - Blank Samples

COMM

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Dinsey Berhanu	1/27/00				
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received for Laboratory by

Method of Shipment:

Remarks:

Report data to Stephen Emsbo-Mattingly (META)

$500 / sample Due 3/1/00

SUB-ATTACHMENT 2D-2.2
Chemical Concentrations Biomarkers

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

lient: ThermoRetec
roject: Gas Works Park

ield ID:	CR-8A	CR-10A	CR-19A	ST-03
ab ID:	RP000124-01PF	RP000124-02PF	RP000124-03PF	RP000124-04PF
ile ID:	02FEB04.D	02FEB05.D	02FEB06.D	02FEB07.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%
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
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
nalyte				
ecane	0.218 J	0.634 J	0.023 J	0.085 J
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 J	0.862 J	0.036 J	0.161 J
20 - Tricyclic terpane	0.479	1.698	0.446	U
21 - Tricyclic terpane	0.522	2.962	0.033 J	0.280
22 - Tricyclic terpane	0.743	5.345	0.030 J	0.463
23 - Tricyclic terpane	1.589	13.345	0.069 J	1.306
24 - Tricyclic terpane	1.126	8.581	0.035 J	0.897
25 - Tricyclic terpane	1.303	11.342	0.068 J	1.009
26 - Tricyclic terpane	1.227	9.881	0.045 J	0.824
27 - Tetracyclic terpane	0.848	6.679	0.043 J	0.421
'27 - Tetracyclic terpane	0.823	6.688	0.019 J	0.370
'28 - Tetracyclic terpane	0.833	5.384	0.062 J	0.434
'28 - Tetracyclic terpane	0.890	5.431	0.032 J	0.403
8a(H),21b(H)-22,29,30-trisnorhopane(Ts	1.575	9.251	0.048 J	1.172
7a(H),18a(H),21a(H)-25,28,30-trisnorho	0.571	4.248	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 J	0.756 J	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	3.553
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	U	0.303
2S-17a(H),21b(H)-30,31-bishomohopane	1.737	3.854	0.093	1.666
2R-17a(H),21b(H)-30,31-bishomohopane	0.734	3.096	0.045 J	0.650
2S-17a(H),21b(H)-30,31,32-trishomohopa	0.734	3.808	0.049 J	0.906
2R-17a(H),21b(H)-30,31,32-trishomohopa	0.643	3.296	U	0.490

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

lient: ThermoRetec
roject: Gas Works Park

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

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

lient: ThermoRetec
roject: Gas Works Park

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%
ımple Size:	22.255	20.448	23.761	0.0052
xtract 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
nalyte				
ecane	0.076 J	0.115 J	0.135 J	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
istane	0.771	2.170	2.499	U
ıytane	0.690	2.805	2.141	U
19 - Tricyclic terpane	0.121 J	0.202 J	0.173 J	U
20 - Tricyclic terpane	U	U	0.119 J	U
21 - Tricyclic terpane	0.197 J	0.330	0.400	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	U
28 - Tetracyclic terpane	0.295	0.452	0.446	U
3a(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 J	0.290	0.356	U
7a(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 J	0.200 J	0.181 J	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 J	0.483	0.411	U
7a(H),21b(H)-hopane	2.392	3.831	3.574	U
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 J	0.322	0.328	U
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	0.516	0.840	0.725	U
2R-17a(H),21b(H)-30,31,32-trishomohopa	0.319	0.375	0.434	U

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

lient: ThermoRetec
roject: Gas Works Park

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	U	0.203 J	0.180 J	U
28 20S-5a(H),14a(H),17a(H)-ergostane	0.355	0.567	0.520	U
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	U
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

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

lient: ThermoRetec
oject: Gas Works Park

eld ID:	MLS-4-1-298
ab ID:	EL980224-01PF
le ID:	11APR07.D
atrix:	Soil/Sediment
ate Received:	10/15/1999
ate Prepared:	1/24/2000
ate Cleanup:	4/3/2000
ate Analyzed:	4/11/2000
Solid:	100%
mple Size:	0.0058
xtract Volume:	1.0
nalysis DF:	1.0
eparation Method:	EPA3580
leanup Method:	EPA 3630 mod.
nalysis Method:	PA 8260/8270 mod.
L	Varies
nits	mg/kg

nalyte		
ecane	605.978	
eptadecane	725.736	
ctadecane	632.805	
icosane	417.458	J
riacontane		U
4,10-Trimethyldodecane (Farnesane)	685.359	
4,10-Trimethyltridecane	793.646	
orpristane	510.068	
ristane	889.394	
ytane	380.222	
19 - Tricyclic terpane	3.211	J
20 - Tricyclic terpane	6.250	J
21 - Tricyclic terpane	6.136	J
22 - Tricyclic terpane		U
23 - Tricyclic terpane	9.024	J
24 - Tricyclic terpane	6.060	J
25 - Tricyclic terpane	6.459	J
26 - Tricyclic terpane	3.040	J
27 - Tetracyclic terpane	5.851	J
27 - Tetracyclic terpane	6.136	J
28 - Tetracyclic terpane	5.015	J
28 - Tetracyclic terpane	5.281	J
8a(H),21b(H)-22,29,30-trisnorhopane(Ts	3.781	J
7a(H),18a(H),21a(H)-25,28,30-trisnorho	4.122	J
7a(H),21b(H)-22,29,30-trisnorhopane(Tm	11.665	J
7a(H),18a(H),21b(H)-28,30-bisnorhopane	1.976	J
7b(H),21a(H)-30-norhopane(Normoretane)	21.999	
8a(H),21b(H)-30norneohopane	3.667	J
7a(H),21b(H)-30-norhopane	7.162	J
7a(H),21b(H)-hopane	40.275	
7b(H),21a(H)-hopane(Moretane)	8.454	J
2S-17a(H),21b(H)-30-homohopane	9.442	J
2R-17a(H),21b(H)-30-homohopane	8.986	J
7b(H),21b(H)-hopane (Hopane)		U
2S-17a(H),21b(H)-30,31-bishomohopane	5.224	J
2R-17a(H),21b(H)-30,31-bishomohopane	5.642	J
2S-17a(H),21b(H)-30,31,32-trishomohopa	4.331	J
2R-17a(H),21b(H)-30,31,32-trishomohopa		U

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

2S-17a(H),21b(H)-30,31,32,33-tetrakish	U
20 5a(H),14a(H),17a(H)-sterane	3.382 J
21 5a(H),14b(H),17b(H)-sterane	6.630 J
22 5a(H),14b(H),17b(H)-sterane	2.812 J
27 20S-13b(H),17a(H)-diasterane	4.046 J
27 20R-13b(H),17a(H)-diasterane	2.337 J
27 20S-13a(H),17b(H)-diasterane	2.261 J
27 20R-13a(H),17b(H)-diasterane	5.433 J
28 20S-13b(H),17a(H)-diasterane	2.109 J
27 20S-5a(H),14a(H),17a(H)-cholestane	9.195 J
27 20R-5a(H),14b(H),17b(H)-cholestane	2.109 J
27 20S-5a(H),14b(H),17b(H)-cholestane	3.952 J
27 20R-5a(H),14a(H),17a(H)-cholestane	13.184 J
29 20S-13b(H),17a(H)-diasterane	U
28 20S-5a(H),14a(H),17a(H)-ergostane	5.927 J
28 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
29 20S-5a(H),14a(H),17a(H)-stigmastane	4.274 J
29 20R-5a(H),14b(H),17b(H)-stigmastane	U
29 20S-5a(H),14b(H),17b(H)-stigmastane	U
29 20R-5a(H),14a(H),17a(H)-stigmastane	8.891 J

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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

		Field ID →		CR-8A		
		Run # →	8212	8230	Ave.	Stdev.
		Lab ID →		RP000124-01DF		
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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

	Field ID →			CR-10A		
	Run # →	8104	8213	8231	Ave.	Stdev.
	Lab ID →			RP000124-02DF		
1545	Naphthalene					
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	
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	Internal 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
C24D	Internal Std. # 5	-26.6	-26.33	-26.05	-26.33	0.28
C32D	Internal Std. # 6	-29.45	-29.74	-30.01	-29.73	0.28

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

	Field ID →			CR-19A		
	Run # →	8090	8218	8233	Ave.	Stdev.
	Lab ID →			RP000124-03DF		
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	Internal Std. # 2	-31.17	-31.73	-31.82	-31.57	0.35
C16D	Internal Std. # 3	-26.76	-27.83	-27.85	-27.48	0.62
C19D	Internal Std. # 4	-26.38	-26.1	-26.45	-26.31	0.19
C24D	Internal Std. # 5	-25.8	-26.32	-25.87	-26.00	0.28
C32D	Internal Std. # 6	-29.68	-29.54	-29.97	-29.73	0.22

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

		Field ID →	ST-03			
		Run # →	8219	8234	Ave.	Stdev.
		Lab ID →		RP000124-04DF		
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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

	Field ID →			ST-08		
	Run # →	8095	8220	8235	Ave.	Stdev.
	Lab ID →			RP000124-05DF		
1545	Naphthalene					
2142	Acenaphthylene					
2213	Acenaphthene					
2406	Fluorene					
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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

		Field ID →		ST-34		
		Run # →	8222	8236	Ave.	Stdev.
		Lab ID →		RP000124-06DF		
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
C9D	Internal Std. # 1		-30.99	-30.83	-23.10	0.11
C10D	Internal Std. # 2		-31.29	-31.15	-23.44	0.10
C16D	Internal Std. # 3		-28.4	-28.71	-21.39	0.22
C19D	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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

	Field ID →		ST-35		
	Run # →	8223	8237	Ave.	Stdev.
	Lab ID →		RP000124-07DF		
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
C10D	Internal Std. # 2	-31.29	-31.31	-31.30	0.01
C16D	Internal Std. # 3	-28.75	-28.63	-28.69	0.08
C19D	Internal Std. # 4	-26.39	-26.87	-26.63	0.34
C24D	Internal Std. # 5	-25.94	-26.21	-26.08	0.19
C32D	Internal Std. # 6	-29.3	-29.63	-29.47	0.23

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

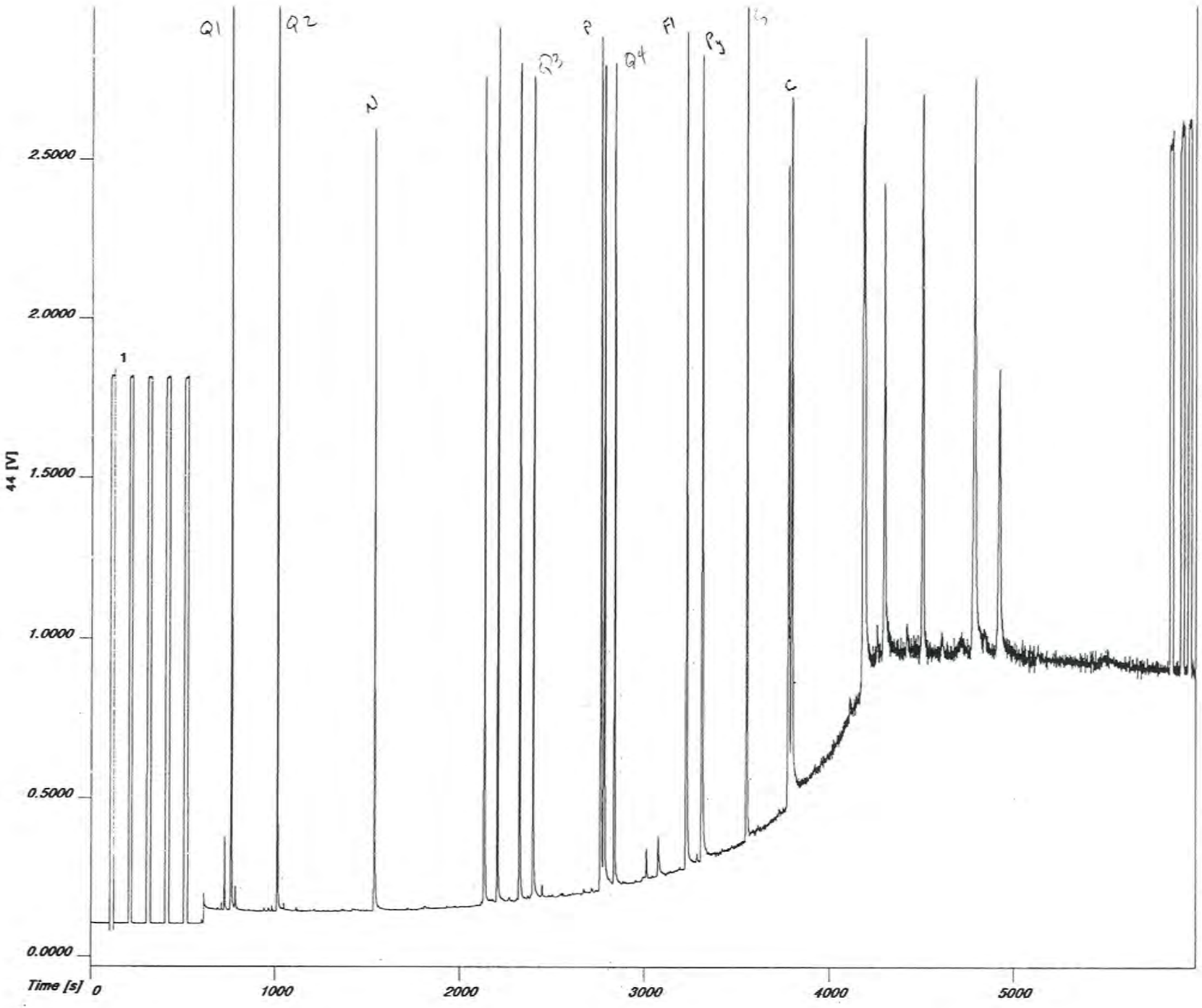
Client: ThermoRetec
Project: Gas Works Park

		Field ID →		GWP-Tank		
		Run # →	8214	8232	Ave.	Stdev.
		Lab ID →		RE980604-03DF		
1545	Naphthalene			-21.08	-21.1	
2142	Acenaphthylene		-21.51	-20.47	-21.0	0.7
2213	Acenaphthene					
2406	Fluorene		-22.11	-22.2	-22.2	0.1
2772	Phenanthrene		-22.07	-22.57	-22.3	0.4
2790	Anthracene		-22.8		-22.8	
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	
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

Analytical results for GC/IRMS of selected PAHs
META Environmental, Inc.

Client: ThermoRetec
Project: Gas Works Park

	Field ID →		MLS-4-1-298		
	Run # →	8211	8228	Ave.	Stdev.
	Lab ID →		EL980224-01DF		
1545	Naphthalene				
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				
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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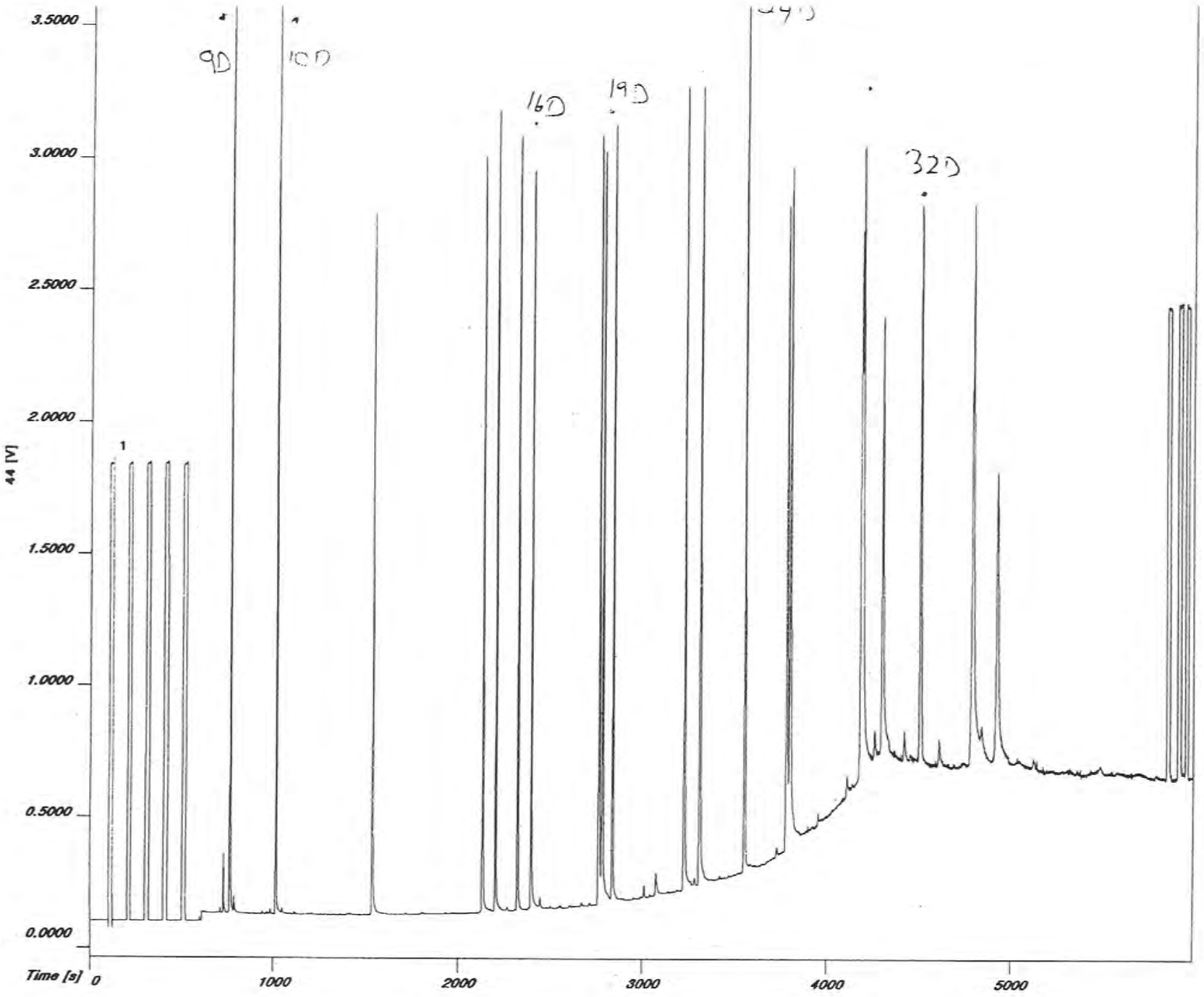
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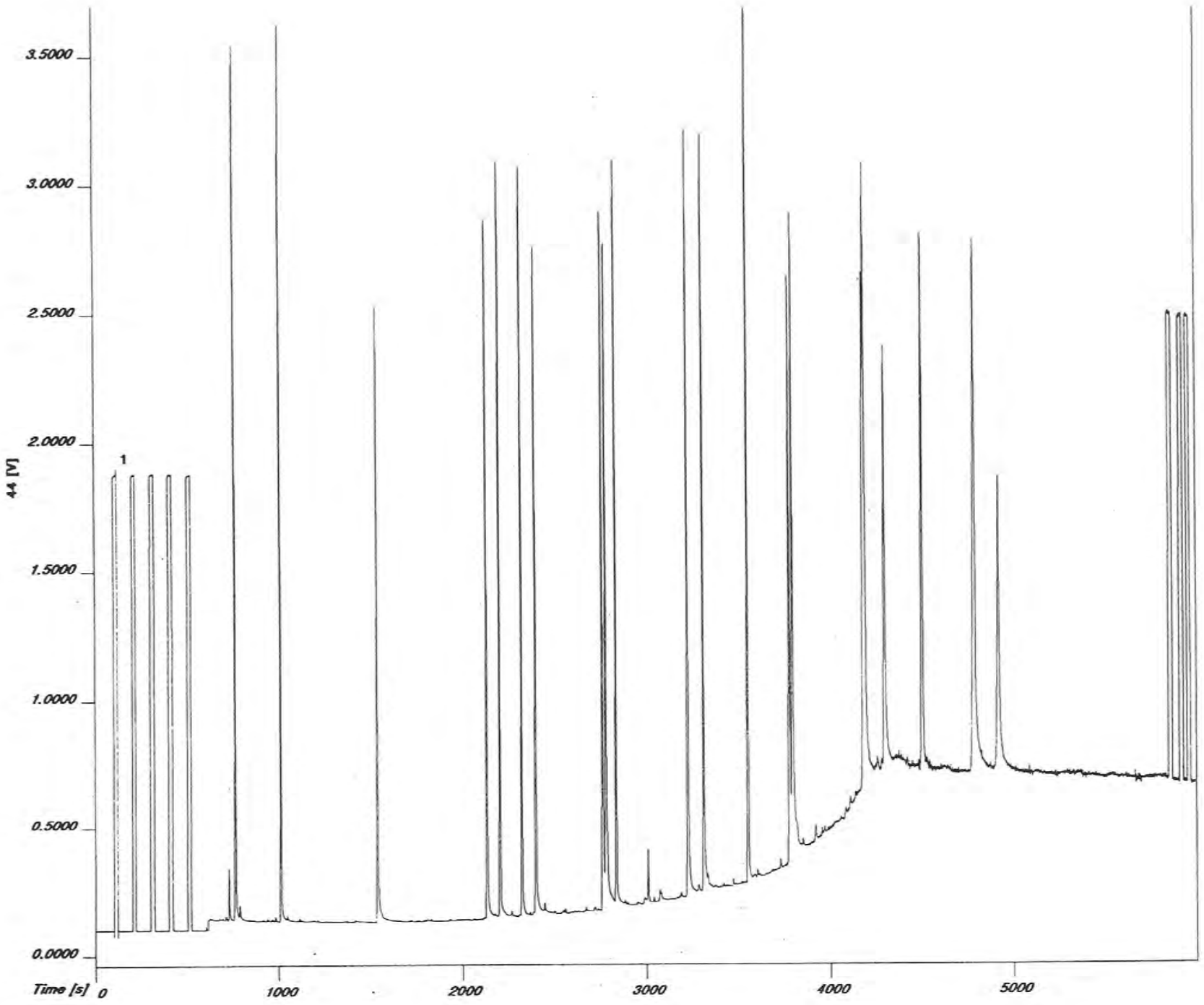
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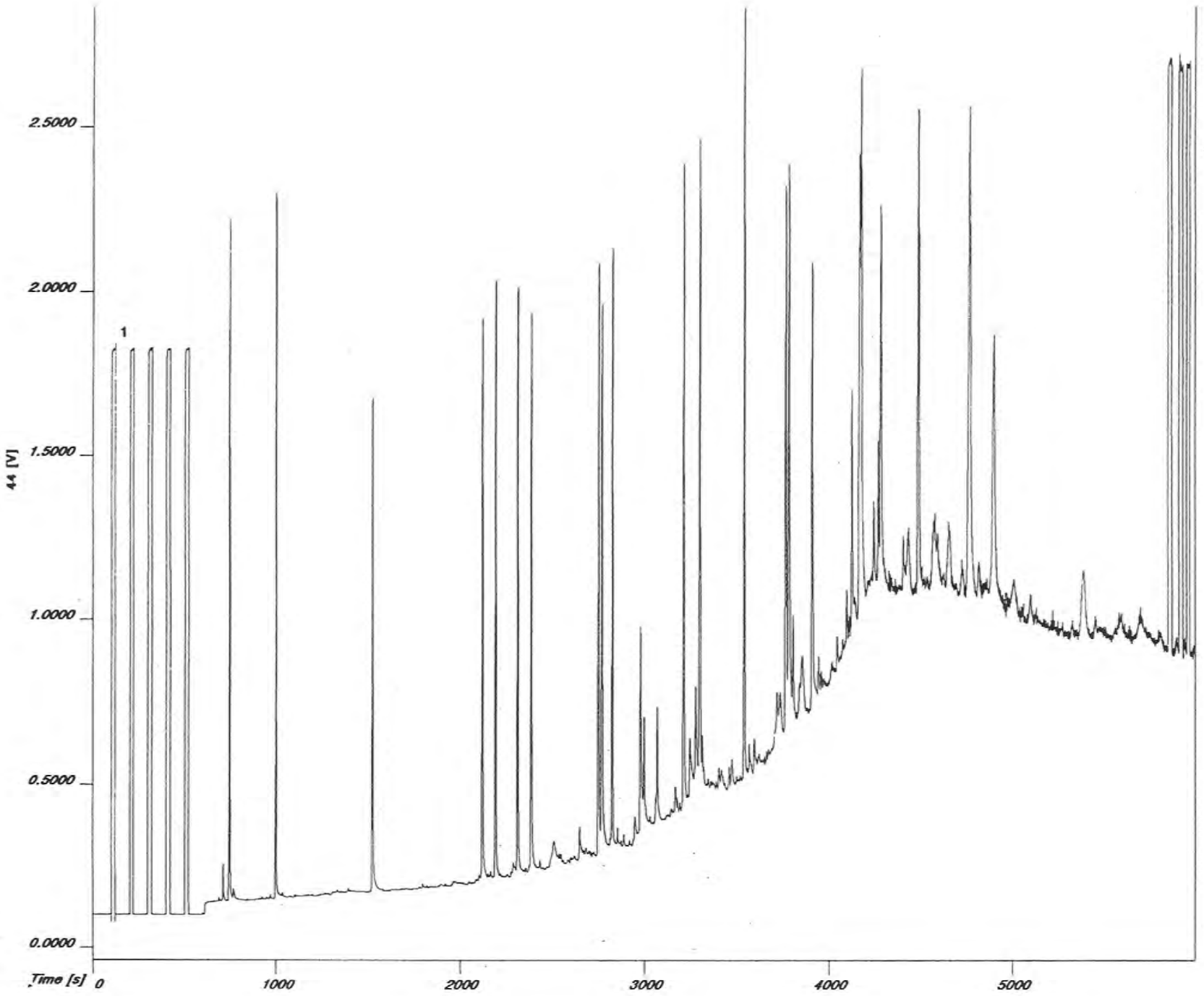
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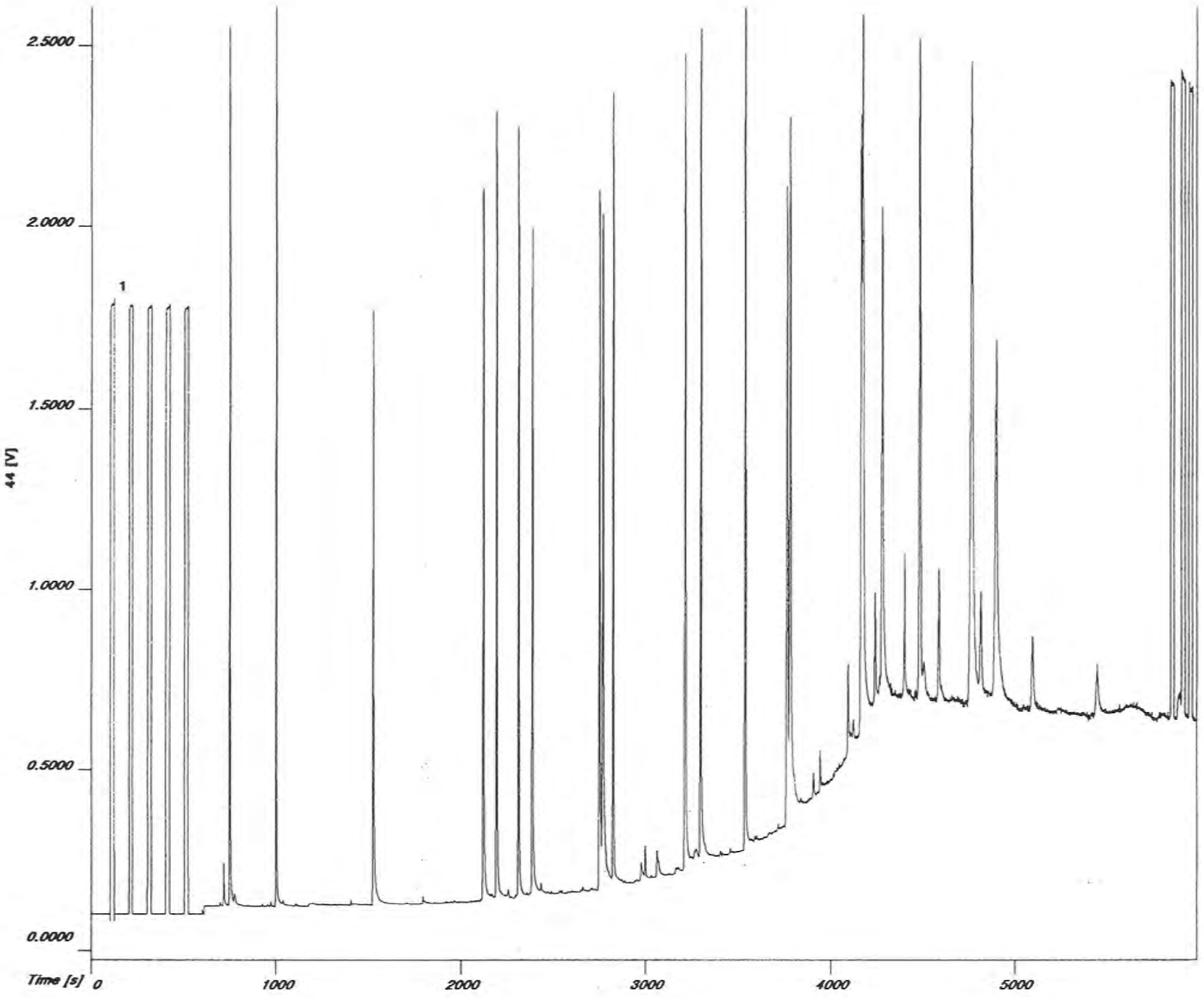
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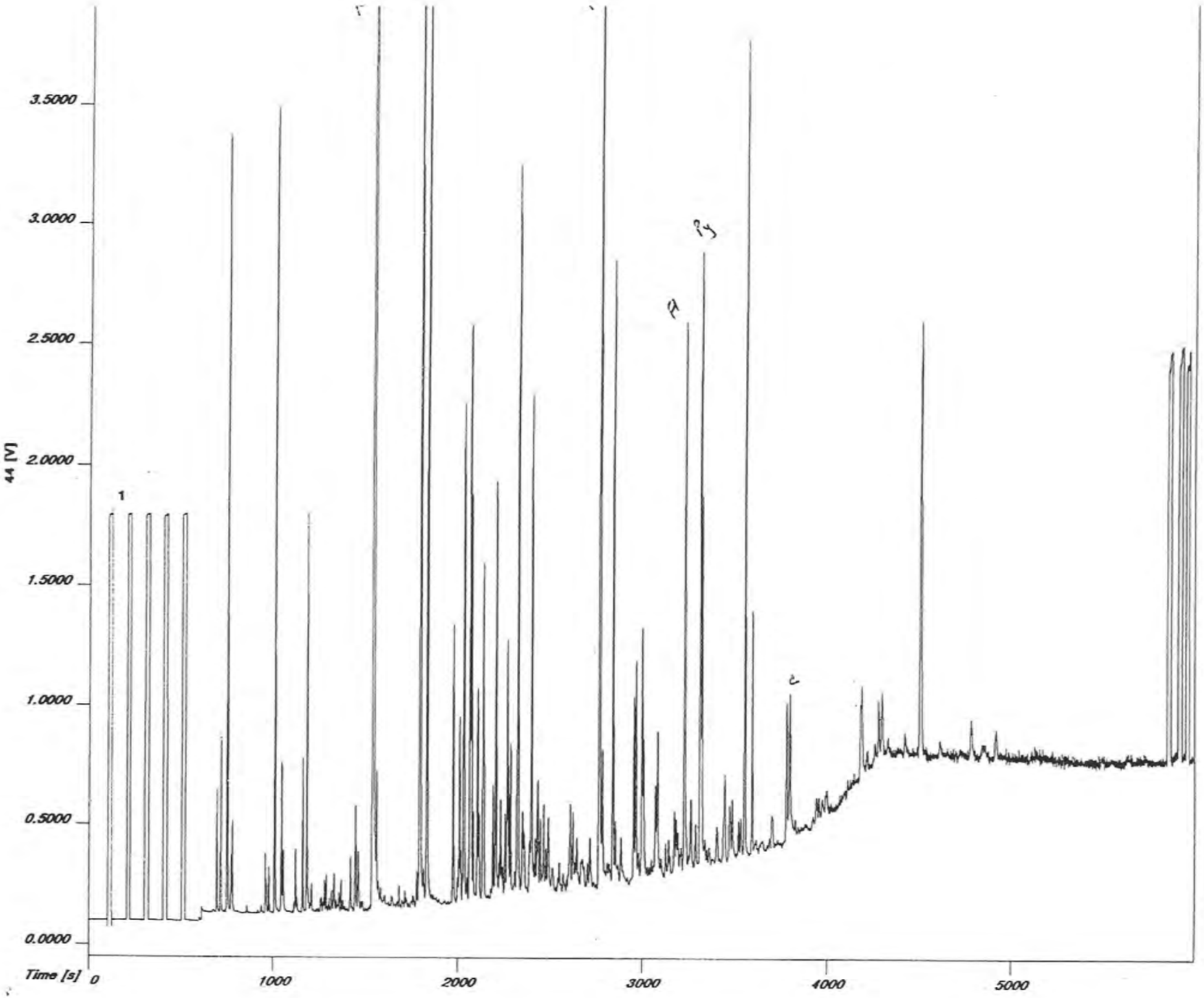
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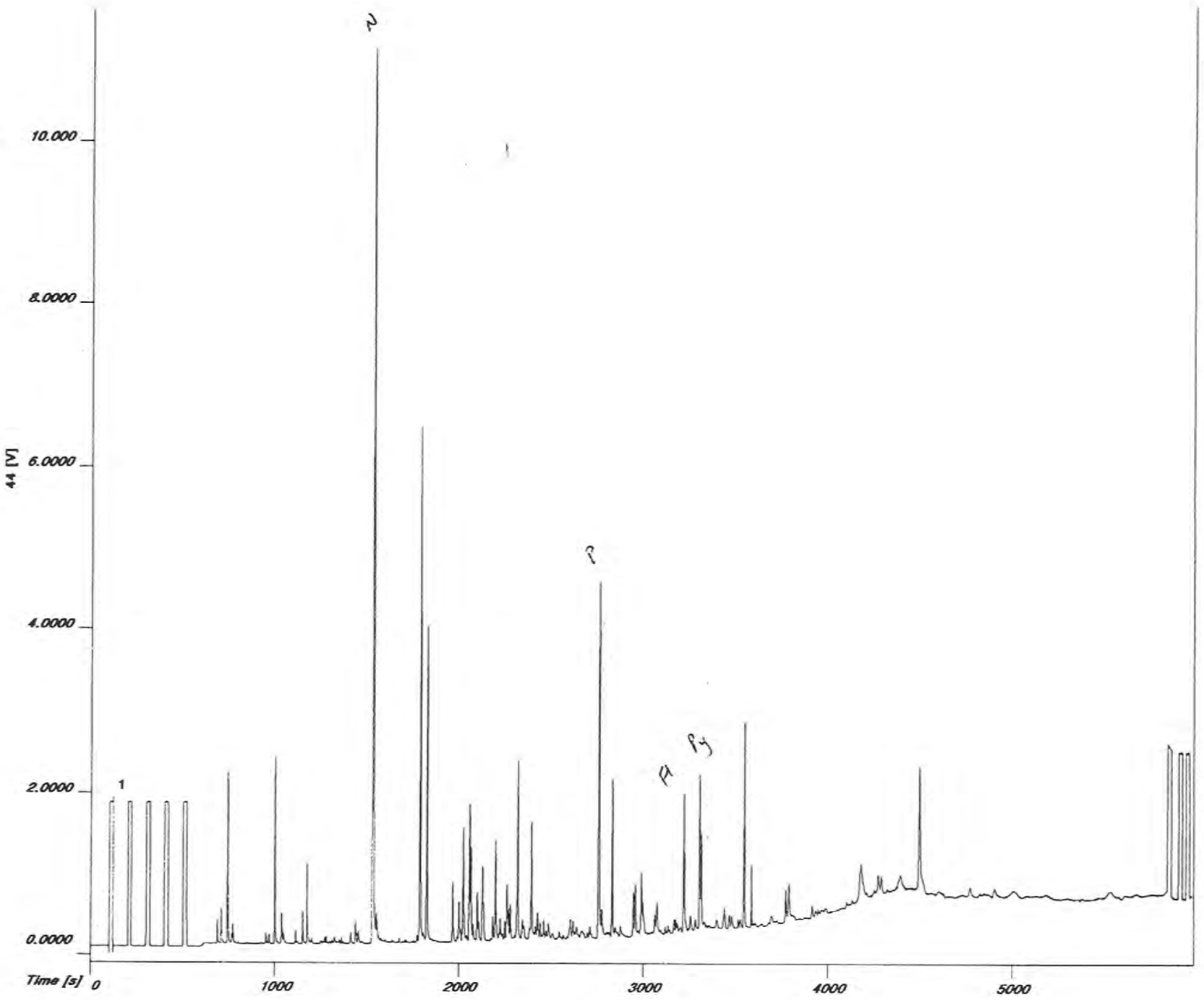
4000
5000
1


10.000
8.0000
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Time [s]
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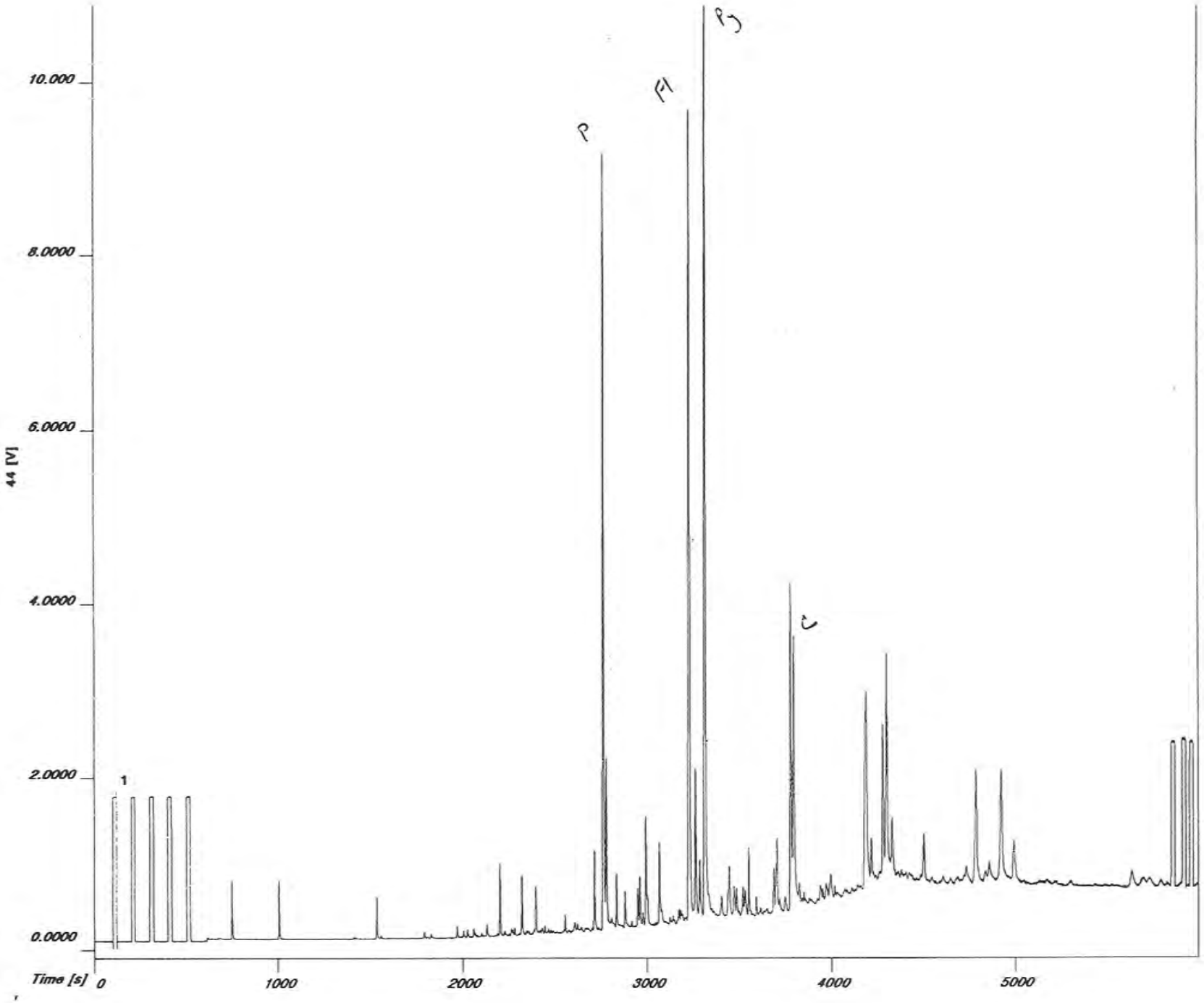
5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Time [s]
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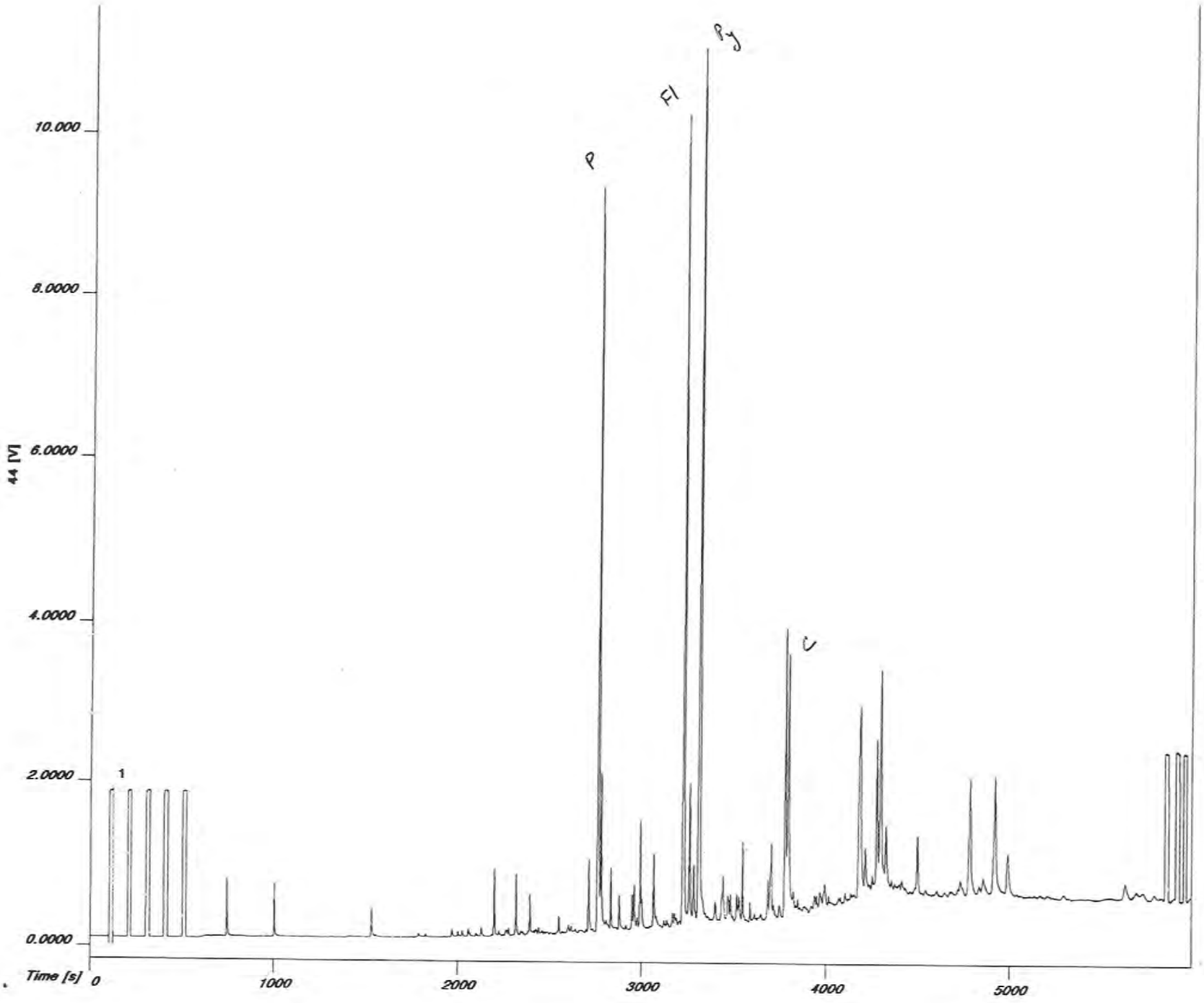
10.000
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Time [s]
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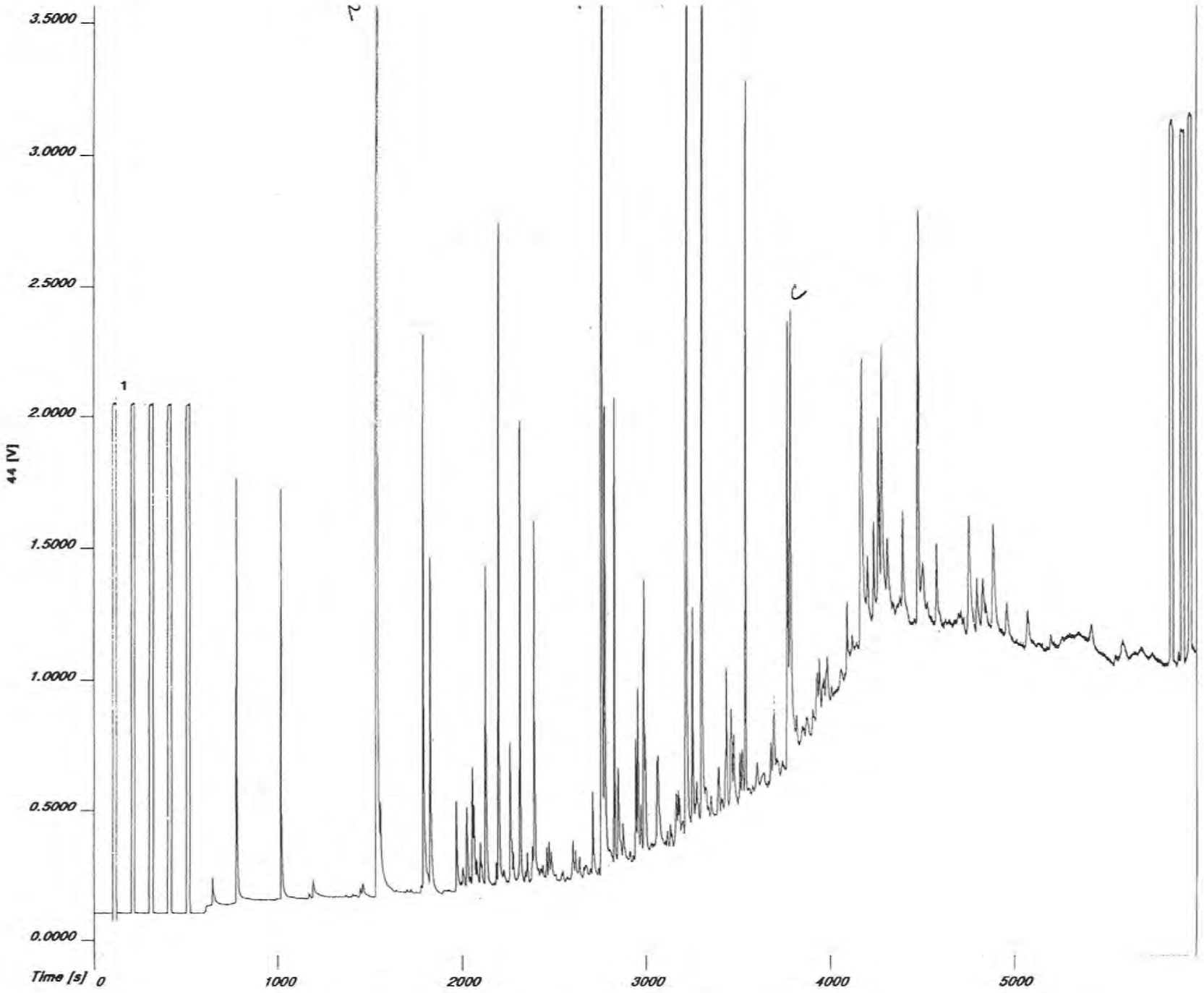
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44 [V]
Time [s]
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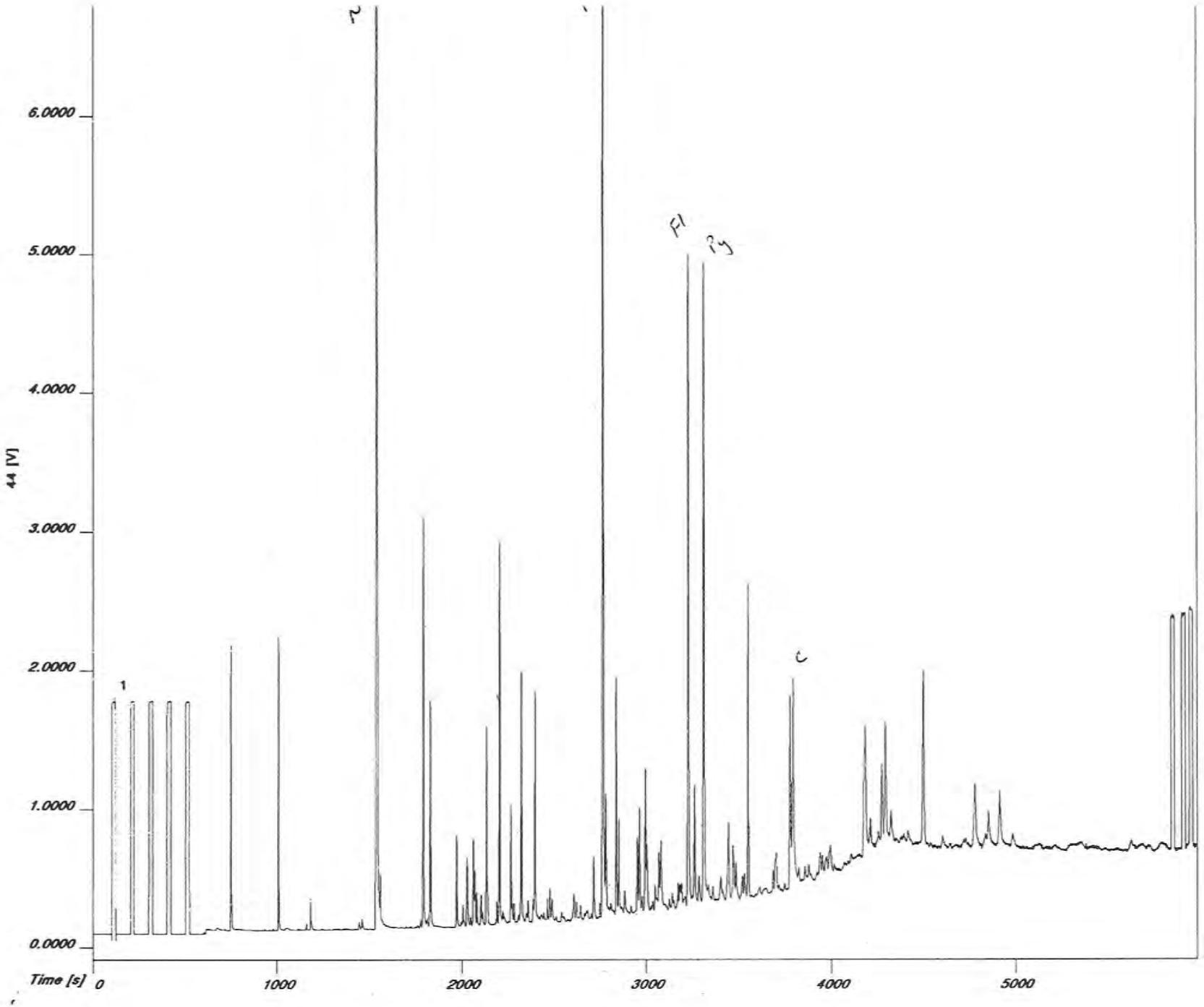
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44 [V]
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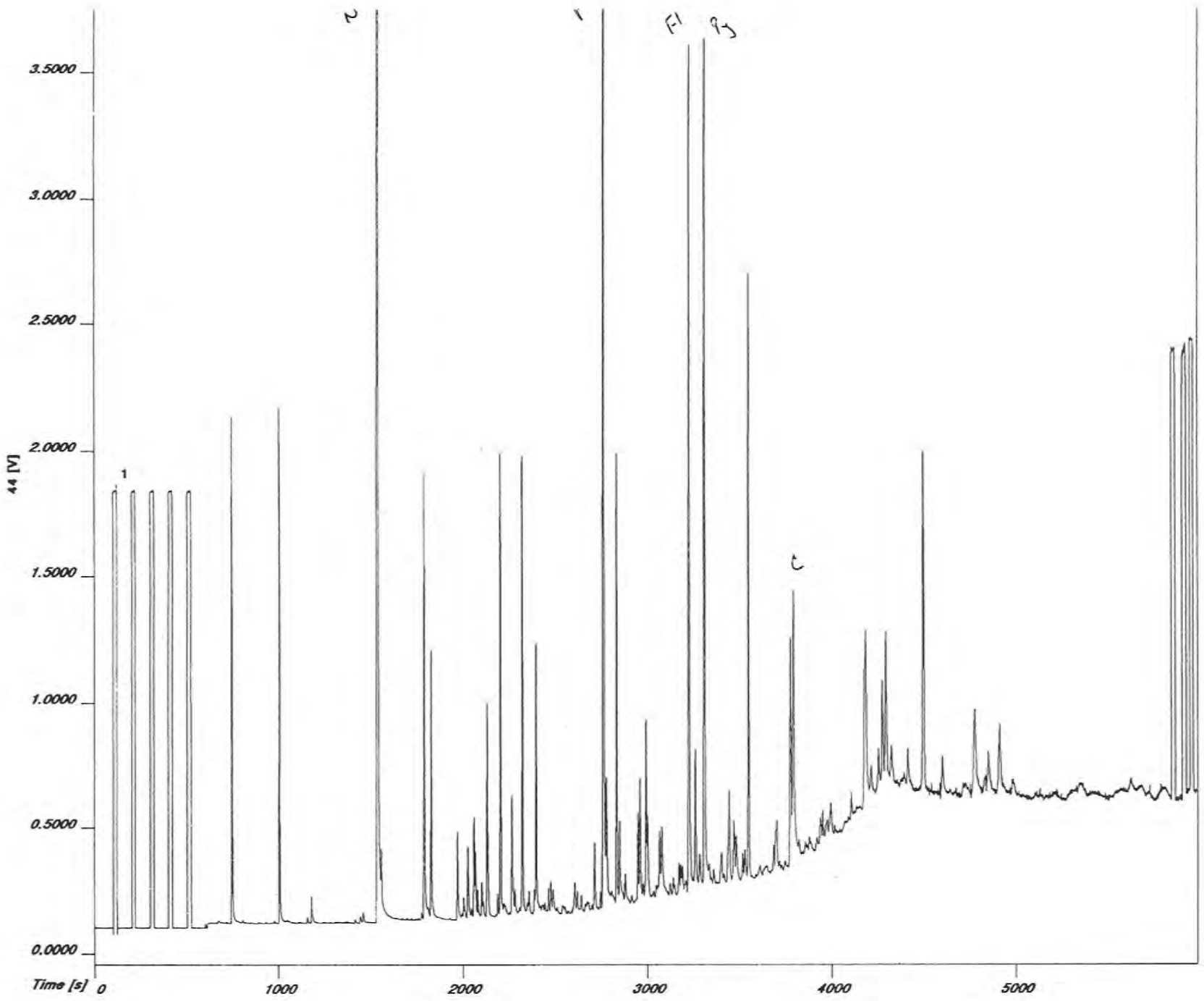
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Time [s]
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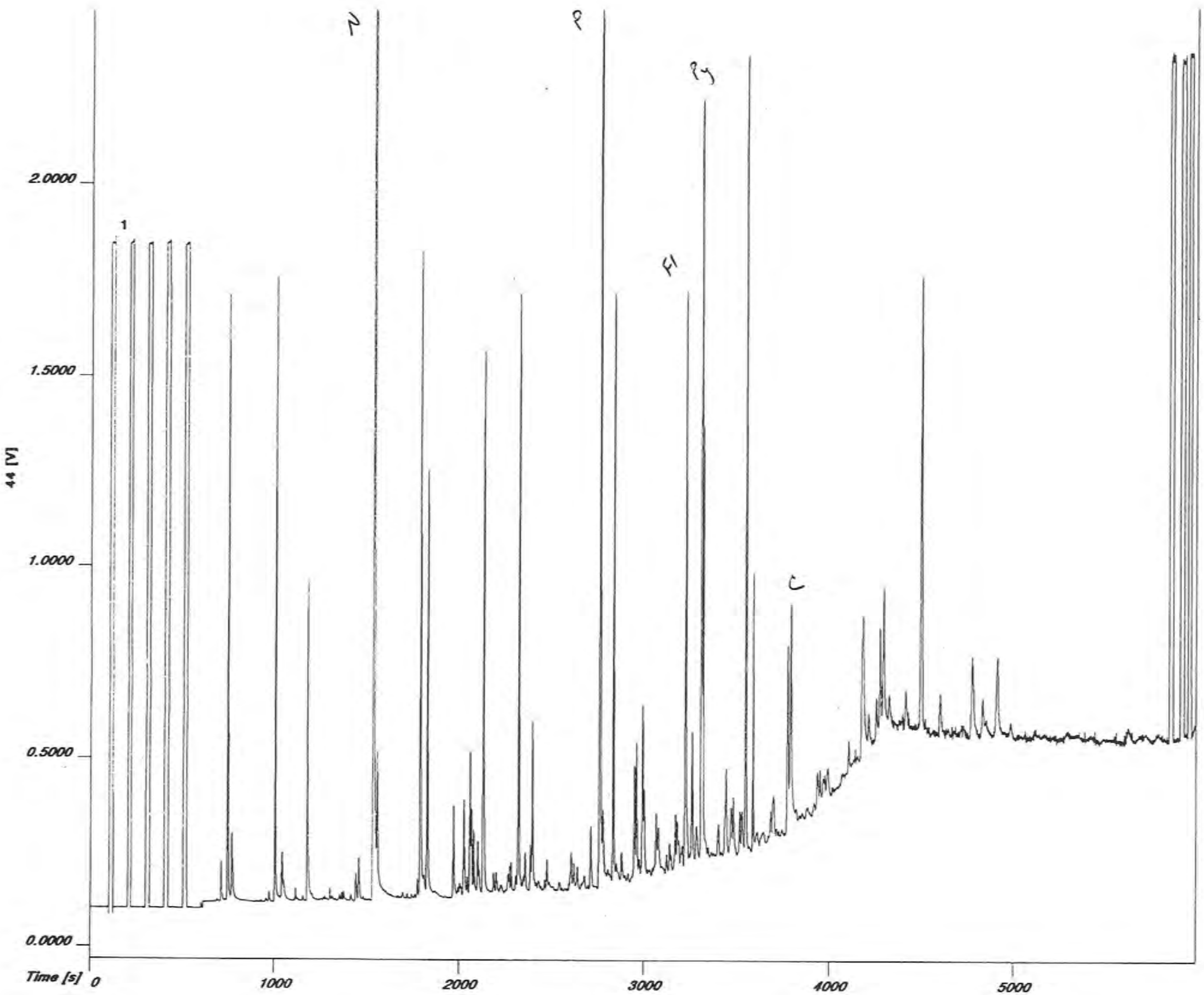
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1.0000
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Time [s]
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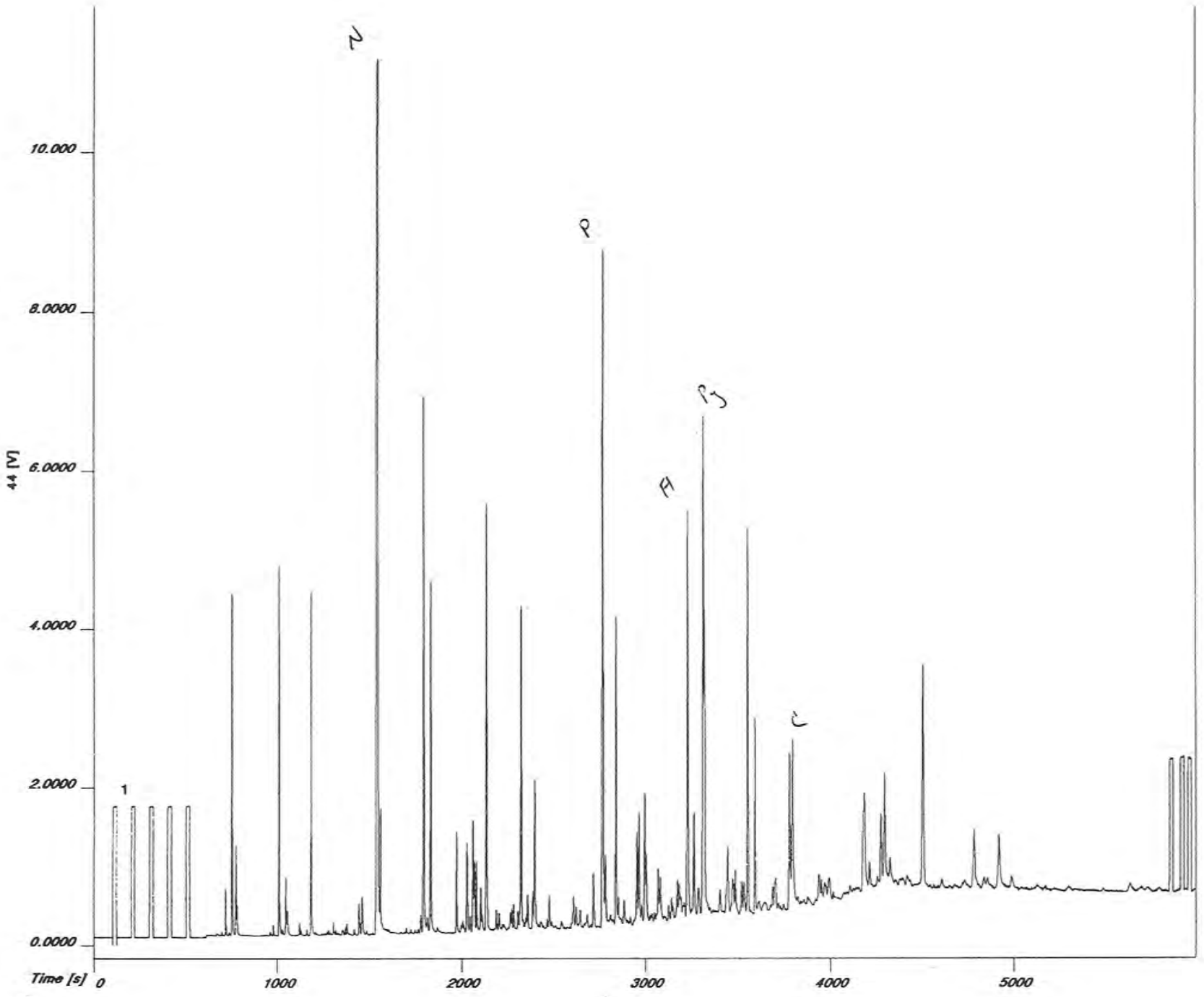
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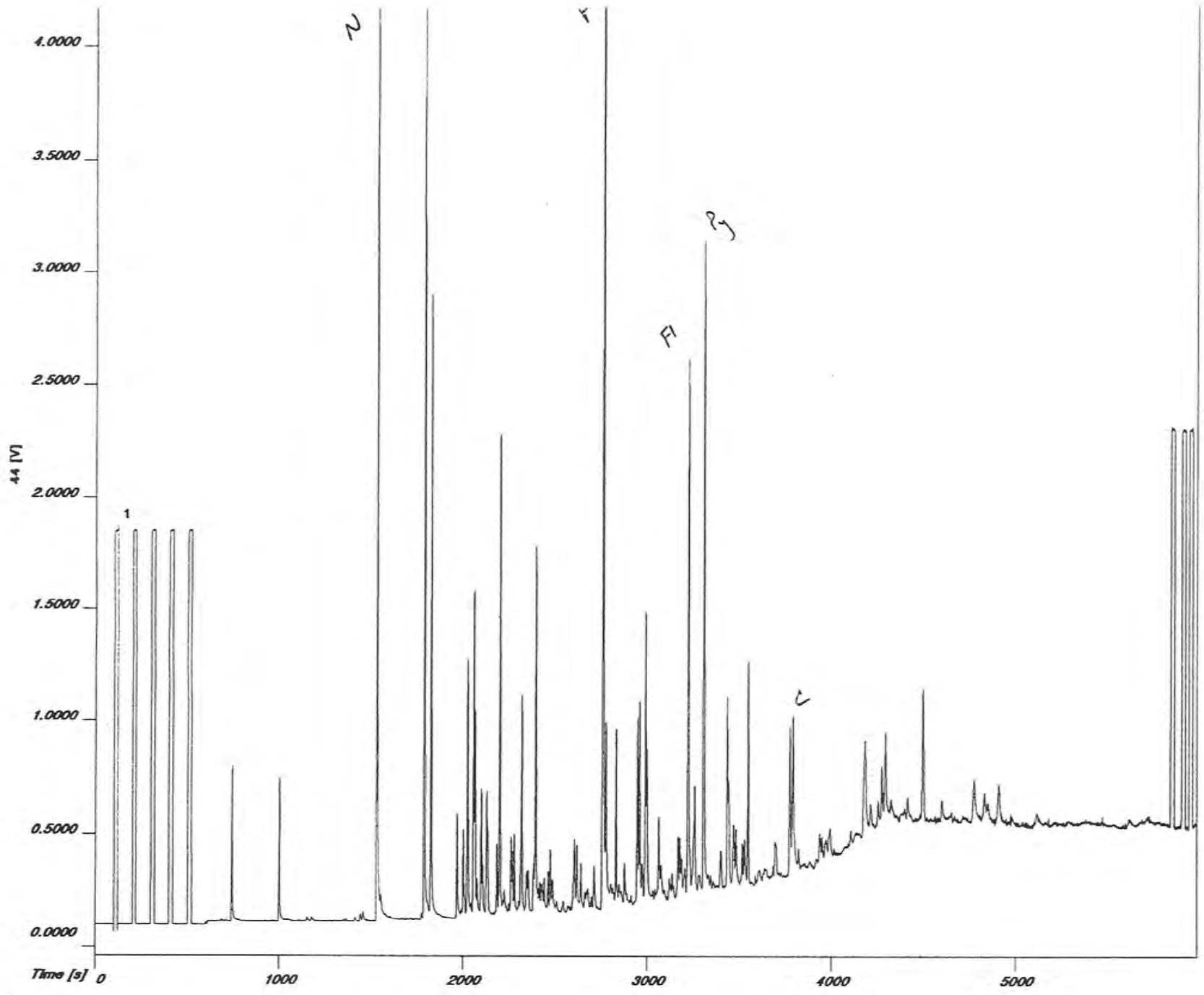
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Time [s]
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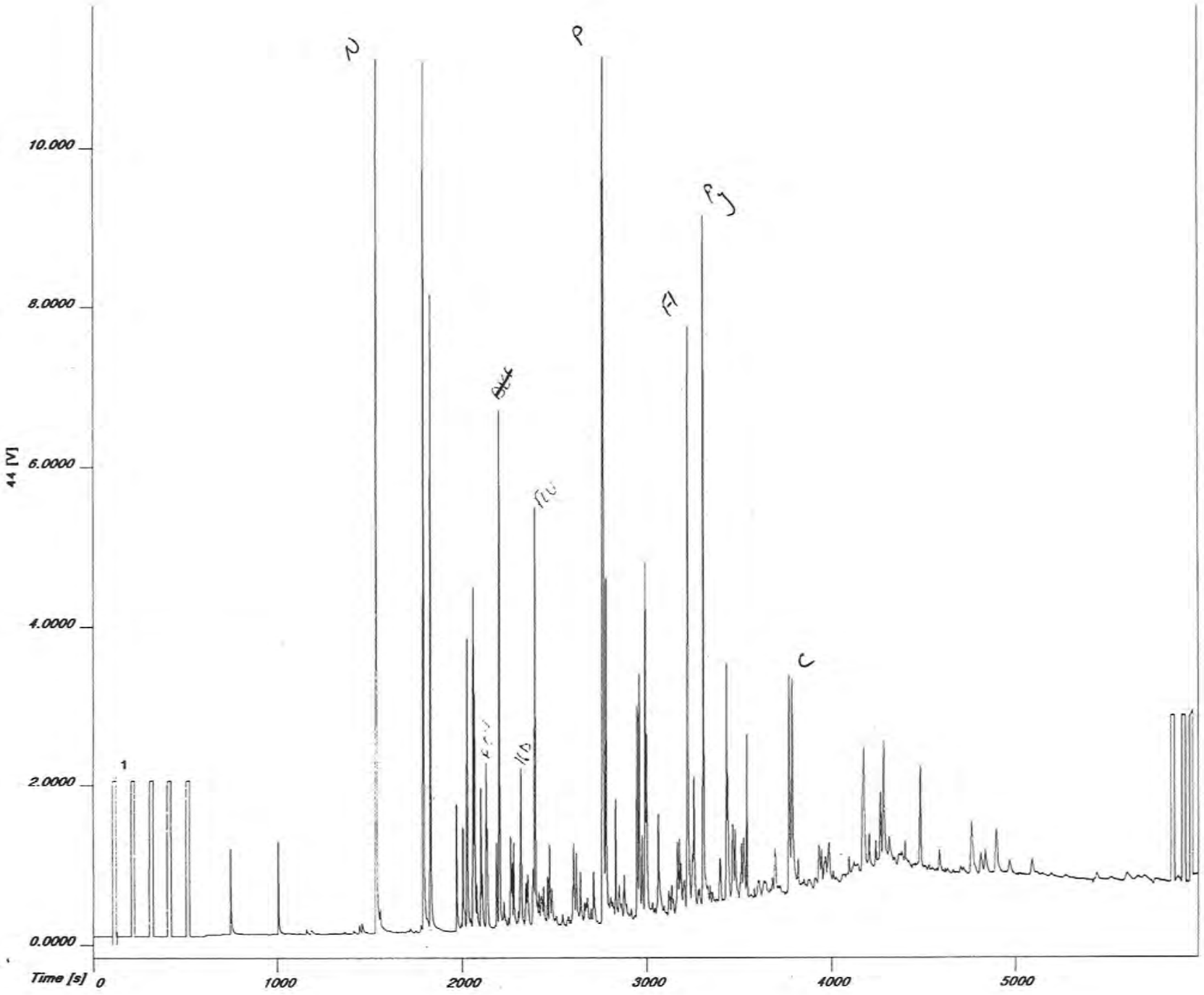
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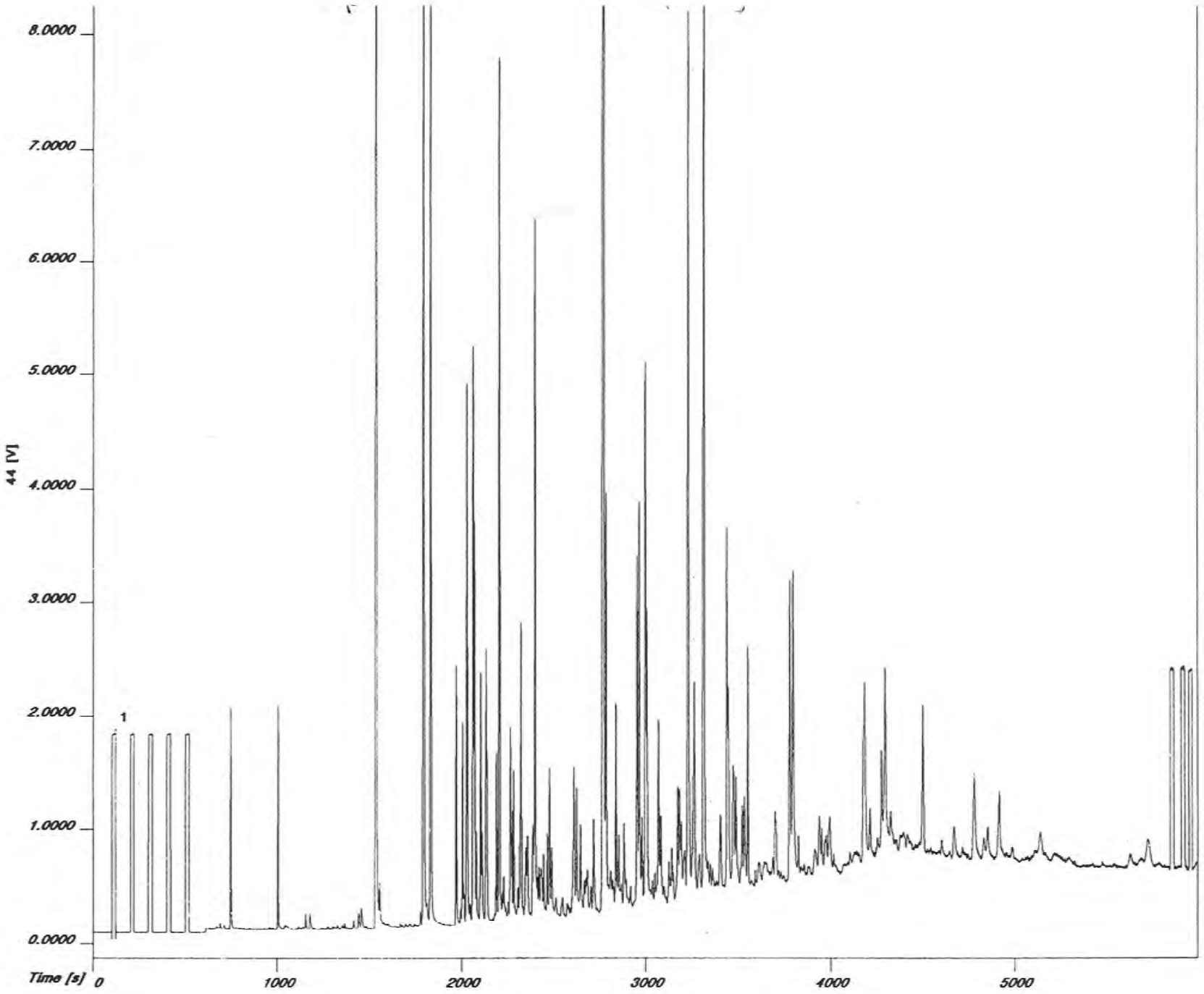
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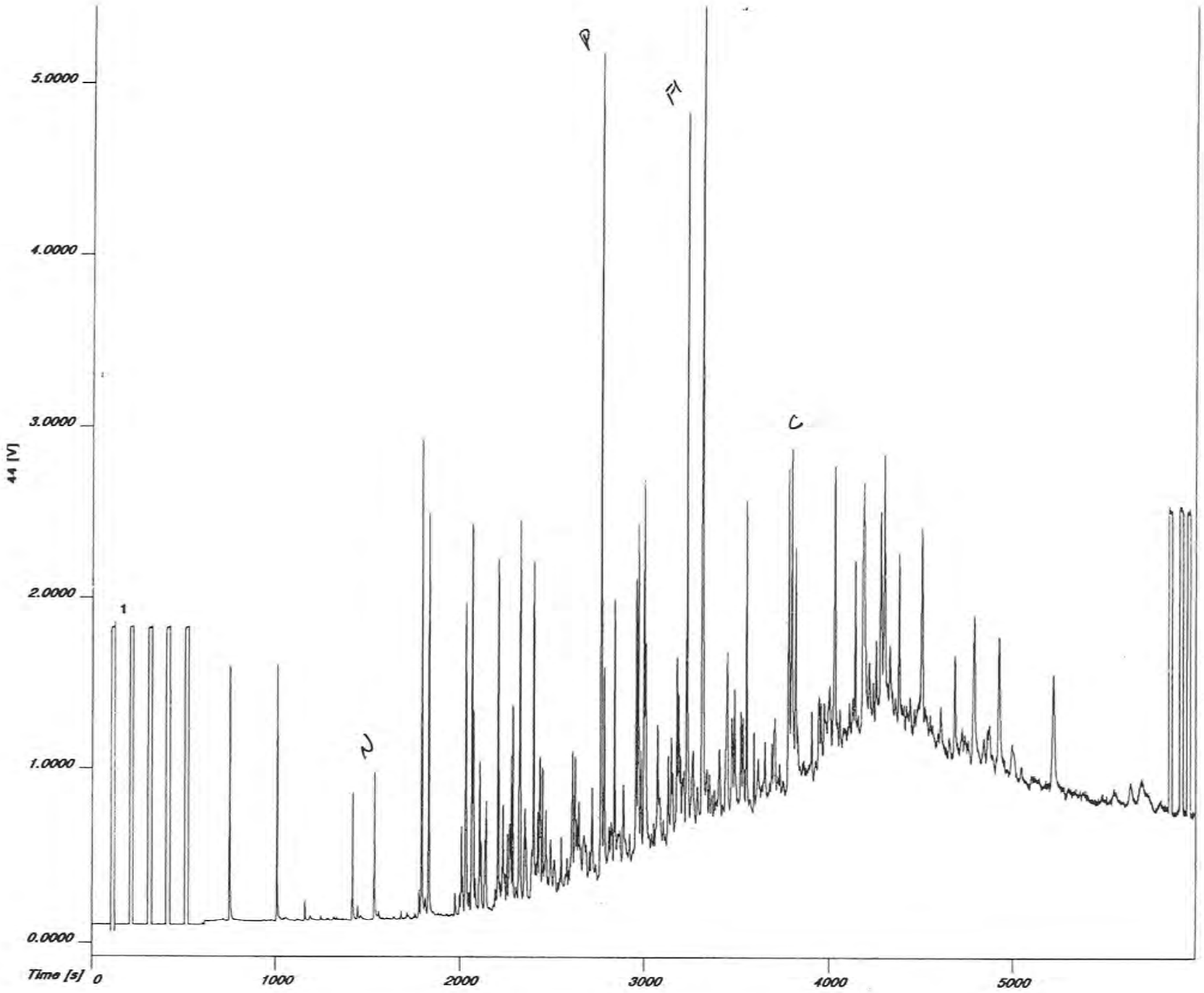
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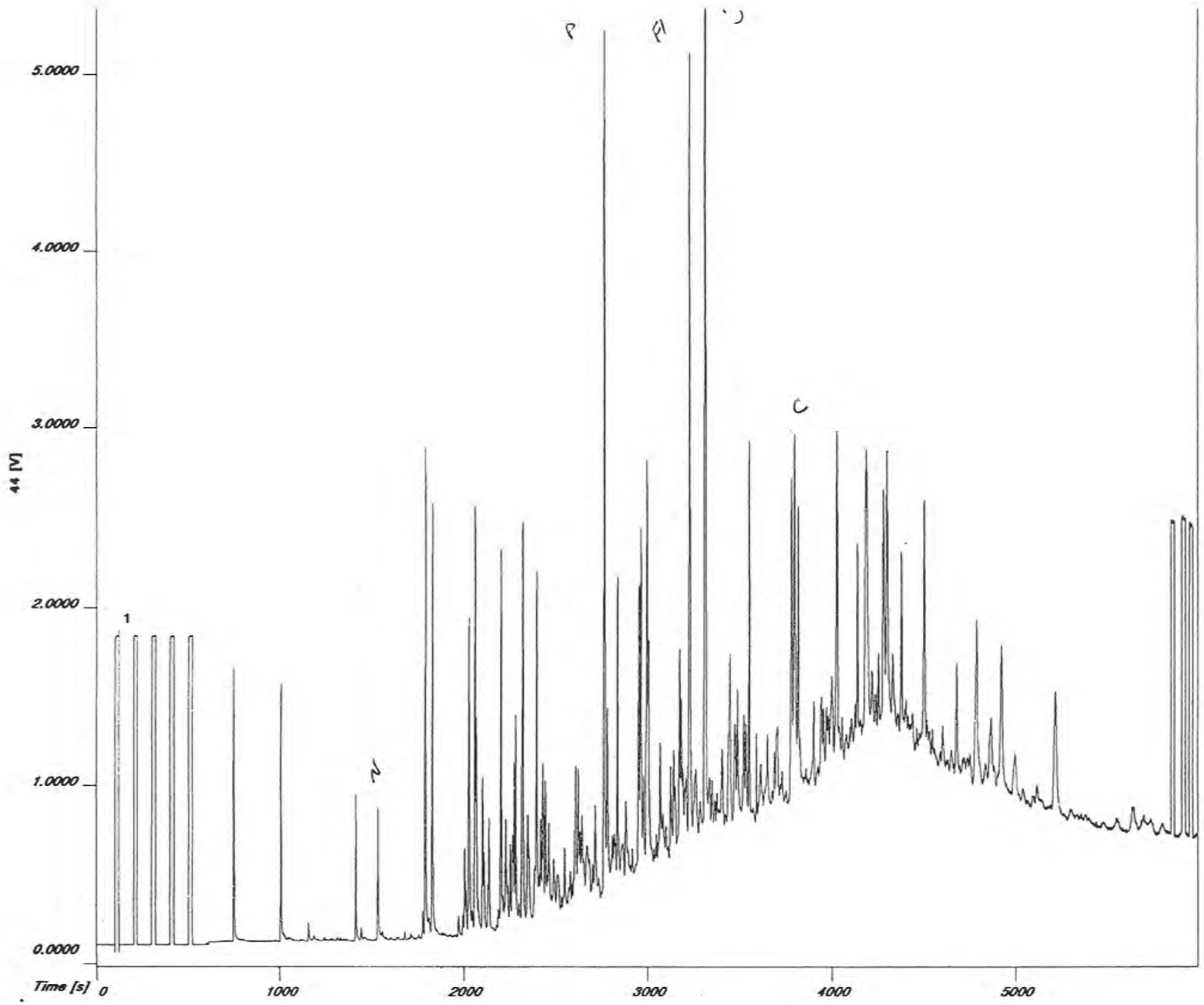
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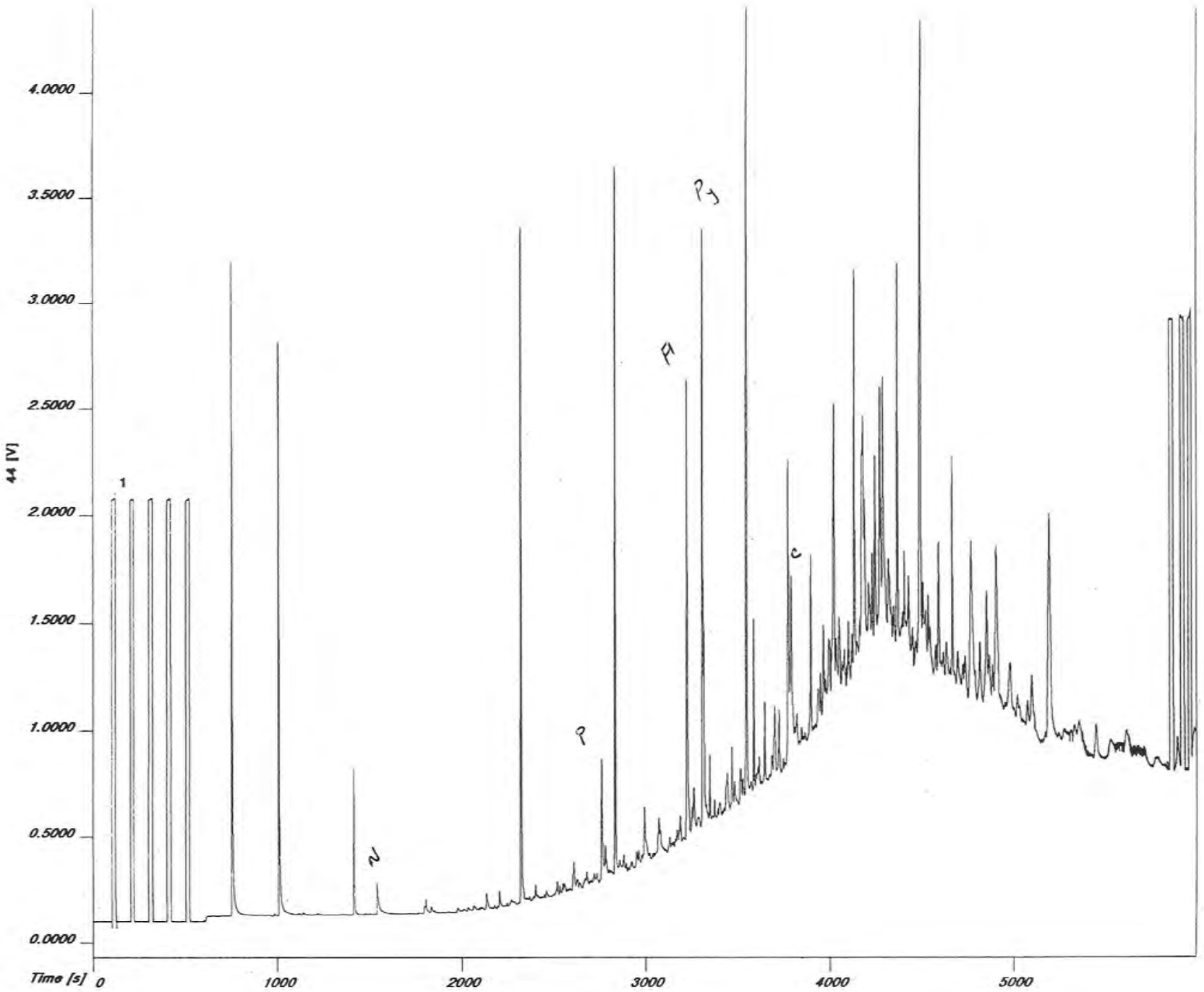
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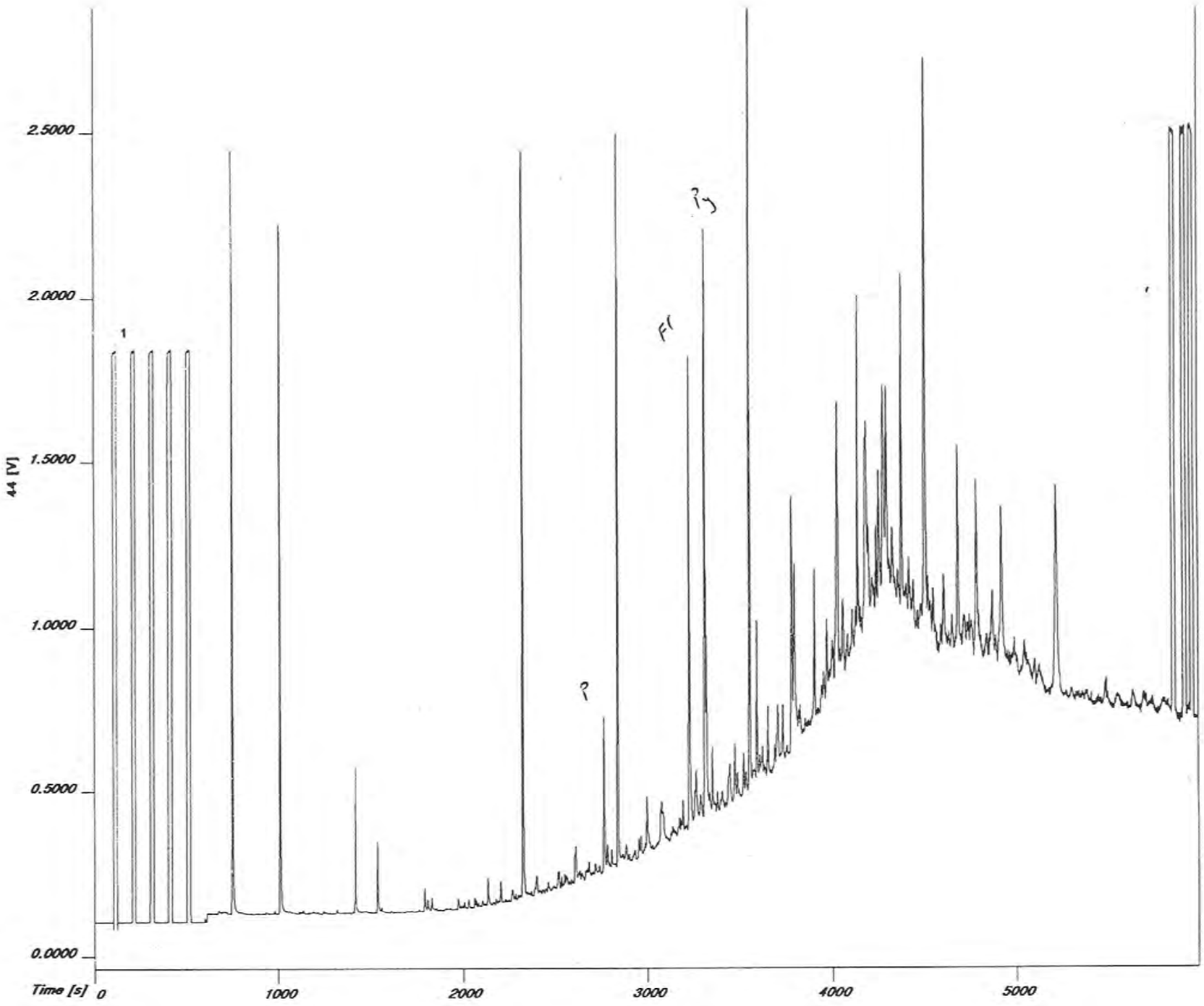
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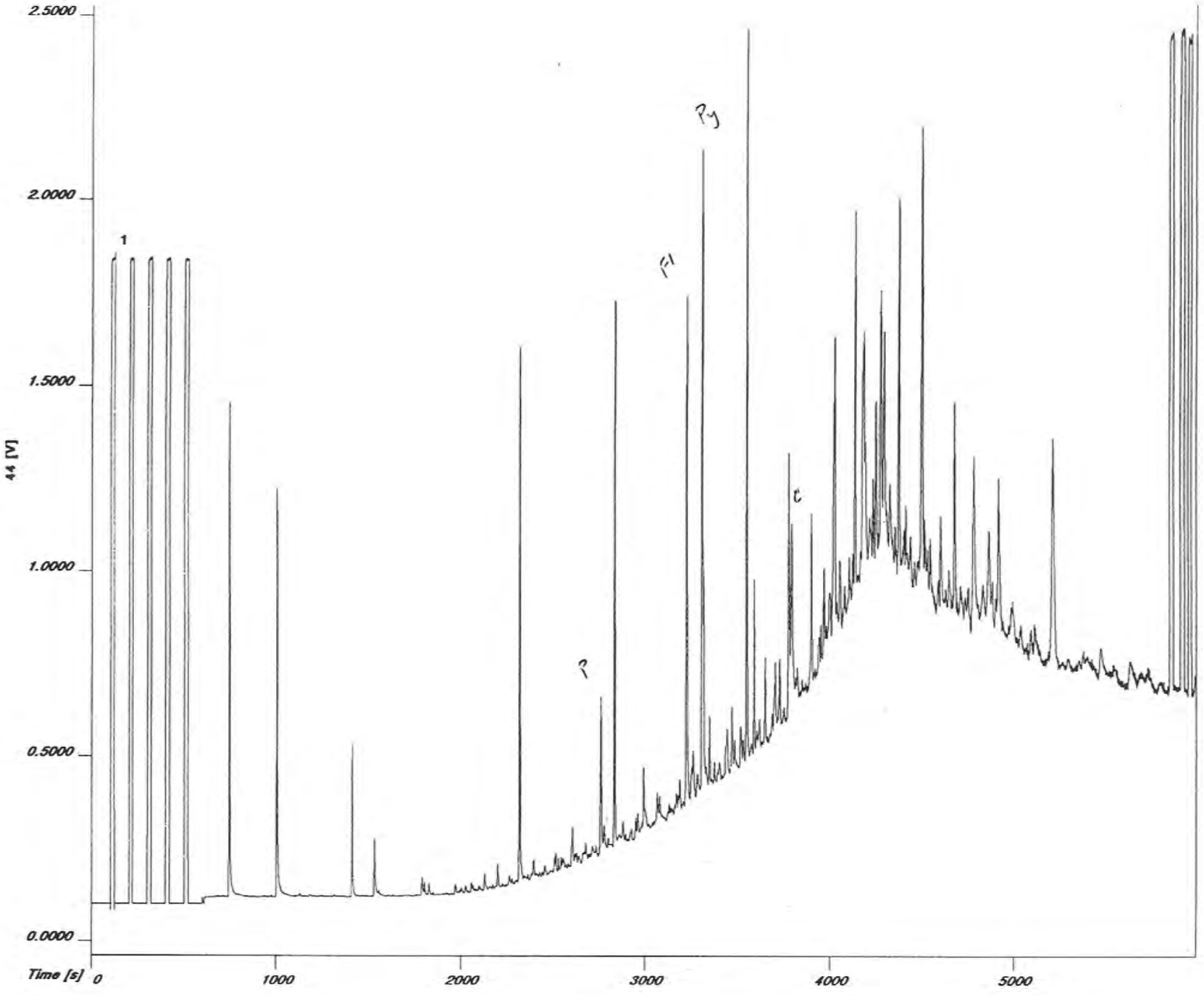
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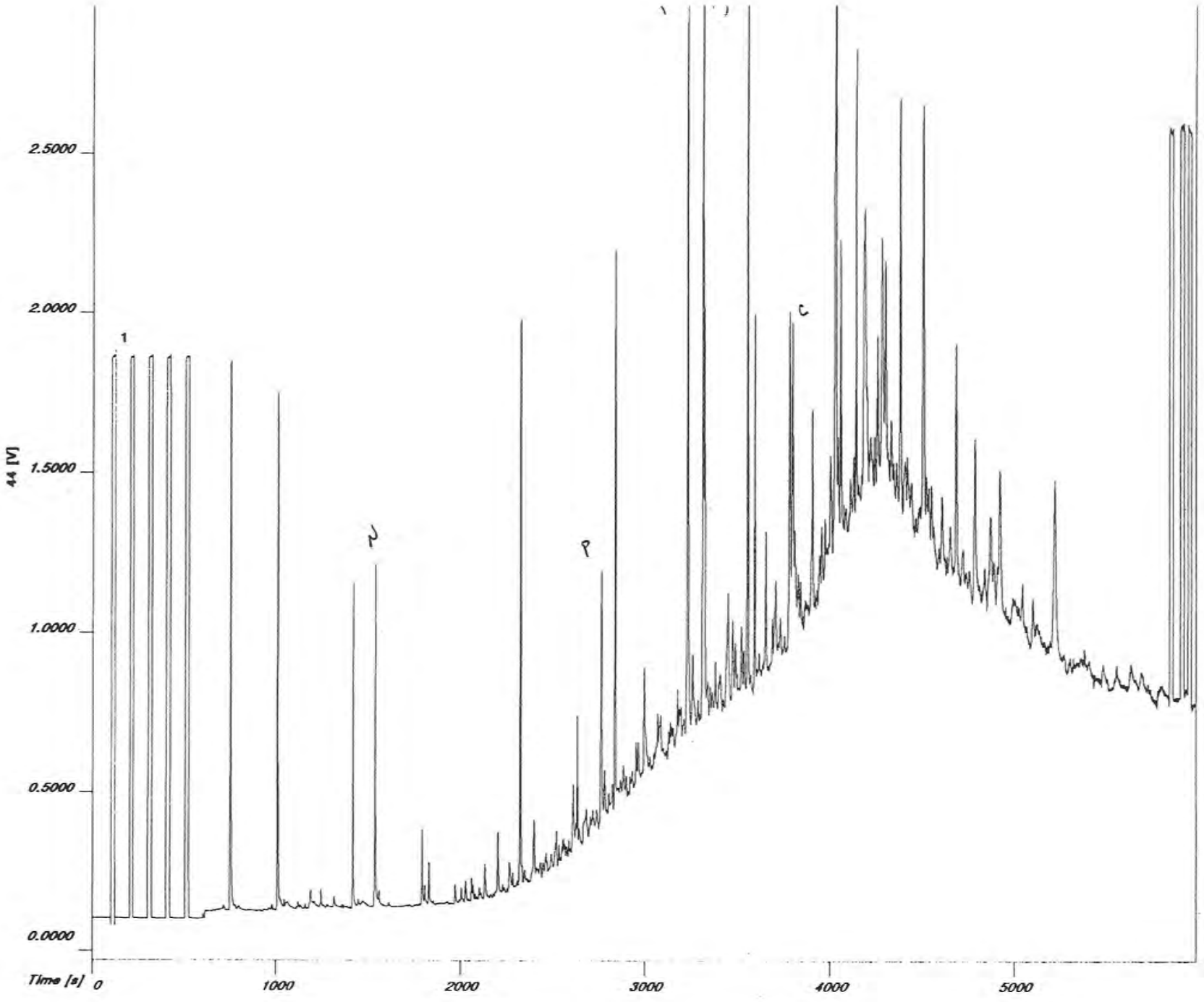
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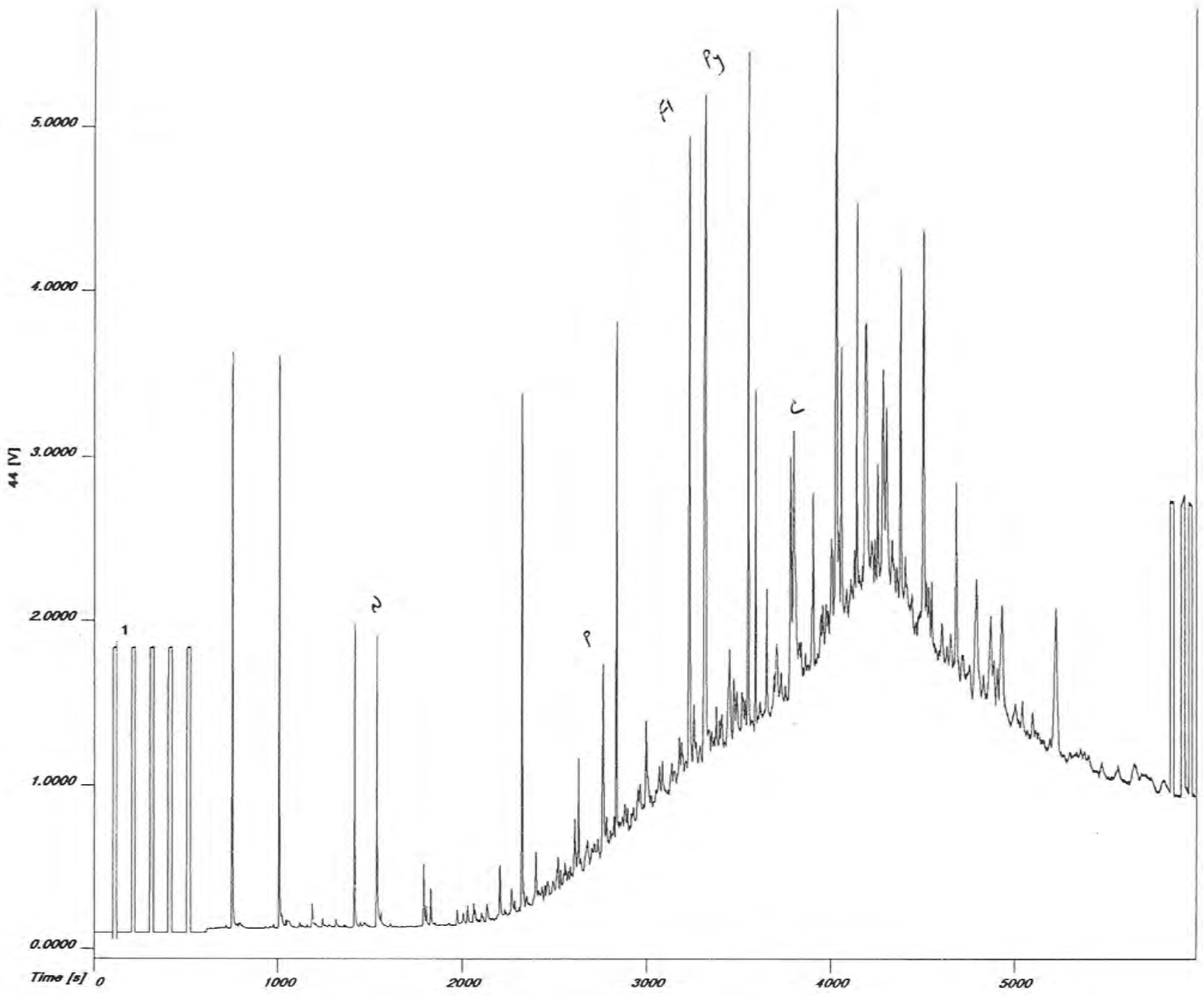
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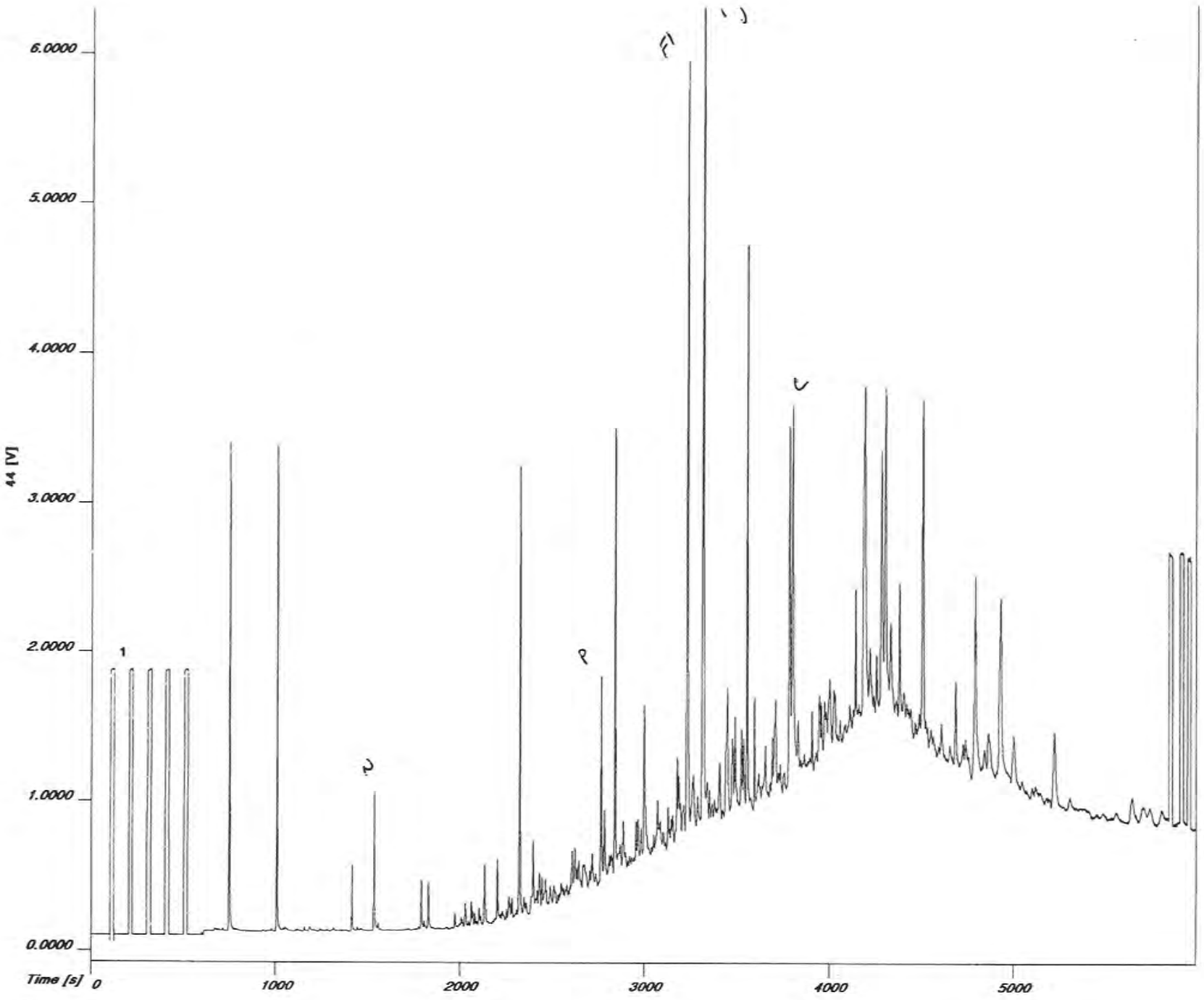
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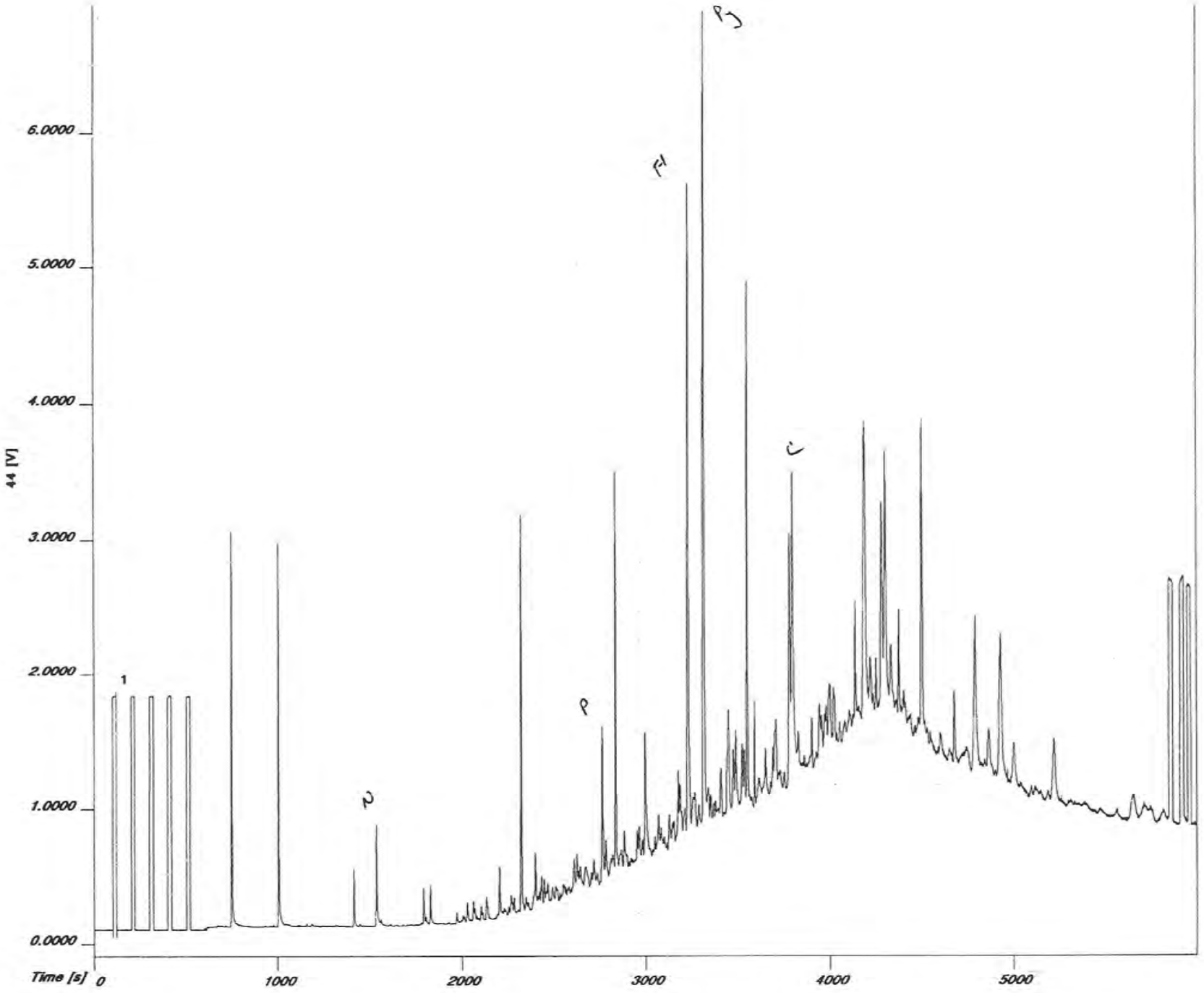
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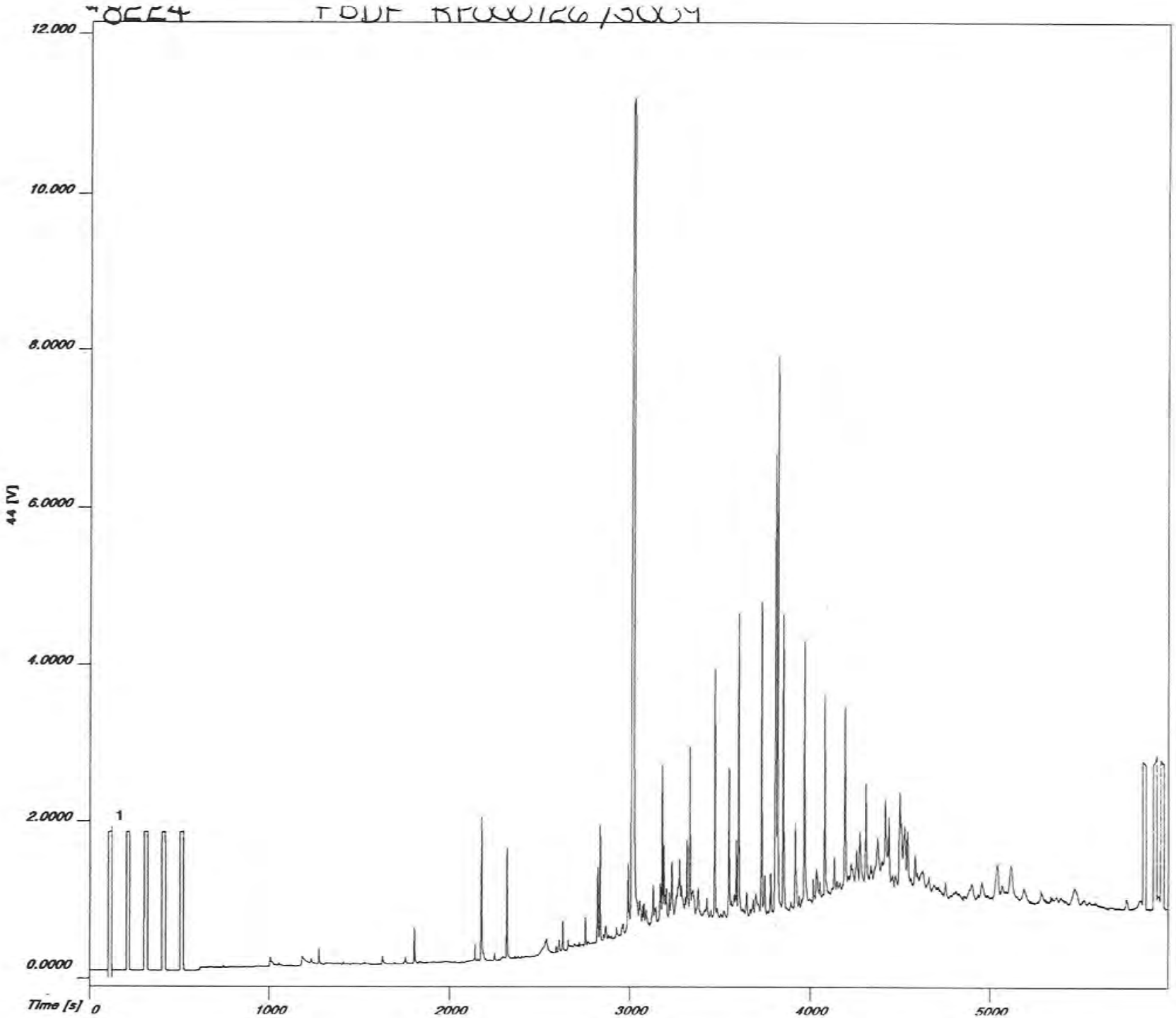
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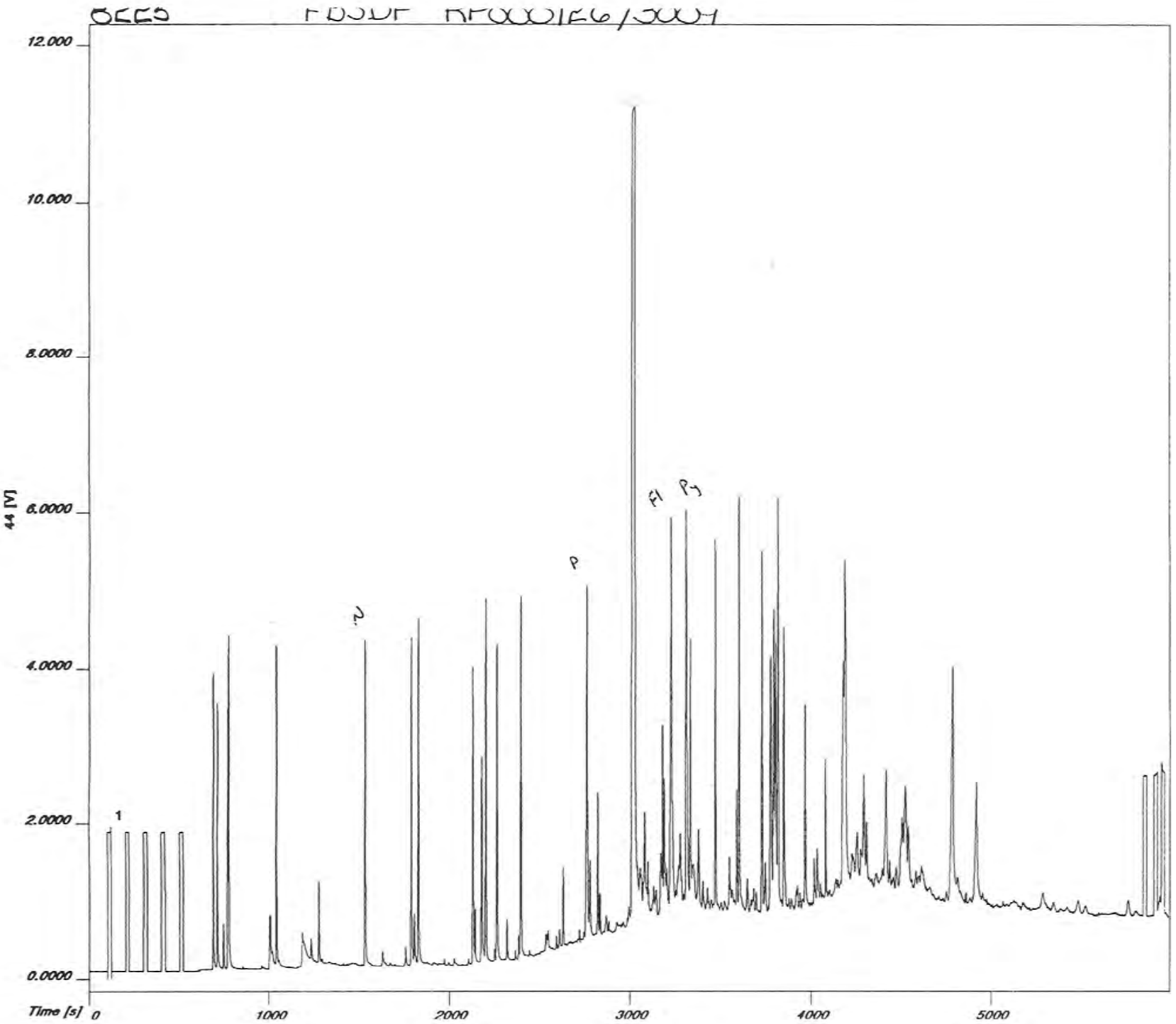
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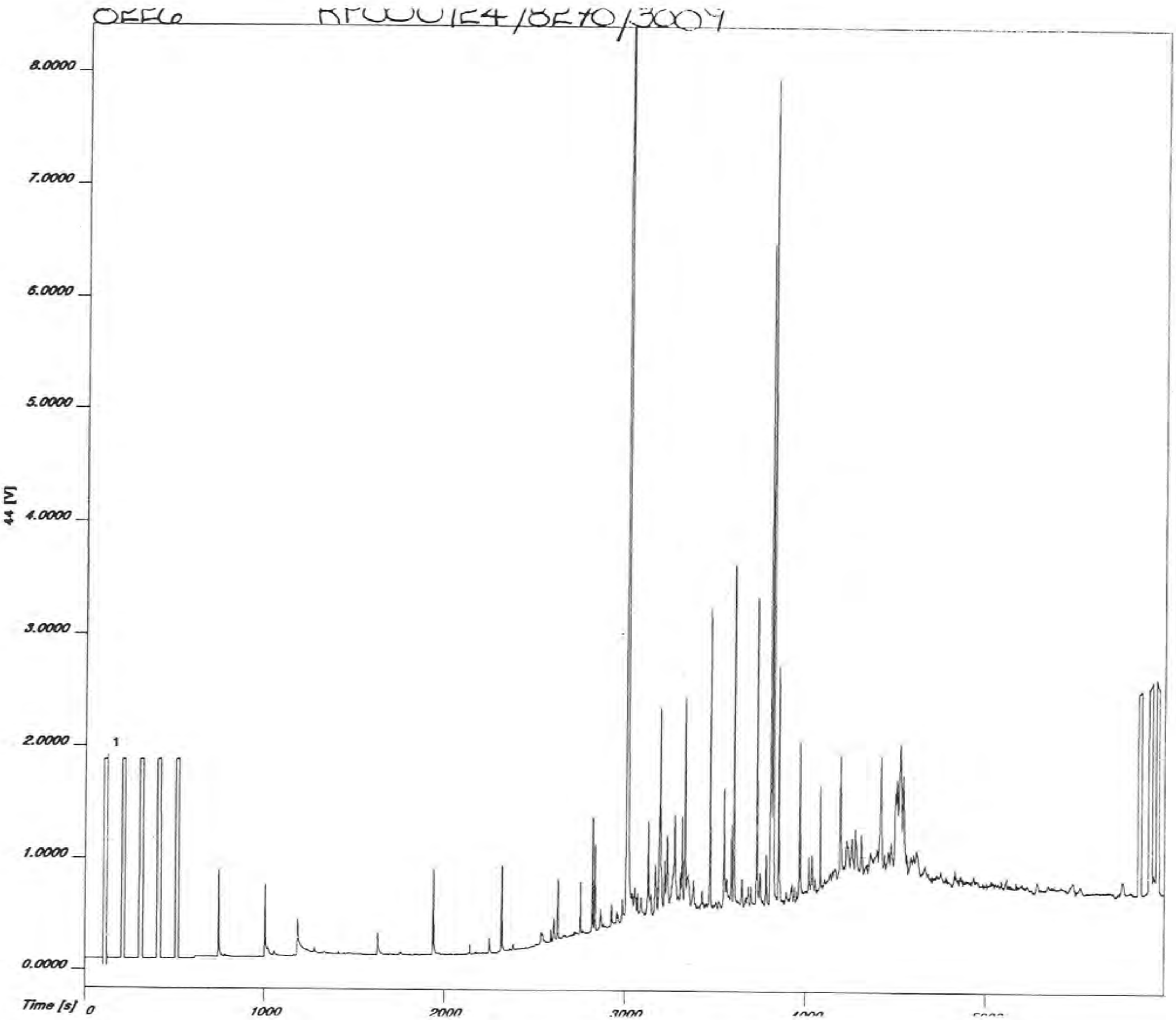
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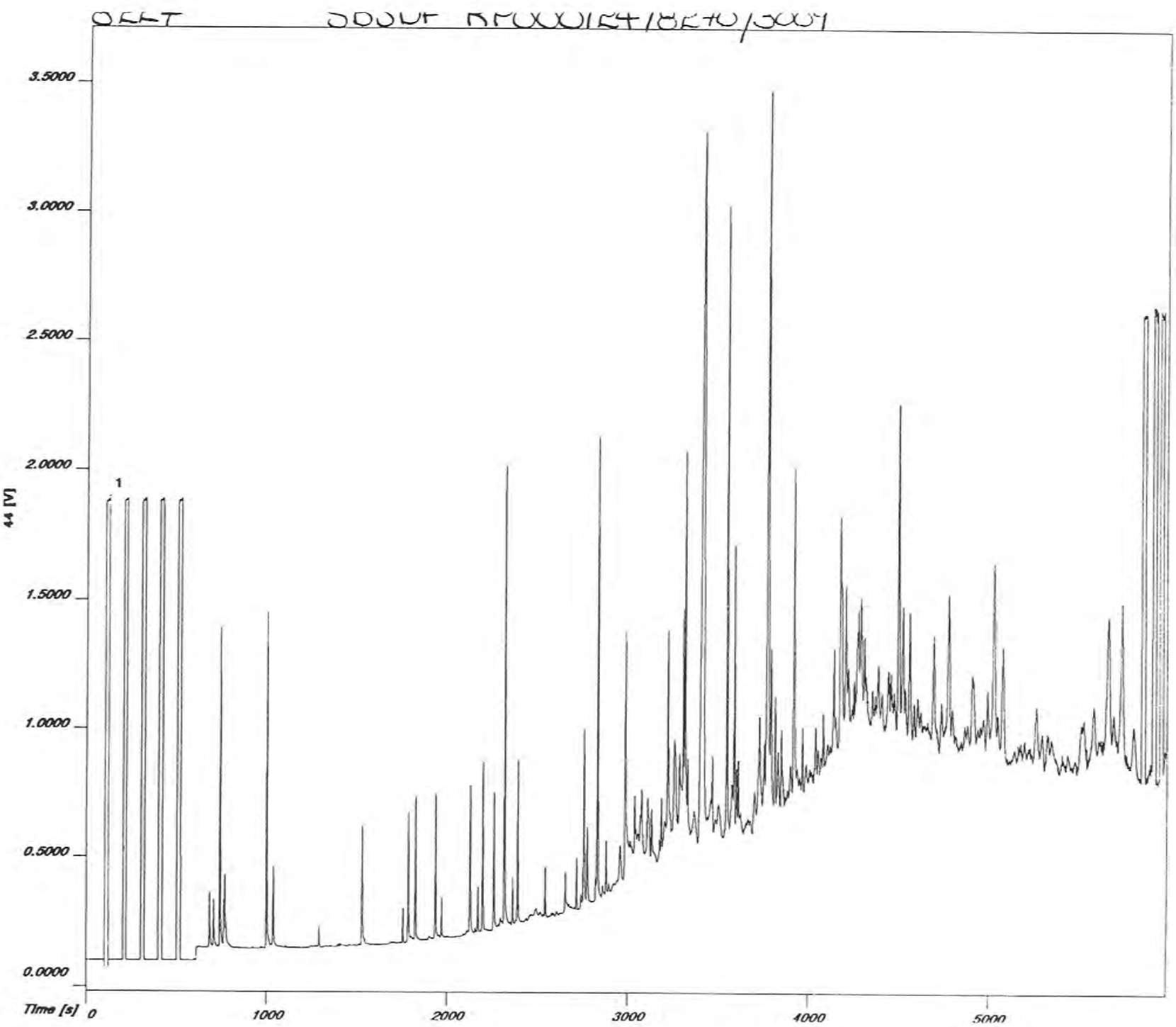
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Time [s]
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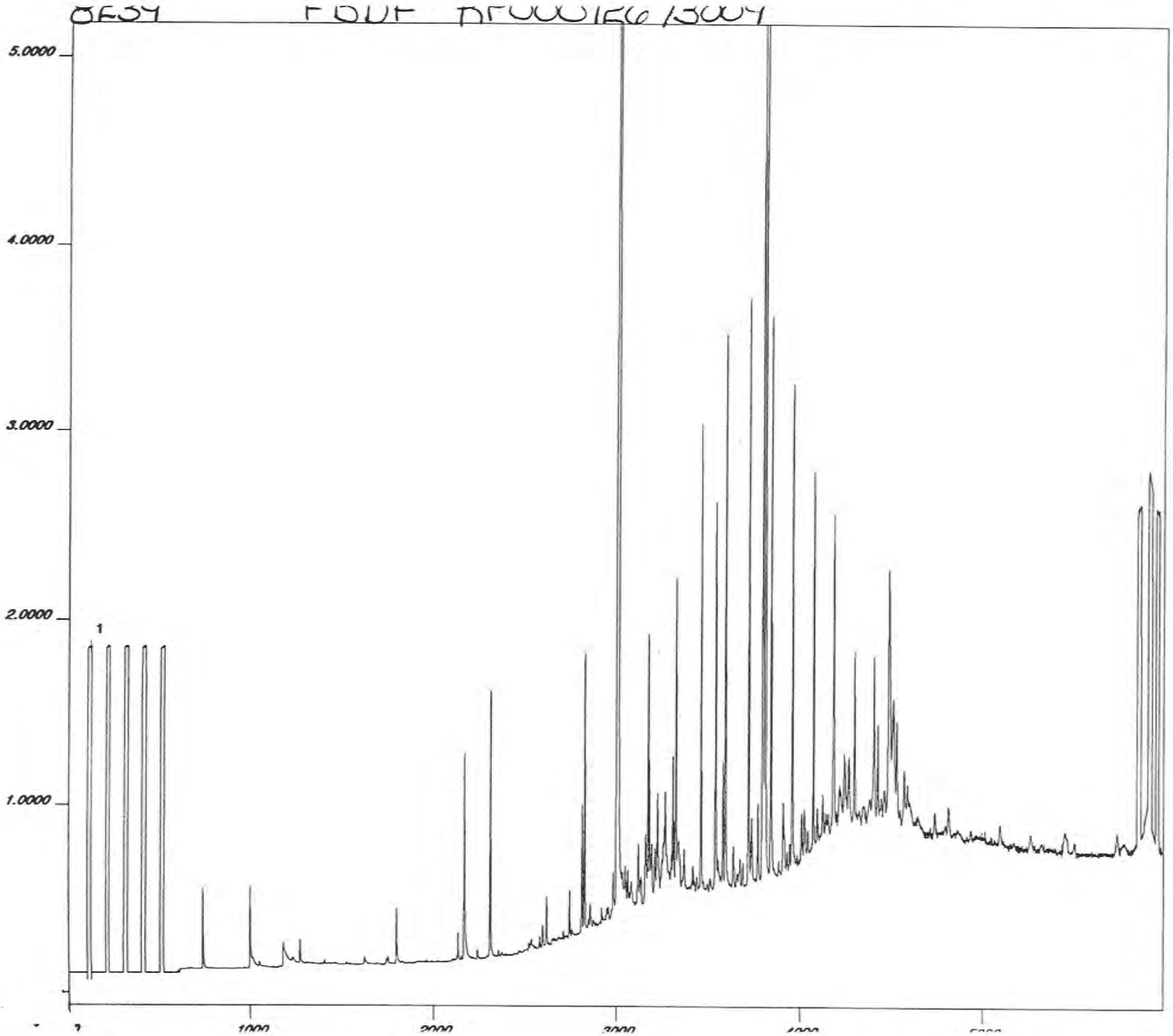
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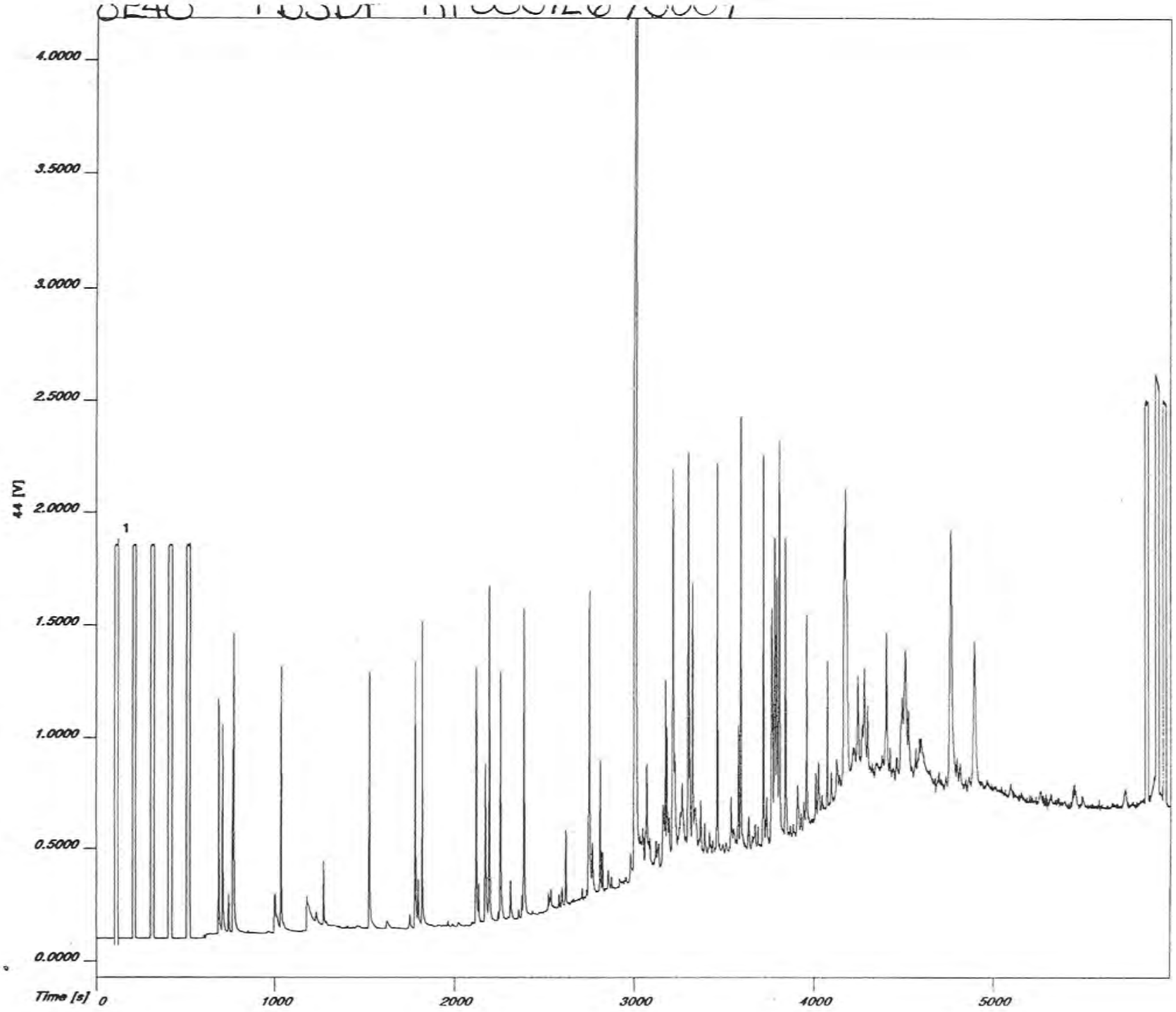
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Time [s]
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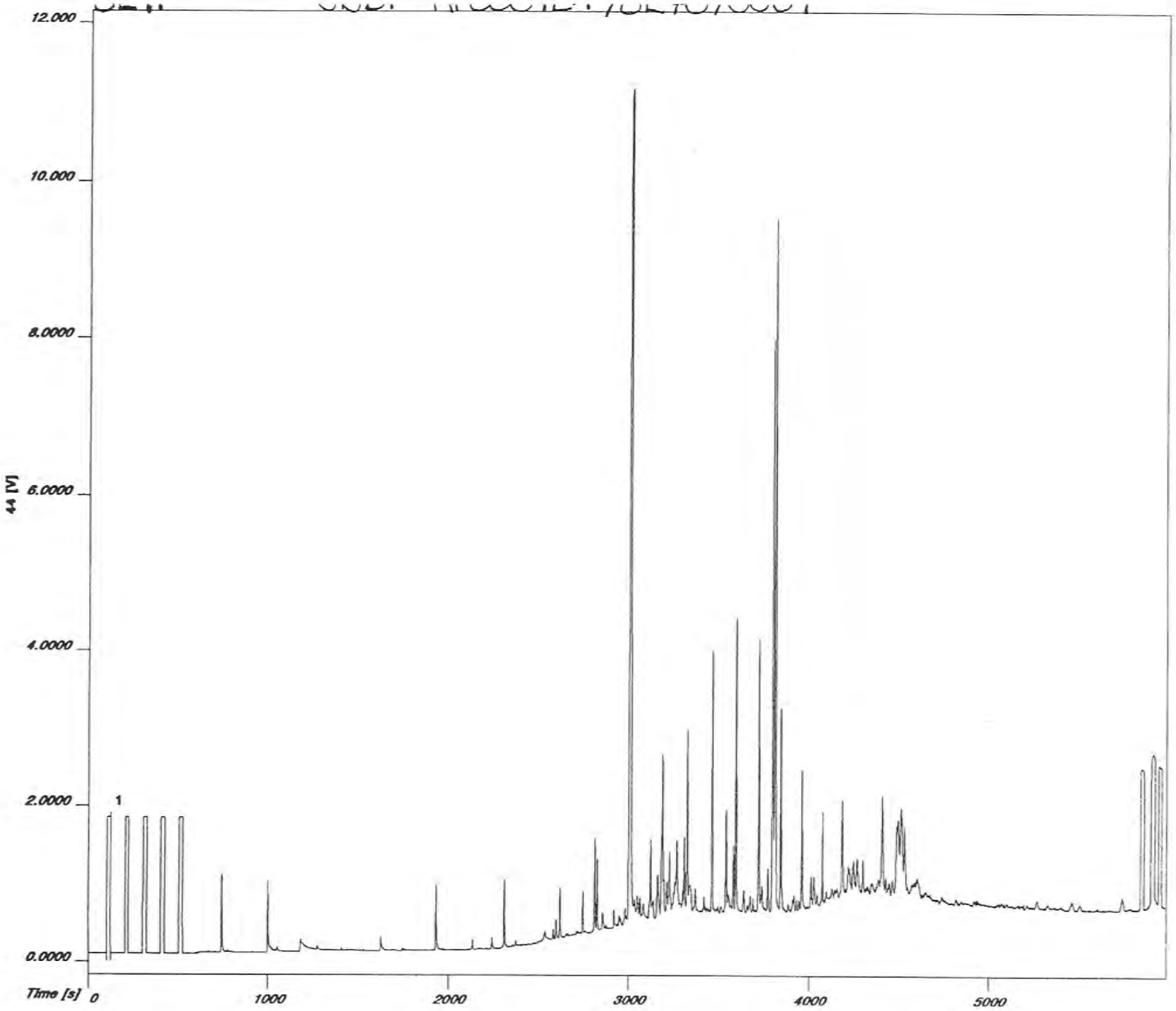
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Time [s]
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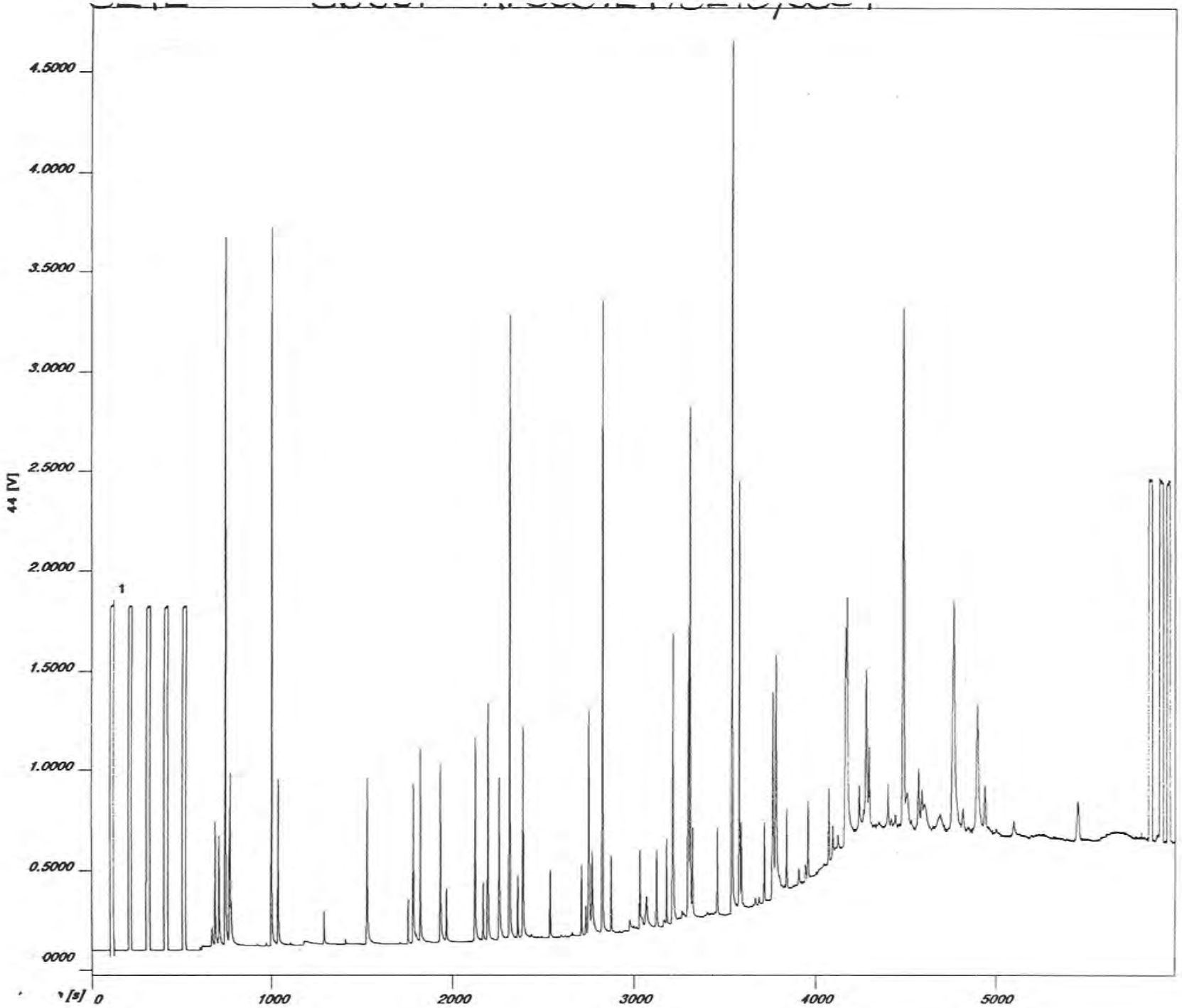
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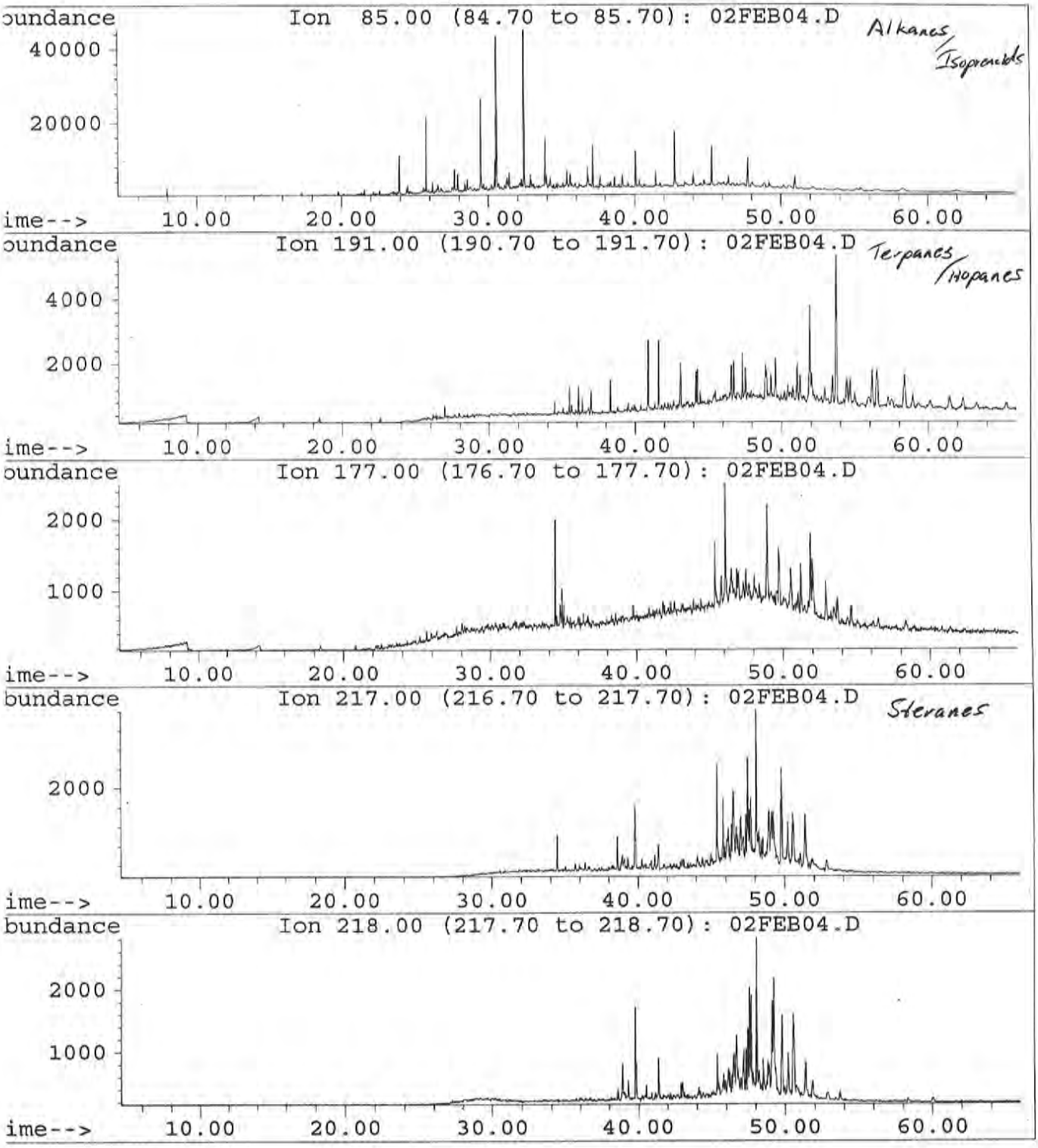
SUB-ATTACHMENT 2D-2.4
Extracted Ion Current Profiles (EICs)

ile : Q:\GC2\2000\MS\02\000202\02FEB04.D
perator : MSB
cquired : 2 Feb 100 3:20 pm using AcqMethod MET4011A
nstrument : GC-2/MS
ample Name: RP000124-01PF CR-8A
isc Info :
ial Number: 5



ile : Q:\GC2\2000\MS\02\000202\02FEB04.D
perator : MSB
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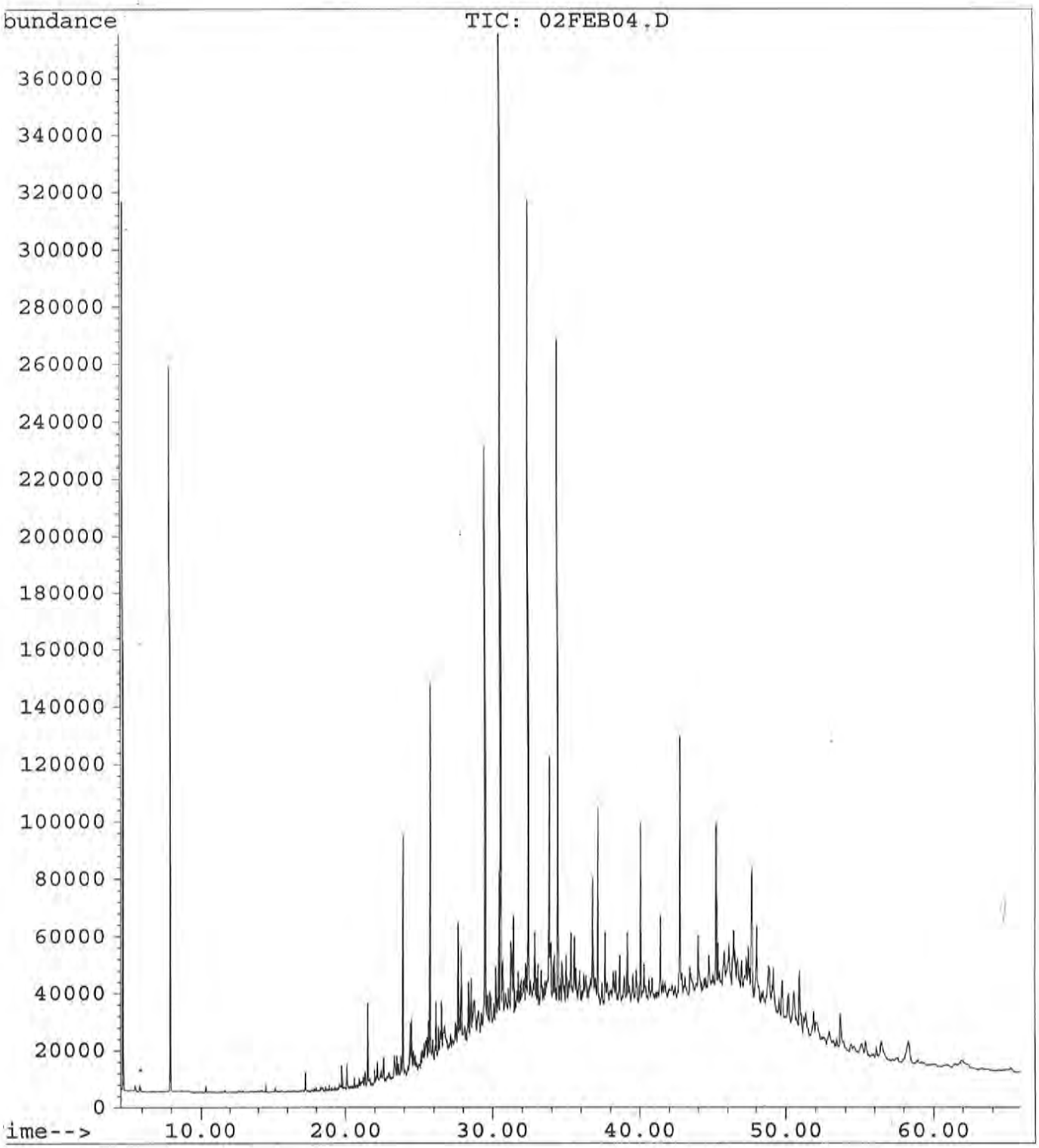
nstrument : GC-2/MS
ample Name: RP000124-01PF CR-8A
isc Info :
ial Number: 5



ile : Q:\GC2\2000\MS\02\000202\02FEB05.D
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equired : 2 Feb 100 4:38 pm using AcqMethod MET4011A
nstrument : GC-2/MS
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isc Info :
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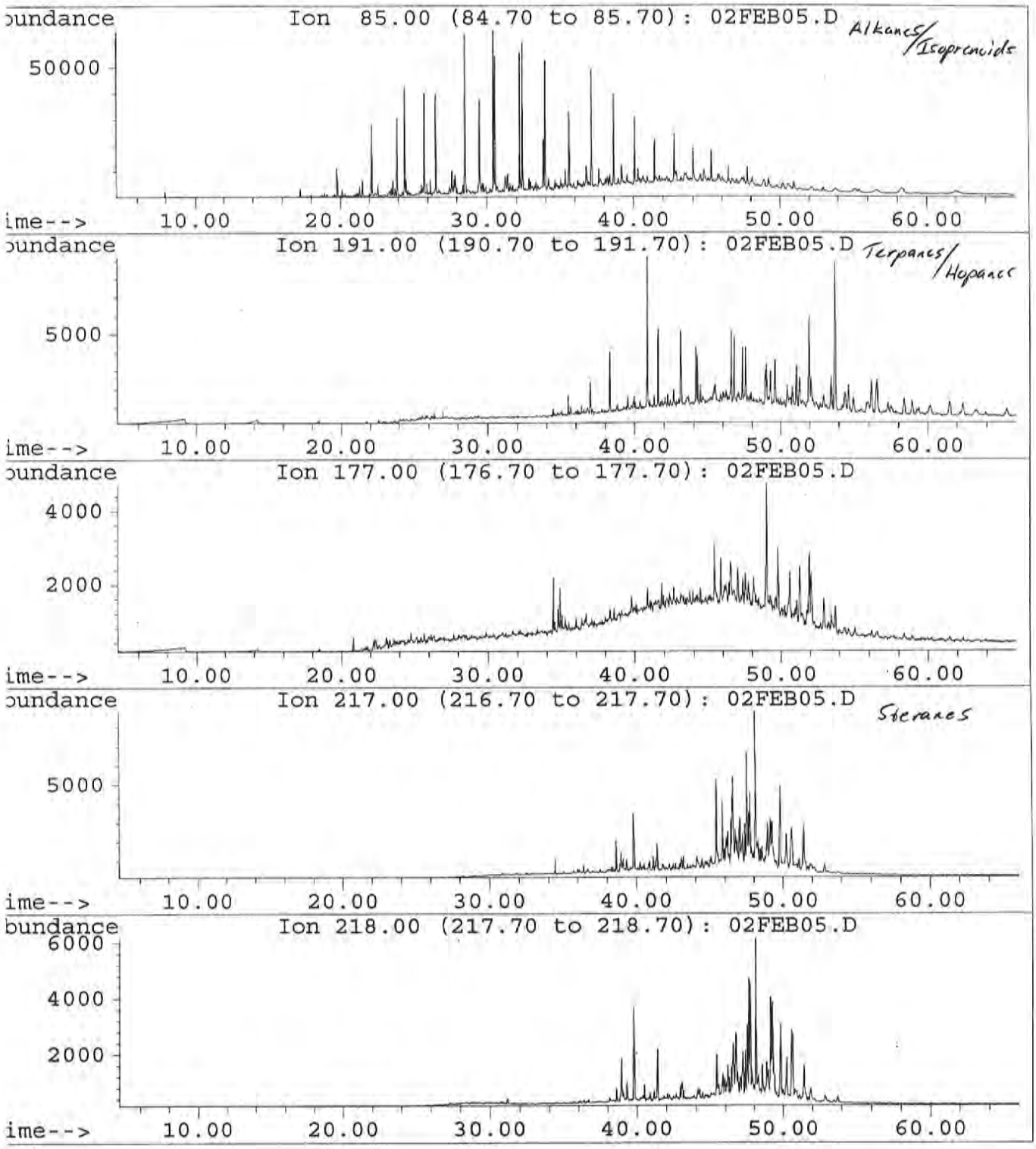

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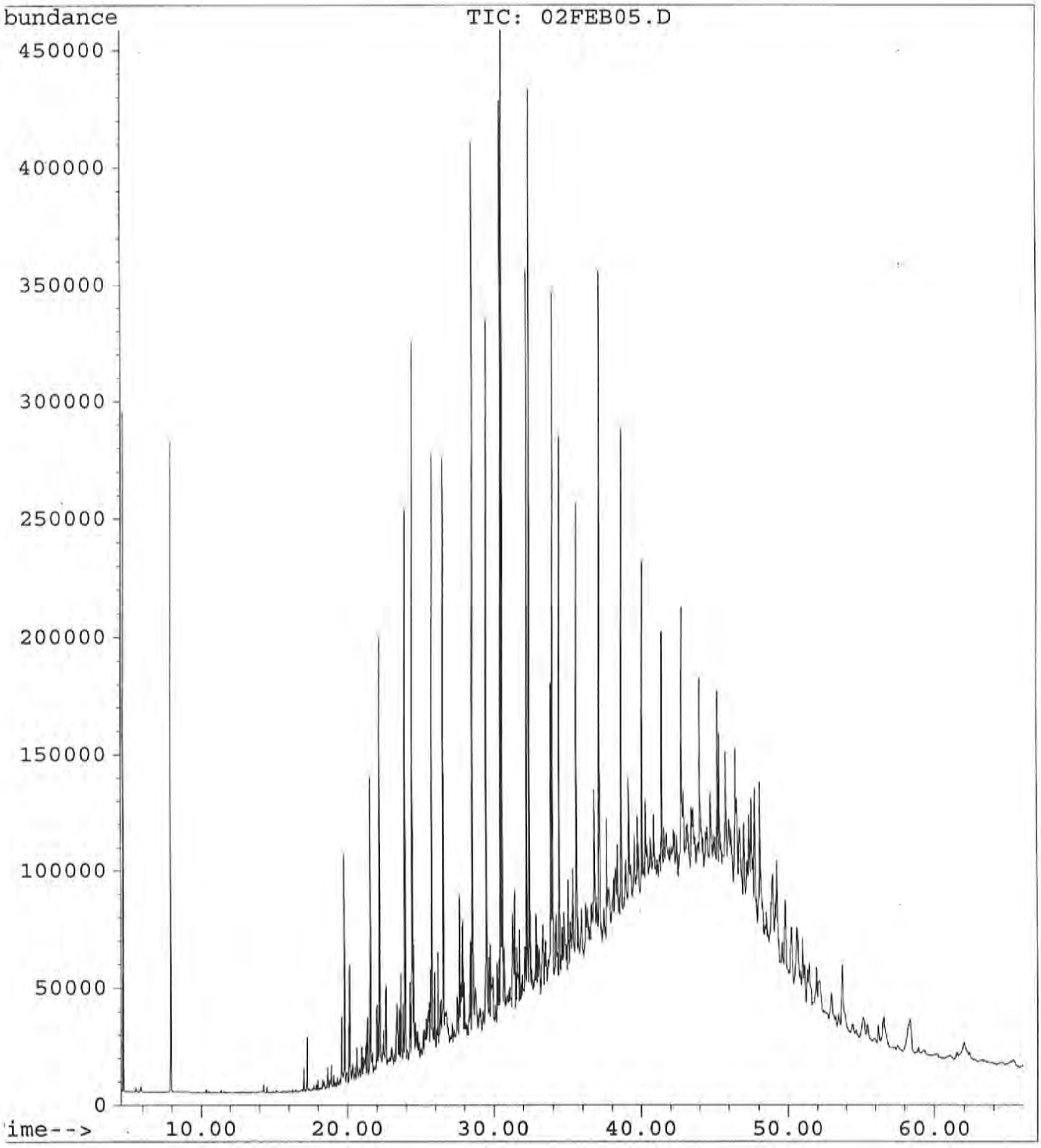
isc Info :
ial Number: 6



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perator : MSB
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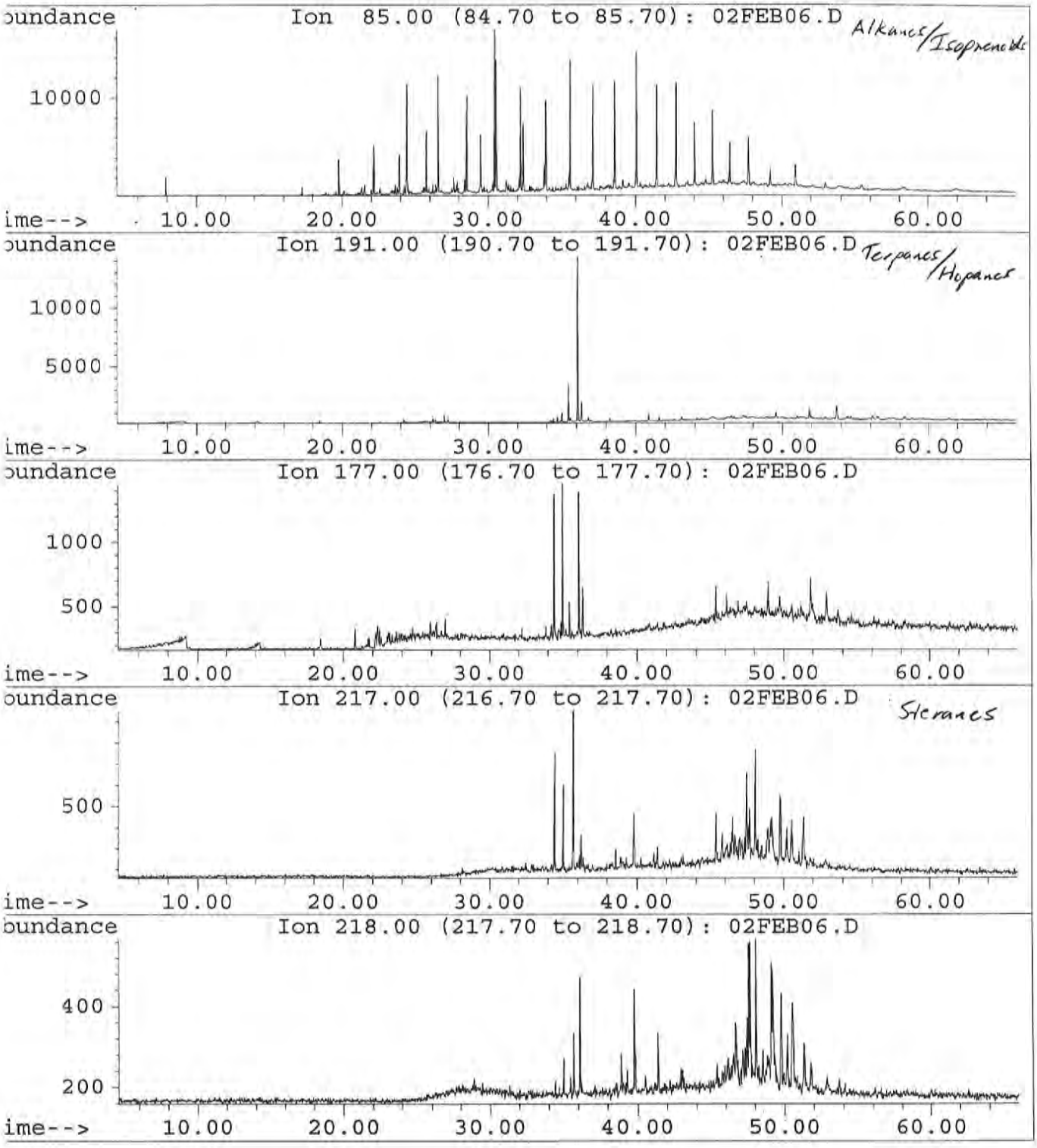
nstrument : GC-2/MS
ample Name: RP000124-03PF CR-19A
isc Info :
ial Number: 7



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perator : MSB
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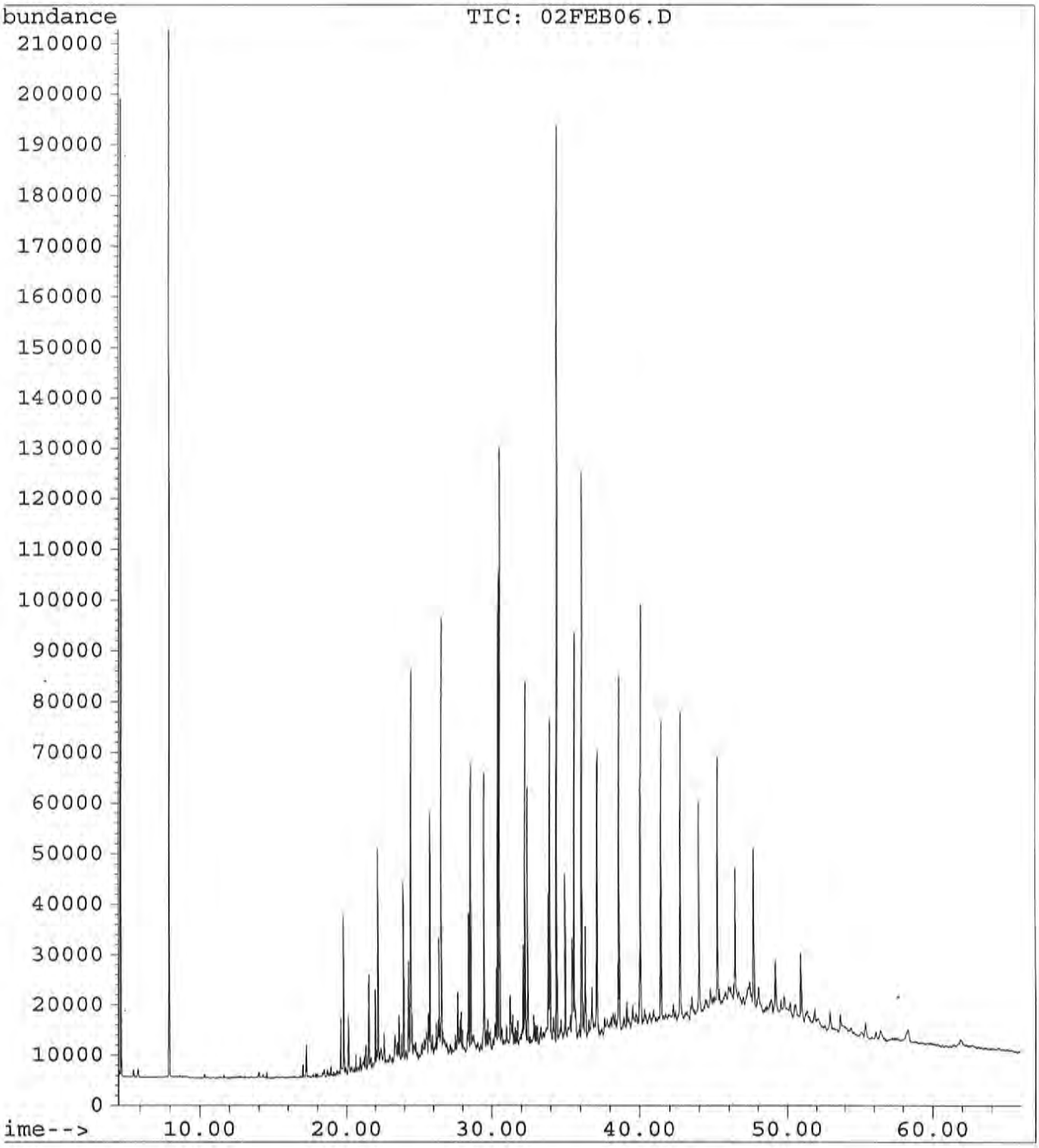
ial Number: 7



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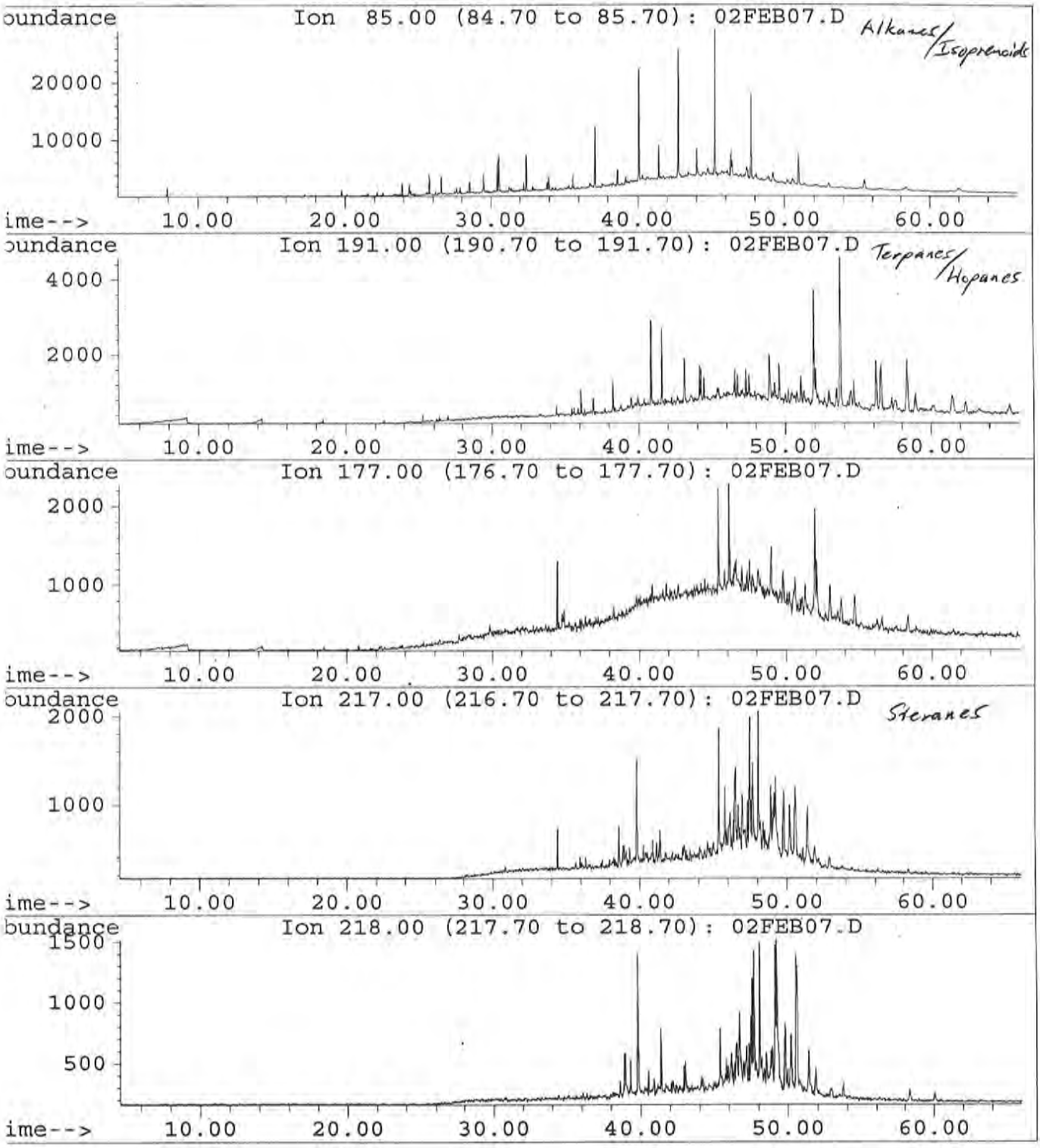
equired : 2 Feb 100 7:14 pm using AcqMethod MET4011A
nstrument : GC-2/MS
ample Name: RP000124-04PF ST-03
isc Info :
ial Number: 8



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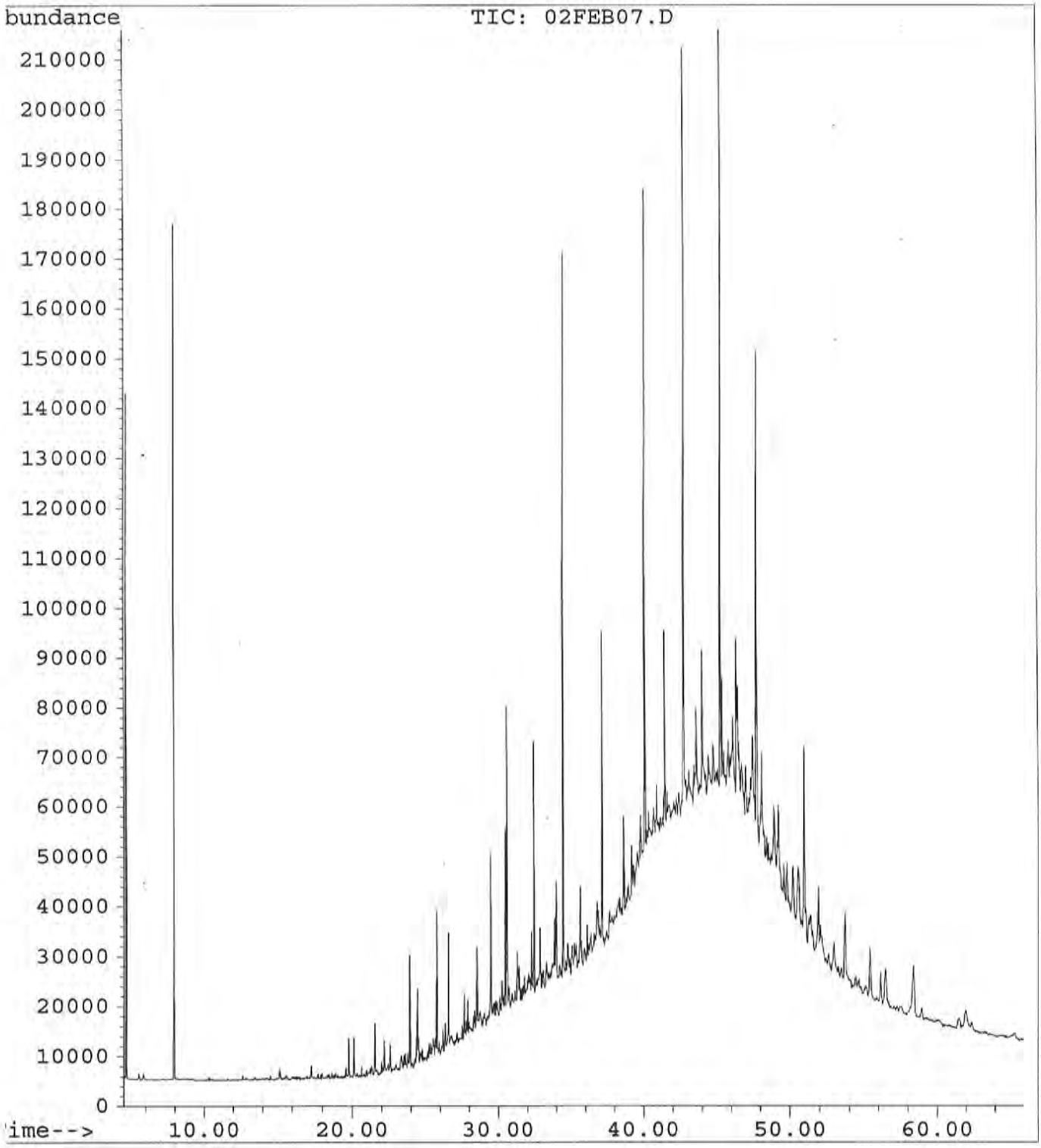
isc Info :
ial Number: 8



ile : Q:\GC2\2000\MS\02\000202\02FEB08.D
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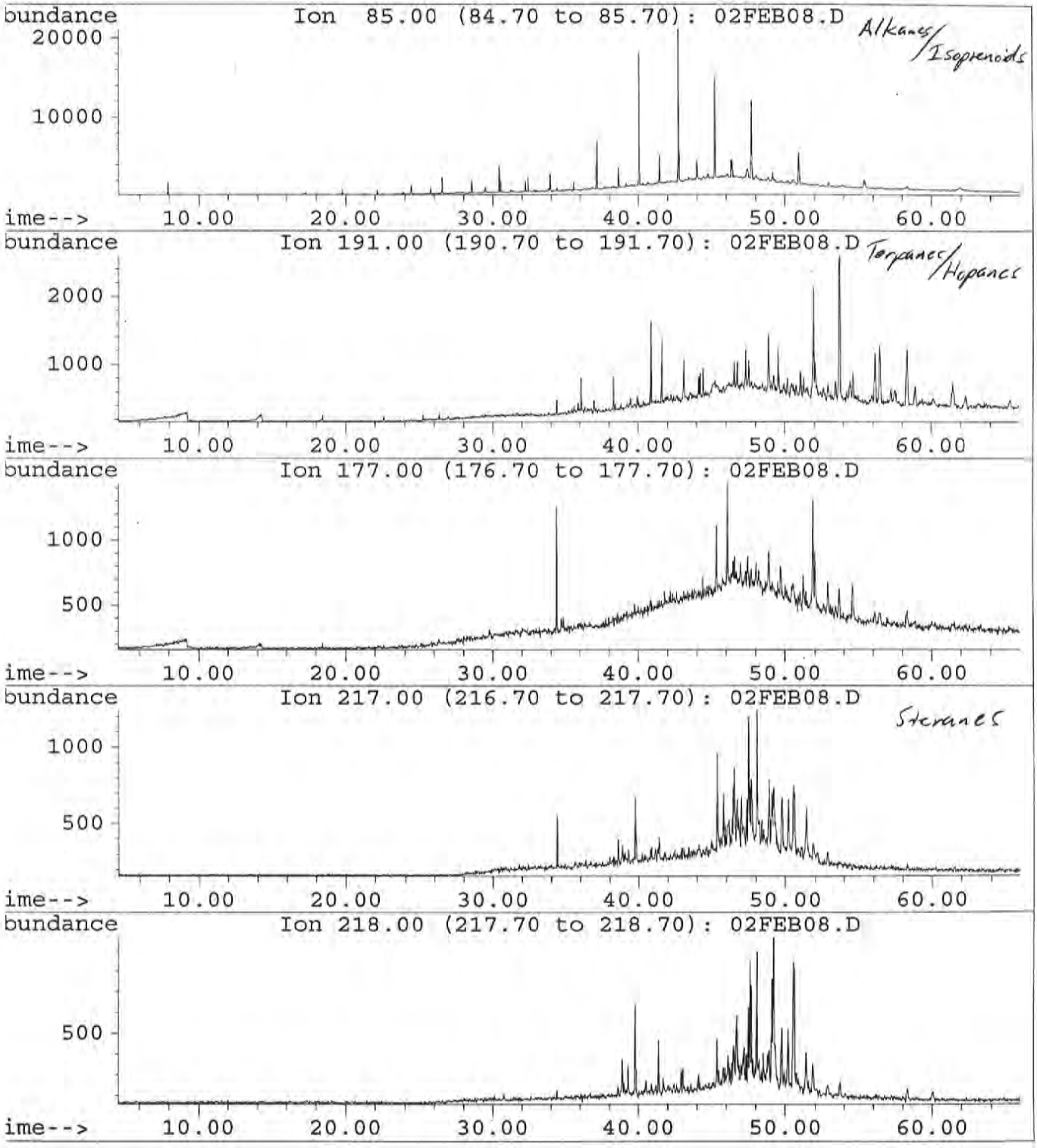
nstrument : GC-2/MS
ample Name: RP000124-05PF ST-08
isc Info :
ial Number: 9



'ile : Q:\GC2\2000\MS\02\000202\02FEB08.D
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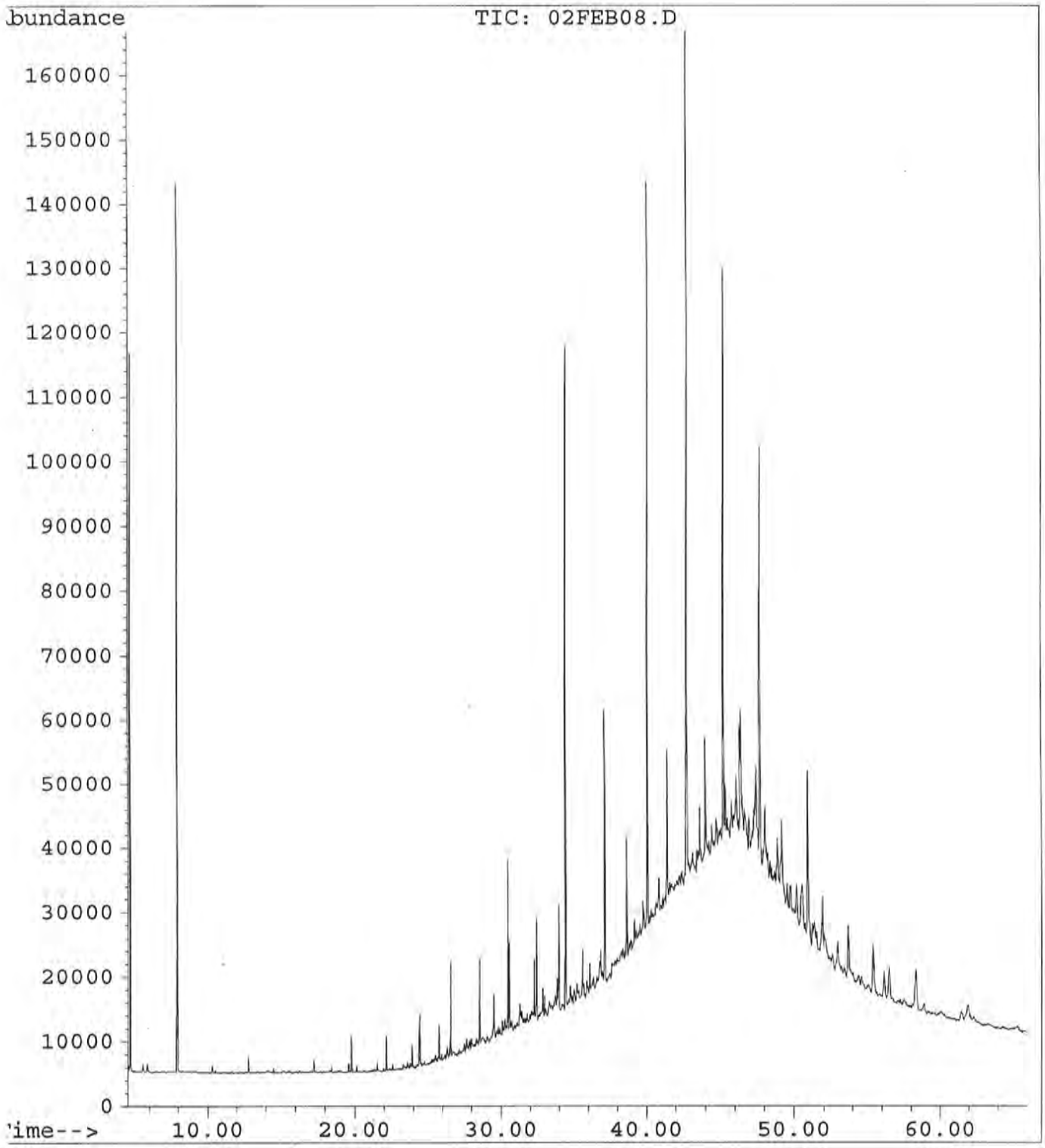
!ample Name: RP000124-05PF ST-08
Misc Info :
'ial Number: 9



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isc Info    :
ial Number: 12
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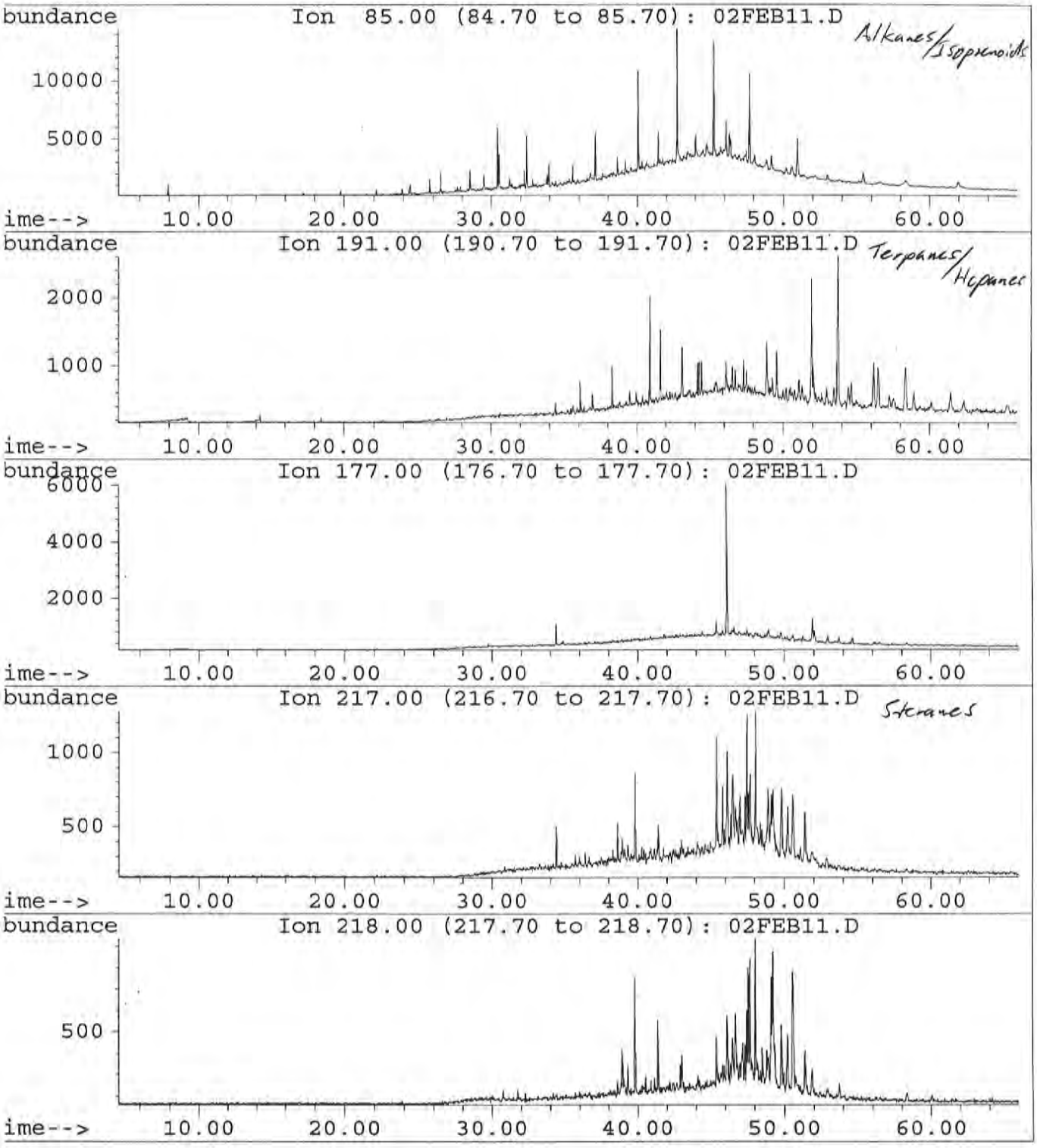

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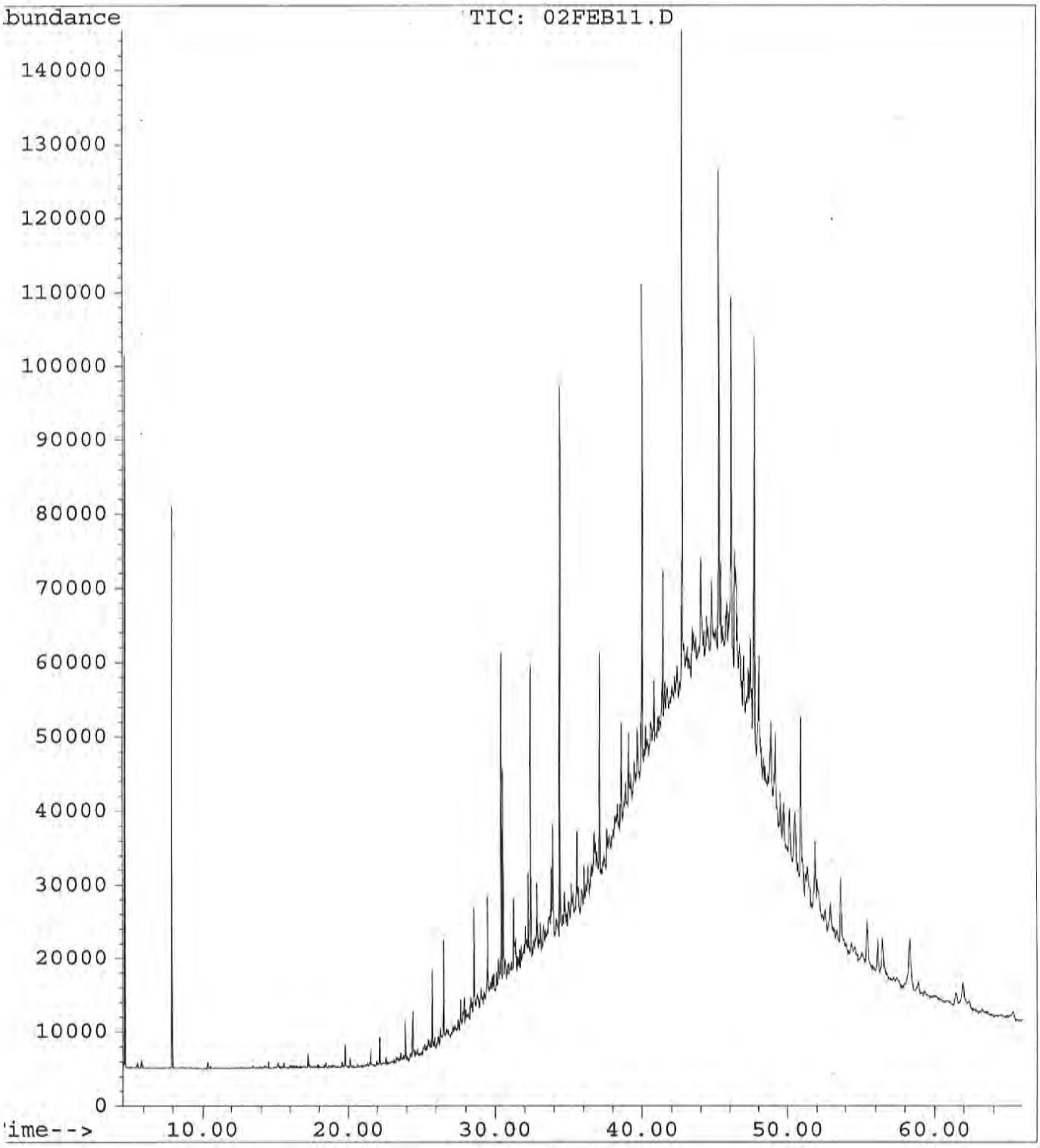

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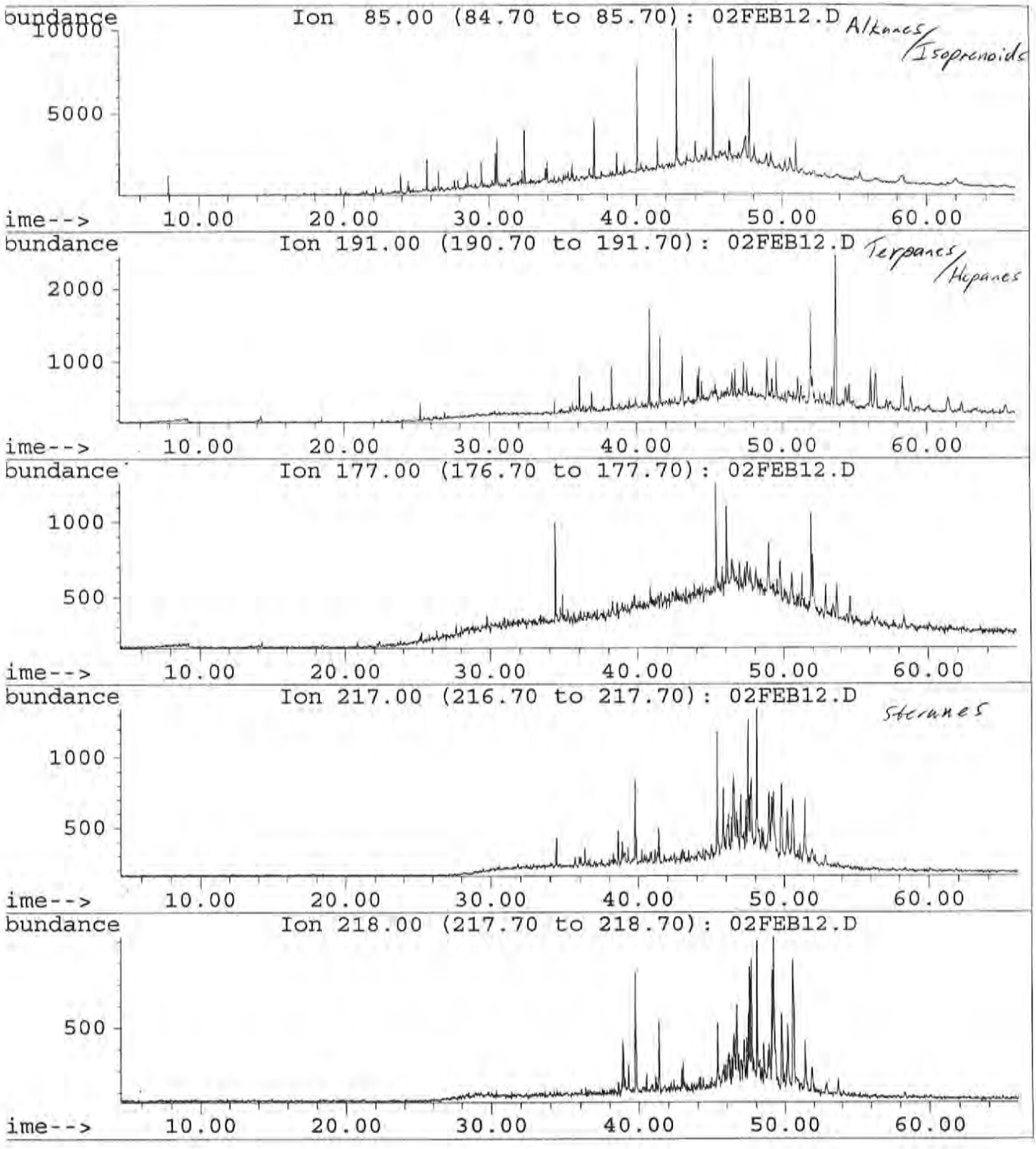

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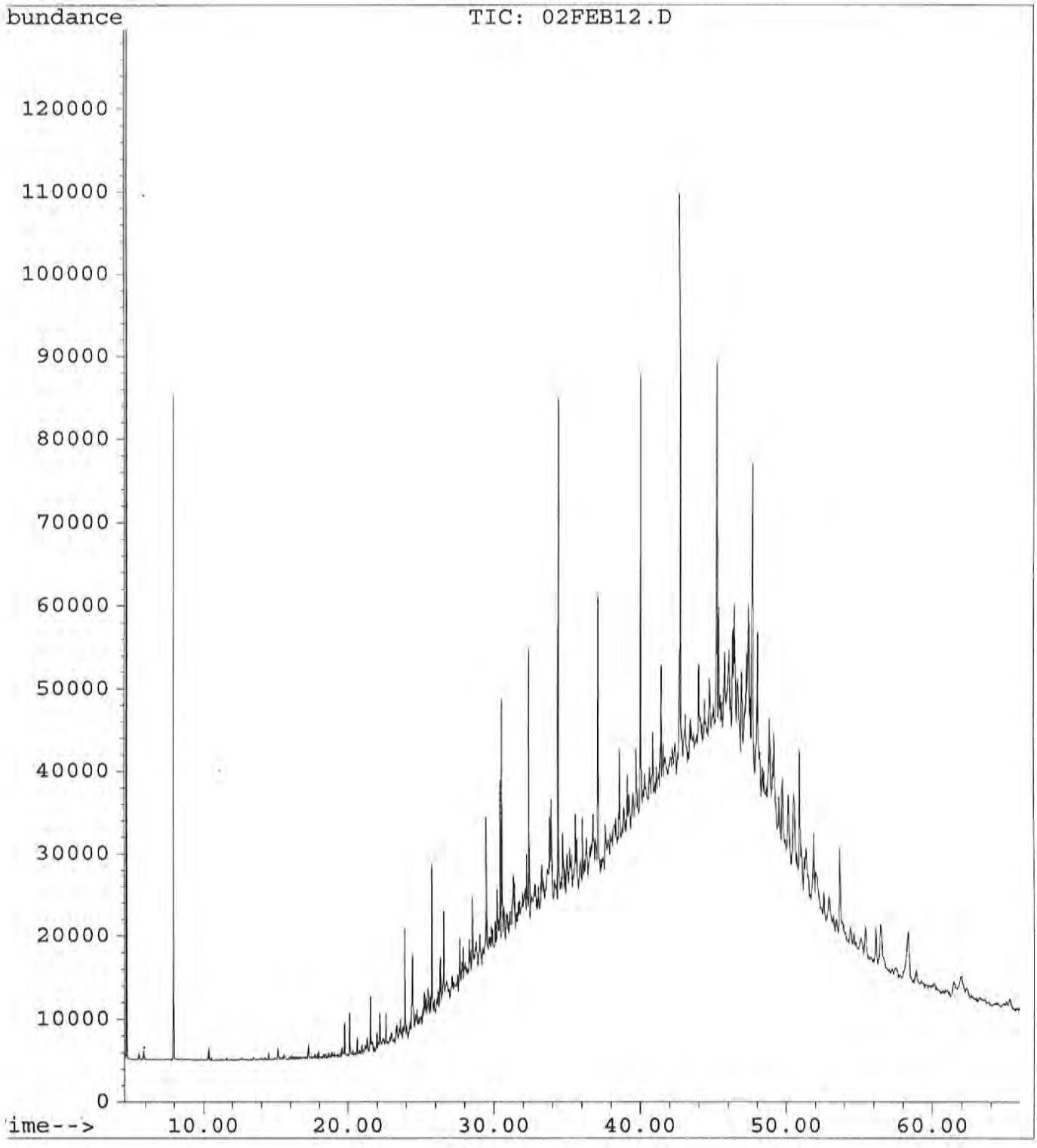

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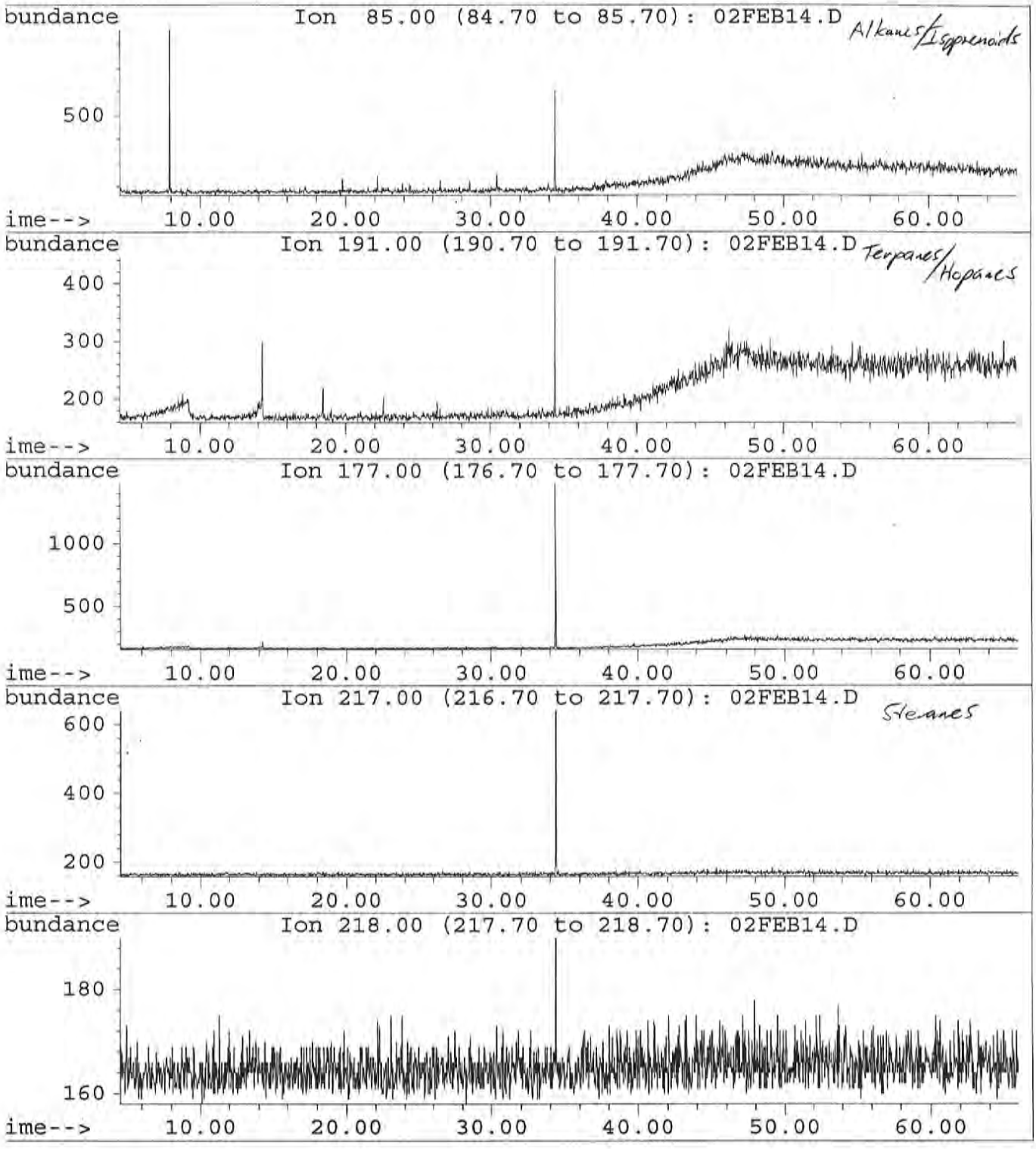

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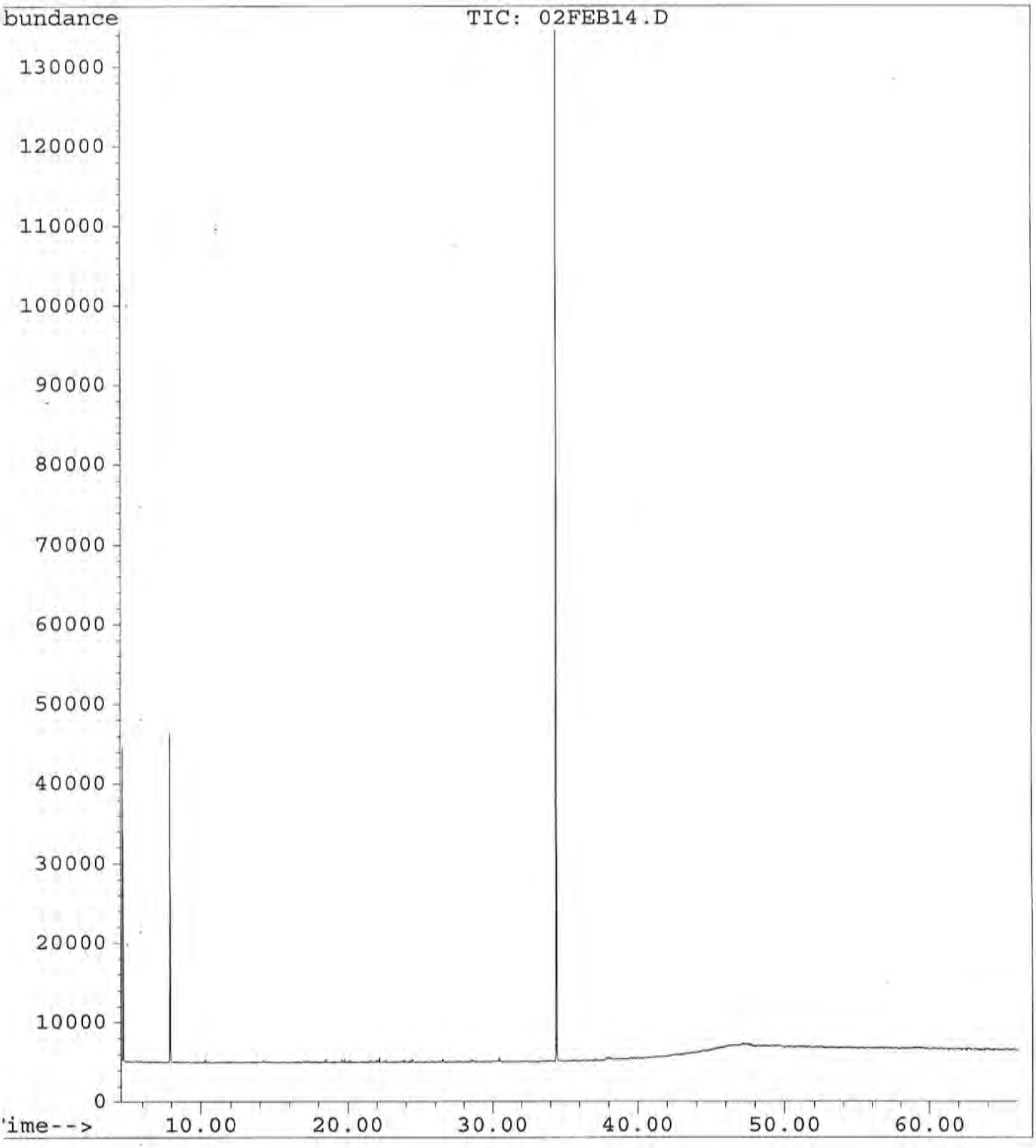
isc Info :
ial Number: 15



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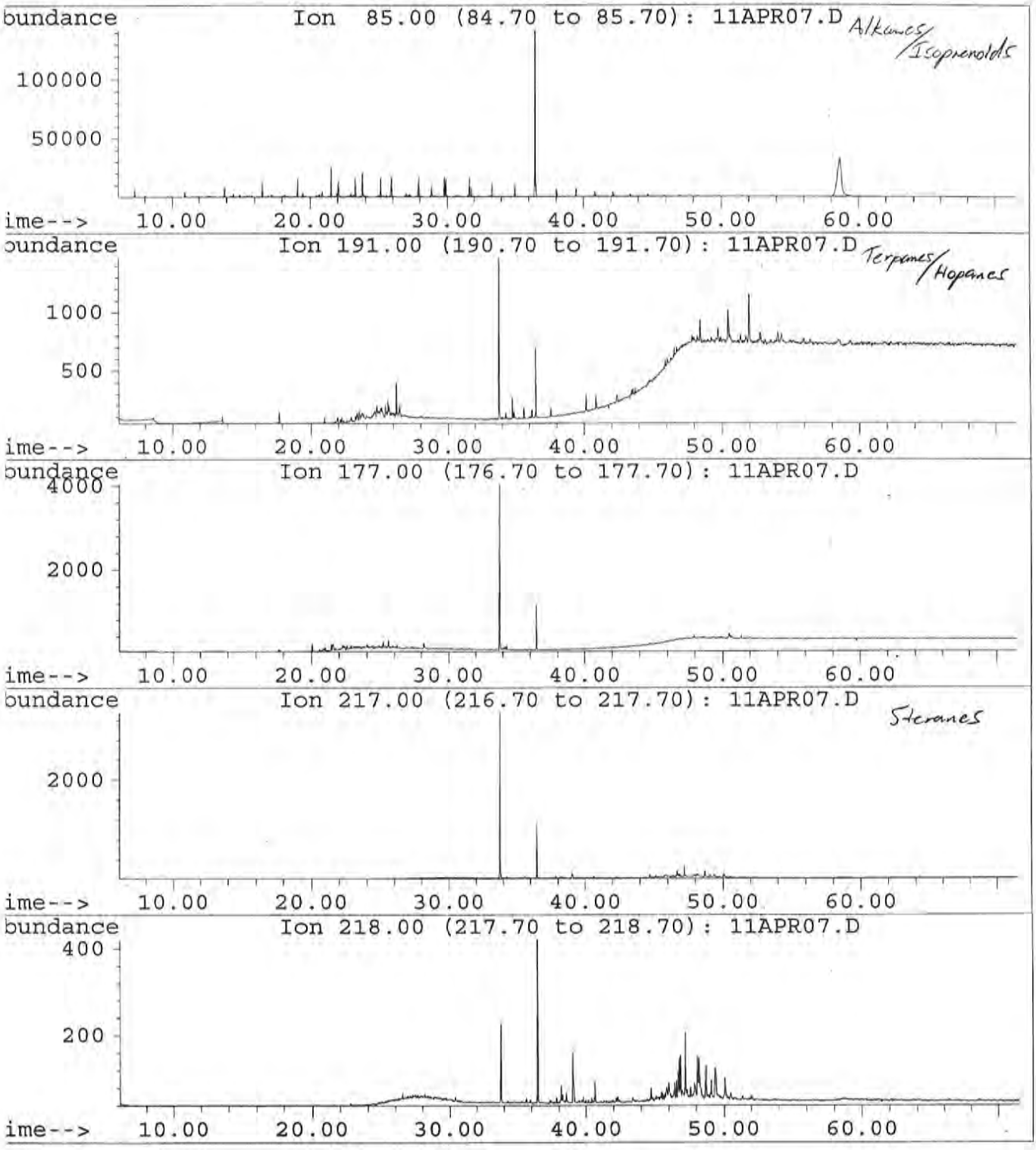
isc Info :
ial Number: 7



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)perator : KTy
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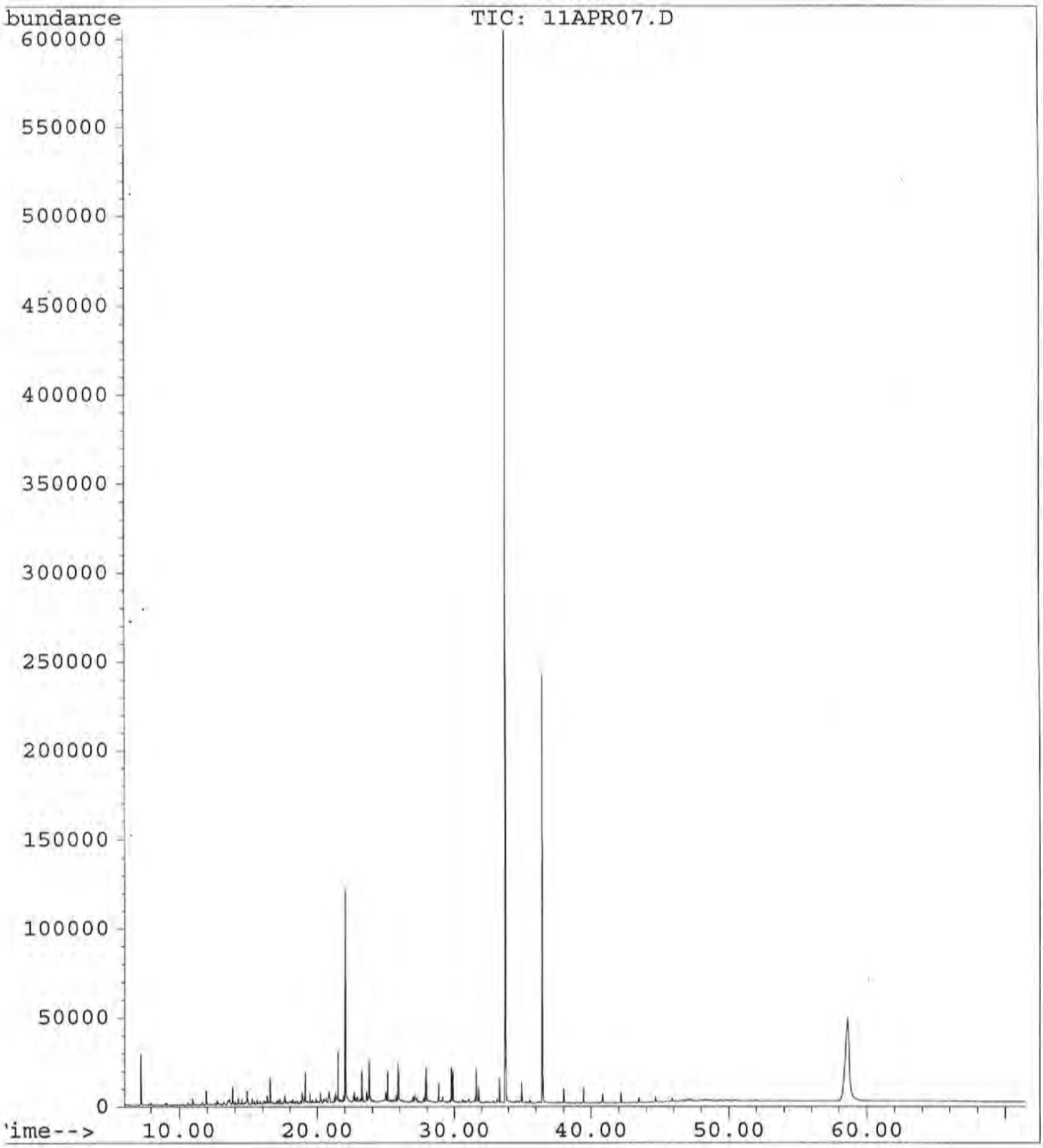
nstrument : GC-4
ample Name: EL980224-01PF MLS-4-1-298
(isc Info :
'ial Number: 7



SUB-ATTACHMENT 2D-2.5
Hydrocarbon Fingerprint Report

TA Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472
TEL: (617) 923-4662
FAX: (617) 923-4610

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.

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

Sincerely,

David M. Mauro
President

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

Lab ID Field ID:	RE980604-01 MW-5 Product		RE980604-02 DW-4 Product		EL980224-01 MLS-4-1-298	
MAHs:						
Benzene	563		2,440		1,760	
Toluene	2,040		6,490		5,540	
Ethylbenzene	1,530		3,130		3,090	
m/p-Xylene	3,520		5,880		5,020	
Styrene	177		2,630		1,600	
o-Xylene	1,620		2,520		2,140	
1,2,4-Trimethylbenzene	3,320		5,460		4,780	
Total MAHs:	**9,450**		**23,100**		**19,100**	
PAHs:						
Naphthalene	84,400	D	131,000	D	117,000	E
2-Methylnaphthalene	38,900	D	49,400	D	47,100	E
1-Methylnaphthalene	23,700	D	27,400	D	25,900	
Acenaphthylene	2,330		7,310		6,910	
Acenaphthene	10,600		10,900		9,930	
Dibenzofuran	3,690		6,000		7,480	
Fluorene	8,680		10,900		11,300	
Phenanthrene	25,700	D	31,900	D	27,500	E
Anthracene	6,460		7,840		7,490	
Fluoranthene	7,560		10,400		9,710	
Pyrene	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	
Indeno(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	
Total PAHs:	**233,000**		**318,000**		**292,000**	
Quantitation Limit:	25.8		29.1		33.3	
Detection Limit:	10.3		11.6		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.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991015-01		RP991015-03		RP991015-04	
Field ID:	CR-01B		CR-8A		CR-10A	
MAHs:						
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	B
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%		I	
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991015-05		RP991015-06		RP991015-07	
Field ID:	CR-13C (108)		CR-14A		CR-18A	
MAHs:						
Benzene	11.8		3.63		1.42	
Toluene	5.58		1.59		2.91	
Ethylbenzene	29.0	B	9.58	B	10.9	B
m/p-Xylene	41.0	B	6.45	B	11.9	B
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		139	
1-Methylnaphthalene	46.3	B	173	B	85.4	B
Acenaphthylene	1.54	U	10.6		3.59	
Acenaphthene	3.87		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		I	157		23.9	
Chrysene	1.54	U	124		24.5	
Benzo(b)fluoranthene	1.54	U	78.8		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	
Detection Limit:	0.62		0.35		0.09	
Fluorobenzene (SS1)	65%		61%		60%	
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991019-SB Soil Blank		RP991019-SBS Soil Blank Spike
MAHs:			
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		
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991015-01 CR-01B		RP991015-01D CR-01B		Laboratory Duplicate Relative Percent Difference
MAHs:					
Benzene	0.23	U	0.17	U	
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		
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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991021-01		RP991021-03		RP991021-04	
Field ID:	FP-01		FP-03		ST-01	
MAHs:						
Benzene	0.70	U	8.04		1.19	J
Toluene	1.70		2.11		2.43	
Ethylbenzene	1.06	B	1.15	B	3.38	B
m/p-Xylene	2.86	B	2.15	B	5.12	B
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	B	0.95	B	1.07	JB
Total MAHs:	**6.65**		**14.3**		**12.1**	
PAHs:						
Naphthalene	16.7	B	100	B	8.65	B
2-Methylnaphthalene	15.8	B	32.6	B	5.03	B
1-Methylnaphthalene	96.1	B	15.8	B	11.7	B
Acenaphthylene	7.11		84.9		2.87	
Acenaphthene	36.2		123		14.4	
Dibenzofuran	6.94		19.9		2.83	
Fluorene	22.2		230		12.4	
Phenanthrene	46.4	B	2,360	BD	23.6	B
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		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		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID	RP991021-05		RP991021-06		RP991021-10	
Field ID:	ST-02		ST-03		ST-08	
MAHs:						
Benzene	1.93		1.90	U	1.78	U
Toluene	2.25		1.22	J	1.06	J
Ethylbenzene	2.11	B	2.15	B	2.58	B
m/p-Xylene	3.55	B	3.17	B	3.30	B
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:						
Naphthalene	11.0	B	5.88	B	1.69	JB
2-Methylnaphthalene	3.25	B	35.9	B	1.78	U
1-Methylnaphthalene	4.23	B	30.7	B	2.30	B
Acenaphthylene	4.13		1.19	J	0.75	J
Acenaphthene	4.84		14.1		0.97	J
Dibenzofuran	1.70		2.83		1.78	U
Fluorene	3.86		10.9		0.75	J
Phenanthrene	12.2	B	20.6	B	3.48	B
Anthracene	6.94		6.83		1.13	J
Fluoranthene	109		16.4		14.5	
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		1.90	U	1.25	J
Benzo(g,h,i)perylene	51.6		8.80		14.0	
Total PAHs:	**635**		**221**		**118**	
Quantitation Limit:	1.11		1.90		1.78	
Detection Limit:	0.45		0.76		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

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		1.64		1.21	
Ethylbenzene	3.12	B	2.21	B	1.93	B
m/p-Xylene	5.25	B	2.66	B	2.94	B
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:						
Naphthalene	8.73	B	10.6	B	8.46	B
2-Methylnaphthalene	1.21	JB	2.59	B	0.74	JB
1-Methylnaphthalene	2.84	B	4.14	B	1.66	B
Acenaphthylene	1.48	J	4.12		0.82	J
Acenaphthene	1.96		3.43		0.58	J
Dibenzofuran	1.09	J	1.47		0.61	J
Fluorene	2.45		3.38		0.56	J
Phenanthrene	6.25	B	7.27	B	1.89	B
Anthracene	2.09		3.28		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		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		15.2		3.93	
Dibenz(a,h)anthracene	1.69	U	1.68		2.46	
Benzo(g,h,i)perylene	6.72		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%		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.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	DA991021-SB Soil Blank		DA991021-SBS 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:			
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		

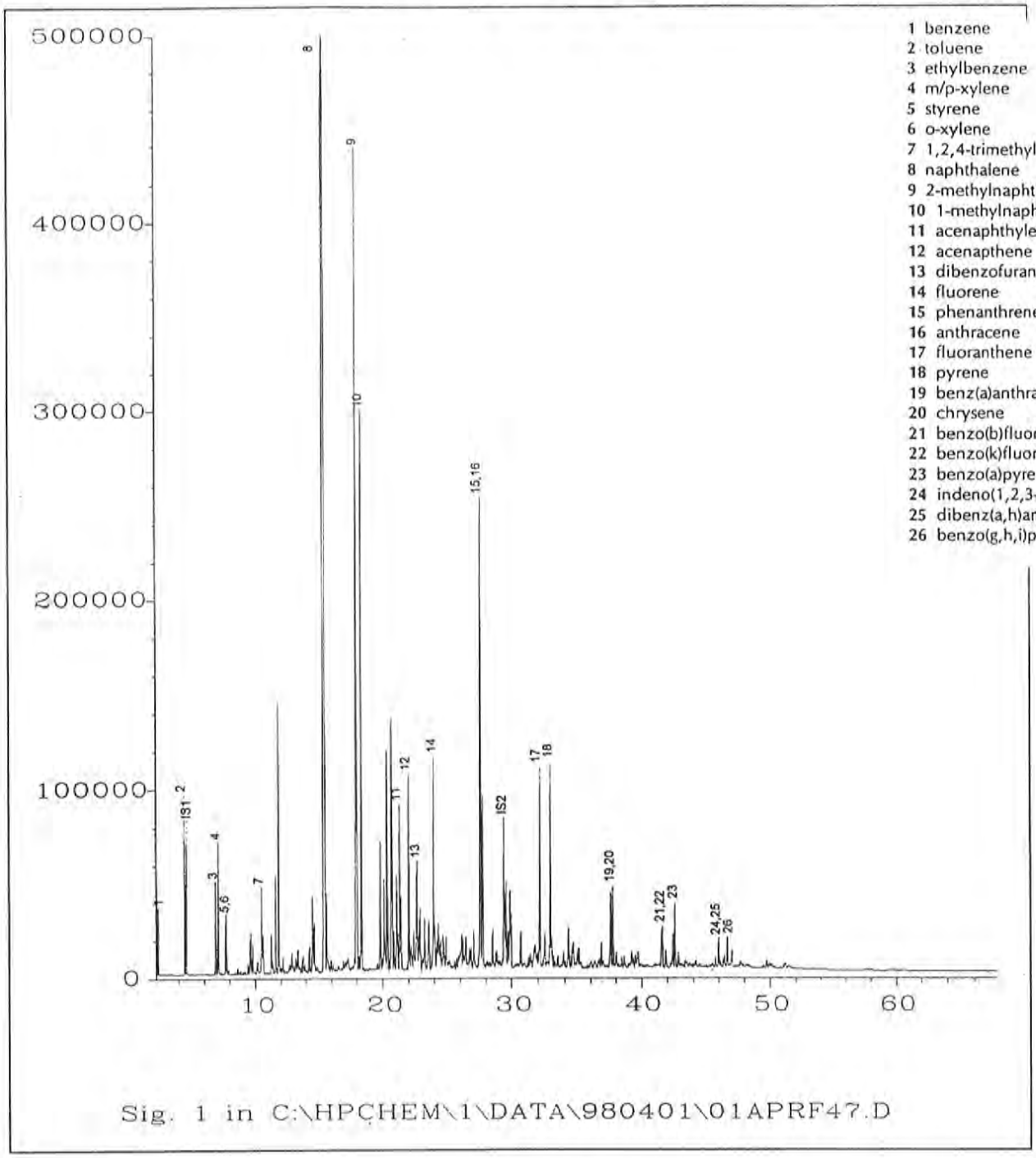
B = Analyte detected in the blank
D = Values from a diluted sample extract
DL = QC compounds diluted out
E = Estimated value, above calibration range
I = Interference
J = Estimated value
L = Coeluted with compound listed above
NM = Not measured
U = Not detected at quantitation limit shown
Total MAHs does not include 1,2,4-Trimethylbenzene.
Total PAHs does not include Dibenzofuran.
All soil results reported on a dry weight basis.

ANALYTICAL RESULTS
MAHs and PAHs
Client: RETEC Project: Gas Works Park

Lab ID Field ID:	RP991021-16 ST-35	RP991021-16MS 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.
All soil results reported on a dry weight basis.

GC/FID Fingerprint

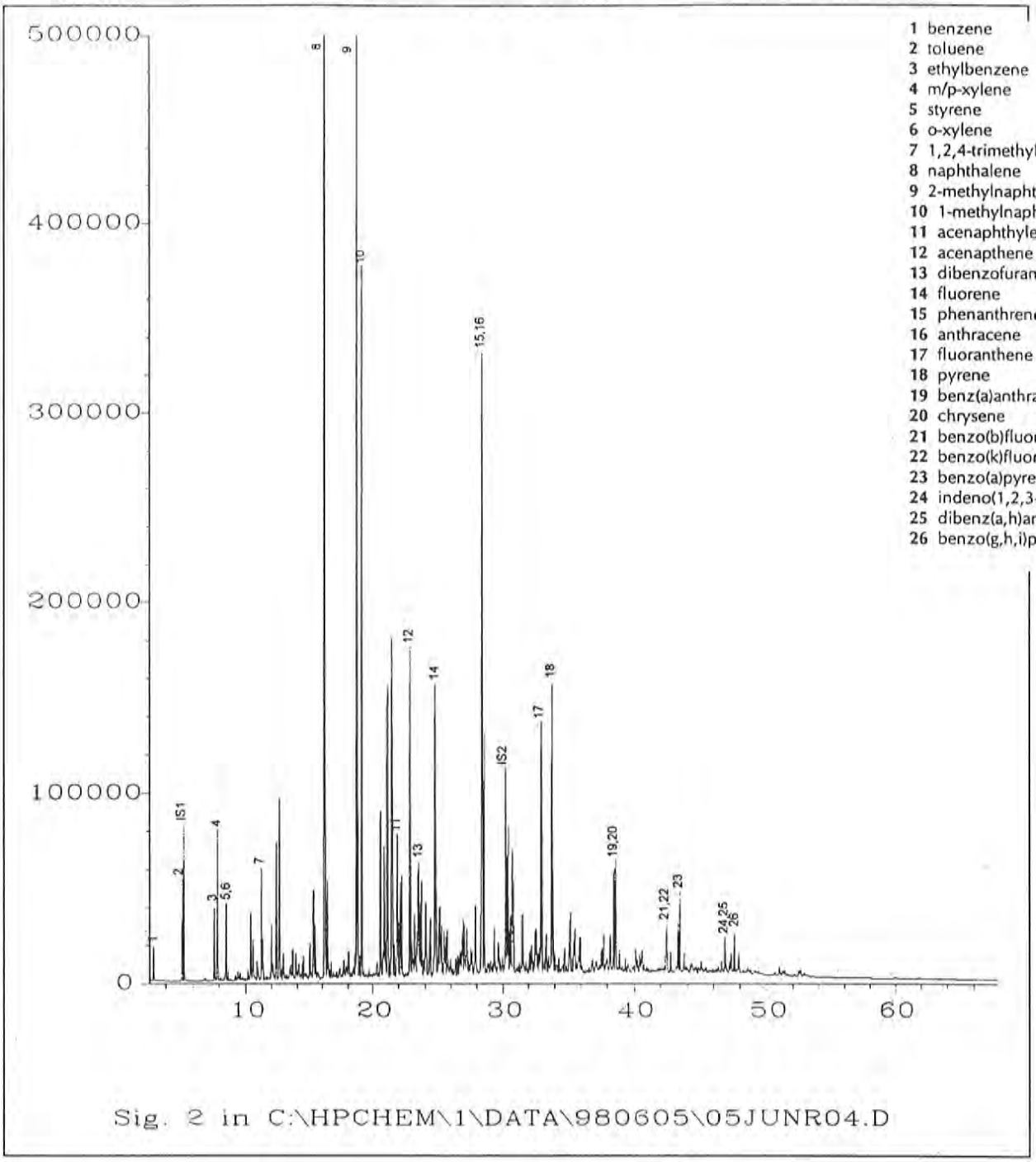


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**MLS-4-1-298**
Laboratory ID:	EL980224-01
Method:	MET4007D

META

GC/FID Fingerprint

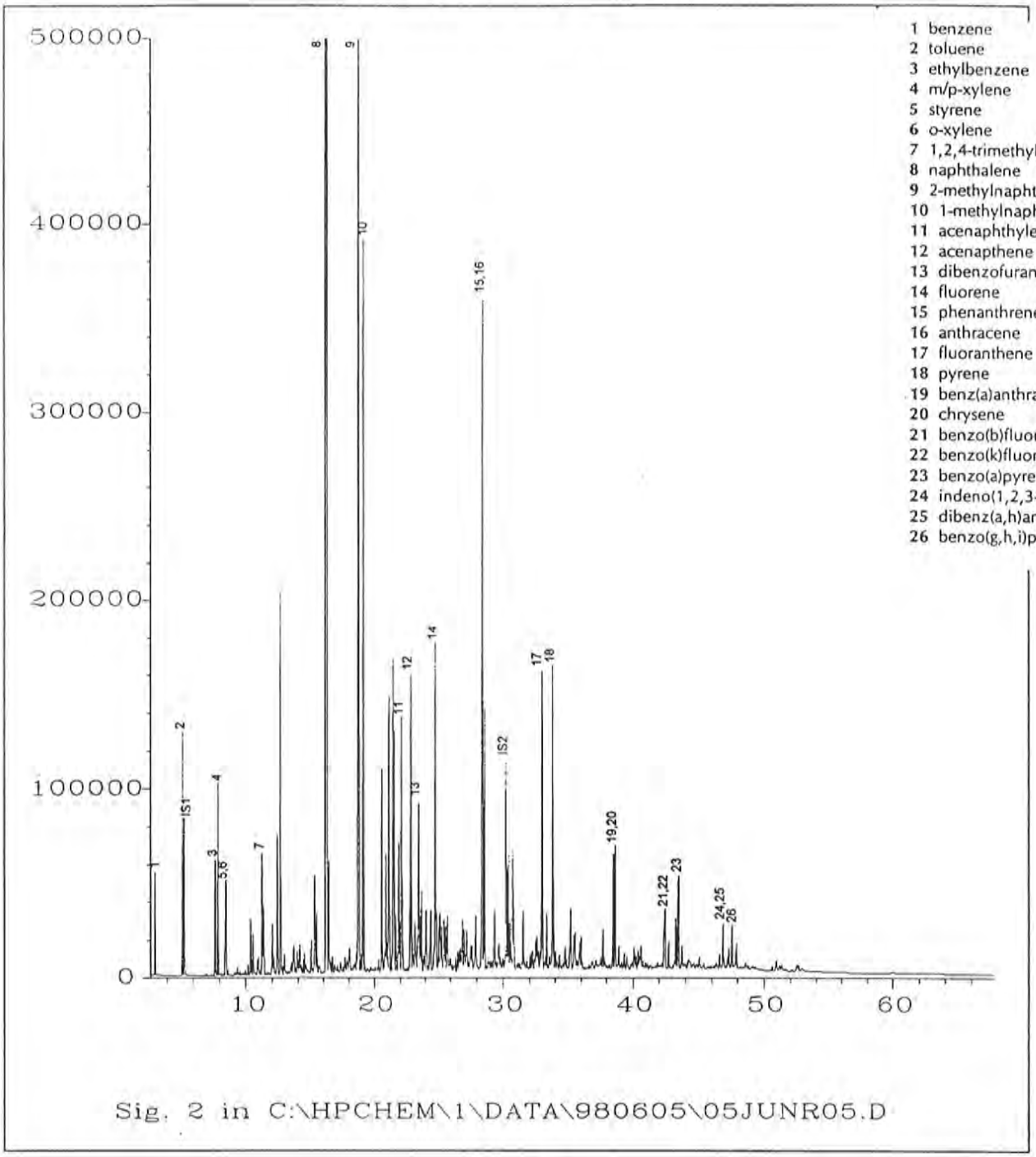


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**MW-5 Product**
Laboratory ID:	RE980604-01
Method:	MET4007D

META

GC/FID Fingerprint

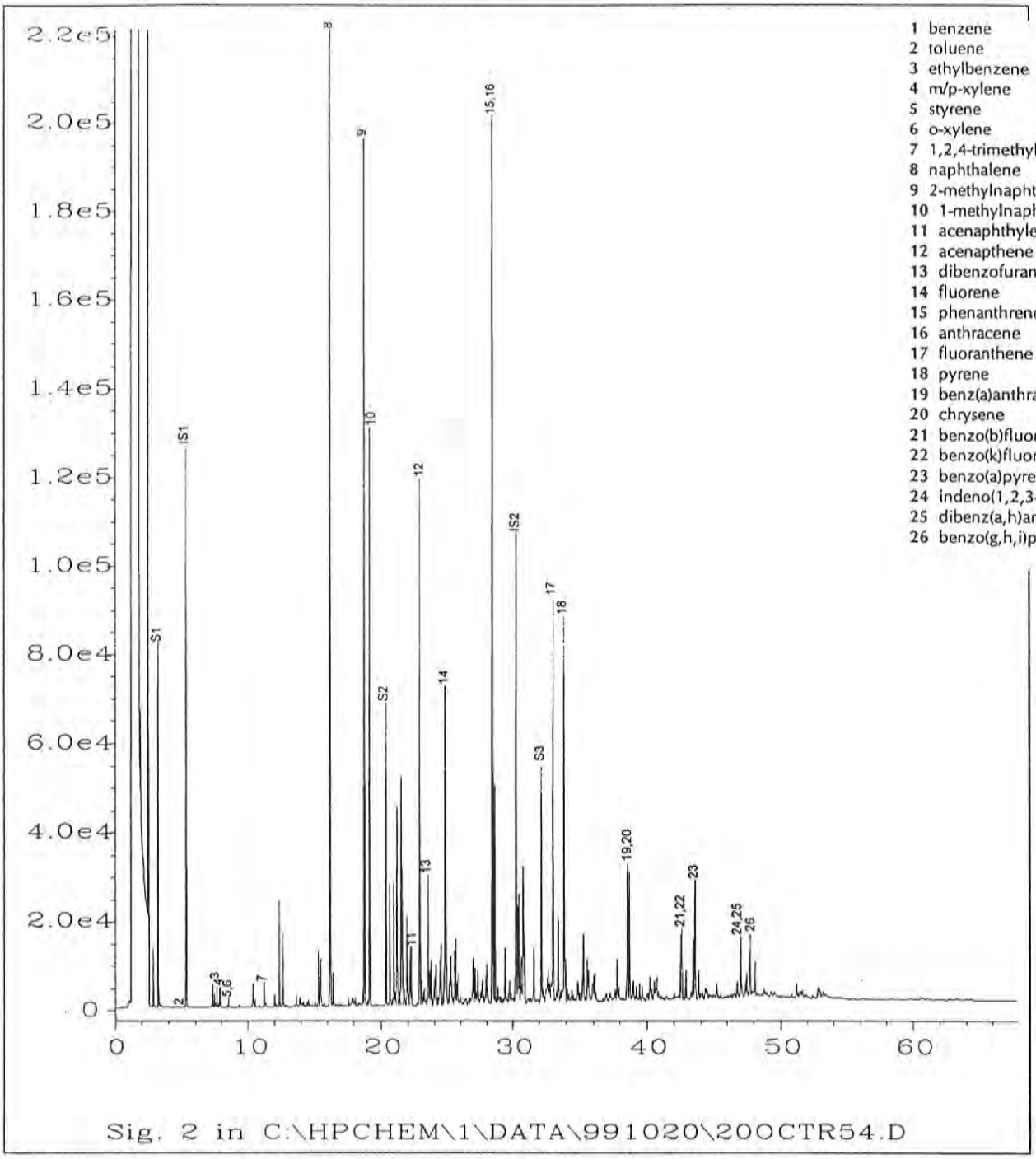


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**DW-4 Product**
Laboratory ID:	RE980604-02
Method:	MET4007D

META

GC/FID Fingerprint

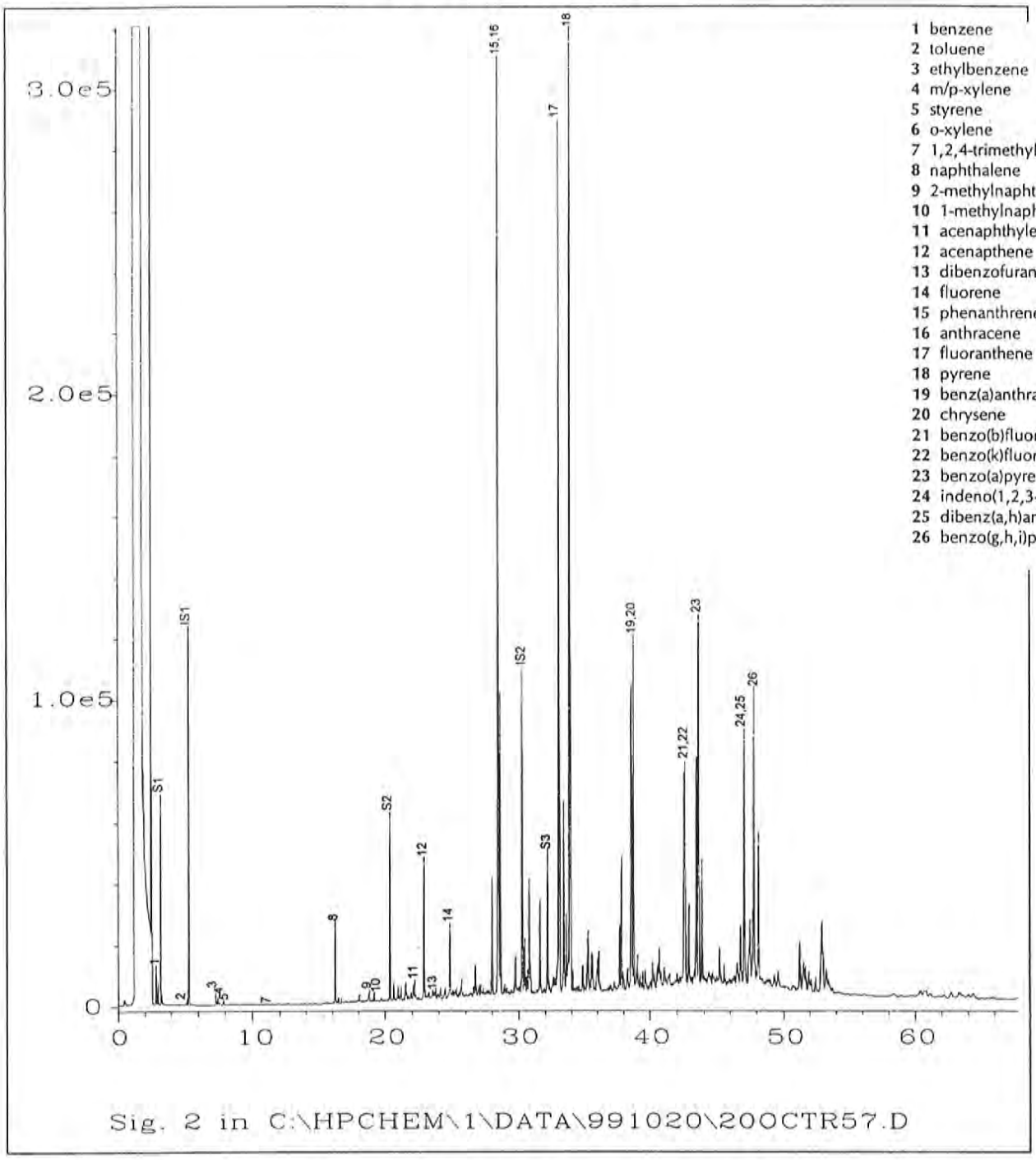


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-01B**
Laboratory ID:	RP991015-01
Method:	MET4007D

META

GC/FID Fingerprint

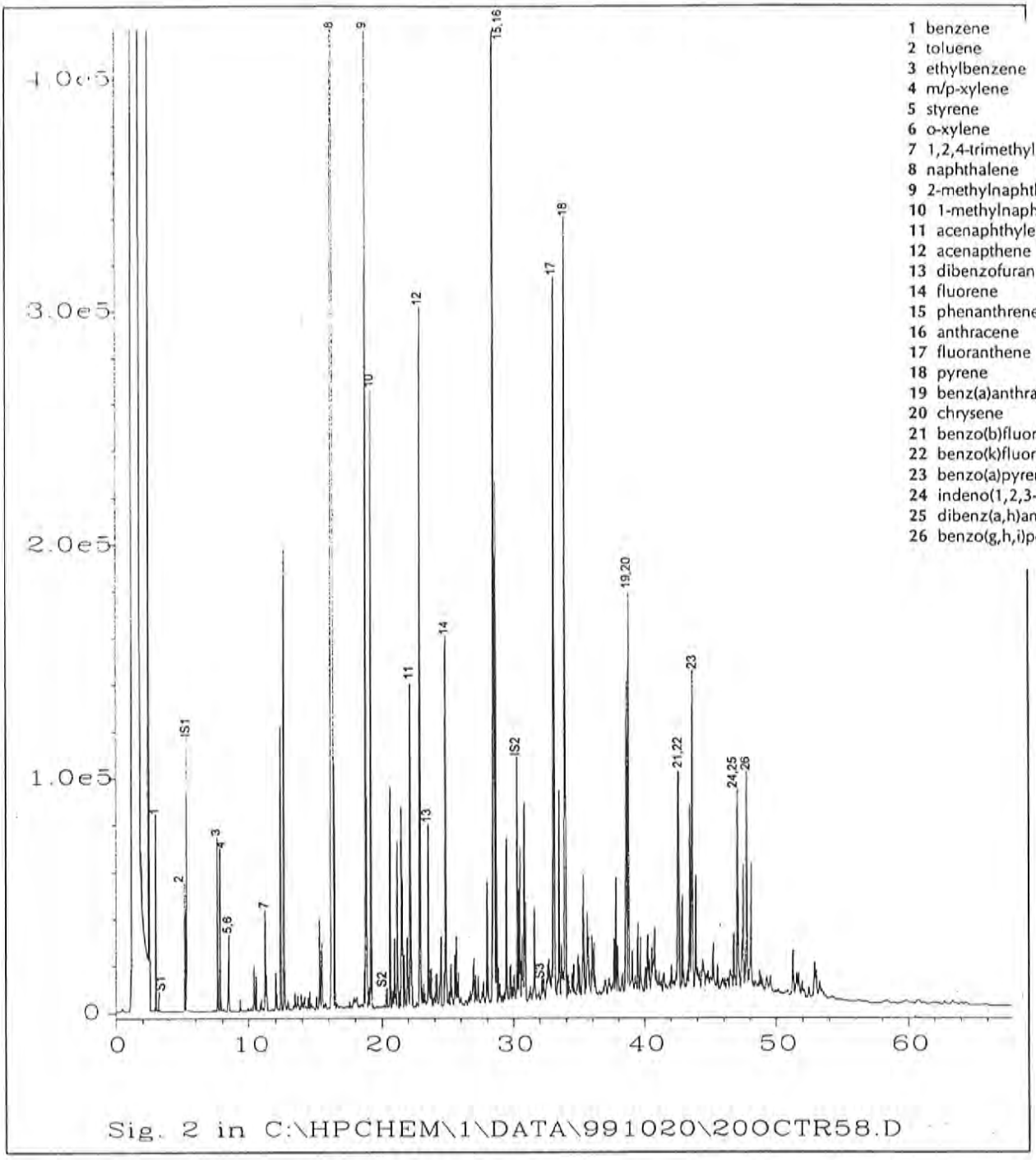


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-8A**
Laboratory ID:	RP991015-03
Method:	MET4007D

META

GC/FID Fingerprint

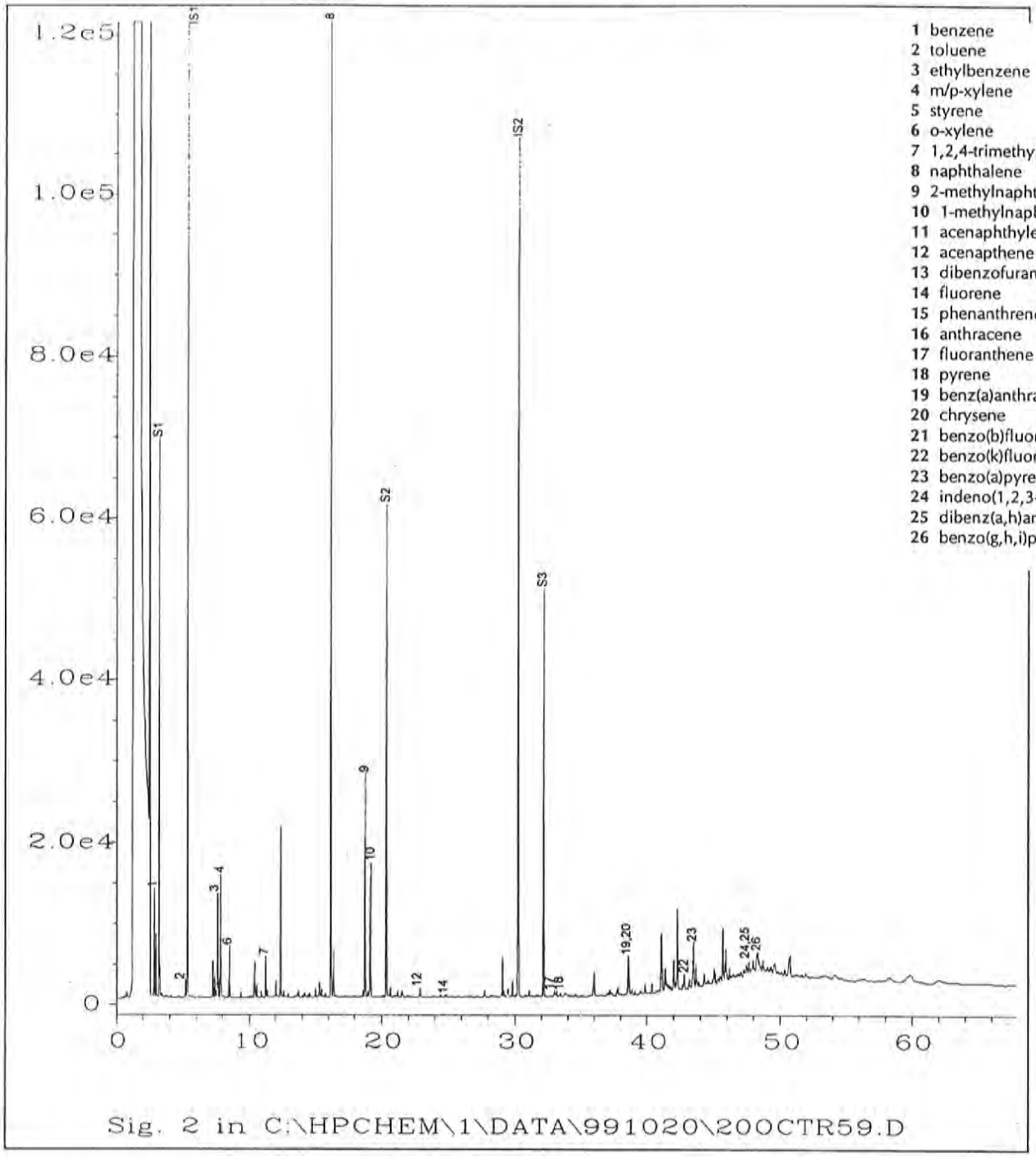


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-10A**
Laboratory ID:	RP991015-04
Method:	MET4007D

META

GC/FID Fingerprint

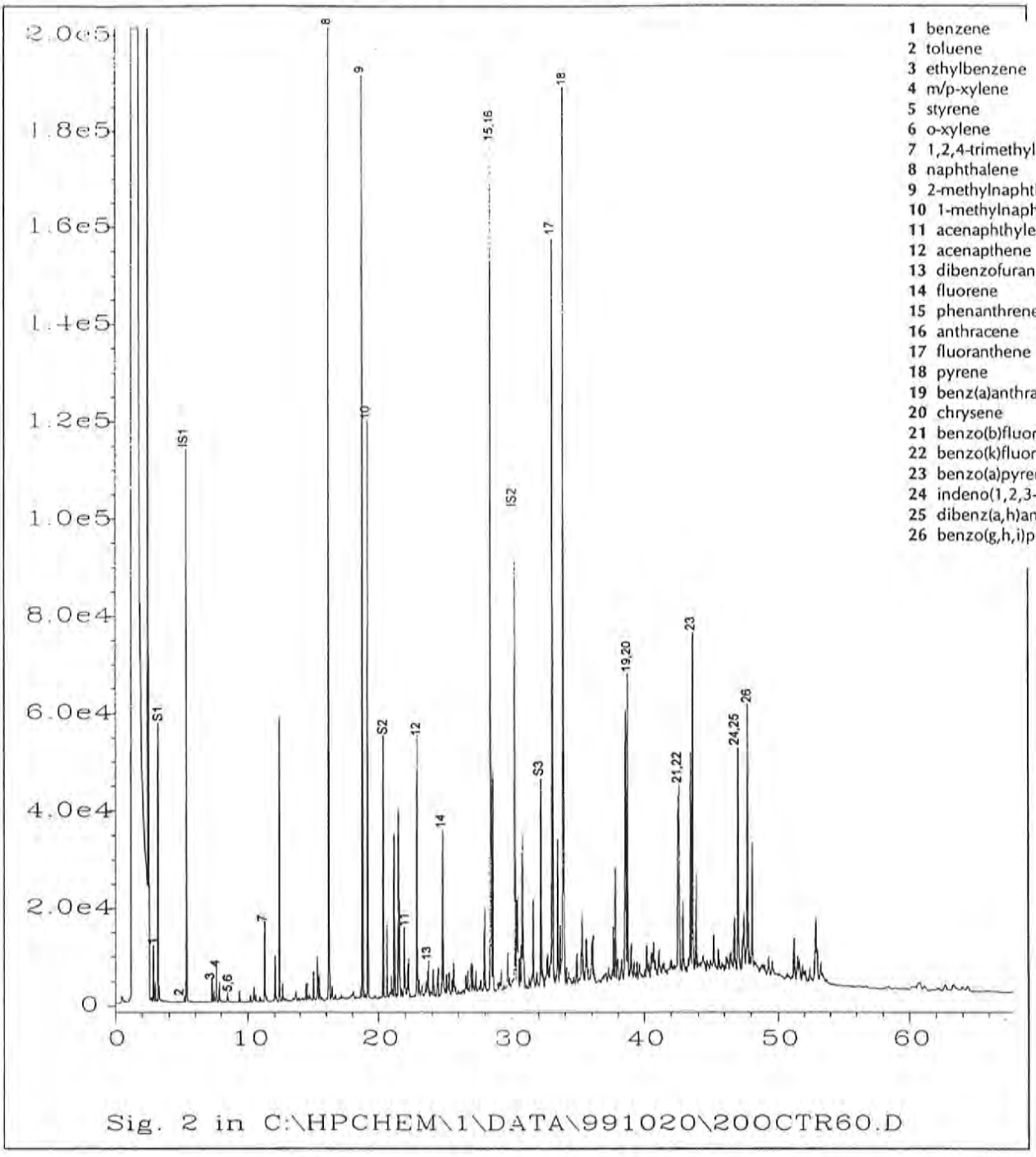


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-13C (108)**
Laboratory ID:	RP991015-05
Method:	MET4007D

META

GC/FID Fingerprint



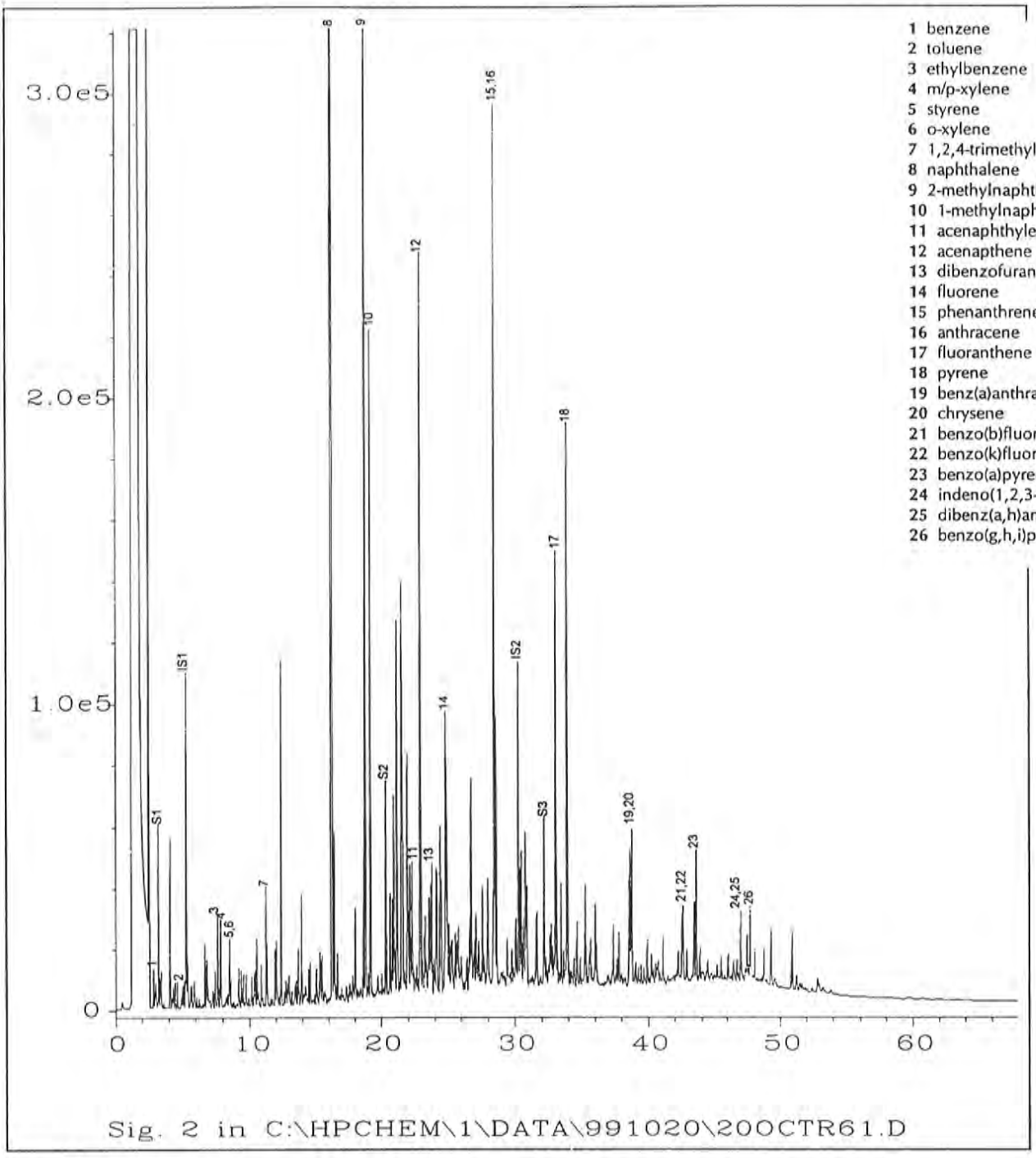
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenapthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-14A**
Laboratory ID:	RP991015-06
Method:	MET4007D

META

GC/FID Fingerprint

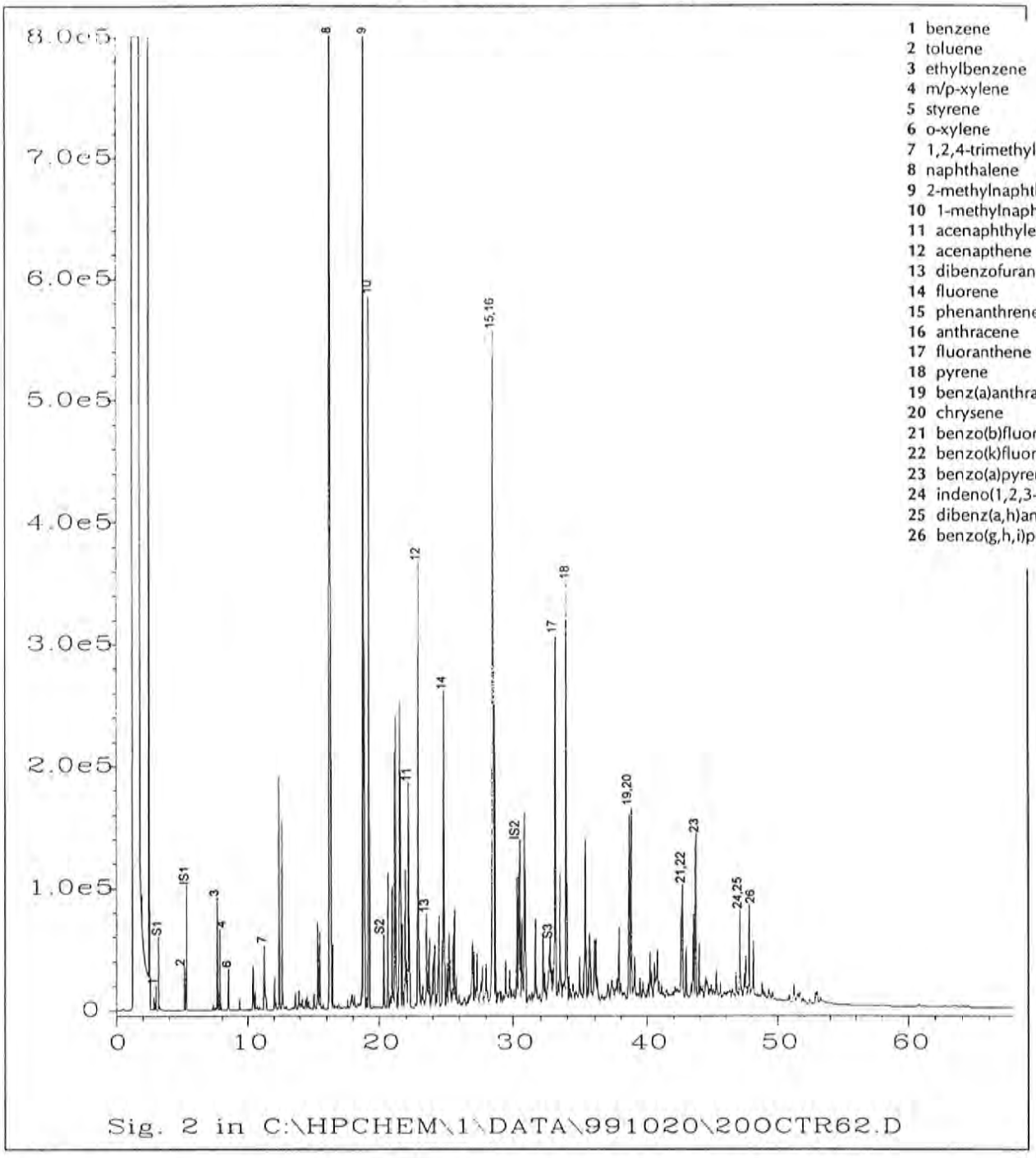


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-18A**
Laboratory ID:	RP991015-07
Method:	MET4007D

META

GC/FID Fingerprint

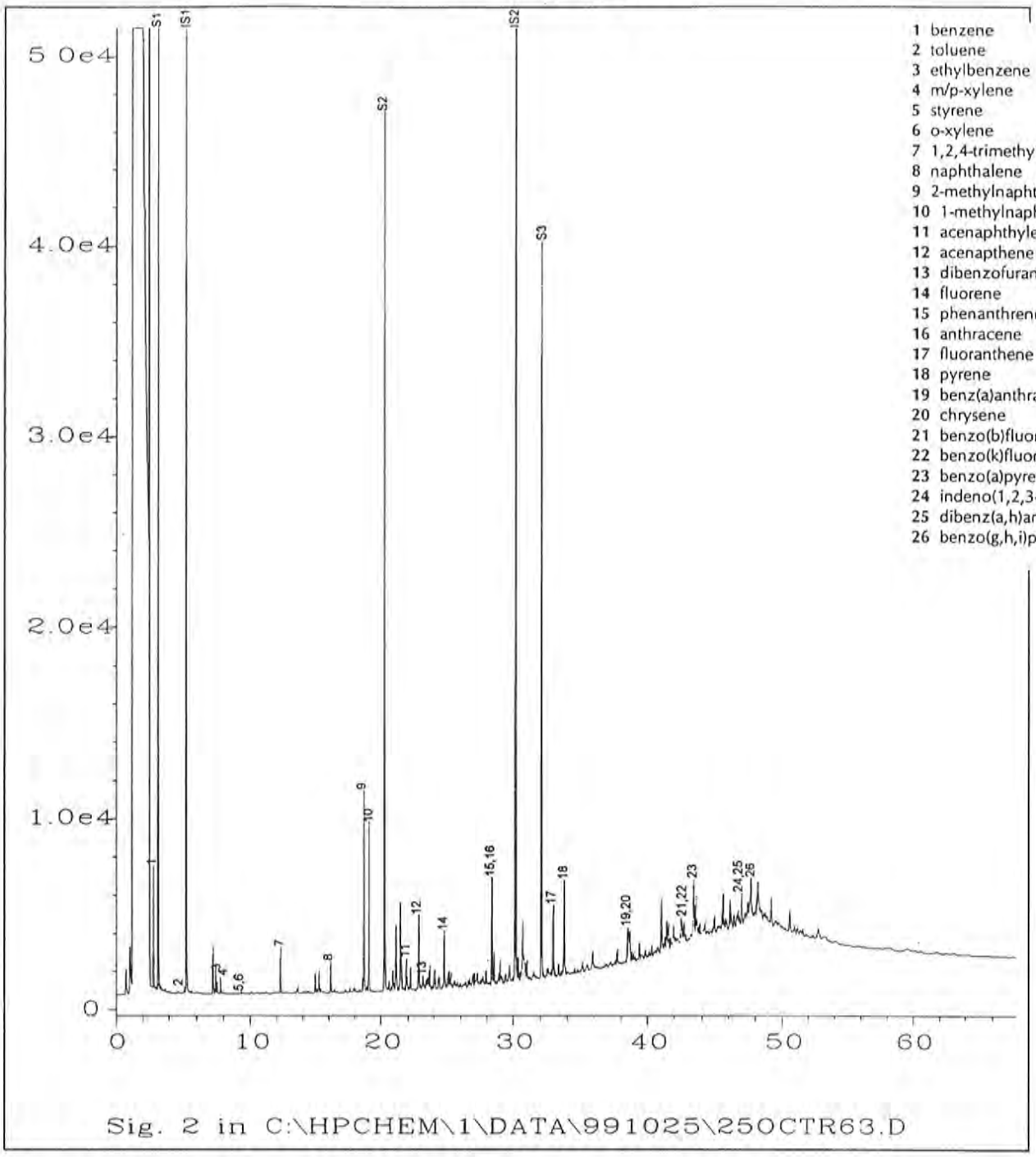


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-19A**
Laboratory ID:	RP991015-08
Method:	MET4007D

META

GC/FID Fingerprint

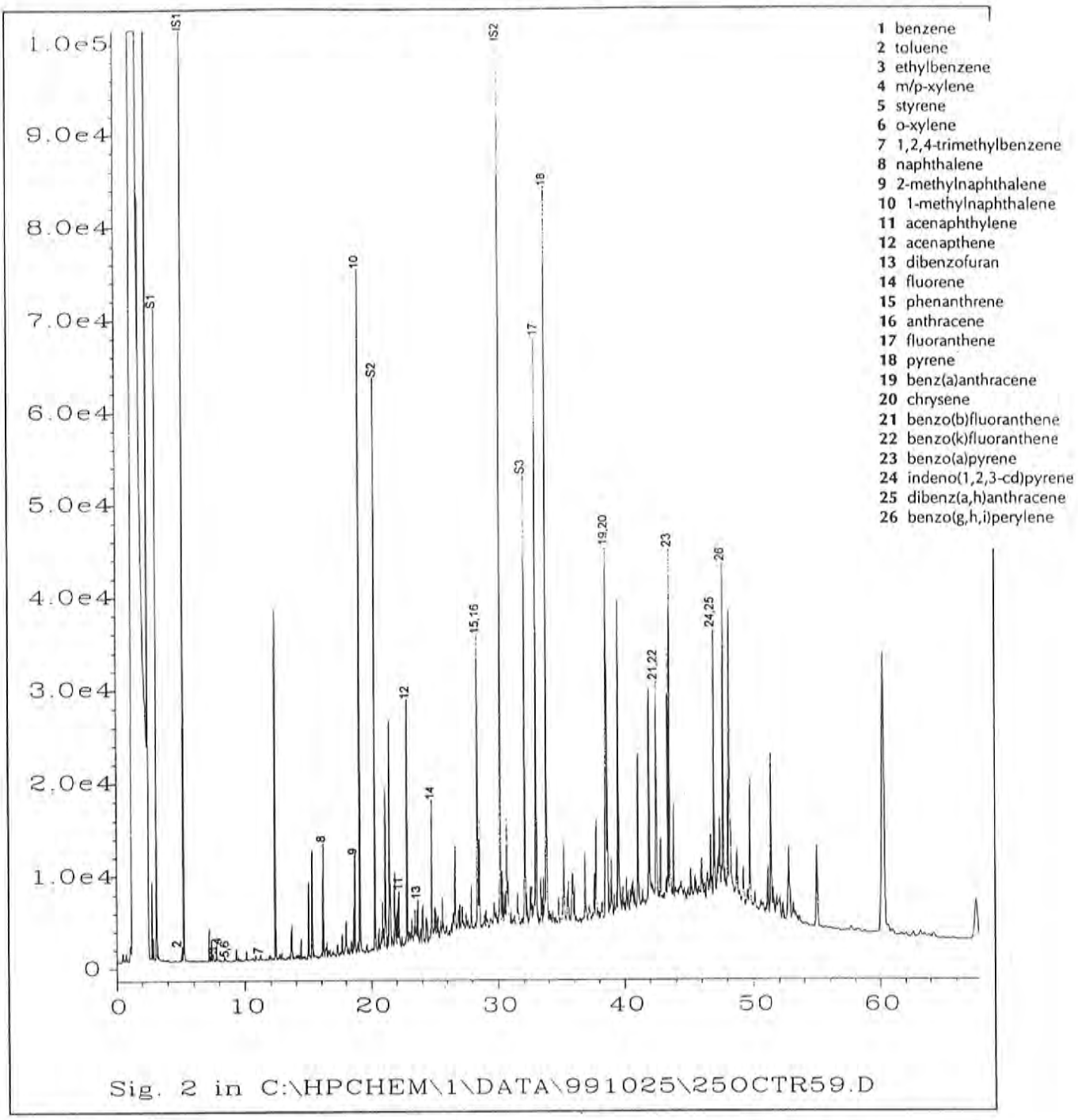


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**CR-21A**
Laboratory ID:	RP991015-09
Method:	MET4007D

META

GC/FID Fingerprint

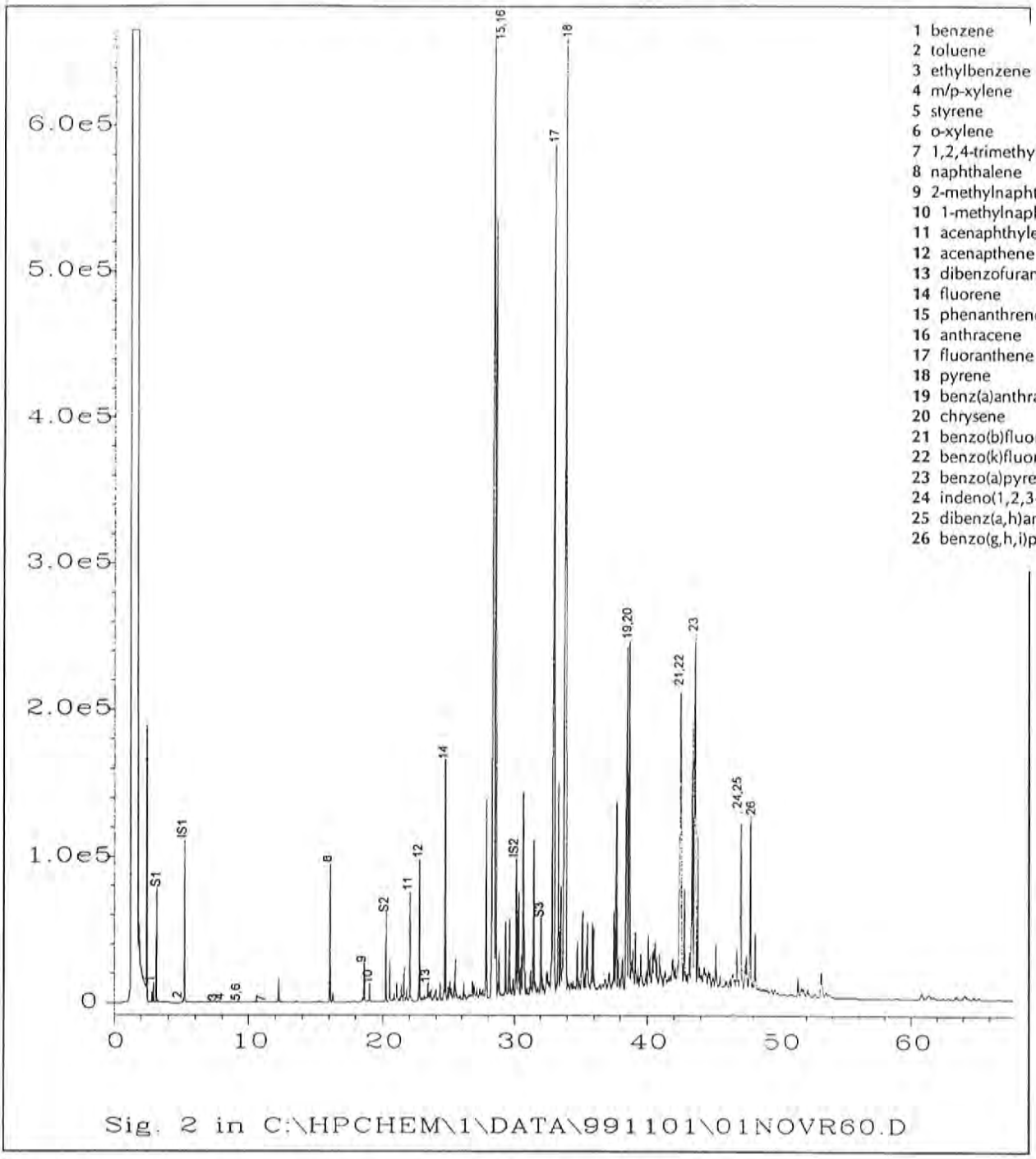


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**FP-01**
Laboratory ID:	RP991021-01
Method:	MET4007D

META

GC/FID Fingerprint

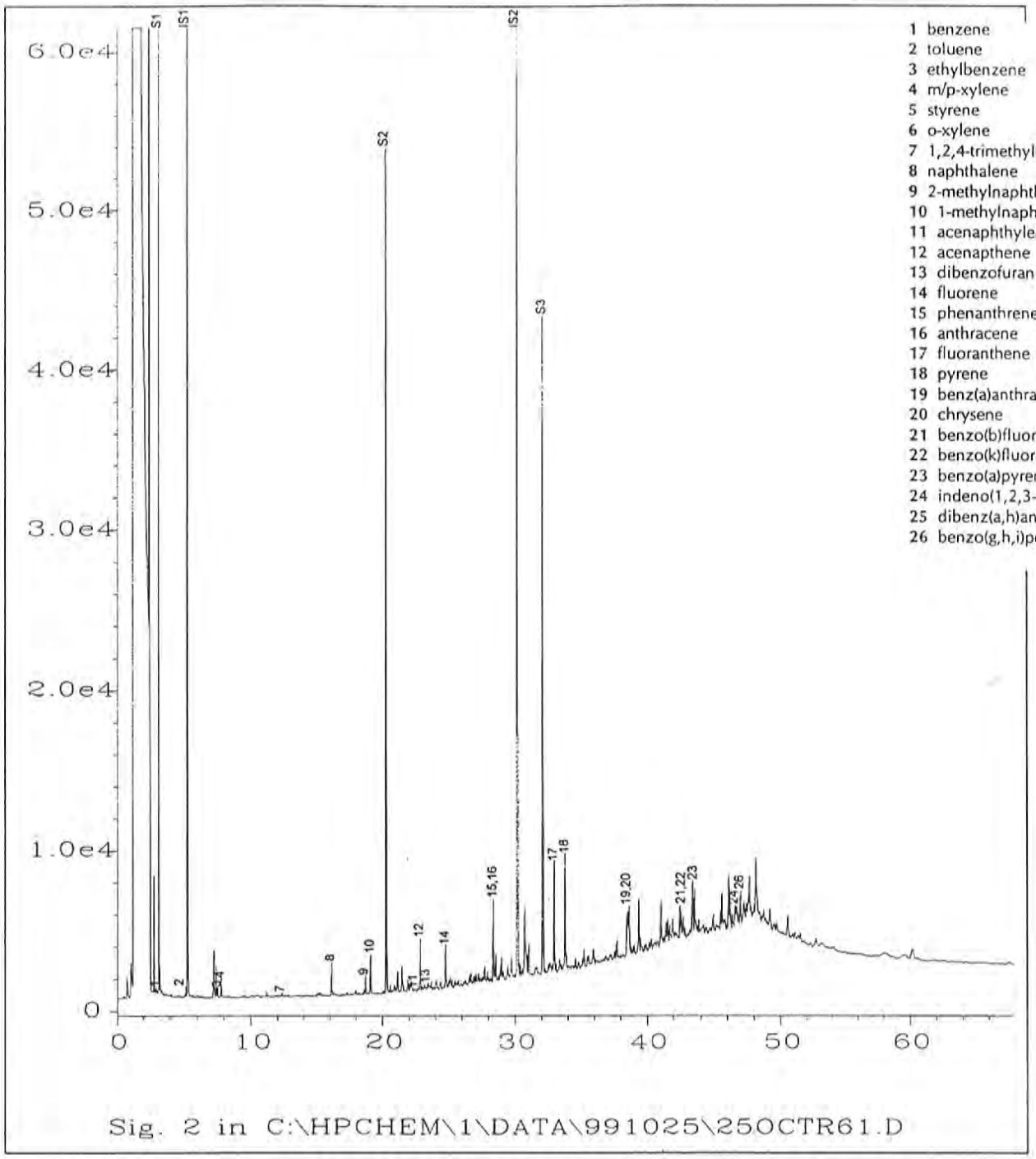


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**FP-03**
Laboratory ID:	RP991021-03
Method:	MET4007D

META

GC/FID Fingerprint



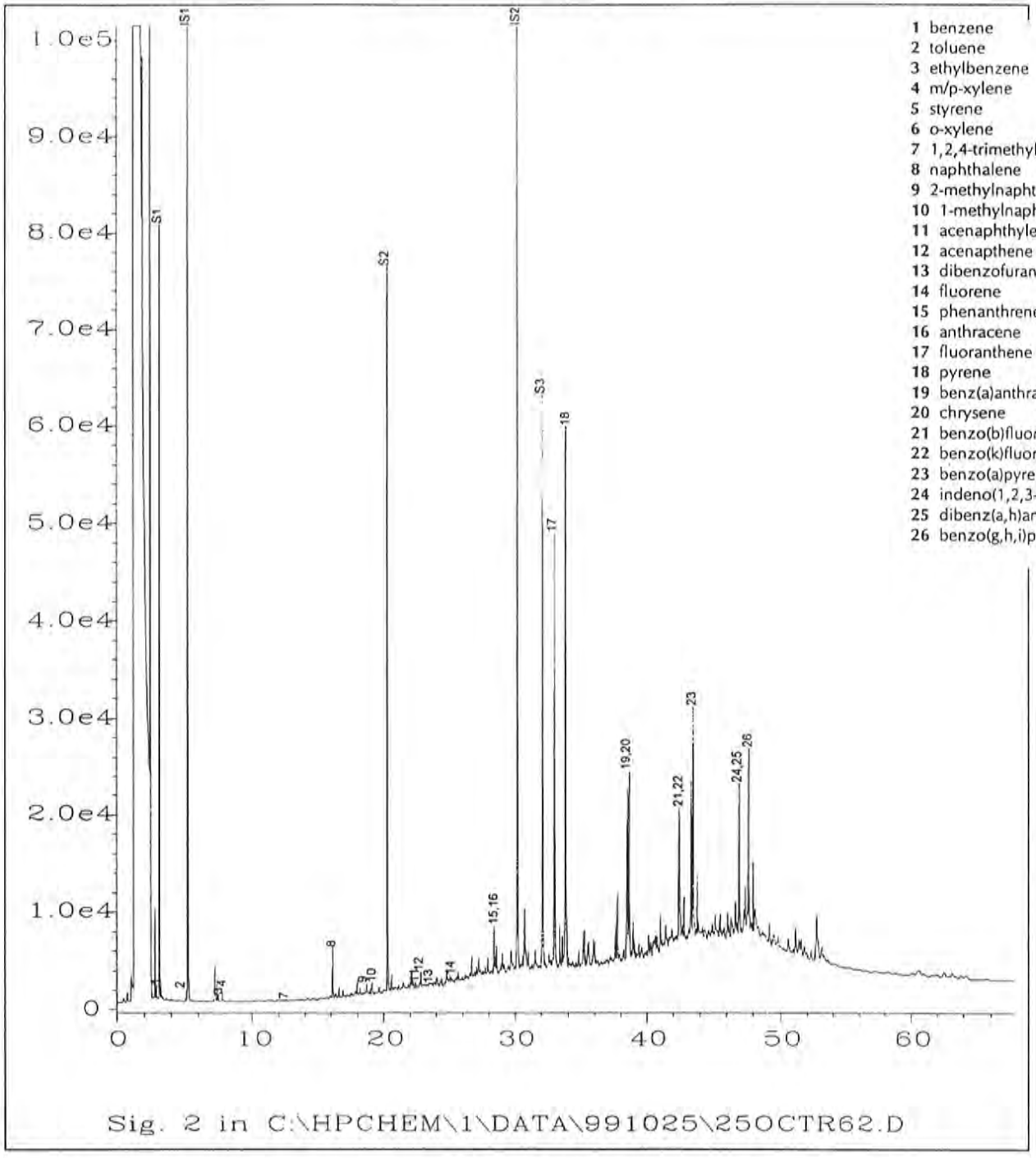
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenapthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-01**
Laboratory ID:	RP991021-04
Method:	MET4007D

META

GC/FID Fingerprint

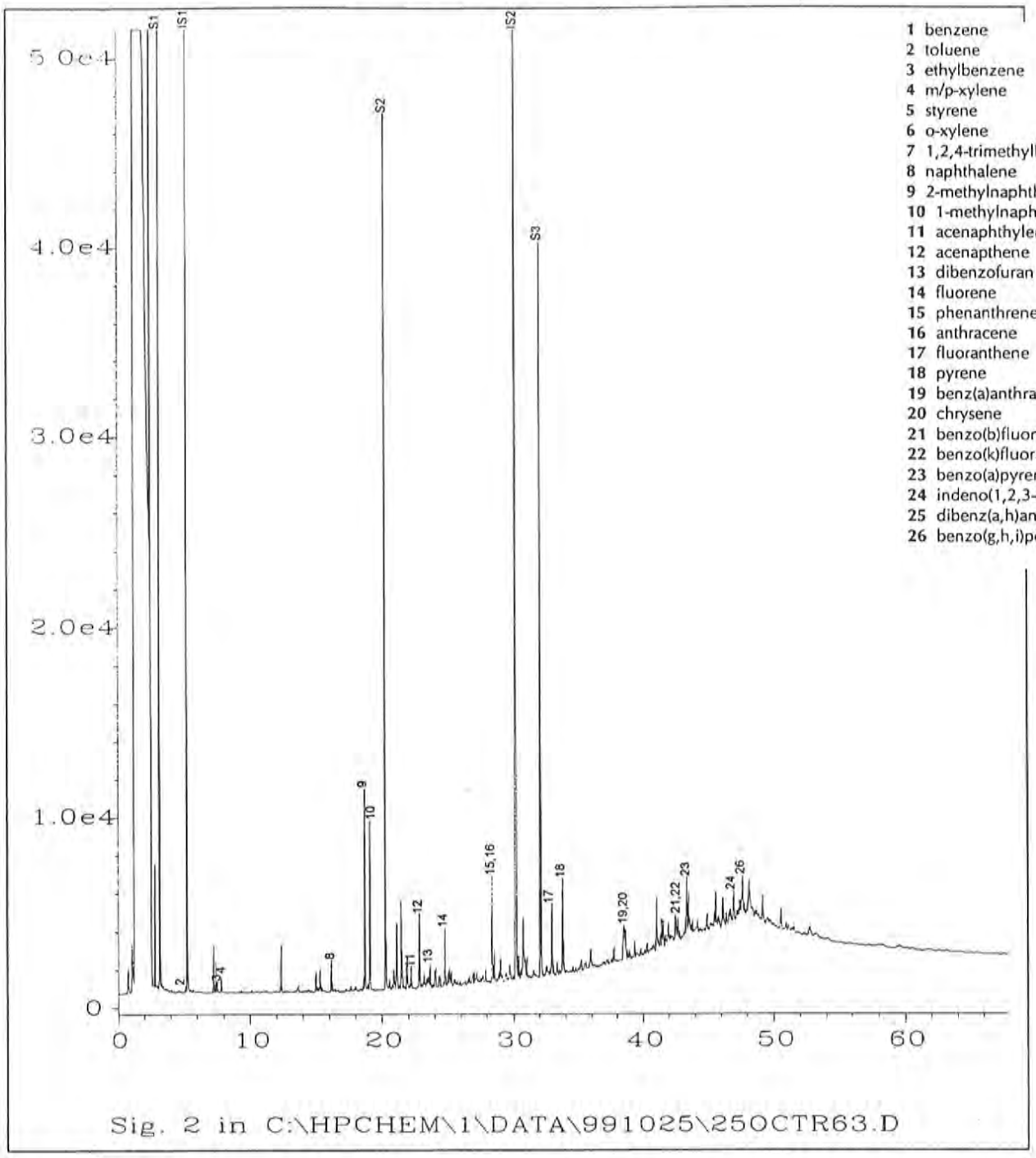


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-02**
Laboratory ID:	RP991021-05
Method:	MET4007D

META

GC/FID Fingerprint

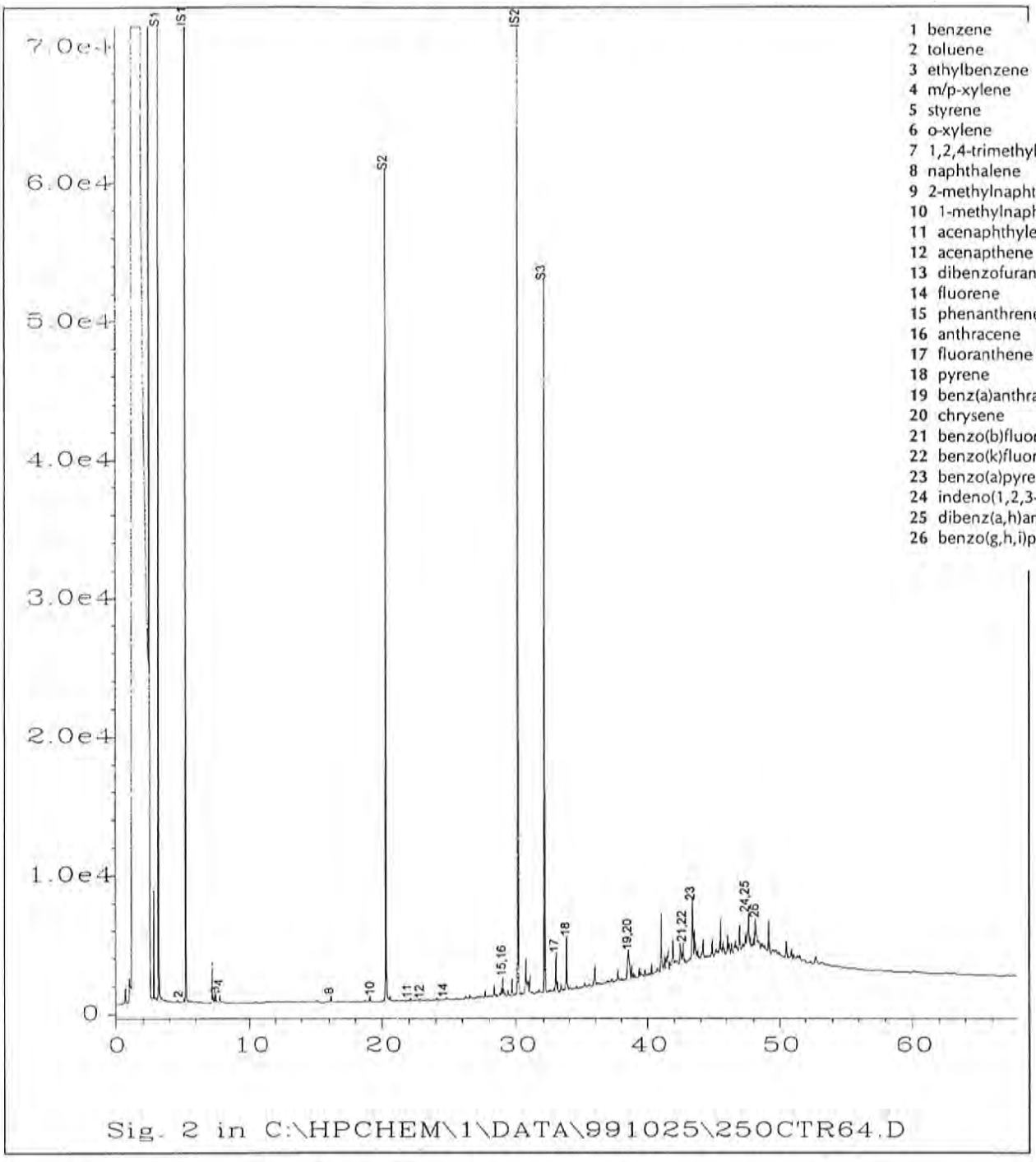


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-03**
Laboratory ID:	RP991021-06
Method:	MET4007D

META

GC/FID Fingerprint

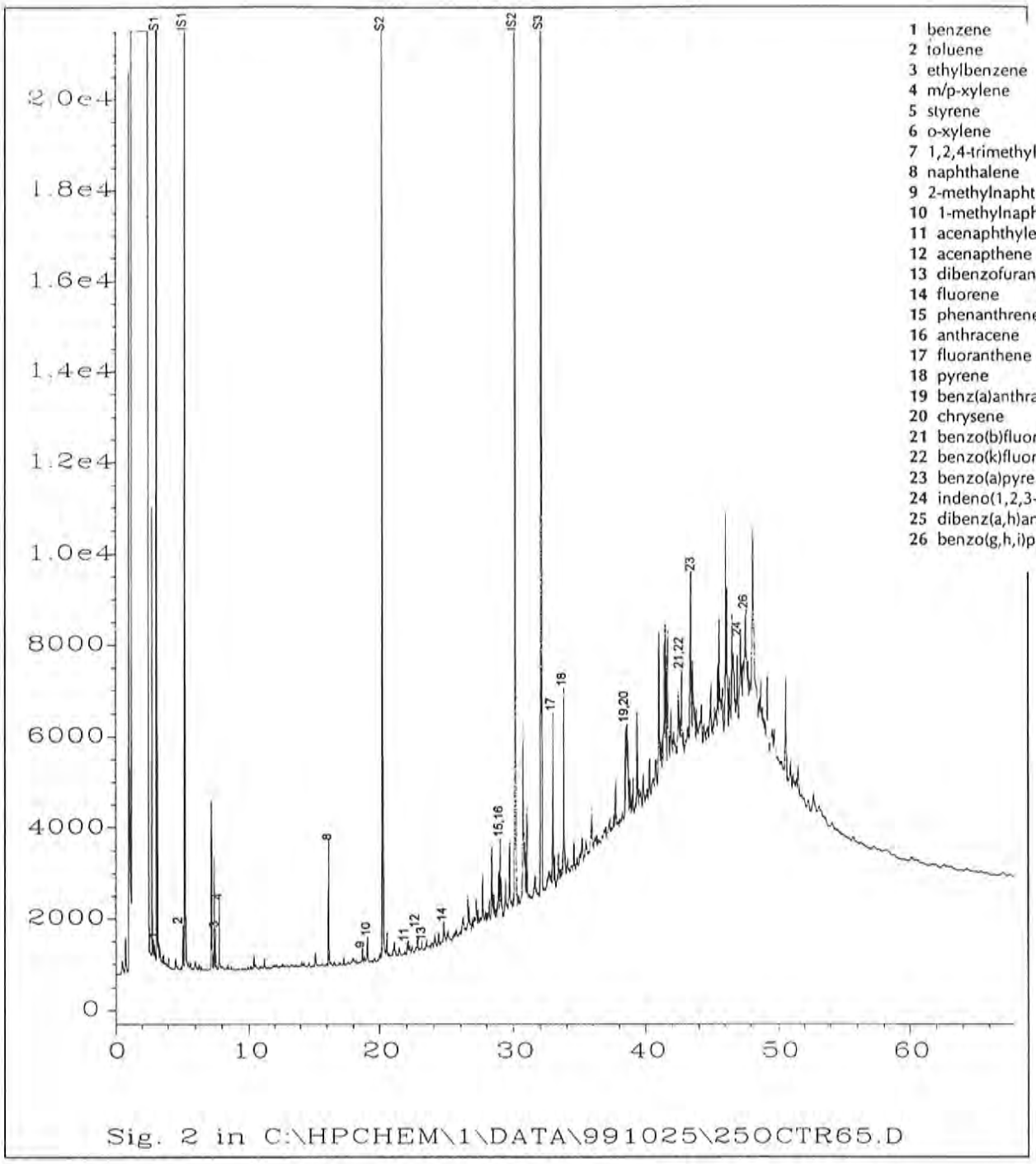


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-08**
Laboratory ID:	RP991021-10
Method:	MET4007D

META

GC/FID Fingerprint

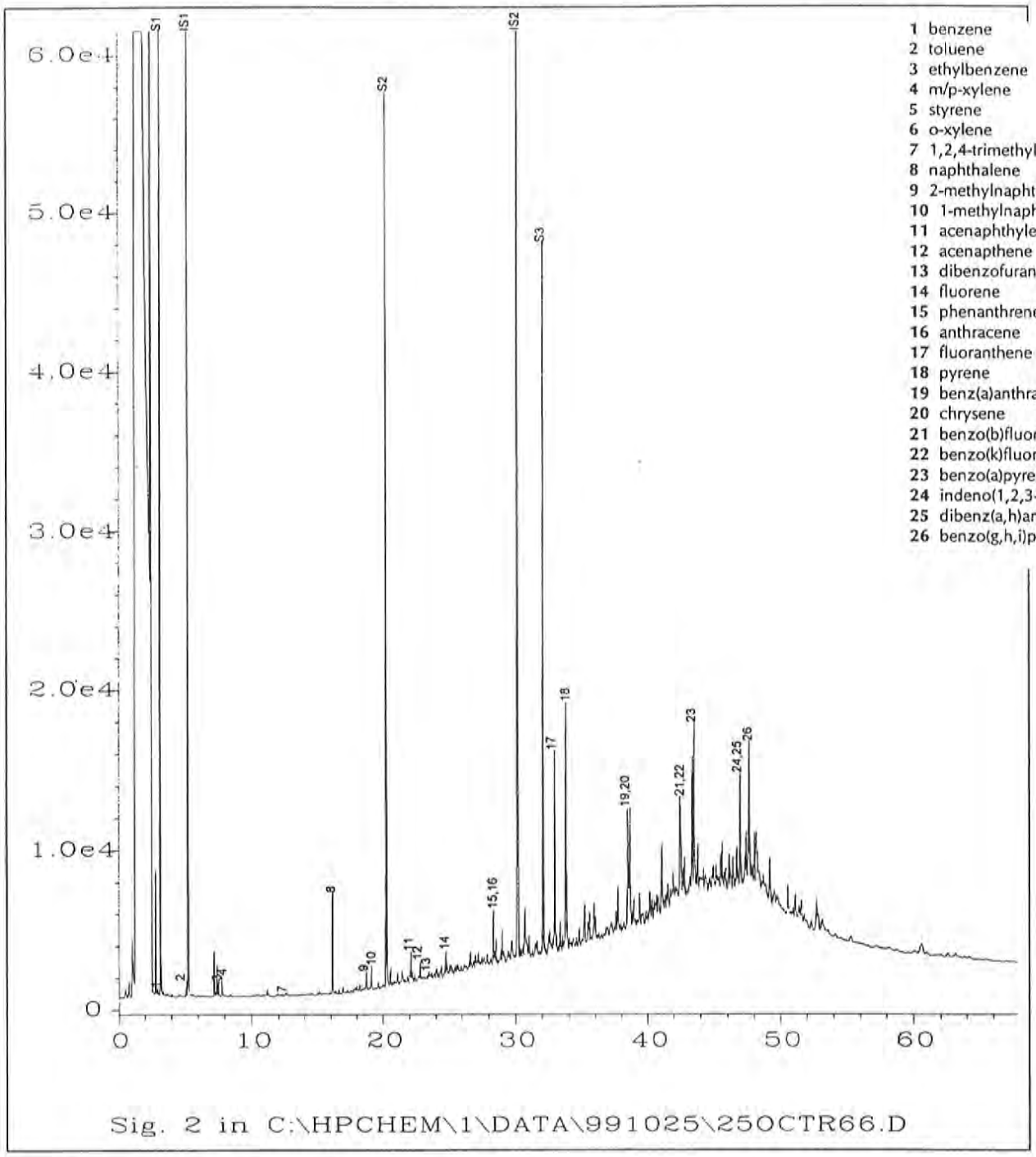


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-34**
Laboratory ID:	RP991021-15
Method:	MET4007D

META

GC/FID Fingerprint

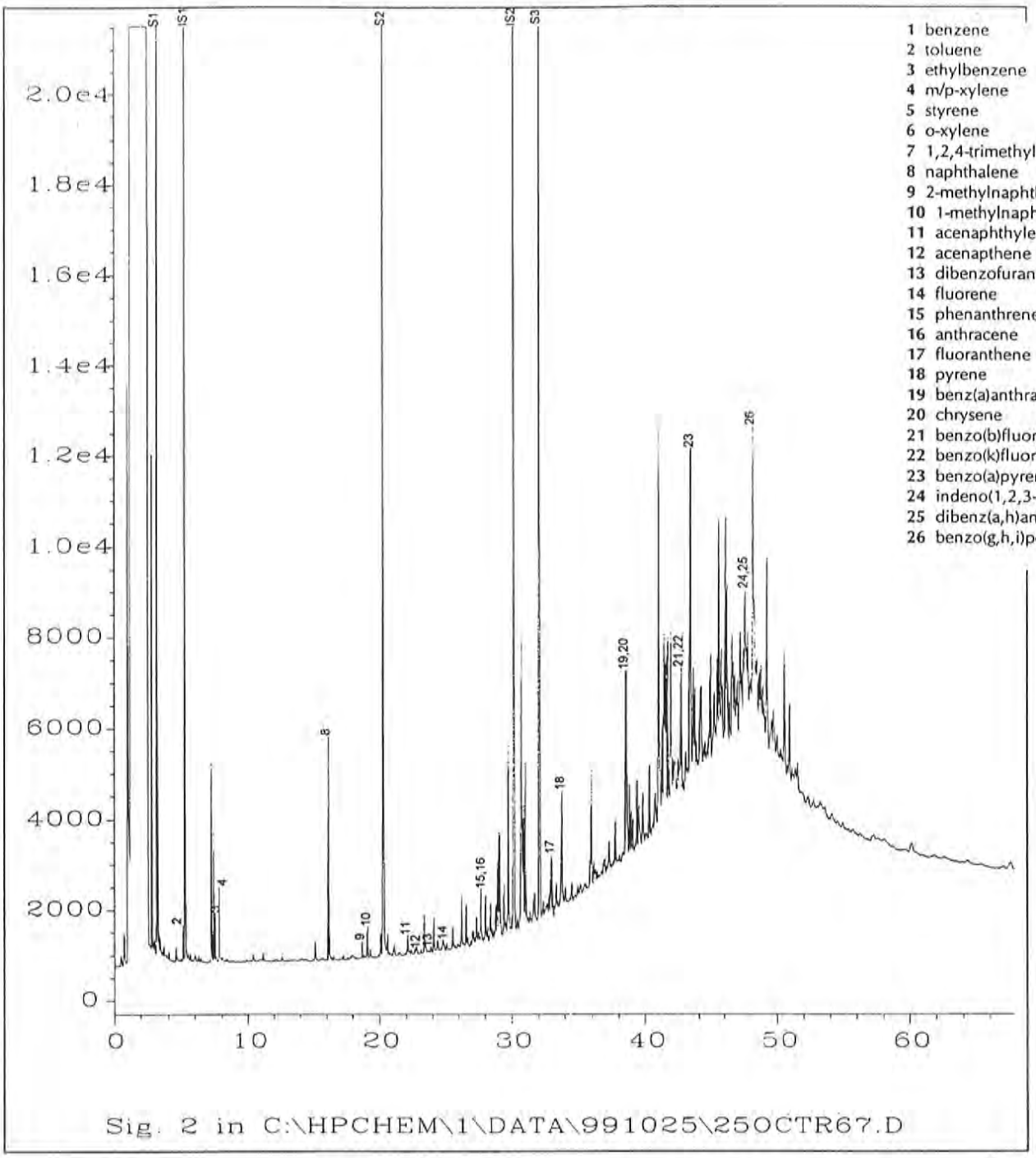


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-35**
Laboratory ID:	RP991021-16
Method:	MET4007D

META

GC/FID Fingerprint

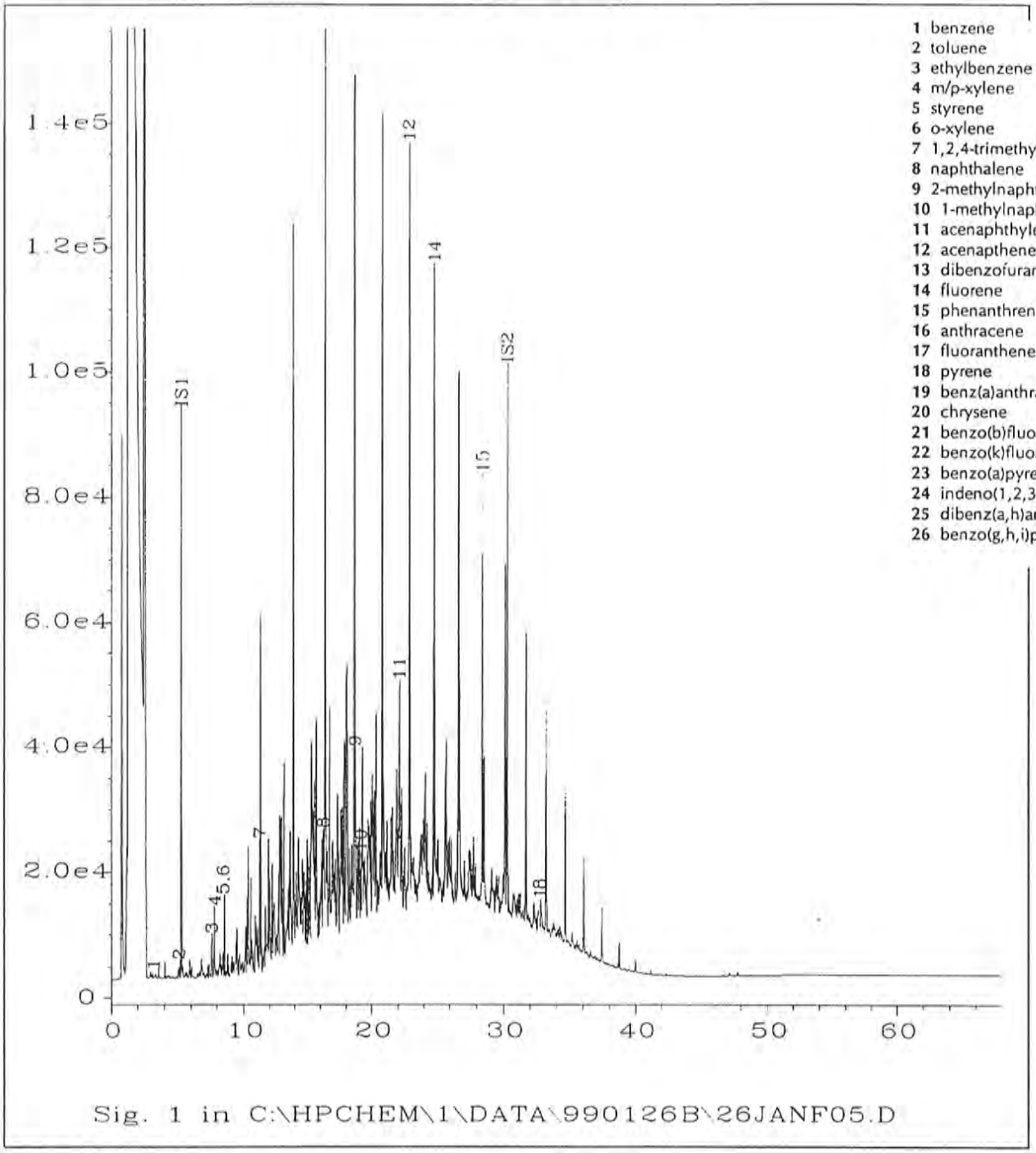


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - fluorobenzene
S2 - 2-fluorobiphenyl
S3 - 5a-androstane

Field ID:	**ST-37**
Laboratory ID:	RP991021-17
Method:	MET4007D

META

GC/FID Fingerprint

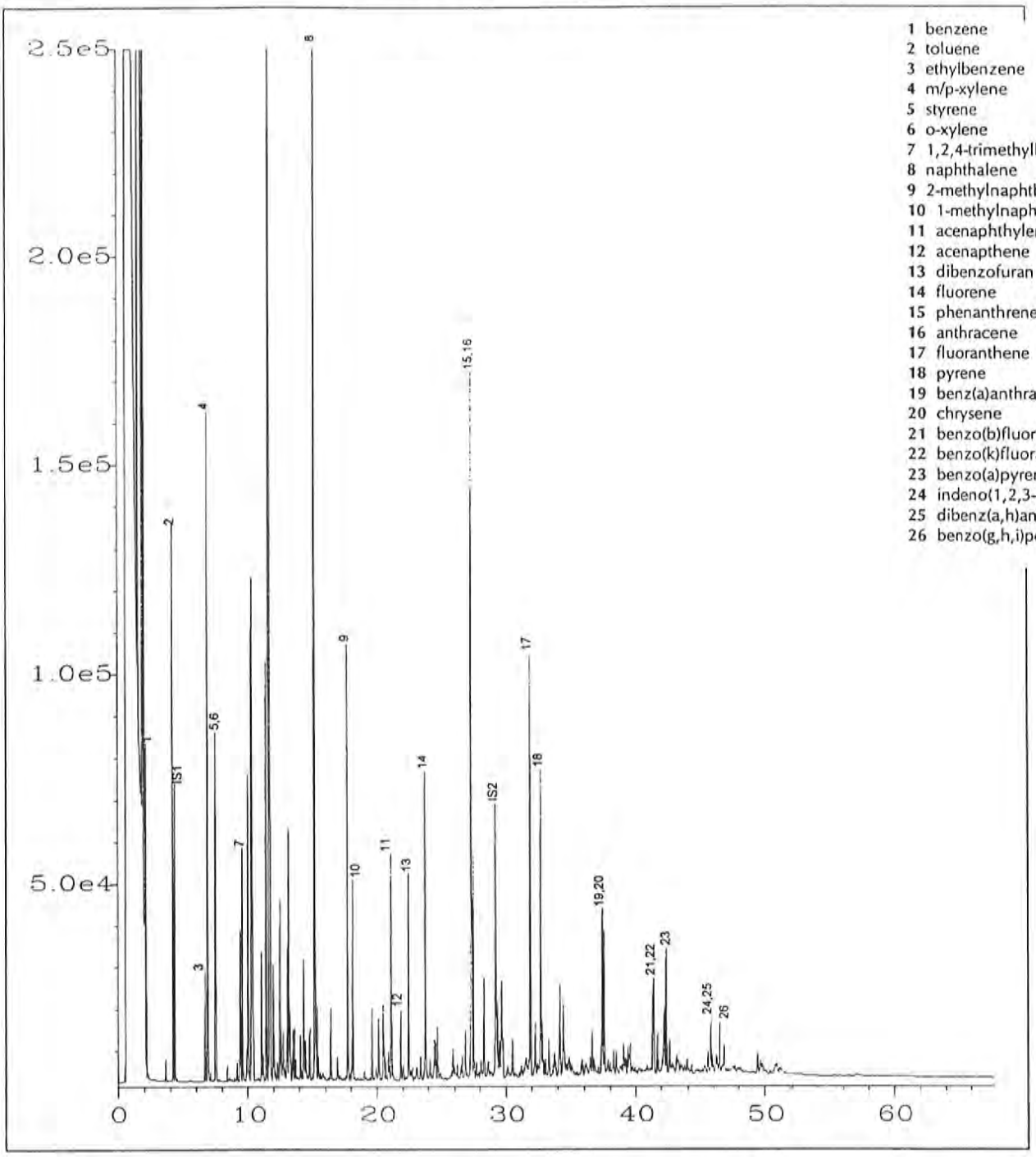


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - Fluorobenzene
S2 - 2-Fluorobiphenyl
S3 - 5a-Androstane

Field ID:	**Unweathered Diesel**
Laboratory ID:	SK990126-RS2
Method:	MET4007D

META

GC/FID Fingerprint



IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
S1 - Fluorobenzene
S2 - 2-Fluorobiphenyl
S3 - 5a-Androstane

Field ID:	**Coal Tar**
Laboratory ID:	T125
Method:	MET4007D

META

PROJ. NO.: 5-3434-230

PROJECT NAME: Gasworks Park

SAMPLERS: D. Kinney

RECEIVING LABORATORY: Meta

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Fingerprinting for Source ID	SEND RESULTS TO: / REMARKS
	2/17/98	1220	MLS-4-1-298	1	X	EL980224-01
						12°C upon receipt
						custody seals intact
						sample intact

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Dale Kinney	2/23/98 13:00	Fed Ex			

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		Sarah C. Watty	2/24/98 2:30

Shipper Information

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PROJ. NO.	PROJECT NAME
5-3434-210	GASWORKS PARK

SAMPLERS: D. BAKER, G. SEGA

RECEIVING LABORATORY: META

SEND RESULTS TO: D. BAKER, (RETEC) I. MURAKA

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	ANALYSIS TO BE DETERMINED *	REMARKS
	6/3	1515	MW-5-PRODUCT	1	RE980604-01	* ANALYSES PER
	"	1500	DW-4-PRODUCT	1	-02	ISHWAR MURAKA
				1	-03	

2°C upon receipt
Samples intact upon receipt SW

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	6/3/98 1645			6/4/98 10:00	Sarah C. Watty
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
			SW		

Shipper Information: VIA FED EX

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

META ENVIRONMENTAL SAMPLE RECEIPT

Lab ID	Field ID	Matrix	Analysis	Date Sampled	Date Received	Client/ Project	Container/ Storage
RP991015-01	CR-01B	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-02	CR-5A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-03	CR-8A	Soil	2508/4007	10/01/99	10/15/99	RO1020-60	32 oz. jar
RP991015-04	CR-10A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar
RP991015-05	CR-13C (108)	Soil	2508/4007	10/04/99	10/15/99	RO1020-60	32 oz. jar
RP991015-06	CR-14A	Soil	2508/4007	10/02/99	10/15/99	RO1020-60	32 oz. jar
RP991015-07	CR-18A	Soil	2508/4007	10/04/99	10/15/99	RO1020-60	32 oz. jar
RP991015-08	CR-19A	Soil	2508/4007	10/07/99	10/15/99	RO1020-60	32 oz. jar
RP991015-09	CR-21A	Soil	2508/4007	10/06/99	10/15/99	RO1020-60	32 oz. jar

10/15/99

SAMPLERS: JZ, YM, JH

RECEIVING LABORATORY: ARI

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Engy	REMARKS
	10/6/99	14:40	CR-01B	1	1	
	10/6/99	17:20	CR-5A	1	1	
	10/1/99	11:00	CR-8A	1	1	
	10/6/99	15:30	CR-10A	1	1	
	10/4/99	11:15	CR-13C (103)	1	1	Confirm with Dan Baker
	10/2/99	11:05	CR-14A	1	1	
	10/4/99	4:25	CR-18A	1	1	
	10/7/99	9:20	CR-19A	1	1	
	10/6/99	10:30	CR-21A	1	1	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
C Y A Z	10/14/99 4:30pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			10/15/99 10:30AM

Shipper Information

* samples in test @ 0.4°C

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

PINK COPY - Sampler YELLOW COPY - Laboratory WHITE COPY - RefTeC

04403- | Gas Works Park

SAMPLERS: J. Zwiebel, J. Palmer

RECEIVING LABORATORY: META, Environmental, Inc.

Dan Baker

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	GC/FID Fingerp			REMARKS
	9/16/99	11:20	FP-3	1	1	RP 991021-01		RF 991021-03 12
	9/15/99	15:25	ST-19	1	1	RP 991021-02		16
	9/16/99	9:45	ST-35	1	1	-03		04
	9/14/99	14:50	ST-1	1	1	-04	Confirm with Dan Baker	17
	9/16/99	10:25	ST-37	1	1	-05		02 ~~03~~
	9/15/99	10:50	ST-4	1	1	-06		01
	9/16/99	9:10	FP-1	1	1	-07		08
	9/15/99	12:10	ST-7	1	1	-08		19
	9/16/99	15:50	ST-43	1	1	-09		11 ~~12~~
	9/15/99	12:35	ST-10	1	1	-10		

* Beware of Broken Glass *

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	10/20/99 8:30 pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			10/21/99 11:00 AM

Shipper Information

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

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ATTACHMENT 2D-3
Battelle 2002 and 2003 Reports

ATTACHMENT 2D-3
Battelle Data Packages

Battelle
. . . Putting Technology To Work

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,

Stephen Emsbo-Mattingly
Principal Research Scientist

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

Battelle
... Putting Technology To Work

Project Name Lake Union Sediment Investigation
Project Number N005443

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-F1	U0170-F1	U0142-F1-D	U0143-F1-D	U0144-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	14.6 %	70.9 %	13.3 %	20 %	10.9 %
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Size	27.5 mg	74.7 mg	39.6 mg	55.5 mg	36.4 mg
Weight Basis	OIL	OIL	OIL	OIL	OIL
Min Reporting Limit	0.268	0.134	0.174	0.120	0.195
Amount Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/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)	4.39	18.7	0.723	1.36	3.3
Q4- Sesquiterpane (4)	1.87	12.7	0.401	0.83	1.84
Q5- Sesquiterpane (5)	0.866	4.96	0.146 J	0.338	0.717
Q6- Sesquiterpane (6)	2.06	13.3	0.302	0.584	1.92
Q7- Sesquiterpane (7)	0.863	12.4	0.18	0.348	0.91
Q8- Sesquiterpane (8)	6.64	57.3	1.42	2.34	6.23
I1-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-Isoprenoid (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	29	22.4	2.91	4	30.7
T5-C24 Tricyclic Terpane	19.2	14.1	1.98	2.79	22
T6-C25 Tricyclic Terpane	24.5	18.1	2.61	3.57	26.9
T6c-C26 Tricyclic Terpane-22R	10.5	7.27	1.16	1.64	11.3
T6b-C26 Tricyclic Terpane-22S	9.42	7.87	1.11	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-Trisnorneohopane-TS	31.2	34.2	3.37	3.59	36.3
T12-17a(H)-22,29,30-Trisnorhopane-TM	32.5	45.4	3.48	4.07	34.2
T14a-a,b- and b,a-28,30-Bisnorhopane	31.5	48.7	3.13	4.42	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-Norneohopane-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	23	27	2.51	3.97	25.2
T19-Hopane	179	245	20.6	26.9	198
T20- Mortane	56	51.1	5.2	6.74	57.9
T21-30-Homohopane-22S	75.9	94.1	8.36	9.44	94.3
T22-30-Homohopane-22R	91.8	65.6	7.42	6.62	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	21.3	28.4	2.28	2.63	28.1
T33-Tetrakishomohopane-22R	14.5	19.3	1.55	1.76	18.8
T34-Pentakishomohopane-22S	22	31.4	2.23	2.21	29.2
T35-Pentakishomohopane-22R	14.5	20.5	1.56	1.49	18.9
S4-13b(H),17a(H)-20S-Diacholestane	37.4	32.5	5.51	8.91	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	88.7	98.6	12.3	21.4 E	99
S18-13b(H),17a(H)-20R- Ethyldiacholestane	16.6	10.6	2.26	2.9	22.7
S19-13a(H),17b(H)-20S-Ethyldiacholestane	4.11	4.6	0.597	0.826	4.69
S20-14a(H),17a(H)-20S- Methylcholestane	45.3	54.2	5.62	9.17	82.4
S22-14b(H),17b(H)-20R-Methylcholestane	67.6	77	8.32	13.6	76.4
S23-14b(H),17b(H)-20S-Methylcholestane	74.4	82.3	10.1	14.3	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

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-107-SS-0010	NLU-109 1214	NLU-109-2630	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	0.168	59.500	15.300	12.8	21.700
Amount Units	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (9)	0.903	119	211	394	183
Q10- Sesquiterpane (10)	0.443	52.7 J	91.1	147	78.3
Q1- Sesquiterpane (1)	1.66	118	156	217	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)	6.71	293	376	604	311
I1-C15-Isoprenoid (1380)	1.86	697	1330	2590	678
I2-C15-Isoprenoid (1470)	3.64	1110	1980	3960	1130
I3-C18-Isoprenoid (1650)	3.72	1420	2550	5280	1330
I4-C19-Isoprenoid (Pristane)	9.74	2990	4590	10300 E	2510
I5-C20-Isoprenoid (Phytane)	16.4	2780	4620	9500 E	2090
T4-C23 Tricyclic Terpane	42	468	613	1120	413
T5-C24 Tricyclic Terpane	26.4	313	413	734	272
T6-C25 Tricyclic Terpane	31.4	423	528	902	346
T6c-C26 Tricyclic Terpane-22R	13.5	220	239	409	144
T6b-C28 Tricyclic Terpane-22S	12.3	200	231	360	155
T6a-C24 Tetracyclic Terpane	13.7	128	112	201	95.5
T7-C28 Tricyclic Terpane-22S	13.3	236	337	556	210
T8-C28 Tricyclic Terpane-22R	13.7	274	342	553	221
T9-C29 Tricyclic Terpane-22S	17.7	324	343	535	210
T10-C29 Tricyclic Terpane-22R	17.5	339	349	573	201
T11-18a(H)-22,29,30-Trisnomeohopane-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
T18-18a(H) & 18b(H)-Oleanane	27.6	352	445	704	300
T19-Hopane	229	2430	2590	3700	2070
T20- Moriane	58.4	681	451	704	630
T21-30-Homohopane-22S	98.4	943	877	1190	877
T22-30-Homohopane-22R	86.5	748	665	853	638
T26-30-Bishomohopane-22S	63.8	621	484	657	370
T27-30,31-Bishomohopane-22R	47.5	452	385	510	300
T30-30,31-Trishomohopane-22S	70.9	565	475	627	338
T31-30,31-Trishomohopane-22R	36.3	356	354	493	271
T32-Tetrakishomohopane-22S	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	86.4
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	1980	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	74.6	875	1040	1550	825
S22-14b(H),17b(H)-20R-Methylcholestane	78.8	1120	1520	2300	816
S23-14b(H),17b(H)-20S-Methylcholestane	101	1200	1620	2390	887
S24-14a(H),17a(H)-20R-Methylcholestane	71.7	1320	1600	2710	1080
S25-14a(H),17a(H)-20S-Ethylcholestane	67.3	774	848	1220	554
S26-14b(H),17b(H)-20R-Ethylcholestane	81.5	1020	1160	1840	717
S27-14b(H),17b(H)-20S-Ethylcholestane	86	789	890	1120	469
S28-14a(H),17a(H)-20R-Ethylcholestane	86	1220	1440	2180	975

J=Result < Sample RL.
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&= 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-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	BB278PB	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
Extraction Date	02/11/03	02/21/03	11/22/02	11/22/02	11/22/02
Acquired Date	02/20/03	03/06/03	12/14/02	12/15/02	12/13/02
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
Q9- Sesquiterpane (9)	233	83.6	1.78	17.4	3.94
Q10- Sesquiterpane (10)	87.8	ND	0.945	6.75	2.41
Q1- Sesquiterpane (1)	156	40.9	2.43	12.1	5.21
Q2- Sesquiterpane (2)	188	73.4	3.13	12.6	5.8
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	27.8 J	1.17	4.41	2.56
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
I2-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
T7-C28 Tricyclic Terpane-22S	221	190	11.6	21.2	14.9
T8-C28 Tricyclic Terpane-22R	218	192	12.2	22.1	15
T9-C29 Tricyclic Terpane-22S	218	252	15.8	23.7	19.8
T10-C29 Tricyclic Terpane-22R	222	223	15.2	23.6	18.4
T11-18a(H)-22,29,30-Trisnorneohopane-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-Normochopane-C29Ts	314	395	42.6	37.3	44.9
X- 17a(H)-Diahopane	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	221	232
T20- Moretane	314	512	56.7	48	61.2
T21-30-Homohopane-22S	530	710	90.5	81.3	92.5
T22-30-Homohopane-22R	439	575	91.5	57.2	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	180	130
S18-13b(H),17a(H)-20R- Ethyldiacholestane	230	282	18.6	25	22.4
S19-13a(H),17b(H)-20S-Ethyldiacholestane	53.3	ND	5.46	5.76	5.47
S20-14a(H),17a(H)-20S- Methylcholestane	839	726	51.2	74.9	70.9
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 I0384,
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 %
Matrix	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	1.460	0.292	0.134	2.160	2.08
Amount Units	µg/kg	mg/kg	mg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (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
I1-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)	547	80.5	2.75	647	351
I4-C19-Isoprenoid (Pristane)	937	128	4.16	1100	583
I5-C20-Isoprenoid (Phytane)	1150	136	5.44	1260	782
T4-C23 Tricyclic Terpane	442	41.8	3.09	658	776
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-C26 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-Trisnorneohopane-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-Bisnorhopane	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-Norneohopane-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- Moretane	839	63.5	5.18	581	744
T21-30-Homohopane-22S	894	97.3	7.13	1110	1260
T22-30-Homohopane-22R	731	76.5	5.42	797	901
T26-30-Bishomohopane-22S	516	60.4	4.04	613	640
T27-30,31-Bishomohopane-22R	400	43.7	3.13	475	528
T30-30,31-Trishomohopane-22S	540	55.8	3.98	566	642
T31-30,31-Trishomohopane-22R	348	38.4	2.9	461	546
T32-Tetrakishomohopane-22S	258	27.5	2.17	320	331
T33-Tetrakishomohopane-22R	162	20.4	1.34	200	215
T34-Pentakishomohopane-22S	224	26	1.76	260	288
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)-20S-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

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample 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	03-0137	03-0159	03-0159	03-0159	03-0100
Associated Blank	BB278PB	BB426PB	BB426PB	BB426PB	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	02/21/03	03/05/03	03/05/03	03/05/03	02/17/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	32.43 %	27.62 %	22.52 %	26.72 %	87.86 %
Matrix	Solid	Solid	Solid	Solid	Solid
Sample Size	0.68 mg	0.33 mg	0.3 mg	0.39 mg	10.1 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	9.970	23.6	34.200	36.600	2.970
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (9)	384	499	390	228	154
Q10- Sesquiterpane (10)	155	235	173	95	60
Q1- Sesquiterpane (1)	181	258	180	110	63.6
Q2- Sesquiterpane (2)	251	288	244	168	86.8
Q3- Sesquiterpane (3)	422	511	483	351	130
Q4- Sesquiterpane (4)	175	215	210	116	34.8
Q5- Sesquiterpane (5)	90.3	91.9	111	65.6	19.9
Q6- Sesquiterpane (6)	135	146	161	74.2	21.3
Q7- Sesquiterpane (7)	48.2	62.5	ND	ND	9.67
Q8- Sesquiterpane (8)	396	405	402	344	100
I1-C15-Isoprenoid (1380)	2360	2830	2890	1000	262
I2-C15-Isoprenoid (1470)	3190	4040	4960	1250	408
I3-C18-Isoprenoid (1650)	4010	5110	4480	1020	218
I4-C19-Isoprenoid (Pristane)	7790 E	10600	6720	1750	515
I5-C20-Isoprenoid (Phytane)	7190	9190	5990	1710	170
T4-C23 Tricyclic Terpane	528	791	841	1040	16.2
T5-C24 Tricyclic Terpane	338	515	615	738	7.8
T6-C25 Tricyclic Terpane	406	679	807	881	9.63
T6c-C26 Tricyclic Terpane-22R	187	269	368	392	4.78
T6b-C26 Tricyclic Terpane-22S	173	273	356	428	5.71
T6a-C24 Tetracyclic Terpane	86.2	133	136	203	8.48
T7-C28 Tricyclic Terpane-22S	257	376	529	562	ND
T8-C28 Tricyclic Terpane-22R	280	398	550	583	ND
T9-C29 Tricyclic Terpane-22S	275	433	566	642	ND
T10-C29 Tricyclic Terpane-22R	270	399	555	583	ND
T11-18a(H)-22,29,30-Trisnorneohopane-TS	269	394	472	548	7.38
T12-17a(H)-22,29,30-Trisnorhopane-TM	331	472	633	907	48.6
T14a-a,b- and b,a-28,30-Bisnorhopane	441	576	850	1400	ND
T14b-17a(H),21b(H)-25-Norhopane	228	355	459	730	ND
T15-30-Norhopane	983	1430	1890	2480	94.1
T16-18a(H)-30-Neohopane-C29Ts	368	540	751	938	ND
X- 17a(H)-Diahopane	61.8	131	171	165	ND
T17- 30-Normoretane	185	280	422	423	27
T18-18a(H) & 18b(H)-Oleanane	359	501	754	995	15.8
T19-Hopane	1950	2810	3650	4470	110
T20- Mortane	366	690	1040	1100	34.6
T21-30-Homohopane-22S	631	971	1360	1560	44.2
T22-30-Homohopane-22R	439	634	788	1050	36.4
T26-30-Bishomohopane-22S	339	458	628	719	24.4
T27-30,31-Bishomohopane-22R	284	420	500	563	16.2
T30-30,31-Trishomohopane-22S	326	468	605	738	13.3
T31-30,31-Trishomohopane-22R	274	368	483	619	11.9
T32-Tetrakishomohopane-22S	193	265	297	360	ND
T33-Tetrakishomohopane-22R	120	167	198	245	ND
T34-Pentakishomohopane-22S	165	202	257	310	ND
T35-Pentakishomohopane-22R	118	149	218	239	ND
S4-13b(H),17a(H)-20S-Diacholestane	1040	1700	1740	1770	11.8
S5-13b(H),17a(H)-20R-Diacholestane	668	1100	1180	1100	5.85
S8-13b(H),17a(H)-20S-Methyldiacholestane	933	1450	1560	1740	ND
S12-14a(H),17a(H)-20S-Cholestane	1620	2560	2990	4110	25.8
S14-14b(H),17b(H)-20R- Cholestane	753	1110	1480	1970	11.7
S15-14b(H),17b(H)-20S- Cholestane	818	1180	1410	1940	11.2
S17-14a(H),17a(H)-20R- Cholestane	2150	3410	4350	8060	32.5
S18-13b(H),17a(H)-20R- Ethyldiacholestane	278	452	504	523	12.4
S19-13a(H),17b(H)-20S-Ethyldiacholestane	61.3	116	147	ND	ND
S20-14a(H),17a(H)-20S- Methylcholestane	799	1290	1700	2380	14.1
S22-14b(H),17b(H)-20R-Methylcholestane	1140	1660	2130	2890	17.1
S23-14b(H),17b(H)-20S-Methylcholestane	1190	1730	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	898	1260	1840	17.6
S26-14b(H),17b(H)-20R-Ethylcholestane	924	1250	1650	1970	17
S27-14b(H),17b(H)-20S-Ethylcholestane	648	965	1150	1560	13.3
S28-14a(H),17a(H)-20R-Ethylcholestane	1220	1700	2420	3620	26.2

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&= Outside of DQO.
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ME= Matrix Interference. Estimated Value.

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	NLU-119-0010c	NLU-119-0608	NLU-119-1618	NLU-119-2426	NLU-119R2-US-0.5
Battelle Sample ID	U6524-D-F1	U0455-D-F1	U0460-D-F1	U0464-D-F1	U4512-D-F1
Battelle Batch ID	03-0137	03-0137	03-0137	03-0137	03-0159
Associated Blank	BB278PB	BB278PB	BB278PB	BB278PB	BB426PB
Field Date	11/18/02	11/18/02	11/18/02	11/18/02	11/21/02
Receipt Date	11/21/02	11/21/02	11/21/02	11/21/02	01/29/03
Extraction Date	02/11/03	02/11/03	02/11/03	02/11/03	02/21/03
Acquired Date	02/20/03	02/20/03	02/20/03	02/20/03	03/06/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	21.3 %	17.92 %	21.01 %	22.77 %	45.79 %
Matrix	Solid	Solid	Solid	Solid	Solid
Sample Size	0.45 mg	0.37 mg	0.26 mg	0.5 mg	1.01 mg
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	15.100	18.300	26.100	13.600	7.370
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Q9- Sesquiterpane (9)	2040	2410	1960	1020	346
Q10- Sesquiterpane (10)	942	918	691	518	112
Q1- Sesquiterpane (1)	888	1020	830	633	134
Q2- Sesquiterpane (2)	1090	1280	1060	702	163
Q3- Sesquiterpane (3)	2050	2430	1920	1070	331
Q4- Sesquiterpane (4)	693	820	580	448	189
Q5- Sesquiterpane (5)	401	428	356	248	156
Q6- Sesquiterpane (6)	469	514	456	328	94
Q7- Sesquiterpane (7)	212	201	144	144	ND
Q8- Sesquiterpane (8)	1500	1690	1390	1040	232
I1-C15-Isoprenoid (1380)	10200	11800	8380	4820	786
I2-C15-Isoprenoid (1470)	11300 E	13300 E	9520	5770	1380
I3-C18-Isoprenoid (1650)	10100	11800	7590	4160	757
I4-C19-Isoprenoid (Pristane)	17800 E	20100 E	11800	7020	1270
I5-C20-Isoprenoid (Phytane)	17000 E	19400 E	12000	6480	872
T4-C23 Tricyclic Terpane	1120	1280	1230	1110	658
T5-C24 Tricyclic Terpane	689	800	817	740	438
T6-C25 Tricyclic Terpane	847	972	955	926	579
T6c-C26 Tricyclic Terpane-22R	386	439	437	447	248
T6b-C26 Tricyclic Terpane-22S	347	396	413	411	244
T6a-C24 Tetracyclic Terpane	190	216	206	202	110
T7-C28 Tricyclic Terpane-22S	587	661	671	676	354
T8-C28 Tricyclic Terpane-22R	596	669	692	696	361
T9-C29 Tricyclic Terpane-22S	573	665	660	681	402
T10-C29 Tricyclic Terpane-22R	608	679	705	720	369
T11-18a(H)-22,29,30-Trisnorneohopane-TS	602	685	680	680	360
T12-17a(H)-22,29,30-Trisnorhopane-TM	754	879	832	895	582
T14a-a,b- and b,a-28,30-Bisnorhopane	966	1120	1080	1200	927
T14b-17a(H),21b(H)-25-Norhopane	476	534	534	609	412
T15-30-Norhopane	2400	2760	2650	2770	1690
T16-18a(H)-30-Norneohopane-C29Ts	835	926	945	992	590
X- 17a(H)-Diahopane	242	188	247	213	113
T17- 30-Normoretane	457	519	504	561	348
T18-18a(H) & 18b(H)-Oleanane	788	882	923	974	578
T19-Hopane	4680	5300	5070	5550	2820
T20- Mortane	853	948	1090	1150	694
T21-30-Homohopane-22S	1550	1770	1740	1780	940
T22-30-Homohopane-22R	1040	1180	1180	1210	771
T26-30-Bishomohopane-22S	856	987	973	955	424
T27-30,31-Bishomohopane-22R	667	770	792	757	351
T30-30,31-Trishomohopane-22S	804	934	926	883	449
T31-30,31-Trishomohopane-22R	688	742	798	772	355
T32-Tetrakishomohopane-22S	474	536	566	492	215
T33-Tetrakishomohopane-22R	294	381	352	302	141
T34-Pentakishomohopane-22S	426	481	491	416	222
T35-Pentakishomohopane-22R	325	383	357	311	175
S4-13b(H),17a(H)-20S-Diacholestane	2170	2350	2460	2140	1050
S5-13b(H),17a(H)-20R-Diacholestane	1400	1560	1630	1450	681
S8-13b(H),17a(H)-20S-Methyldiacholestane	1900	2030	2200	2050	1150
S12-14a(H),17a(H)-20S-Cholestane	3550	4080	4030	4180	2600
S14-14b(H),17b(H)-20R- Cholestane	1690	1990	1920	2040	1160
S15-14b(H),17b(H)-20S- Cholestane	1820	2070	2080	2080	1160
S17-14a(H),17a(H)-20R- Cholestane	4730	5500	5660	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)-20R-Methylcholestane	2560	2980	2910	3070	1890
S23-14b(H),17b(H)-20S-Methylcholestane	2590	2920	2960	3100	1690
S24-14a(H),17a(H)-20R-Methylcholestane	3340	3920	3850	4570	3010
S25-14a(H),17a(H)-20S-Ethylcholestane	1450	1670	1720	1850	1280
S26-14b(H),17b(H)-20R-Ethylcholestane	1860	2210	2450	2290	1200
S27-14b(H),17b(H)-20S-Ethylcholestane	1590	1700	1490	1900	979
S28-14a(H),17a(H)-20R-Ethylcholestane	2840	3210	3150	3620	2190

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	NLU-121-SS-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	0.139	0.215	0.136	0.124	0.136
Amount Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Q9- Sesquiterpane (9)	18.5	27.2	24.7	34.3	10.5
Q10- Sesquiterpane (10)	8.48	8.4	10.9	16.5	4.24
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 (3)	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 (8)	27.6	34.6	36.4	33	24.1
I1-C15-Isoprenoid (1380)	15.3	120	114	369 E	28
I2-C15-Isoprenoid (1470)	30.5	157	123	381 E	38.9
I3-C18-Isoprenoid (1650)	15.9	156	91.6	280	33.6
I4-C19-Isoprenoid (Pristane)	25	269	164	462 E	54.3
I5-C20-Isoprenoid (Phytane)	29.6	298	136	373 E	65.7
T4-C23 Tricyclic Terpane	30.4	36.4	35.4	15.8	34
T5-C24 Tricyclic Terpane	20.4	24.8	24	10.9	23.9
T6-C25 Tricyclic Terpane	24	29.7	28.6	12.6	28.6
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	31.9
T14a-a,b- and b,a-28,30-Bisnorhopane	29.6	29.4	46.2	22.9	31.5
T14b-17a(H),21b(H)-25-Norhopane	14	17.3	19.2	6.59	17.1
T15-30-Norhopane	111	97	131	47.9	115
T16-18a(H)-30-Neomeohopane-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	16.2	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- Moriane	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	35.2
T30-30,31-Trishomohopane-22S	54.4	38.4	50.4	21.8	49.1
T31-30,31-Trishomohopane-22R	28.7	29.2	36.4	18.5	30.6
T32-Tetrakishomohopane-22S	22.3	20.3	27.6	13.7	22.7
T33-Tetrakishomohopane-22R	15.1	15.9	19.8	9.14	14.8
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	87.3	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
S18-13b(H),17a(H)-20R- Ethyldiacholestane	15.8	20.9	16.8	8.19	16.2
S19-13a(H),17b(H)-20S-Ethyldiacholestane	4.25	5.11	5.55	2.34	4.18
S20-14a(H),17a(H)-20S- Methylcholestane	51.8	83.5	60.9	30.7	80.1
S22-14b(H),17b(H)-20R-Methylcholestane	88.8	93.6	93.4	46	78.6
S23-14b(H),17b(H)-20S-Methylcholestane	80.8	101	102	48.4	91.6
S24-14a(H),17a(H)-20R-Methylcholestane	68.1	112	114	60.3	88.7
S25-14a(H),17a(H)-20S-Ethylcholestane	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

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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 %	16.66 %	24.92 %	30.91 %
Matrix	Sediment	Sediment	Sediment	Solid	Solid
Sample Size	56.4 mg	40 mg	22.9 mg	7.57 g	9.48 g
Weight Basis	OIL	OIL	OIL	DRY	DRY
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	14	5.88	92
Q3- Sesquiterpane (3)	6.56	29.8	20.3	14.2	120
Q4- Sesquiterpane (4)	2.46	13.6	9.87	5.75	63.1
Q5- Sesquiterpane (5)	1.09	5.36	4.11	12	29.2
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
I4-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	42.6	4.21	298
T5-C24 Tricyclic Terpane	15.2	46.4	28.4	3.95 J	193
T6-C25 Tricyclic Terpane	17.3	55.9	35.2	7.25	248
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
T8-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-Trisnorneohopane-TS	24	45	38.1	6.56	281
T12-17a(H)-22,29,30-Trisnorhopane-TM	24	56.2	37.1	8.54	297
T14a-a,b- and b,a-28,30-Bisnorhopane	20.7	84.1	33.8	ND	302
T14b-17a(H),21b(H)-25-Norhopane	10.6	44.5	20.5	ND	192
T15-30-Norhopane	90.8	179	133	23.2	1030
T16-18a(H)-30-Norneohopane-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- Moretane	31.3	62.1	47.8	18.7	372
T21-30-Homohopane-22S	57.7	108	86.4	15.2	607
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	23.6	ND	153
T35-Pentakishomohopane-22R	11.6	20	17.2	ND	118
S4-13b(H),17a(H)-20S-Diacholestane	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	52.7
S20-14a(H),17a(H)-20S- Methylcholestane	29.3	147	64.5	9.25	579
S22-14b(H),17b(H)-20R-Methylcholestane	45.1	201	93.1	9.84	761
S23-14b(H),17b(H)-20S-Methylcholestane	51.2	200	107	11.6	833
S24-14a(H),17a(H)-20R-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.

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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
Acquired Date	12/28/02	12/14/02	02/19/03	02/19/03
Analytical Method	8270M	8270M	8270M	8270M
Percent Solids	75 %	81.3 %	20.2 %	24.34 %
Matrix	Sediment	Sediment	Sediment	Sediment
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
I2-C15-Isoprenoid (1470)	13.2	14.5	261	319
I3-C18-Isoprenoid (1650)	17.2	17.5	142	149
I4-C19-Isoprenoid (Pristane)	33.5 E	35.6	327	300
I5-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
T6-C25 Tricyclic Terpane	4.24	32.8	601	366
T6c-C26 Tricyclic Terpane-22R	1.75	13.9	263	157
T6b-C26 Tricyclic Terpane-22S	1.82	15	263	152
T6a-C24 Tetracyclic Terpane	1.33	12.2	360	300
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-Trisnorneohopane-TS	4.11	34.9	840	655
T12-17a(H)-22,29,30-Trisnorhopane-TM	4.46	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-Normoohopane-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	444
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
T35-Pentakishomohopane-22R	1.38	25.4	393	354
S4-13b(H),17a(H)-20S-Diacholestane	6.86	62	1010	646
S5-13b(H),17a(H)-20R-Diacholestane	5.81	35.1	575	405
S8-13b(H),17a(H)-20S-Methyldiacholestane	8.58	56.6	734	479
S12-14a(H),17a(H)-20S-Cholestane	16	140	1990	1400
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

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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	02-688	02-667	02-667
Associated Blank	AB489PB	BB142PB	AB489PB	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
Extraction Date	11/22/02	01/31/03	11/22/02	11/22/02	11/22/02
Acquired Date	12/15/02	02/17/03	12/15/02	12/14/02	12/15/02
Analytical Method	8270M	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	0.121	7.390	0.353	0.120	0.161
Amount Units	mg/kg	µg/kg	mg/kg	mg/kg	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 (8)	30.2	40.1	10.1	9.55	19.5
I1-C15-Isoprenoid (1380)	35.2	328	9.8	6.31	14.3
I2-C15-Isoprenoid (1470)	57.5	385	17.1	9.78	24
I3-C18-Isoprenoid (1650)	38.9	332	20.3	11.8	24
I4-C19-Isoprenoid (Pristane)	66.1	486	34.5	21.6	38.4
I5-C20-Isoprenoid (Phytane)	43	440	34.5	21.6	55.4
T4-C23 Tricyclic Terpane	13.3	90.2	9.65	8.58	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 Terpane-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- Moriane	12.8	76.4	11.2	11.7	61.2
T21-30-Homohopane-22S	22	146	18.3	18.6	96.7
T22-30-Homohopane-22R	14.8	87.7	13.1	13.4	80.7
T26-30-Bishomohopane-22S	11.8	77.1	11.1	11.2	63.3
T27-30,31-Bishomohopane-22R	8.54	66.6	8.54	8.44	45.5
T30-30,31-Trishomohopane-22S	7.53	64.8	11.6	10.8	64.9
T31-30,31-Trishomohopane-22R	6.01	64.2	8.65	8.12	39.3
T32-Tetrakishomohopane-22S	3.72	40.8	6.16	5.46	29.6
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
S6-13b(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
S26-14b(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
S28-14a(H),17a(H)-20R-Ethylcholestane	18.9	199	28.8	29.1	118

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&= Outside of DQO.
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ME= Matrix Interference. Estimated Value.

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	DW-5-1202	DW-5	MW-5 Product (T190)		GWP Tank (T192)		SS-1-1202	
Battelle Sample ID	U4514-D-F1	U451·	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	
Field Date	12/06/02		01/14/03		01/14/03		12/06/02	
Receipt Date	01/29/03		01/15/03		01/15/03		01/29/03	
Extraction Date	01/31/03		01/31/03		01/31/03		01/31/03	
Acquired Date	02/18/03		02/18/03		02/18/03		02/17/03	
Analytical Method	8270M		8270M		8270M		8270M	
Percent Solids	N	%	N	%	N	%	N	%
Matrix	Oily Material		Oily Material		Oily Material		Oily Material	
Sample Size	517.8	g	506.8	g	427.2	g	447.2	g
Weight Basis	OIL		OIL		OIL		OIL	
Min Reporting Limit	0.116		0.118		0.140		0.134	
Amount Units	mg/kg		mg/kg		mg/kg		mg/kg	
Q9- Sesquiterpane (9)	11		10.8		1.3		2.07	
Q10- Sesquiterpane (10)	3.53		3.91		0.507		0.615	
Q1- Sesquiterpane (1)	3.95		4.26		0.556		0.858	
Q2- Sesquiterpane (2)	5.47		5.62		0.49		0.888	
Q3- Sesquiterpane (3)	12		12.5		0.918		1.54	
Q4- Sesquiterpane (4)	2.6		3.17		0.247		0.464	
Q5- Sesquiterpane (5)	1.53		1.78		0.158		0.277	
Q6- Sesquiterpane (6)	1.8		2.1		0.138	J	0.236	
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	E	83.1	E	4.14		5.26	
I3-C18-Isoprenoid (1650)	50.8		58.2		2.86		4.38	
I4-C19-Isoprenoid (Pristane)	88.1	E	83.9	E	3.76		5.57	
I5-C20-Isoprenoid (Phytane)	55.2		60.8		3.28		5.39	
T4-C23 Tricyclic Terpane	2.55		4.73		0.459		0.42	
T5-C24 Tricyclic Terpane	1.58		2.94		0.265		0.232	
T6-C25 Tricyclic Terpane	1.71		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	0.67		1.39		0.129	J	0.114	J
T6a-C24 Tetracyclic Terpane	0.496		0.91		0.0785	J	0.0641	J
T7-C28 Tricyclic Terpane-22S	1.11		2.2		0.153		0.111	J
T8-C28 Tricyclic Terpane-22R	1.11		2.3		0.166		0.125	J
T9-C29 Tricyclic Terpane-22S	1.09		2.24		0.162		0.149	
T10-C29 Tricyclic Terpane-22R	1.16		2.23		0.128	J	0.148	
T11-18a(H)-22,29,30-Trisnorneohopane-TS	1.07		2.22		0.131	J	0.168	
T12-17a(H)-22,29,30-Trisnorhopane-TM	3.04		4.54		0.2		0.168	
T14a-a,b- and b,a-28,30-Bisnorhopane	3.1		6.88		0.336		0.246	
T14b-17a(H),21b(H)-25-Norhopane	0.961		2.03		0.175		0.204	
T15-30-Norhopane	6.59		11.4		0.421		0.4	
T16-18a(H)-30-Neohopane-C29Ts	1.53		3.4		0.242		0.231	
X- 17a(H)-Diahopane	0.373		0.557		0.0609	J	0.107	J
T17- 30-Normoretane	1.53		2.45		ND		ND	
T18-18a(H) & 18b(H)-Oleanane	1.79		3.66		0.27		0.302	
T19-Hopane	11.3		20.7		0.693		0.546	
T20- Moretane	2.88		5.41		ND		ND	
T21-30-Normohopane-22S	3.89		7.04		0.224		0.223	
T22-30-Normohopane-22R	2.54		4.5		0.138	J	0.141	
T26-30-Bisnormohopane-22S	2.06		3.93		0.151		0.126	J
T27-30,31-Bisnormohopane-22R	1.68		3.09		0.0673	J	0.0972	J
T30-30,31-Trisnormohopane-22S	1.8		3.61		0.0918	J	0.0916	J
T31-30,31-Trisnormohopane-22R	1.59		3.28		0.083	J	0.0964	J
T32-Tetrakisnormohopane-22S	1.11		2.26		ND		ND	
T33-Tetrakisnormohopane-22R	0.768		1.63		ND		ND	
T34-Pentakisnormohopane-22S	1.2		2.58		ND		ND	
T35-Pentakisnormohopane-22R	0.825		2.1		ND		ND	
S4-13b(H),17a(H)-20S-Diacholestane	2.73		5.66		0.386		0.316	
S5-13b(H),17a(H)-20R-Diacholestane	1.71		3.36		0.22		0.194	
S8-13b(H),17a(H)-20S-Methyldiacholestane	2.76		5.59		0.301		0.266	
S12-14a(H),17a(H)-20S-Cholestane	6.49		12.3		0.609		0.463	
S14-14b(H),17b(H)-20R- Cholestane	3.84		7.02		0.326		0.218	
S15-14b(H),17b(H)-20S- Cholestane	3.48		6.82		0.302		0.216	
S17-14a(H),17a(H)-20R- Cholestane	10		19.1		0.884		0.596	
S18-13b(H),17a(H)-20R- Ethyldiacholestane	0.754		1.33		0.429		0.481	
S19-13a(H),17b(H)-20S-Ethyldiacholestane	0.235		0.487		ND		ND	
S20-14a(H),17a(H)-20S- Methylcholestane	3.67		6.97		0.304		0.228	
S22-14b(H),17b(H)-20R-Methylcholestane	5.19		10.1		0.369		0.24	
S23-14b(H),17b(H)-20S-Methylcholestane	5.37		9.73		0.325		0.22	
S24-14a(H),17a(H)-20R-Methylcholestane	8.1		15.6		0.63		0.443	
S25-14a(H),17a(H)-20S-Ethylcholestane	3.13		5.8		0.205		0.145	
S26-14b(H),17b(H)-20R-Ethylcholestane	3.73		6.74		0.238		0.196	
S27-14b(H),17b(H)-20S-Ethylcholestane	2.49		5.69		0.186		0.123	J
S28-14a(H),17a(H)-20R-Ethylcholestane	8.12		12.2		0.503		0.301	

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.

Battelle
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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	
Acquired Date	12/13/02	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	50	mg
Weight Basis	NA	
Min Reporting Limit	0.24	
Amount Units	mg/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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	ND	
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	ND	
I5-C20-Isoprenoid (Phytane)	ND	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND	
T6c-C28 Tricyclic Terpane-22R	ND	
T6b-C28 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-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	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	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	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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.

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	NLU-104-SS-0010	NLU-104-SS-0010		
Battelle Sample ID	U0142-F1-D	U0142DUP-F1-D		
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	12/28/02	12/28/02		
Analytical Method	8270M	8270M		
Percent Solids	13.3 %	13.3 %		
Matrix	Sediment	Sediment		
Sample Size	39.6 mg	30.8 mg		
Weight Basis	OIL	OIL		
Min Reporting Limit	0.174	0.234		
Amount Units	mg/kg	mg/kg	RPD(%)	Q
Q9- Sesquiterpane (9)	0.22	0.187 J	NA	
Q10- Sesquiterpane (10)	0.104 J	0.13 J	NA	
Q1- Sesquiterpane (1)	0.431	0.422	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	
Q5- Sesquiterpane (5)	0.146 J	0.166 J	NA	
Q6- Sesquiterpane (6)	0.302	0.295	NA	
Q7- Sesquiterpane (7)	0.18	0.179 J	NA	
Q8- Sesquiterpane (8)	1.42	1.39	2.13	
I1-C15-Isoprenoid (1380)	0.474	0.576	NA	
I2-C15-Isoprenoid (1470)	1.08	1.1	NA	
I3-C18-Isoprenoid (1650)	0.897	0.937	NA	
I4-C19-Isoprenoid (Pristane)	1.97	1.92	2.57	
I5-C20-Isoprenoid (Phytane)	3.04	3.02	0.66	
T4-C23 Tricyclic Terpane	2.91	3.05	4.7	
T5-C24 Tricyclic Terpane	1.98	2.06	3.96	
T6-C25 Tricyclic Terpane	2.61	2.66	1.9	
T6c-C26 Tricyclic Terpane-22R	1.16	1.18	1.71	
T6b-C26 Tricyclic Terpane-22S	1.11	1.12	NA	
T6a-C24 Tetracyclic Terpane	1.04	1.05	NA	
T7-C28 Tricyclic Terpane-22S	1.36	1.24	9.23	
T8-C28 Tricyclic Terpane-22R	1.43	1.38	3.56	
T9-C29 Tricyclic Terpane-22S	1.79	1.77	1.12	
T10-C29 Tricyclic Terpane-22R	1.61	1.62	0.619	
T11-18a(H)-22,29,30-Trisnorneohopane-TS	3.37	3.72	9.87	
T12-17a(H)-22,29,30-Trisnorhopane-TM	3.48	3.5	0.573	
T14a-a,b- and b,a-28,30-Bisnorhopane	3.13	3.03	3.25	
T14b-17a(H),21b(H)-25-Norhopane	1.65	1.69	2.4	
T15-30-Norhopane	12.3	12.4	0.81	
T16-18a(H)-30-Norneohopane-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	2.51	2.55	1.58	
T19-Hopane	20.6	20.4	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	
T26-30-Bishomohopane-22S	4.8	4.78	0.418	
T27-30,31-Bishomohopane-22R	3.8	3.87	1.82	
T30-30,31-Trishomohopane-22S	5.08	5.2	2.33	
T31-30,31-Trishomohopane-22R	3	3.03	0.995	
T32-Tetrakishomohopane-22S	2.28	2.44	6.78	
T33-Tetrakishomohopane-22R	1.55	1.67	7.45	
T34-Pentakishomohopane-22S	2.23	2.4	7.34	
T35-Pentakishomohopane-22R	1.56	1.53	1.94	
S4-13b(H),17a(H)-20S-Diacholestane	5.51	5.53	0.362	
S5-13b(H),17a(H)-20R-Diacholestane	3.26	3.24	0.615	
S8-13b(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)-20R- Cholestane	5.81	5.73	1.39	
S15-14b(H),17b(H)-20S- Cholestane	5.95	6.19	3.95	
S17-14a(H),17a(H)-20R- Cholestane	12.3	12.8	2.41	
S18-13b(H),17a(H)-20R- Ethyldiacholestane	2.26	2.28	0.881	
S19-13a(H),17b(H)-20S-Ethyldiacholestane	0.597	0.606	NA	
S20-14a(H),17a(H)-20S- Methylcholestane	5.62	5.66	0.709	
S22-14b(H),17b(H)-20R-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)-20R-Methylcholestane	7.44	6.97	6.52	
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)-20S-Ethylcholestane	6.74	7.49	10.5	
S28-14a(H),17a(H)-20R-Ethylcholestane	7.88	8.35	5.79	

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

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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	AB489PB-F1	
Battelle Batch ID	02-668	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	11/22/02	
Acquired Date	12/14/02	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	56	mg
Weight Basis	OIL	
Min Reporting Limit	0.214	
Amount Units	mg/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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	ND	
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	ND	
I5-C20-Isoprenoid (Phytane)	ND	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND	
T6c-C26 Tricyclic Terpane-22R	ND	
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-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	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	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	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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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		
Analytical Method	8270M	8270M		
Percent Solids	18.29	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	9.84	
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	
Q5- Sesquiterpane (5)	4.41	5.07	13.9	
Q6- Sesquiterpane (6)	10.6	10.8	1.87	
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	
I5-C20-Isoprenoid (Phytane)	219	256	15.6	
T4-C23 Tricyclic Terpane	40.1	42.7	6.28	
T5-C24 Tricyclic Terpane	26.4	29.9	12.4	
T6-C25 Tricyclic Terpane	34.6	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	24.8	4.96	
T11-18a(H)-22,29,30-Trisnorneohopane-TS	27.5	30.2	9.36	
T12-17a(H)-22,29,30-Trisnorhopane-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-Norhopane	20.2	20	0.995	
T15-30-Norhopane	108	116	7.14	
T16-18a(H)-30-Norneohopane-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	37.3	6.65	
T19-Hopane	221	237	6.99	
T20- Mortane	48	61.5	24.6	
T21-30-Homohopane-22S	81.3	88.8	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	12.5	
T33-Tetrakishomohopane-22R	14.8	15.6	5.26	
T34-Pentakishomohopane-22S	20.3	21.6	6.2	
T35-Pentakishomohopane-22R	15.7	16.4	4.36	
S4-13b(H),17a(H)-20S-Diacholestane	82.2	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	25	26.9	7.32	
S19-13a(H),17b(H)-20S-Ethyldiacholestane	5.76	6.16	6.71	
S20-14a(H),17a(H)-20S- Methylcholestane	74.9	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

Prepared by Andy Smith
4/15/2003

Battelle
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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	
Extraction Date	01/09/03	
Acquired Date-Biomarker	02/18/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	7	g
Weight Basis	NA	
Min Reporting Limit	1.71	
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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	ND	
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	ND	
I5-C20-Isoprenoid (Phytane)	ND	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND	
T6c-C26 Tricyclic Terpane-22R	ND	
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	
T12-17a(H)-22,29,30-Trisnorhopane-TM	ND	
T14a-a,b- and b,e-28,30-Bisnorhopane	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	
T19-Hopane	ND	
T20- Moretane	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	ND	
T34-Pentakishomohopane-22S	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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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		
Analytical Method	8270M	8270M		
Percent Solids	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(%)	Q
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- Sesquiterpane (4)	171	189	10	
Q5- Sesquiterpane (5)	96.7	97.1	0.413	
Q6- Sesquiterpane (6)	126	141	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	
I2-C15-Isoprenoid (1470)	424	446	5.06	
I3-C18-Isoprenoid (1650)	351	388	10	
I4-C19-Isoprenoid (Pristane)	583	603	3.37	
I5-C20-Isoprenoid (Phytane)	782	831	6.08	
T4-C23 Tricyclic Terpane	776	806	3.79	
T5-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	497	2.03	
T9-C29 Tricyclic Terpane-22S	506	524	3.5	
T10-C29 Tricyclic Terpane-22R	482	539	11.2	
T11-18a(H)-22,29,30-Trisnorneohopane-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-Neohopane-C29Ts	810	826	1.96	
X- 17a(H)-Diahopane	145	172	17	
T17- 30-Normoretane	424	431	1.64	
T18-18a(H) & 18b(H)-Oleanane	778	783	0.641	
T19-Hopane	4110	4190	1.93	
T20- Moretane	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	7.95	
T27-30,31-Bishomohopane-22R	528	554	4.8	
T30-30,31-Trishomohopane-22S	642	650	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	980	0.614	
S8-13b(H),17a(H)-20S-Methyldiacholestane	1450	1430	1.39	
S12-14a(H),17a(H)-20S-Cholestane	2940	3070	4.33	
S14-14b(H),17b(H)-20R- Cholestene	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	
S22-14b(H),17b(H)-20R-Methylcholestane	2270	2270	0	
S23-14b(H),17b(H)-20S-Methylcholestane	2300	2290	0.436	
S24-14a(H),17a(H)-20R-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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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedurel Blank	
Battelle Sample ID	BB278PB-D-F1	
Battelle Batch ID	03-0137	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	02/11/03	
Acquired Date-Biomarker	02/19/03	
Analytical Method	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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	5.2	J
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	6.12	J
I5-C20-Isoprenoid (Phytane)	6.33	J
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	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-C26 Tricyclic Terpane-22R	ND	
T9-C29 Tricyclic Terpane-22S	ND	
T10-C29 Tricyclic Terpane-22R	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	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	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	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank-F1 Only	
Battelle Sample ID	BB362PB-F1	
Battelle Batch ID	03-0137	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	02/19/03	
Acquired Date-Biomarker	02/19/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size	0.5	g
Weight Basis	NA	
Min Reporting Limit	12	
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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	ND	
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	ND	
I5-C20-Isoprenoid (Phytane)	ND	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND	
T6c-C26 Tricyclic Terpane-22R	ND	
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-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	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	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	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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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		
Amount Units	µg/kg	µg/kg	RPD(%)	Q
Q9- Sesquiterpane (9)	211	248	16.1	
Q10- Sesquiterpane (10)	91.1	113	21.5	
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	8.97	
Q5- Sesquiterpane (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)	1980	2260	13.2	
I3-C18-Isoprenoid (1650)	2550	2730	6.82	
I4-C19-Isoprenoid (Pristane)	4590	5140	11.3	
I5-C20-Isoprenoid (Phytane)	4620	5230	12.4	
T4-C23 Tricyclic Terpane	613	651	6.01	
T5-C24 Tricyclic Terpane	413	444	7.23	
T6-C25 Tricyclic Terpane	528	561	6.06	
T6c-C26 Tricyclic Terpane-22R	239	234	2.11	
T6b-C26 Tricyclic Terpane-22S	231	231	0	
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-Trisnorneohopane-TS	395	422	6.61	
T12-17a(H)-22,29,30-Trisnorhopane-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	0.966	
T15-30-Norhopane	1380	1490	7.66	
T16-18a(H)-30-Norneohopane-C29Ts	490	547	11	
X- 17a(H)-Diahopane	109	135	21.3	
T17- 30-Normoretane	245	253	3.21	
T18-18a(H) & 18b(H)-Oleanane	445	480	7.57	
T19-Hopane	2590	2810	8.15	
T20- Mortane	451	533	16.7	
T21-30-Homohopane-22S	877	926	5.44	
T22-30-Homohopane-22R	665	728	9.04	
T26-30-Bishomohopane-22S	484	525	8.13	
T27-30,31-Bishomohopane-22R	385	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	4.08	
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	1130	8.29	
S17-14a(H),17a(H)-20R- Cholestane	2580	2810	8.53	
S18-13b(H),17a(H)-20R- Ethyldiacholestane	410	416	1.45	
S19-13a(H),17b(H)-20S-Ethyldiacholestane	78.7	102	25.8	
S20-14a(H),17a(H)-20S- Methylcholestane	1040	1150	10	
S22-14b(H),17b(H)-20R-Methylcholestane	1520	1600	5.13	
S23-14b(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.

Not Surrogate Corrected
DUP results

Prepared by Andy Smith
4/15/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	BB426PB-D-F1	
Battelle Batch ID	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	NA	
Matrix	Solid	
Sample Size	0.4	g
Weight Basis	NA	
Min Reporting Limit	30	
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)	ND	
Q7- Sesquiterpane (7)	ND	
Q8- Sesquiterpane (8)	ND	
I1-C15-Isoprenoid (1380)	ND	
I2-C15-Isoprenoid (1470)	ND	
I3-C18-Isoprenoid (1650)	ND	
I4-C19-Isoprenoid (Pristane)	ND	
I5-C20-Isoprenoid (Phytane)	ND	
T4-C23 Tricyclic Terpane	ND	
T5-C24 Tricyclic Terpane	ND	
T6-C25 Tricyclic Terpane	ND	
T6c-C26 Tricyclic Terpane-22R	ND	
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-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	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	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	ND	
T35-Pentakishomohopane-22R	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	
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	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	
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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Project Name Lake Union Sediment Investigation
Project Number 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
Extraction Date	02/26/03
Acquired Date-Biomarker	03/05/03
Analytical Method	8270M
Percent Solids	NA
Matrix	Solid
Sample Size	0.4 g
Weight Basis	NA
Min Reporting Limit	15
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)	ND
Q7- Sesquiterpane (7)	ND
Q6- Sesquiterpane (8)	ND
I1-C15-Isoprenoid (1380)	ND
I2-C15-Isoprenoid (1470)	ND
I3-C18-Isoprenoid (1650)	ND
I4-C19-Isoprenoid (Pristane)	ND
I5-C20-Isoprenoid (Phytane)	ND
T4-C23 Tricyclic Terpane	ND
T5-C24 Tricyclic Terpane	ND
T6-C25 Tricyclic Terpane	ND
T6c-C26 Tricyclic Terpane-22R	ND
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-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	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	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	ND
T35-Pentakishomohopane-22R	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
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	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	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
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank
Battelle Sample ID	BB142PB-D-F1
Battelle Batch ID	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	NA
Matrix	Solid
Sample Size	7 g
Weight Basis	NA
Min Reporting Limit	1.71
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)	ND
Q7- Sesquiterpane (7)	ND
Q8- Sesquiterpane (8)	ND
I1-C15-Isoprenoid (1380)	ND
I2-C15-Isoprenoid (1470)	ND
I3-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
T6c-C26 Tricyclic Terpane-22R	ND
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-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	ND
X- 17a(H)-Diahopane	ND
T17- 30-Normoretane	ND
T18-18a(H) & 18b(H)-Oleanane	ND
T19-Hopane	ND
T20- Moretane	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	ND
T34-Pentakishomohopane-22S	ND
T35-Pentakishomohopane-22R	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
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	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
S27-14b(H),17b(H)-20S-Ethylcholestane	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
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank
Battelle Sample ID	BB146PB-D-F1
Battelle Batch ID	03-0100
Associated Blank	NA
Field Date	NA
Receipt Date	NA
Extraction Date	02/06/03
Acquired Date-Biomarker	02/18/03
Analytical Method	8270M
Percent Solids	NA
Matrix	Oily Material
Sample Size	511 mg
Weight Basis	NA
Min Reporting Limit	0.0235
Amount Units	mg/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)	ND
Q7- Sesquiterpane (7)	ND
Q8- Sesquiterpane (8)	ND
I1-C15-Isoprenoid (1380)	ND
I2-C15-Isoprenoid (1470)	ND
I3-C18-Isoprenoid (1650)	ND
I4-C19-Isoprenoid (Pristene)	ND
I5-C20-Isoprenoid (Phytane)	ND
T4-C23 Tricyclic Terpane	ND
T5-C24 Tricyclic Terpane	ND
T6-C25 Tricyclic Terpane	ND
T6c-C26 Tricyclic Terpane-22R	ND
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-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	ND
X- 17a(H)-Diahopane	ND
T17- 30-Normoretane	ND
T18-18a(H) & 18b(H)-Oleanane	ND
T19-Hopane	ND
T20- Moretane	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	ND
T34-Pentakishomohopane-22S	ND
T35-Pentakishomohopane-22R	ND
S4-13b(H),17a(H)-20S-Diacholestane	ND
S5-13b(H),17a(H)-20R-Diacholestene	ND
S6-13b(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
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	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
S27-14b(H),17b(H)-20S-Ethylcholestane	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.

Summary of TPH, TOC, and PAH Measurements

Client Sample ID:	Battelle Sample ID:	Matrix	TPH (ug/kg)	TOC (%)	Total PAH (ug/kg)	EPA 16 PAH (ug/kg)	L PAH (ug/kg)	H PAH (ug/kg)
NLU-102-SS-0010	U0169	Sediment	2560000	13.1	21600	13500	6010	15600
NLU-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
NLU-106-SS-0010	U0144	Sediment	3820000	12.3	44700	30500	8570	36200
NLU-107-SS-0010	U0145	Sediment	4340000	12	73100	51400	13200	59900
NLU-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
NLU-110 0406	U0353	Sediment	18100000	29.7	5450000	4610000	1210000	4250000
NLU-110-1214	U0357	Sediment	21200000	36.1	7050000	5910000	1520000	5530000
NLU-110 2022	U0361	Sediment	8500000	22	1820000	1470000	330000	1490000
NLU-112-SS-0010	U0171	Sediment	6190000	15	216000	171000	33100	183000
NLU-112-SS-2030	U0101	Sediment	8930000	15.9	2060000	1620000	681000	1380000
NLU-112-SS-2030	U0101DUP	Sediment	9330000	15.9	2230000	1770000	726000	1500000
NLU-113-SS-0010	U0146	Sediment	4160000	12.5	170000	128000	30400	140000
NLU-113-SS-1020	U0108	Sediment	7230000	10.5	516000	341000	189000	327000
NLU-115-SS-0010	U0149	Sediment	7210000	10.9	1120000	517000	696000	424000
NLU-116-SS-0010	U0150	Sediment	5360000	8.92	211000	139000	49800	161000
NLU-116-SS-1020	U0122	Sediment	10200000	15.6	1240000	984000	255000	990000
NLU-116-SS-2030	U0123	Sediment	10500000	15.9	1180000	954000	151000	1030000
NLU-116-SS-2030	U0123DUP	Sediment	11000000		1190000	963000	149000	1040000
NLU-117-0010c	U6525	Sediment	20600000	38.7	6720000	5170000	2140000	4580000
NLU-117 0810	U0387	Sediment	32300000	47.1	9290000	7110000	2950000	6340000
NLU-117 2830	U0397	Sediment	22400000	35.6	3370000	2360000	1360000	2010000
NLU-117 4850	U0407	Sediment	11300000	16.7	691000	430000	391000	300000
NLU-117-US-9.6	U4507	Sediment	20400000	1.9	14400000	9300000	11100000	3270000
NLU-119-0010c	U6524	Sediment	72700000	34.5	30500000	14100000	22500000	8040000
NLU-119-0608	U0455	Sediment	83500000	33.7	28800000	13500000	21000000	7830000
NLU-119-1618	U0460	Sediment	75400000	34.6	24400000	11700000	17700000	6690000
NLU-119-2426	U0464	Sediment	36600000	25.8	9480000	5390000	5980000	3500000
NLU-119R2-US-0.5	U4512	Sediment	26400000	14.3	10000000	5130000	8980000	1060000
NLU-121-SS-0010	U0151	Sediment	5740000	15.9	323000	185000	86200	237000
NLU-121-SS-2030	U0152	Sediment	15600000	14.9	2780000	1660000	1290000	1490000
NLU-122-SS-0010	U0153	Sediment	5130000	6.43	804000	447000	486000	318000
NLU-122-SS-2030	U0154	Sediment	62200000	17.1	18900000	10300000	14200000	4710000
NLU-123-SS-0010	U0155	Sediment	5640000	10.7	501000	306000	187000	314000
NLU-124-SS-0010	U0156	Sediment	4600000	11.7	157000	100000	41000	116000
NLU-124-SS-2030	U0157	Sediment	7080000	7.98	332000	203000	115000	217000
NLU-126-SS-0010	U0158	Sediment	3970000	10.1	222000	133000	65900	156000
NLU-126-SS-0010 Roofing	U4517	Sediment	5810000	10.1	192000	91800	153000	39300
NLU-126-SS-1020	U0097	Sediment	4290000	7.45	248000	153000	100000	148000
NLU-127-SS-0010	U0159	Sediment	2090000	2.84	73200	42100	28400	44800
NLU-128-SS-0010	U0160	Sediment	702000	0.65	8310	5150	1980	6330
NLU-129-SS-0010	U0135	Sediment	11400000	22.8	95600	57000	29000	66600
NLU-129-SS-2030	U0137	Sediment	14700000	19.5	108000	64100	29600	78300
NLU-130-SS-0010	U0161	Sediment	8090000	42.2	3000000	2260000	618000	2380000
NLU-131-SS-0010	U4518	Sediment	46300000	88.1	29900000	27200000	10300000	19600000
NLU-133-SS-0010	U0162	Sediment	1130000	4.96	368000	298000	65400	303000
NLU-133-SS-1020	U0163	Sediment	955000	8.04	372000	303000	62400	310000
NLU-136-SS-0010	U0172	Sediment	6730000	11.8	173000	128000	27600	146000
DW-5-1202	U4514	Oily Material	755000000	81	350000000	214000000	307000000	42800000
MW-5 Product(T190)	U3754	Oily Material	670000000	83.6	288000000	170000000	245000000	43100000
GWP Tank(T192)	U3752	Oily Material	969000000	82.5	382000000	294000000	294000000	87900000
SS-1-1202	U4515	Oily Material	691000000	82.3	231000000	118000000	190000000	41300000
NLU-VV2	U0165	Wipe			85.7	30.3	62.2	23.5
NLU-VV3	U0166	Wipe			60.1	16.6	57.7	2.44
NLU-VV4	U0167	Wipe			46.6	14.2	45.4	1.22
NLU-VV5	U0168	Wipe			116	19.9	113	2.22

Summary of Butyltin, Pesticide, and PCB Measurements

CLIENT ID	BATTELLE ID	TTBT (ug/kg)	TBT (ug/kg)	DBT (ug/kg)	MBT (ug/kg)	Sum of Butyltins (ug/kg)	Total Pesticides (ug/kg)	Total PCB (Homologue) (ug/kg)	Dominant LOC
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

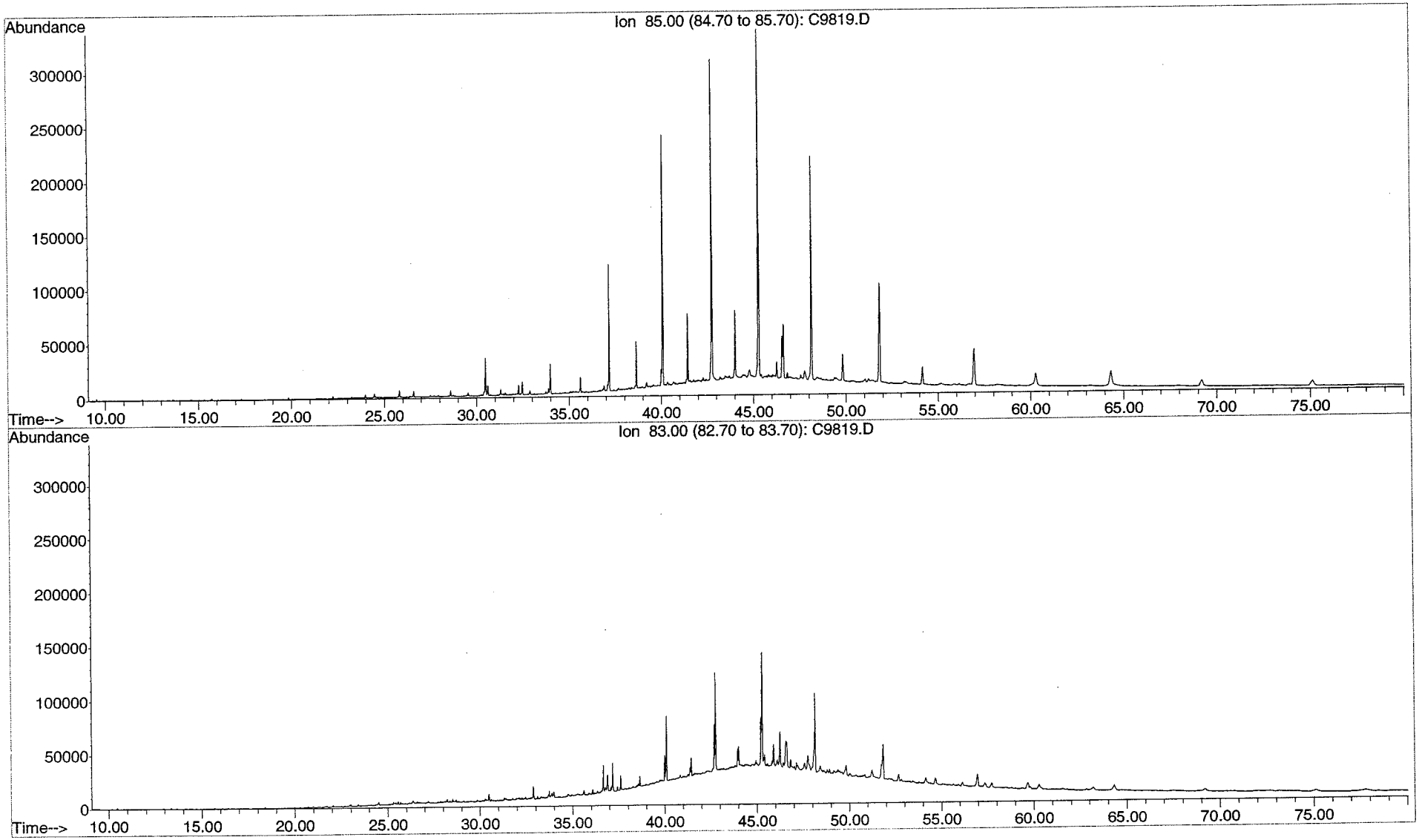
MBT	Monobutyltin
DBT	Dibutyltin
TBT	Tributyltin
TTBT	Tetrabutyltin
LOC	Level of chlorination or homologue
<DL	Below detection limit
ND	Not determined
MI	Matrix Interference

Summary of Petrology Measurements

Client Sample ID	Battelle Sample ID	%Coal	%Coke	%Tar/Pitch	%Sediment Particulates	Vitrinite Reflectance
NLU126-1020	U0047	<1	<1	<1	100	not detected
NLU113-1020	U0108	<1	<1	<1	100	not detected
NLU116-1020	U0122	8.5	<1	2.5	88	not detected
NLU116-2030	U0123	<1	<1	1.5	97	not detected
NLU116-0010	U0150	<1	<1	2.5	96	not detected
NLU126-0010	U0158	<1	<1	<1	100	not detected
NLU117-2830	U0397	<1	2	36	62	not detected
NLU119-1618	U0460	<1	<1	28.5	72	high volatile C bituminous and lesser amounts of high volatile A bituminous
NLU119R2	U4512	6.5	2.5	12	88	high volatile C bituminous and lesser amounts of high volatile A bituminous and medium volatile bituminous
NLU126-0010 Roofing Material	U4517	<1	<1	100	<1	not detected
NLU131-0010	U4518	<1	1	95	4	not detected

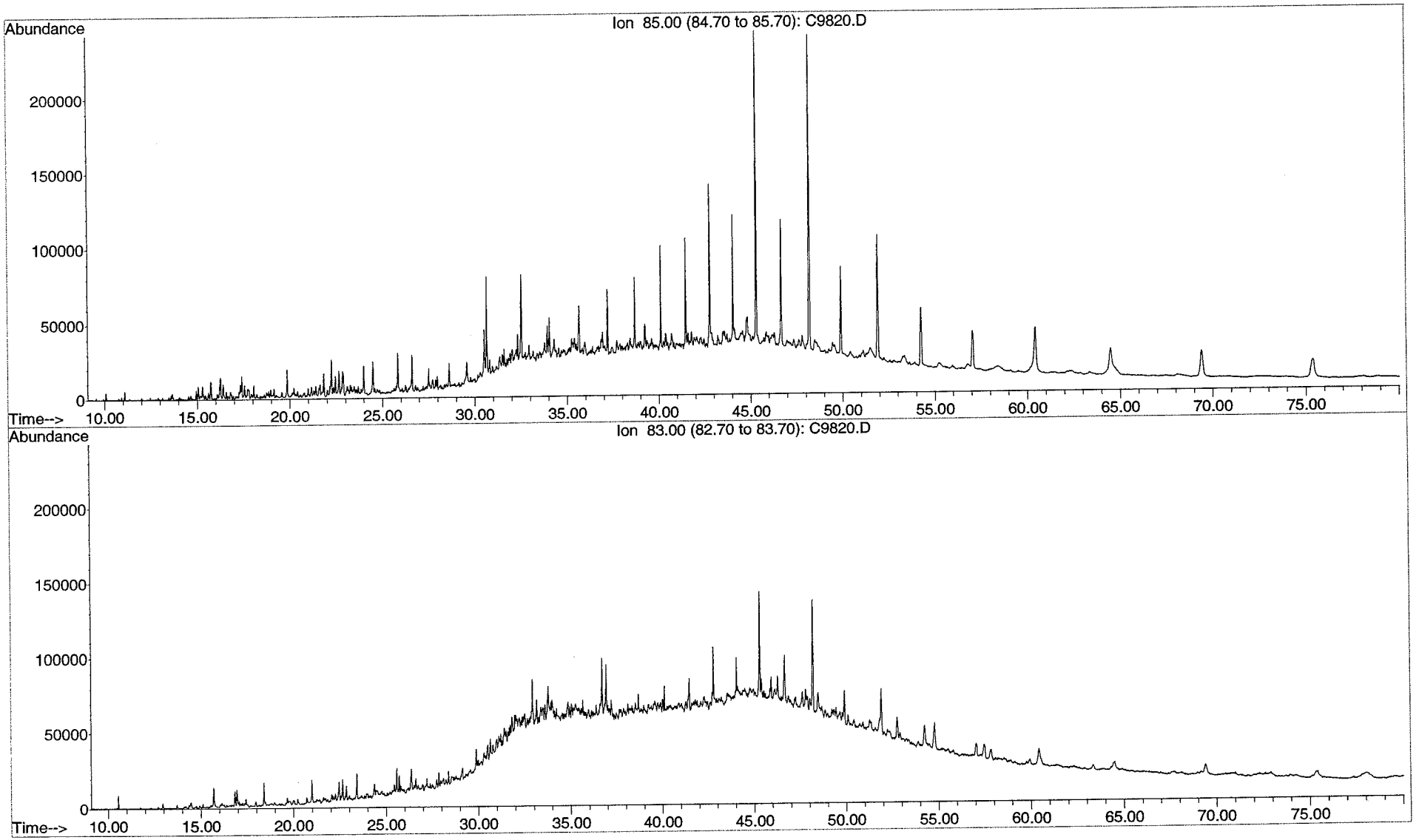
File : G:\C\DATA\SQC647\C9819.D
Operator : AC
Acquired : 12 Apr 2003 4:59 pm using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0169-F1
Misc Info :
Vial Number: 18

Normal Alkanes and Alkylcyclohexanes
NLU-102-SS-0010
U0169



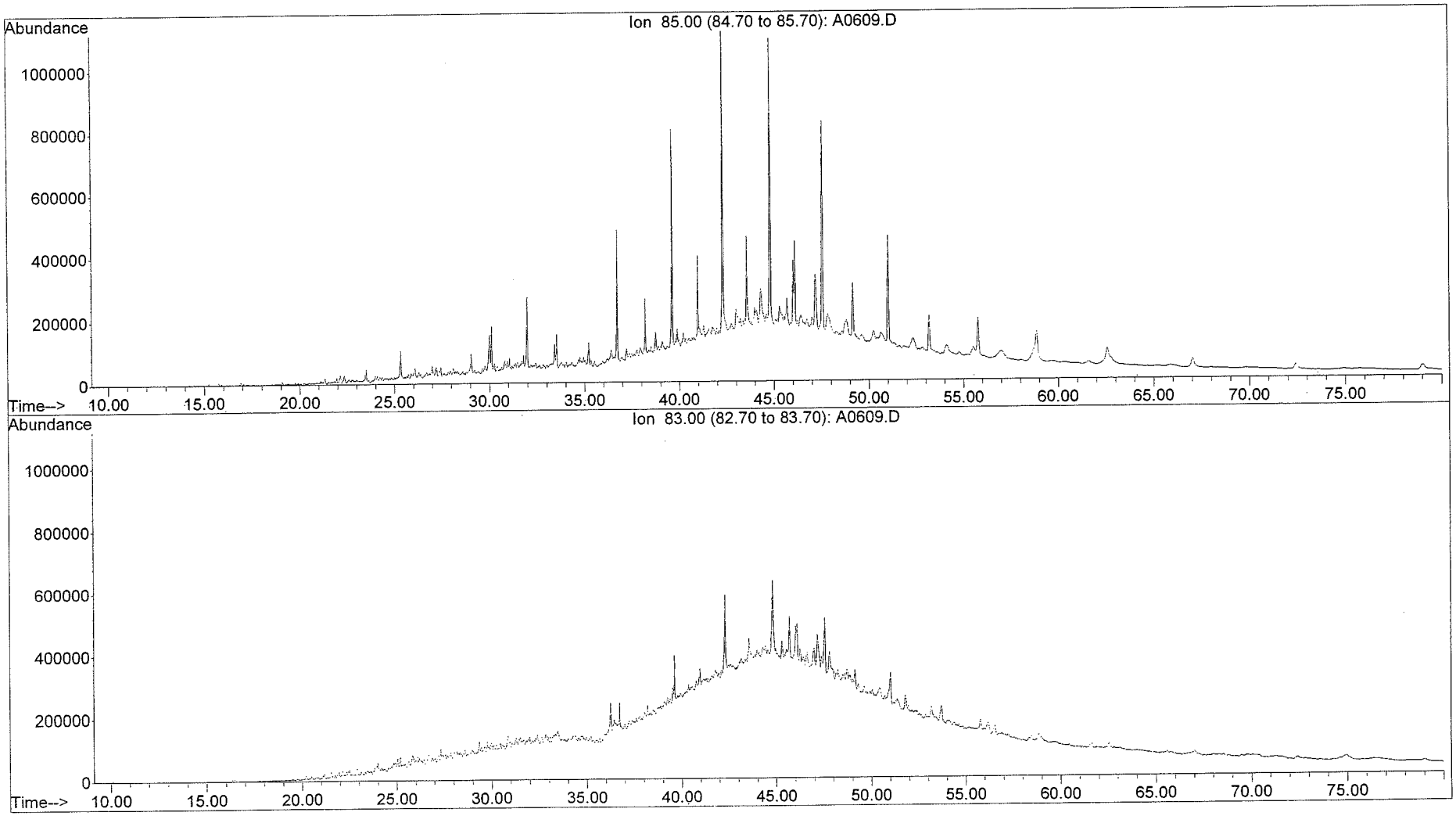
File : G:\C\DATA\SQC647\C9820.D
Operator : AC
Acquired : 12 Apr 2003 6:30 pm using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0170-F1
Misc Info :
Vial Number: 19

Normal Alkanes and Alkylcyclohexanes
NLU-103-SS-0010
U0170



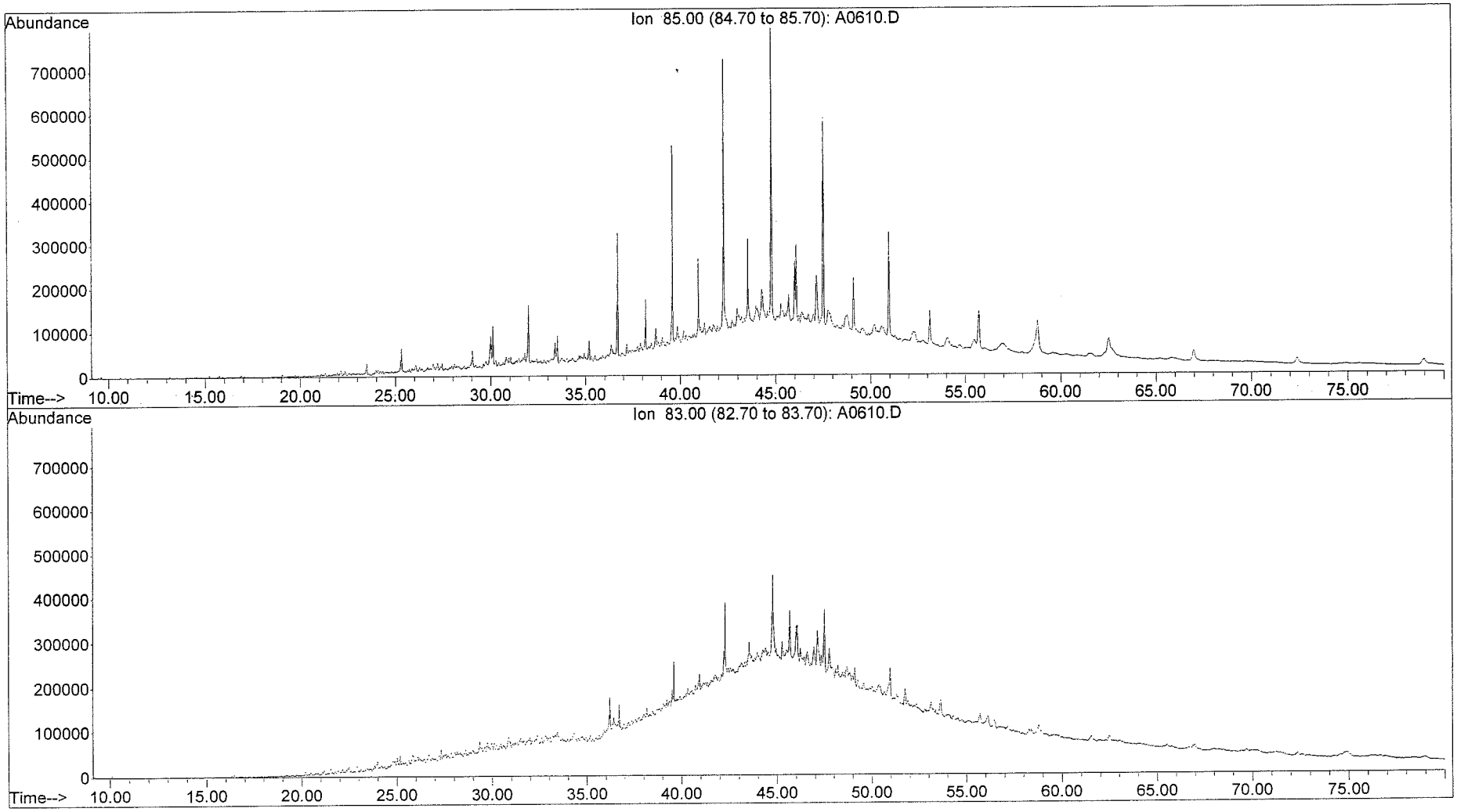
File : G:\A\DATA\SQA319\A0609.D
Operator : TH
Acquired : 13 Dec 2002 8:51 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0142-F1
Misc Info :
Vial Number: 13

Normal Alkanes and Alkylcyclohexanes
NLU-104-SS-0010
U0142



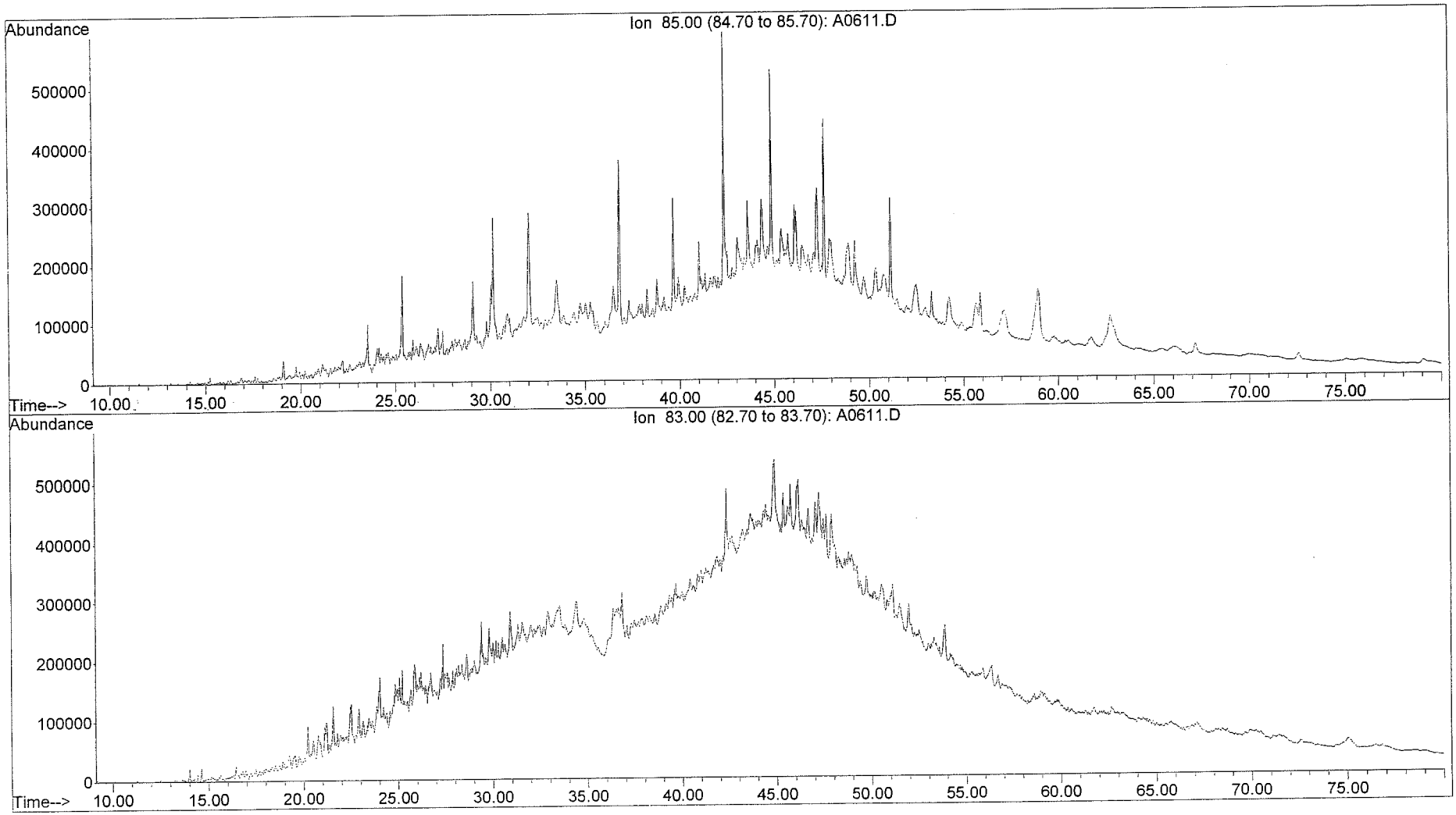
File : G:\A\DATA\SQA319\A0610.D
Operator : TH
Acquired : 13 Dec 2002 10:21 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0142DUP-F1
Misc Info :
Vial Number: 14

Normal Alkanes and Alkylcyclohexanes
NLU-104-SS-0010
U0142 Duplicate



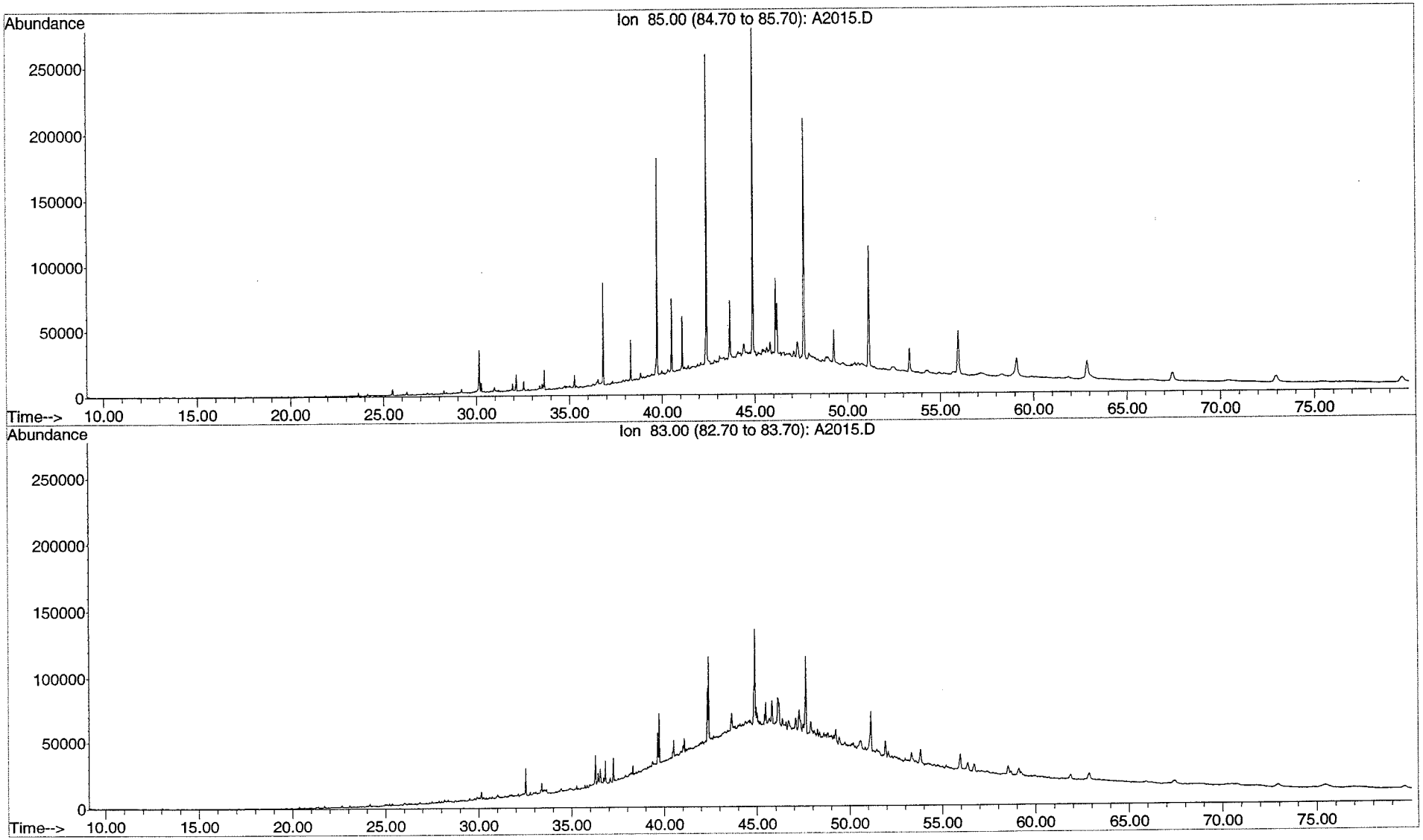
File : G:\A\DATA\SQA319\A0611.D
Operator : TH
Acquired : 13 Dec 2002 11:55 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0143-F1
Misc Info :
Vial Number: 15

Normal Alkanes and Alkylcyclohexanes
NLU-105-SS-0010
U0143



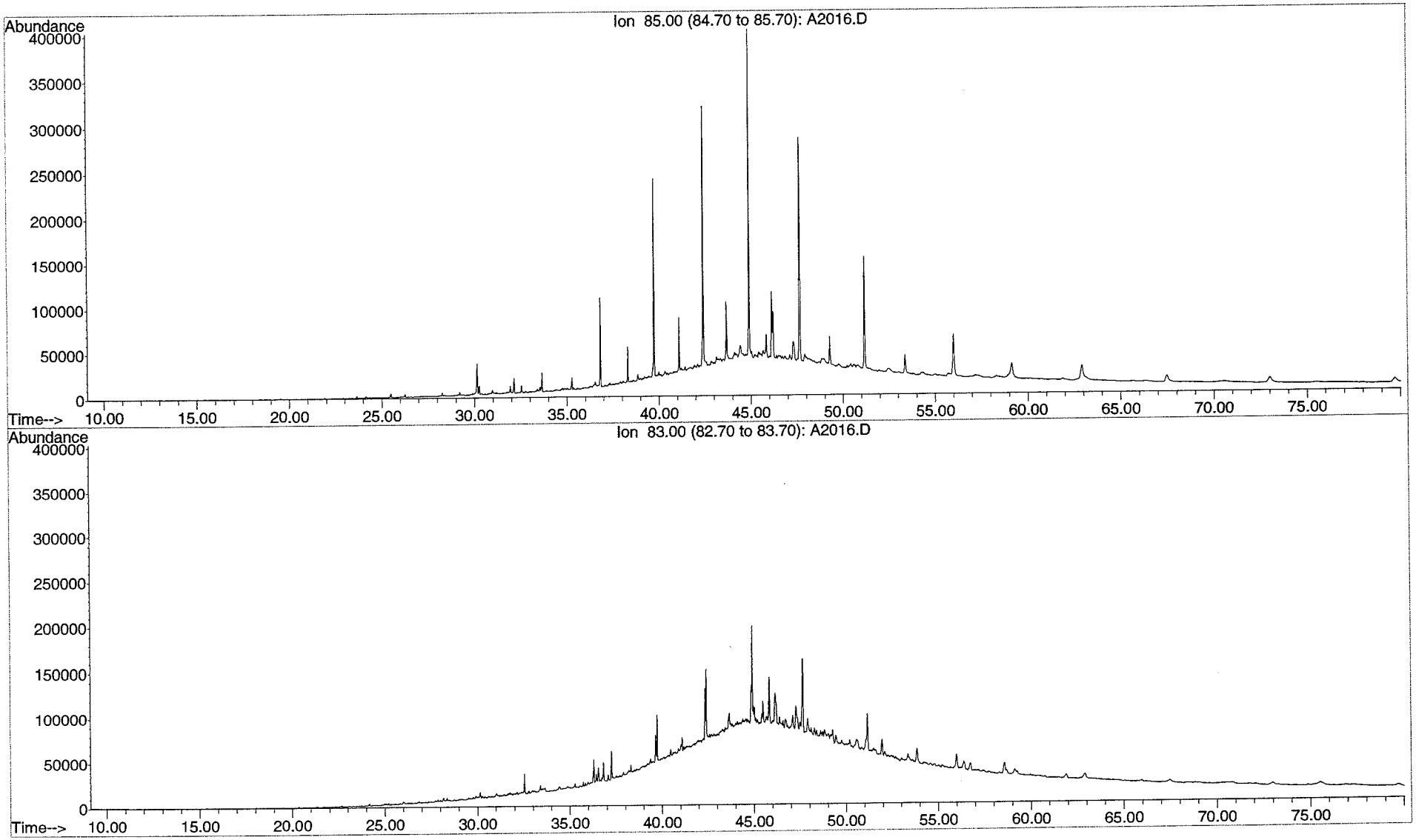
File : G:\A\DATA\SQA350\A2015.D
Operator : JR
Acquired : 28 Mar 2003 11:30 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0144-F1
Misc Info :
Vial Number: 13

Normal Alkanes and Alkylcyclohexanes
NLU-106-SS-0010
U0144



File : G:\A\DATA\SQA350\A2016.D
Operator : JR
Acquired : 28 Mar 2003 1:02 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0145-F1
Misc Info :
Vial Number: 14

Normal Alkanes and Alkylcyclohexanes
NLU-107-SS-0010
U0145

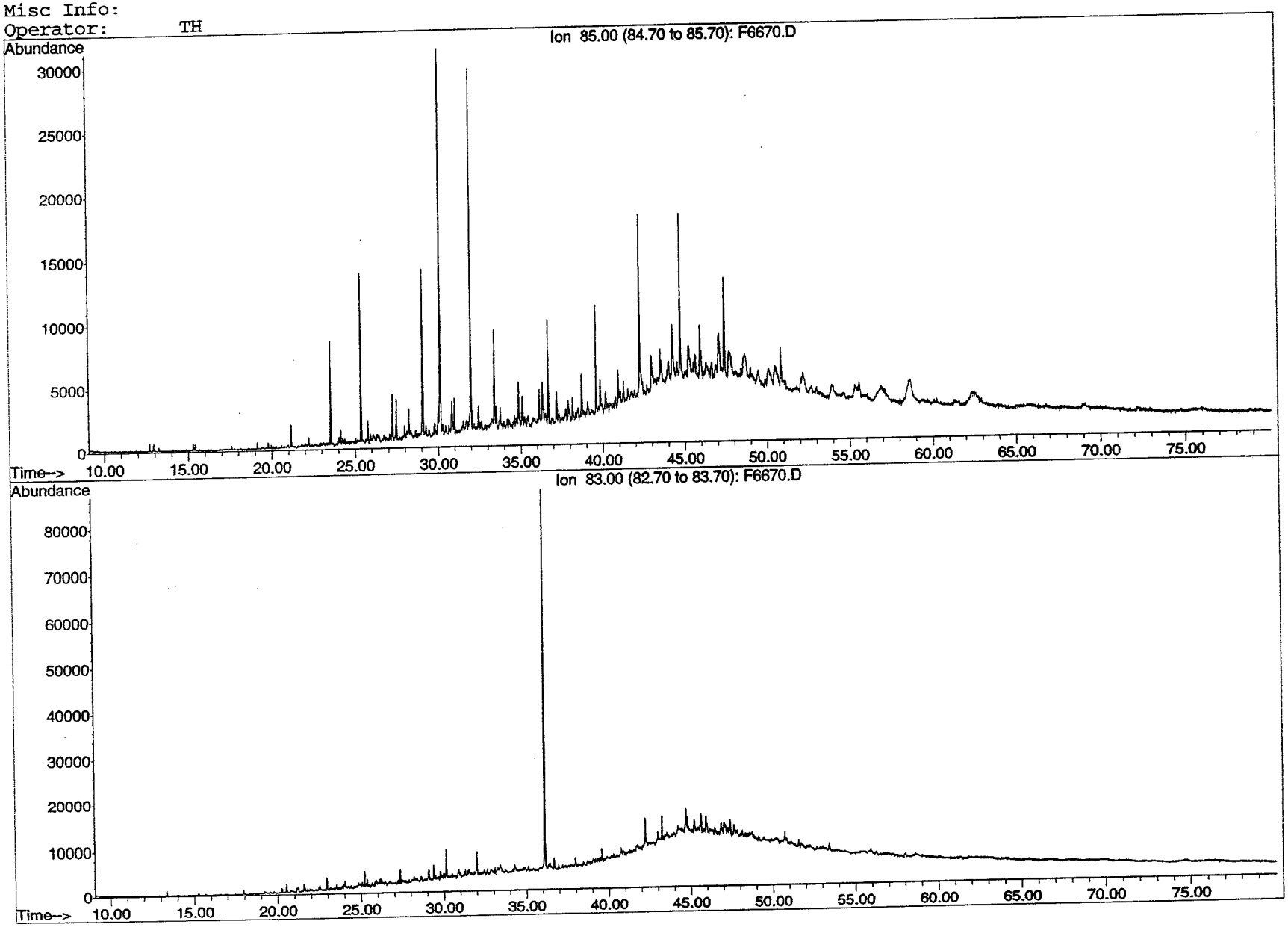


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6670.D
Date Acquired: 6 Mar 2003 11:29 am
Method File: BIO1SIM
Sample Name: U0277-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-109 1214
U0277

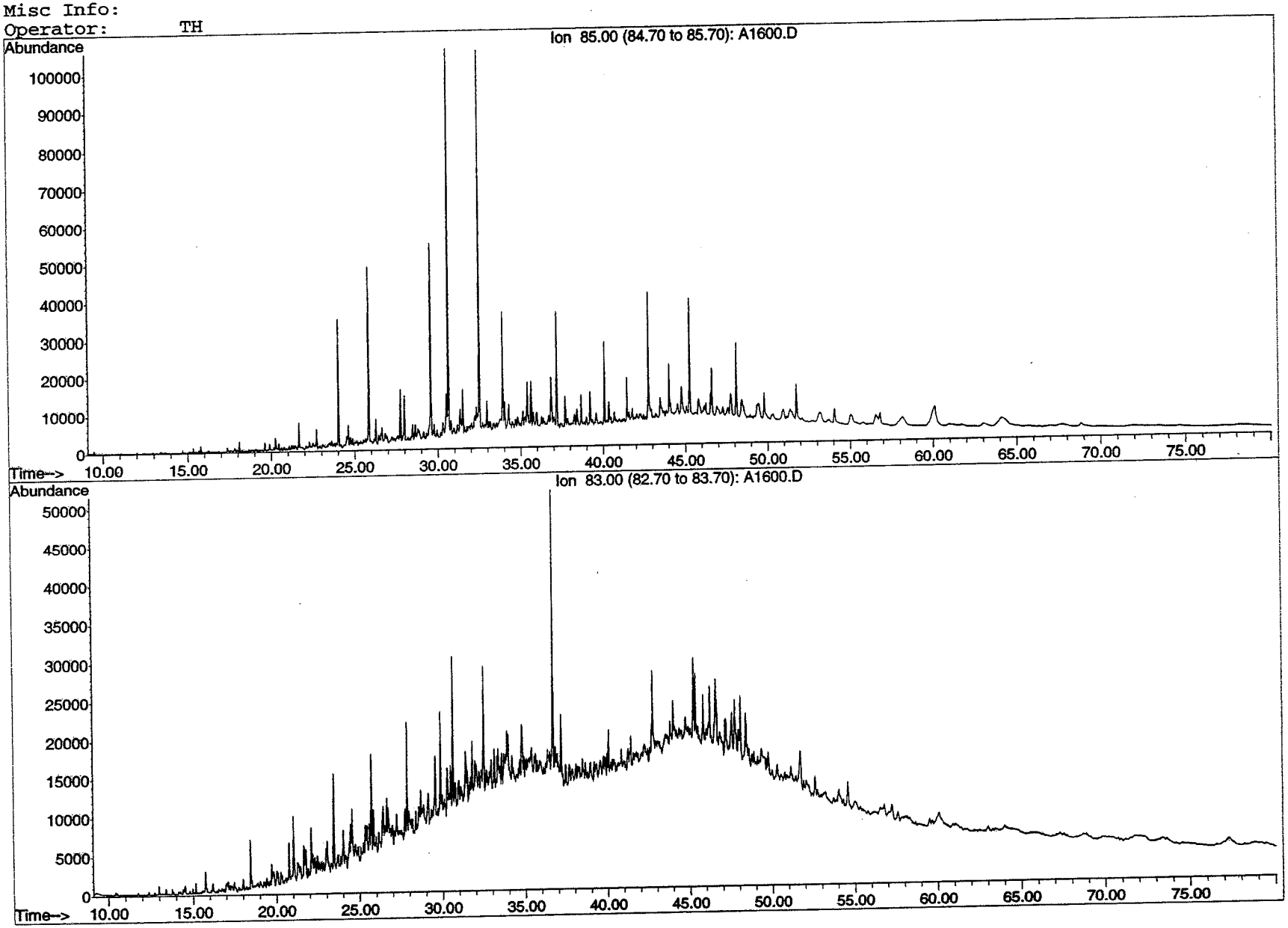


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1600.D
Date Acquired: 20 Feb 2003 7:50 pm
Method File: BIO1SIM
Sample Name: U0285-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-109 2830
U0285

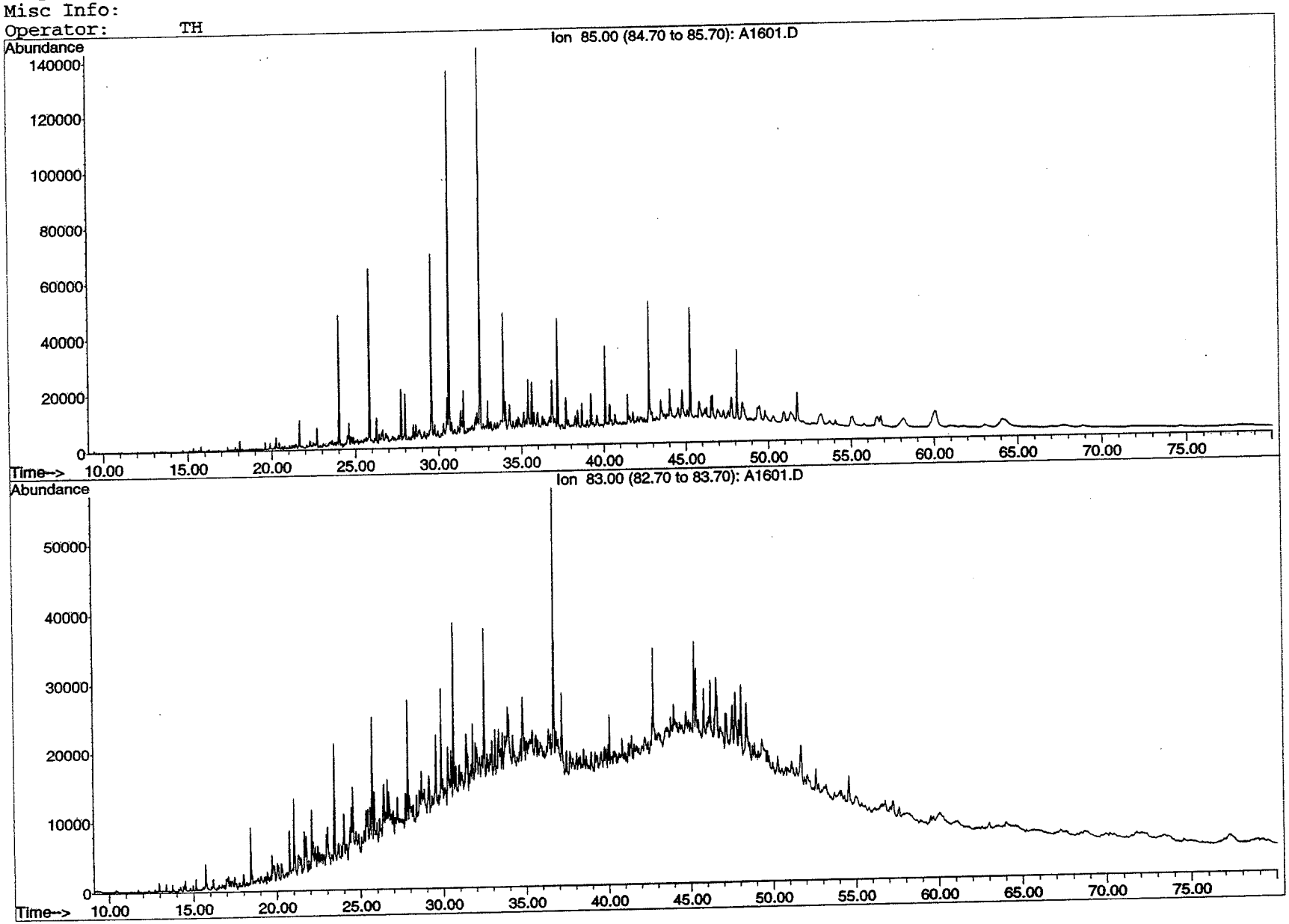


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1601.D
Date Acquired: 20 Feb 2003 9:21 pm
Method File: BIO1SIM
Sample Name: U0285DUP-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-109 2830
U0285 Duplicate

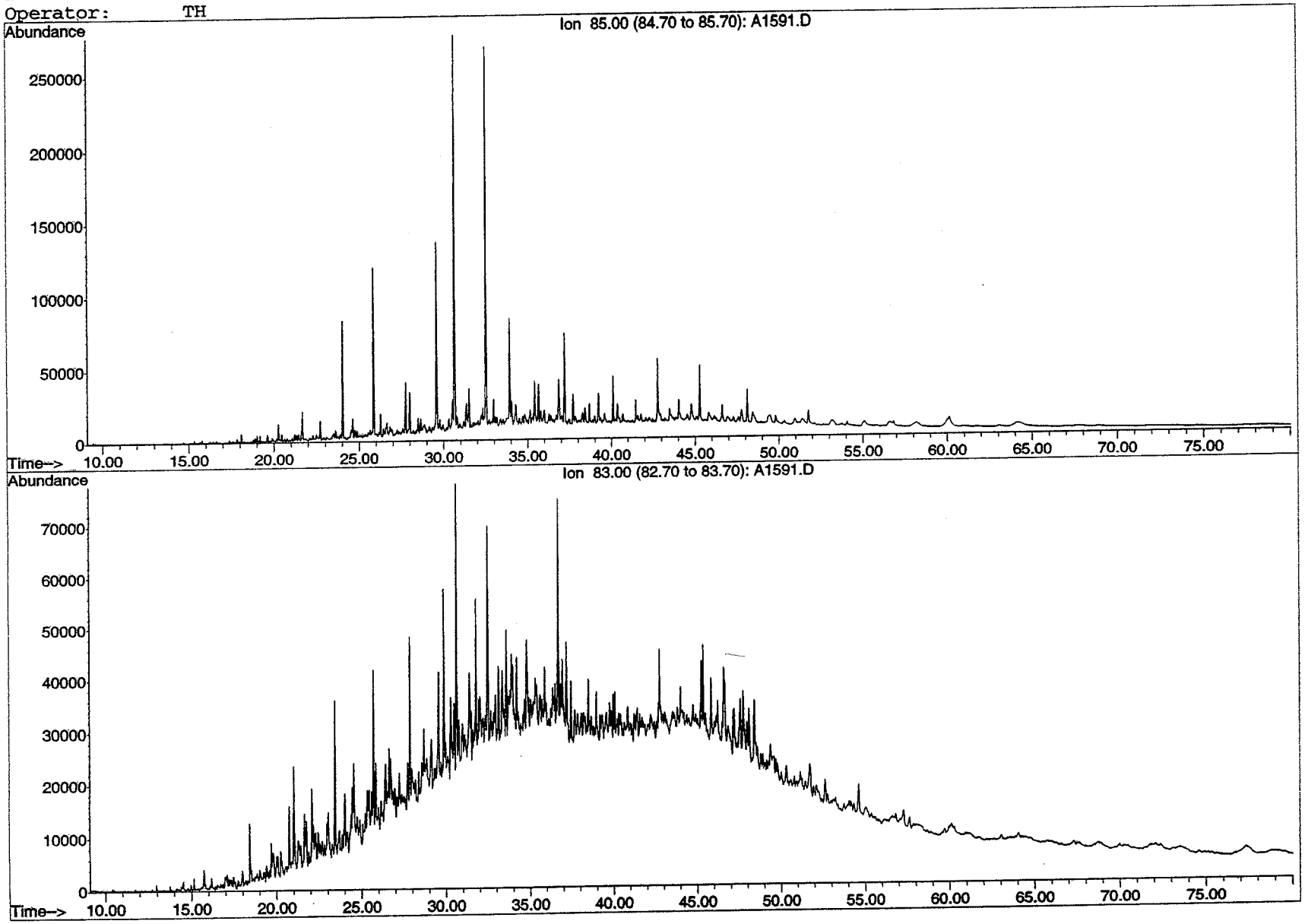


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1591.D
Date Acquired: 20 Feb 2003 2:33 am
Method File: BIO1SIM
Sample Name: U0290-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-109 3840
U0290

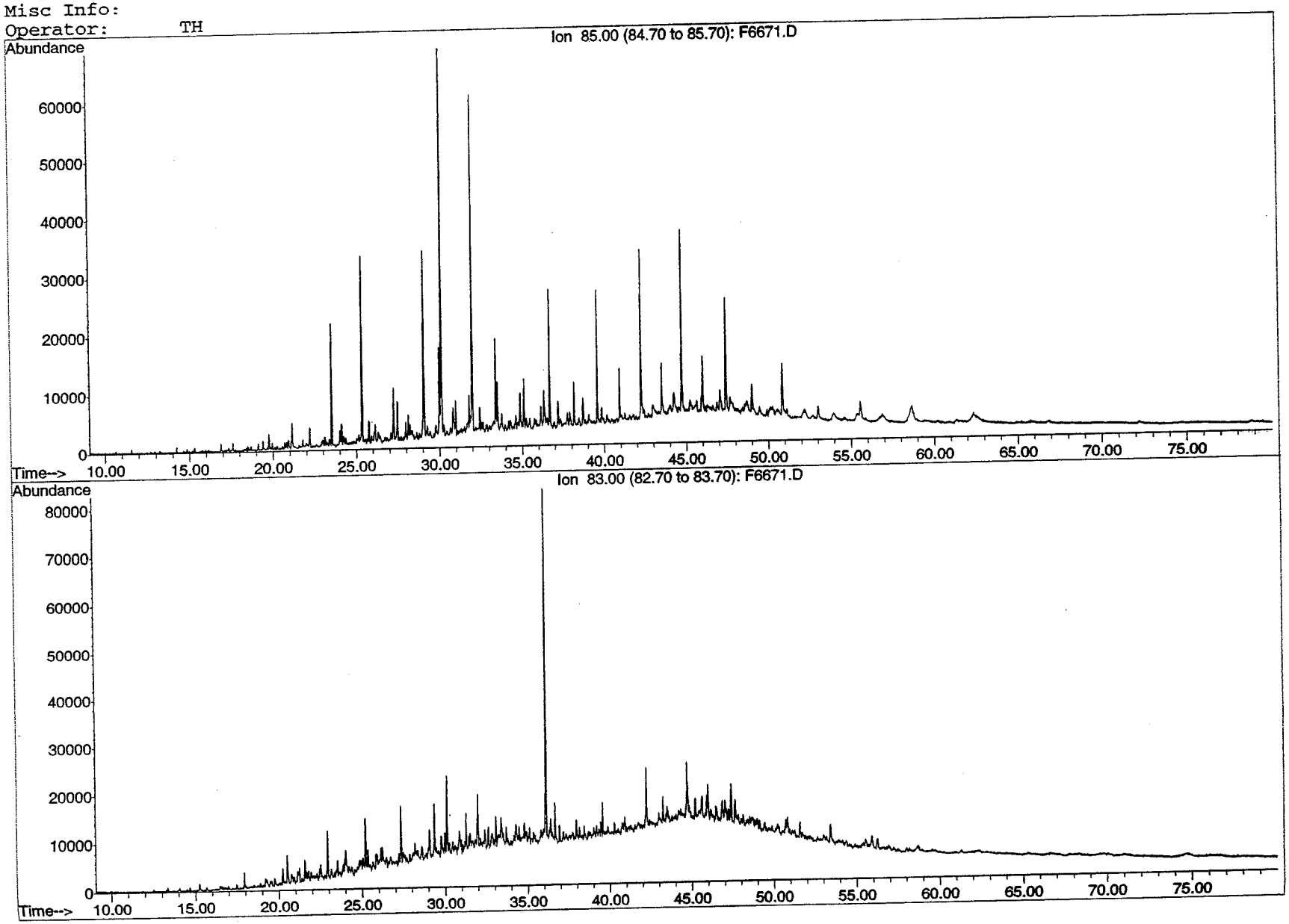


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

Normal Alkanes and Alkylcyclohexanes
NLU-110 0406
U0353

File: H:\F\DATA\SQF171\F6671.D
Date Acquired: 6 Mar 2003 12:59 pm
Method File: BIO1SIM
Sample Name: U0353-D-F1
Misc Info:
Operator: TH

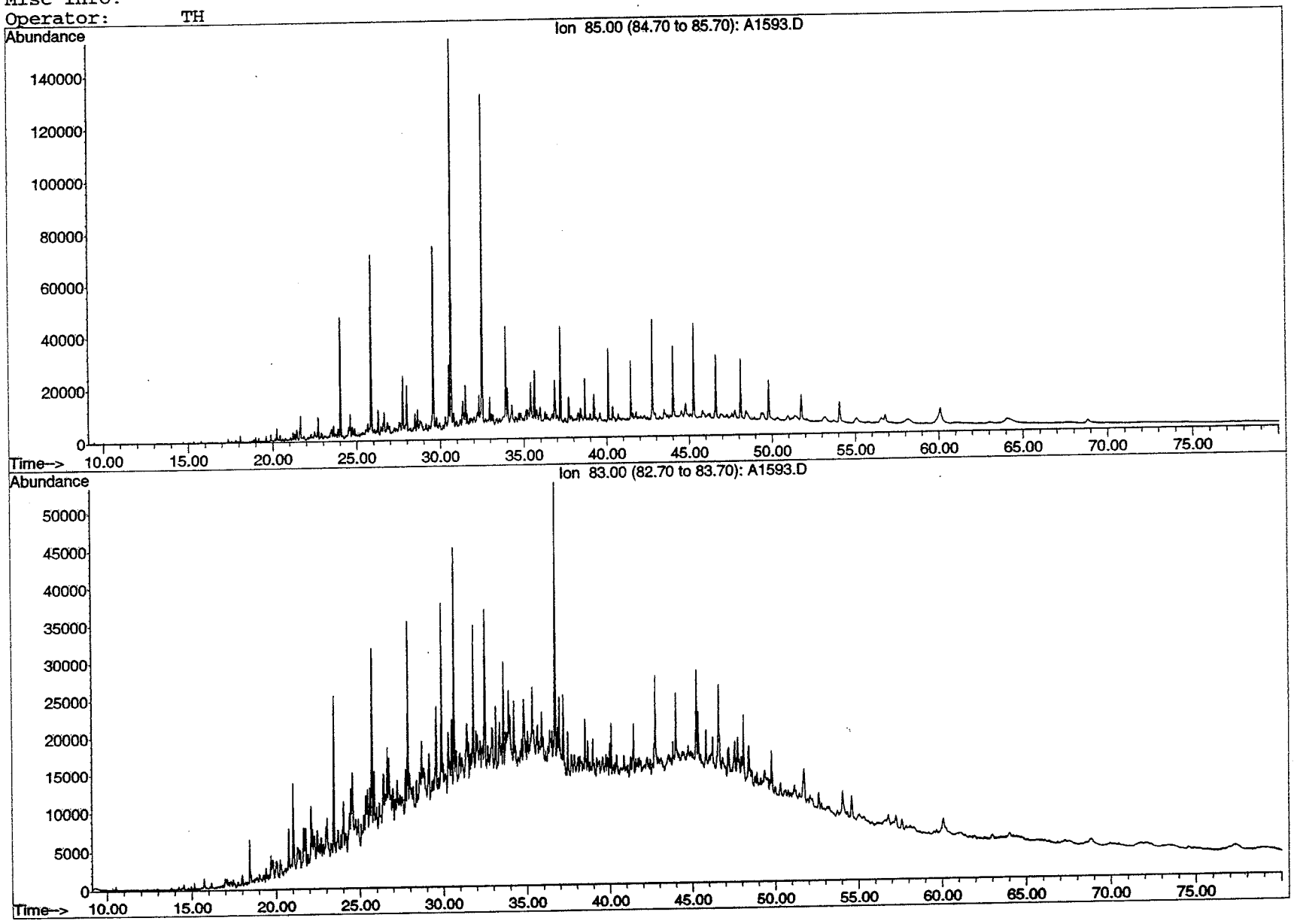


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1593.D
Date Acquired: 20 Feb 2003 5:36 am
Method File: BIO1SIM
Sample Name: U0357-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-110 1214
U0357

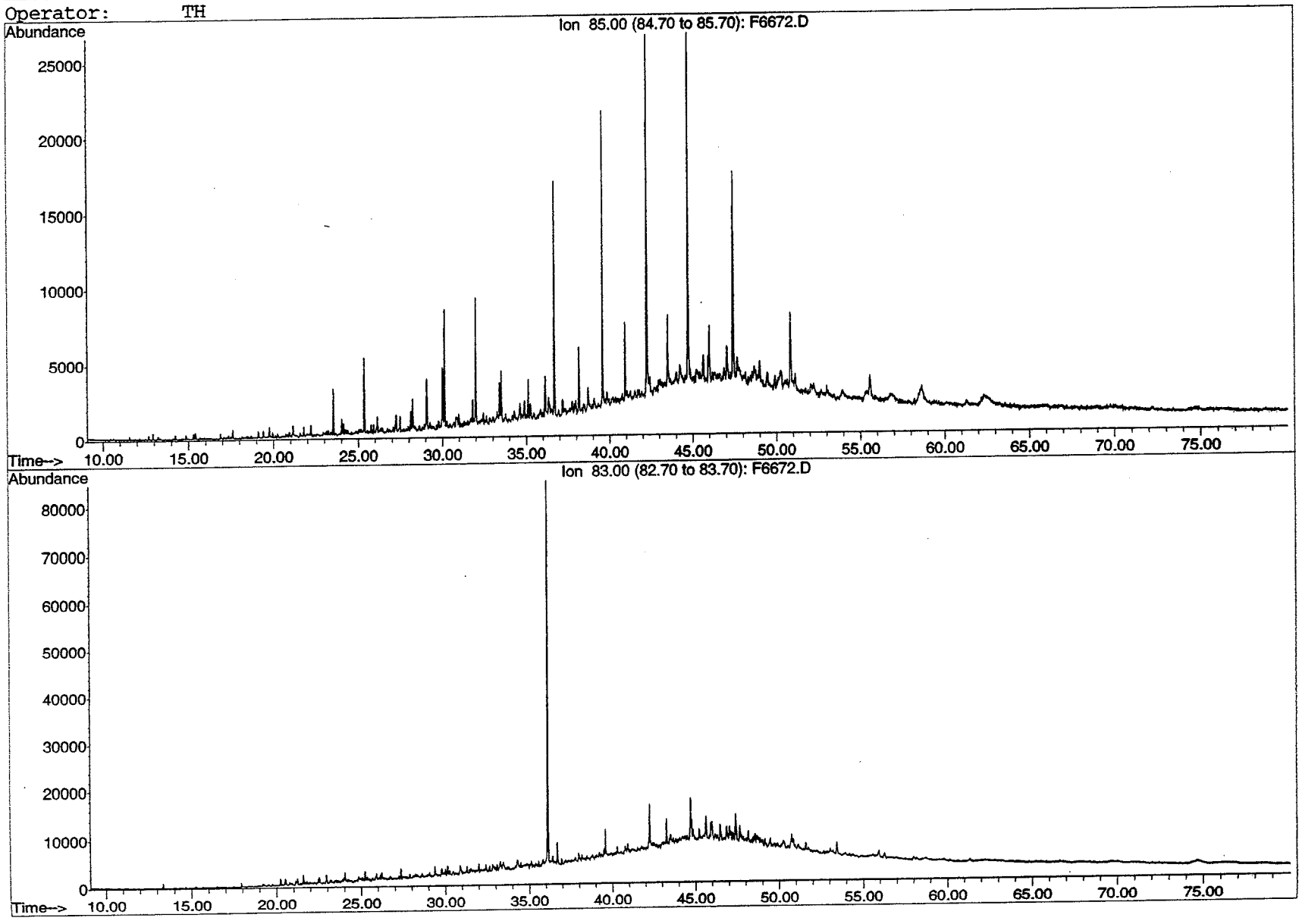


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

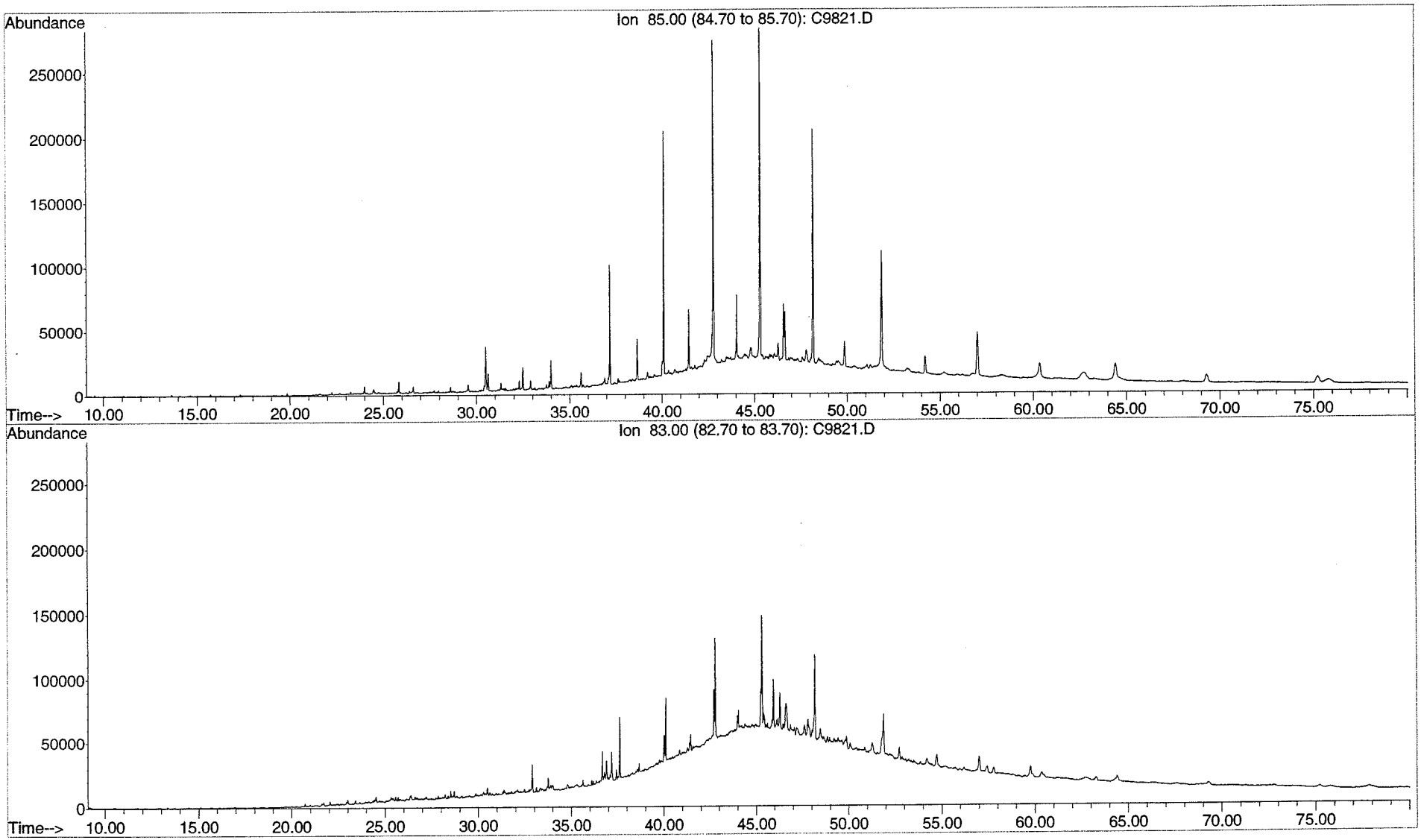
Normal Alkanes and Alkylcyclohexanes
NLU-110 2022
U0361

File: H:\F\DATA\SQF171\F6672.D
Date Acquired: 6 Mar 2003 2:30 pm
Method File: BIO1SIM
Sample Name: U0361-D-F1
Misc Info:
Operator: TH



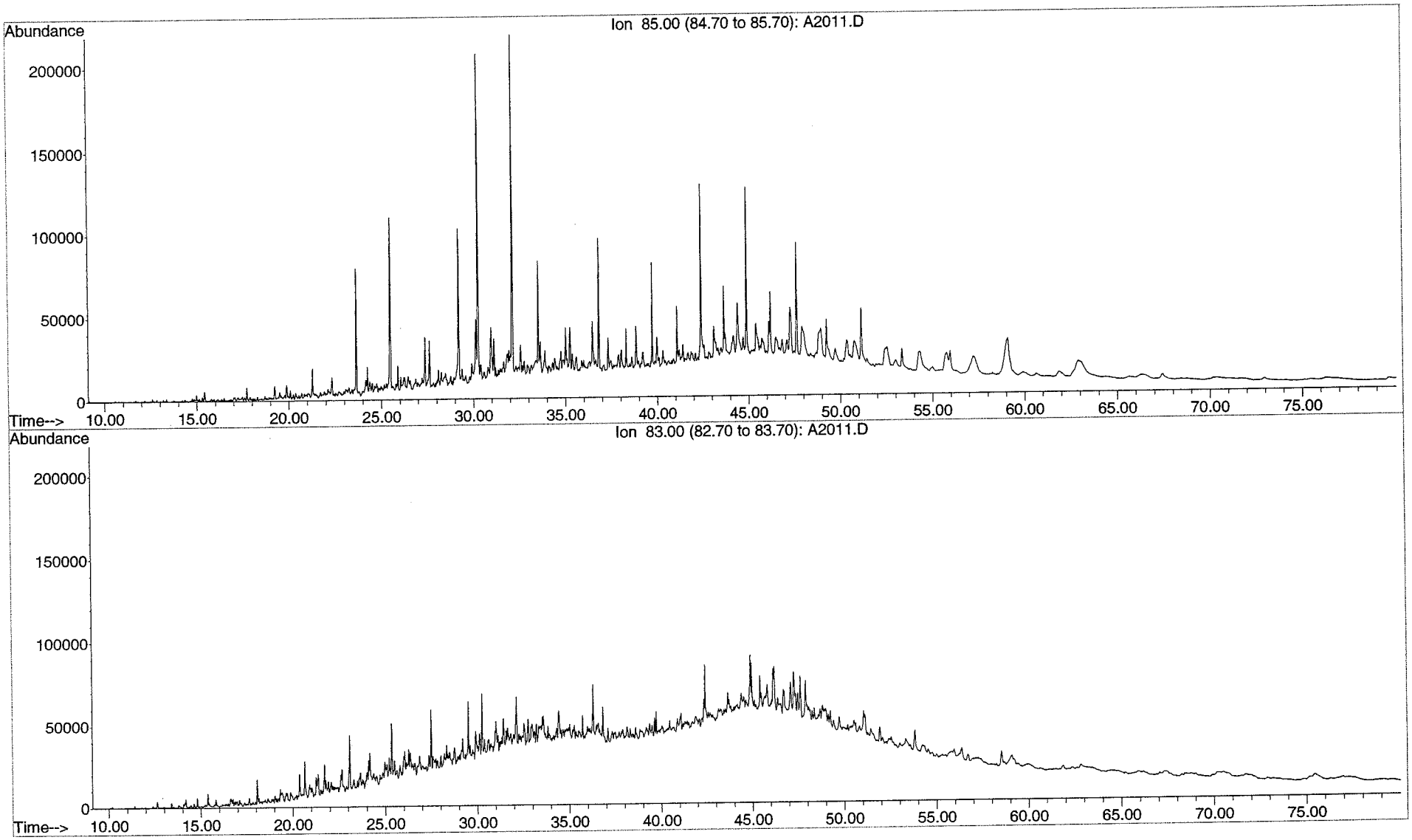
File : G:\C\DATA\SQC647\C9821.D
Operator : AC
Acquired : 12 Apr 2003 8:00 pm using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0171-F1
Misc Info :
Vial Number: 20

Normal Alkanes and Alkylcyclohexanes
NLU-112-SS-0010
U0171



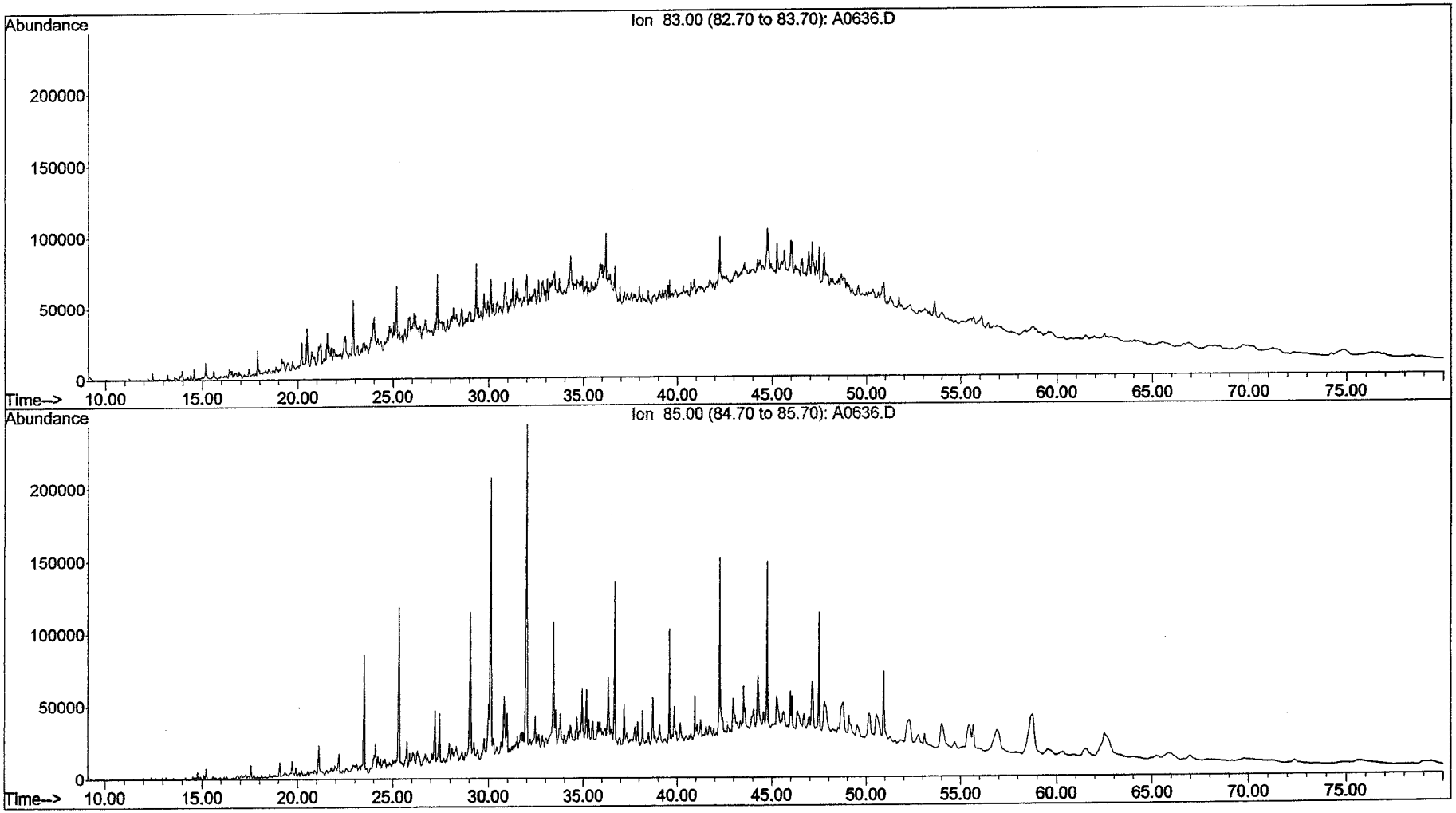
File : G:\A\DATA\SQA350\A2011.D
Operator : JR
Acquired : 28 Mar 2003 5:22 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0101-F1
Misc Info :
Vial Number: 9

Normal Alkanes and Alkylcyclohexanes
NLU-112-SS-2030
U0101



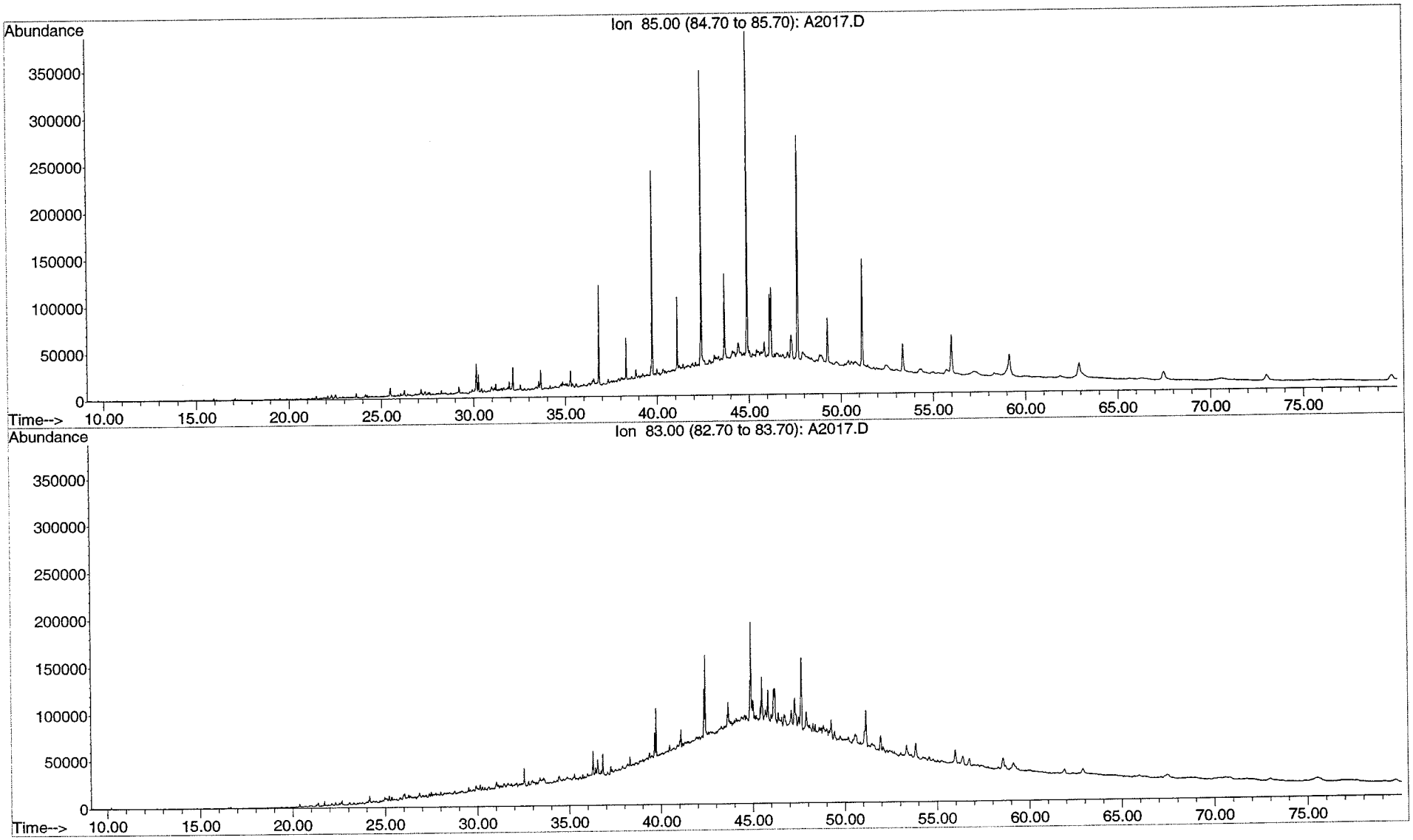
File : Q:\A\DATA\SQA319\A0636.D
Operator : TH
Acquired : 15 Dec 2002 3:35 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0101DUP-F1
Misc Info :
Vial Number: 40

Normal Alkanes and Alkylcyclohexanes
NLU-112-SS-2030
U0101 Duplicate



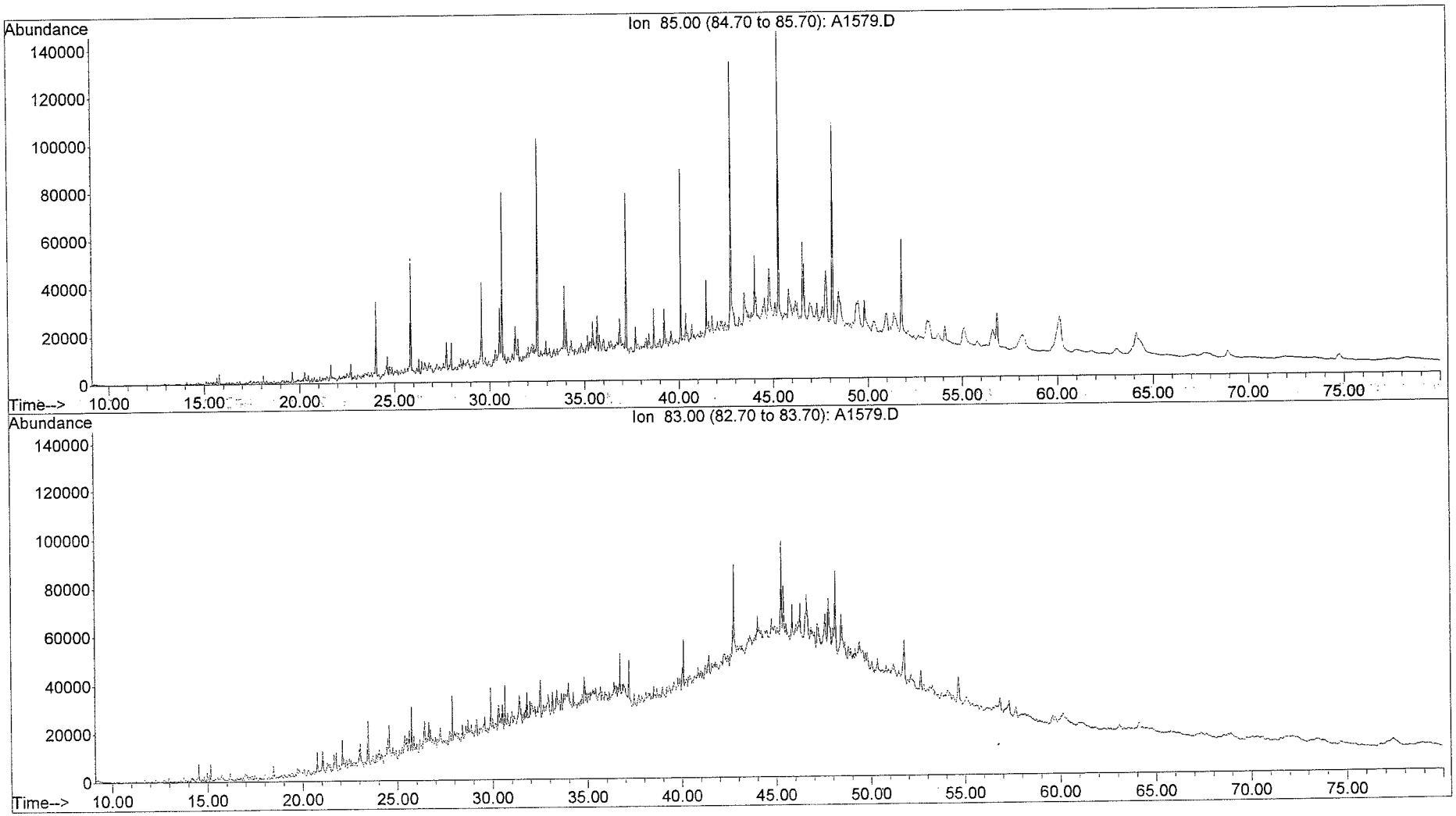
File : G:\A\DATA\SQA350\A2017.D
Operator : JR
Acquired : 28 Mar 2003 2:33 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0146-F1
Misc Info :
Vial Number: 15

Normal Alkanes and Alkylcyclohexanes
NLU-113-SS-0010
U0146



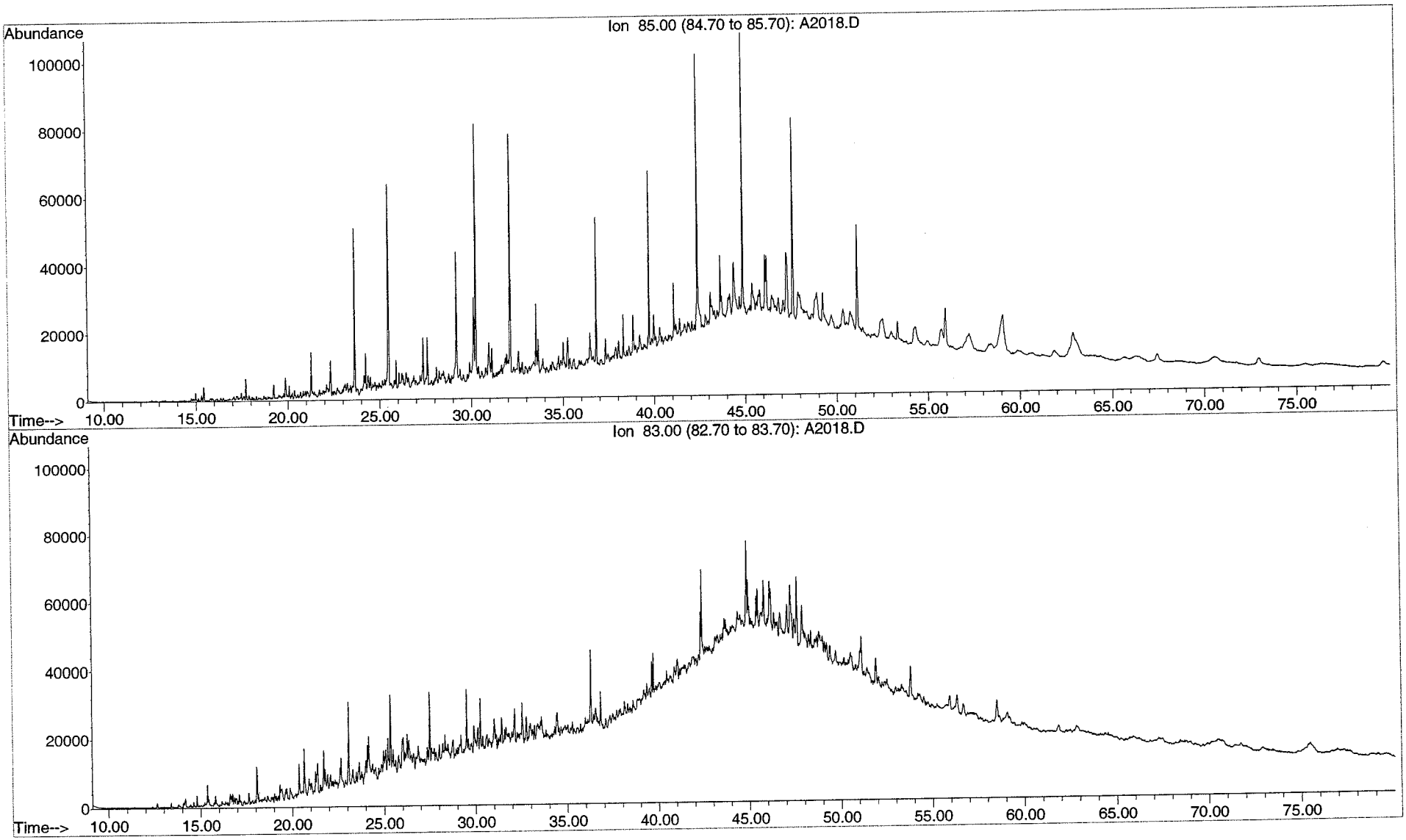
File : G:\A\DATA\SQA339\A1579.D
Operator : TH
Acquired : 19 Feb 2003 5:10 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: UU0108-D-F1 (IVD)
Misc Info :
Vial Number: 42

Normal Alkanes and Alkylcyclohexanes
NLU-113-SS-1020
U0108



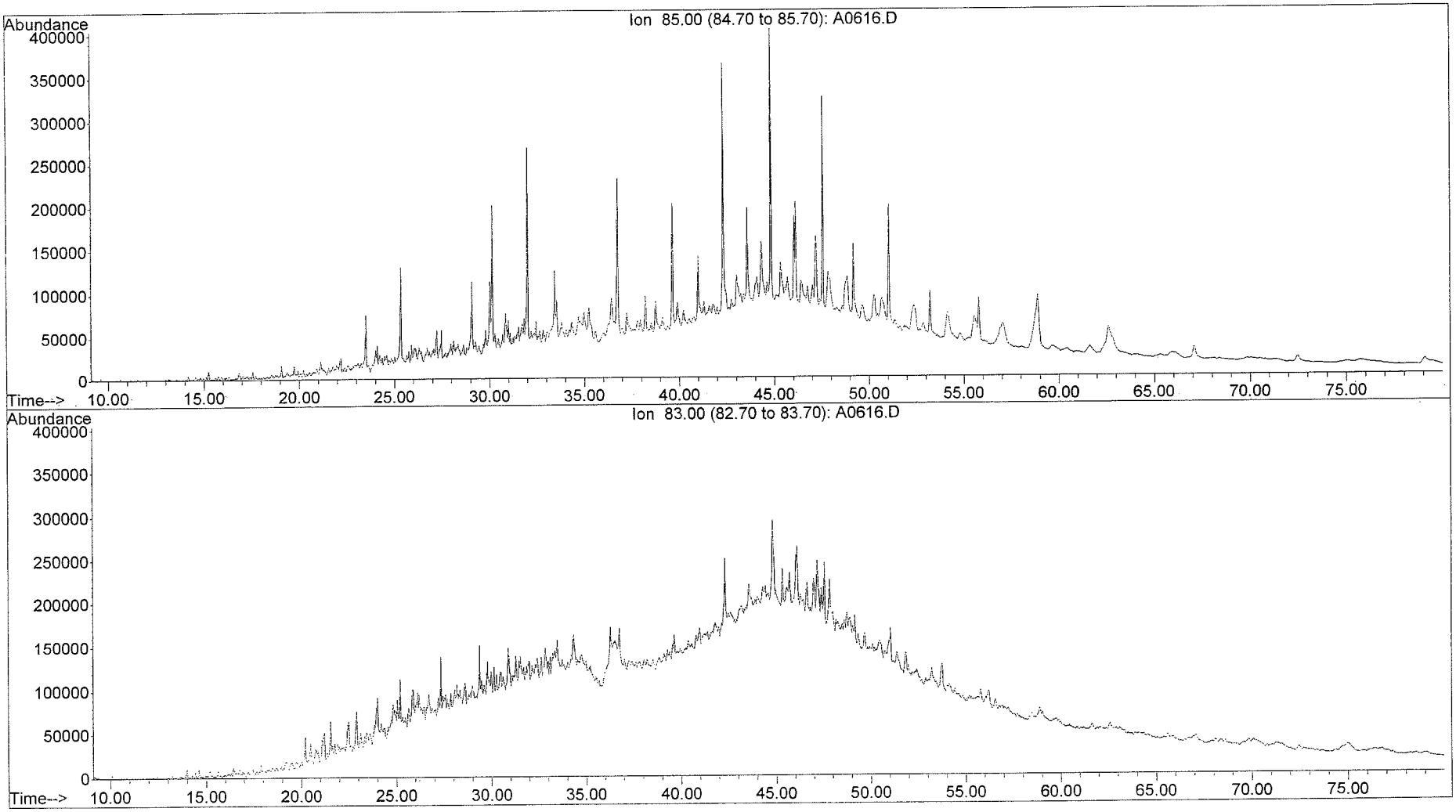
File : G:\A\DATA\SQA350\A2018.D
Operator : JR
Acquired : 28 Mar 2003 4:07 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0149-F1
Misc Info :
Vial Number: 16

Normal Alkanes and Alkylcyclohexanes
NLU-115-SS-0010
U0149



File : G:\A\DATA\SQA319\A0616.D
Operator : TH
Acquired : 13 Dec 2002 7:25 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0150-F1
Misc Info :
Vial Number: 20

Normal Alkanes and Alkylcyclohexanes
NLU-116-SS-0010
U0150

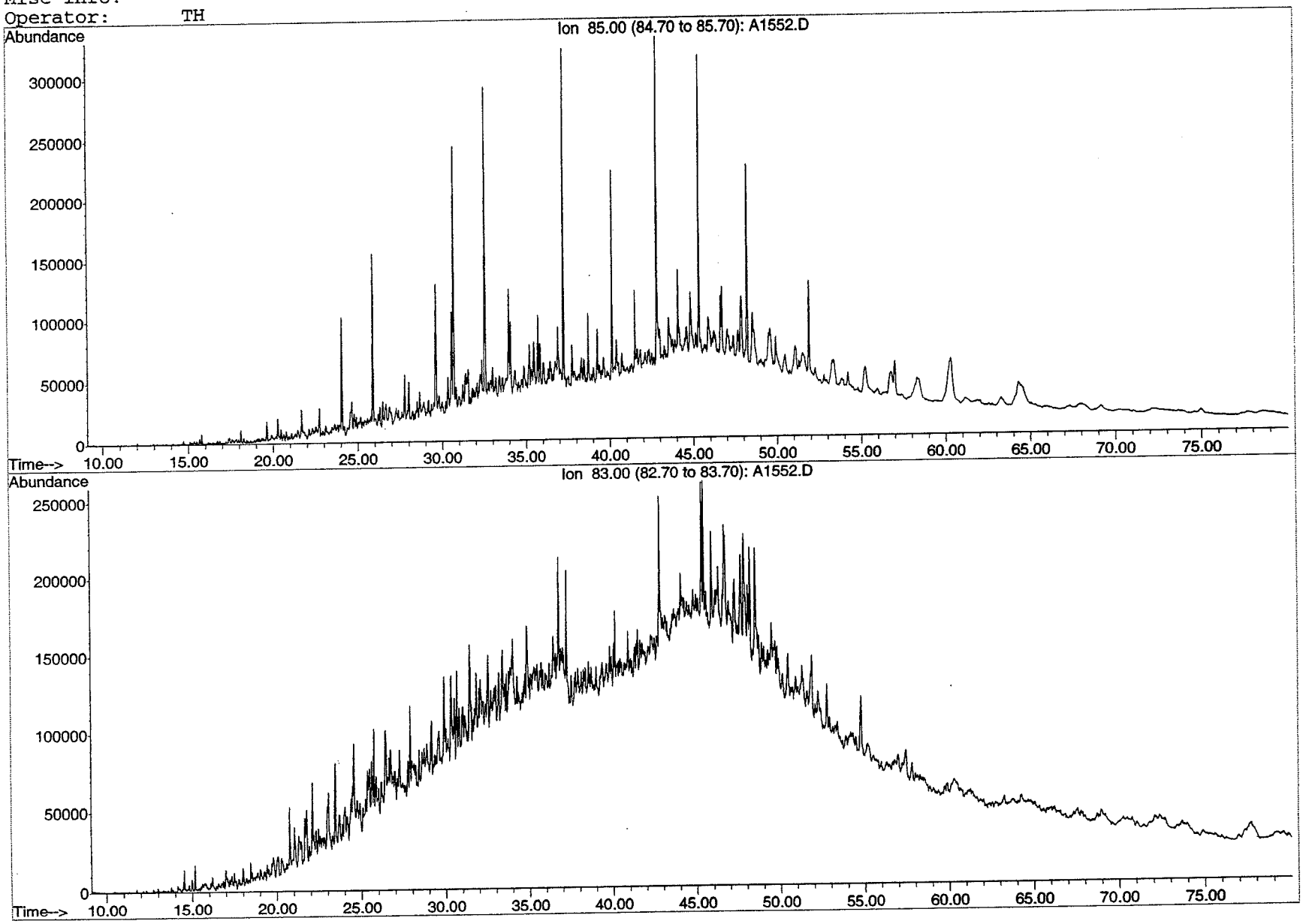


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

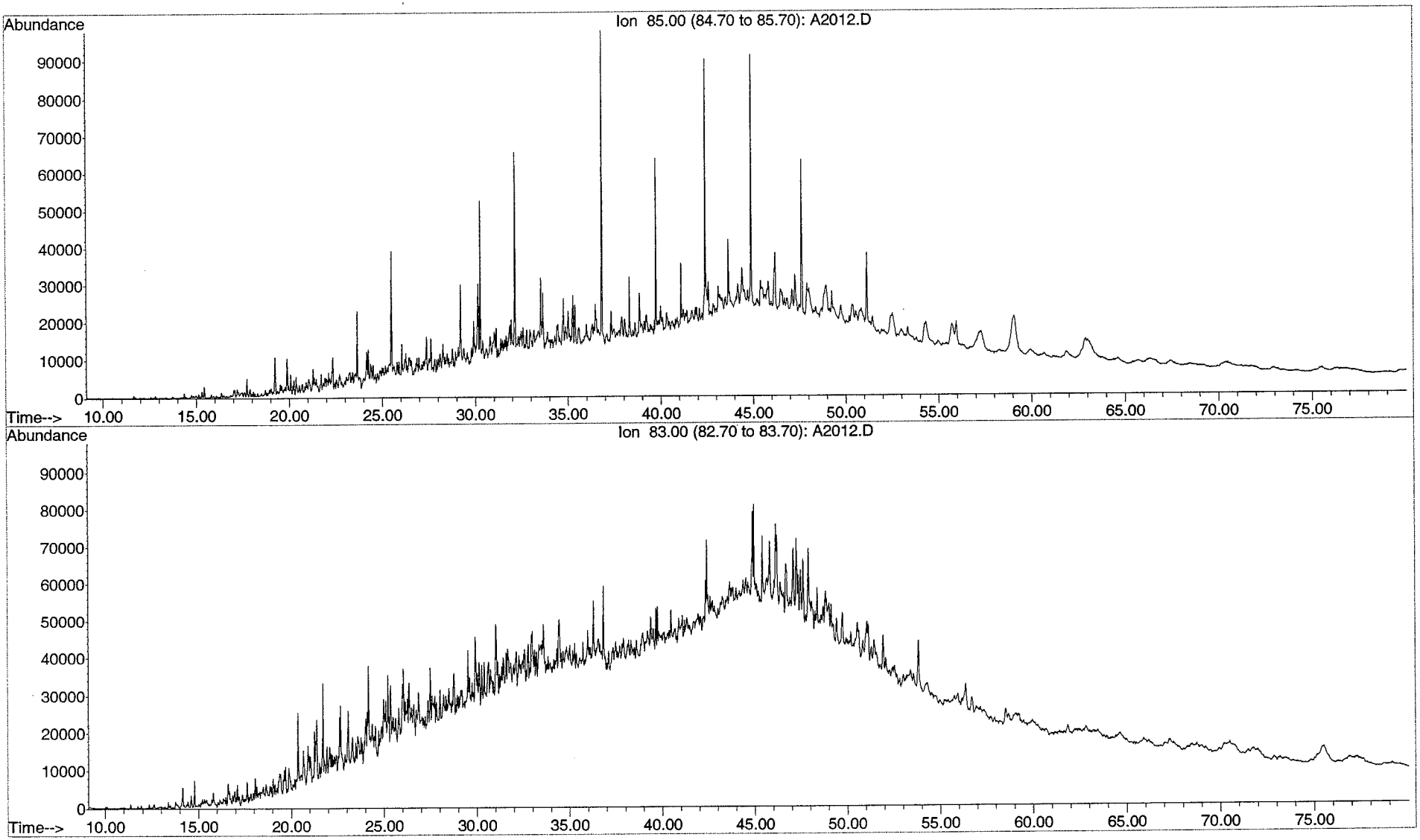
File: H:\A\DATA\SQA339\A1552.D
Date Acquired: 17 Feb 2003 12:26 pm
Method File: BIO1SIM
Sample Name: U ~~X~~0122-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-116-SS-1020
U0122



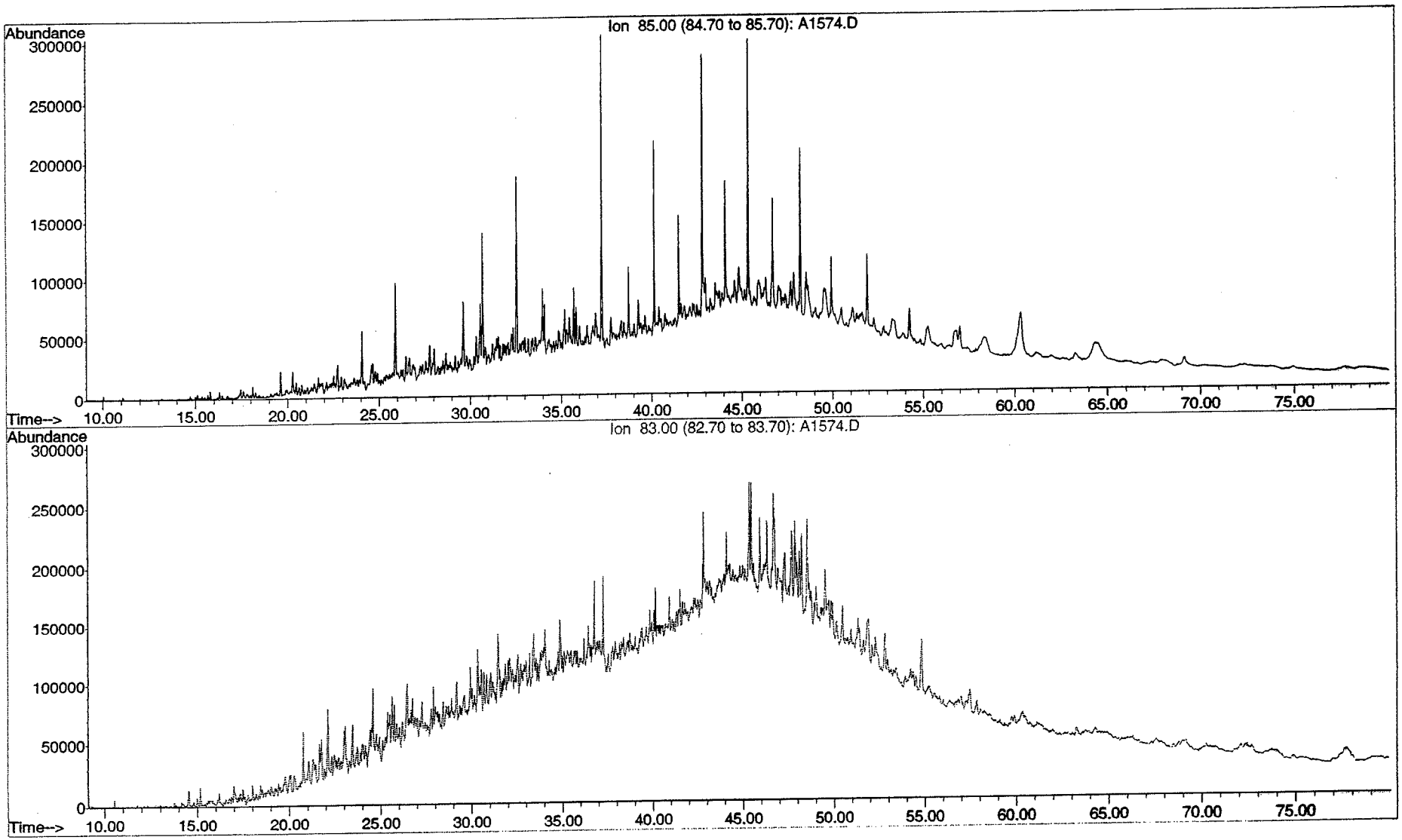
File : G:\A\DATA\SQA350\A2012.D
Operator : JR
Acquired : 28 Mar 2003 6:54 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0123-F1
Misc Info :
Vial Number: 10

Normal Alkanes and Alkylcyclohexanes
NLU-116-SS-2030
U0123



File : H:\A\DATA\SQA339\A1574.D
Operator : TH
Acquired : 18 Feb 2003 9:36 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0123DUP-F1
Misc Info :
Vial Number: 37

Normal Alkanes and Alkylcyclohexanes
NLU-116-SS-2030
U0123 Duplicate

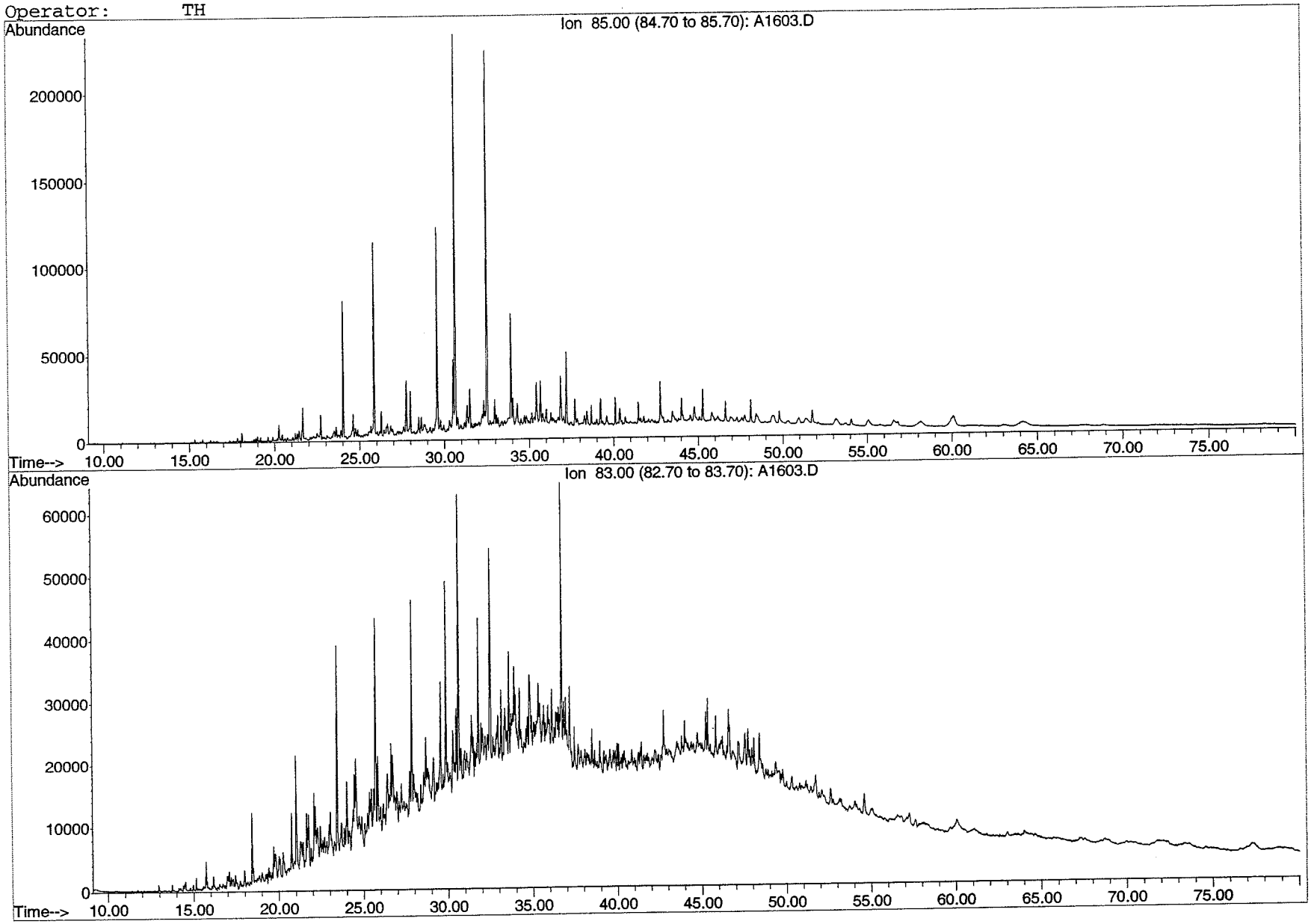


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1603.D
Date Acquired: 21 Feb 2003 12:21 am
Method File: BIO1SIM
Sample Name: U6525-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-117 0010 Composite
U6525

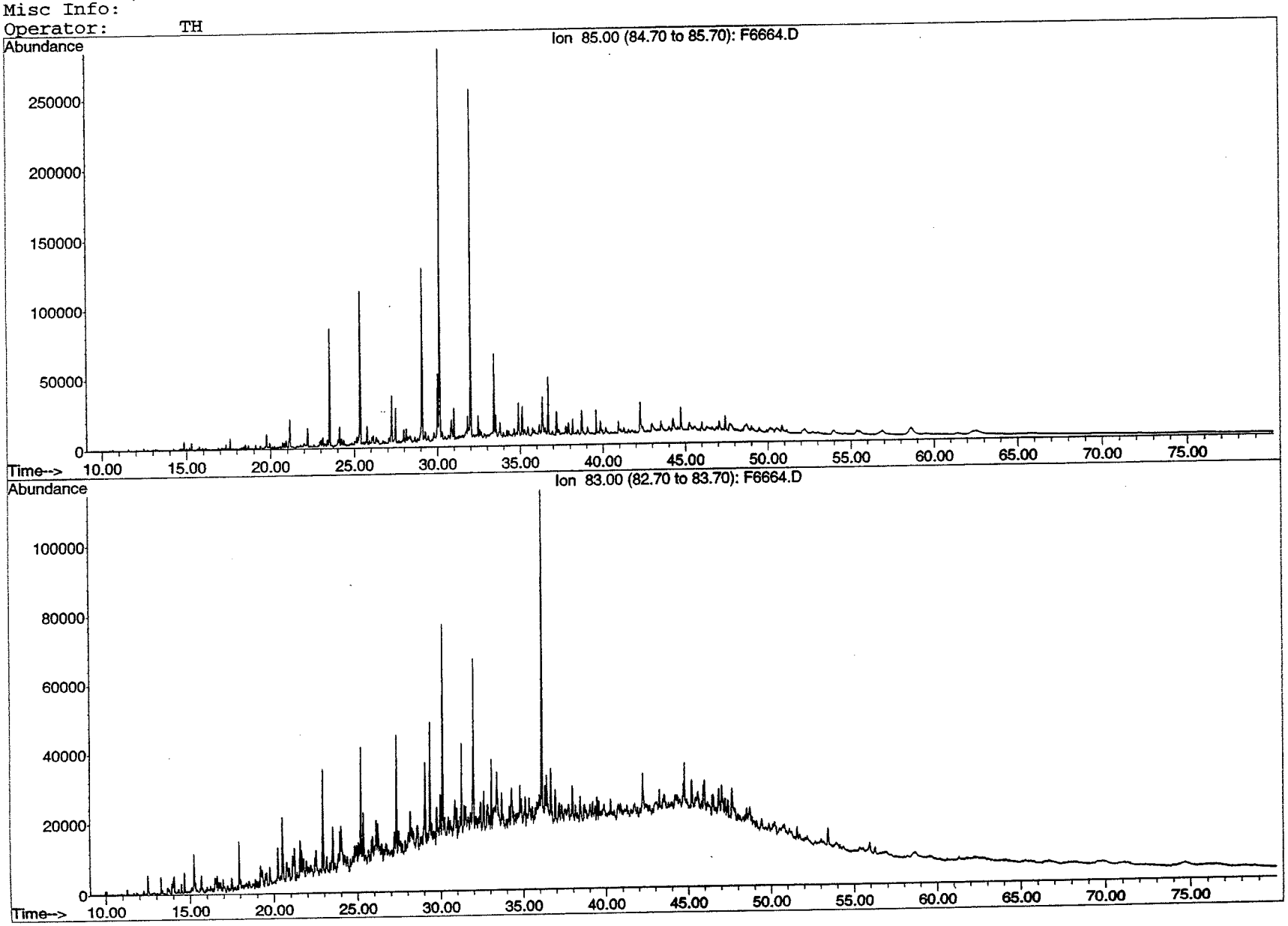


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

Normal Alkanes and Alkylcyclohexanes
NLU-117 0810
U0387

File: H:\F\DATA\SQF171\F6664.D
Date Acquired: 5 Mar 2003 4:28 pm
Method File: BIO1SIM
Sample Name: U0387-D-F1
Misc Info:
Operator: TH

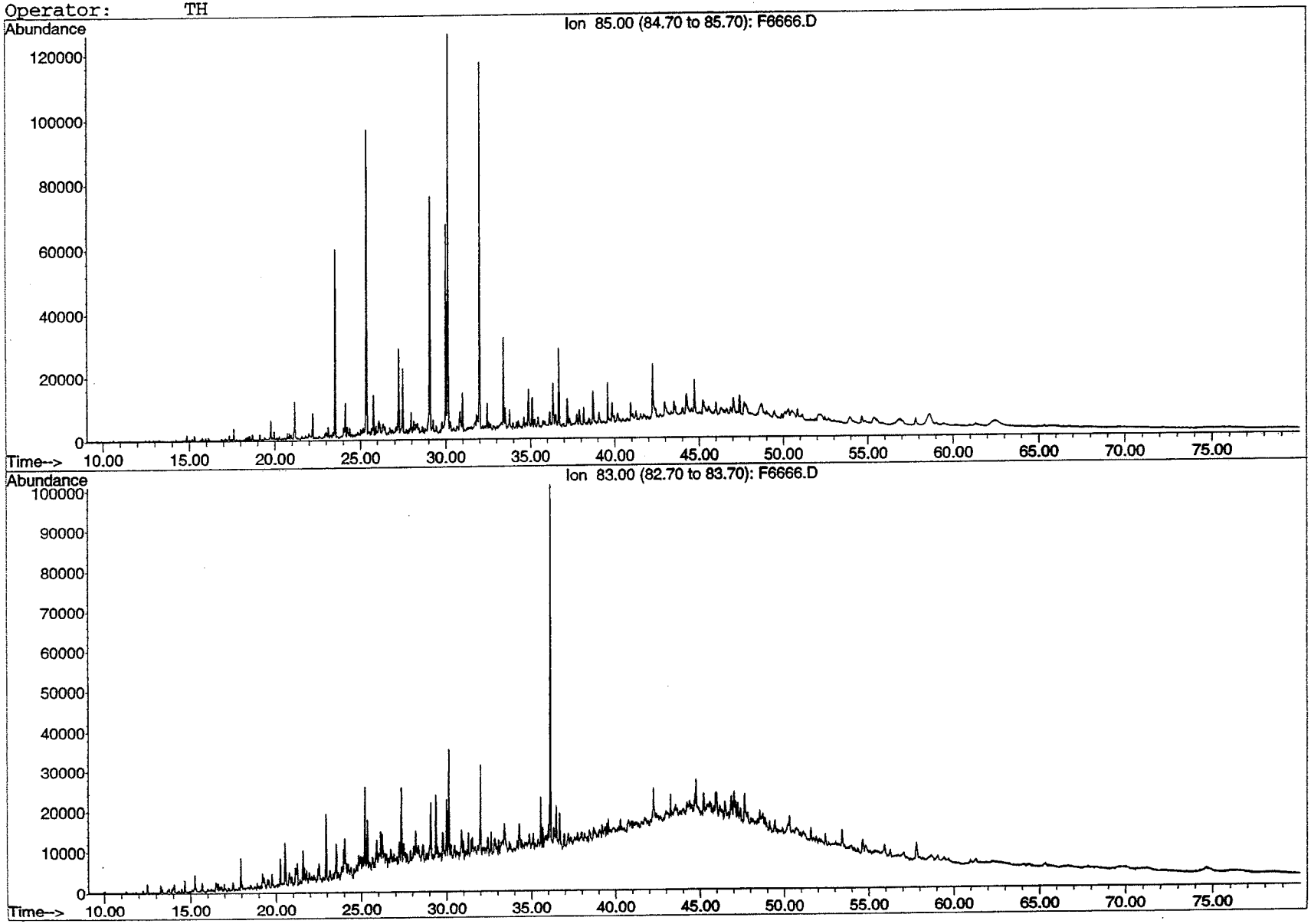


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6666.D
Date Acquired: 5 Mar 2003 7:33 pm
Method File: BIO1SIM
Sample Name: U0397-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-117 2830
U0397

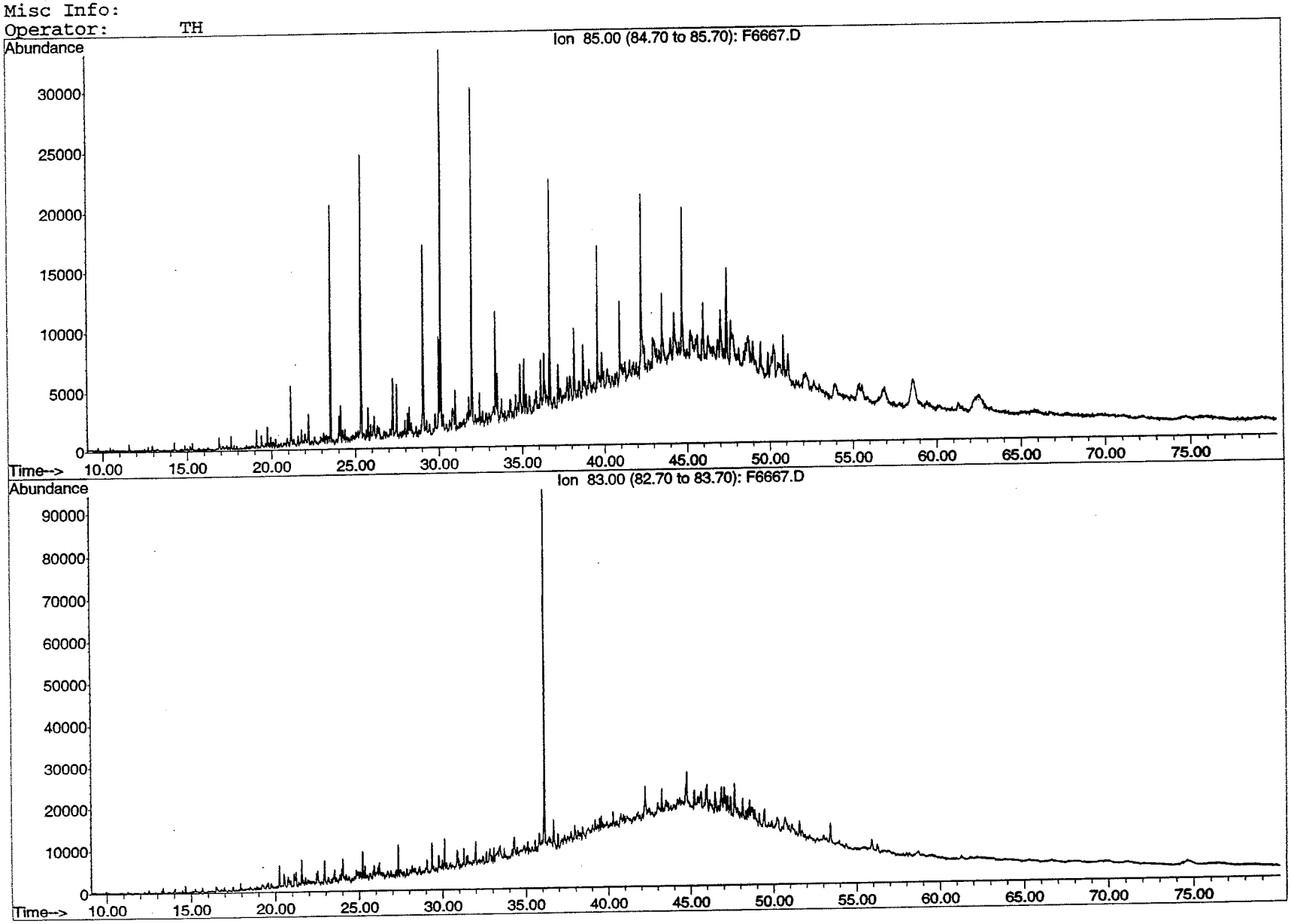


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

Normal Alkanes and Alkylcyclohexanes
NLU-117 4850
U0407

File: H:\F\DATA\SQF171\F6667.D
Date Acquired: 5 Mar 2003 9:05 pm
Method File: BIO1SIM
Sample Name: U0407-D-F1
Misc Info:
Operator: TH

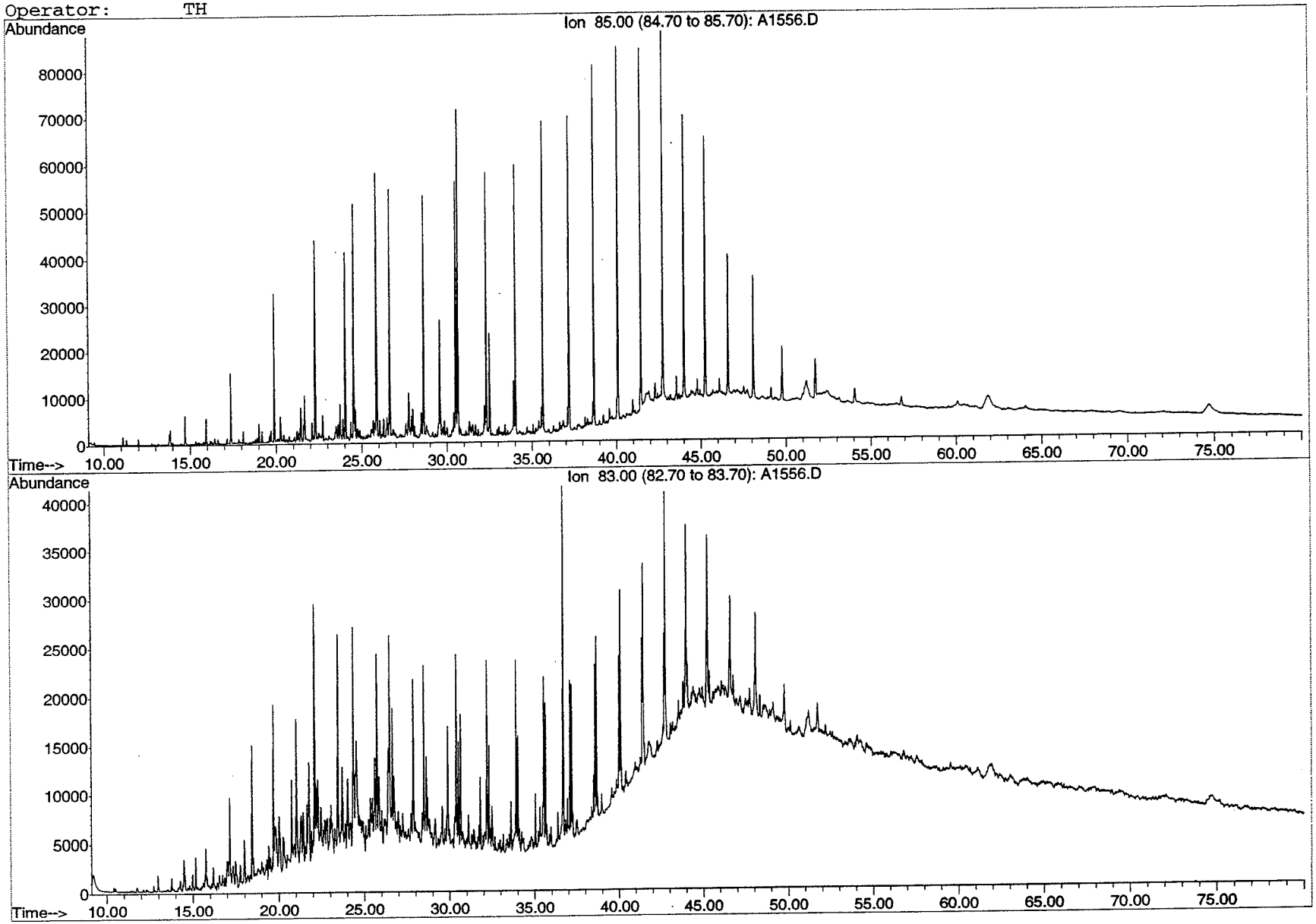


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1556.D
Date Acquired: 17 Feb 2003 6:26 pm
Method File: BIO1SIM
Sample Name: U4507-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-117-US-9.6
U4507

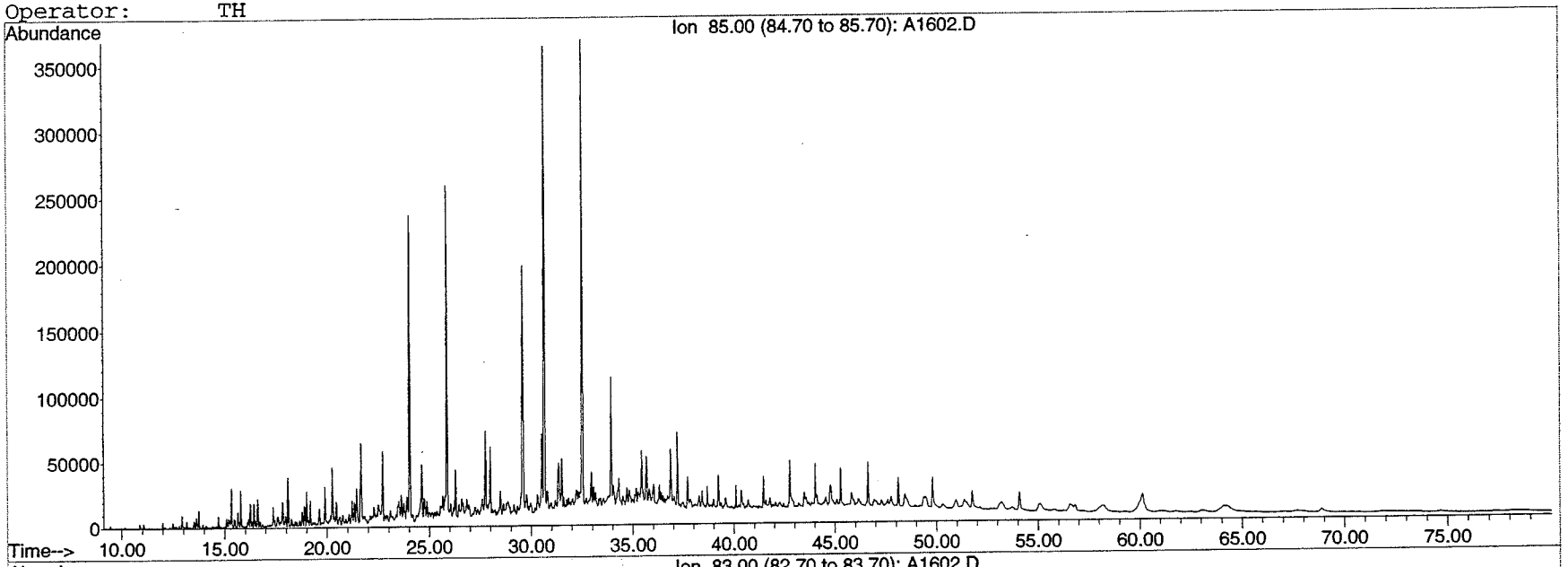


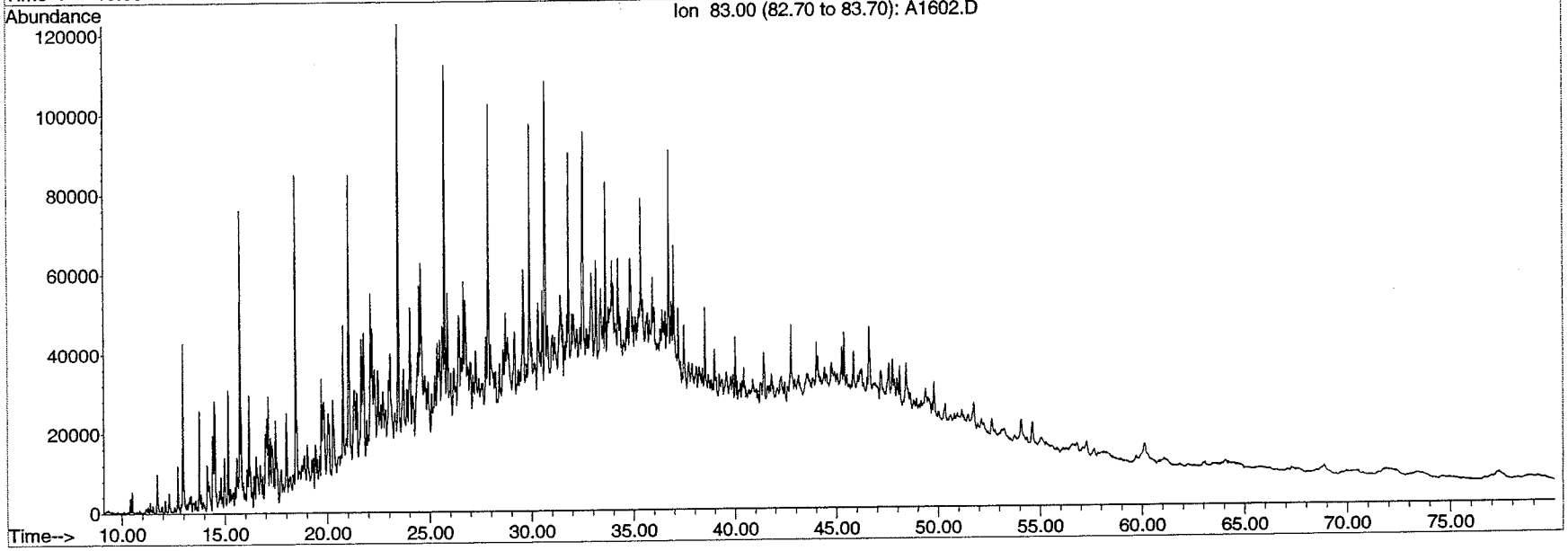
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1602.D
Date Acquired: 20 Feb 2003 10:50 pm
Method File: BIO1SIM
Sample Name: U6524-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-119 0010 Composite
U6524



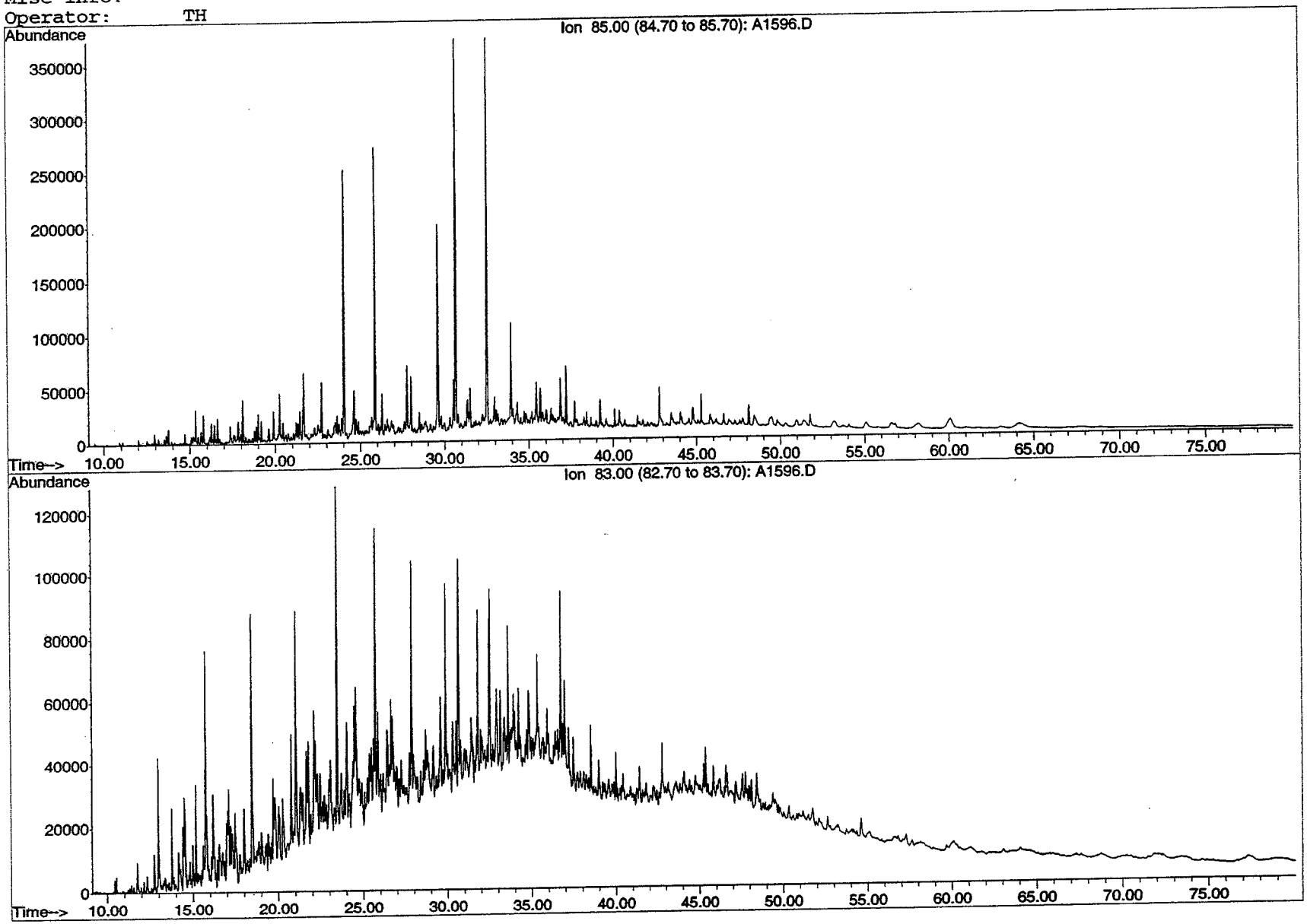


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1596.D
Date Acquired: 20 Feb 2003 10:06 am
Method File: BIO1SIM
Sample Name: U0455-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-119 0608
U0455

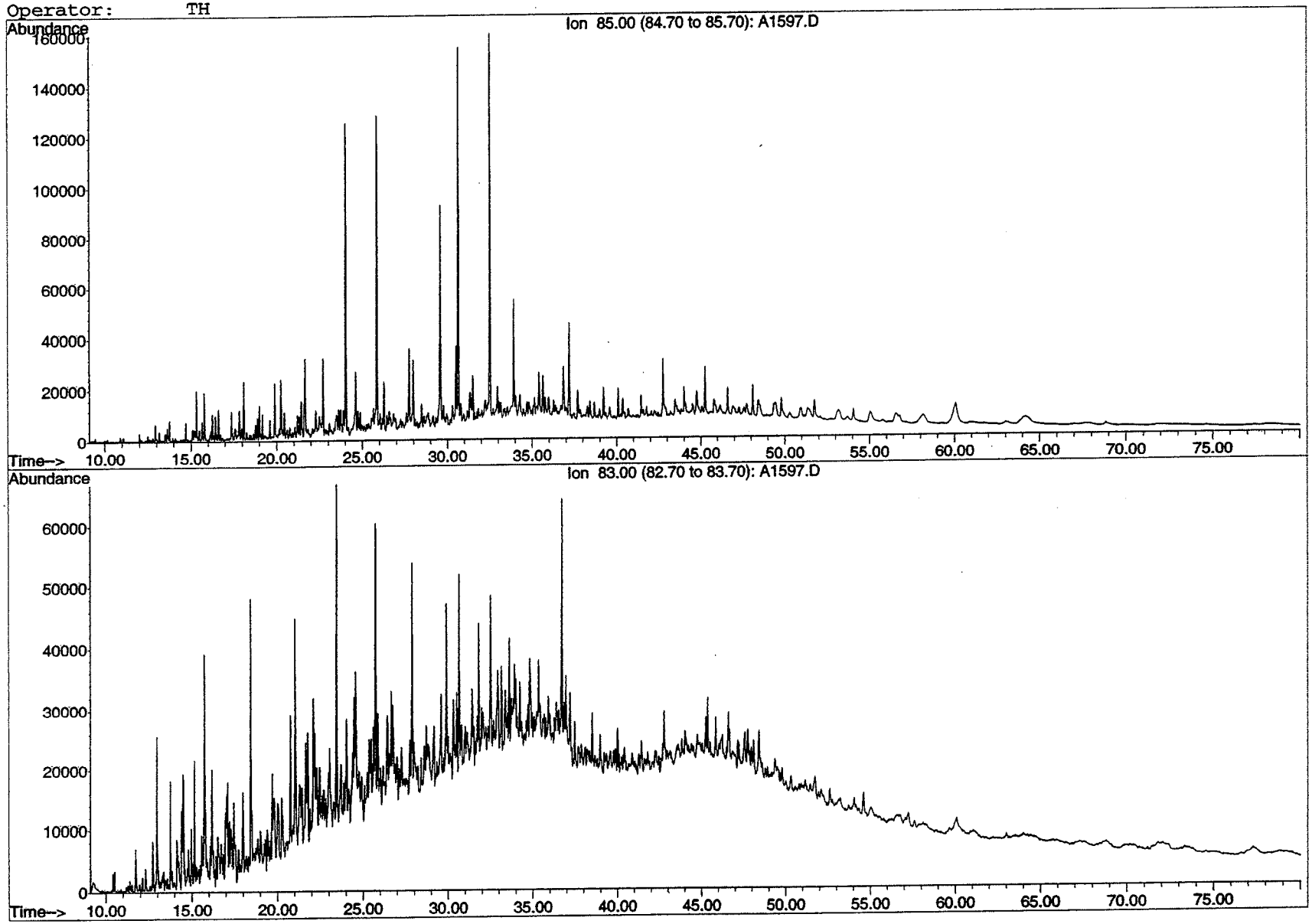


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1597.D
Date Acquired: 20 Feb 2003 1:29 pm
Method File: BIO1SIM
Sample Name: U0460-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-119 1618
U0460

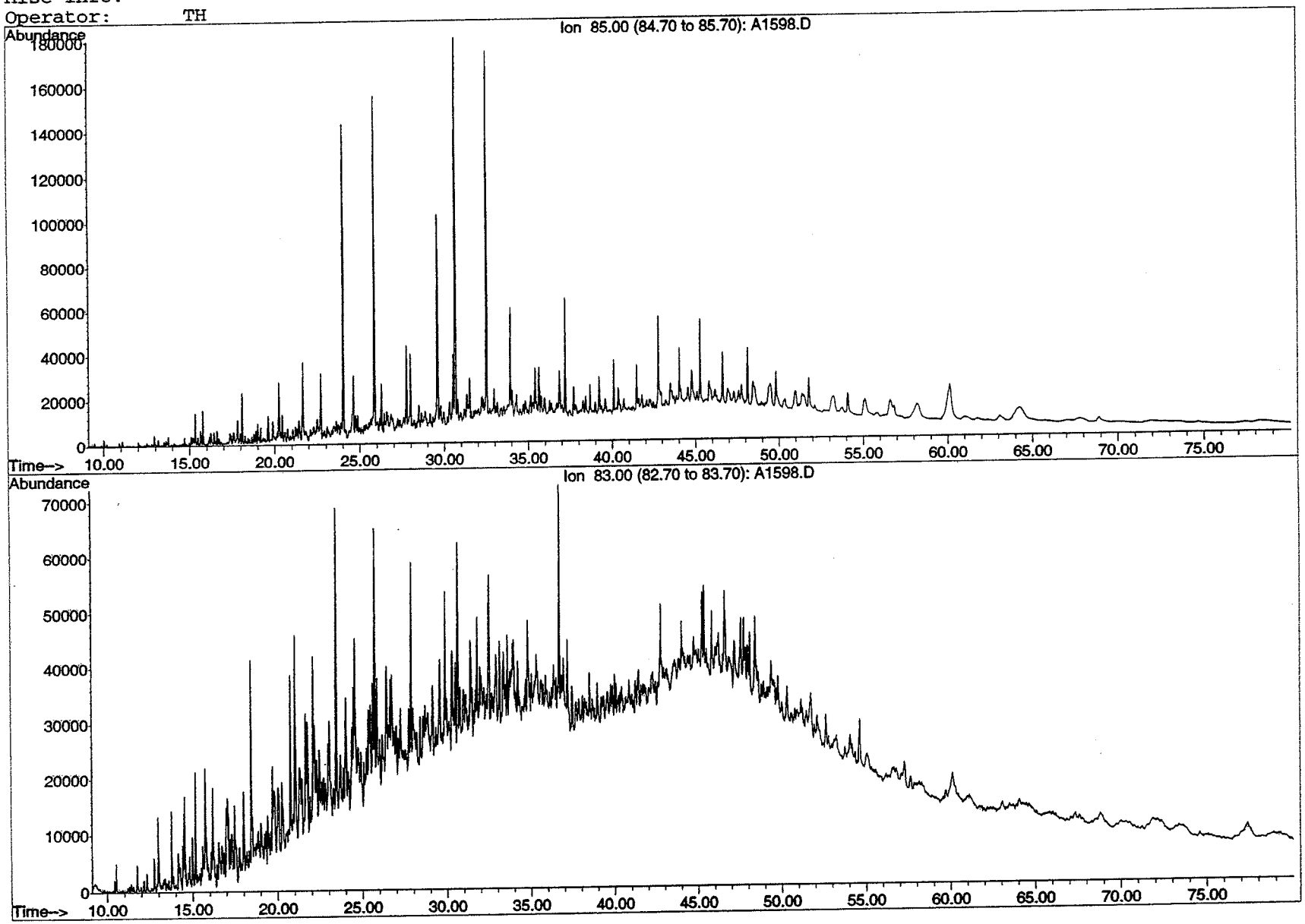


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1598.D
Date Acquired: 20 Feb 2003 4:48 pm
Method File: BIO1SIM
Sample Name: U0464-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-119 2426
U0464

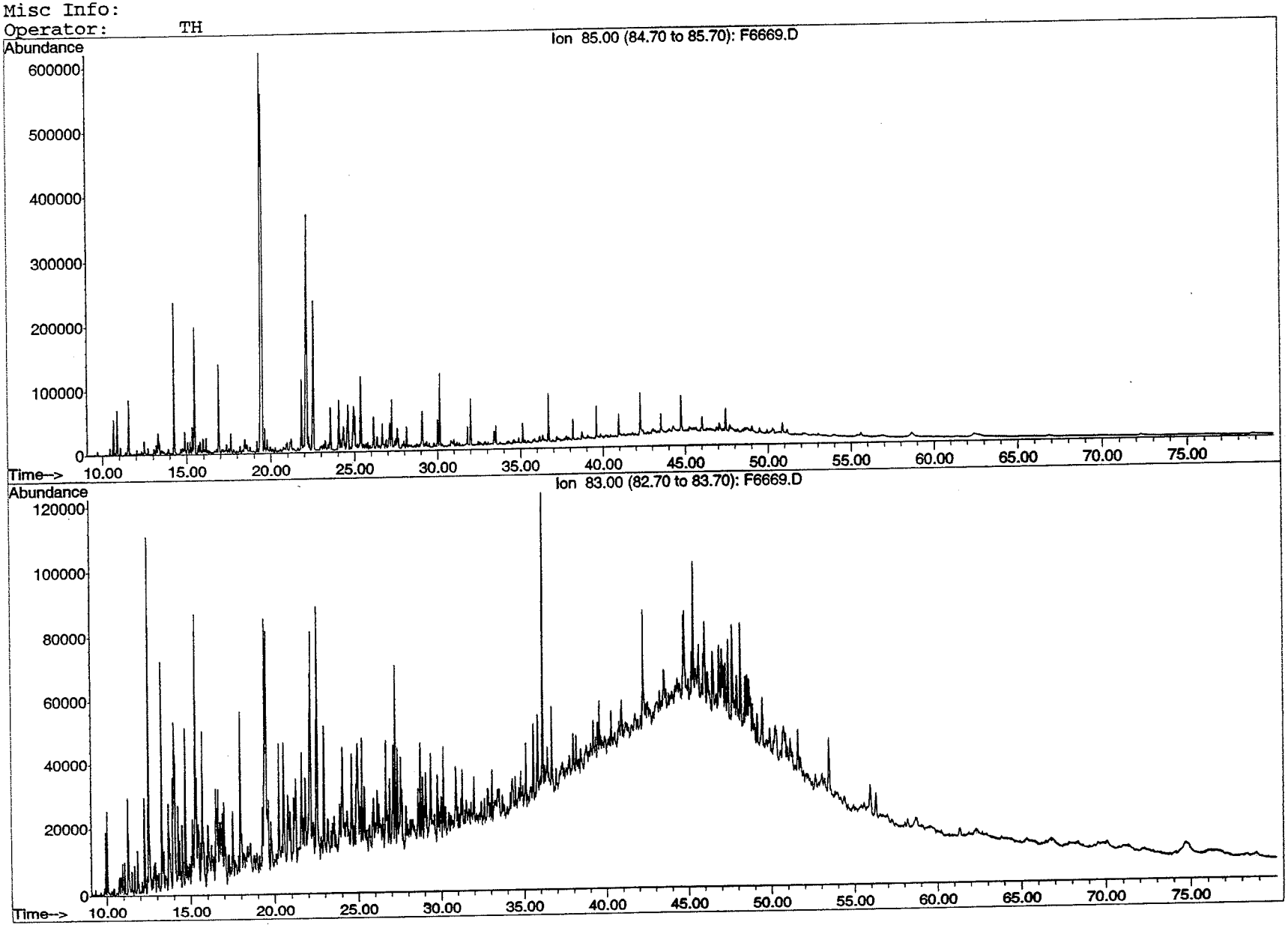


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

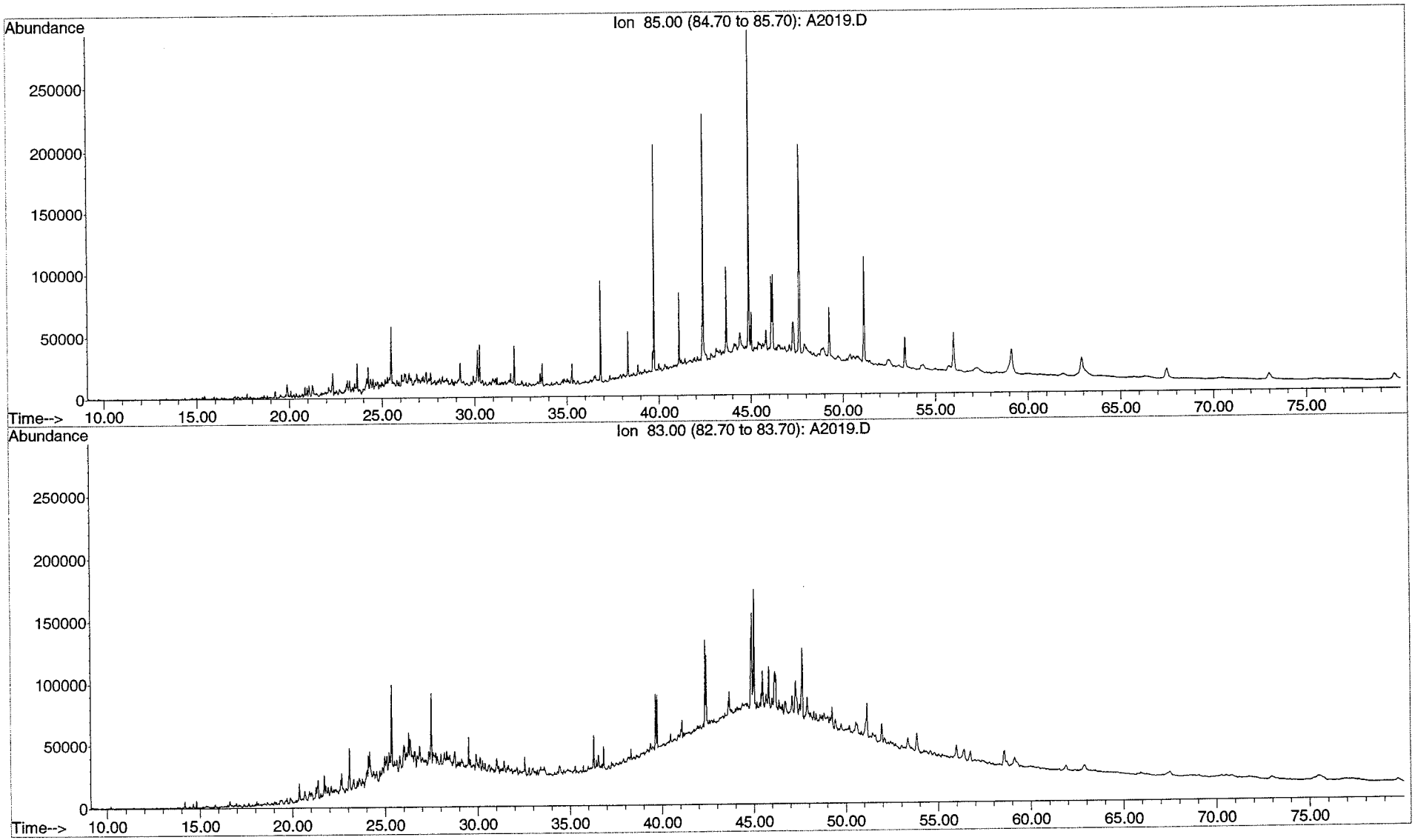
File: H:\F\DATA\SQF171\F6669.D
Date Acquired: 6 Mar 2003 9:58 am
Method File: BIO1SIM
Sample Name: U4512-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-119R2-US-0.5
U4512



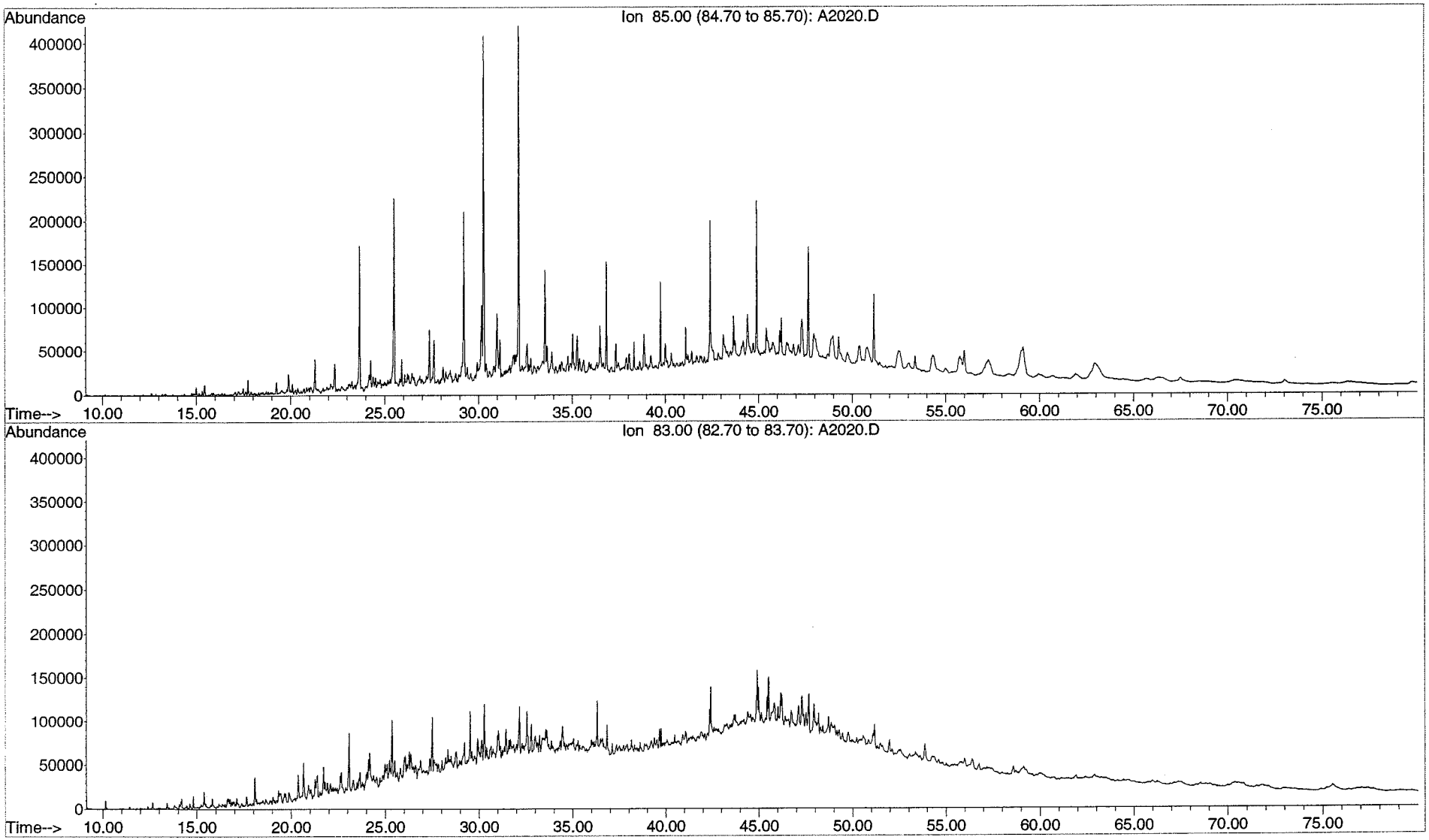
File : G:\A\DATA\SQA350\A2019.D
Operator : JR
Acquired : 28 Mar 2003 5:41 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0151-F1
Misc Info :
Vial Number: 17

Normal Alkanes and Alkylcyclohexanes
NLU-121-SS-0010
U0151



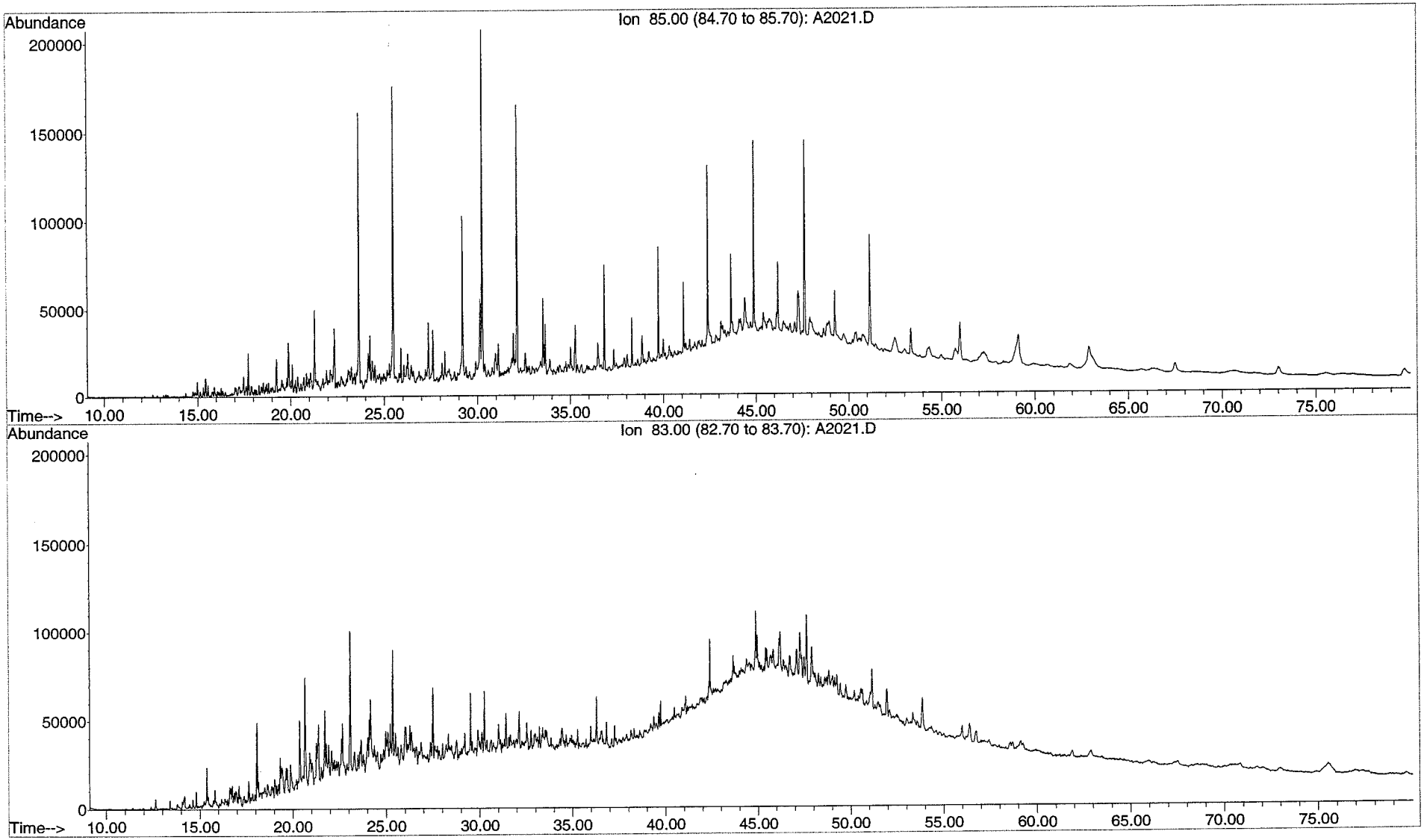
File : G:\A\DATA\SQA350\A2020.D
Operator : JR
Acquired : 28 Mar 2003 7:16 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0152-F1
Misc Info :
Vial Number: 18

Normal Alkanes and Alkylcyclohexanes
NLU-121-SS-2030
U0152



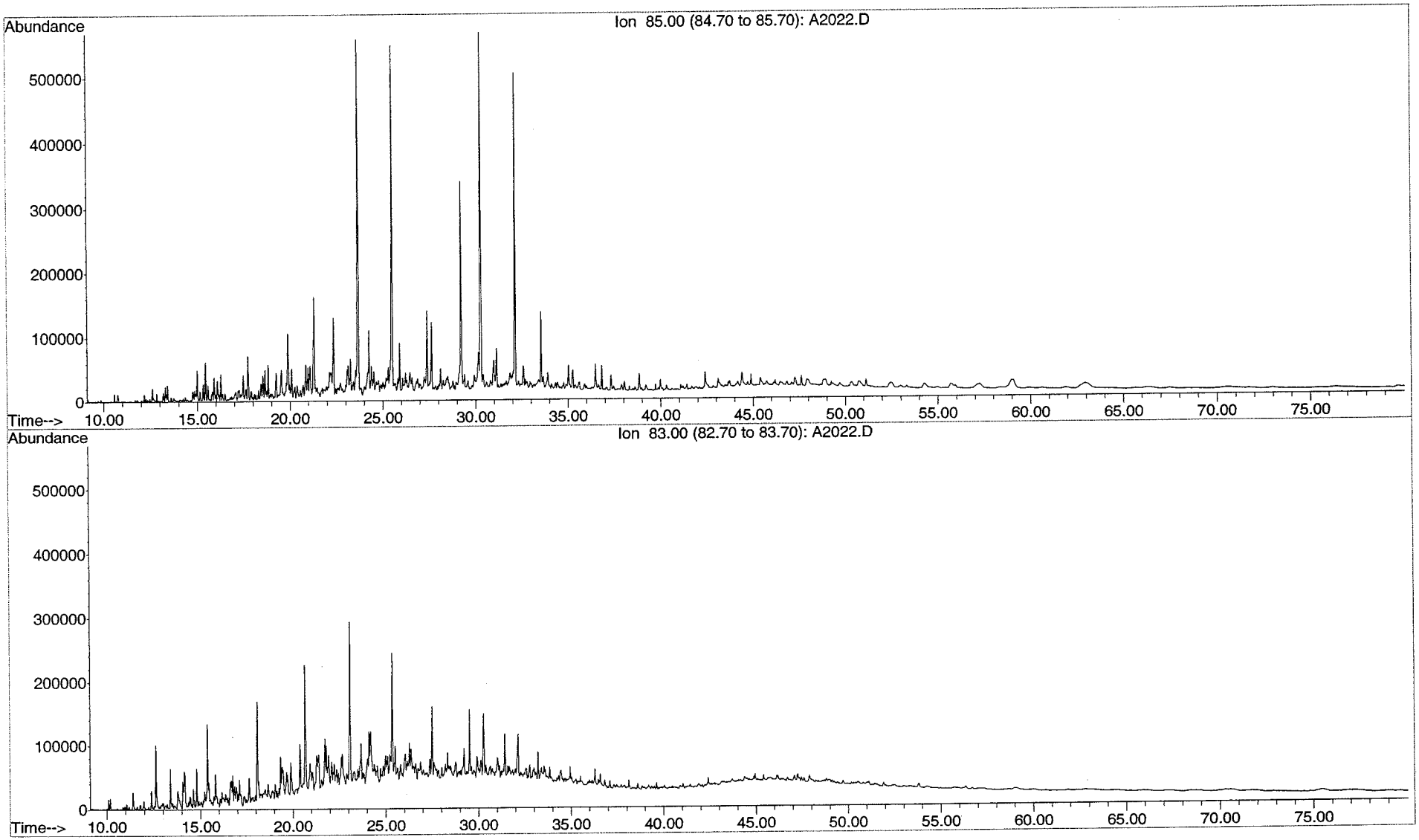
File : G:\A\DATA\SQA350\A2021.D
Operator : JR
Acquired : 28 Mar 2003 8:51 pm using AcqMethod BIOlSIM
Instrument : GC/MS Ins
Sample Name: U0153-Fl
Misc Info :
Vial Number: 19

Normal Alkanes and Alkylcyclohexanes
NLU-122-SS-0010
U0153



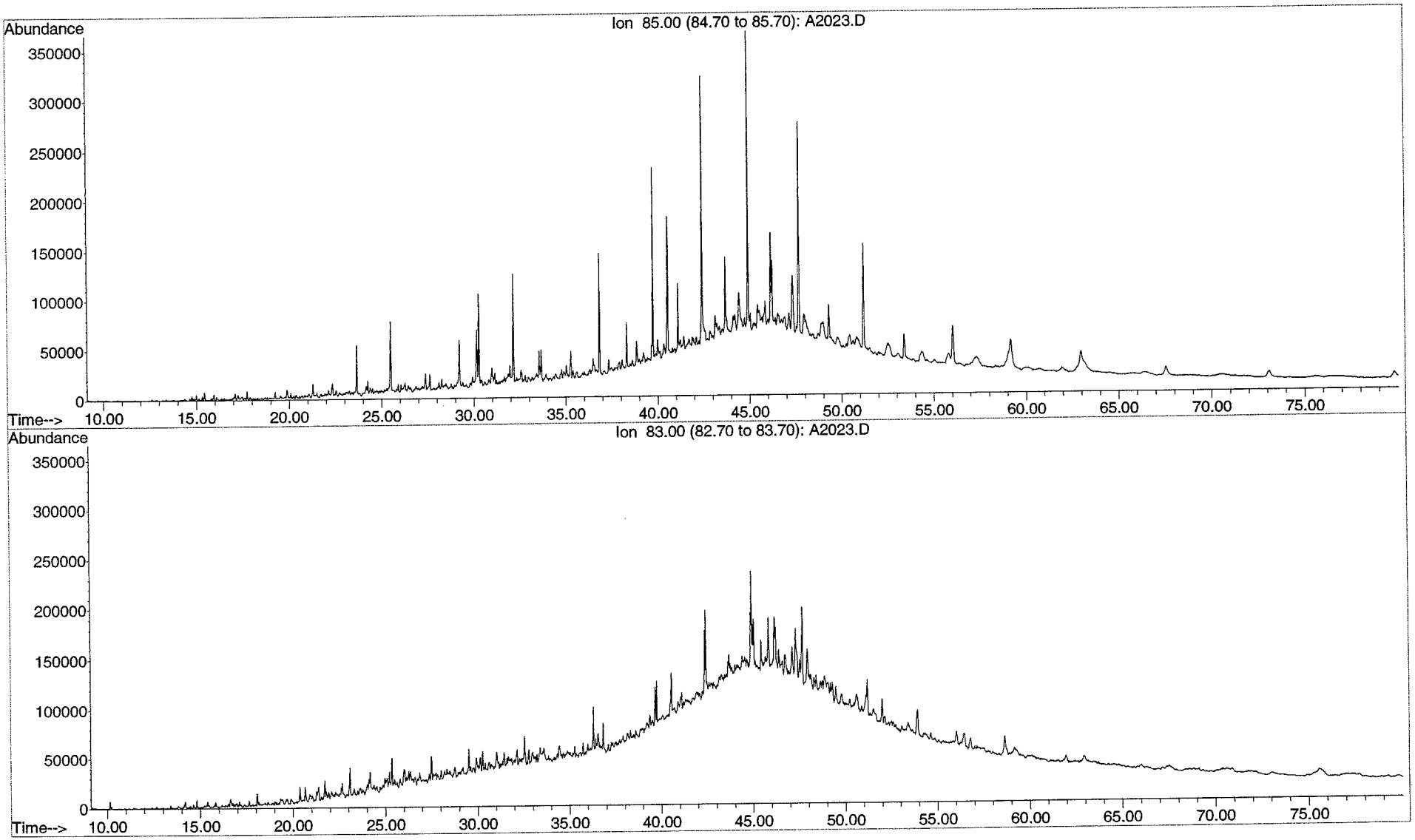
File : G:\A\DATA\SQA350\A2022.D
Operator : JR
Acquired : 28 Mar 2003 10:25 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0154-F1
Misc Info :
Vial Number: 20

Normal Alkanes and Alkylcyclohexanes
NLU-122-SS-2030
U0154



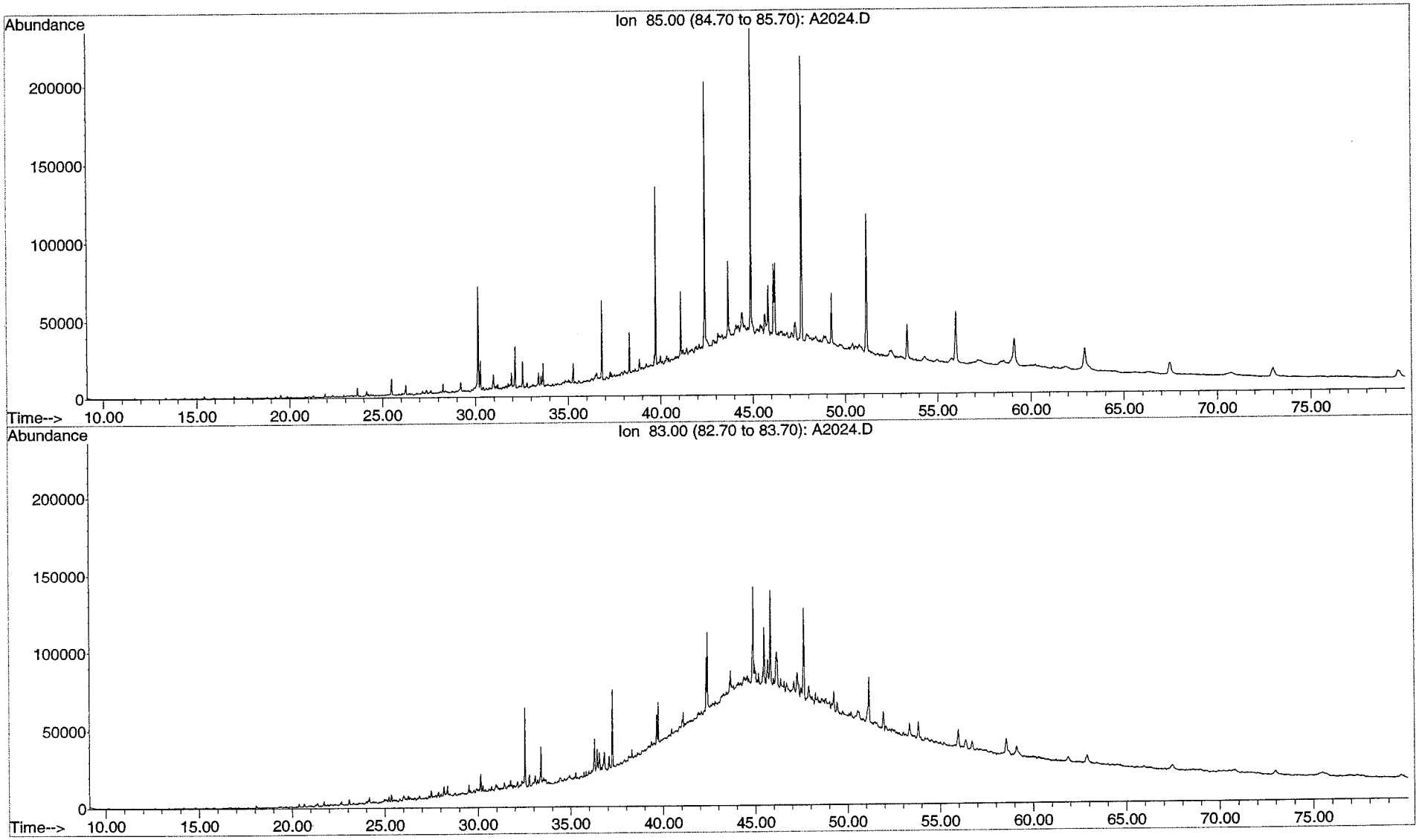
File : G:\A\DATA\SQA350\A2023.D
Operator : JR
Acquired : 28 Mar 2003 11:58 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0155-F1
Misc Info :
Vial Number: 21

Normal Alkanes and Alkylcyclohexanes
NLU-123-SS-0010
U0155



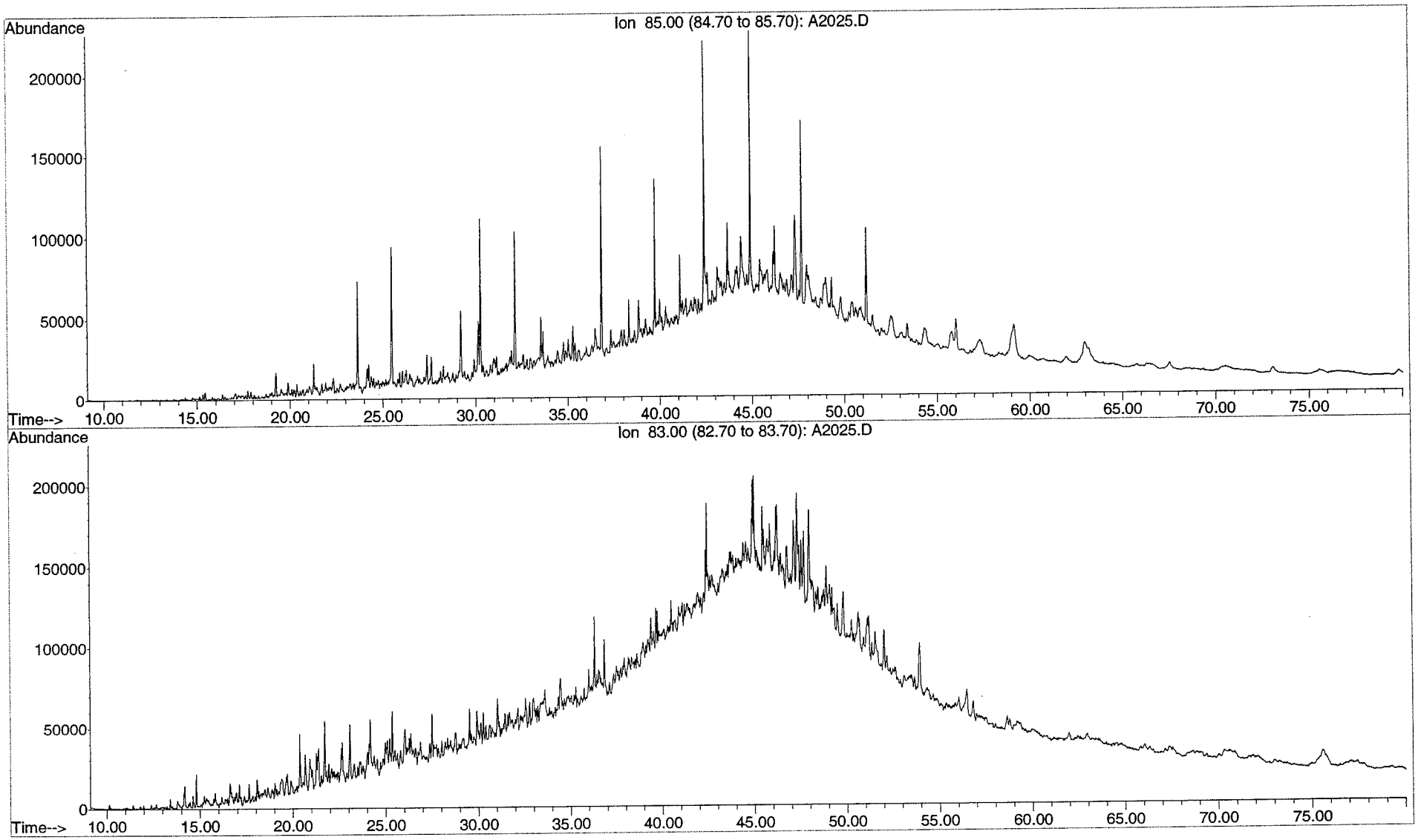
File : G:\A\DATA\SQA350\A2024.D
Operator : JR
Acquired : 29 Mar 2003 1:31 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0156-F1
Misc Info :
Vial Number: 22

Normal Alkanes and Alkylcyclohexanes
NLU-124-SS-0010
U0156



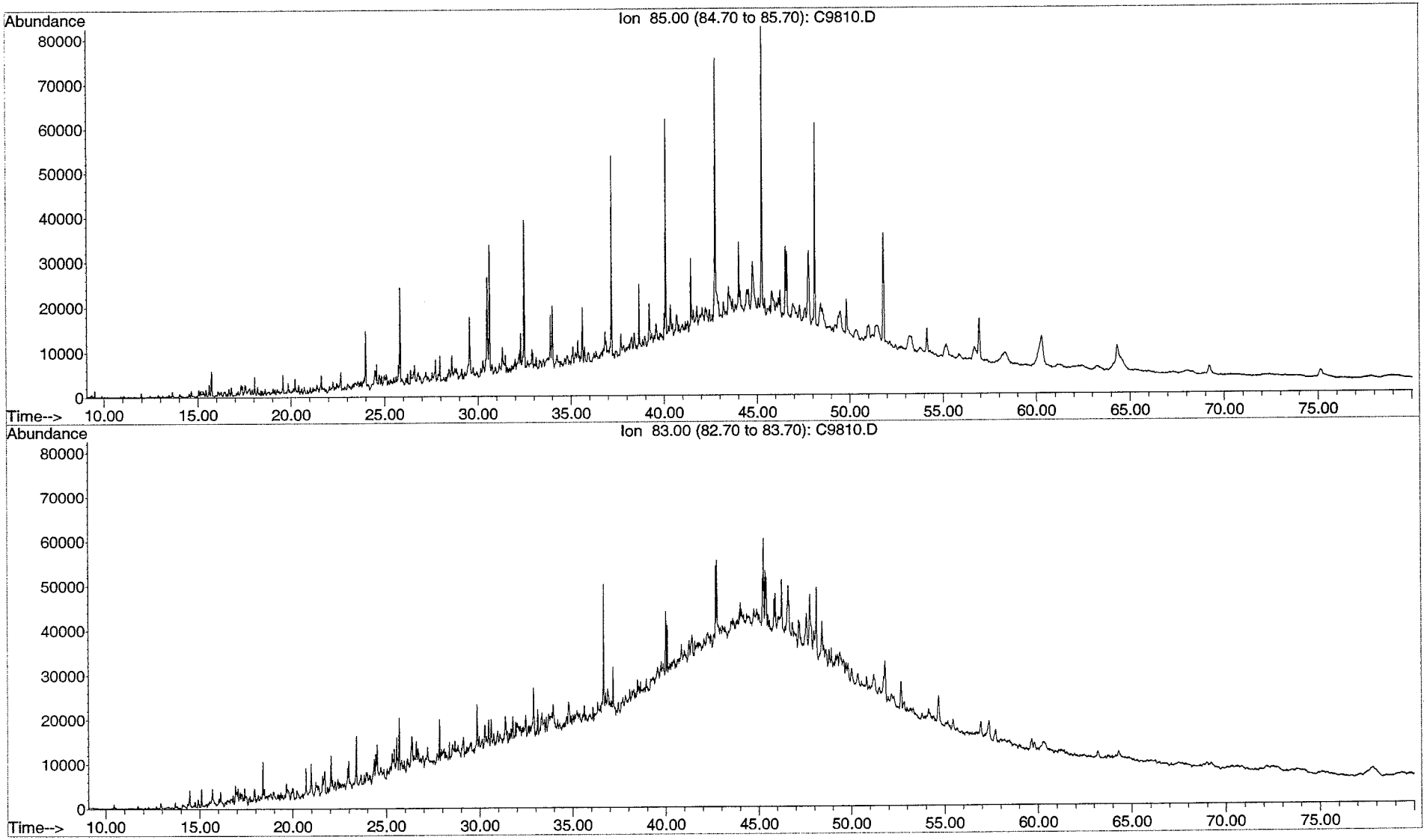
File : G:\A\DATA\SQA350\A2025.D
Operator : JR
Acquired : 29 Mar 2003 3:04 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0157-F1
Misc Info :
Vial Number: 23

Normal Alkanes and Alkylcyclohexanes
NLU-124-SS-2030
U0157



File : G:\C\DATA\SQC647\C9810.D
Operator : AC
Acquired : 12 Apr 2003 3:23 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0158-F1
Misc Info :
Vial Number: 9

Normal Alkanes and Alkylcyclohexanes
NLU-126-SS-0010
U0158

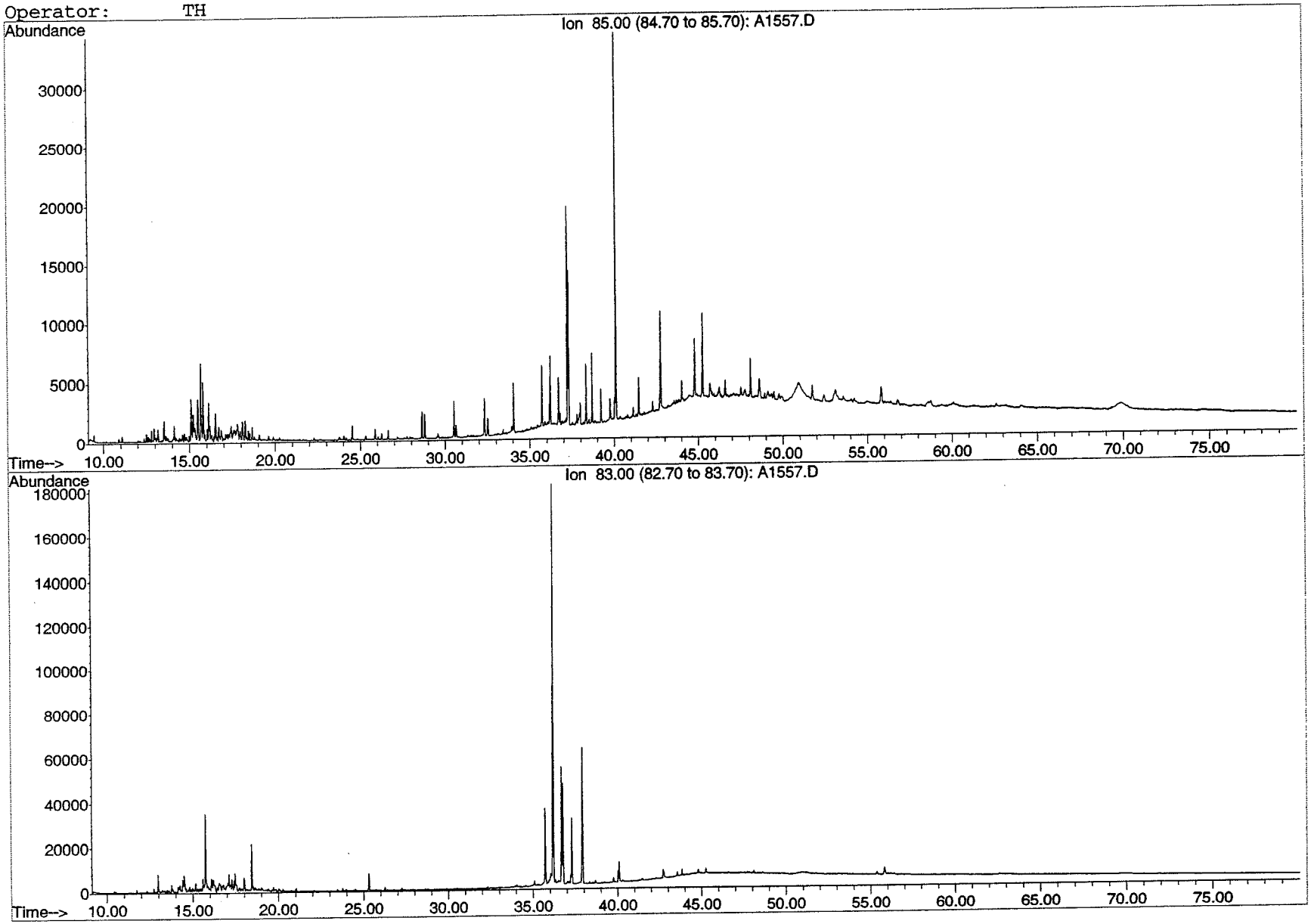


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1557.D
Date Acquired: 17 Feb 2003 7:57 pm
Method File: BIO1SIM
Sample Name: U4517-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-126-SS-0010
U4517

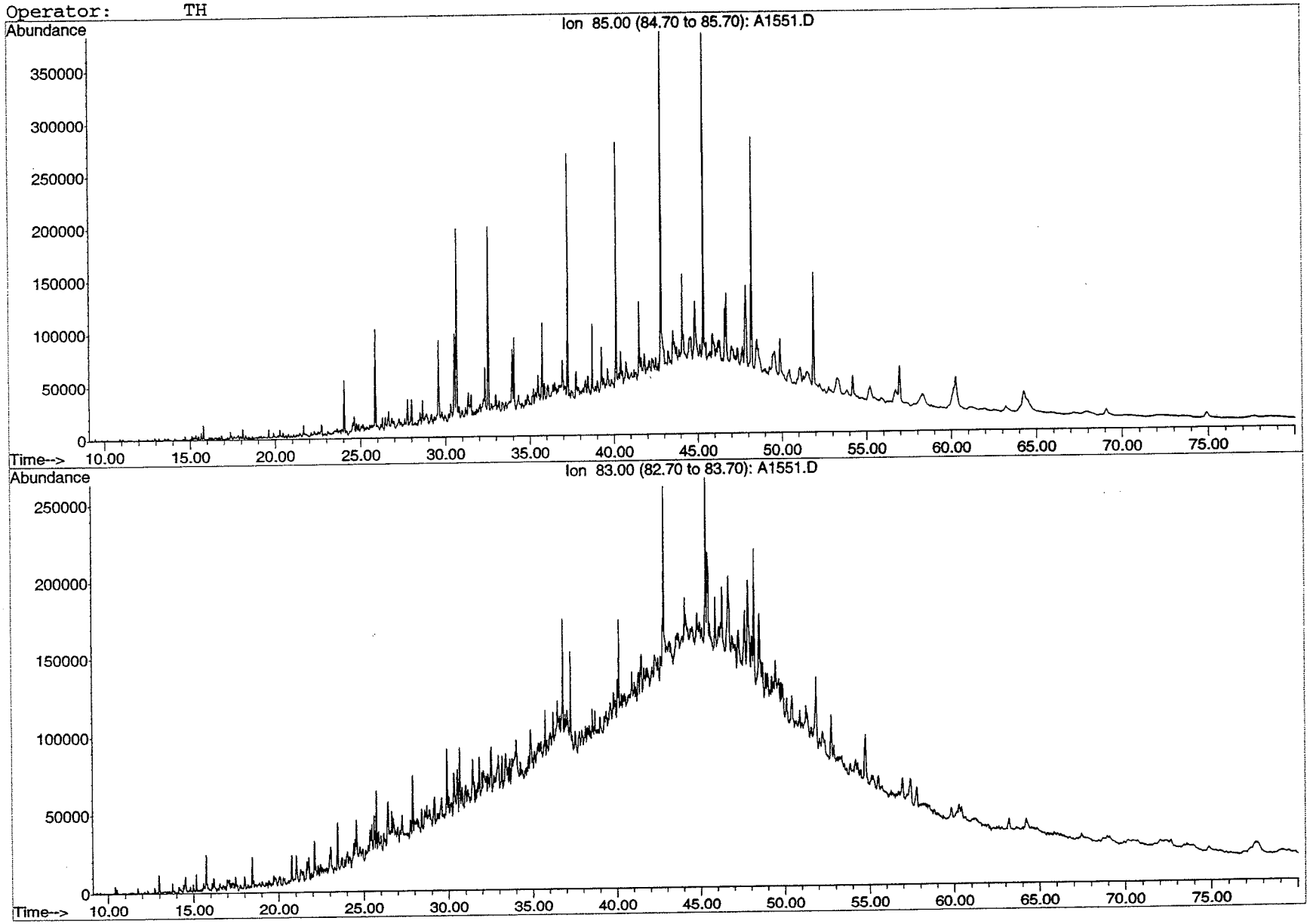


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

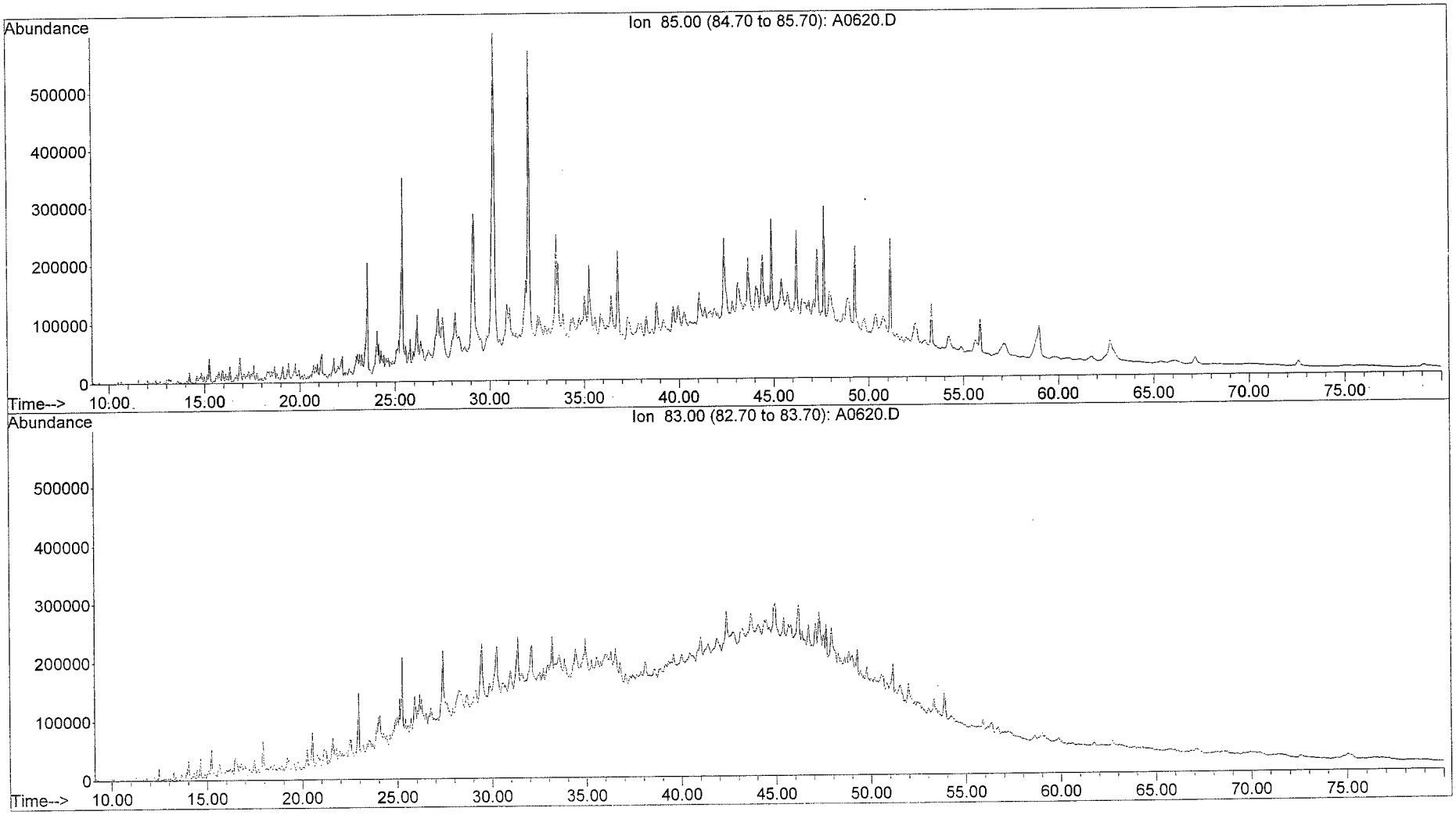
File: H:\A\DATA\SQA339\A1551.D
Date Acquired: 17 Feb 2003 10:58 am
Method File: BIO1SIM
Sample Name: U70097-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
NLU-126-SS-1020
U0097



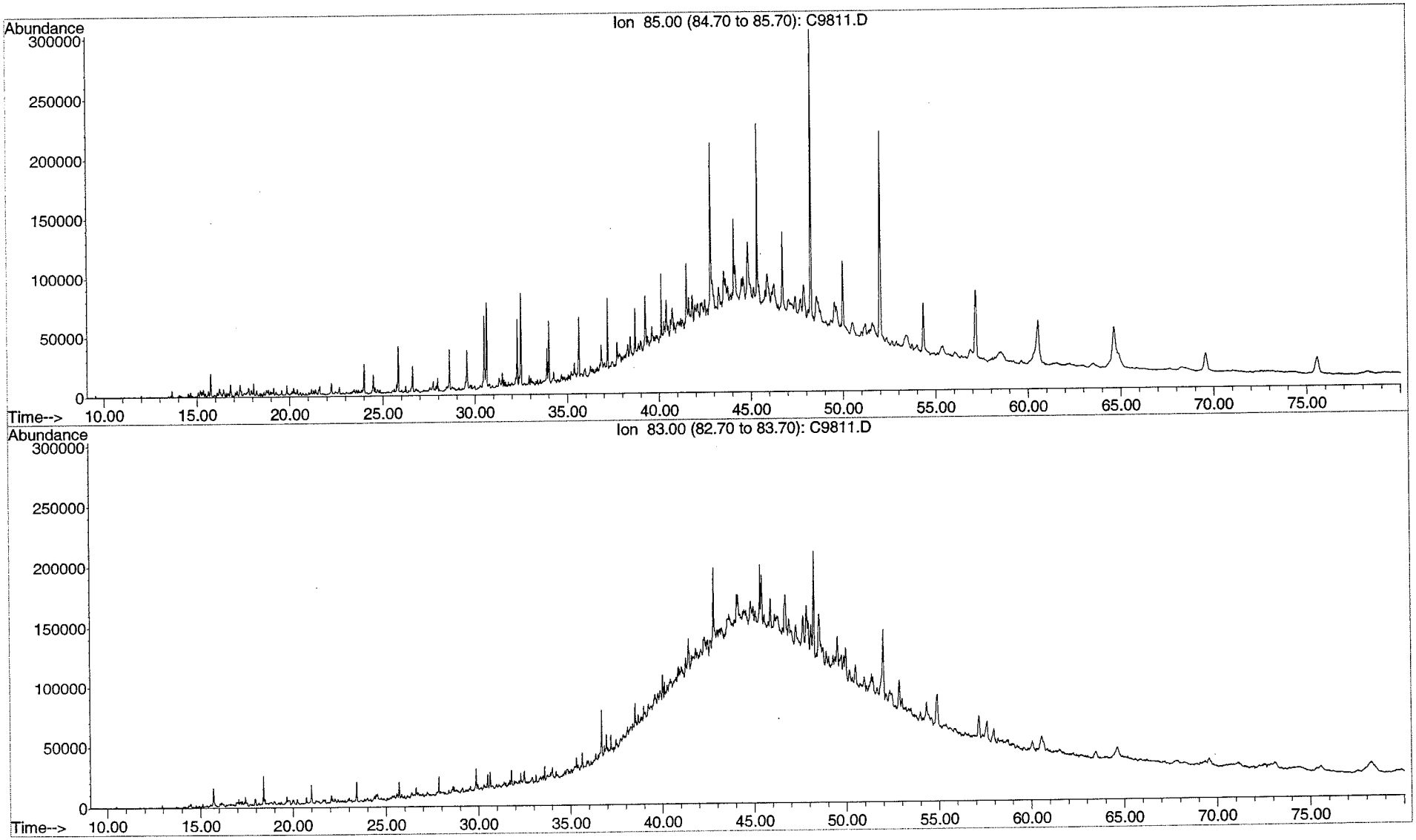
File : G:\A\DATA\SQA319\A0620.D
Operator : TH
Acquired : 14 Dec 2002 1:44 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0159-F1
Misc Info :
Vial Number: 24

Normal Alkanes and Alkylcyclohexanes
NLU-127-SS-0010
U0159



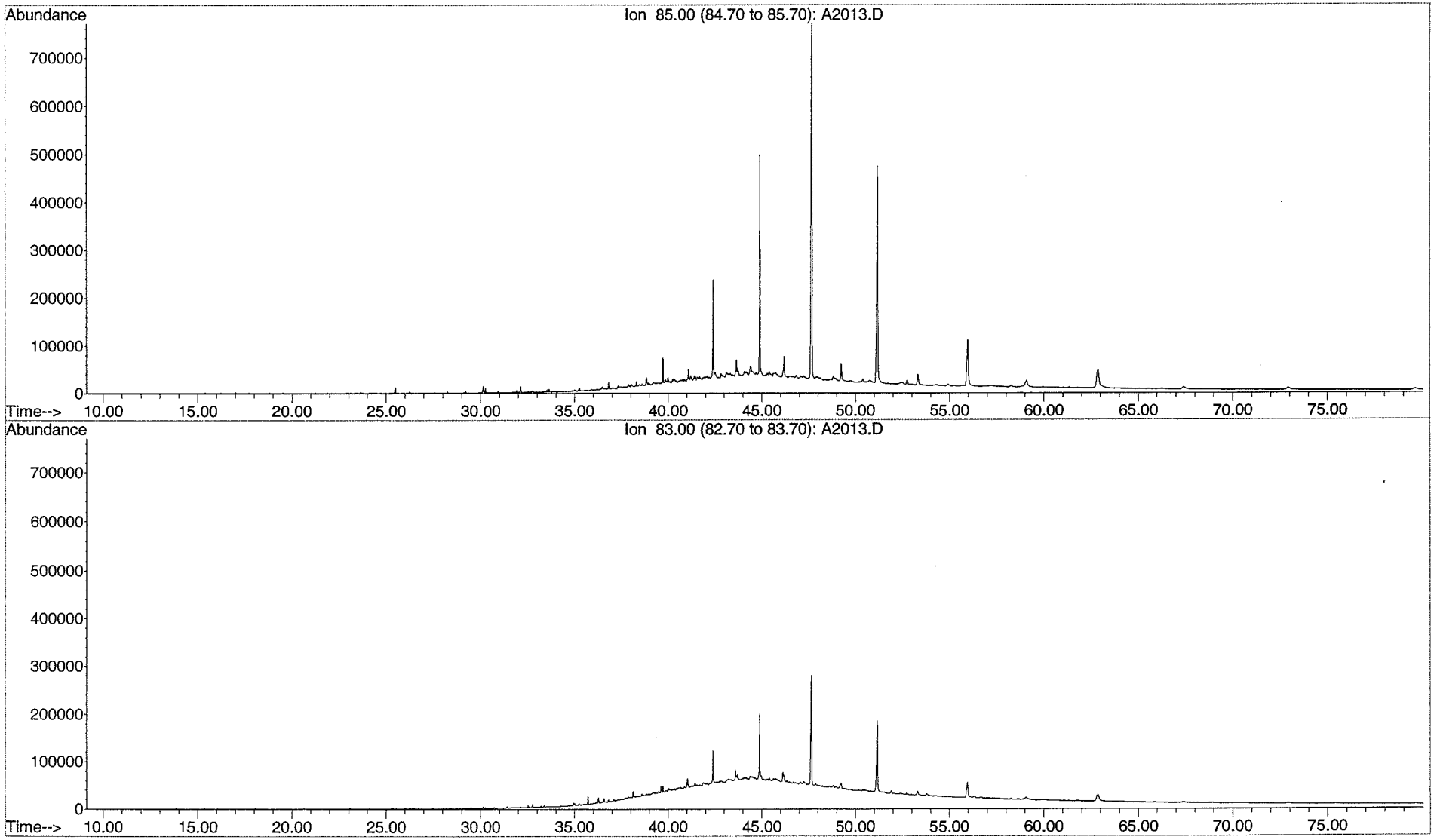
File : G:\C\DATA\SQC647\C9811.D
Operator : AC
Acquired : 12 Apr 2003 4:53 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0160-F1
Misc Info :
Vial Number: 10

Normal Alkanes and Alkylcyclohexanes
NLU-128-SS-0010
U0160



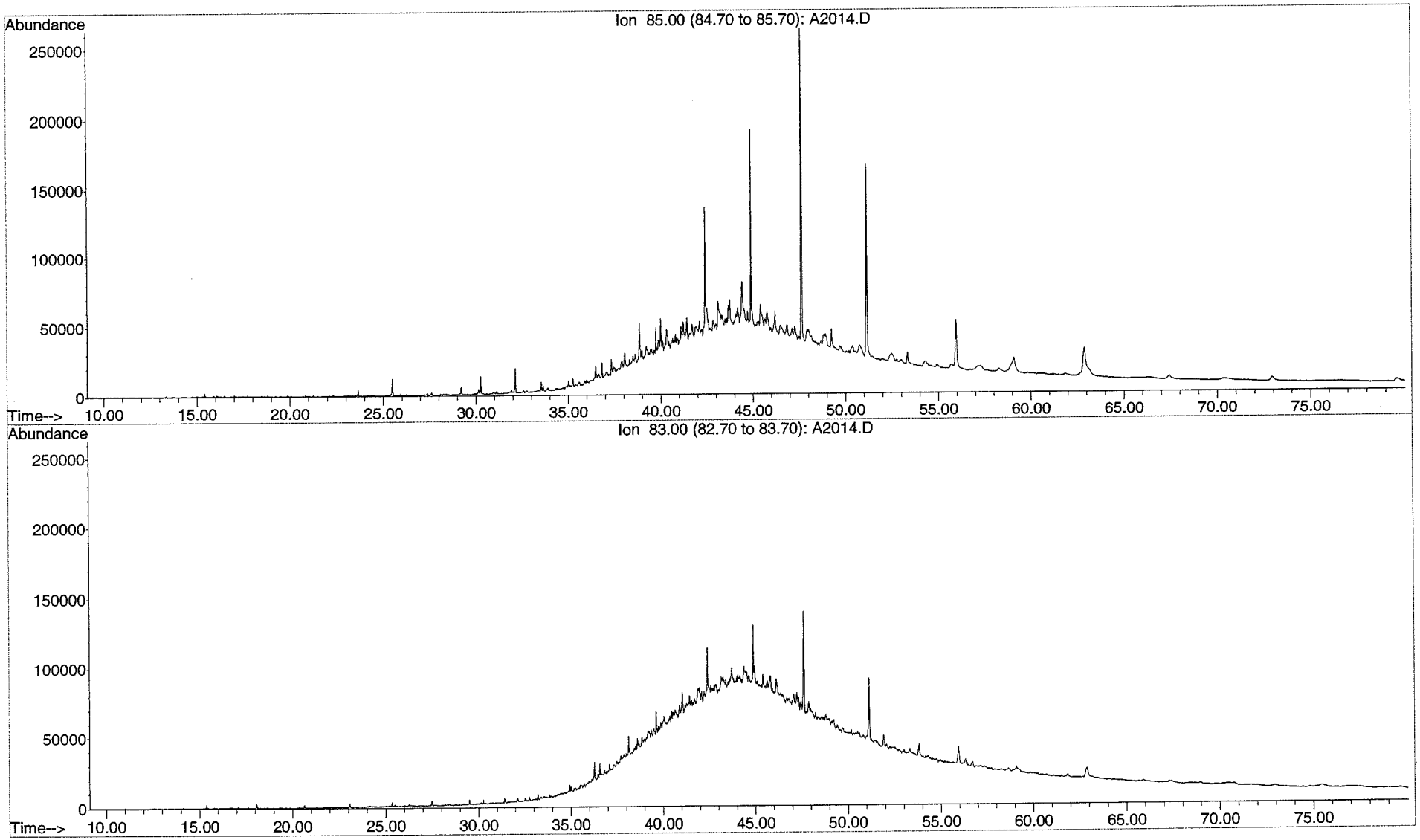
File : G:\A\DATA\SQA350\A2013.D
Operator : JR
Acquired : 28 Mar 2003 8:25 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0135-F1
Misc Info :
Vial Number: 11

Normal Alkanes and Alkylcyclohexanes
NLU-129-SS-0010
U0135



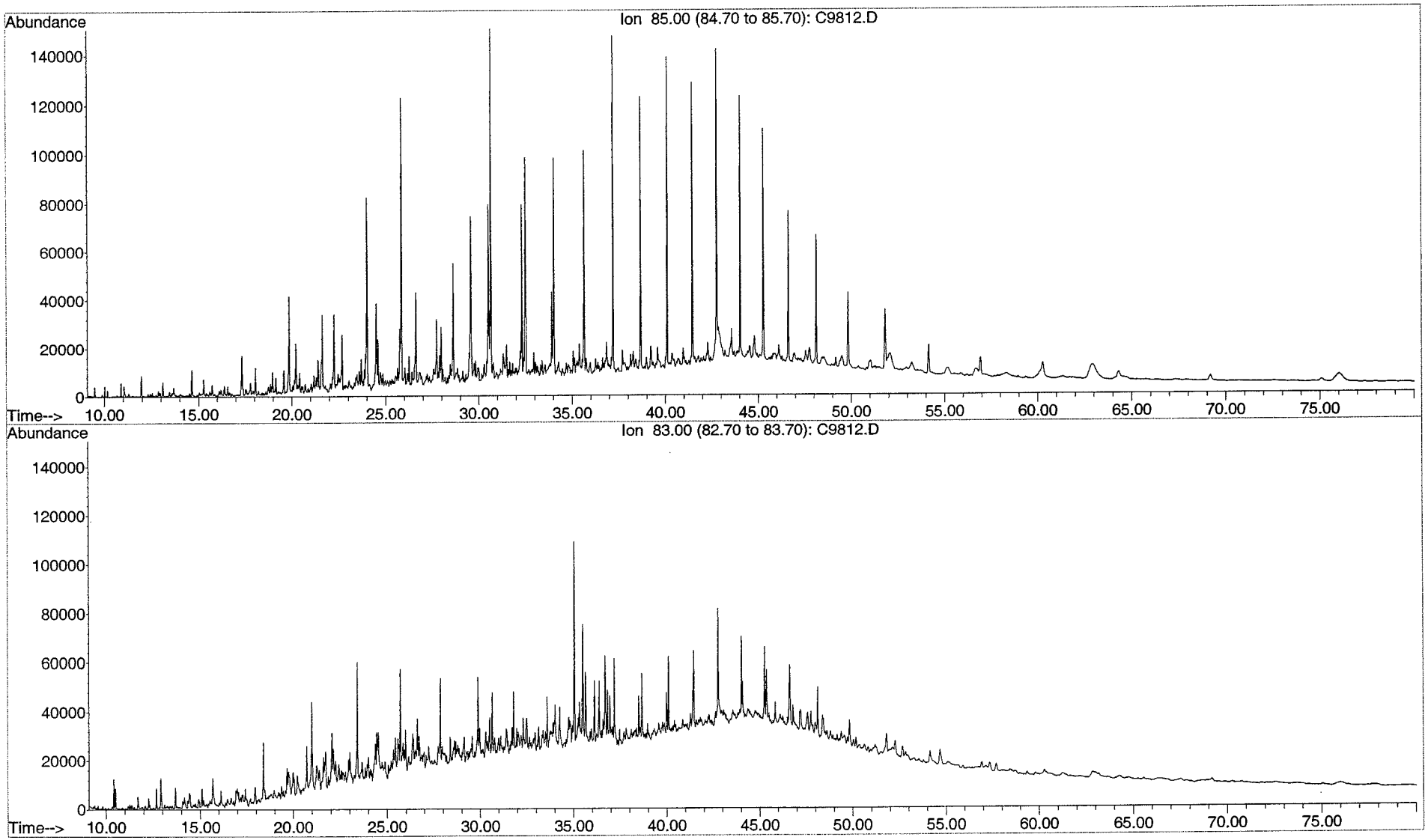
File : G:\A\DATA\SQA350\A2014.D
Operator : JR
Acquired : 28 Mar 2003 9:58 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0137-F1
Misc Info :
Vial Number: 12

Normal Alkanes and Alkylcyclohexanes
NLU-129-SS-2030
U0137



File : G:\C\DATA\SQC647\C9812.D
Operator : AC
Acquired : 12 Apr 2003 6:25 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0161-F1
Misc Info :
Vial Number: 11

Normal Alkanes and Alkylcyclohexanes
NLU-130-SS-0010
U0161

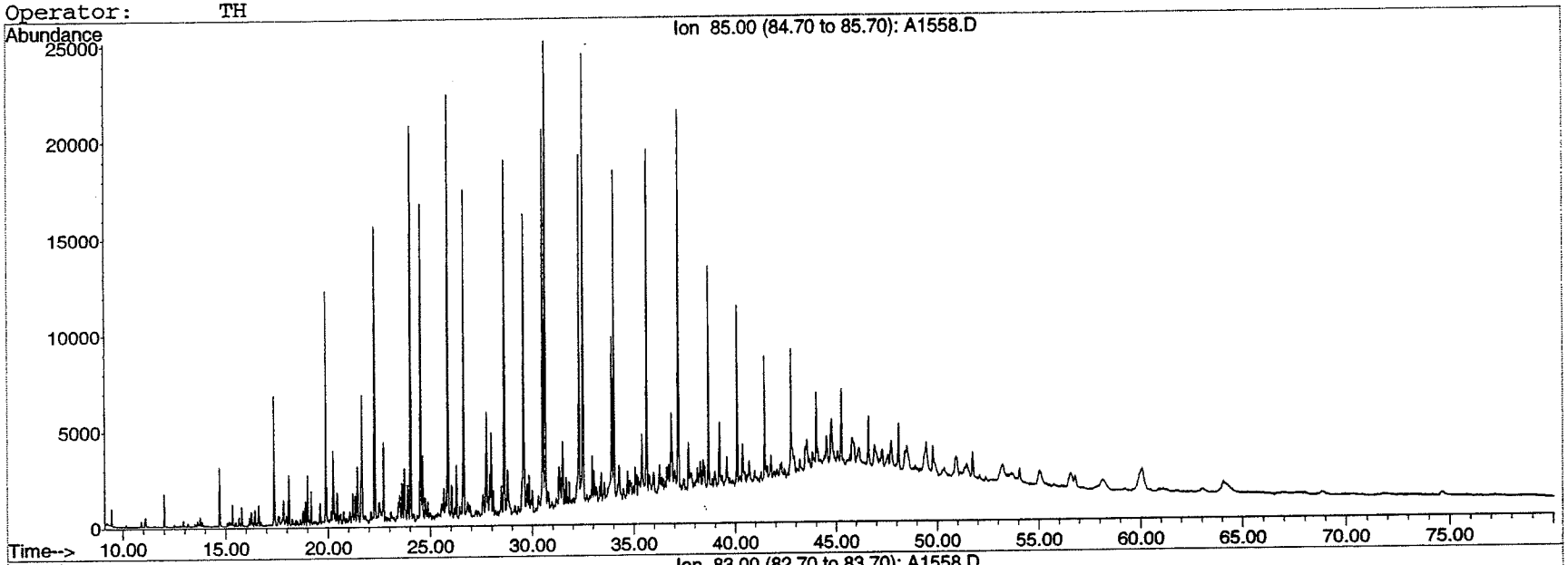


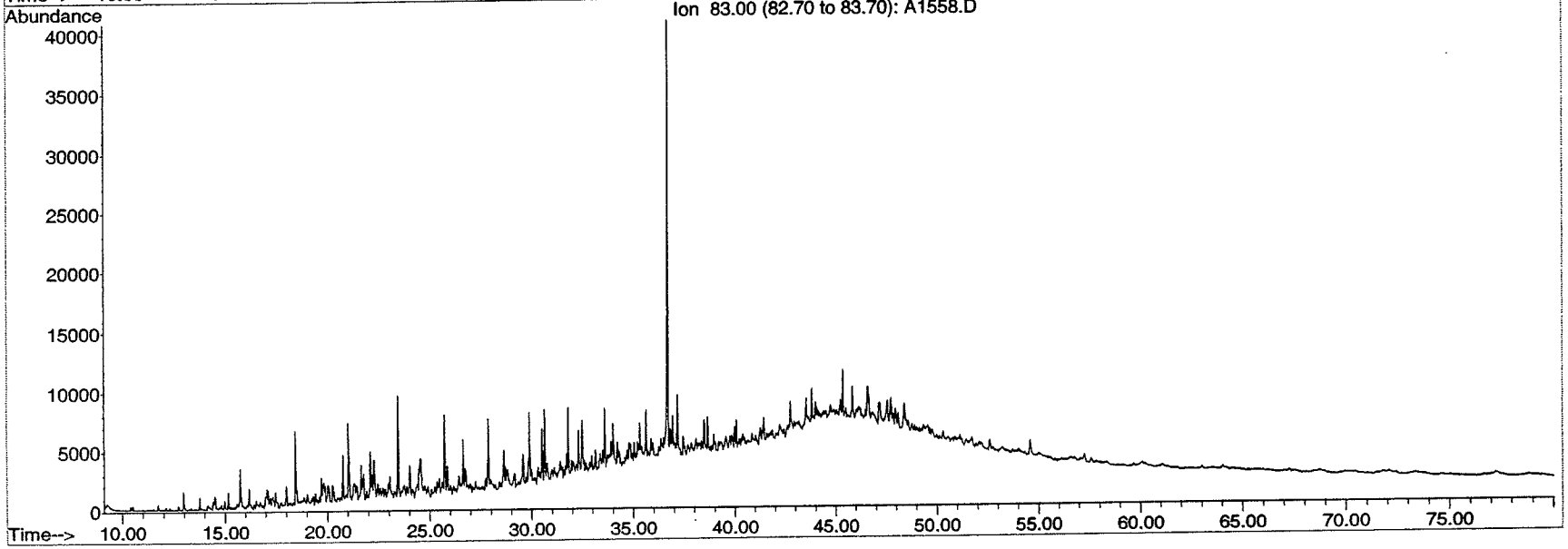
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1558.D
Date Acquired: 17 Feb 2003 9:29 pm
Method File: BIO1SIM
Sample Name: U 4518-D-F1
Misc Info:
Operator: TH

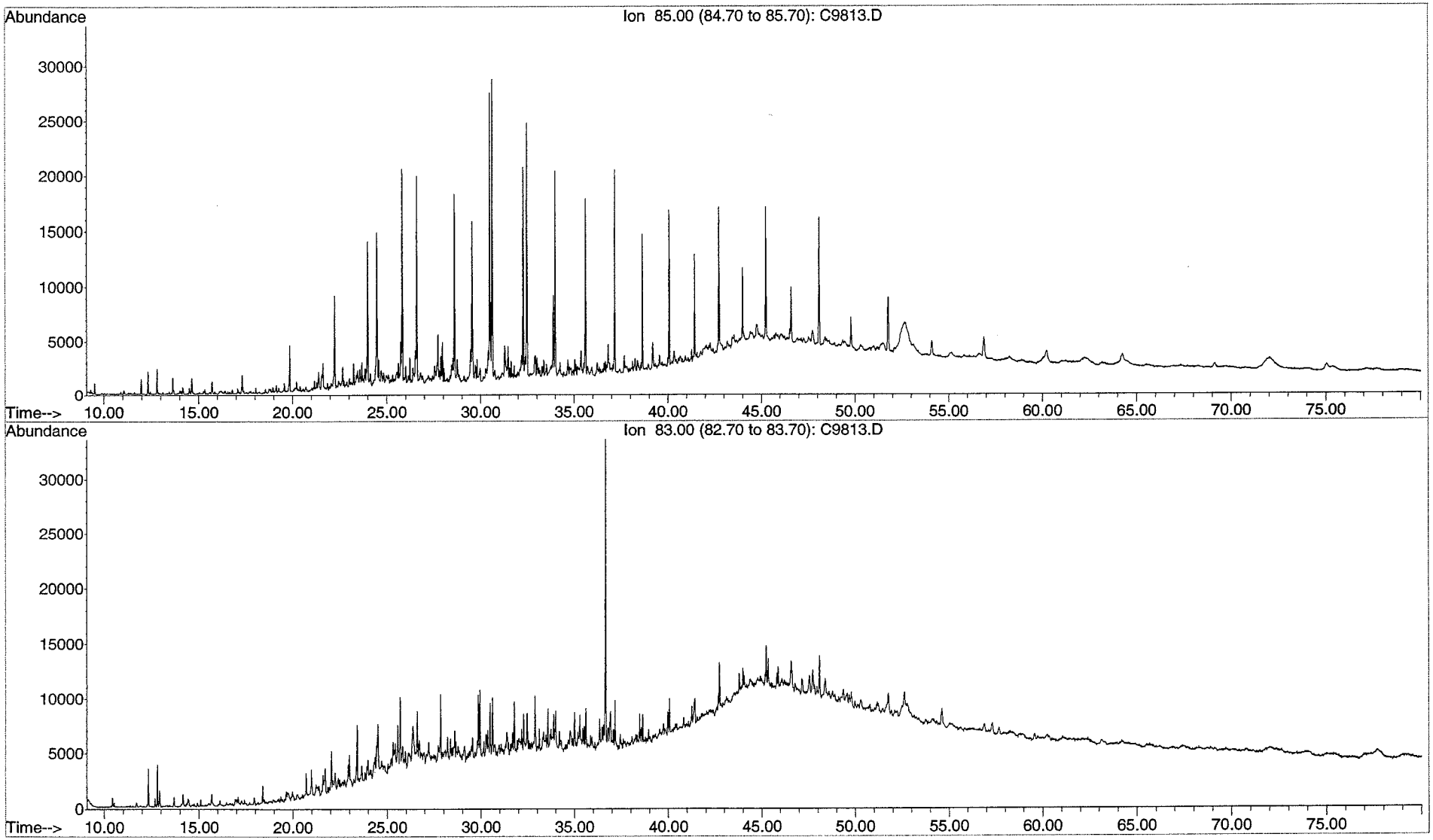
Normal Alkanes and Alkylcyclohexanes
NLU-131-SS-0010
U4518





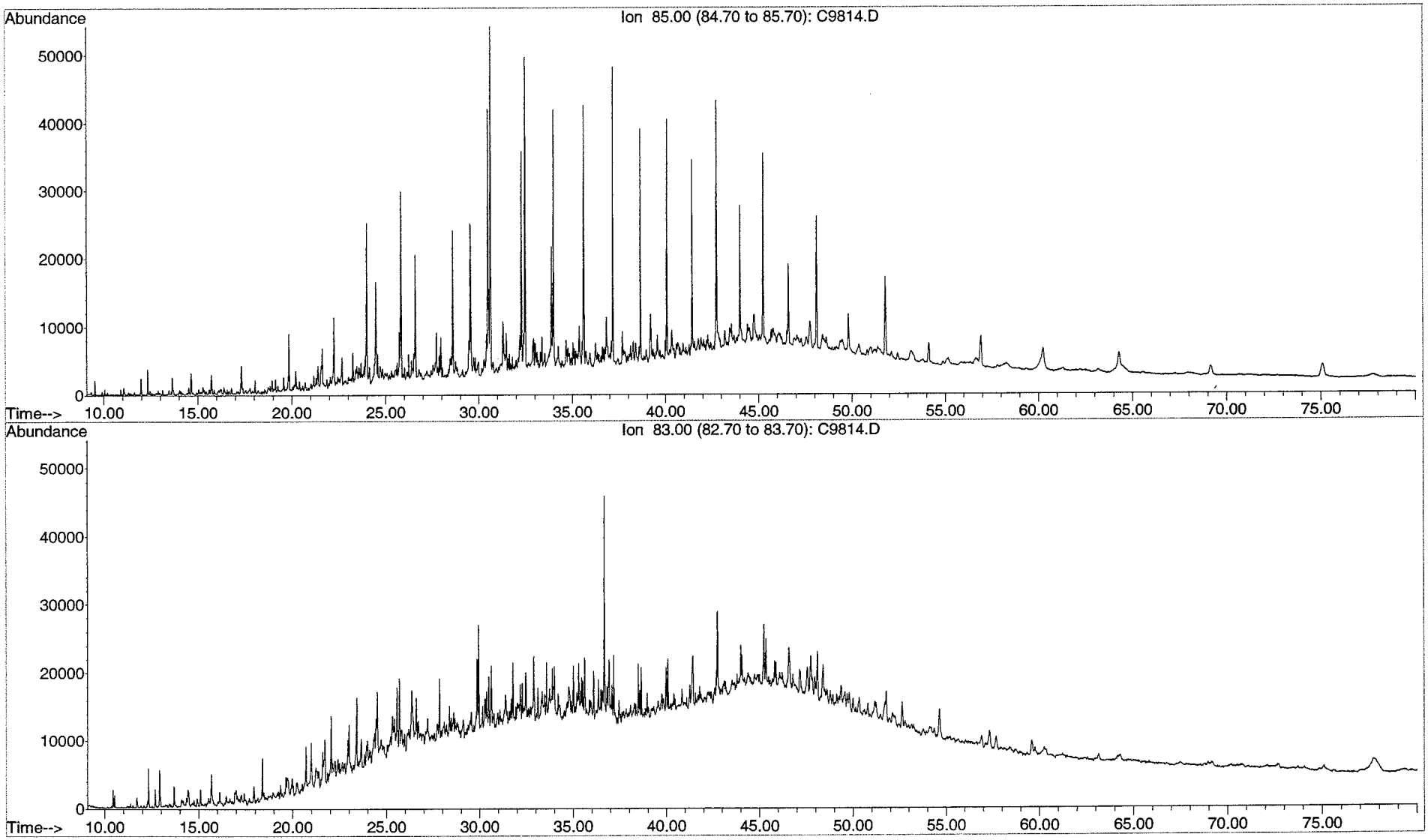
File : G:\C\DATA\SQC647\C9813.D
Operator : AC
Acquired : 12 Apr 2003 7:55 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0162-F1
Misc Info :
Vial Number: 12

Normal Alkanes and Alkylcyclohexanes
NLU-133-SS-0010
U0162



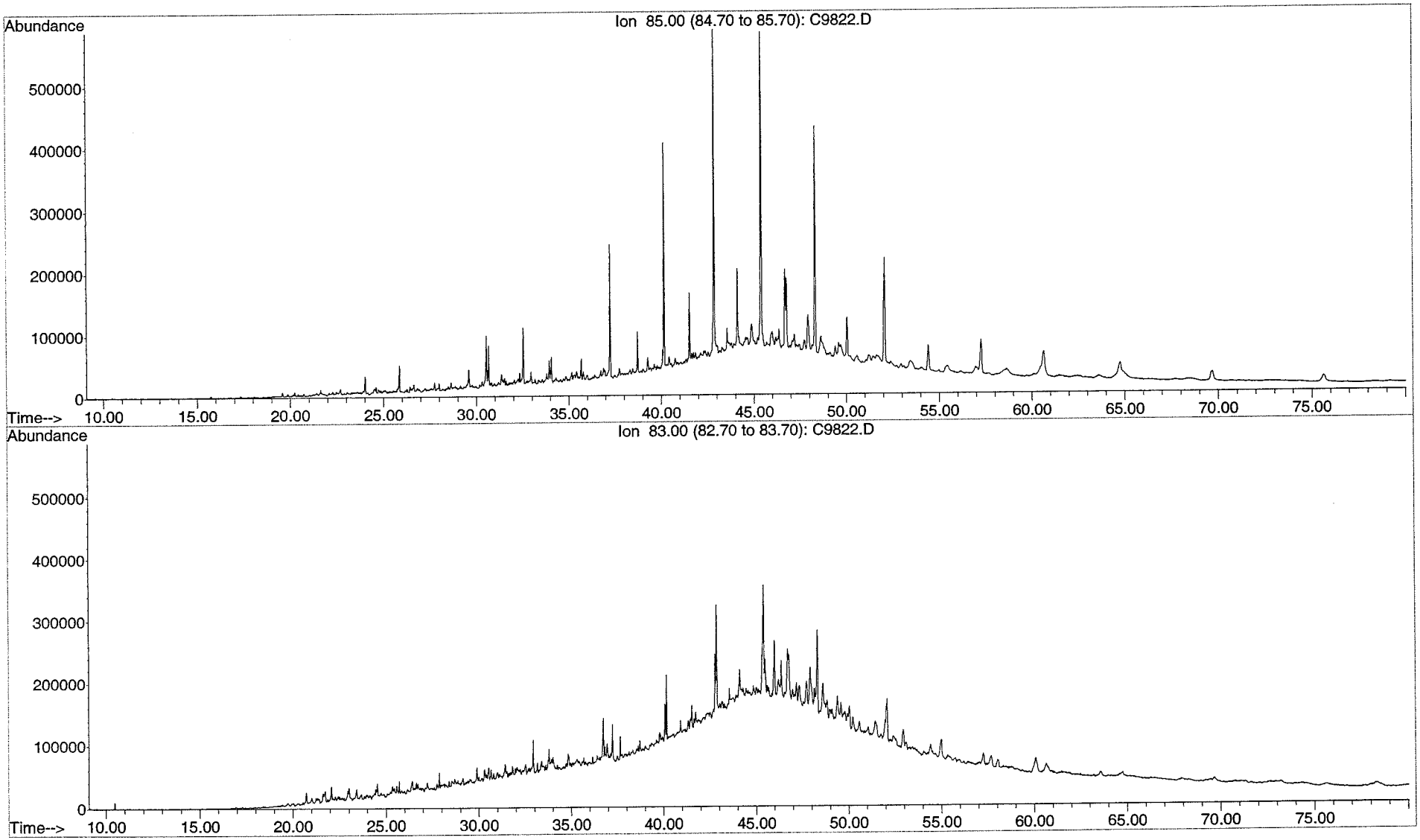
File : G:\C\DATA\SQC647\C9814.D
Operator : AC
Acquired : 12 Apr 2003 9:26 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0163-F1
Misc Info :
Vial Number: 13

Normal Alkanes and Alkylcyclohexanes
NLU-133-SS-1020
U0163



File : G:\C\DATA\SQC647\C9822.D
Operator : AC
Acquired : 12 Apr 2003 9:30 pm using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: U0172-F1
Misc Info :
Vial Number: 21

Normal Alkanes and Alkylcyclohexanes
NLU-136-SS-0010
U0172

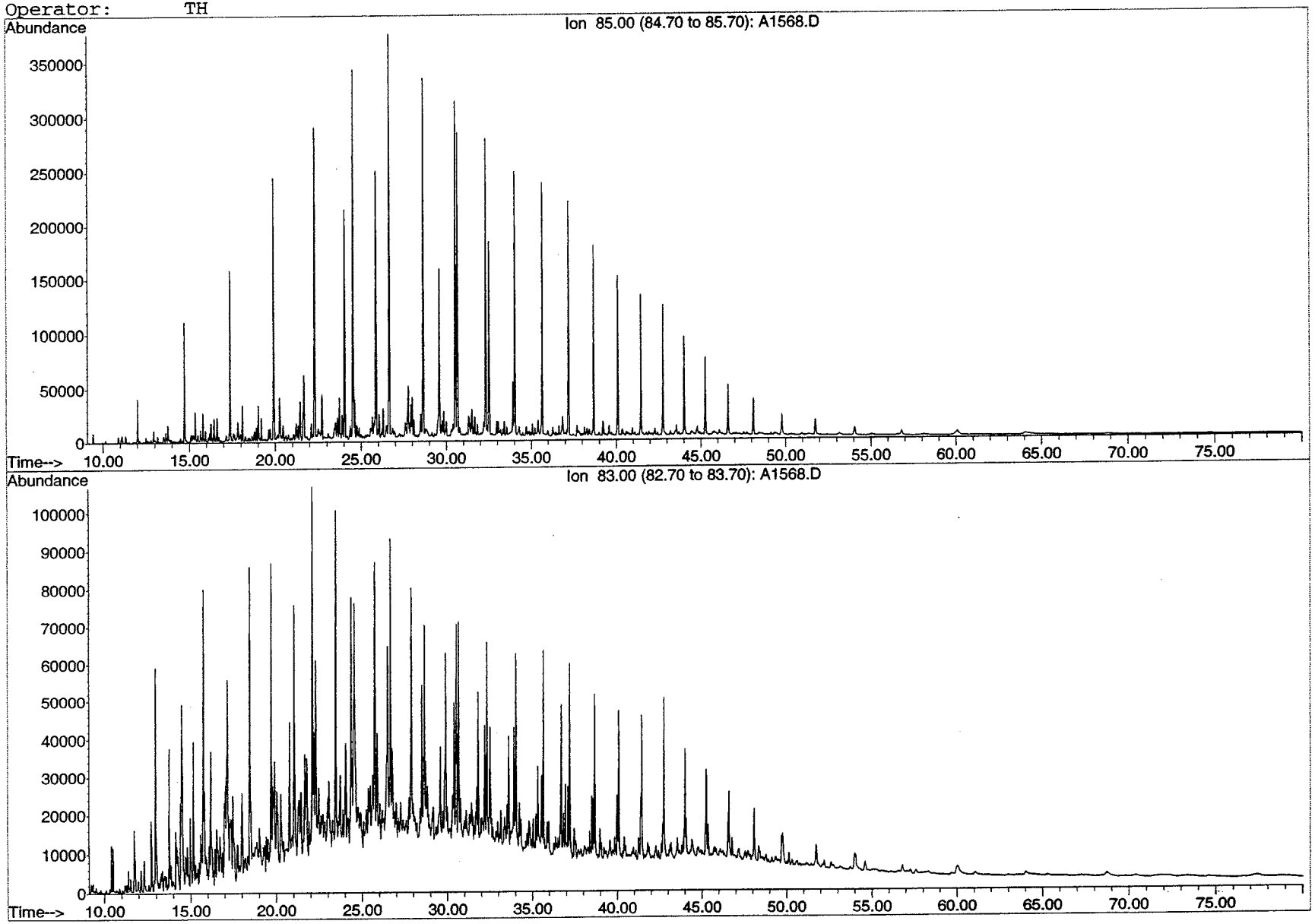


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1568.D
Date Acquired: 18 Feb 2003 12:39 pm
Method File: BIO1SIM
Sample Name: U4514-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
DW-5-1202
U4514

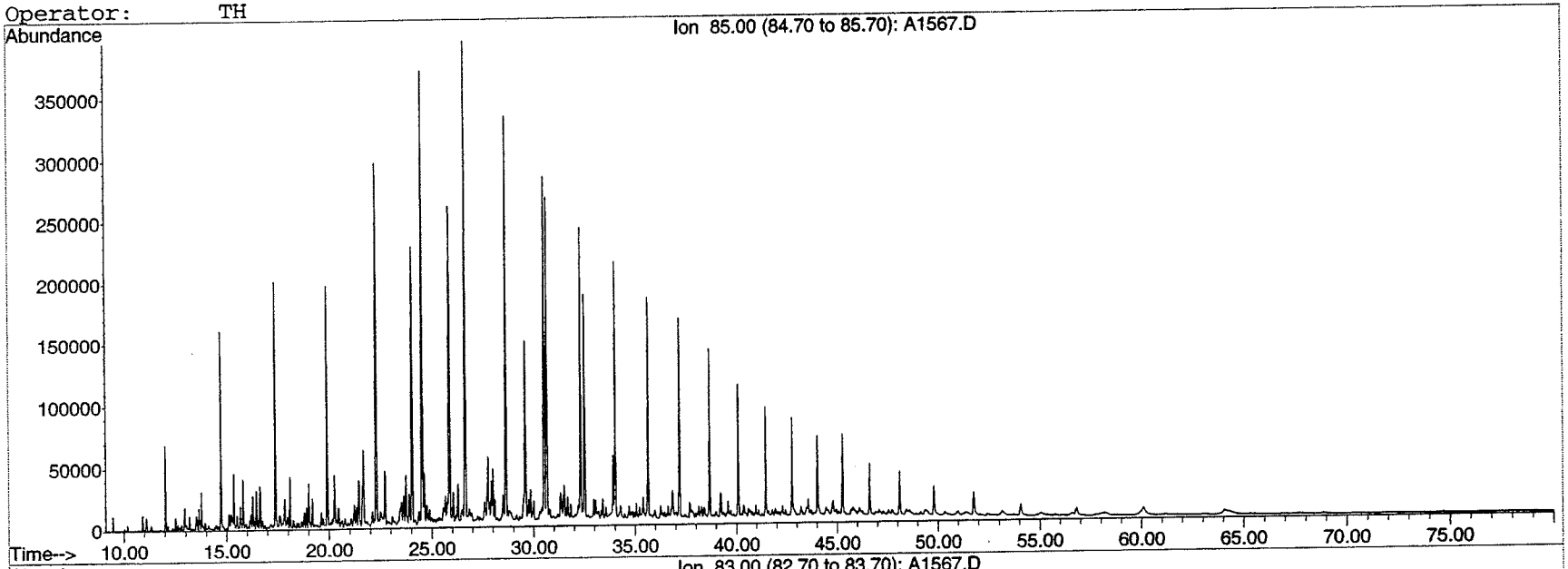


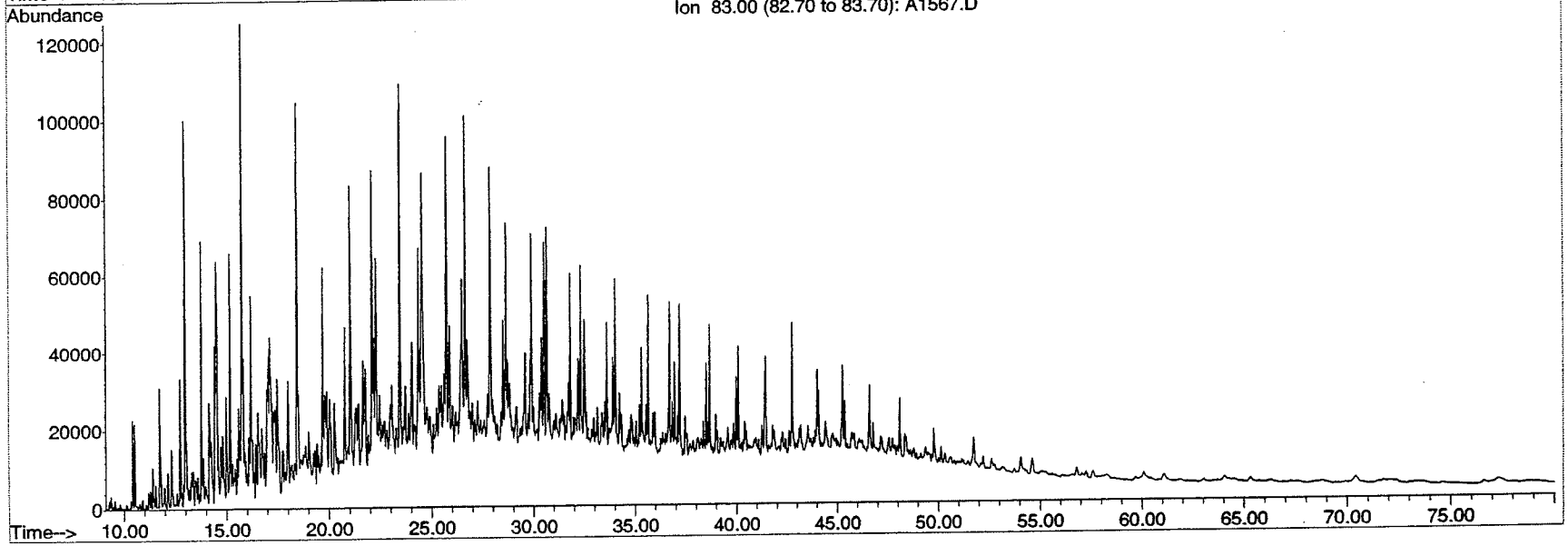
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1567.D
Date Acquired: 18 Feb 2003 11:10 am
Method File: BIO1SIM
Sample Name: U3754-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
MW-5 Product(T190)
U3754



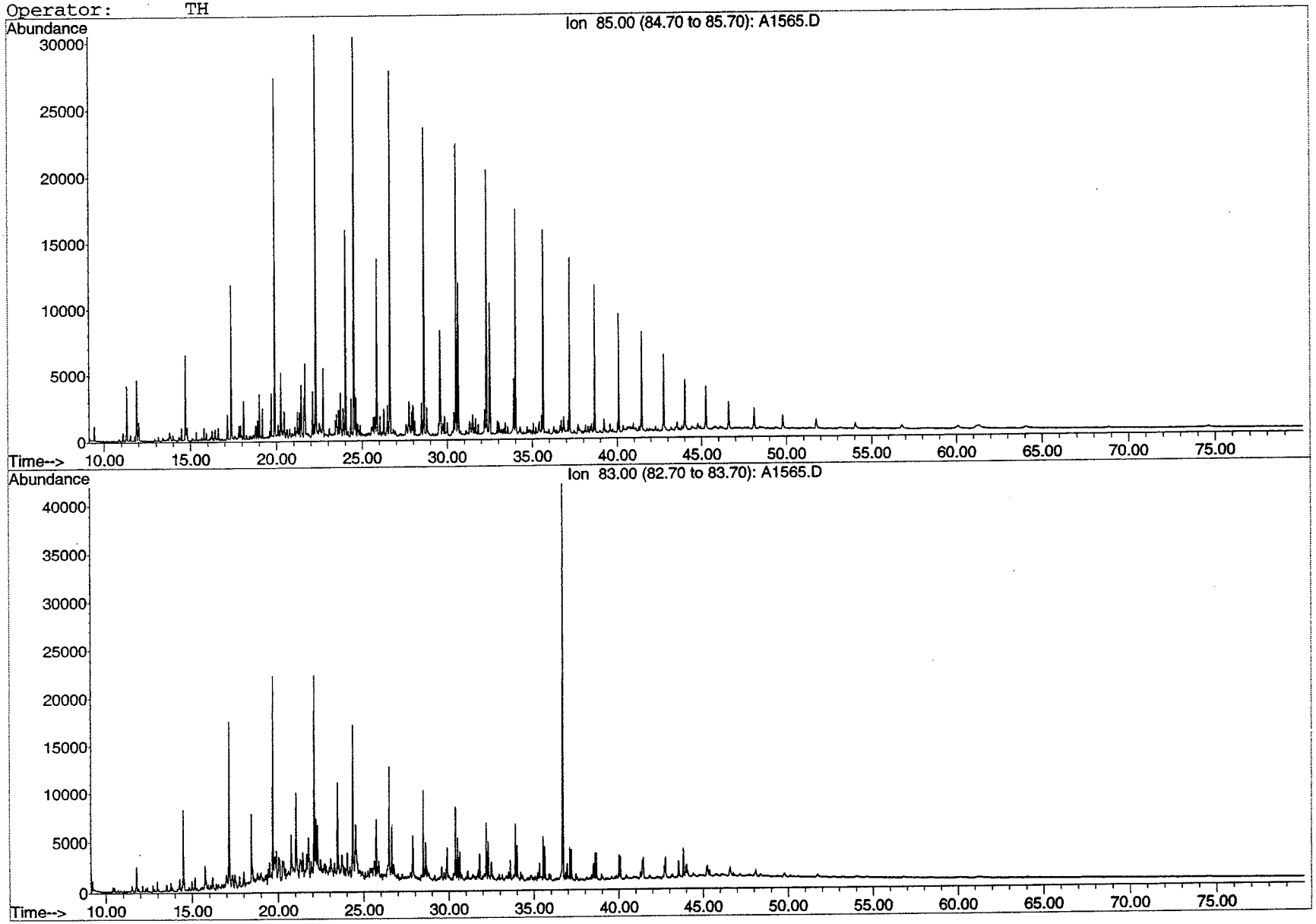


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1565.D
Date Acquired: 18 Feb 2003 8:08 am
Method File: BIO1SIM
Sample Name: U3752-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
GWP Tank (T192)
U3752

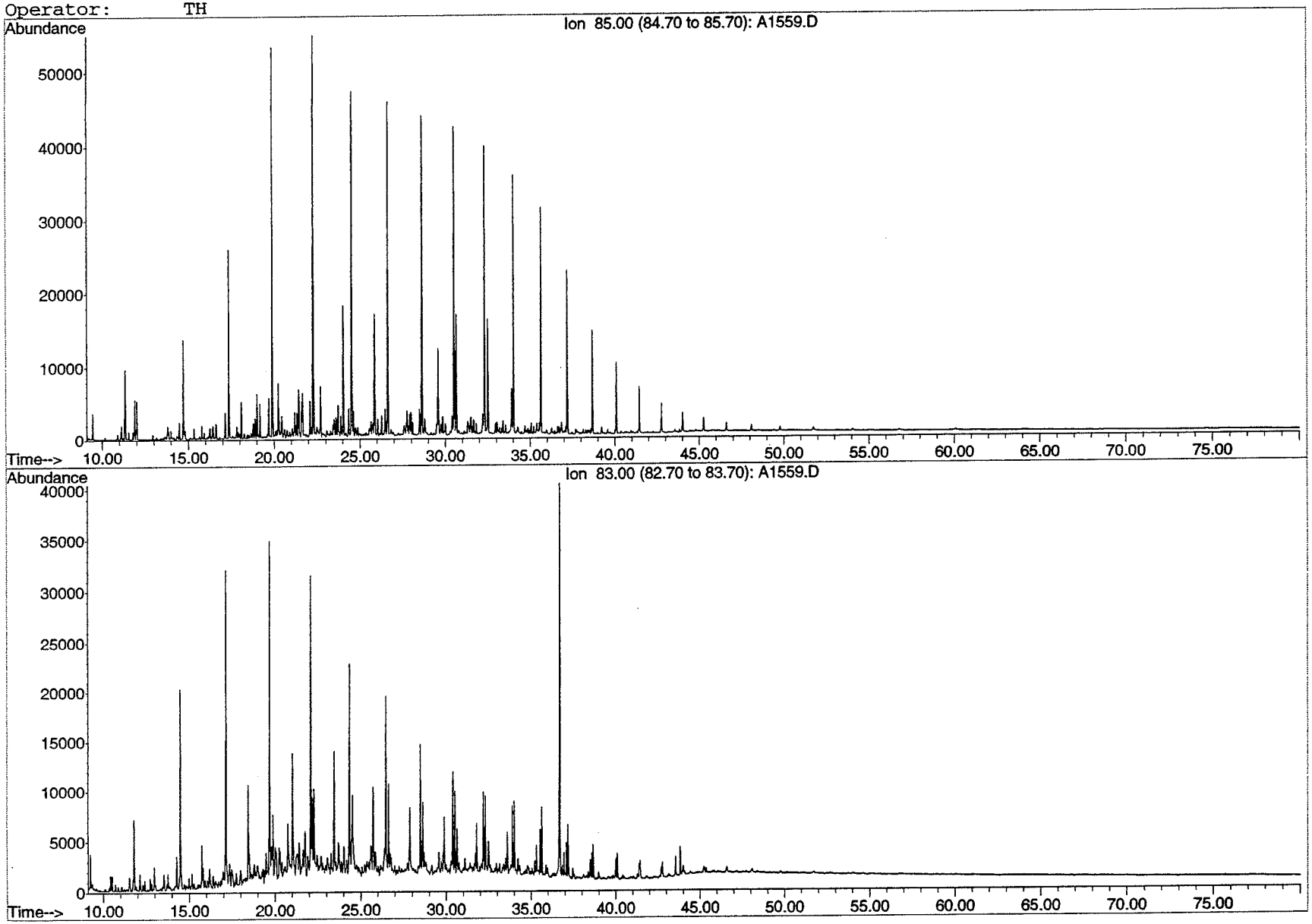


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

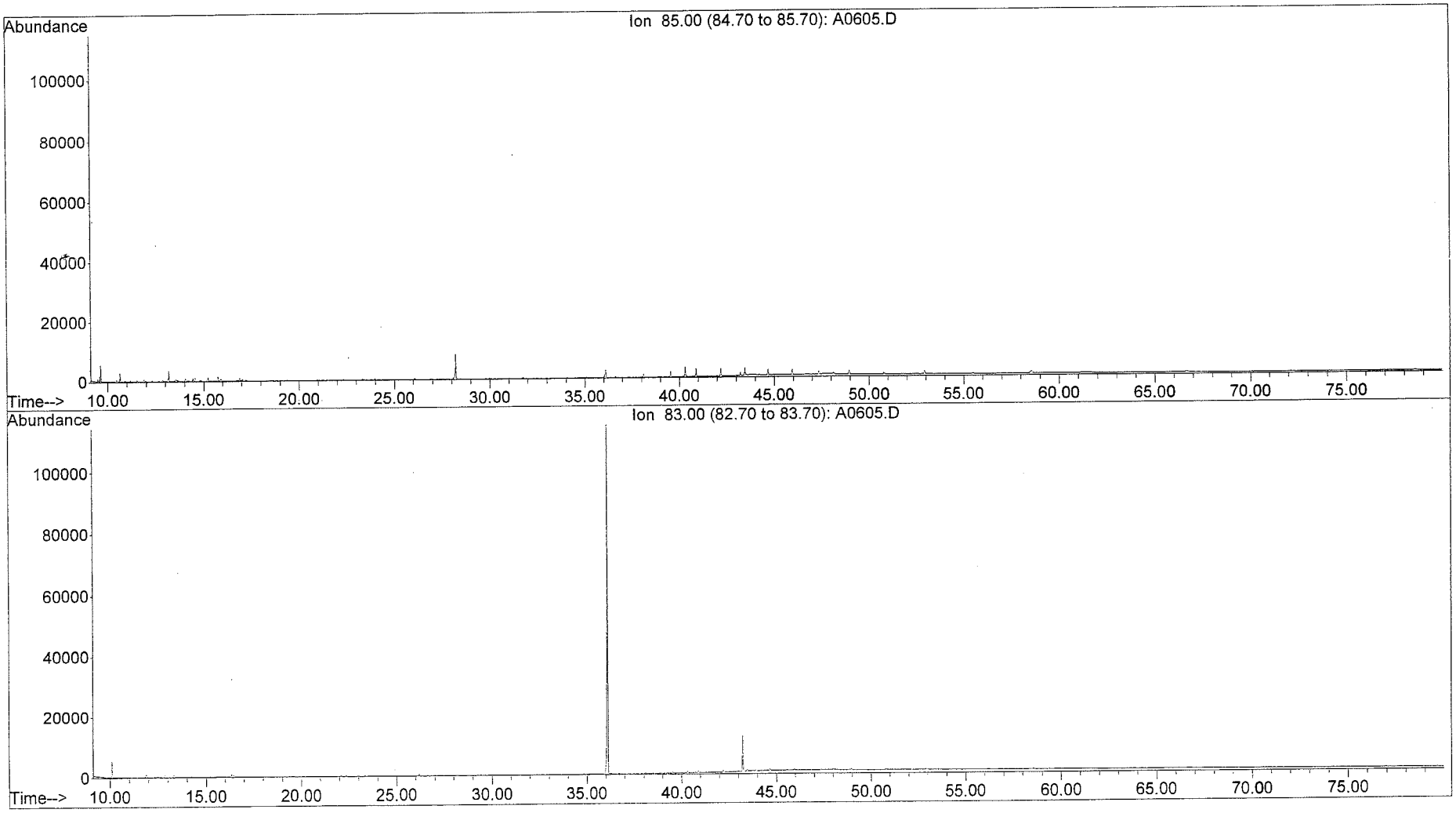
File: H:\A\DATA\SQA339\A1559.D
Date Acquired: 17 Feb 2003 11:00 pm
Method File: BIO1SIM
Sample Name: U 4515-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
SS-1-1202
U4515



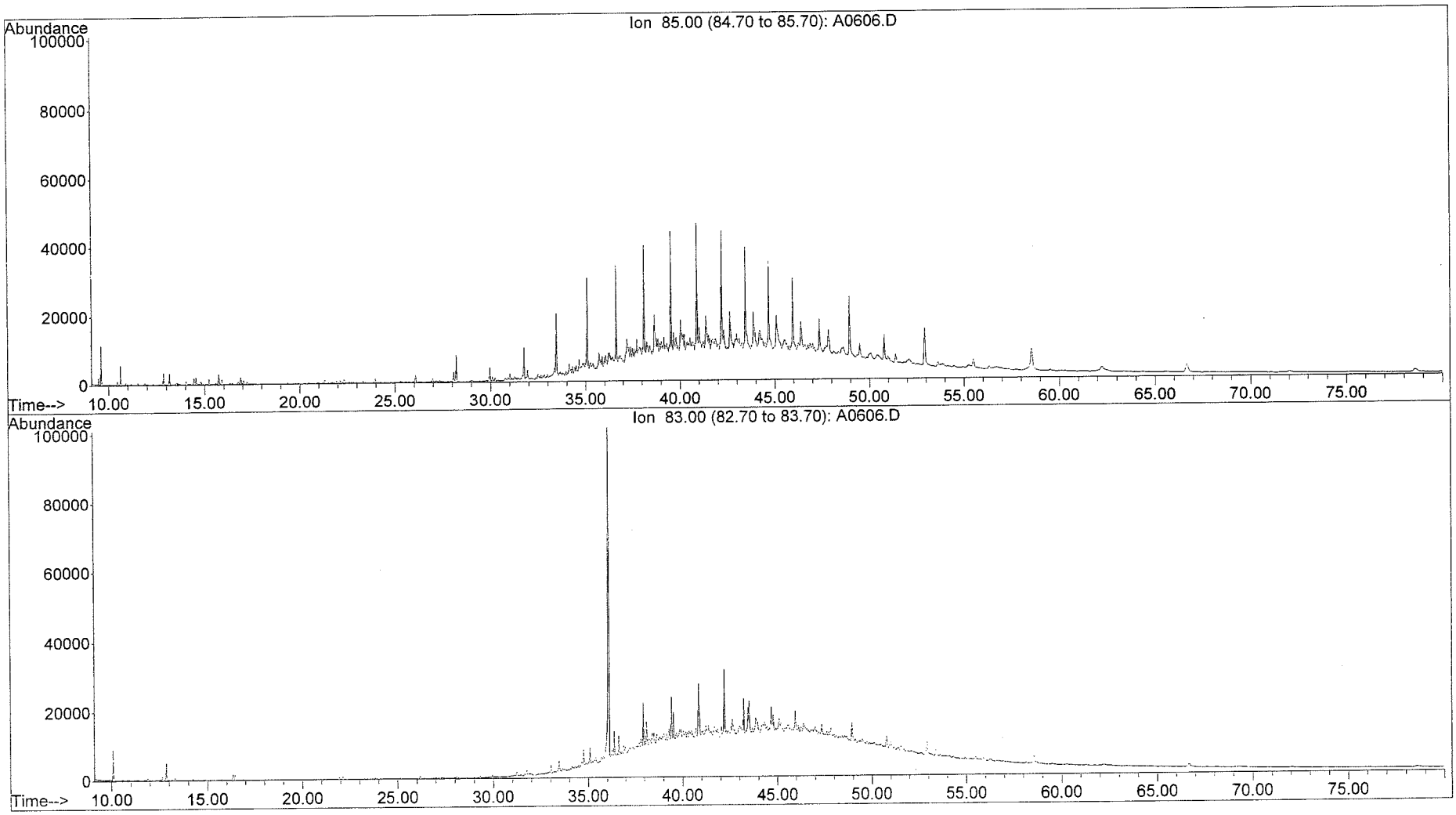
File : G:\A\DATA\SQA319\A0605.D
Operator : TH
Acquired : 13 Dec 2002 2:34 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB484PB-F1
Misc Info :
Vial Number: 9

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
AB484PB



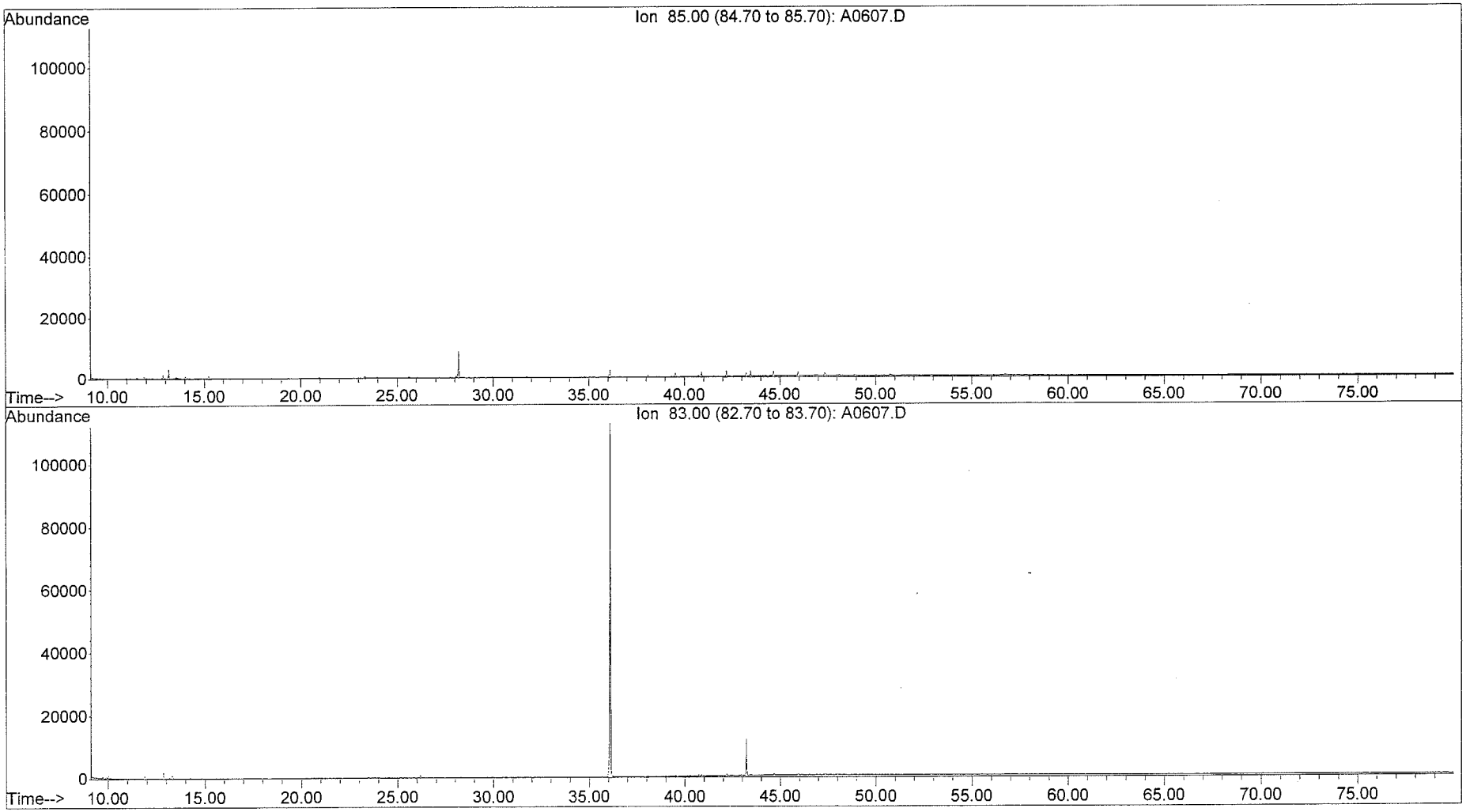
File : G:\A\DATA\SQA319\A0606.D
Operator : TH
Acquired : 13 Dec 2002 4:10 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB485PB-F1
Misc Info :
Vial Number: 10

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
AB485PB



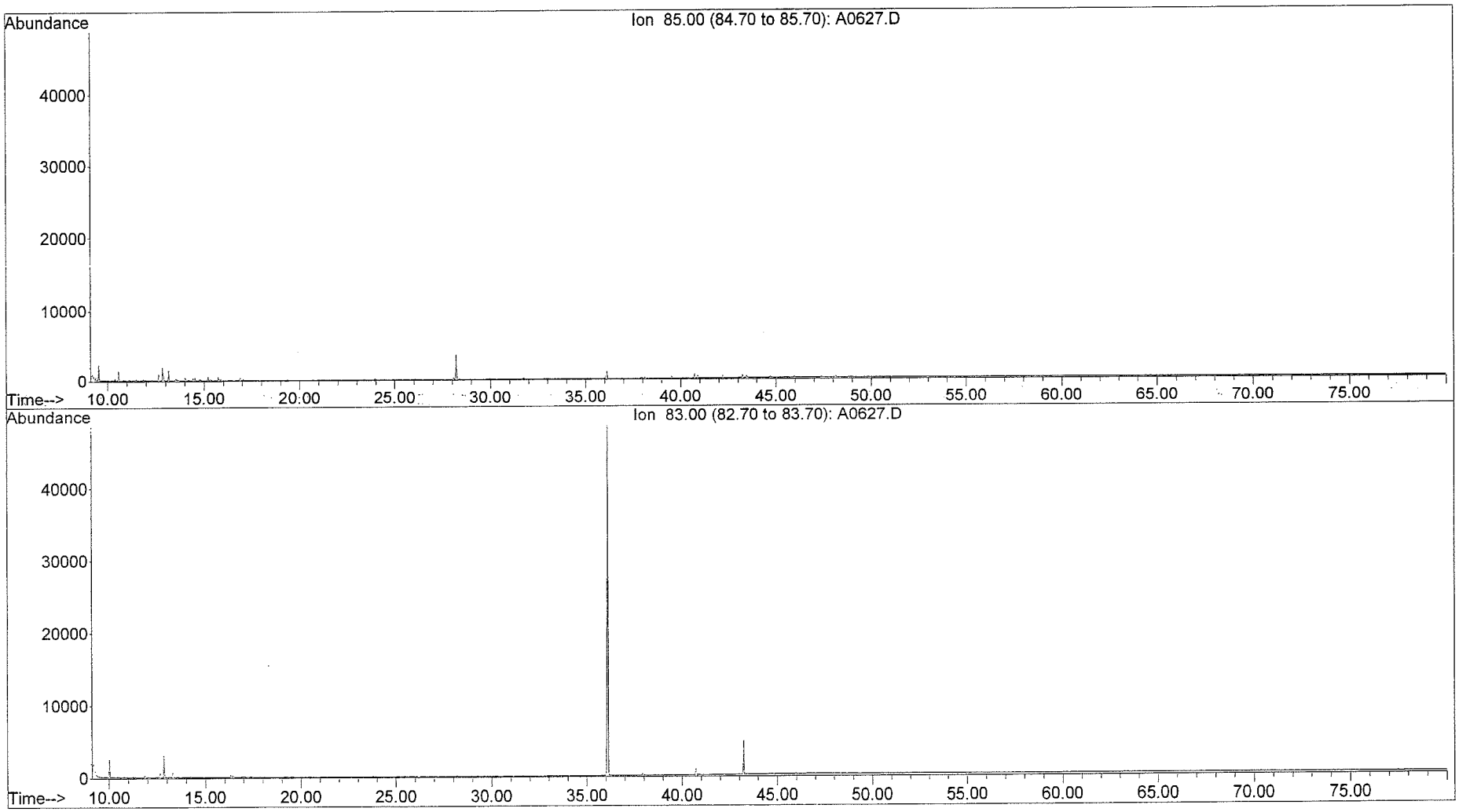
File : G:\A\DATA\SQA319\A0607.D
Operator : TH
Acquired : 13 Dec 2002 5:44 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB486LCS-F1
Misc Info :
Vial Number: 11

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
AB486LCS



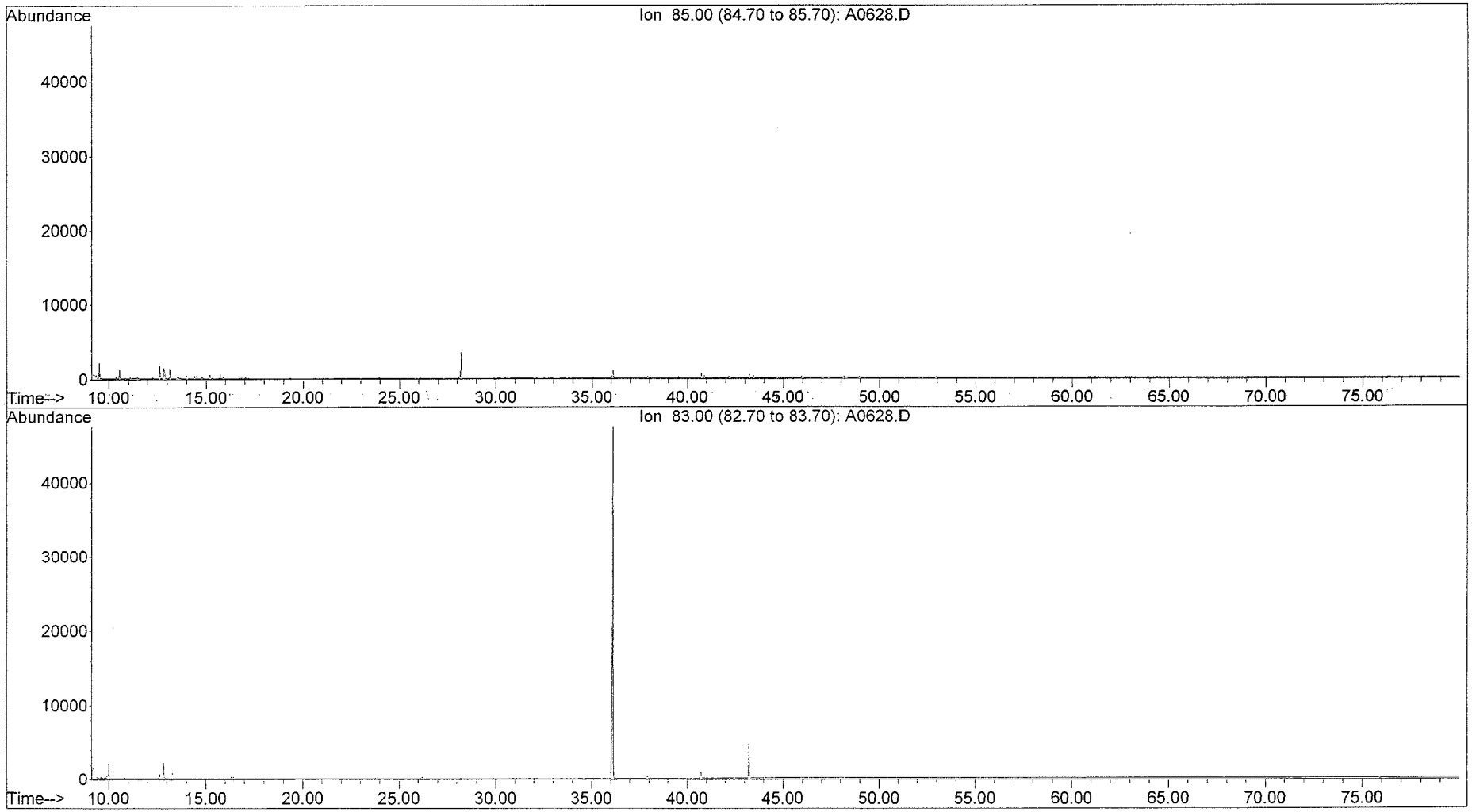
File : G:\A\DATA\SQA319\A0627.D
Operator : TH
Acquired : 14 Dec 2002 12:58 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB489PB-F1
Misc Info :
Vial Number: 31

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
AB489PB



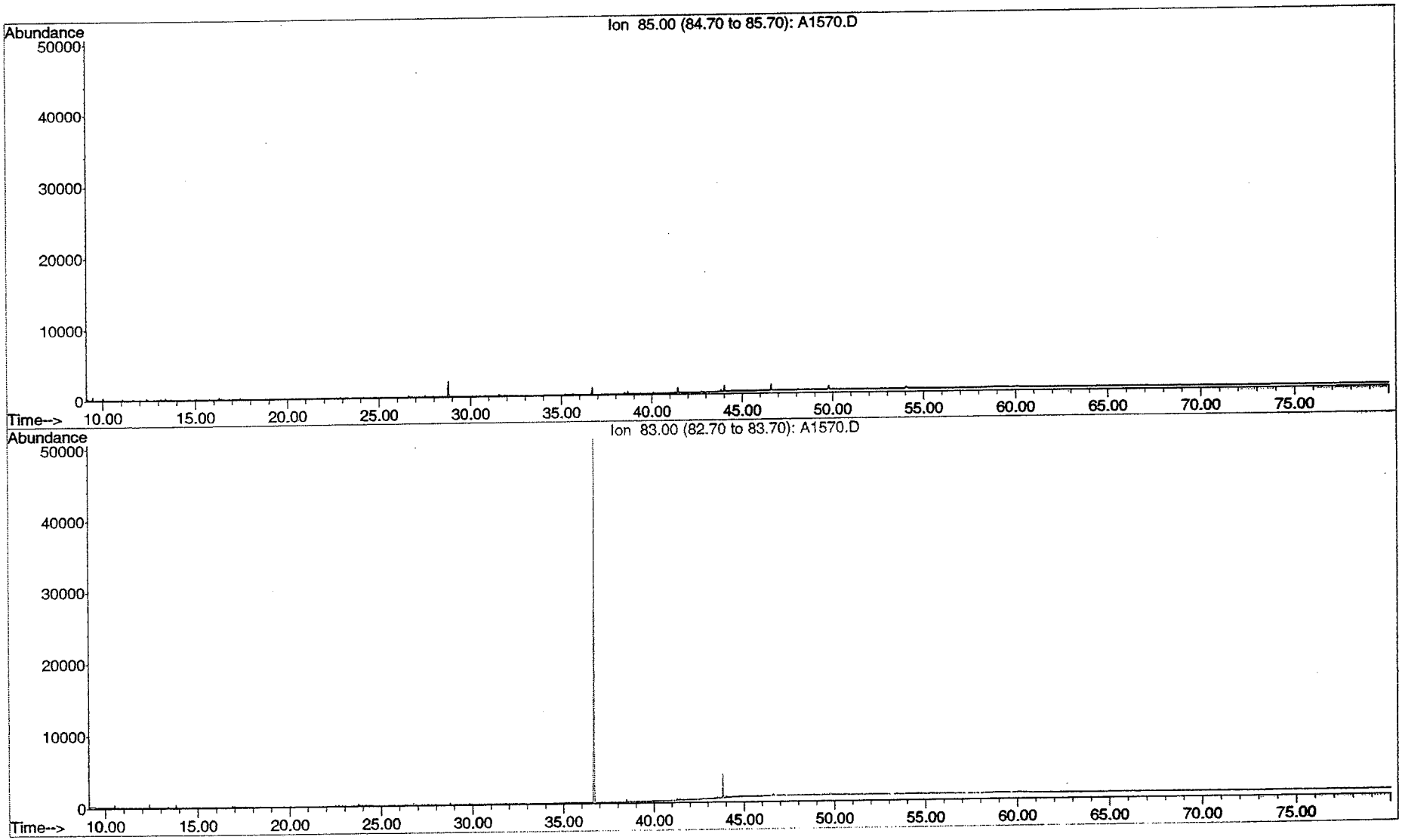
File : G:\A\DATA\SQA319\A0628.D
Operator : TH
Acquired : 14 Dec 2002 2:33 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB490LCS-F1
Misc Info :
Vial Number: 32

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
AB490LCS



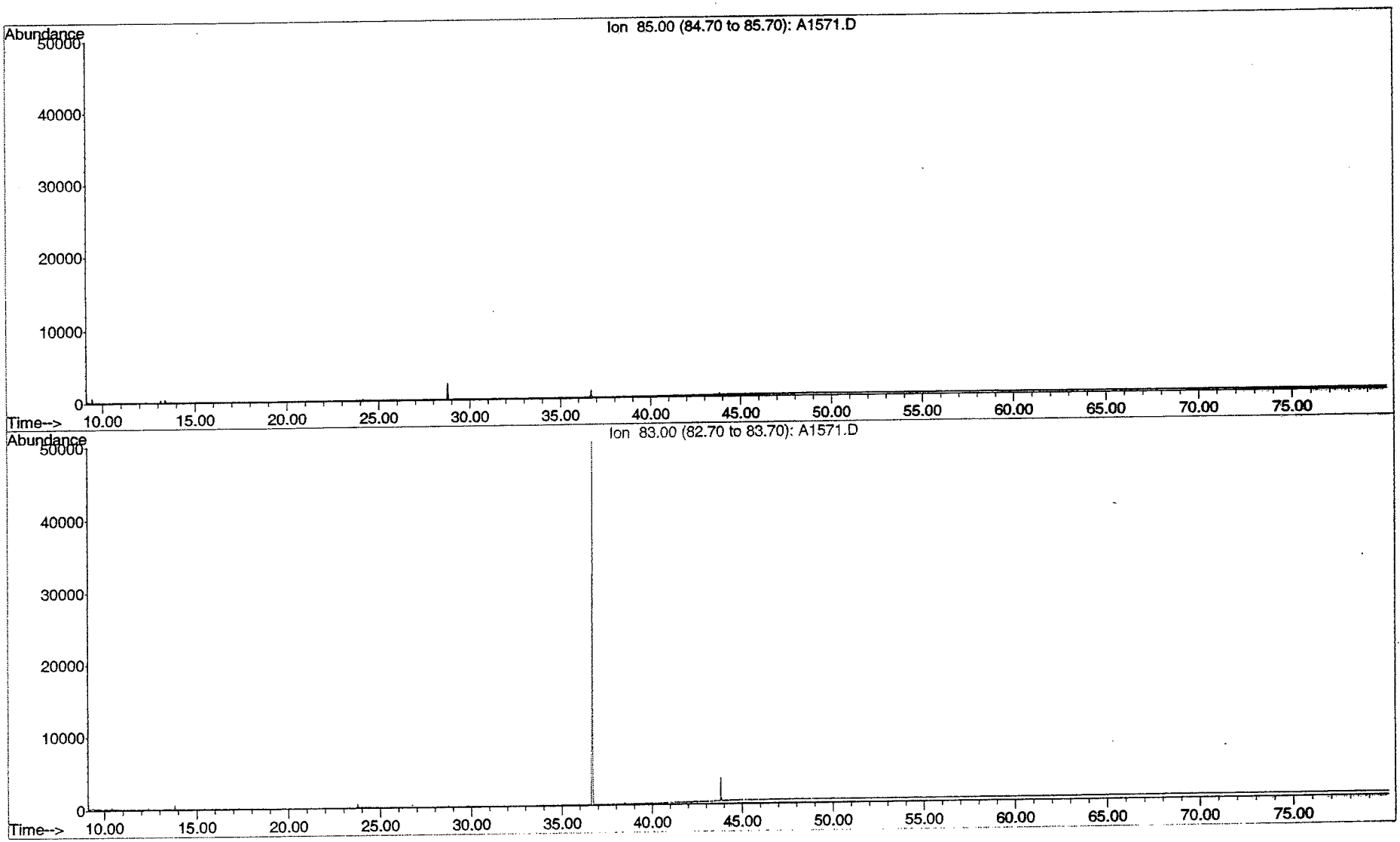
File : H:\A\DATA\SQA339\A1570.D
Operator : TH
Acquired : 18 Feb 2003 3:38 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB851PB
Misc Info :
Vial Number: 33

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
AB851PB



File : H:\A\DATA\SQA339\A1571.D
Operator : TH
Acquired : 18 Feb 2003 5:07 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB852LCS
Misc Info :
Vial Number: 34

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
AB852LCS

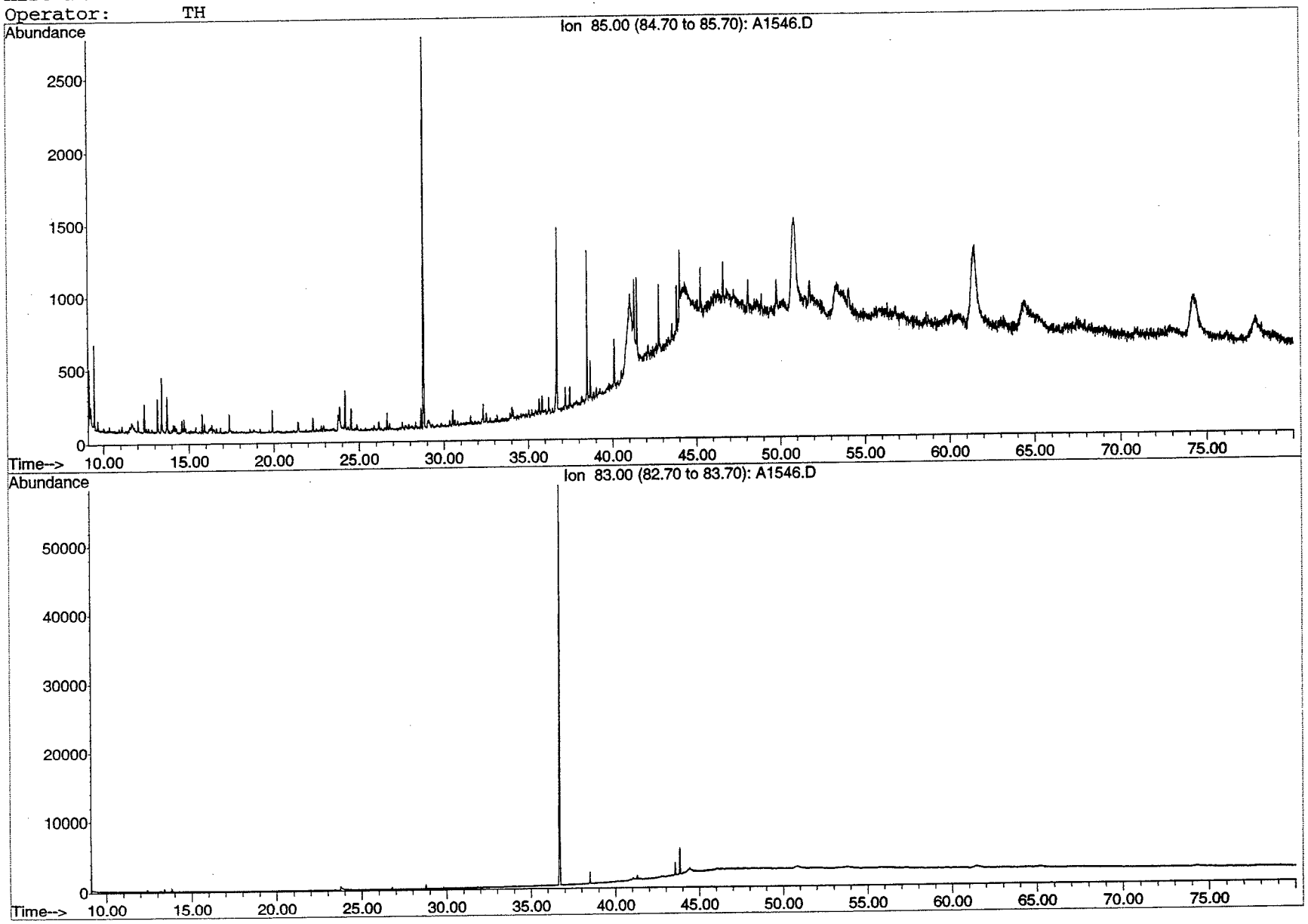


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1546.D
Date Acquired: 17 Feb 2003 3:32 am
Method File: BIO1SIM
Sample Name: BB142PB-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB142PB

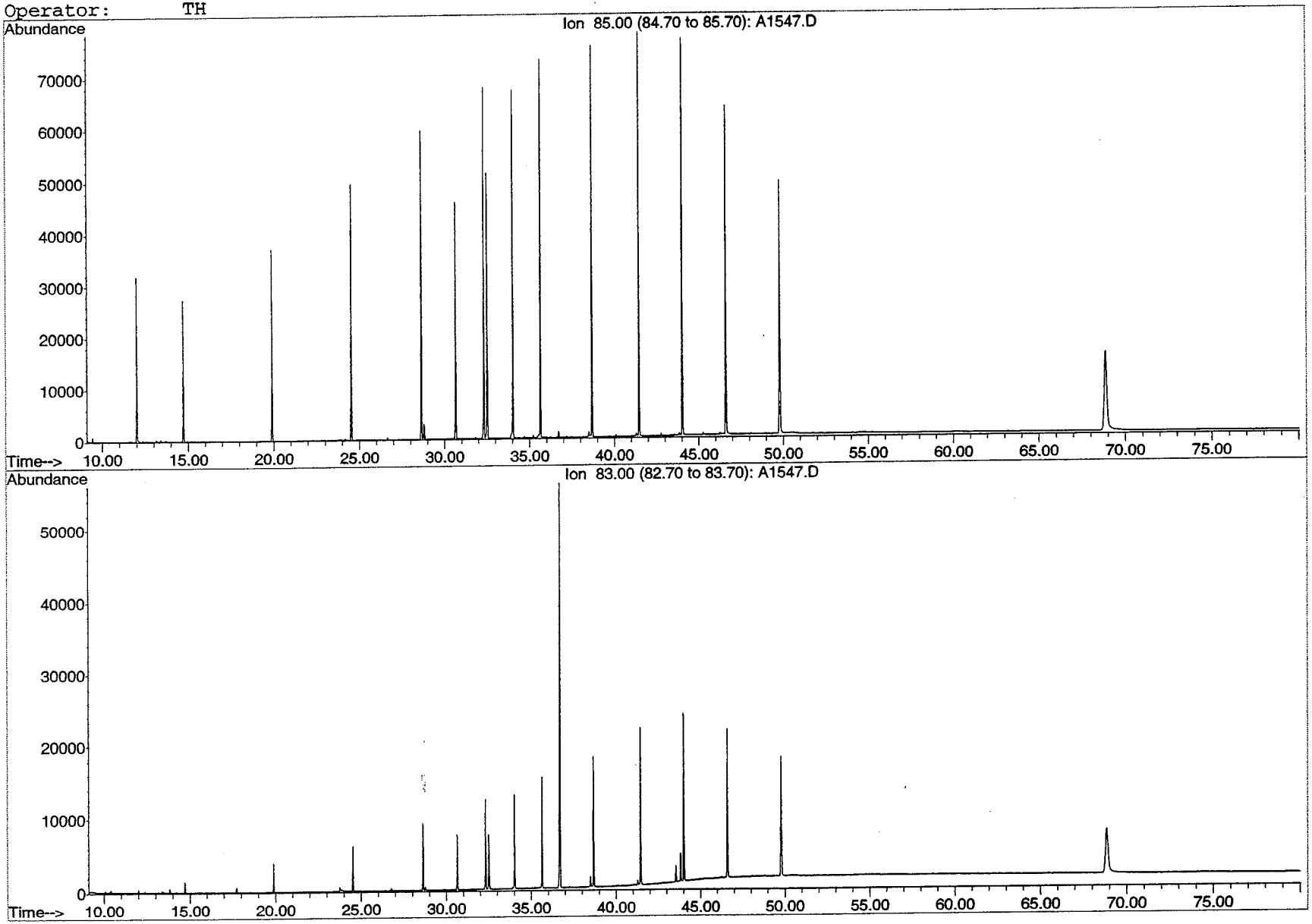


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1547.D
Date Acquired: 17 Feb 2003 5:02 am
Method File: BIO1SIM
Sample Name: BB143LCS-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB143LCS

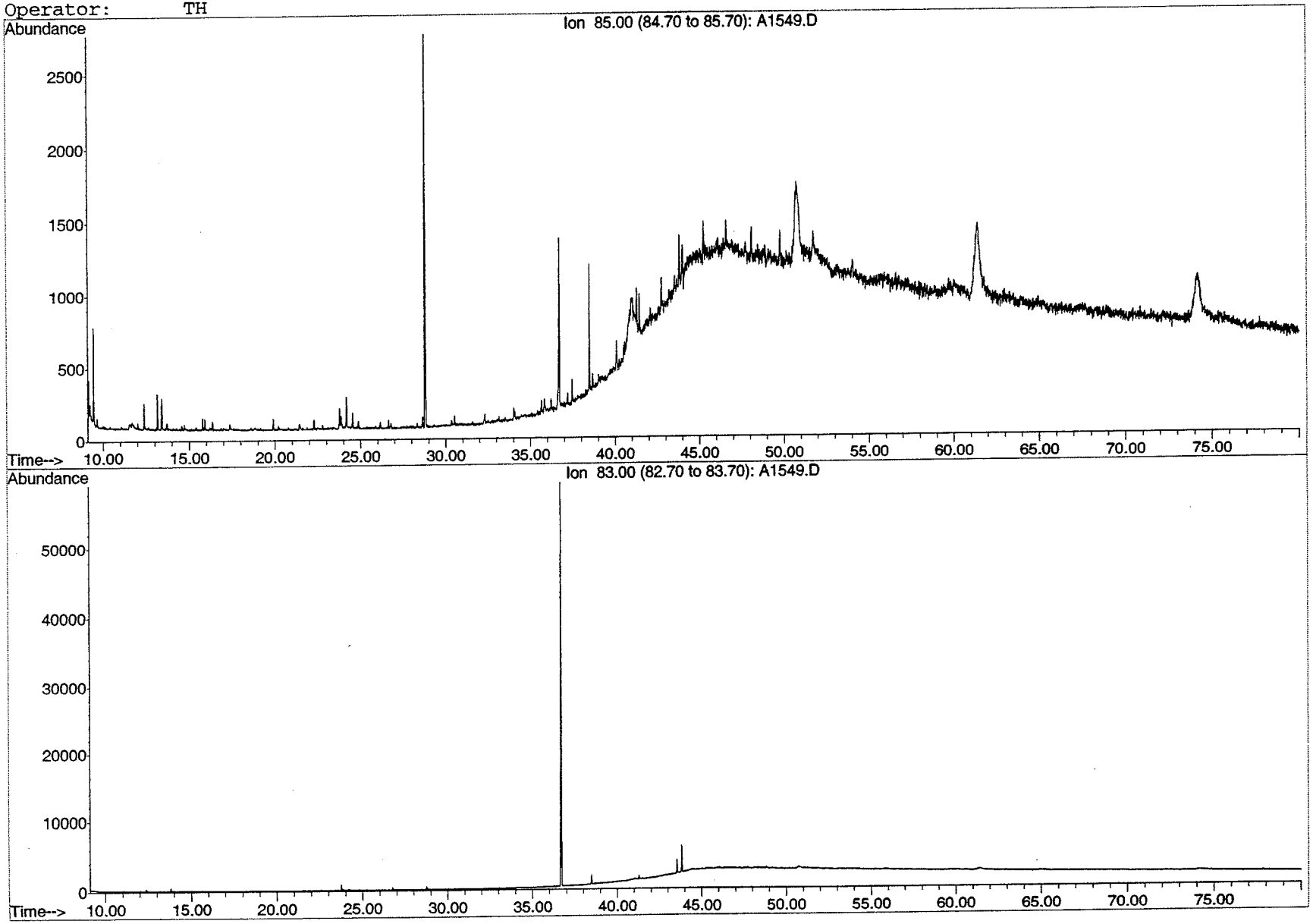


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1549.D
Date Acquired: 17 Feb 2003 8:01 am
Method File: BIO1SIM
Sample Name: BB146PB-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB146PB

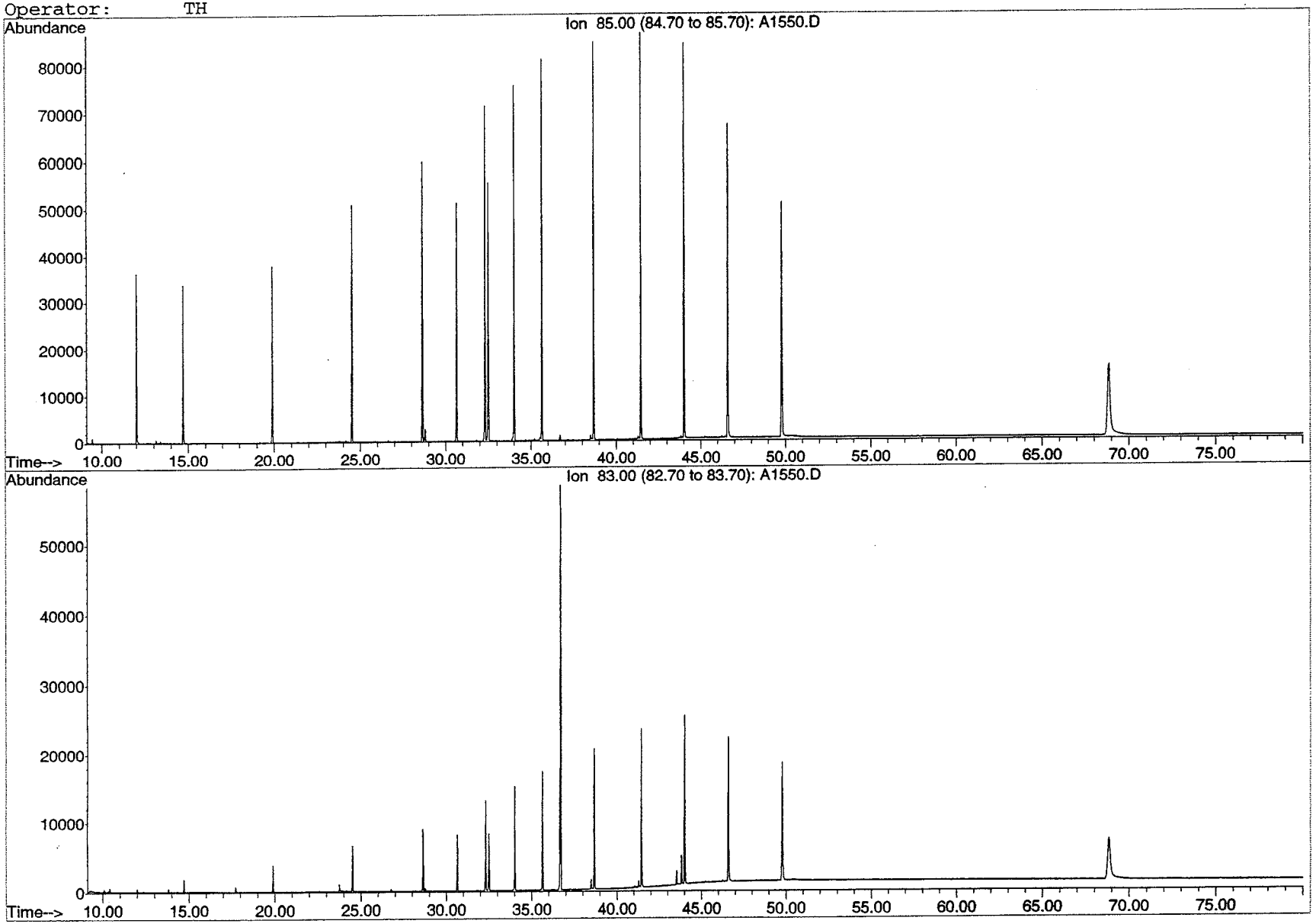


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1550.D
Date Acquired: 17 Feb 2003 9:30 am
Method File: BIO1SIM
Sample Name: BB147LCS-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB147LCS

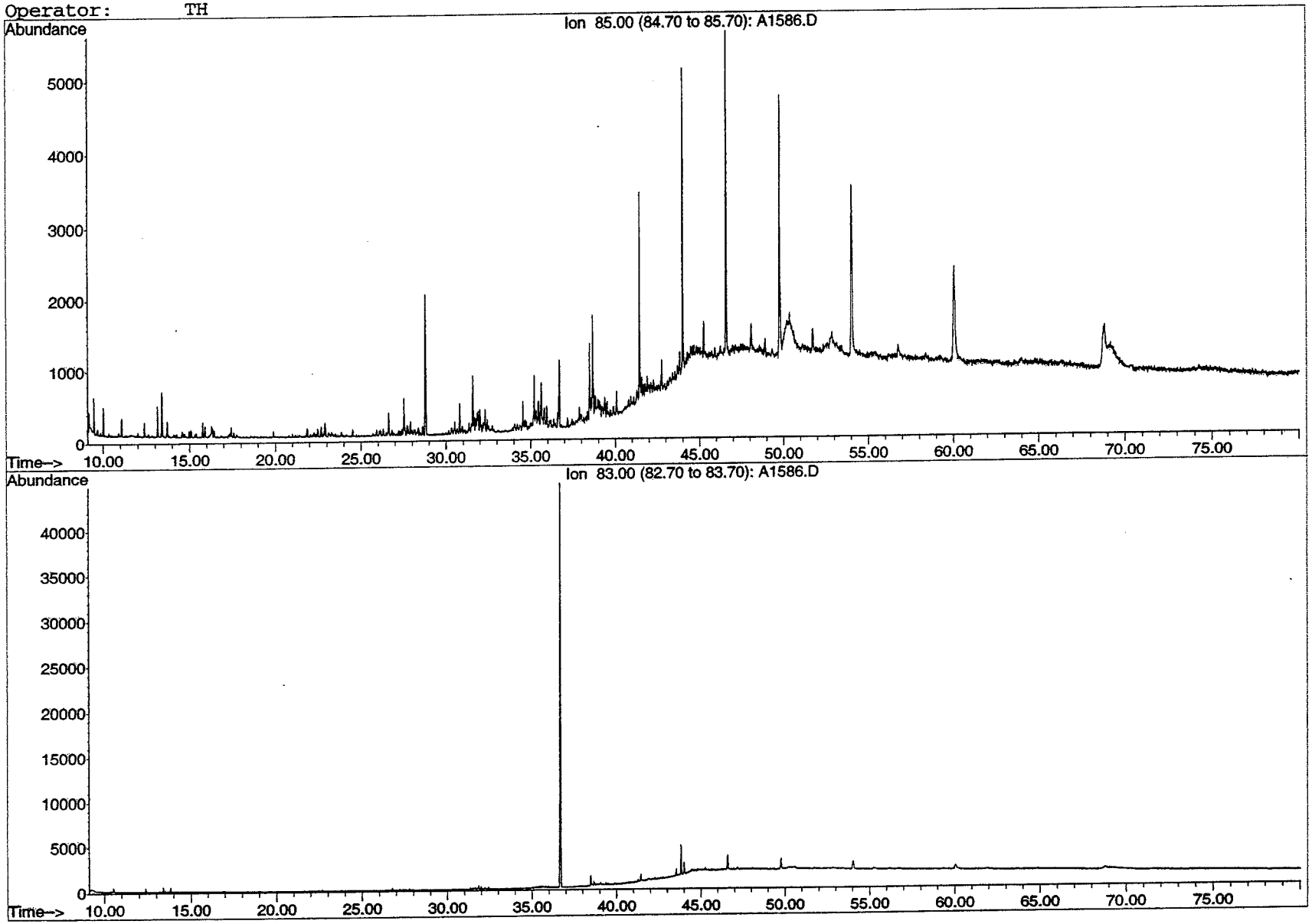


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1586.D
Date Acquired: 19 Feb 2003 7:00 pm
Method File: BIO1SIM
Sample Name: BB278PB-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB278PB

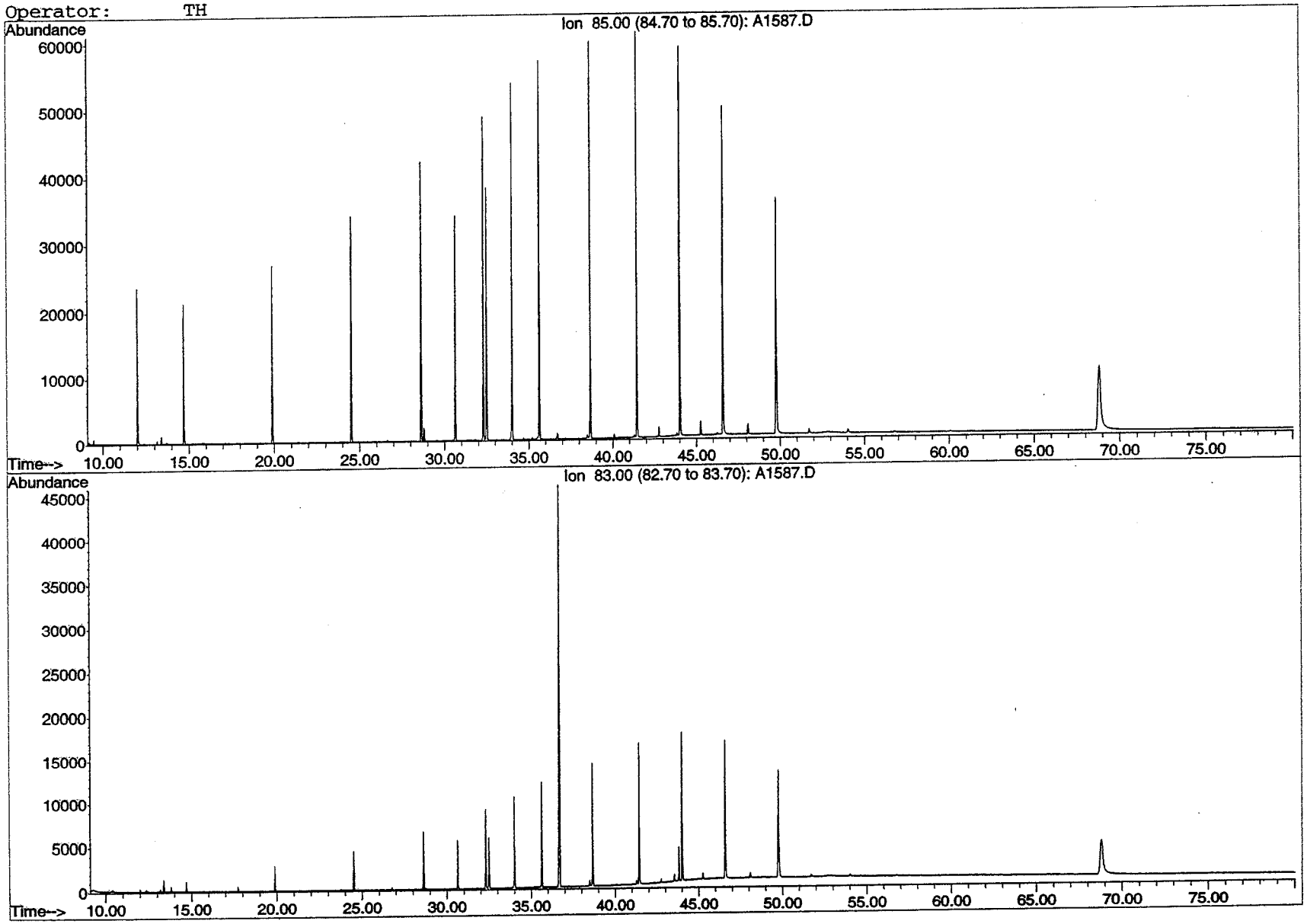


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1587.D
Date Acquired: 19 Feb 2003 8:30 pm
Method File: BIO1SIM
Sample Name: BB279LCS-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB279LCS

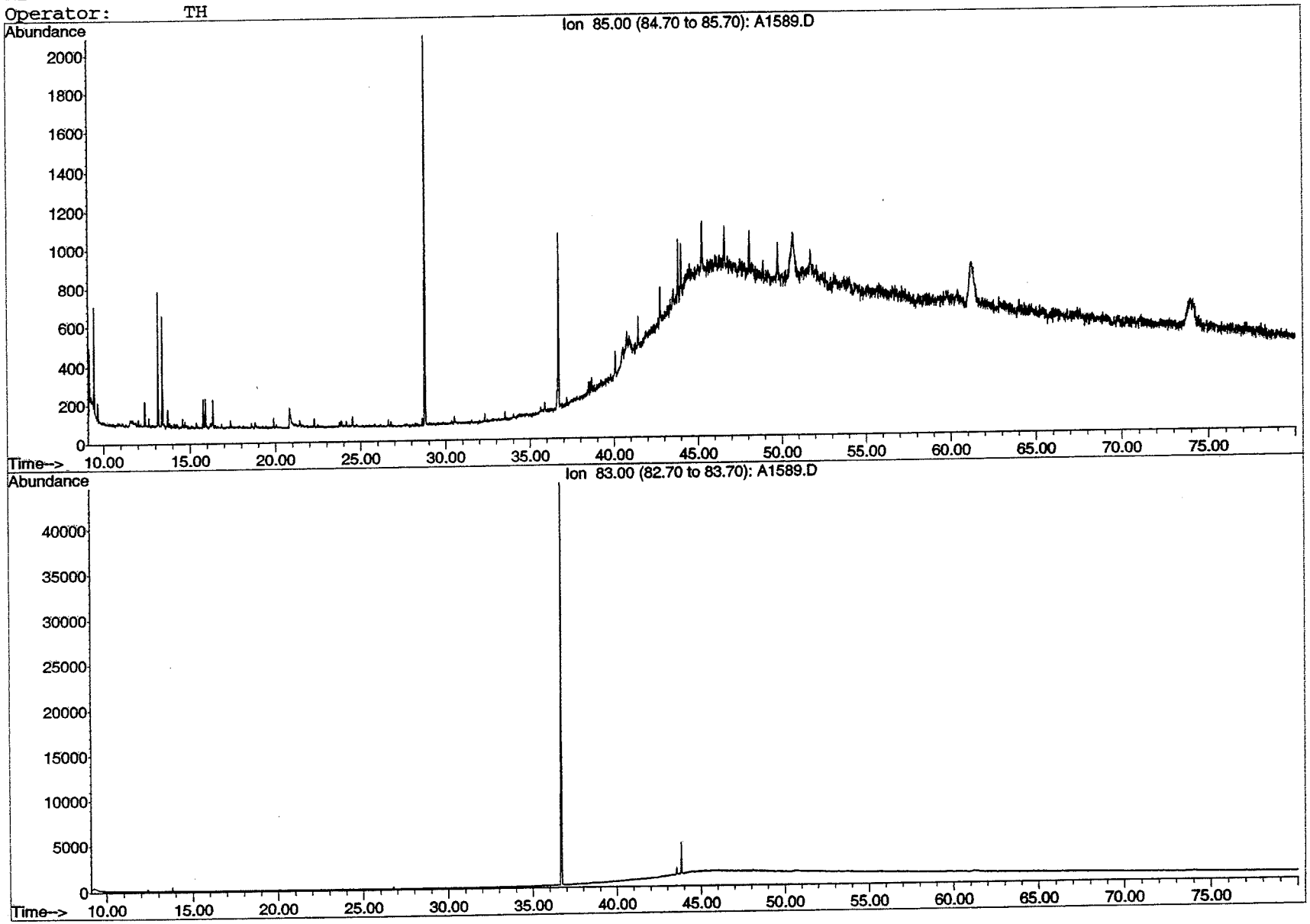


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1589.D
Date Acquired: 19 Feb 2003 11:31 pm
Method File: BIO1SIM
Sample Name: BB362PB-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB362PB

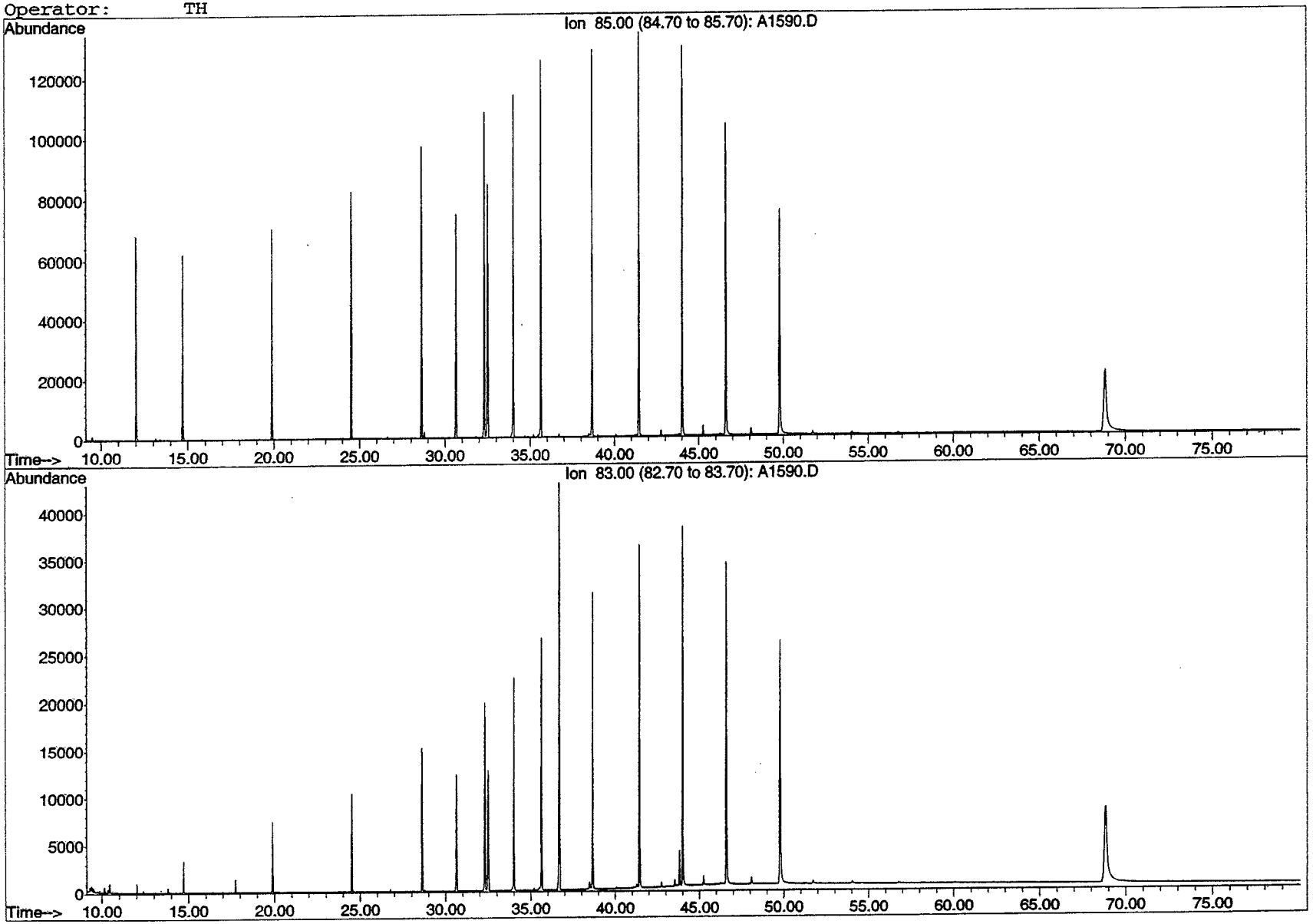


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1590.D
Date Acquired: 20 Feb 2003 1:02 am
Method File: BIO1SIM
Sample Name: BB363LCS-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB363LCS

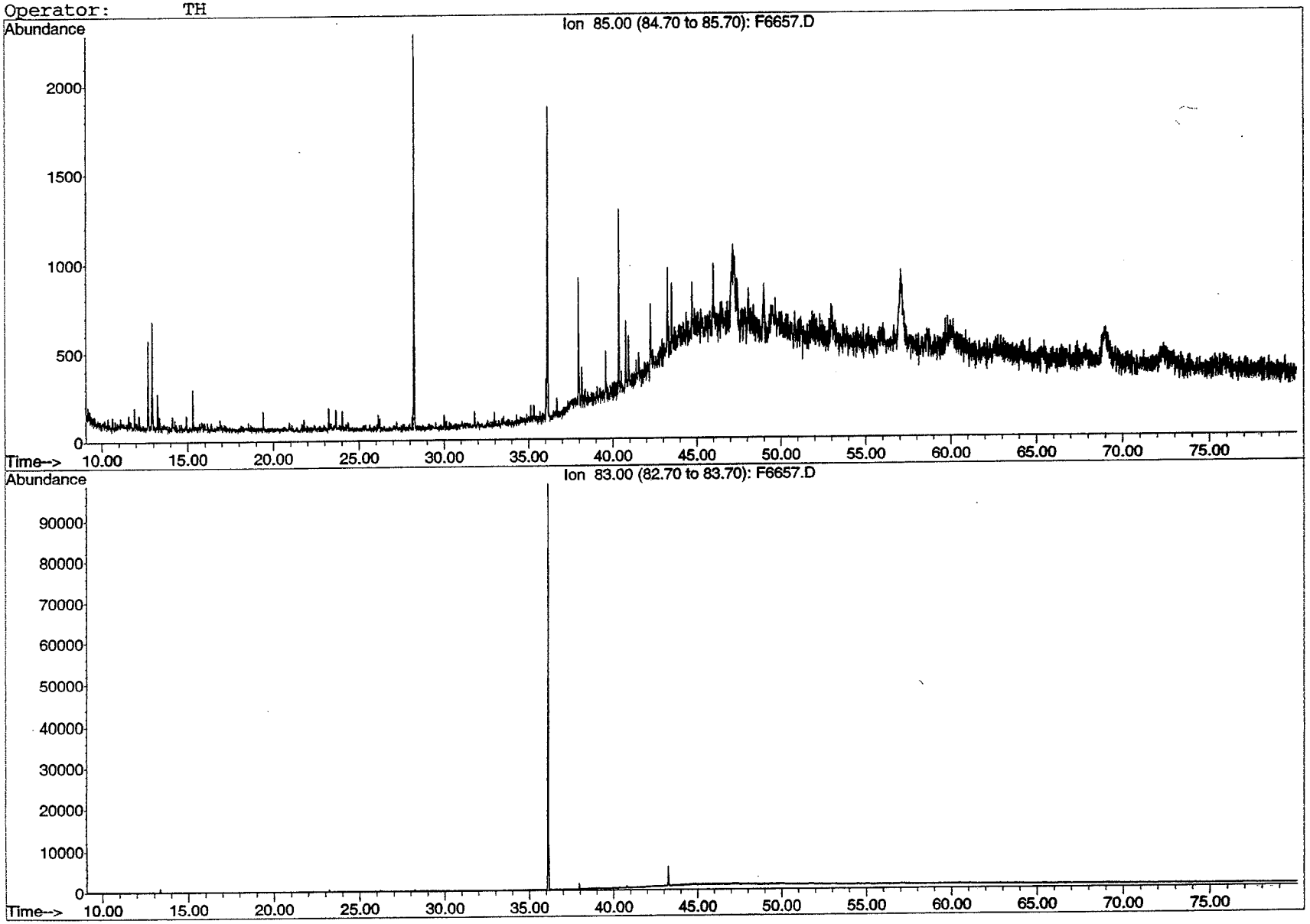


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6657.D
Date Acquired: 5 Mar 2003 5:40 am
Method File: BIO1SIM
Sample Name: BB426PB-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB426PB

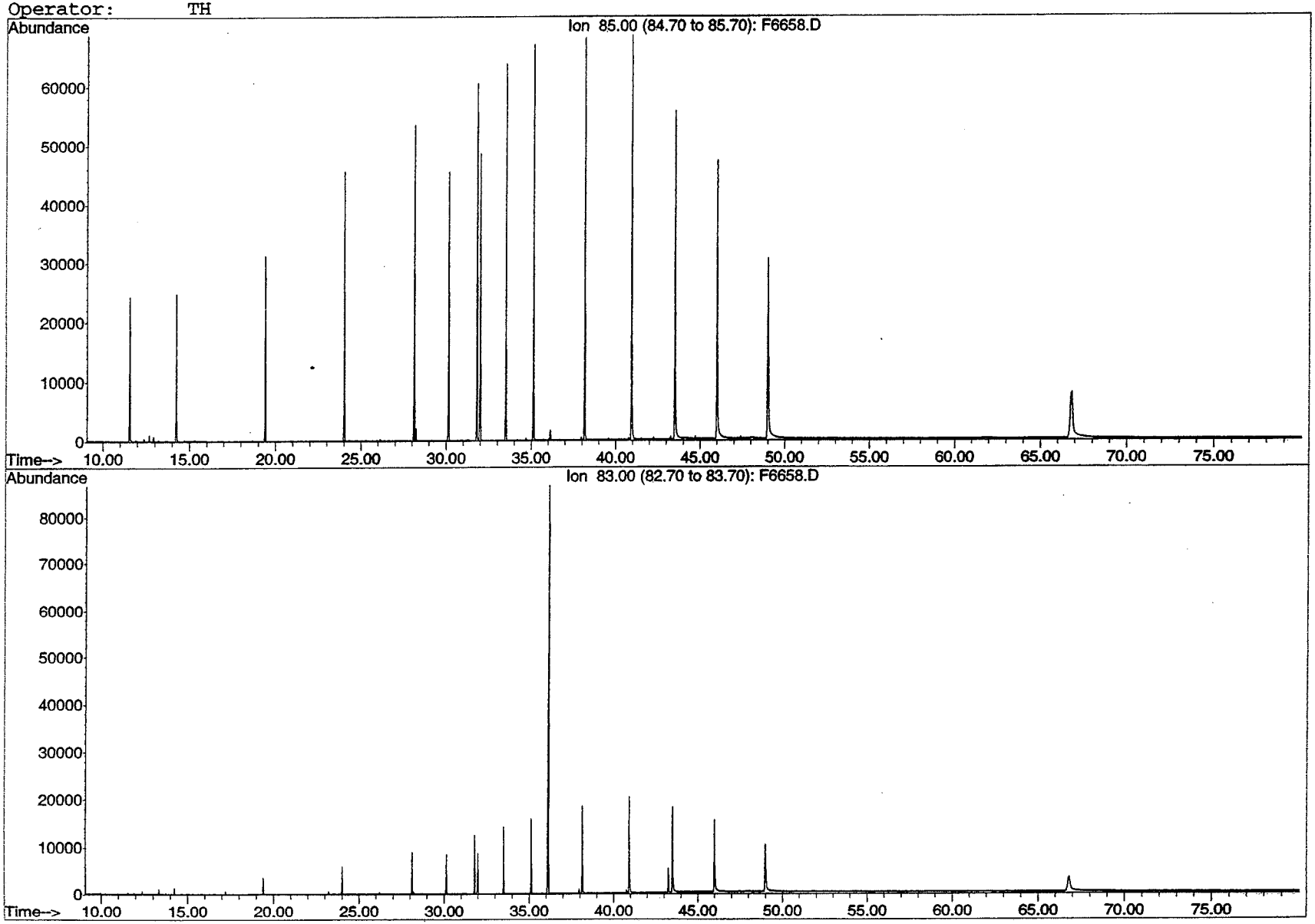


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6658.D
Date Acquired: 5 Mar 2003 7:13 am
Method File: BIO1SIM
Sample Name: BB427LCS-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB427LCS

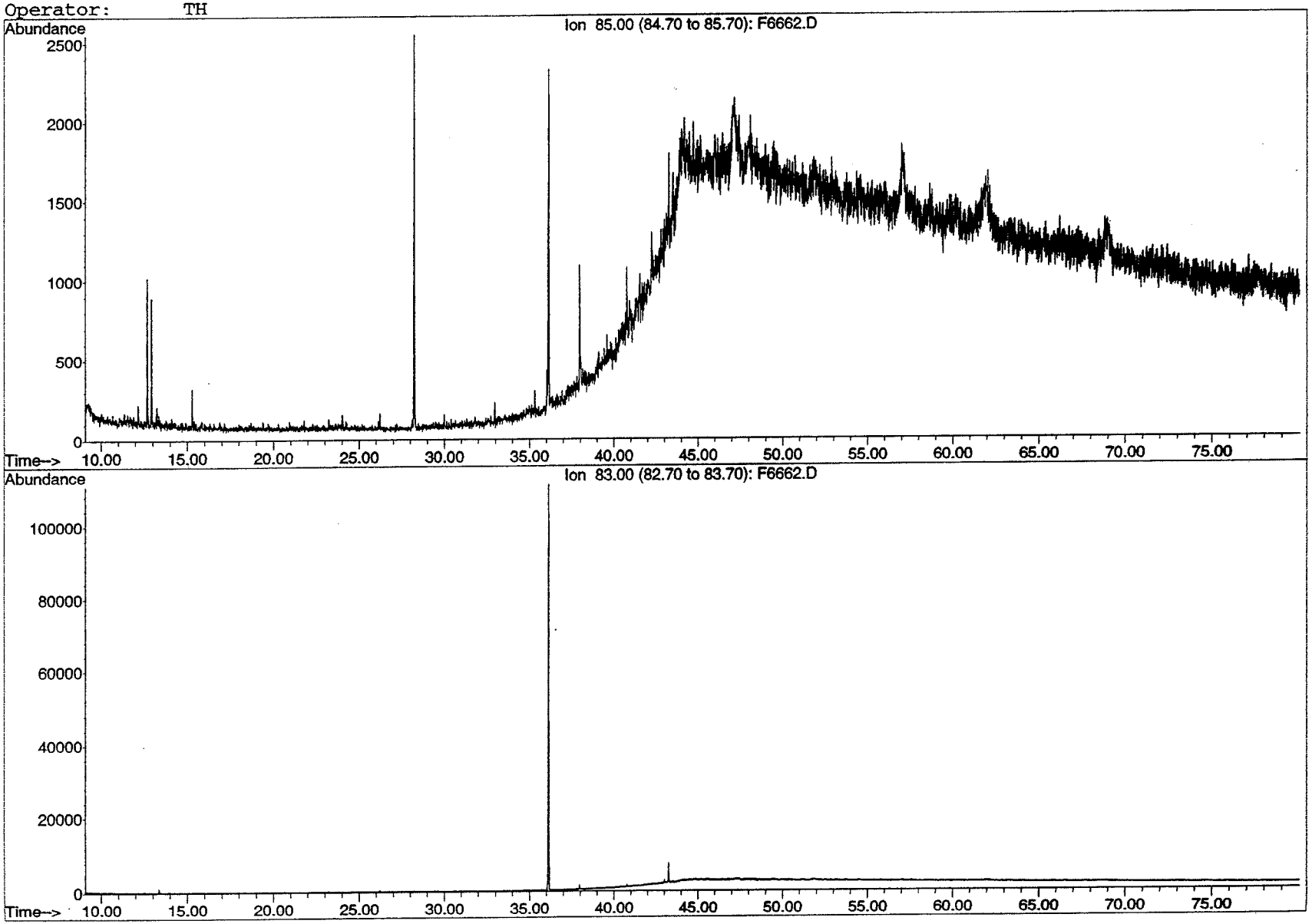


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6662.D
Date Acquired: 5 Mar 2003 1:24 pm
Method File: BIO1SIM
Sample Name: BB501PB-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Procedural Blank
BB501PB

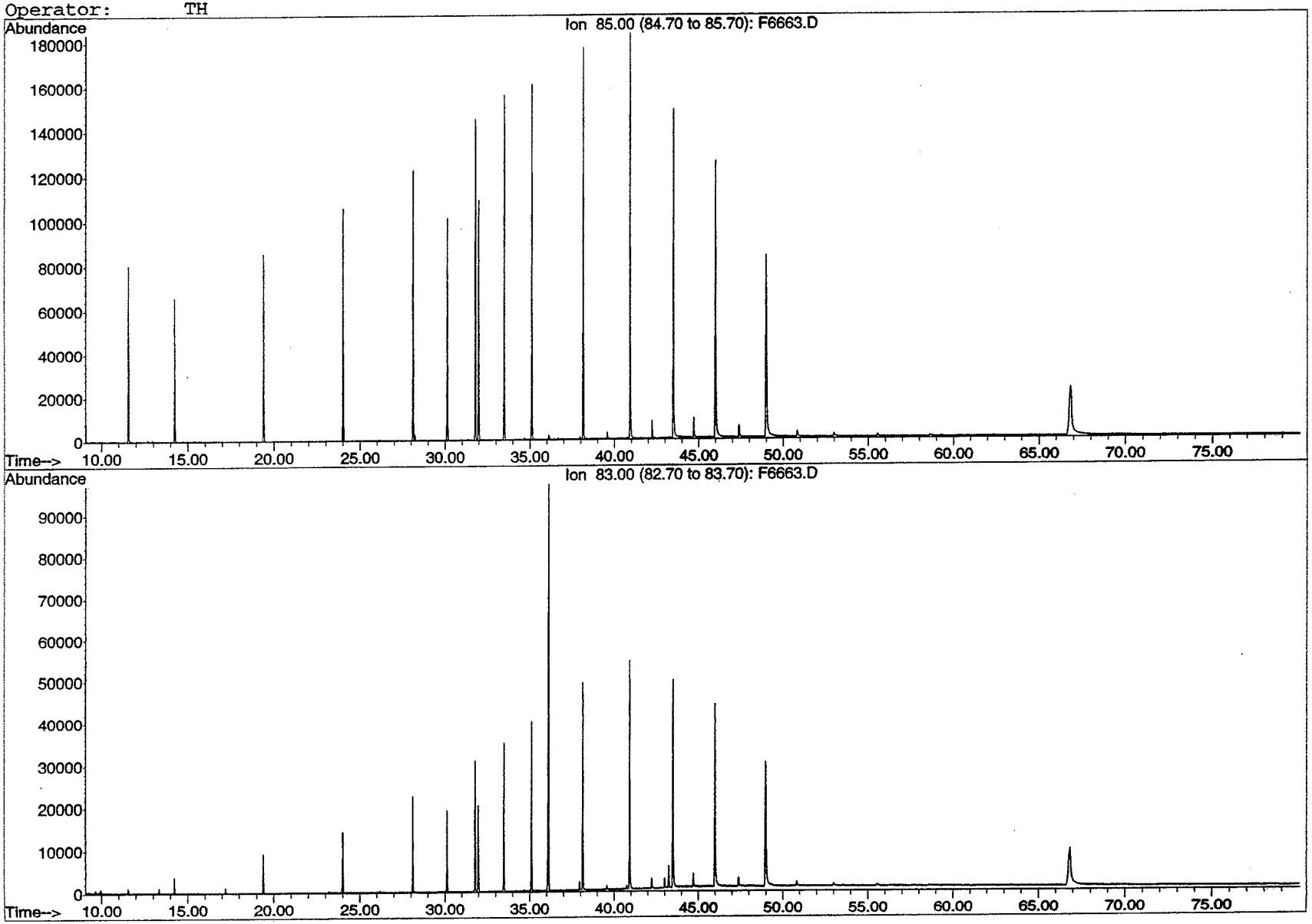


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

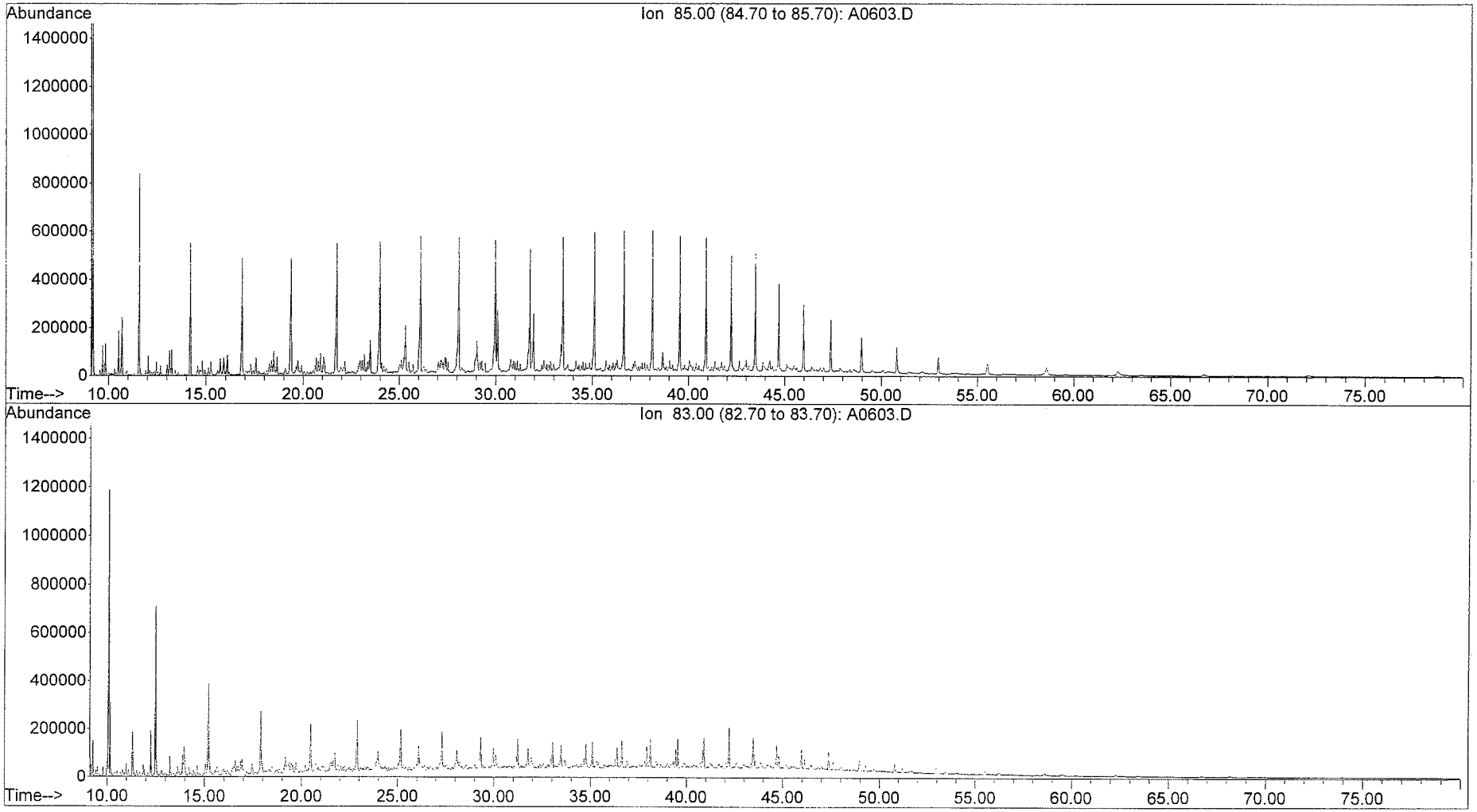
File: H:\F\DATA\SQF171\F6663.D
Date Acquired: 5 Mar 2003 2:56 pm
Method File: BIO1SIM
Sample Name: BB478LCS-D-F1
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Laboratory Control Sample
BB478LCS



File : G:\A\DATA\SQA319\A0603.D
Operator : TH
Acquired : 12 Dec 2002 11:23 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: FX46 NSC
Misc Info :
Vial Number: 7

Normal Alkanes and Alkylcyclohexanes
Reference Crude Oil
FX46

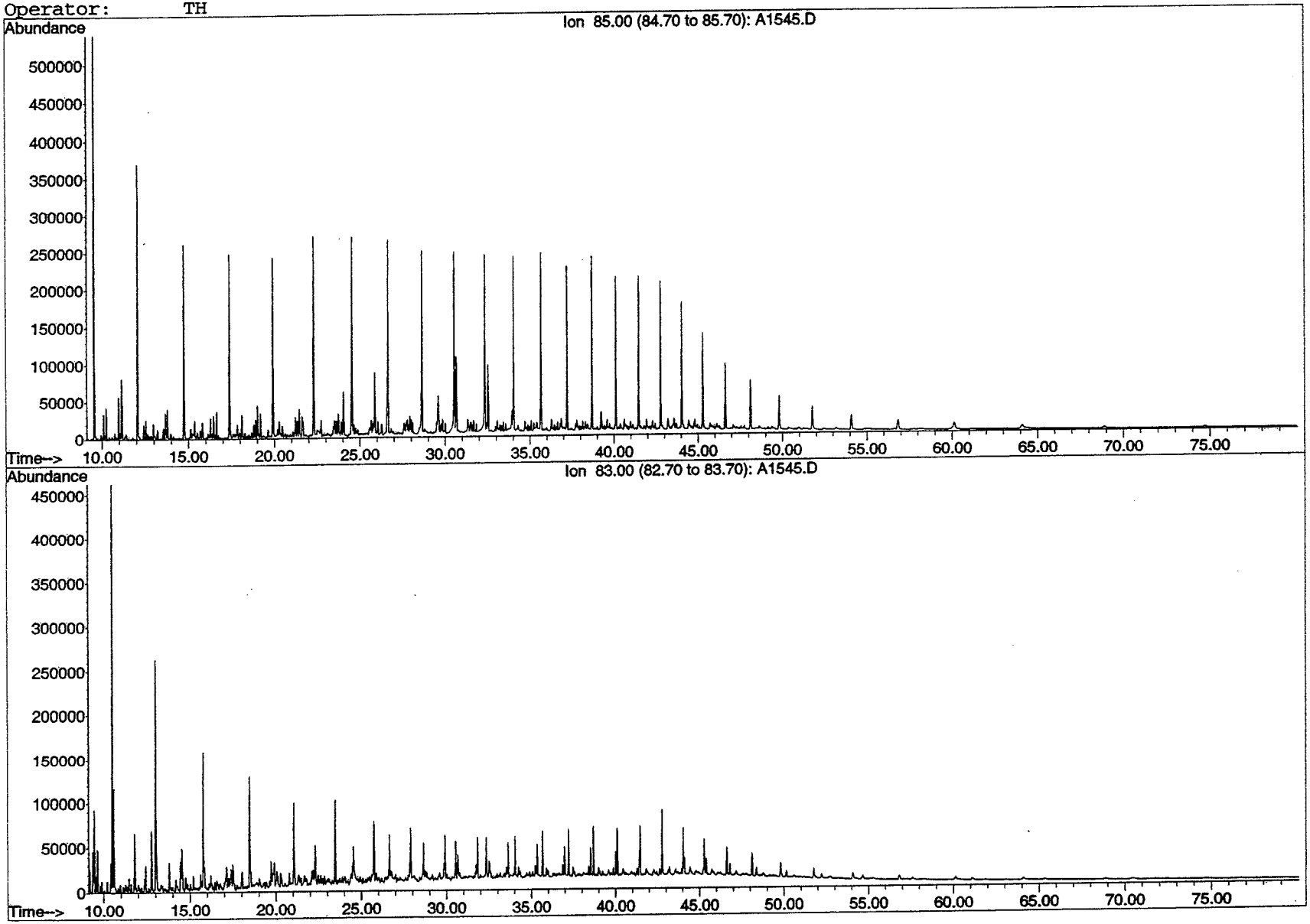


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1545.D
Date Acquired: 17 Feb 2003 2:01 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Reference Crude Oil
FX46

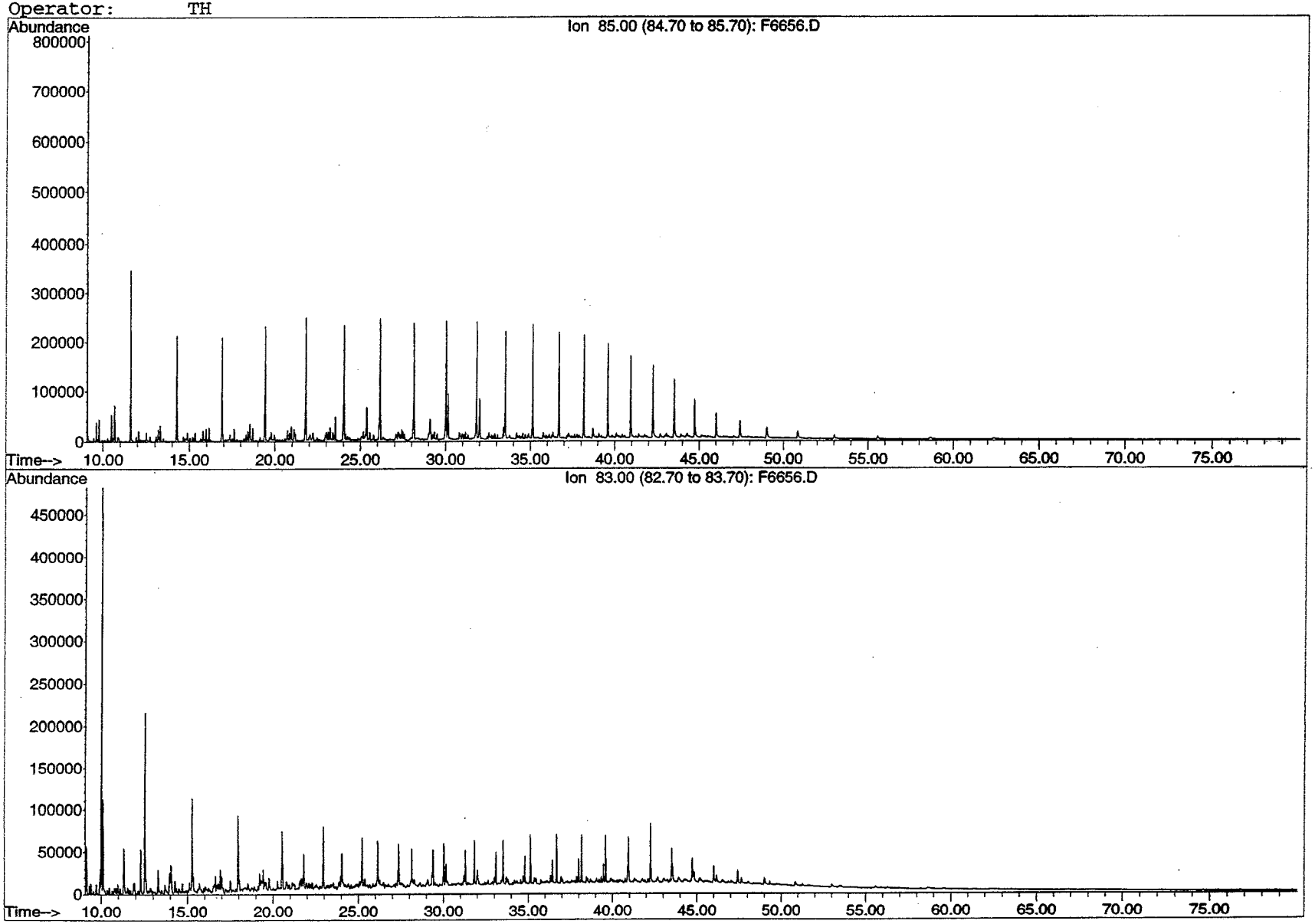


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

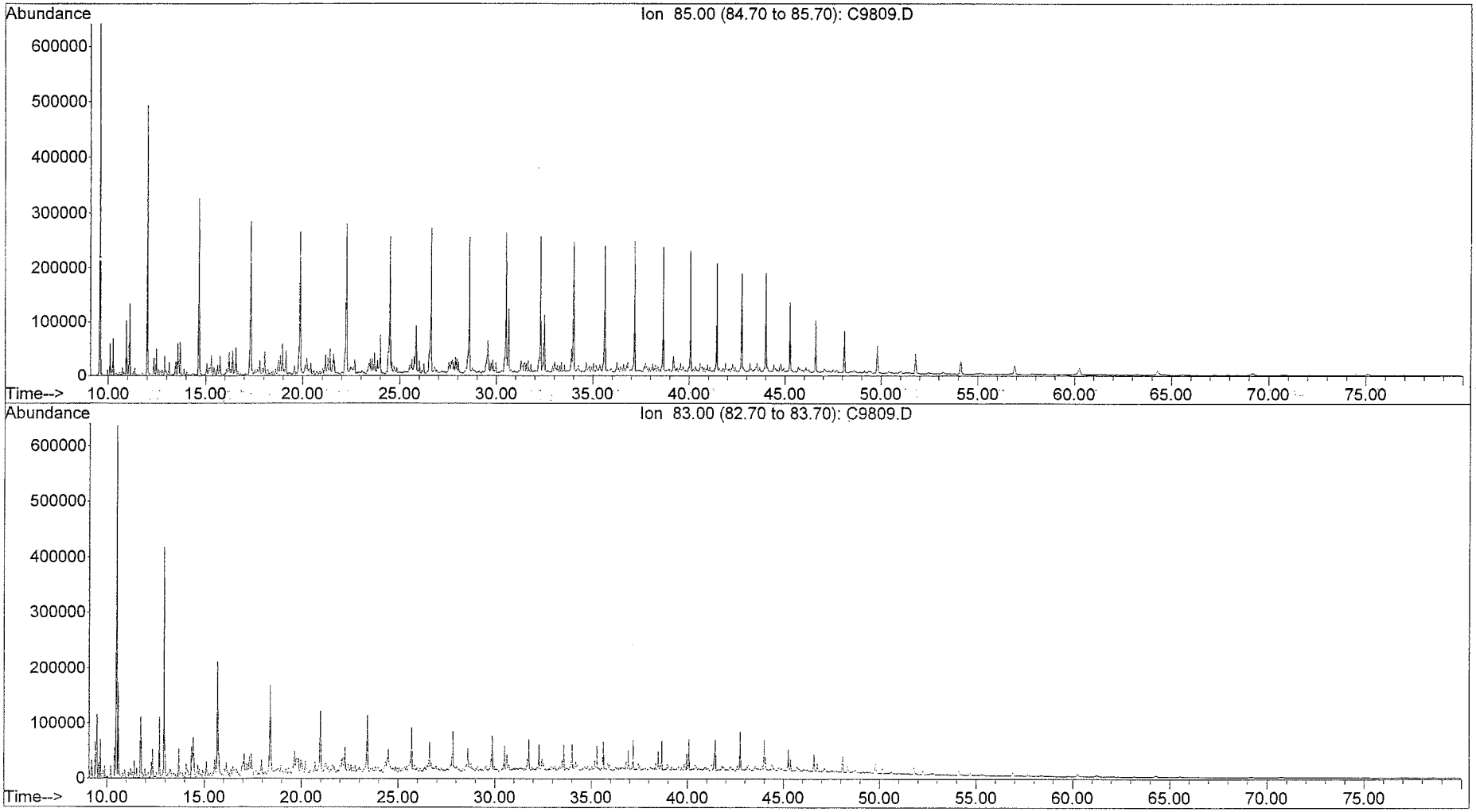
File: H:\F\DATA\SQF171\F6656.D
Date Acquired: 5 Mar 2003 4:05 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

Normal Alkanes and Alkylcyclohexanes
Reference Crude Oil
FX46



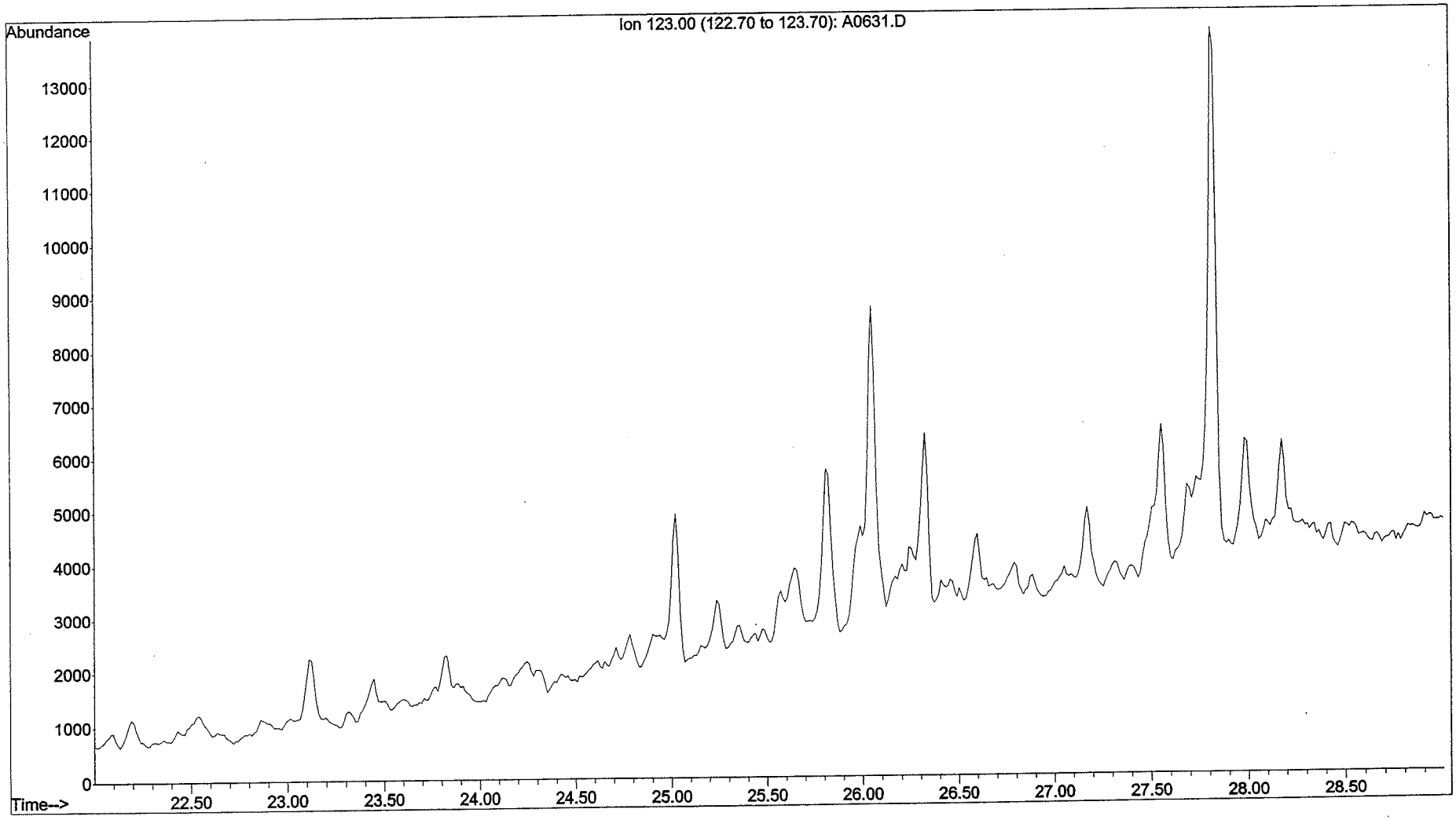
File : G:\C\DATA\SQC647\C9809.D
Operator : AC
Acquired : 12 Apr 2003 1:52 am using AcqMethod BIO1SIM
Instrument : GCMS3
Sample Name: North Slope Crude
Misc Info :
Vial Number: 8

Normal Alkanes and Alkylcyclohexanes
Reference Crude Oil



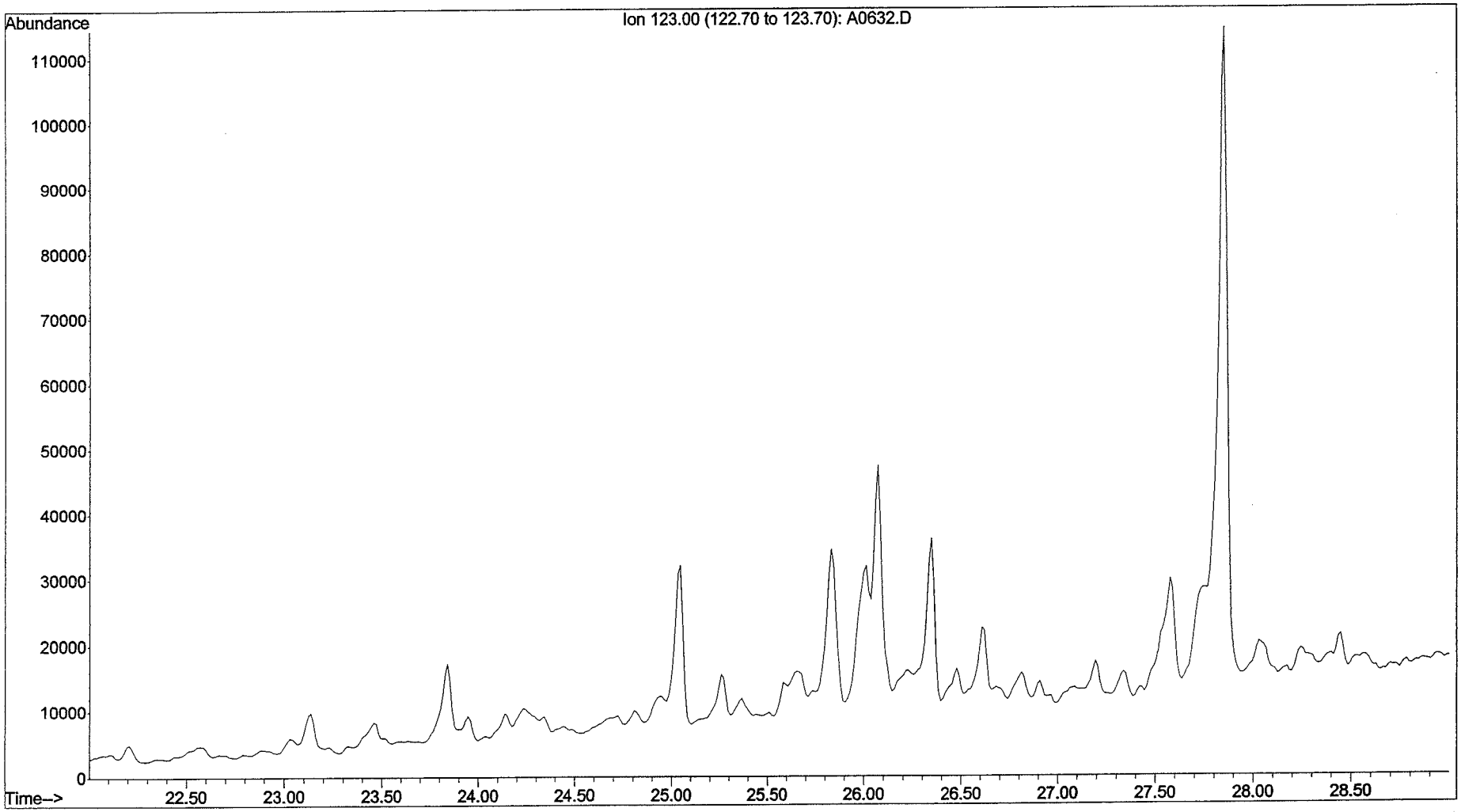
File : Q:\A\DATA\SQA319\A0631.D
Operator : TH
Acquired : 14 Dec 2002 7:30 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0169-F1
Misc Info :
Vial Number: 35

Sesquiterpane Biomarkers
NLU-102-SS-0010
U0169



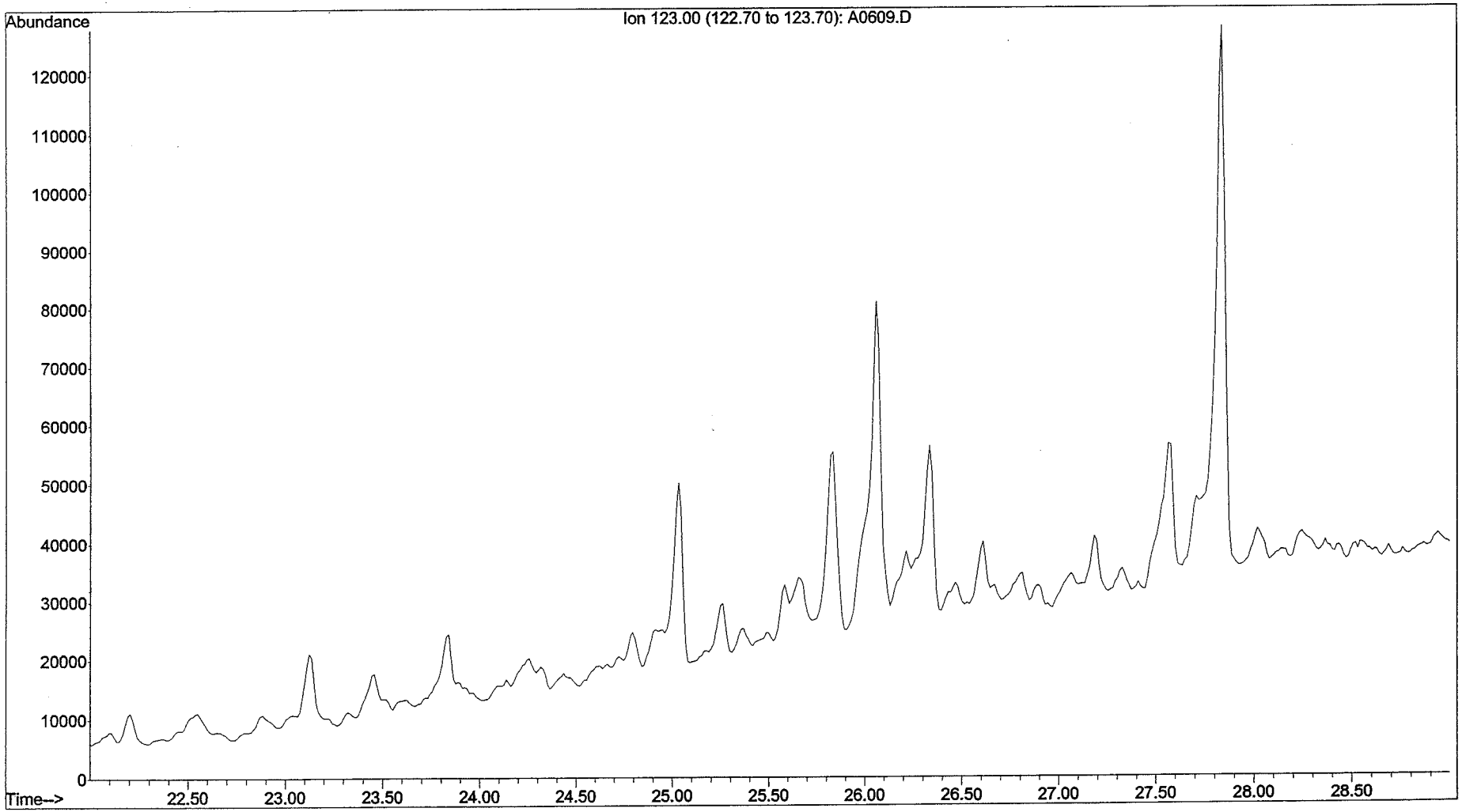
File : Q:\A\DATA\SQA319\A0632.D
Operator : TH
Acquired : 14 Dec 2002 9:06 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0170-F1
Misc Info :
Vial Number: 36

Sesquiterpane Biomarkers
NLU-103-SS-0010
U0170



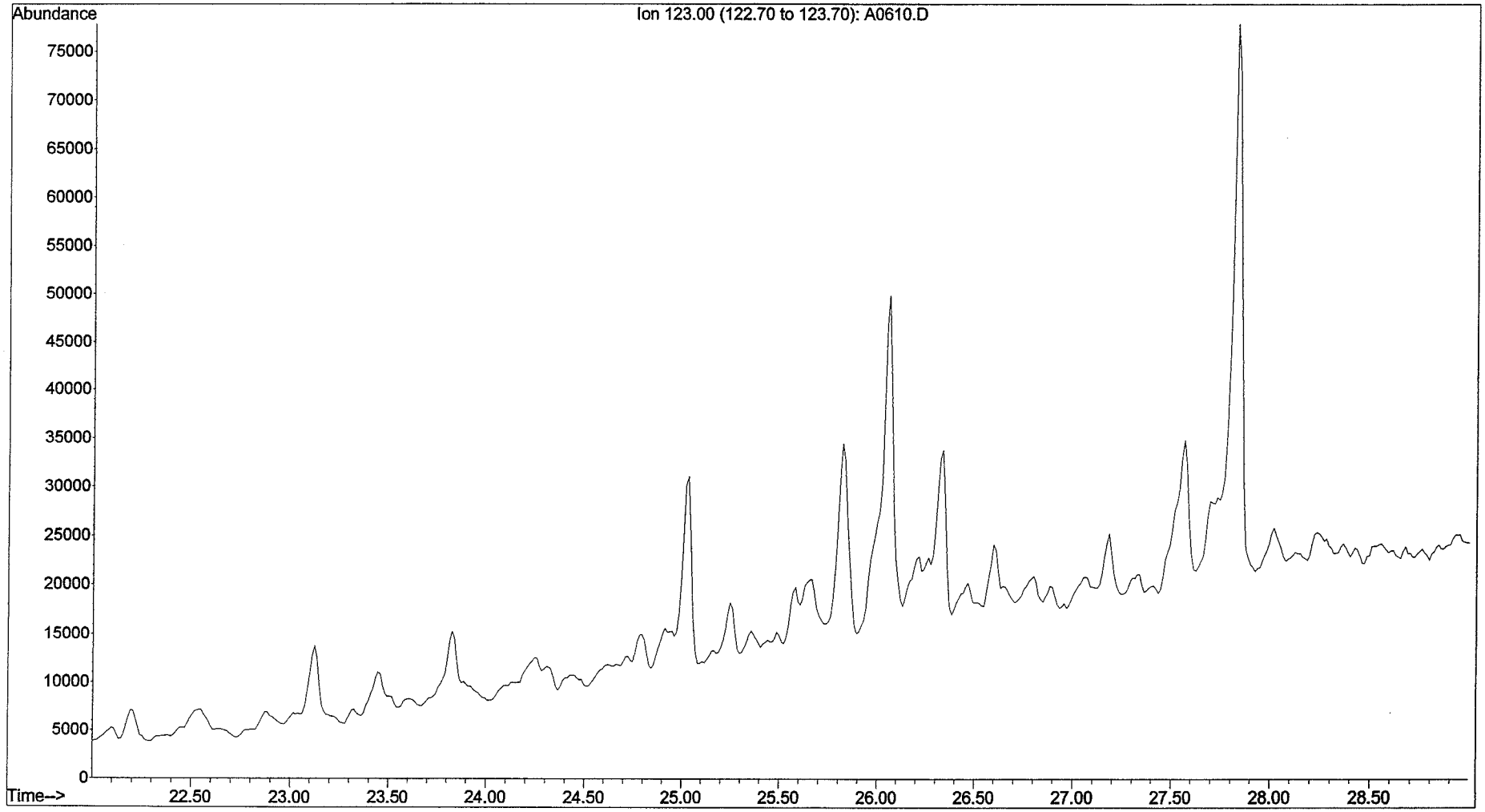
File : Q:\A\DATA\SQA319\A0609.D
Operator : TH
Acquired : 13 Dec 2002 8:51 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0142-F1
Misc Info :
Vial Number: 13

Sesquiterpane Biomarkers
NLU-104-SS-0010
U0142



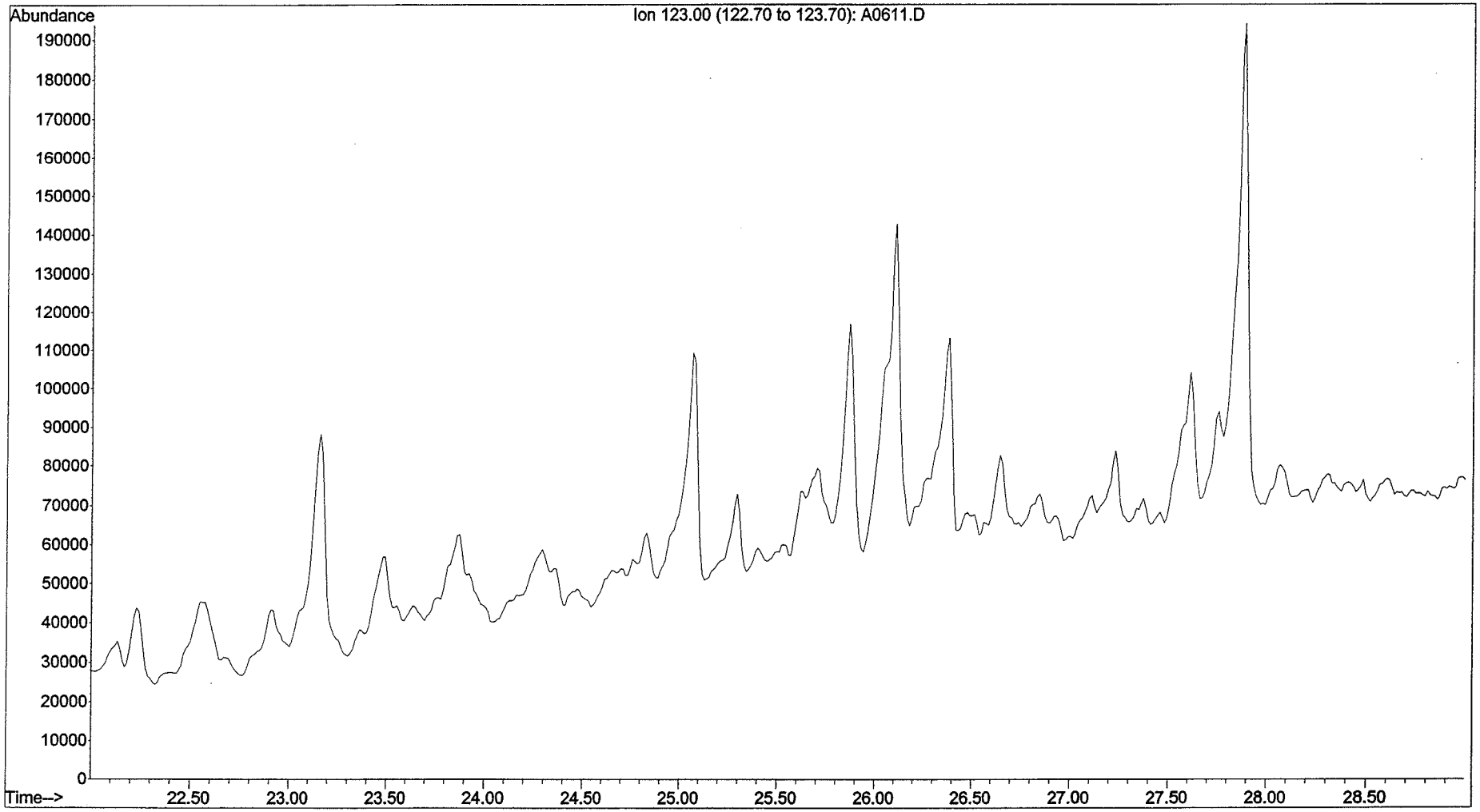
File : Q:\A\DATA\SQA319\A0610.D
Operator : TH
Acquired : 13 Dec 2002 10:21 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0142DUP-F1
Misc Info :
Vial Number: 14

Sesquiterpane Biomarkers
NLU-104-SS-0010
U0142 Duplicate



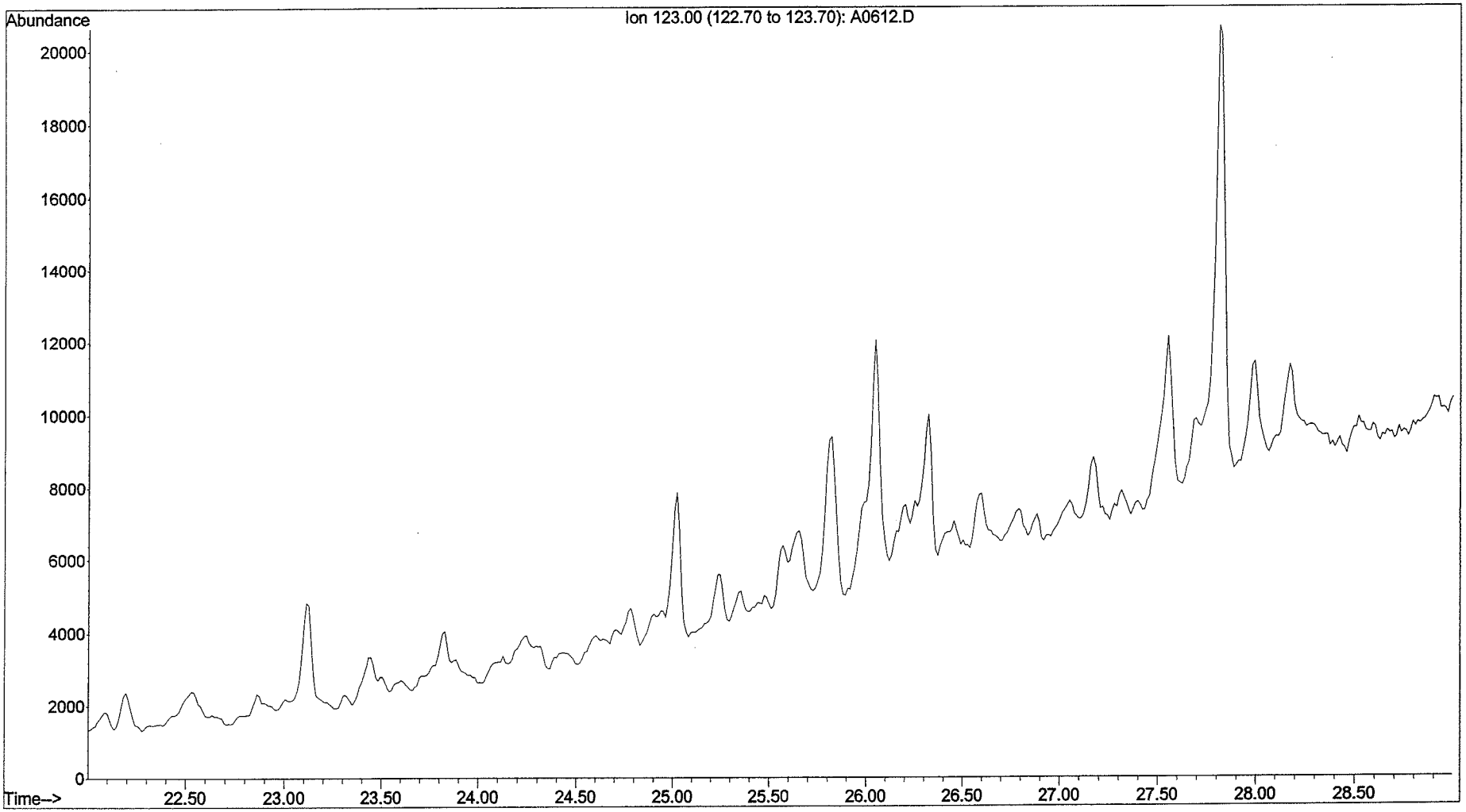
File : Q:\A\DATA\SQA319\A0611.D
Operator : TH
Acquired : 13 Dec 2002 11:55 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0143-F1
Misc Info :
Vial Number: 15

Sesquiterpane Biomarkers
NLU-105-SS-0010
U0143



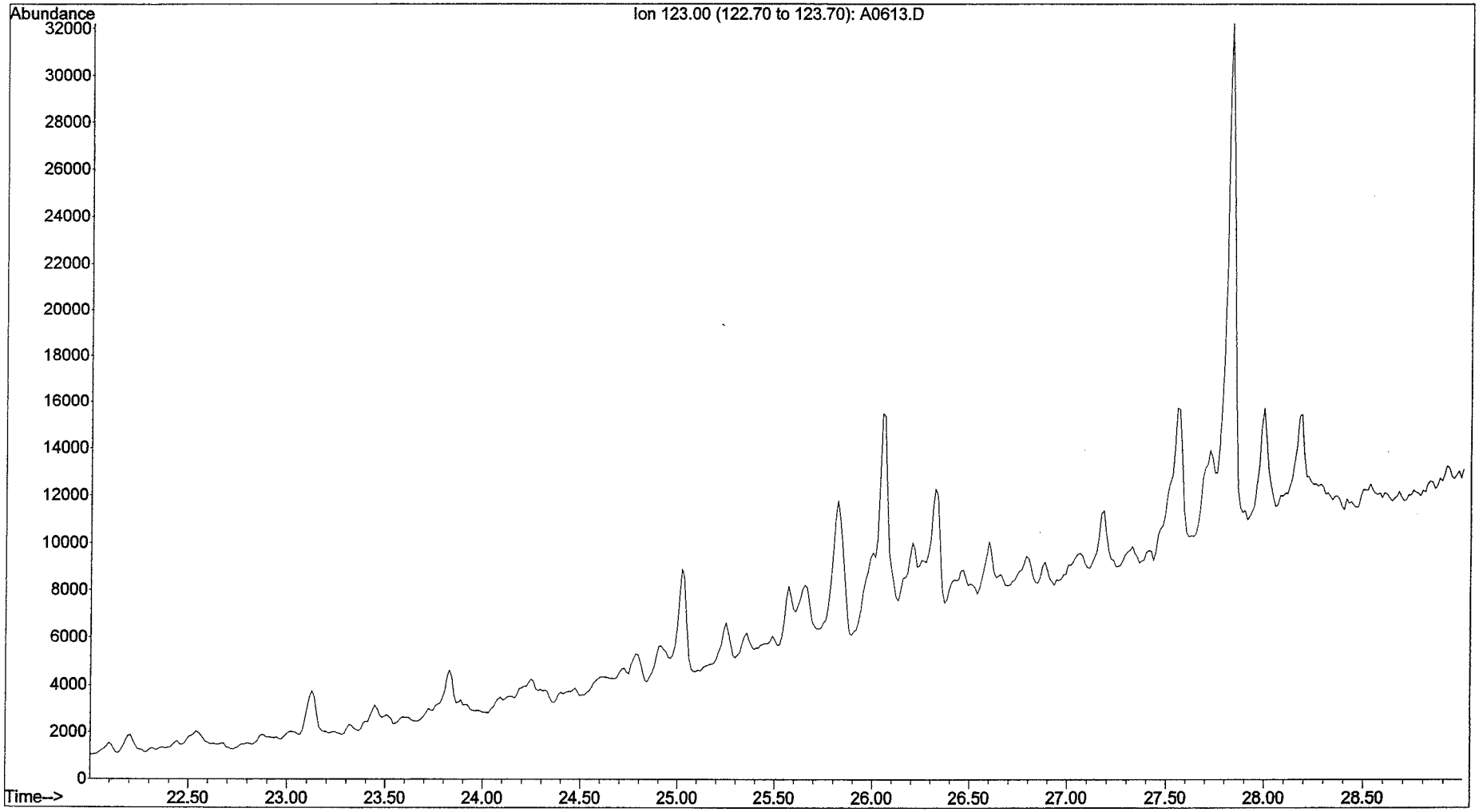
File : Q:\A\DATA\SQA319\A0612.D
Operator : TH
Acquired : 13 Dec 2002 1:24 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0144-F1
Misc Info :
Vial Number: 16

Sesquiterpane Biomarkers
NLU-106-SS-0010
U0144



File : Q:\A\DATA\SQA319\A0613.D
Operator : TH
Acquired : 13 Dec 2002 2:54 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0145-F1
Misc Info :
Vial Number: 17

Sesquiterpane Biomarkers
NLU-107-SS-0010
U0145

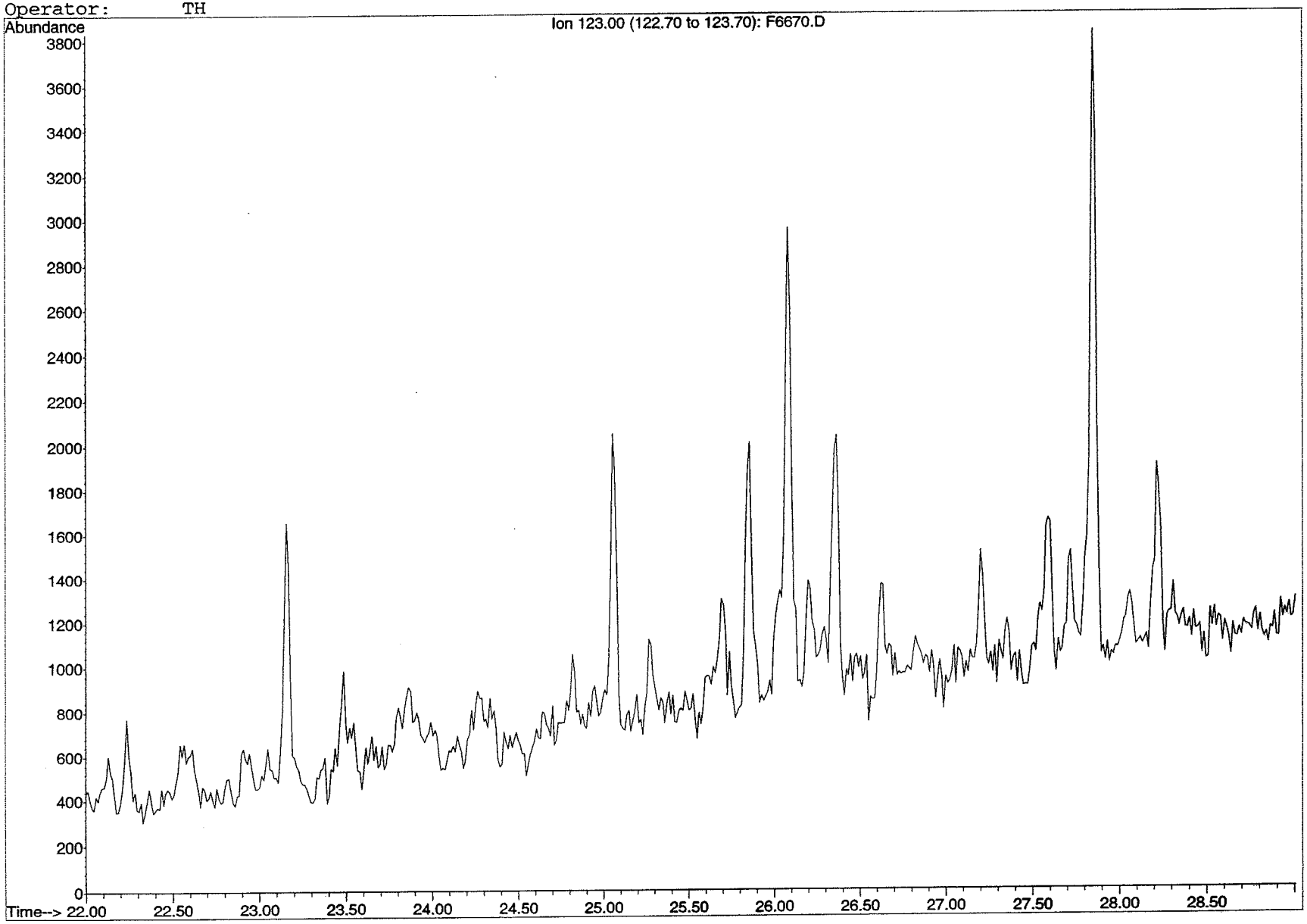


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6670.D
Date Acquired: 6 Mar 2003 11:29 am
Method File: BIO1SIM
Sample Name: U0277-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-109 1214
U0277

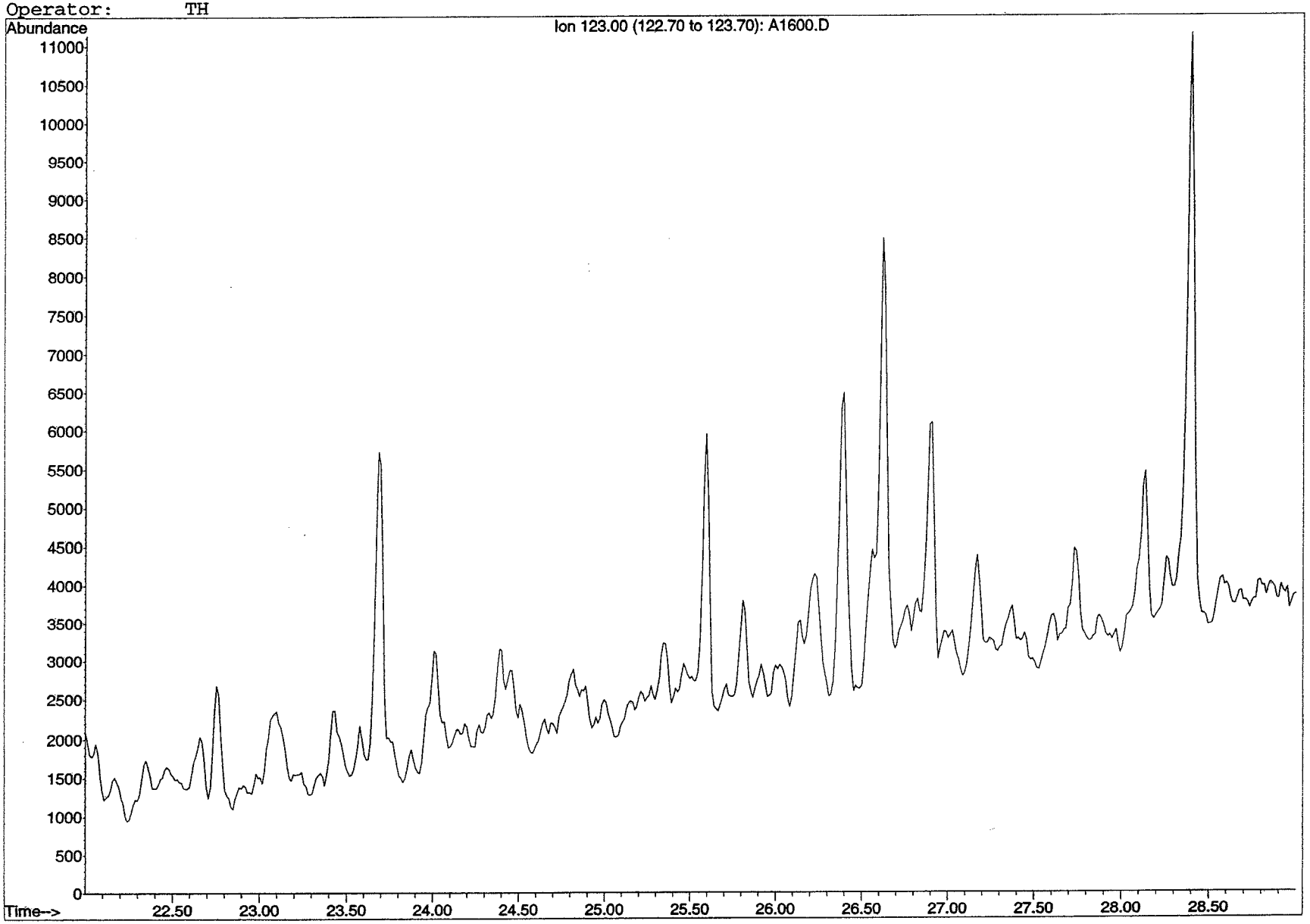


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1600.D
Date Acquired: 20 Feb 2003 7:50 pm
Method File: BIO1SIM
Sample Name: U0285-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-109 2830
U0285

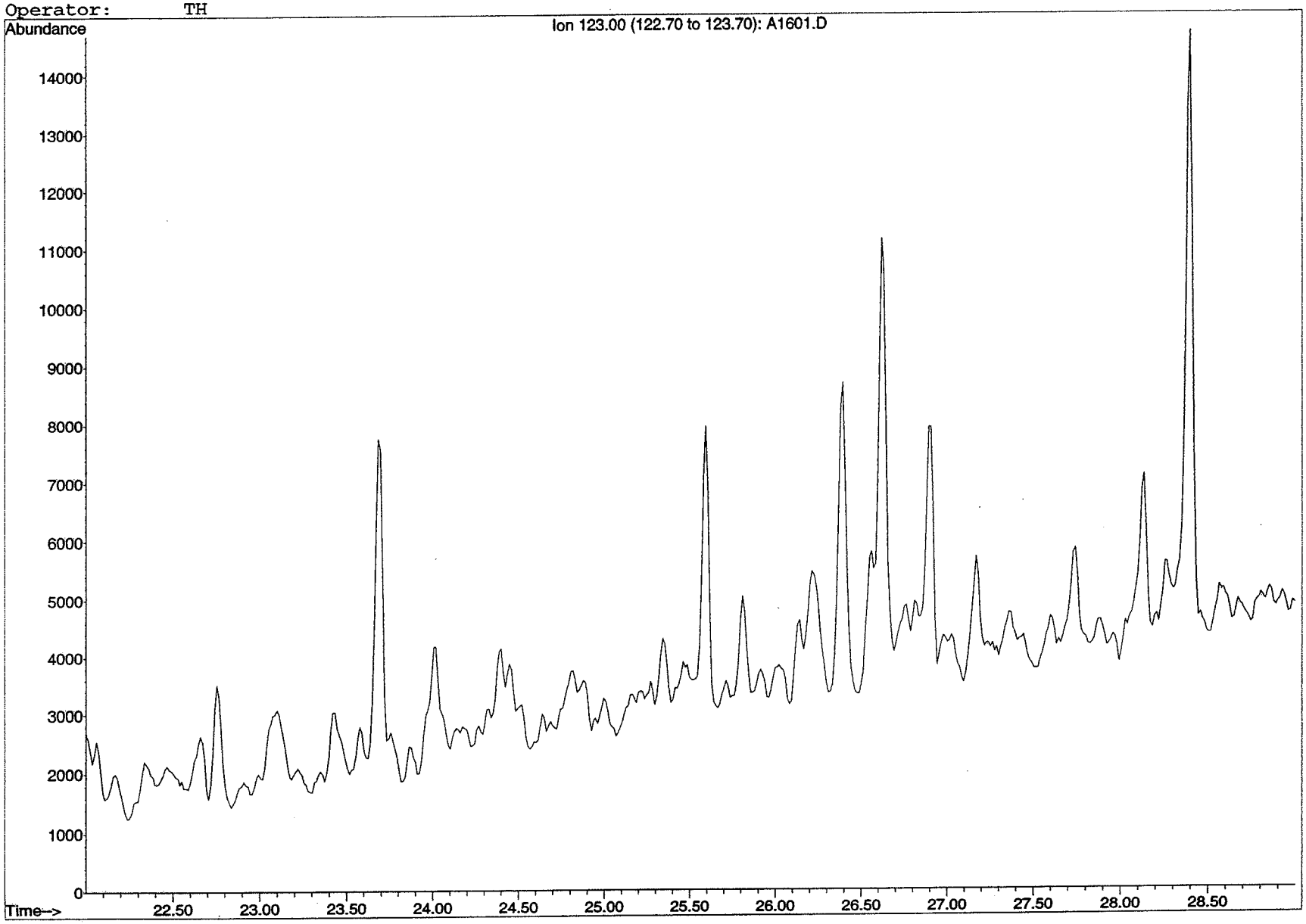


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1601.D
Date Acquired: 20 Feb 2003 9:21 pm
Method File: BIO1SIM
Sample Name: U0285DUP-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-109 2830
U0285 Duplicate

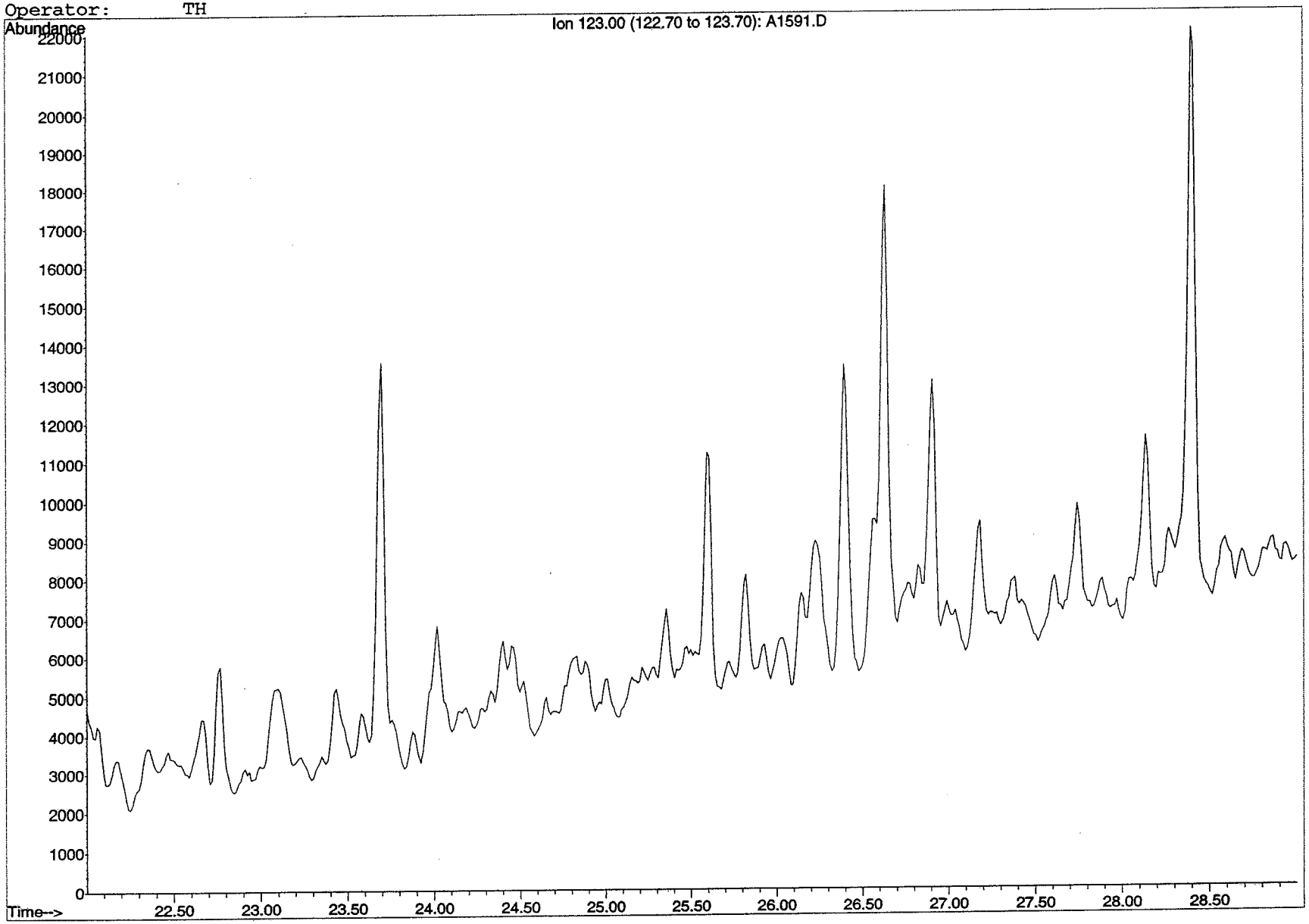


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1591.D
Date Acquired: 20 Feb 2003 2:33 am
Method File: BIO1SIM
Sample Name: U0290-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-109 3840
U0290

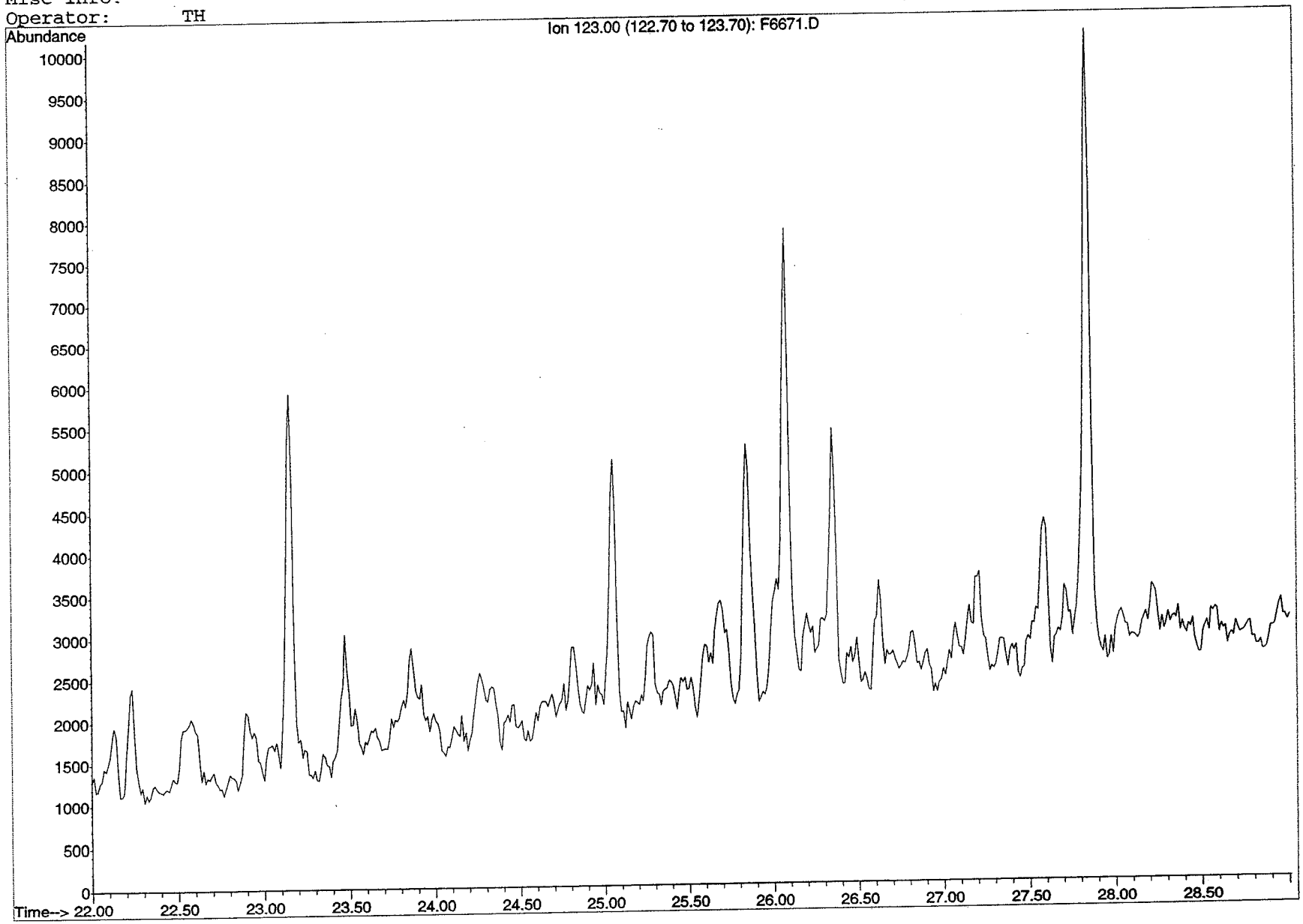


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6671.D
Date Acquired: 6 Mar 2003 12:59 pm
Method File: BIO1SIM
Sample Name: U0353-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-110 0406
U0353

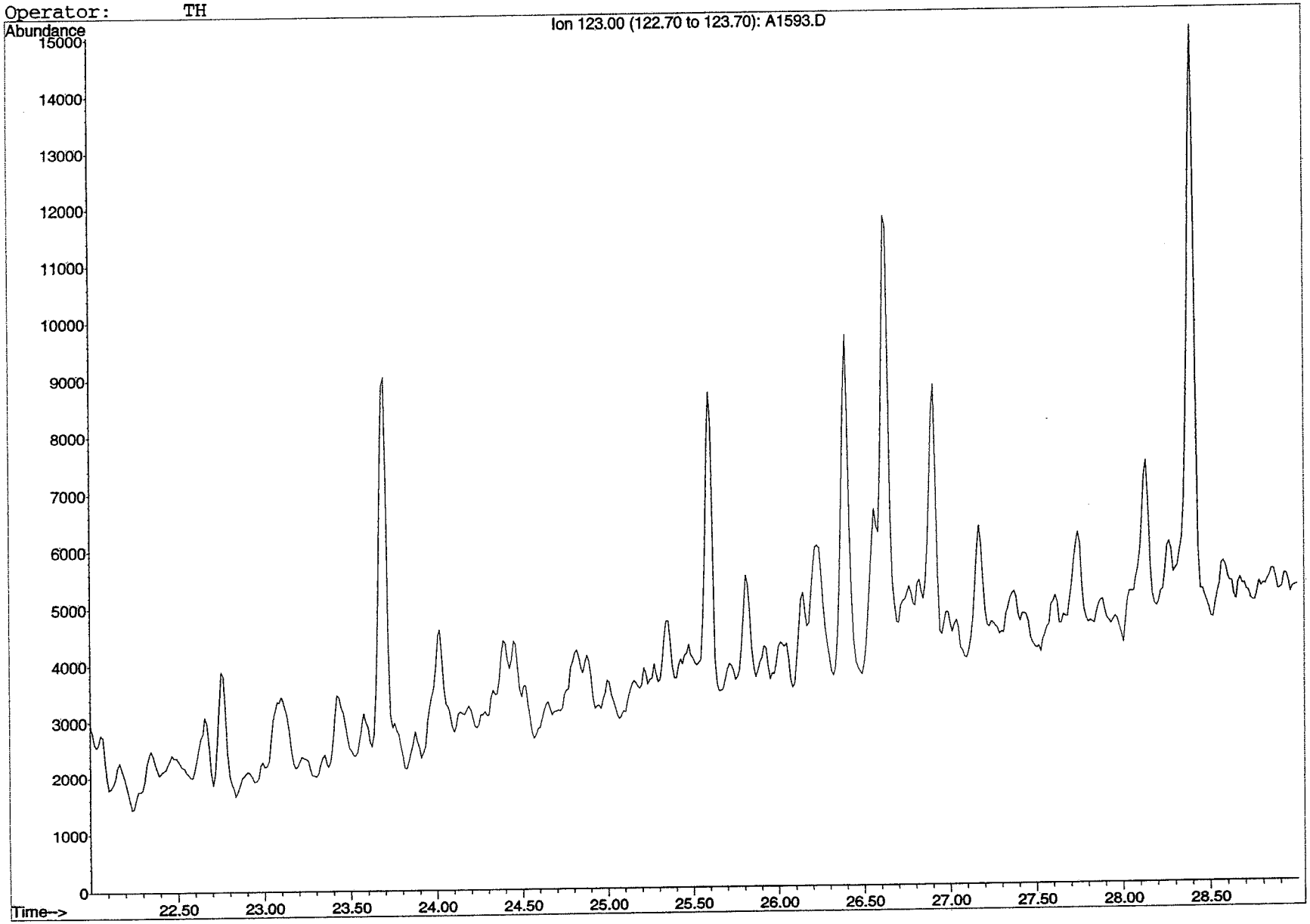


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1593.D
Date Acquired: 20 Feb 2003 5:36 am
Method File: BIO1SIM
Sample Name: U0357-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-110 1214
U0357

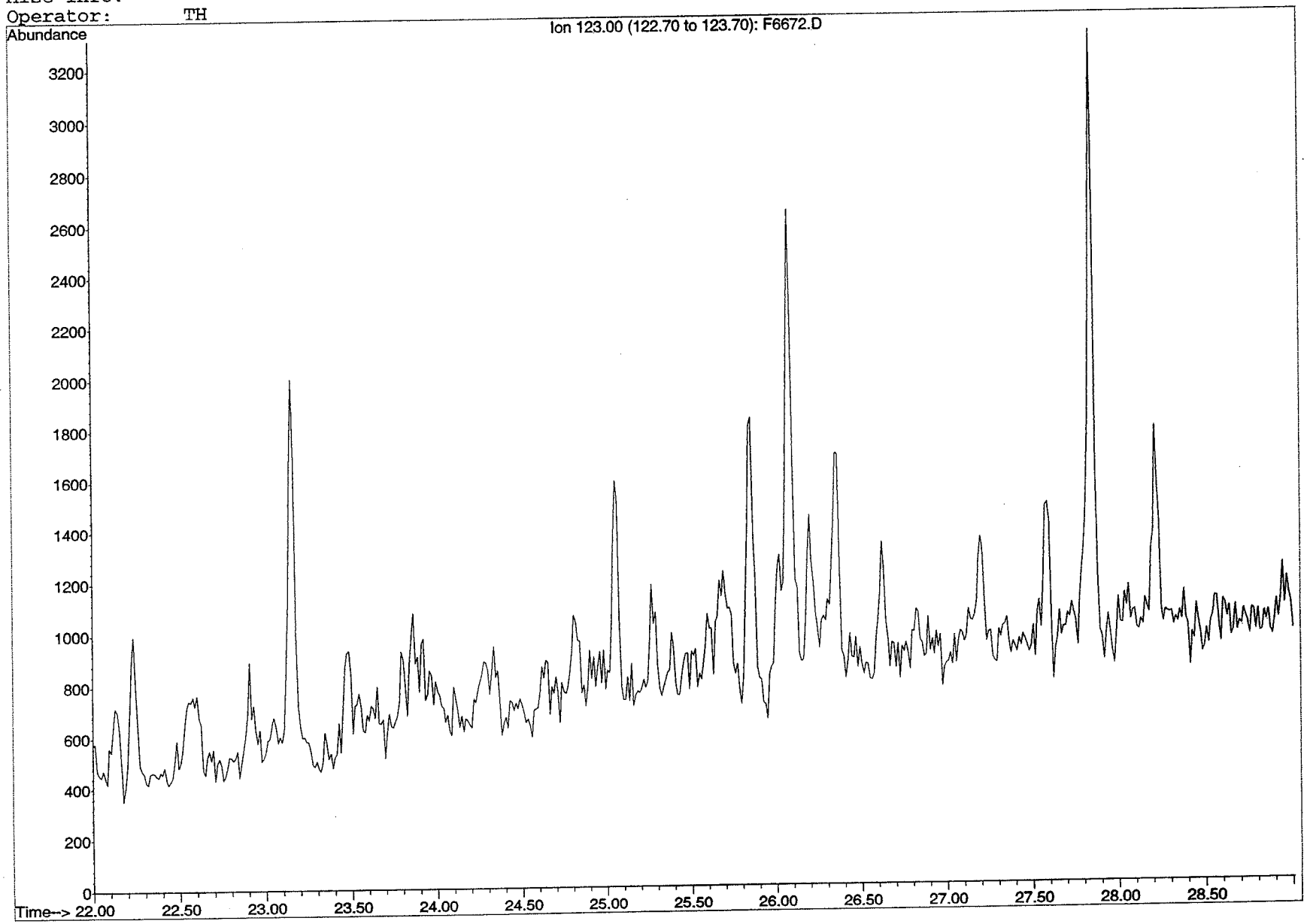


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

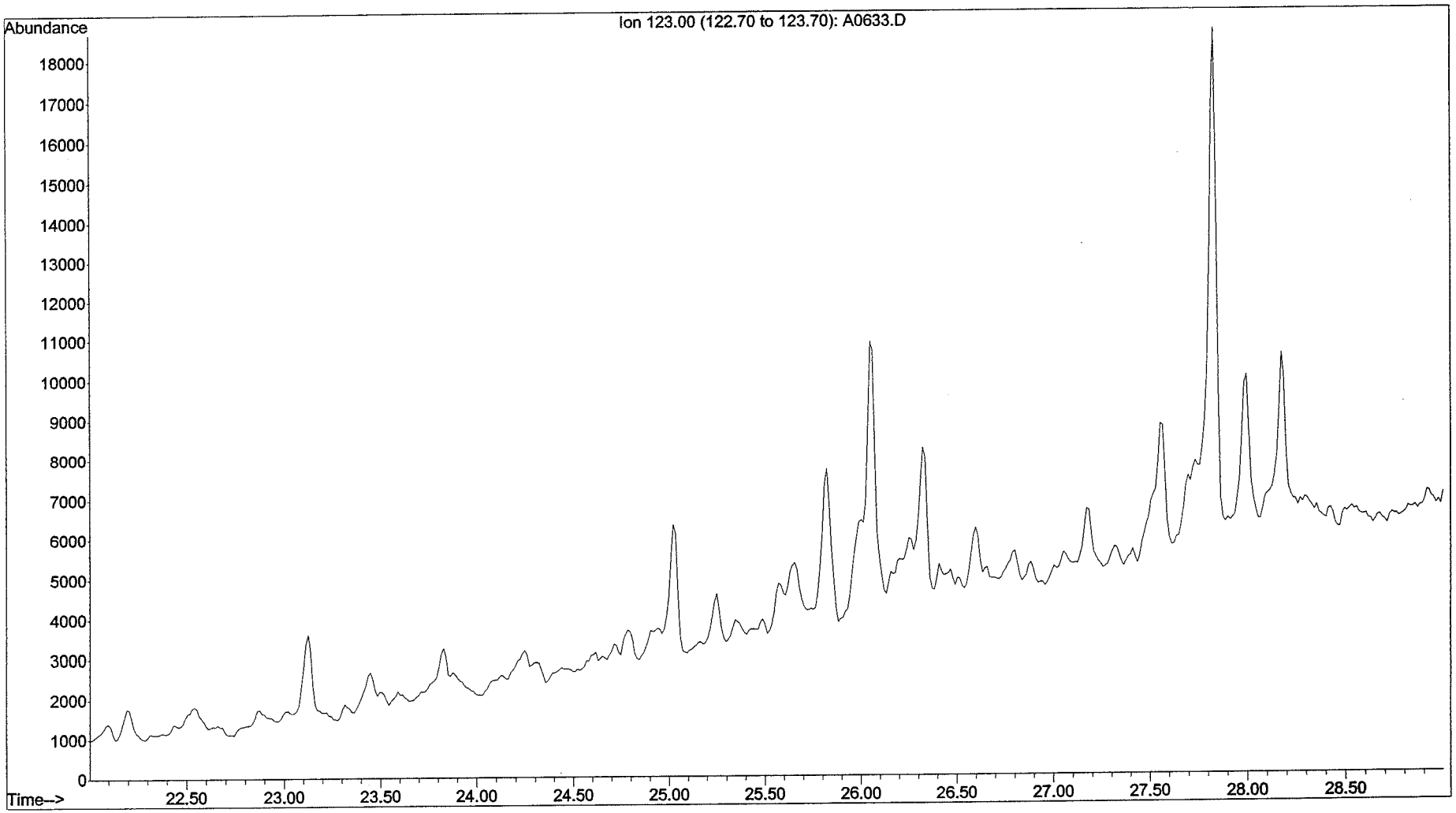
File: H:\F\DATA\SQF171\F6672.D
Date Acquired: 6 Mar 2003 2:30 pm
Method File: BIO1SIM
Sample Name: U0361-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-110 2022
U0361



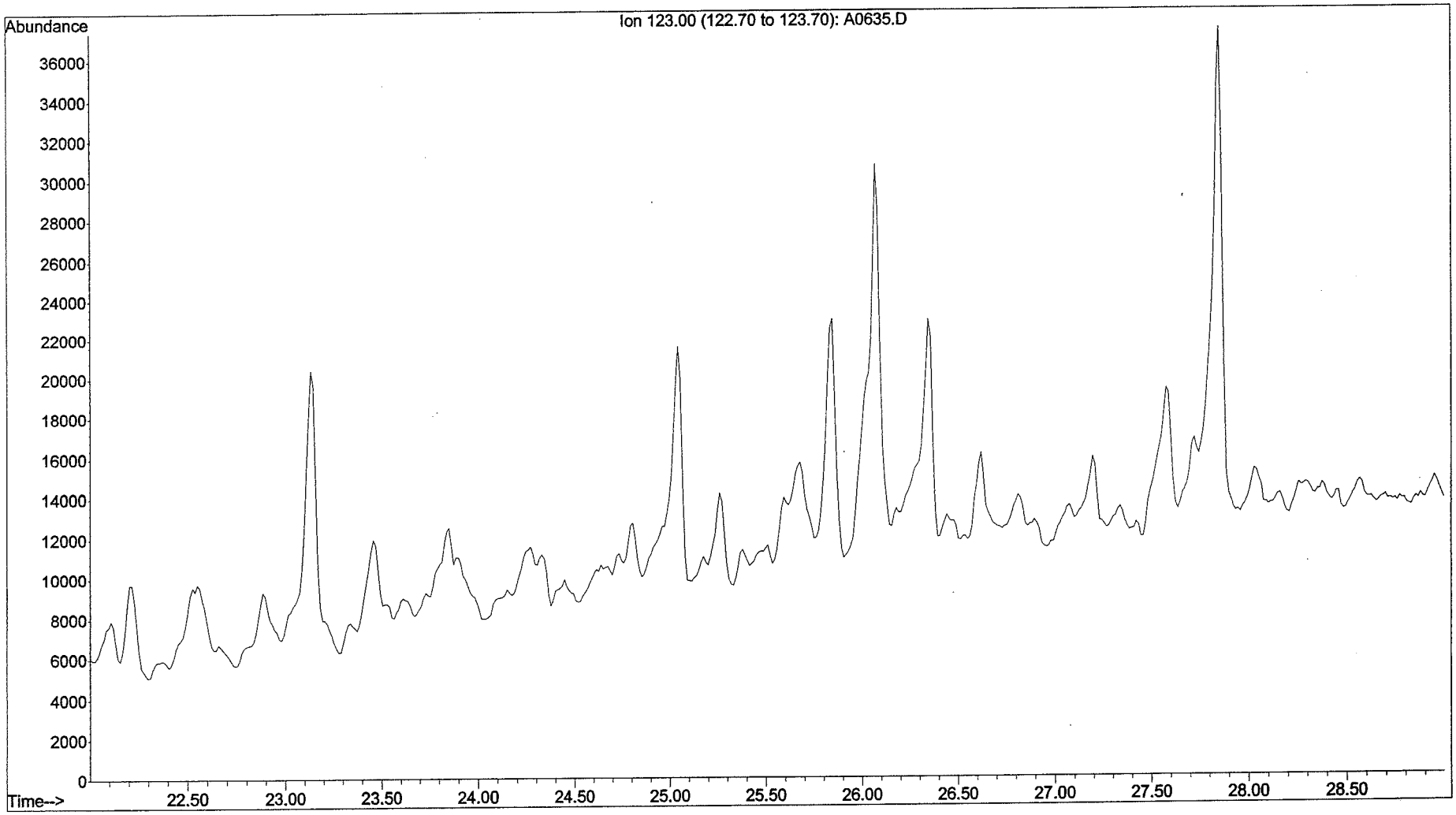
File : Q:\A\DATA\SQA319\A0633.D
Operator : TH
Acquired : 14 Dec 2002 10:43 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0171-F1
Misc Info :
Vial Number: 37

Sesquiterpane Biomarkers
NLU-112-SS-0010
U0171



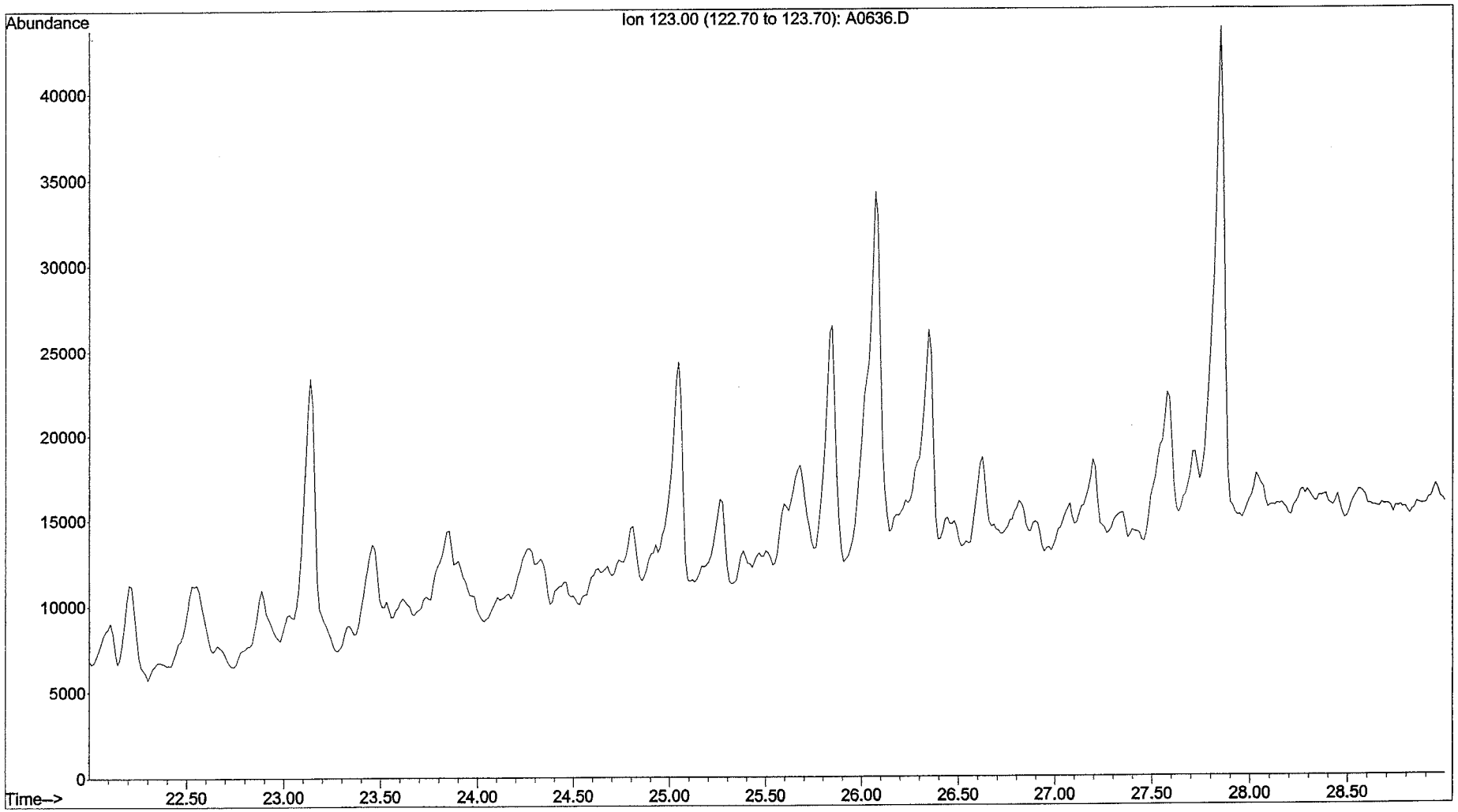
File : Q:\A\DATA\SQA319\A0635.D
Operator : TH
Acquired : 15 Dec 2002 1:58 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0101-F1
Misc Info :
Vial Number: 39

Sesquiterpane Biomarkers
NLU-112-SS-2030
U0101



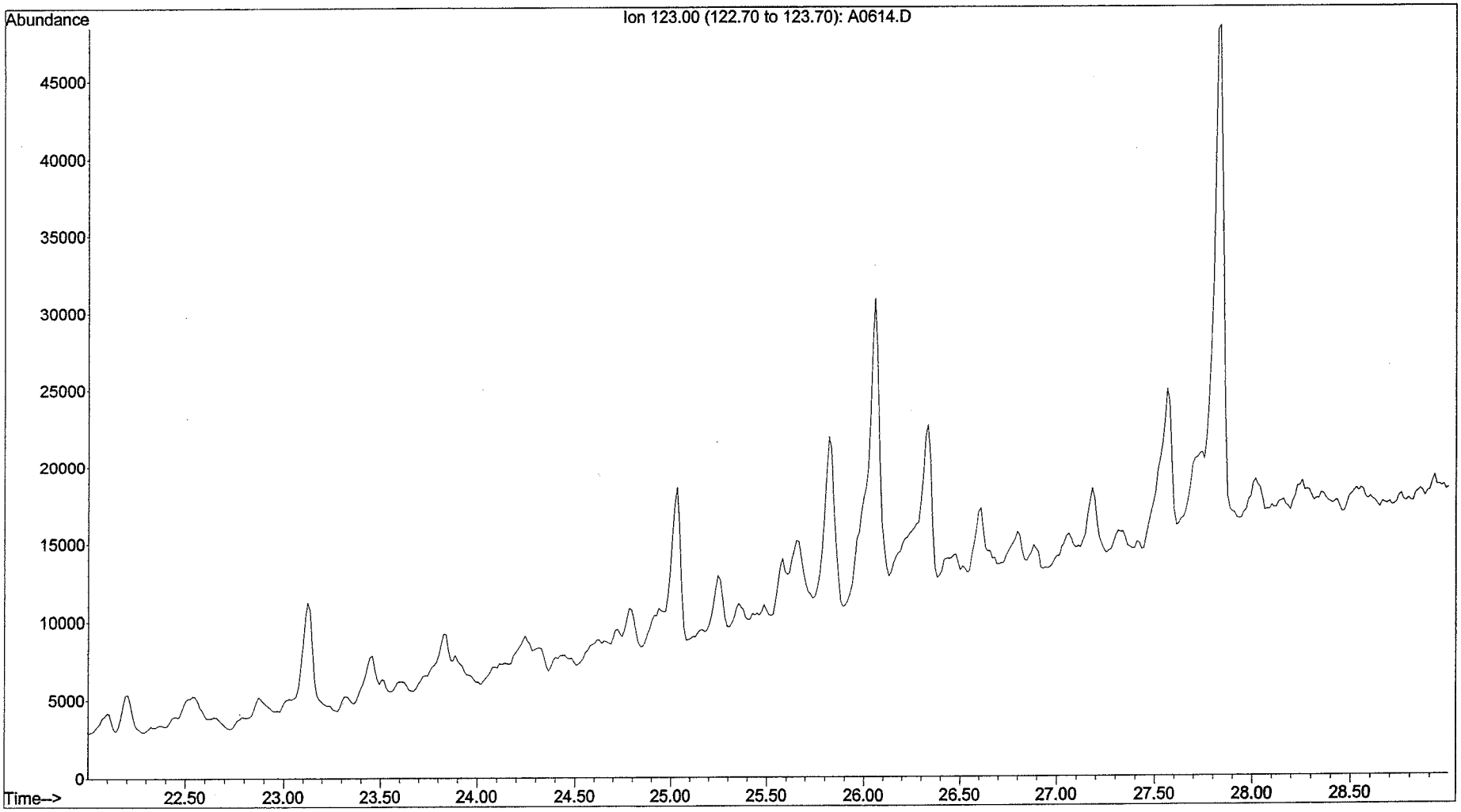
File : Q:\A\DATA\SQA319\A0636.D
Operator : TH
Acquired : 15 Dec 2002 3:35 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0101DUP-F1
Misc Info :
Vial Number: 40

Sesquiterpane Biomarkers
NLU-112-SS-2030
U0101 Duplicate



File : Q:\A\DATA\SQA319\A0614.D
Operator : TH
Acquired : 13 Dec 2002 4:24 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0146-F1
Misc Info :
Vial Number: 18

Sesquiterpane Biomarkers
NLU-113-SS-0010
U0146

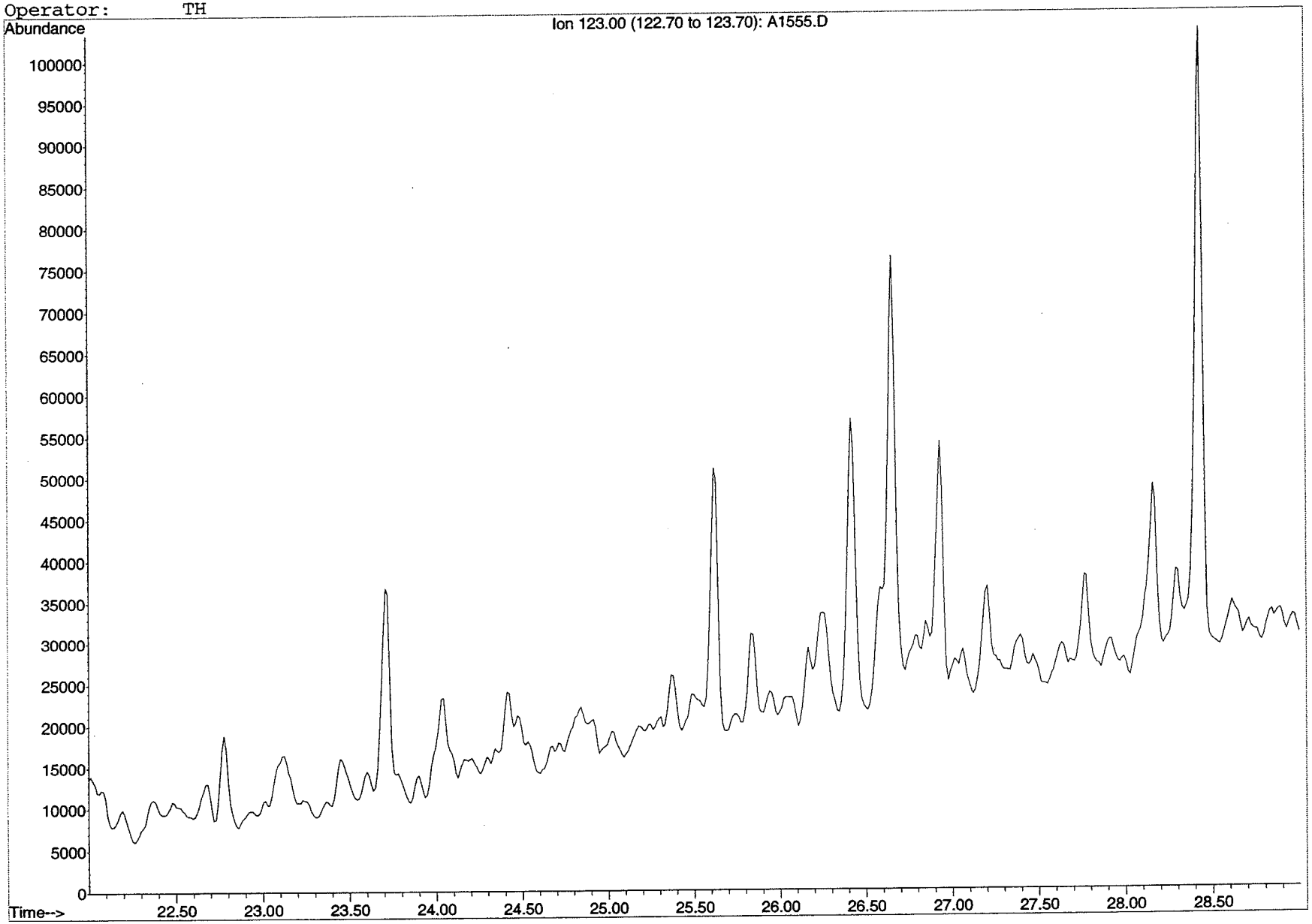


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

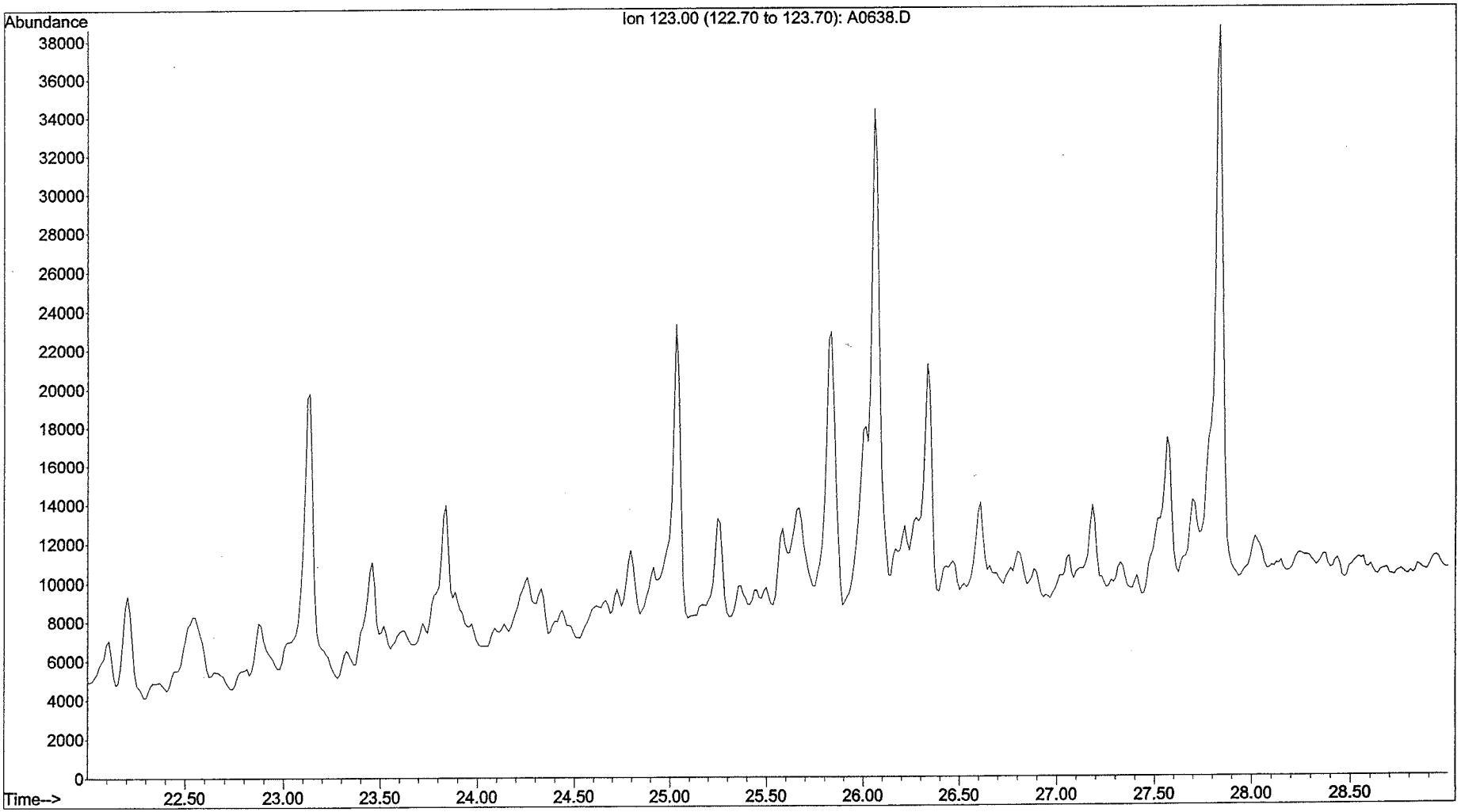
File: H:\A\DATA\SQA339\A1555.D
Date Acquired: 17 Feb 2003 4:55 pm
Method File: BIO1SIM
Sample Name: U0108-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-113-SS-1020
U0108



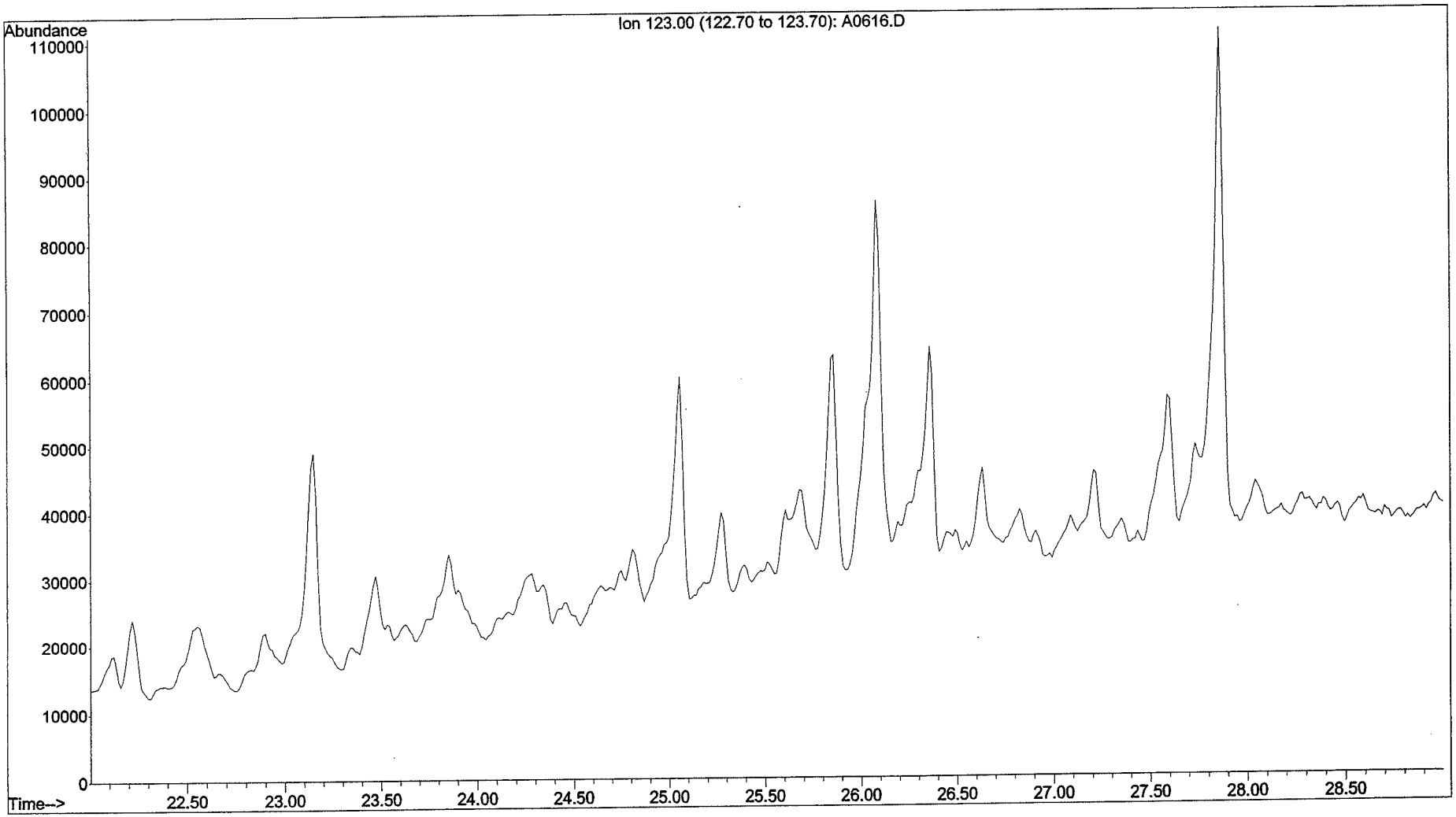
File : Q:\A\DATA\SQA319\A0638.D
Operator : TH
Acquired : 15 Dec 2002 6:50 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0149-F1
Misc Info :
Vial Number: 42

Sesquiterpane Biomarkers
NLU-115-SS-0010
U0149



File : Q:\A\DATA\SQA319\A0616.D
Operator : TH
Acquired : 13 Dec 2002 7:25 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0150-F1
Misc Info :
Vial Number: 20

Sesquiterpane Biomarkers
NLU-116-SS-0010
U0150

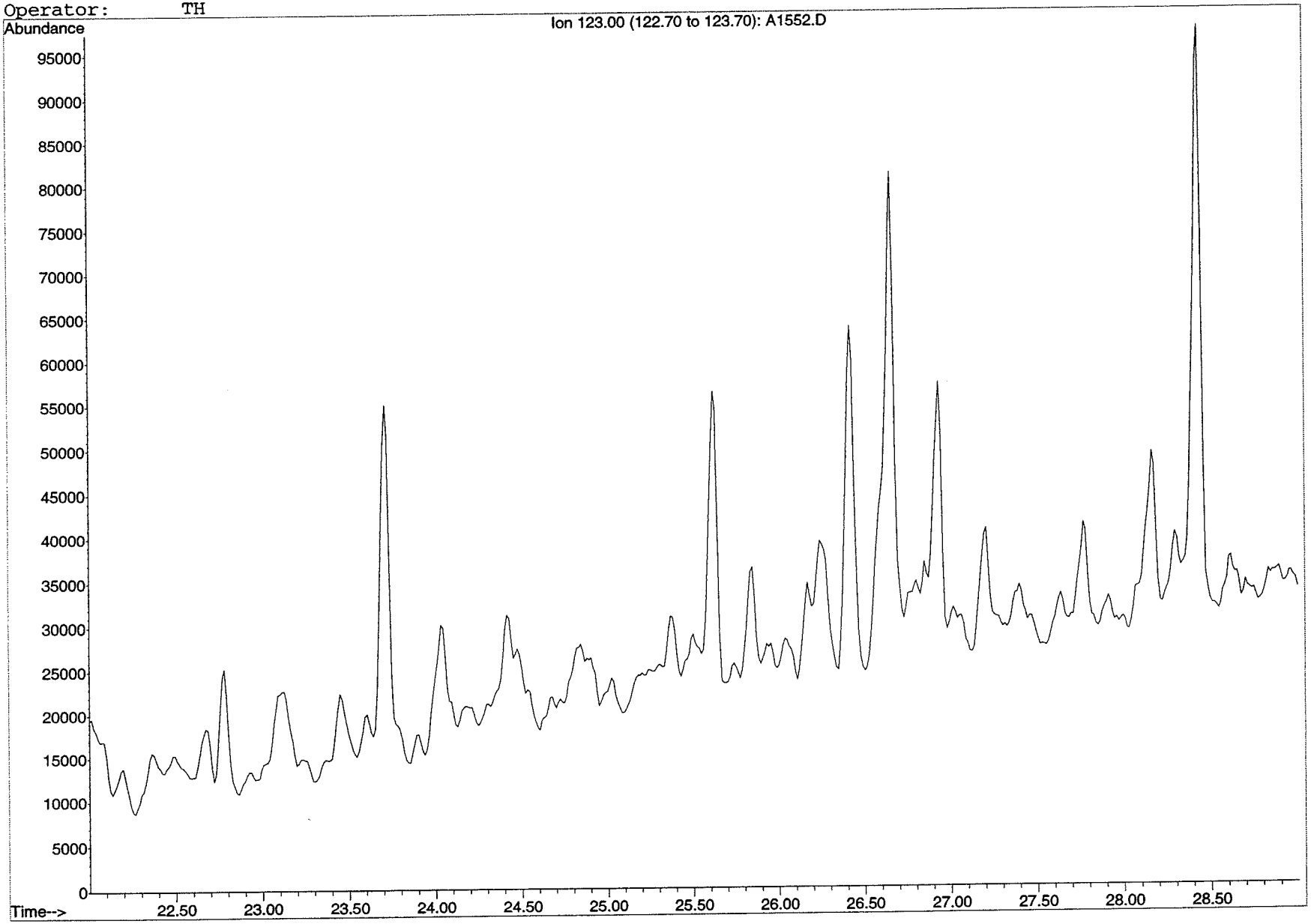


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

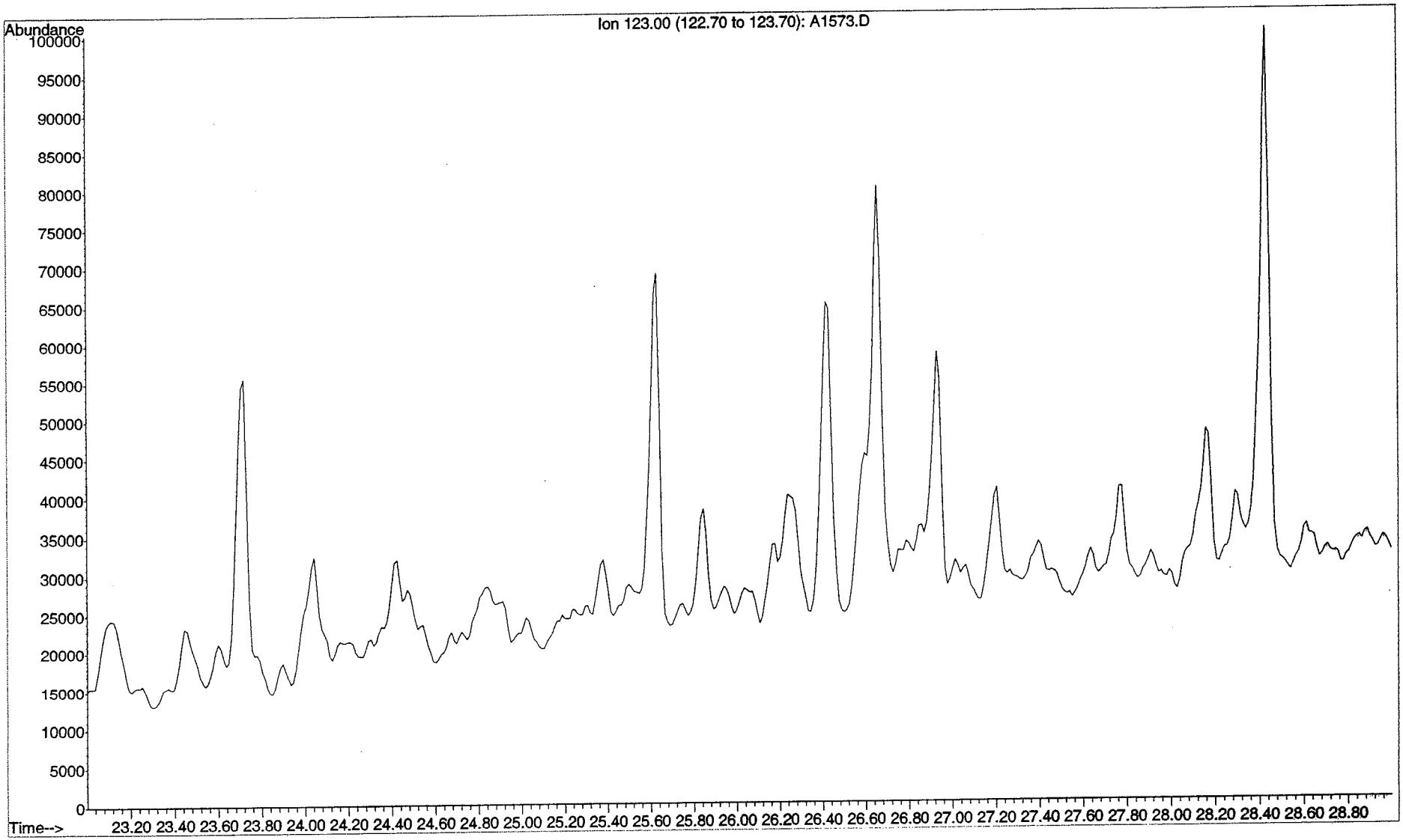
File: H:\A\DATA\SQA339\A1552.D
Date Acquired: 17 Feb 2003 12:26 pm
Method File: BIO1SIM
Sample Name: U0122-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-116-SS-1020
U0122



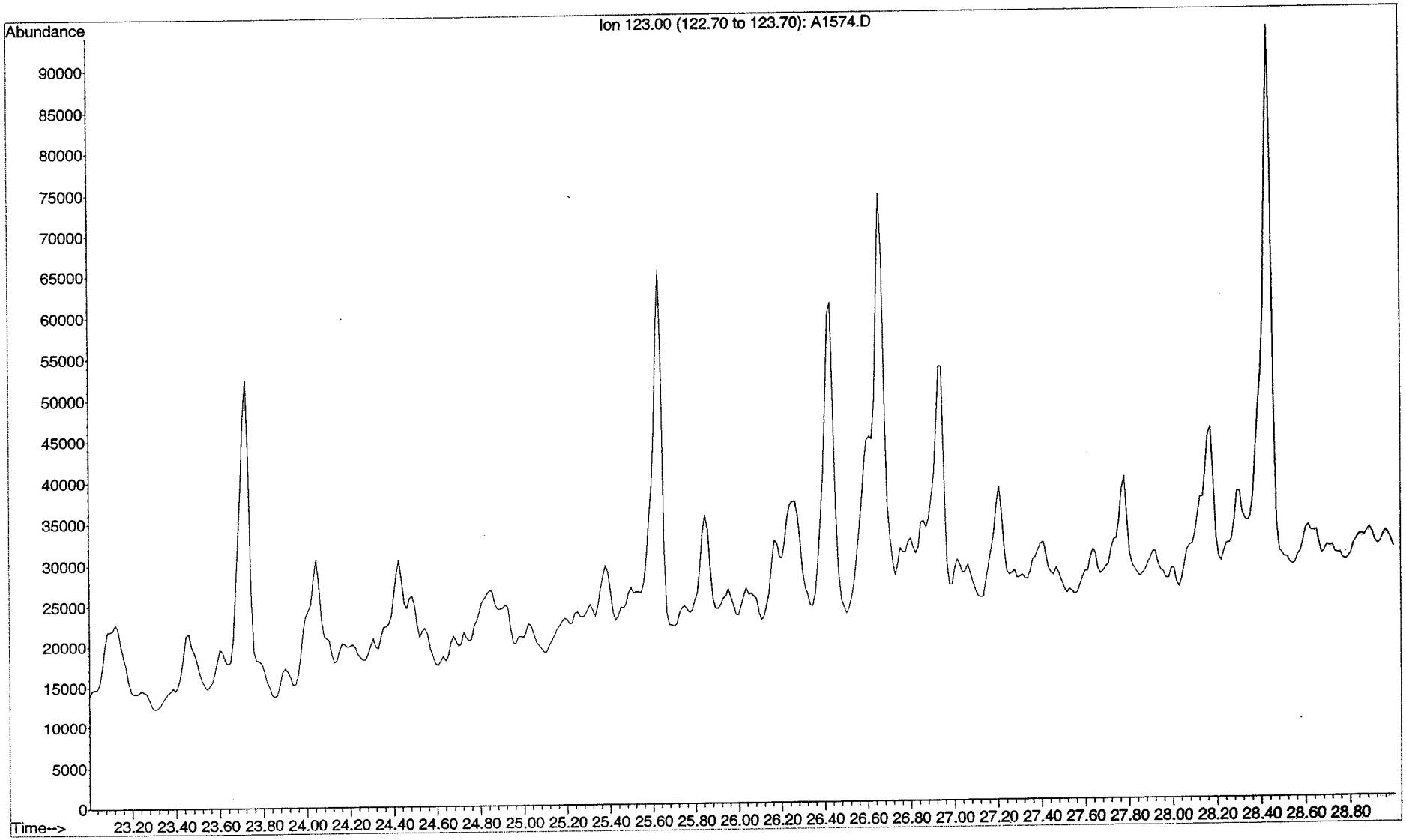
File : H:\A\DATA\SQA339\A1573.D
Operator : TH
Acquired : 18 Feb 2003 8:06 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0123-F1
Misc Info :
Vial Number: 36

Sesquiterpane Biomarkers
NLU-116-SS-2030
U0123



File : H:\A\DATA\SQA339\A1574.D
Operator : TH
Acquired : 18 Feb 2003 9:36 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0123DUP-F1
Misc Info :
Vial Number: 37

Sesquiterpane Biomarkers
NLU-116-SS-2030
U0123 Duplicate

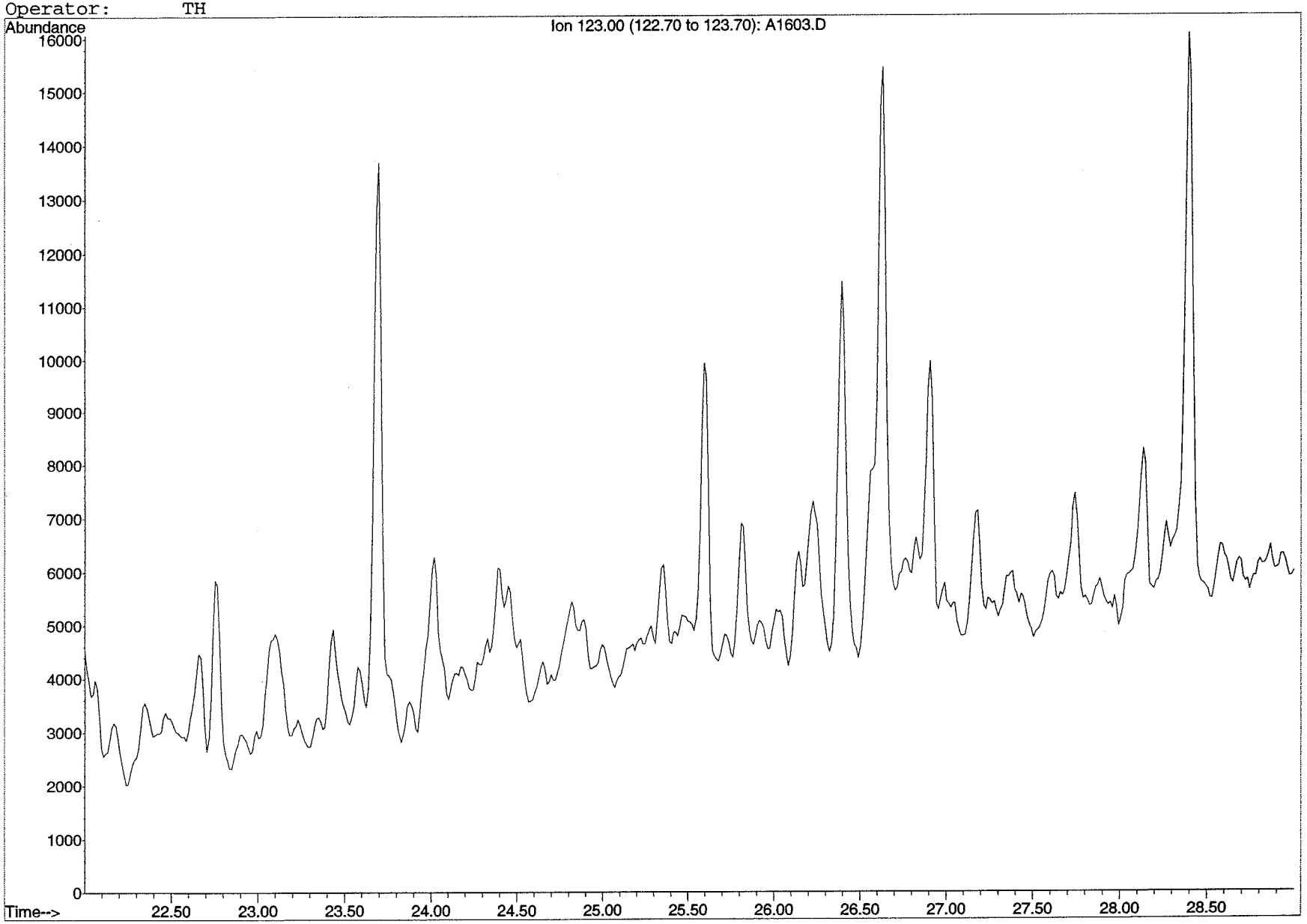


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1603.D
Date Acquired: 21 Feb 2003 12:21 am
Method File: BIO1SIM
Sample Name: U6525-D-F1
Misc Info:
Operator: TH

Sesquiterpanes
NLU-117 0010 Composite
U6525

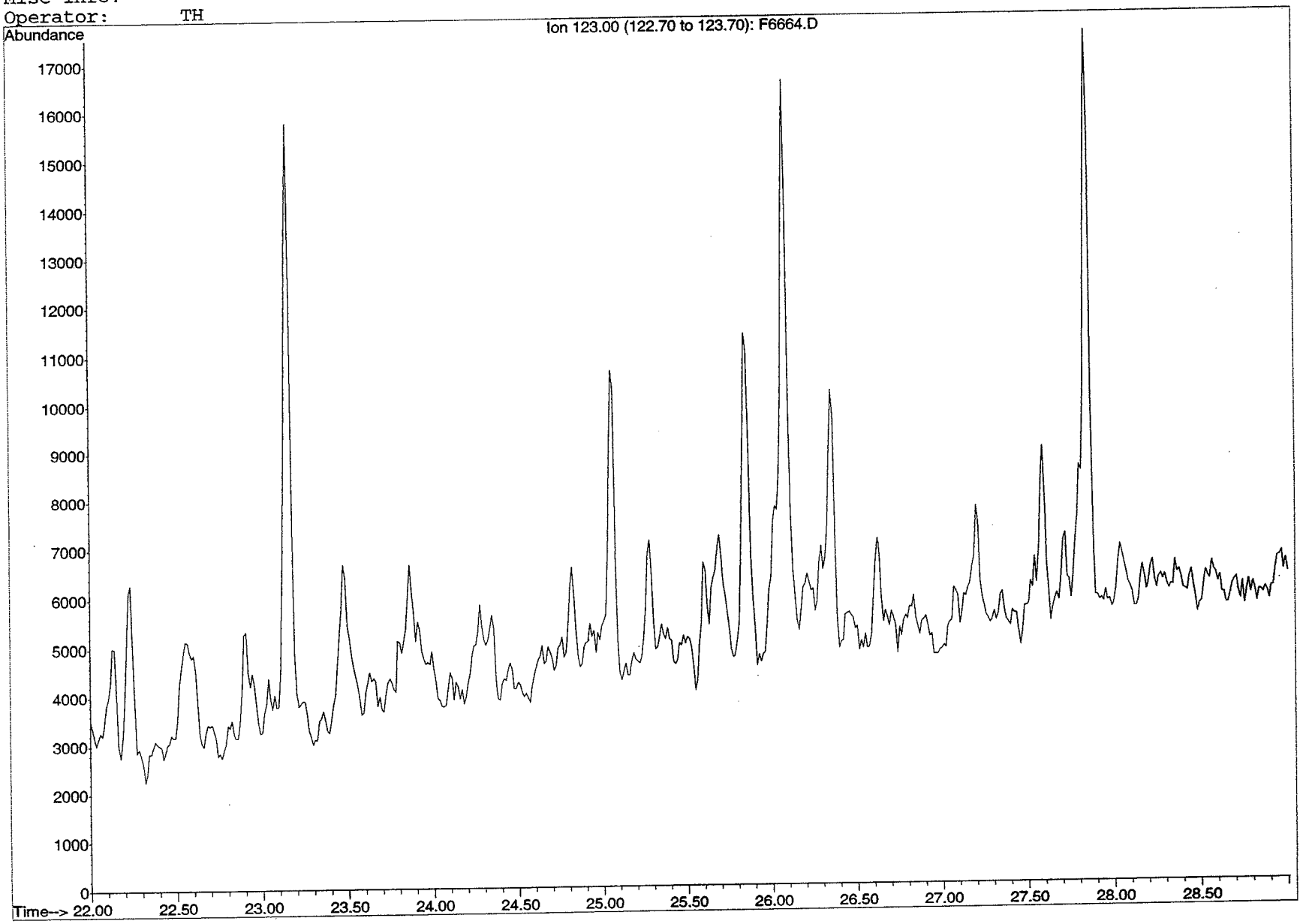


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6664.D
Date Acquired: 5 Mar 2003 4:28 pm
Method File: BIO1SIM
Sample Name: U0387-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-117 0810
U0387

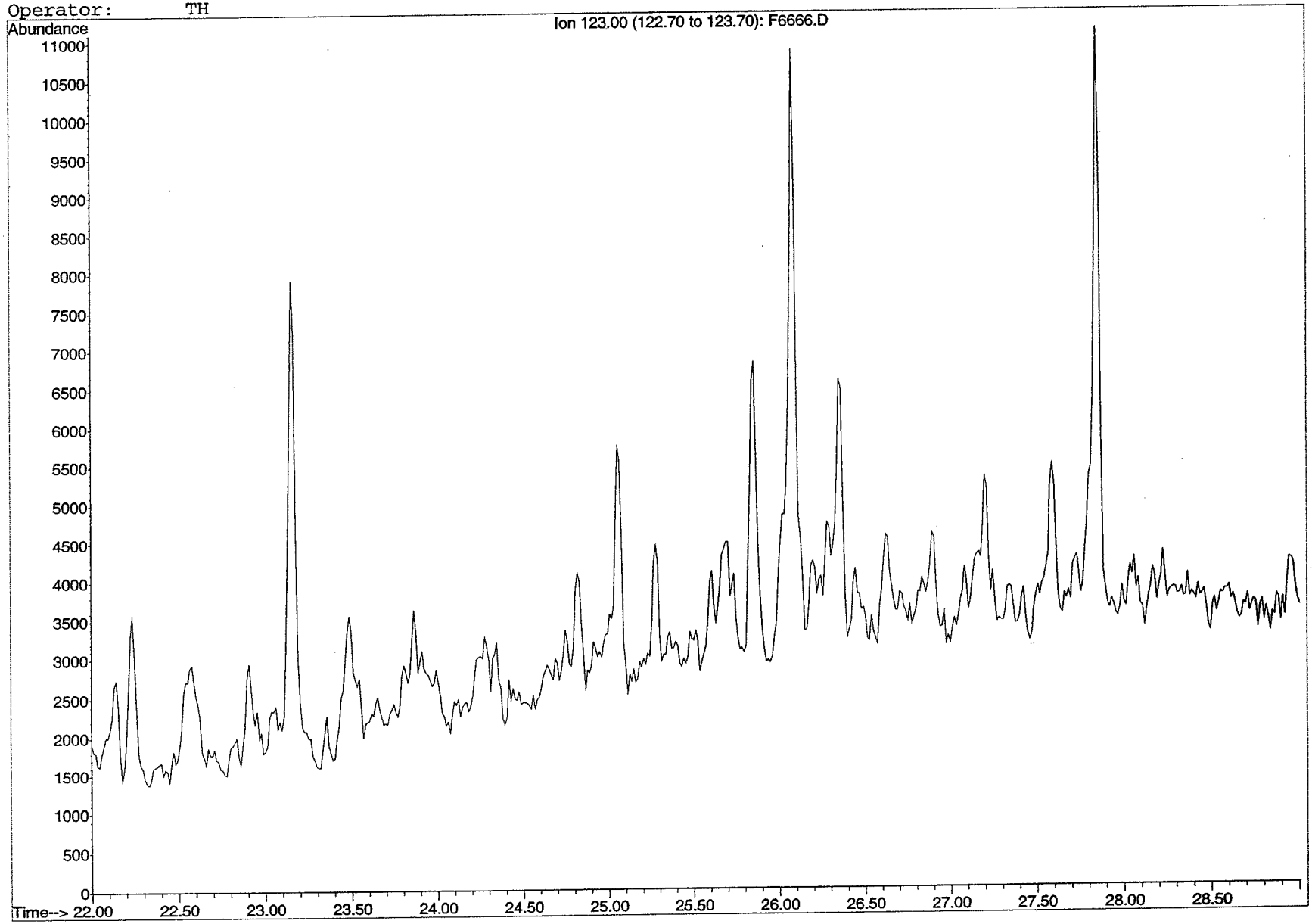


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6666.D
Date Acquired: 5 Mar 2003 7:33 pm
Method File: BIO1SIM
Sample Name: U0397-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-117 2830
U0397

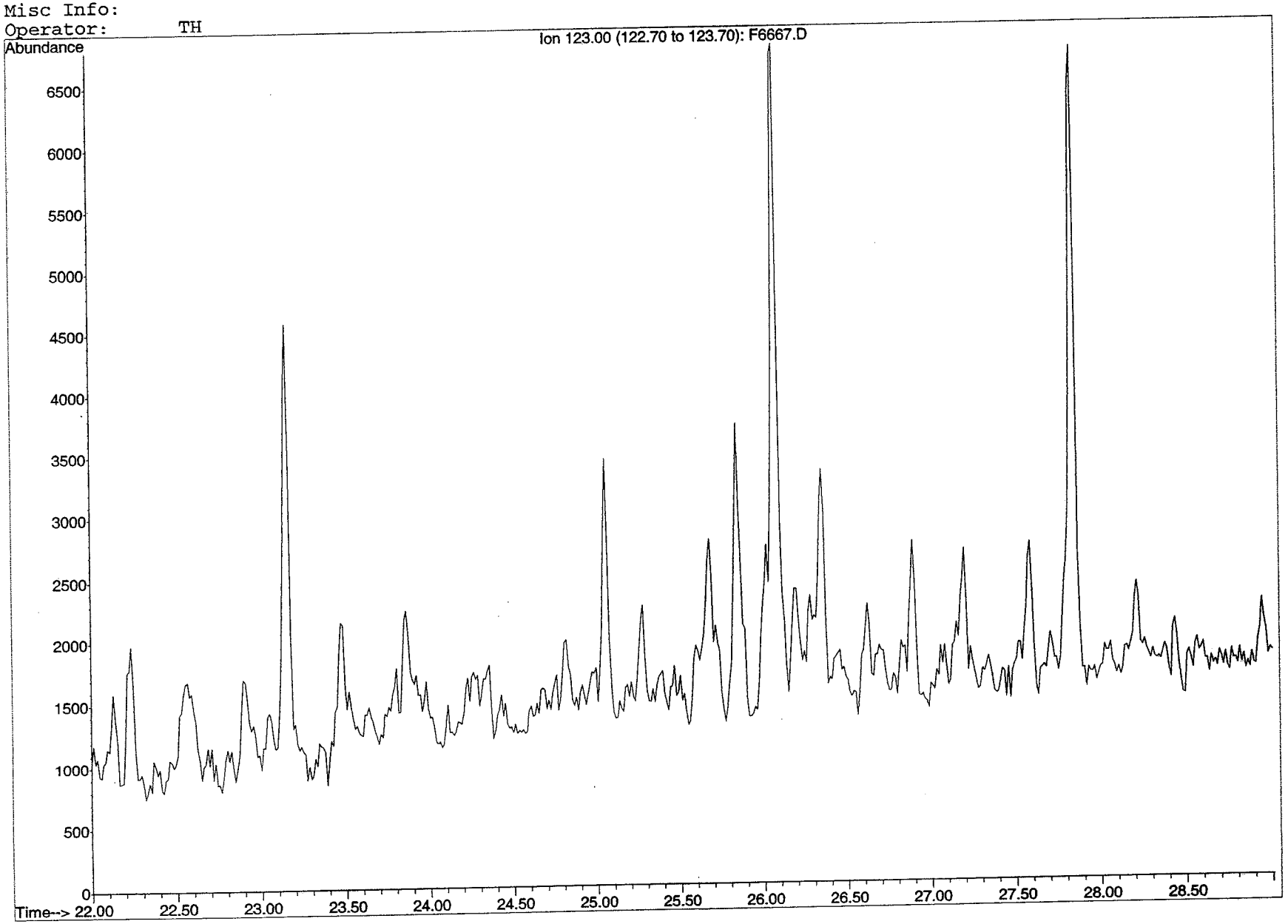


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6667.D
Date Acquired: 5 Mar 2003 9:05 pm
Method File: BIO1SIM
Sample Name: U0407-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-117 4850
U0407

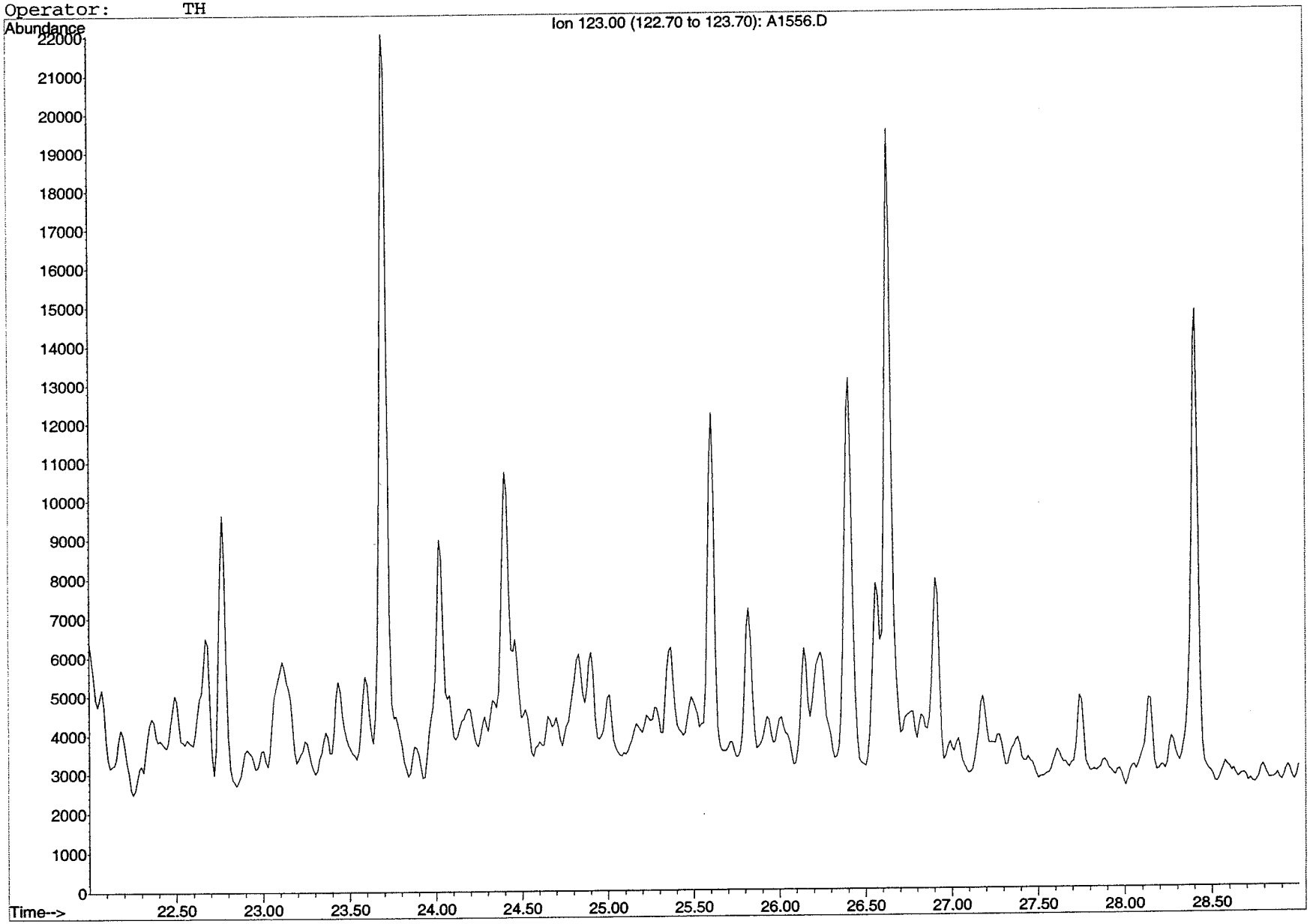


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1556.D
Date Acquired: 17 Feb 2003 6:26 pm
Method File: BIO1SIM
Sample Name: U 4507-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-117-US-9.6
U4507

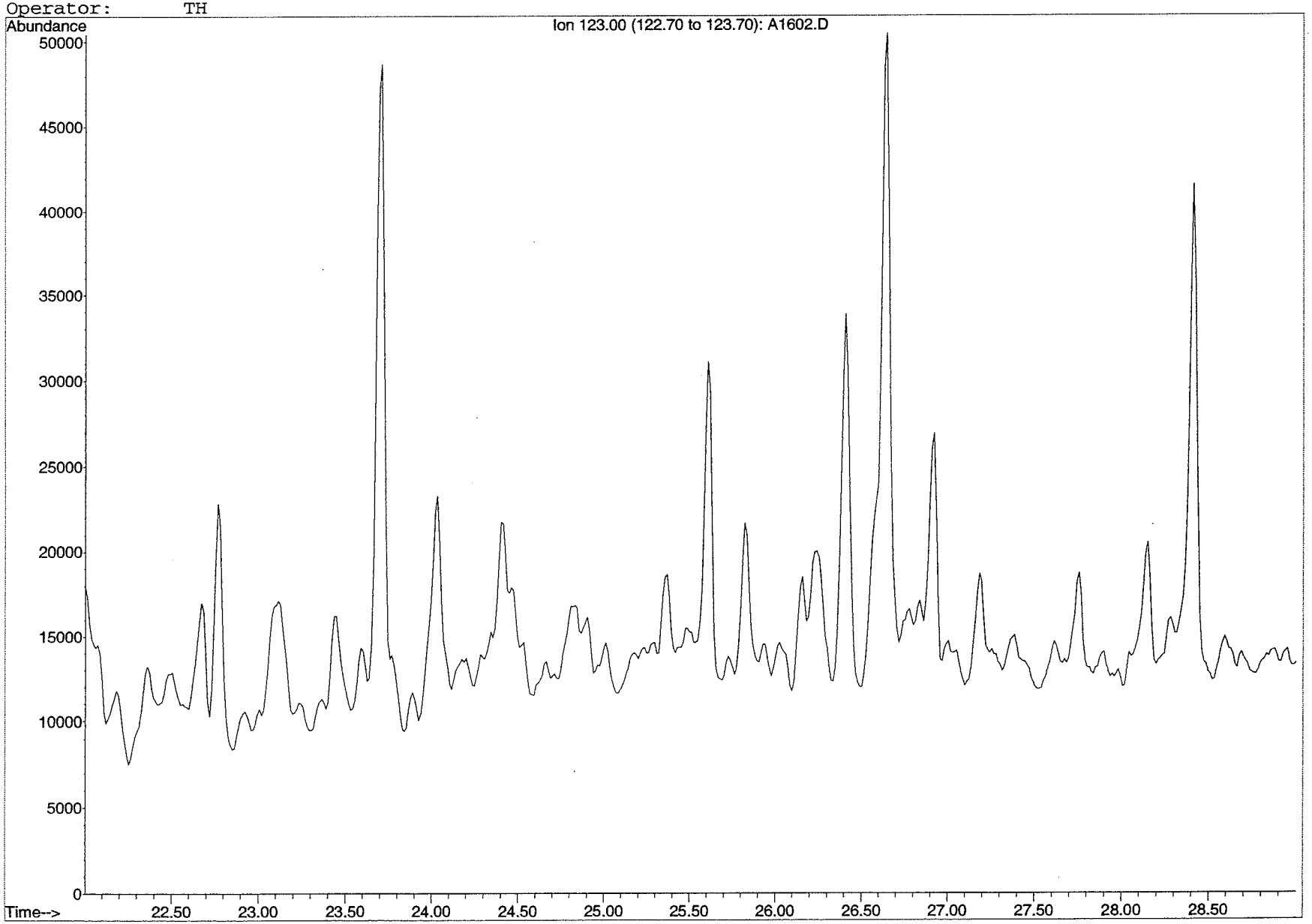


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1602.D
Date Acquired: 20 Feb 2003 10:50 pm
Method File: BIO1SIM
Sample Name: U6524-D-F1
Misc Info:
Operator: TH

Sesquiterpanes
NLU-119 0010 Composite
U6524

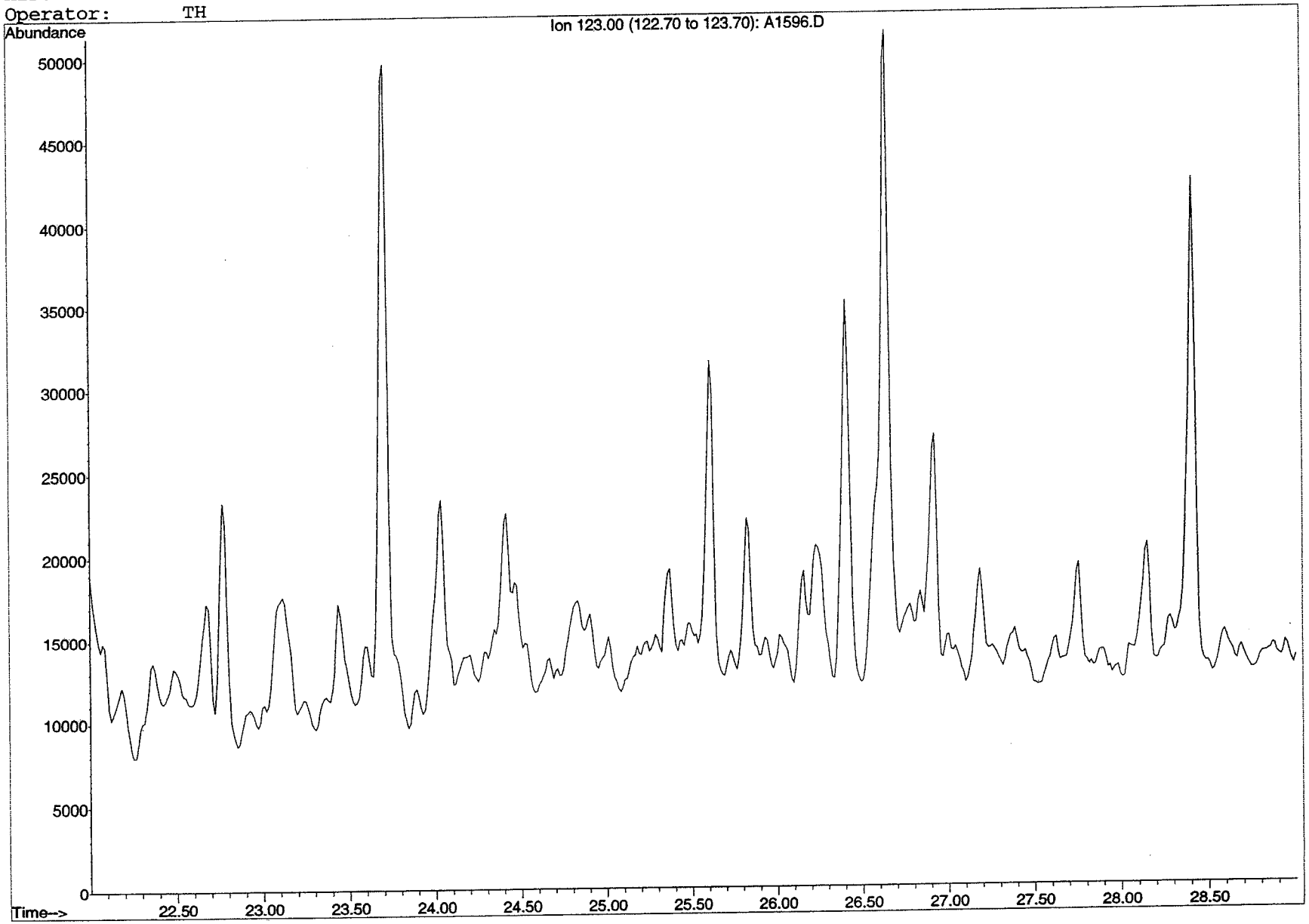


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1596.D
Date Acquired: 20 Feb 2003 10:06 am
Method File: BIO1SIM
Sample Name: U0455-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-119 0608
U0455

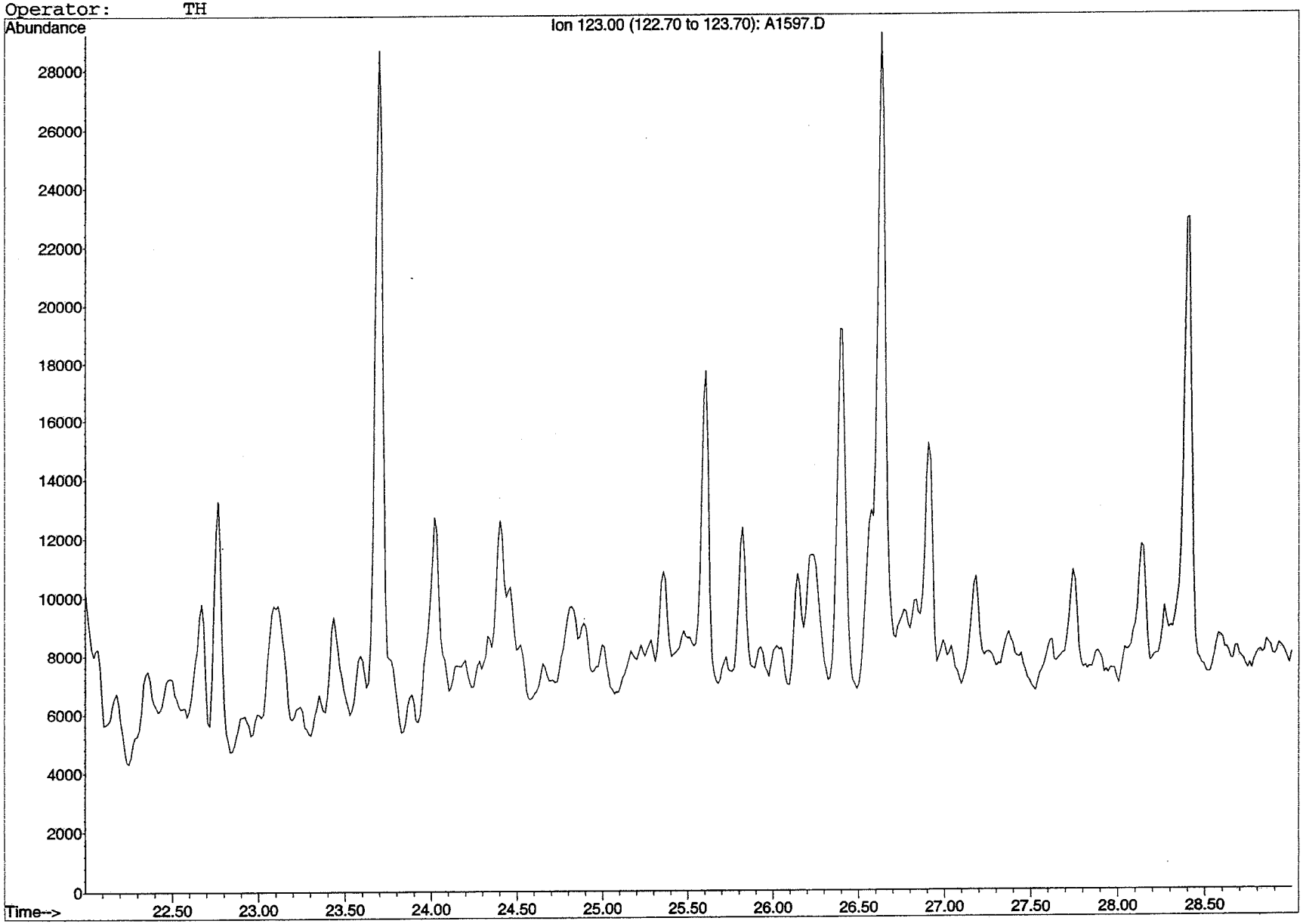


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1597.D
Date Acquired: 20 Feb 2003 1:29 pm
Method File: BIO1SIM
Sample Name: U0460-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-119 1618
U0460

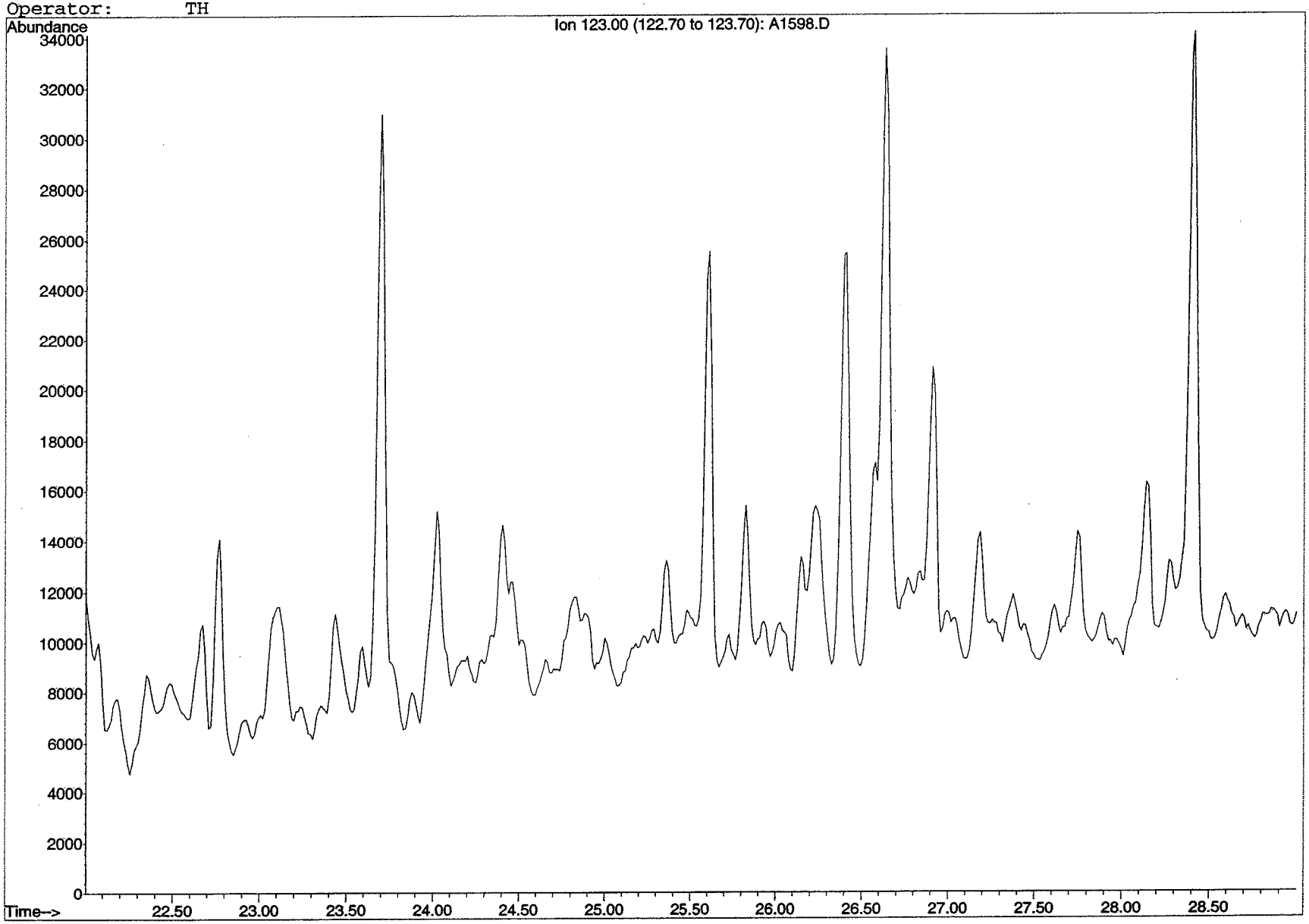


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1598.D
Date Acquired: 20 Feb 2003 4:48 pm
Method File: BIO1SIM
Sample Name: U0464-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-119 2426
U0464

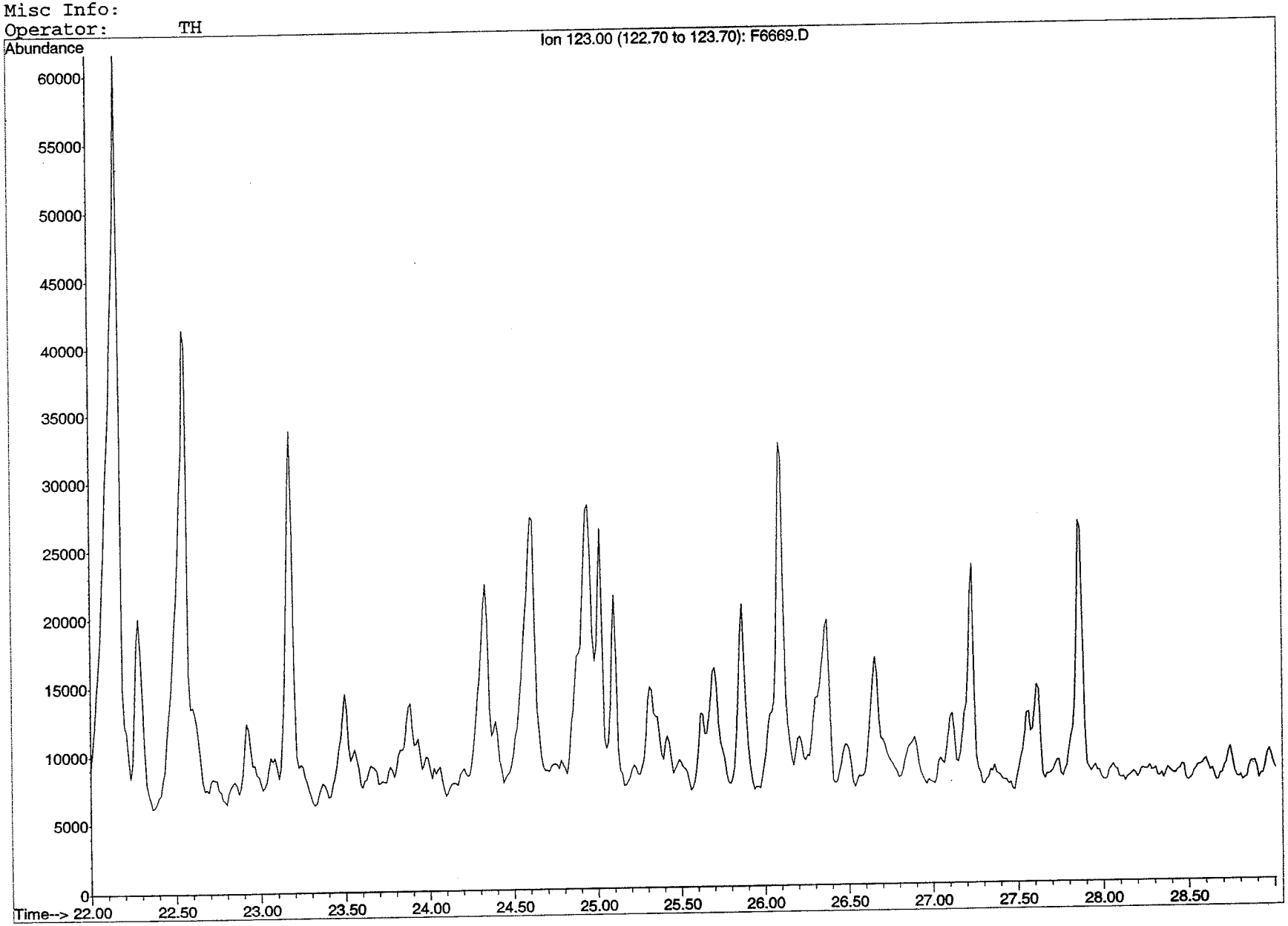


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

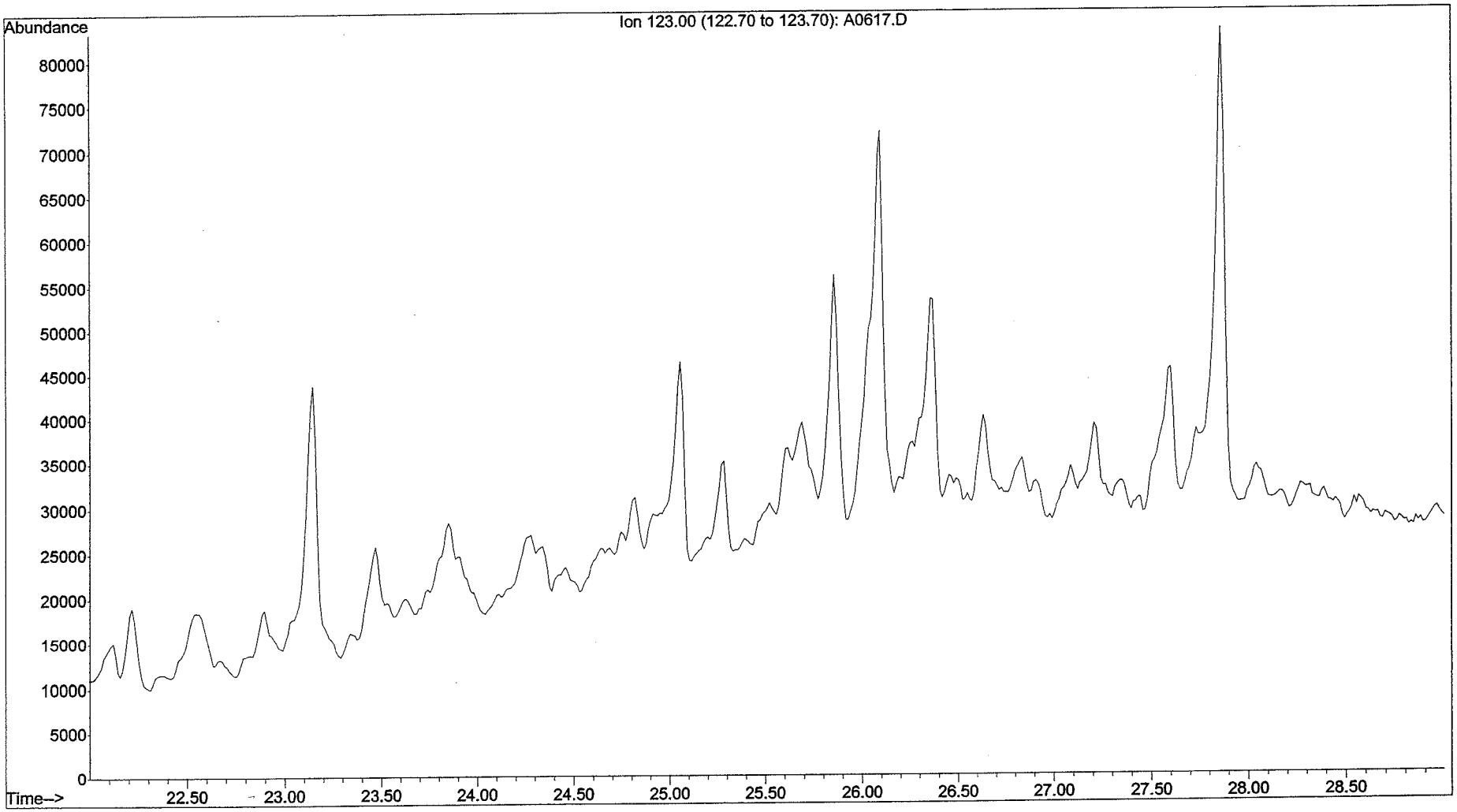
File: H:\F\DATA\SQF171\F6669.D
Date Acquired: 6 Mar 2003 9:58 am
Method File: BIO1SIM
Sample Name: U4512-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-119R2-US-0.5
U4512



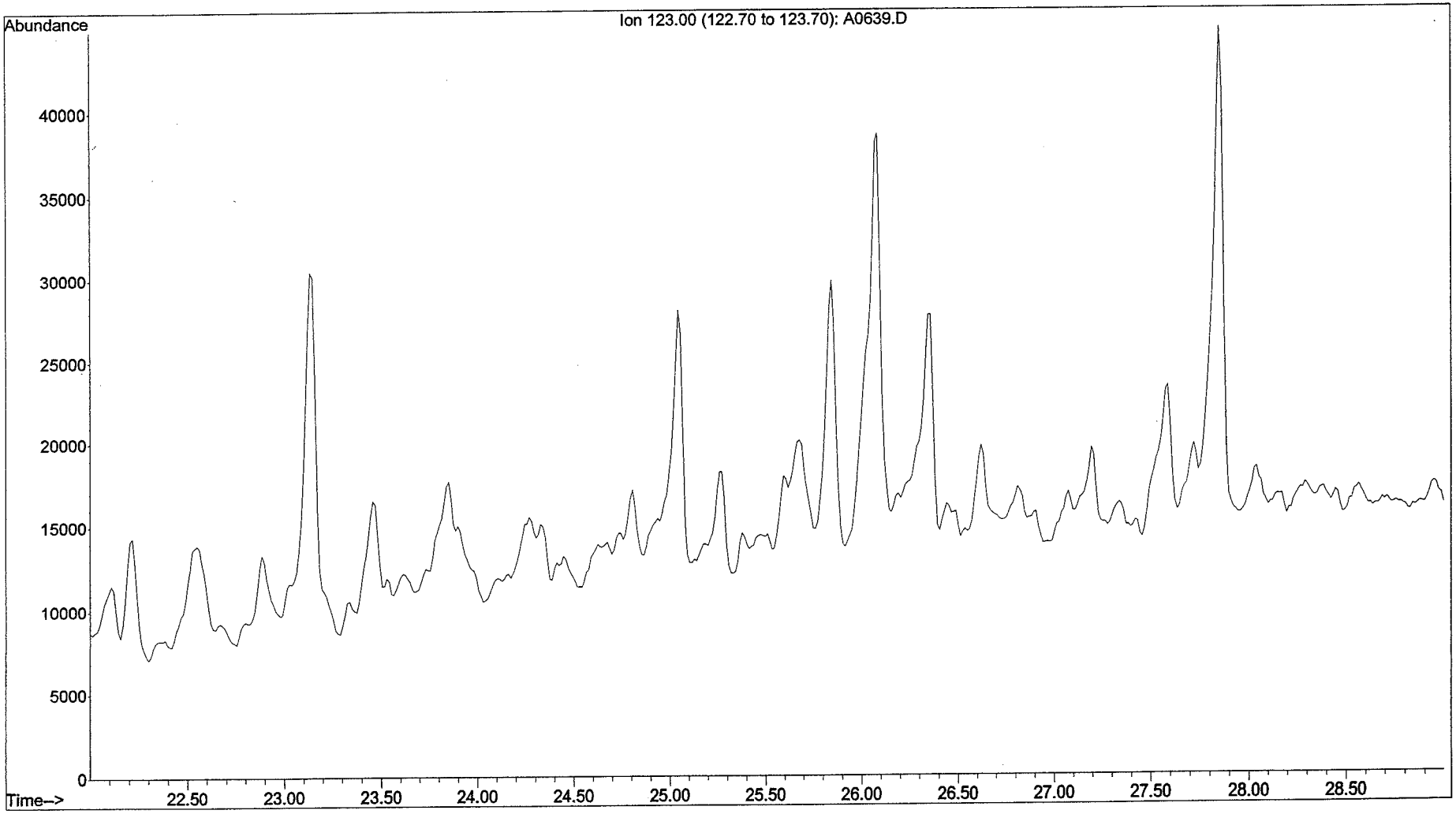
File : Q:\A\DATA\SQA319\A0617.D
Operator : TH
Acquired : 13 Dec 2002 8:59 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0151-F1
Misc Info :
Vial Number: 21

Sesquiterpane Biomarkers
NLU-121-SS-0010
U0151



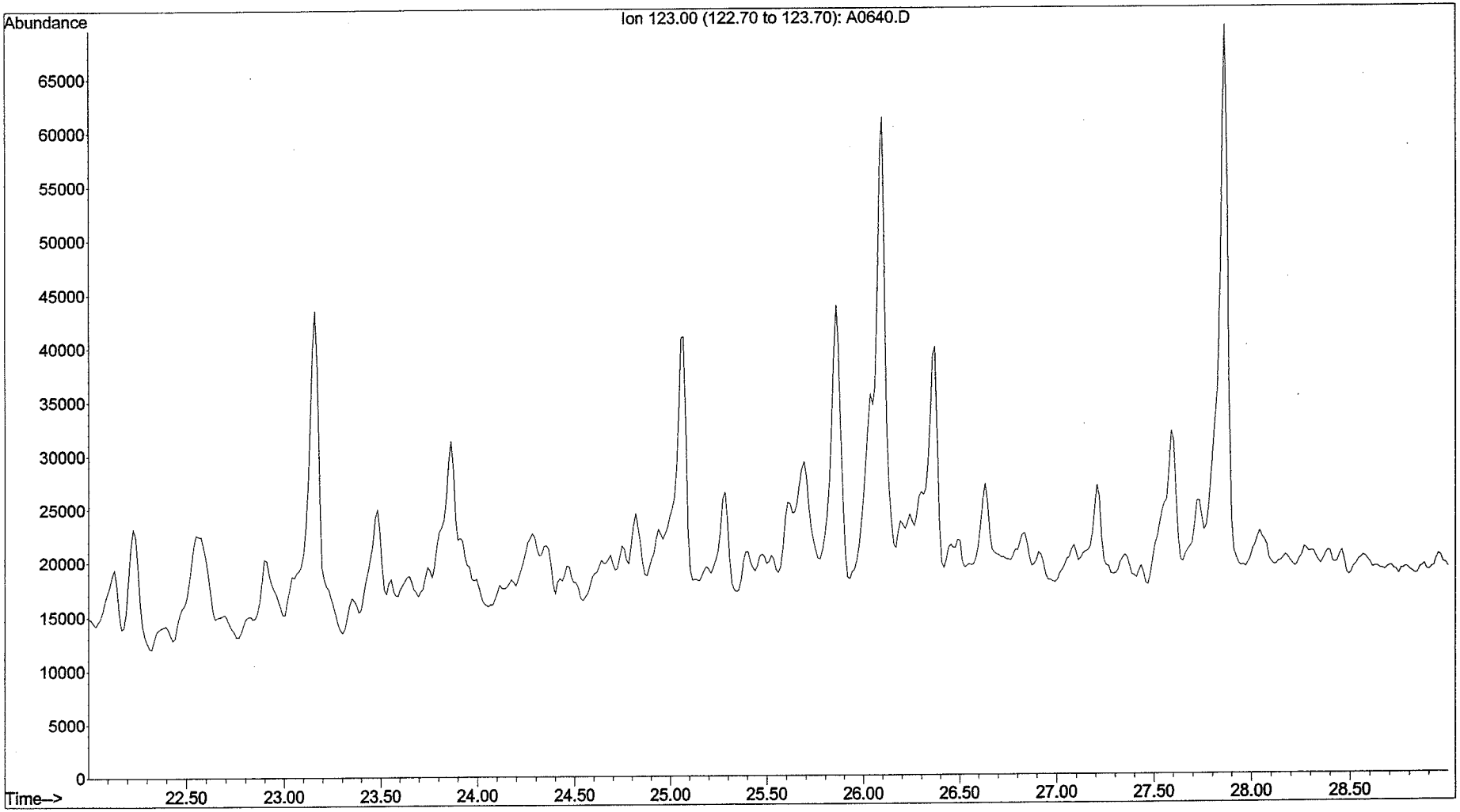
File : Q:\A\DATA\SQA319\A0639.D
Operator : TH
Acquired : 15 Dec 2002 8:27 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0152-F1
Misc Info :
Vial Number: 43

Sesquiterpane Biomarkers
NLU-121-SS-2030
U0152



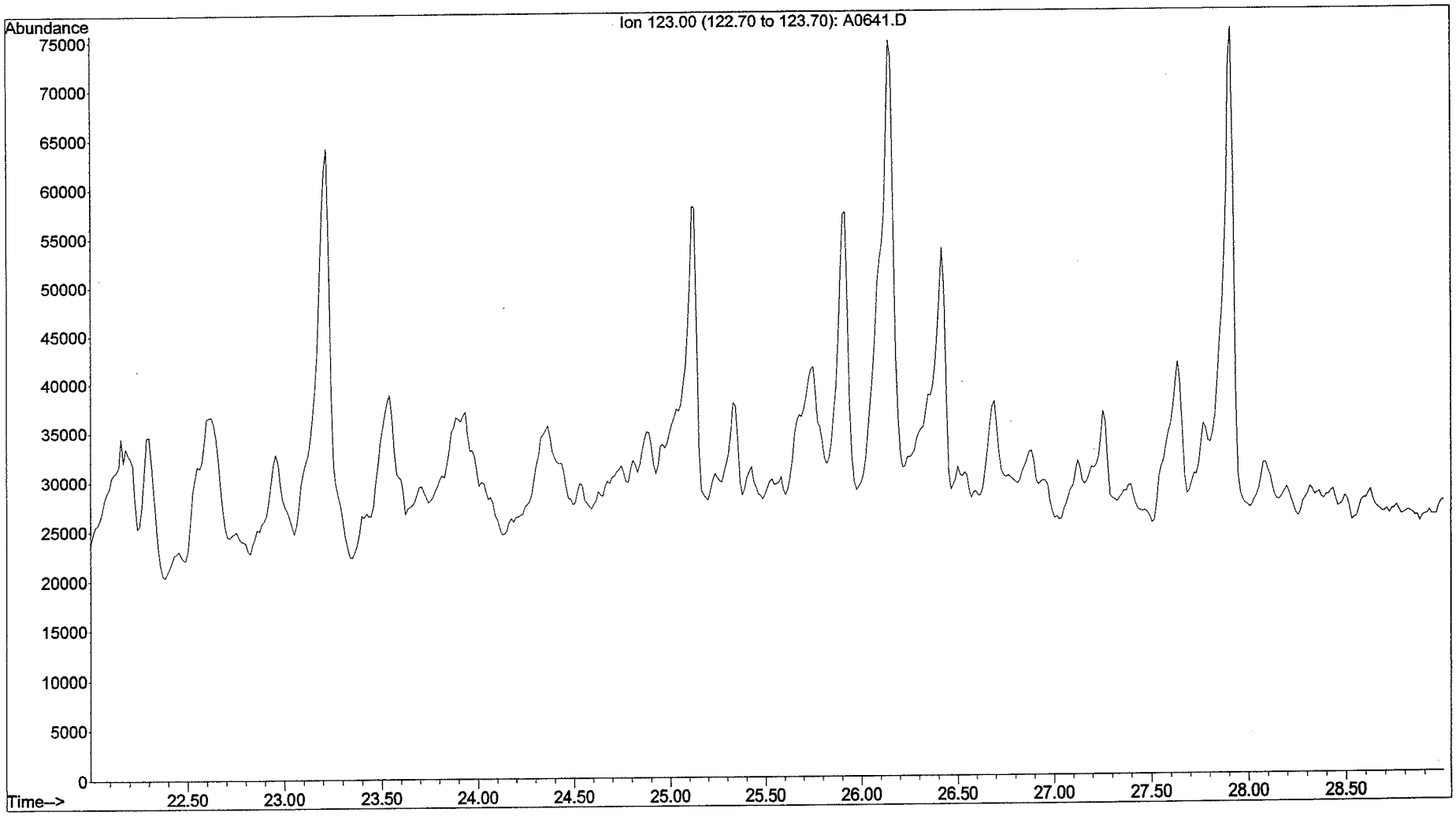
File : Q:\A\DATA\SQA319\A0640.D
Operator : TH
Acquired : 15 Dec 2002 10:02 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0153-F1
Misc Info :
Vial Number: 44

Sesquiterpane Biomarkers
NLU-122-SS-0010
U0153



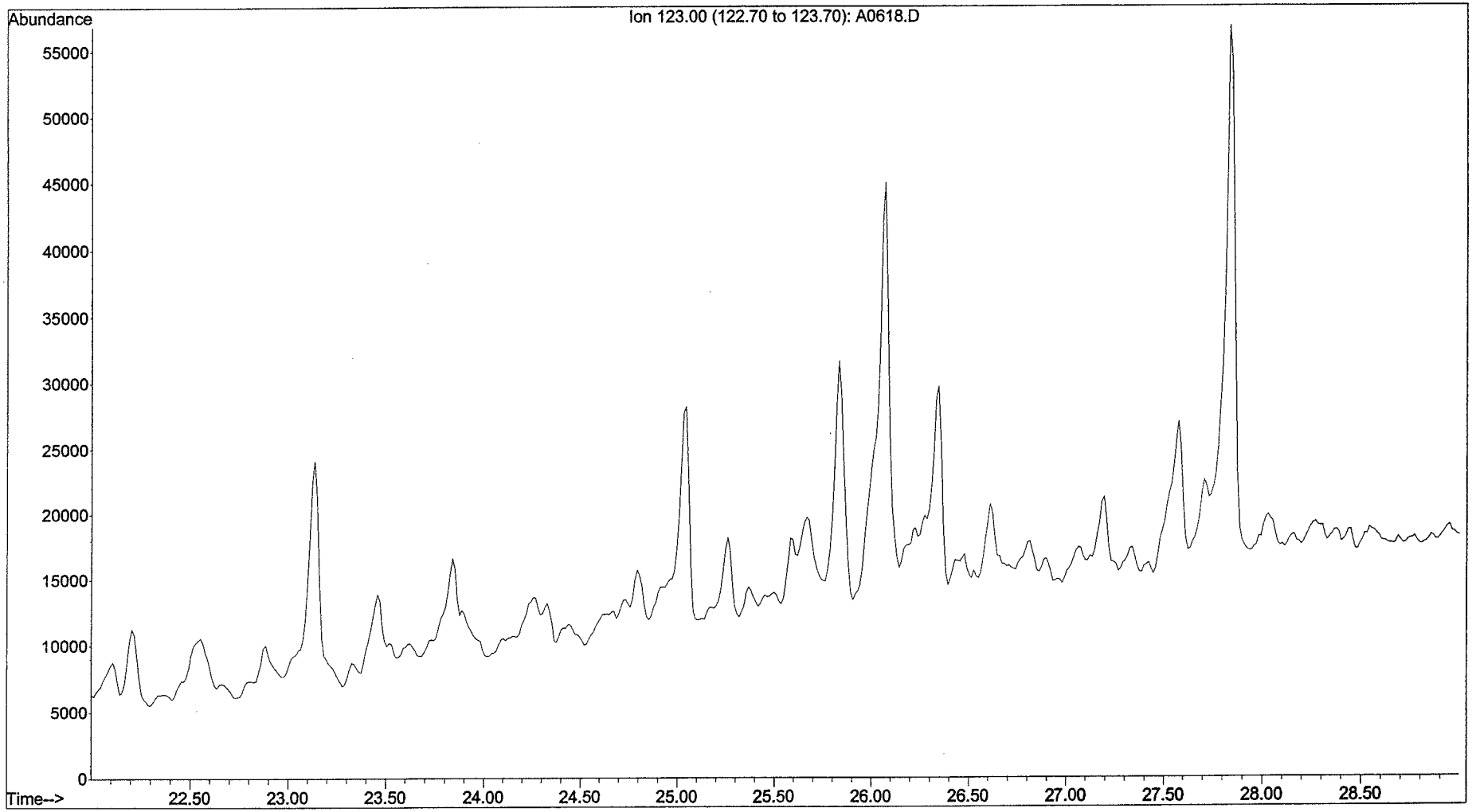
File : Q:\A\DATA\SQA319\A0641.D
Operator : TH
Acquired : 15 Dec 2002 11:36 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0154-F1
Misc Info :
Vial Number: 45

Sesquiterpane Biomarkers
NLU-122-SS-2030
U0154



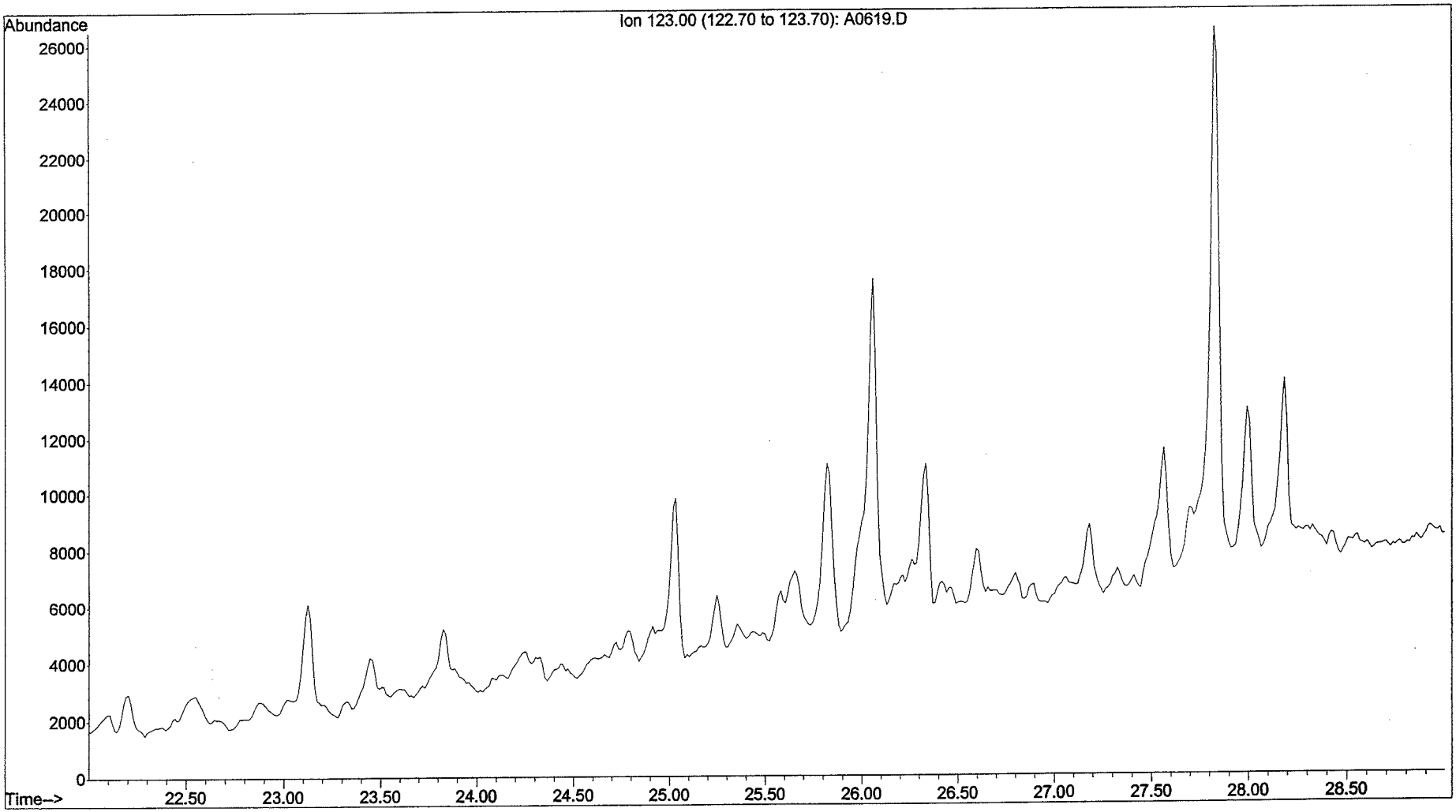
File : Q:\A\DATA\SQA319\A0618.D
Operator : TH
Acquired : 13 Dec 2002 10:34 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0155-F1
Misc Info :
Vial Number: 22

Sesquiterpane Biomarkers
NLU-123-SS-0010
U0155



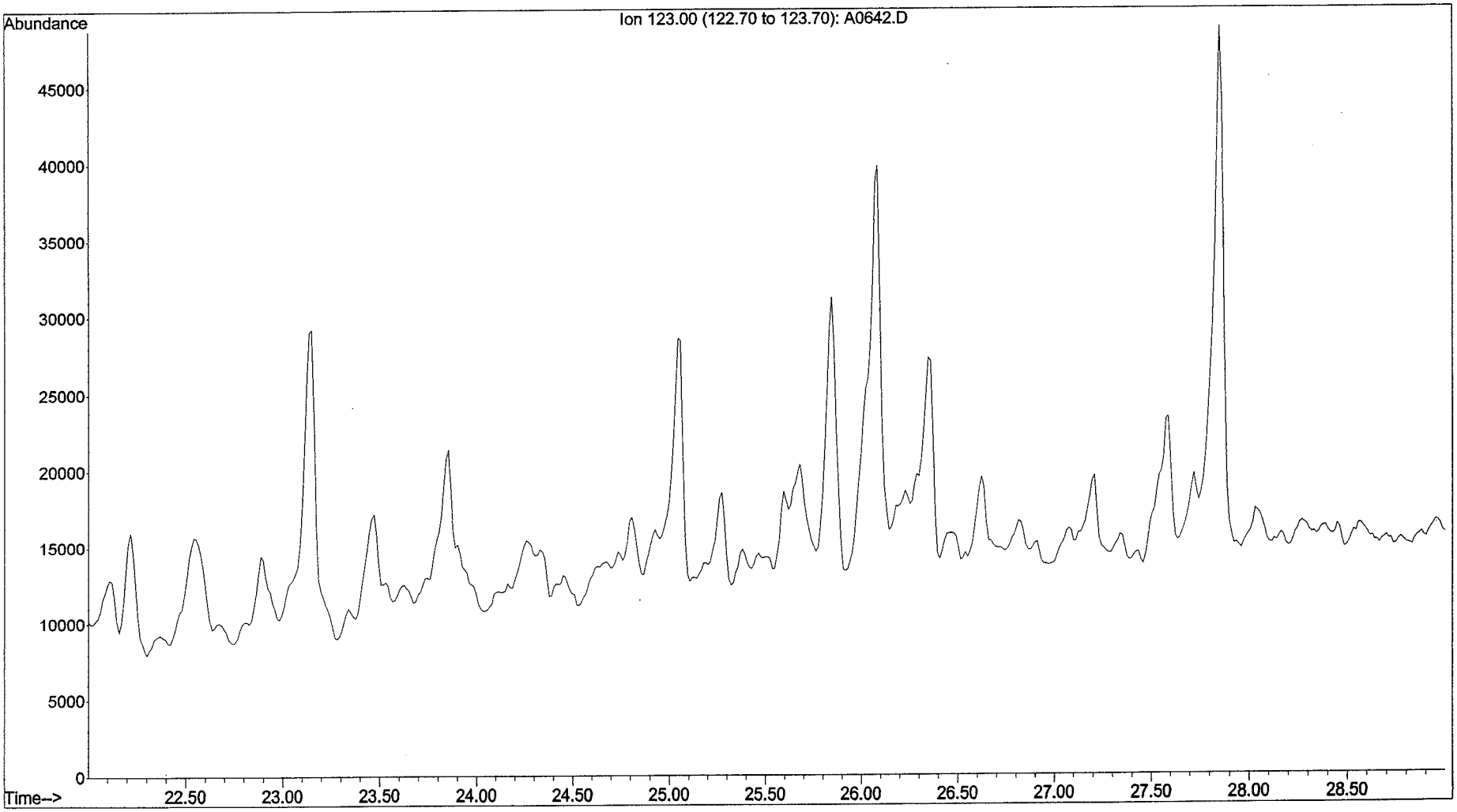
File : Q:\A\DATA\SQA319\A0619.D
Operator : TH
Acquired : 14 Dec 2002 12:09 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0156-F1
Misc Info :
Vial Number: 23

Sesquiterpane Biomarkers
NLU-124-SS-0010
U0156



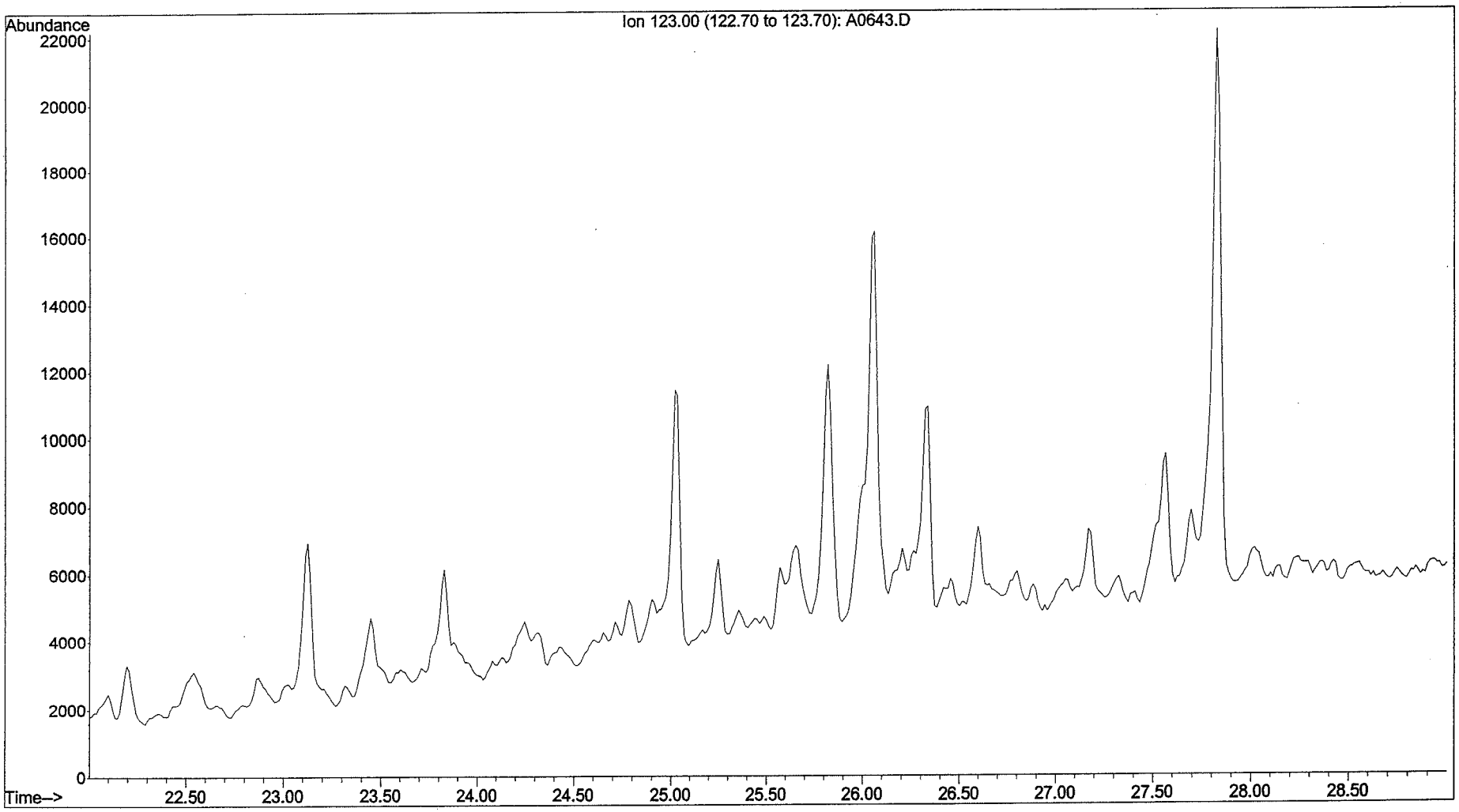
File : Q:\A\DATA\SQA319\A0642.D
Operator : TH
Acquired : 15 Dec 2002 1:09 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0157-F1
Misc Info :
Vial Number: 46

Sesquiterpane Biomarkers
NLU-124-SS-2030
U0157



File : Q:\A\DATA\SQA319\A0643.D
Operator : TH
Acquired : 15 Dec 2002 2:43 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0158-F1
Misc Info :
Vial Number: 47

Sesquiterpane Biomarkers
NLU-126-SS-0010
U0158

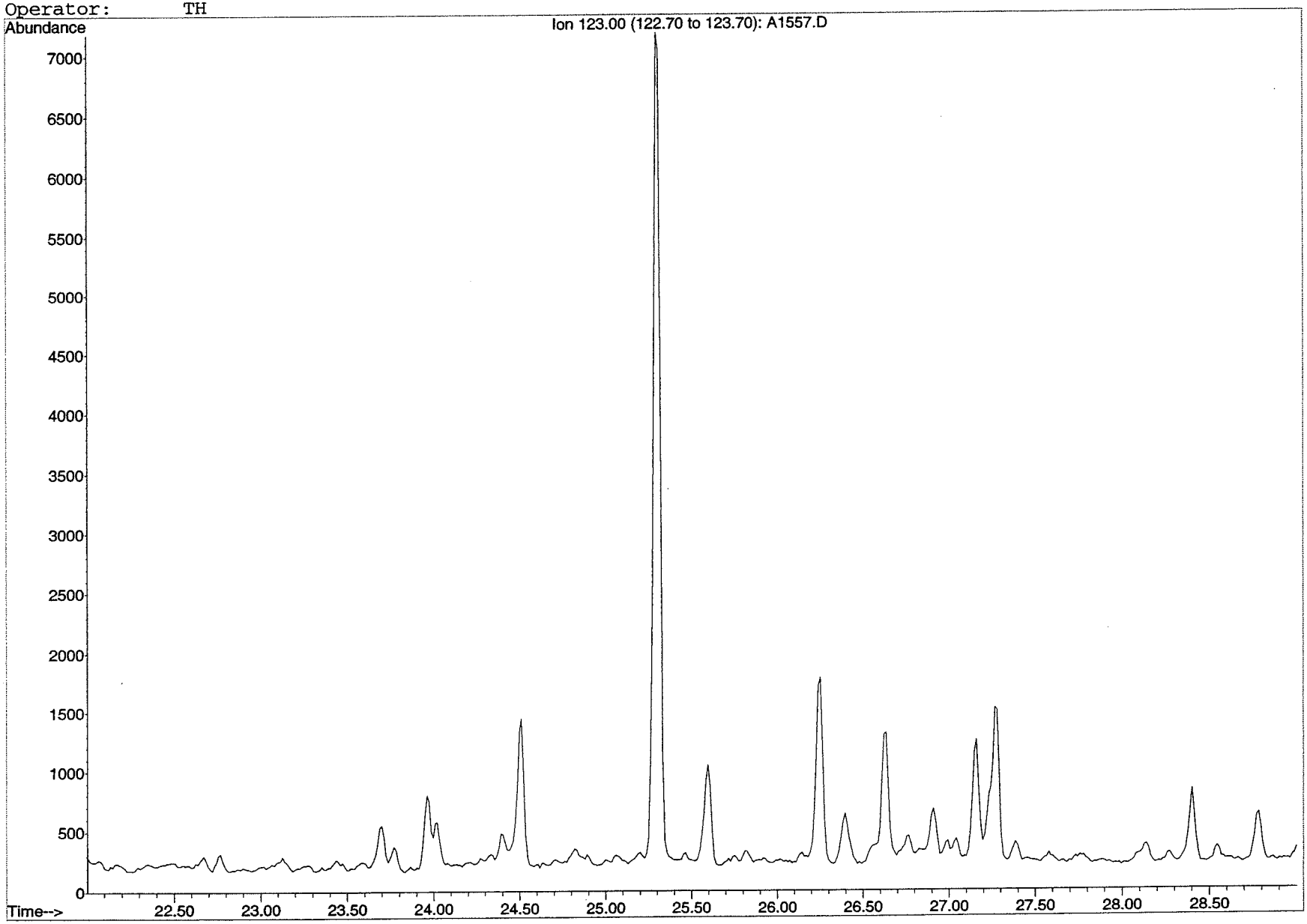


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1557.D
Date Acquired: 17 Feb 2003 7:57 pm
Method File: BIO1SIM
Sample Name: U4517-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-126-SS-0010
U4517

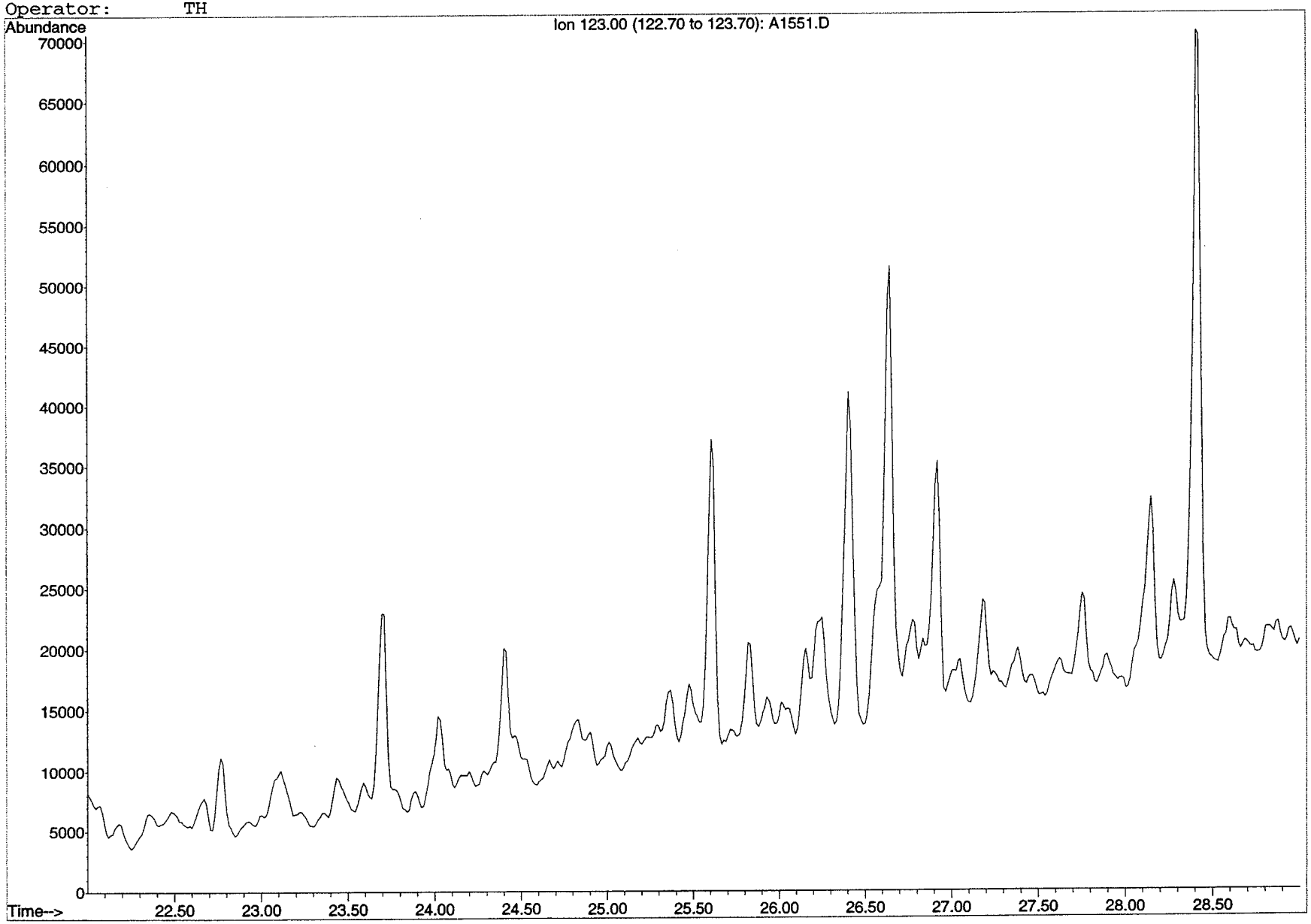


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

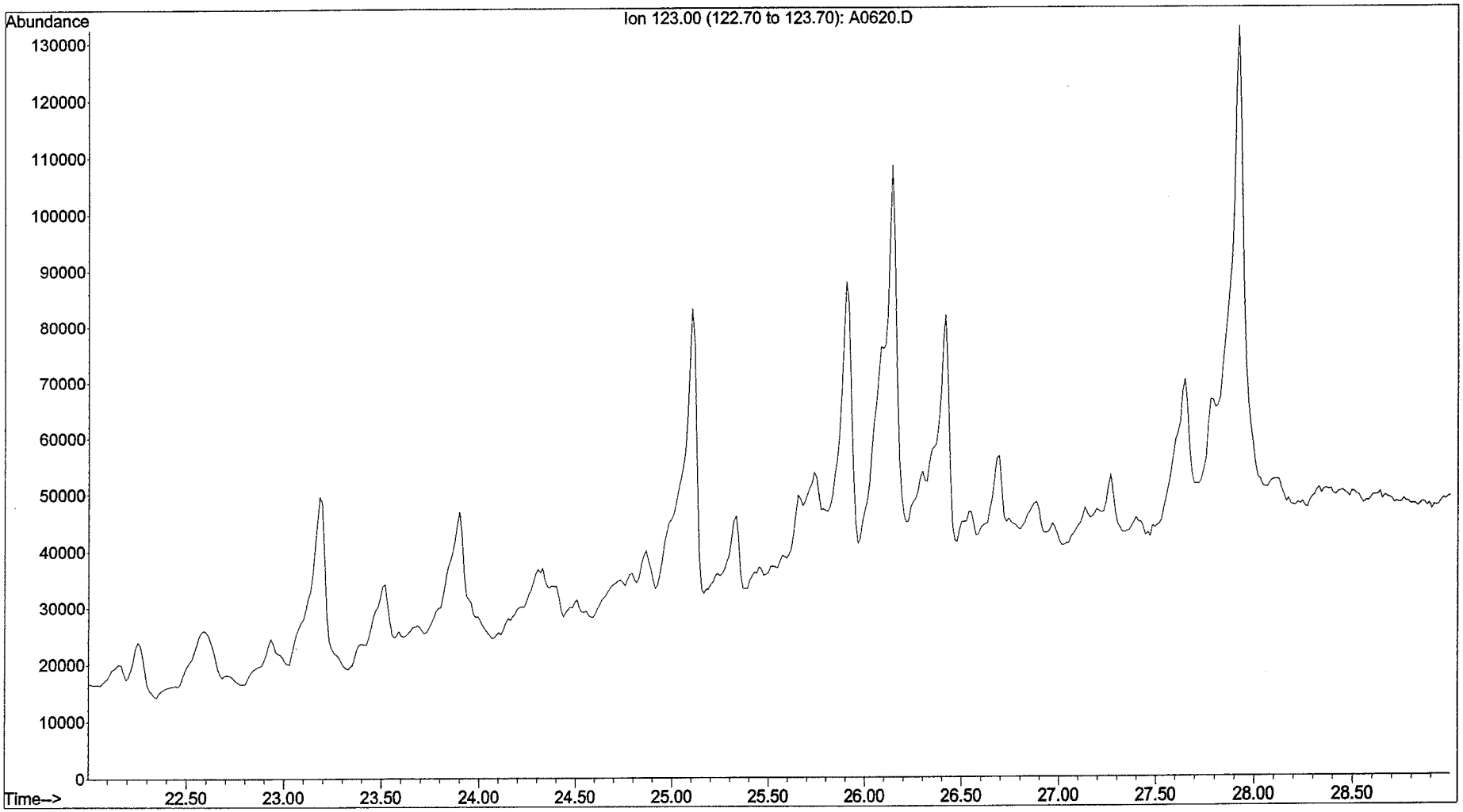
File: H:\A\DATA\SQA339\A1551.D
Date Acquired: 17 Feb 2003 10:58 am
Method File: BIO1SIM
Sample Name: U0097-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-126-SS-1020
U0097



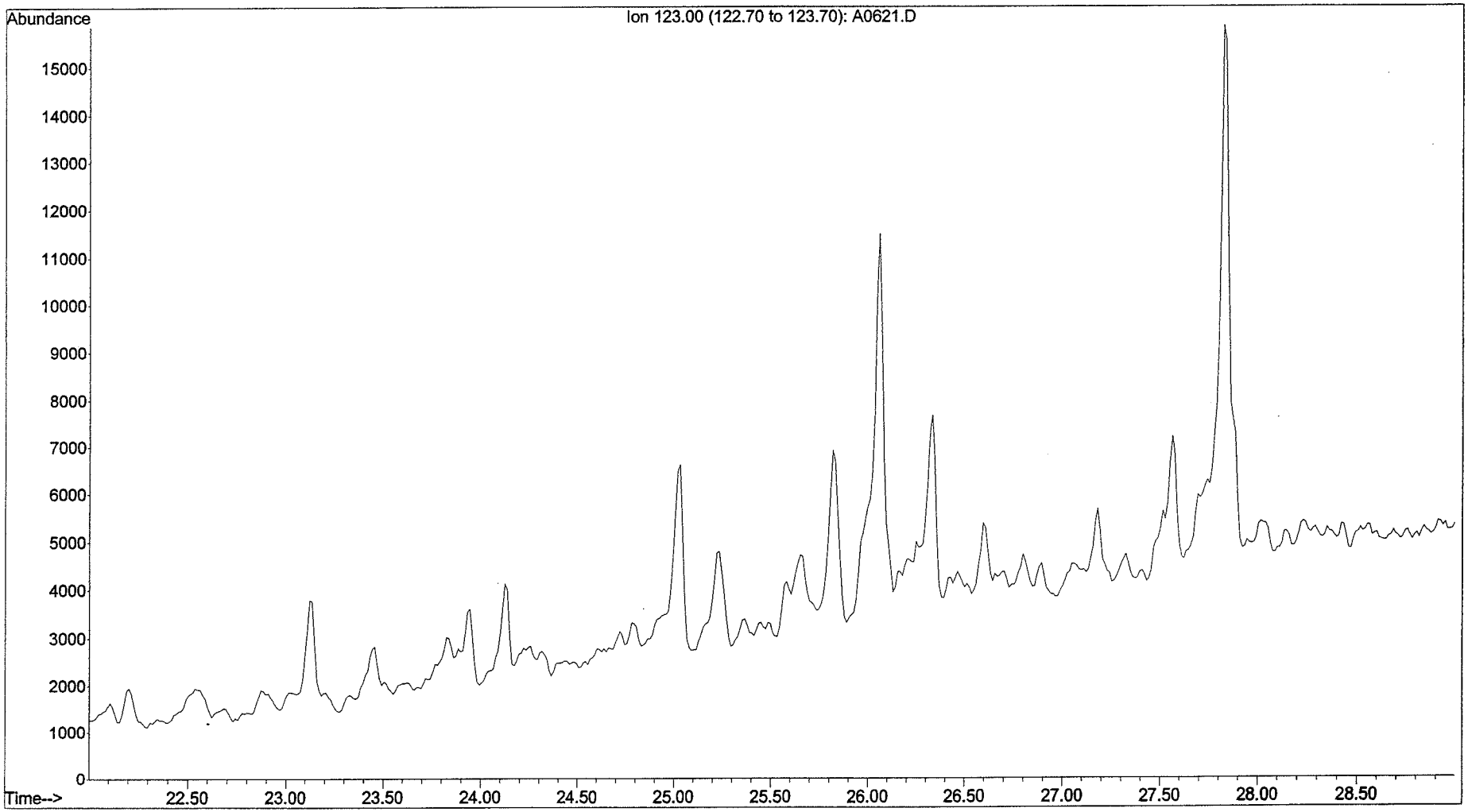
File : Q:\A\DATA\SQA319\A0620.D
Operator : TH
Acquired : 14 Dec 2002 1:44 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0159-F1
Misc Info :
Vial Number: 24

Sesquiterpane Biomarkers
NLU-127-SS-0010
U0159



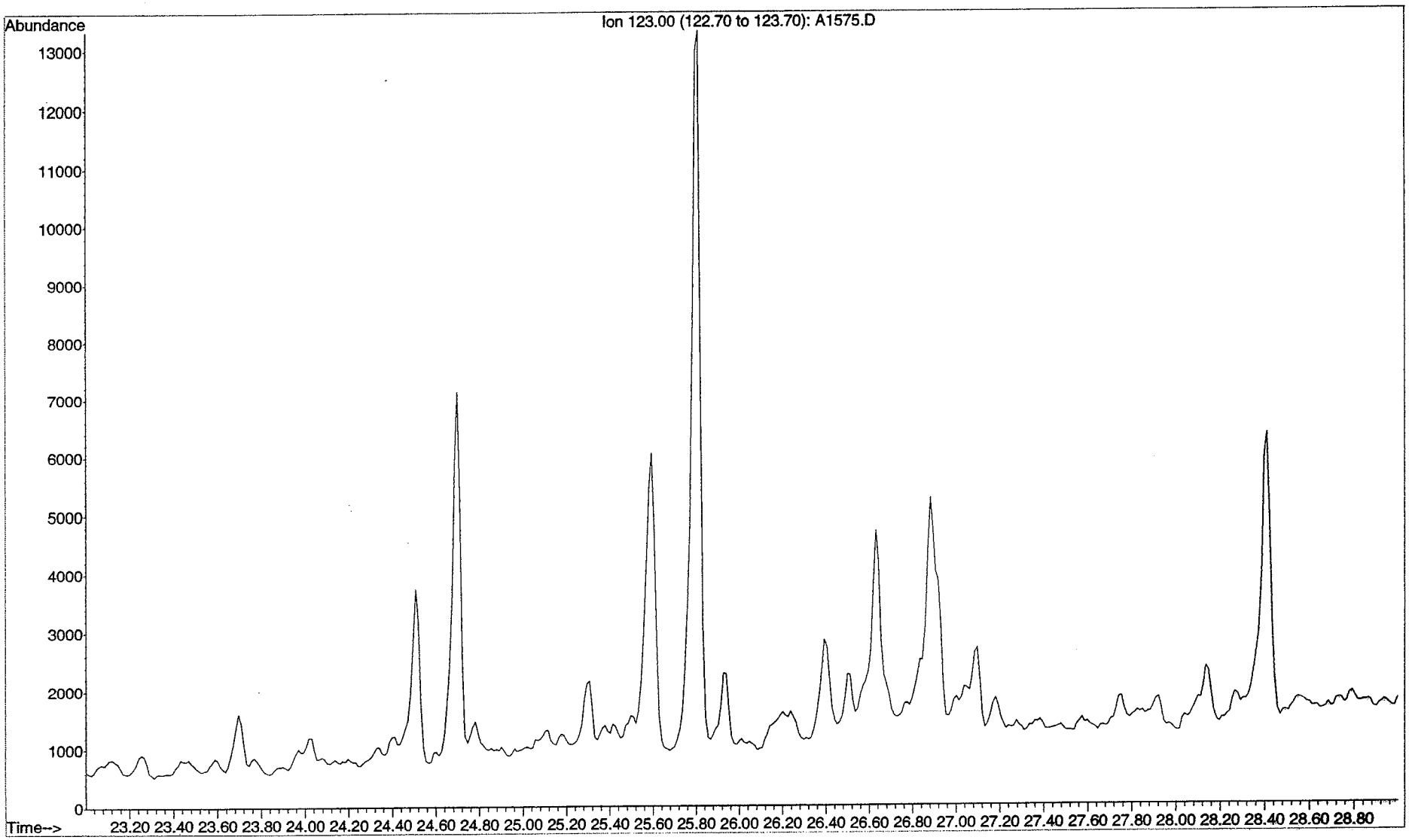
File : Q:\A\DATA\SQA319\A0621.D
Operator : TH
Acquired : 14 Dec 2002 3:20 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0160-F1
Misc Info :
Vial Number: 25

Sesquiterpane Biomarkers
NLU-128-SS-0010
U0160



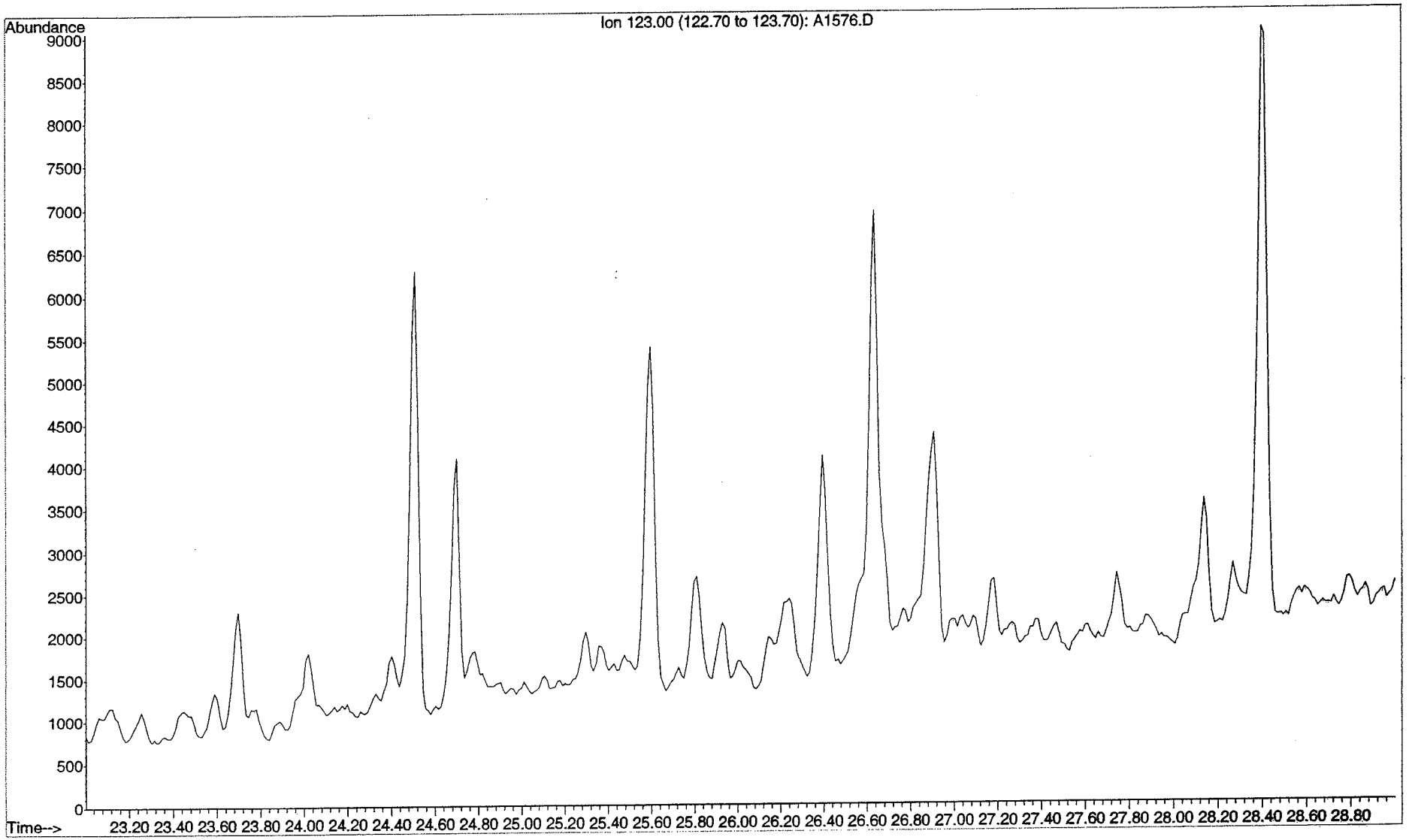
File : H:\A\DATA\SQA339\A1575.D
Operator : TH
Acquired : 18 Feb 2003 11:07 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0135-F1
Misc Info :
Vial Number: 38

Sesquiterpane Biomarkers
NLU-129-SS-0010
U0135



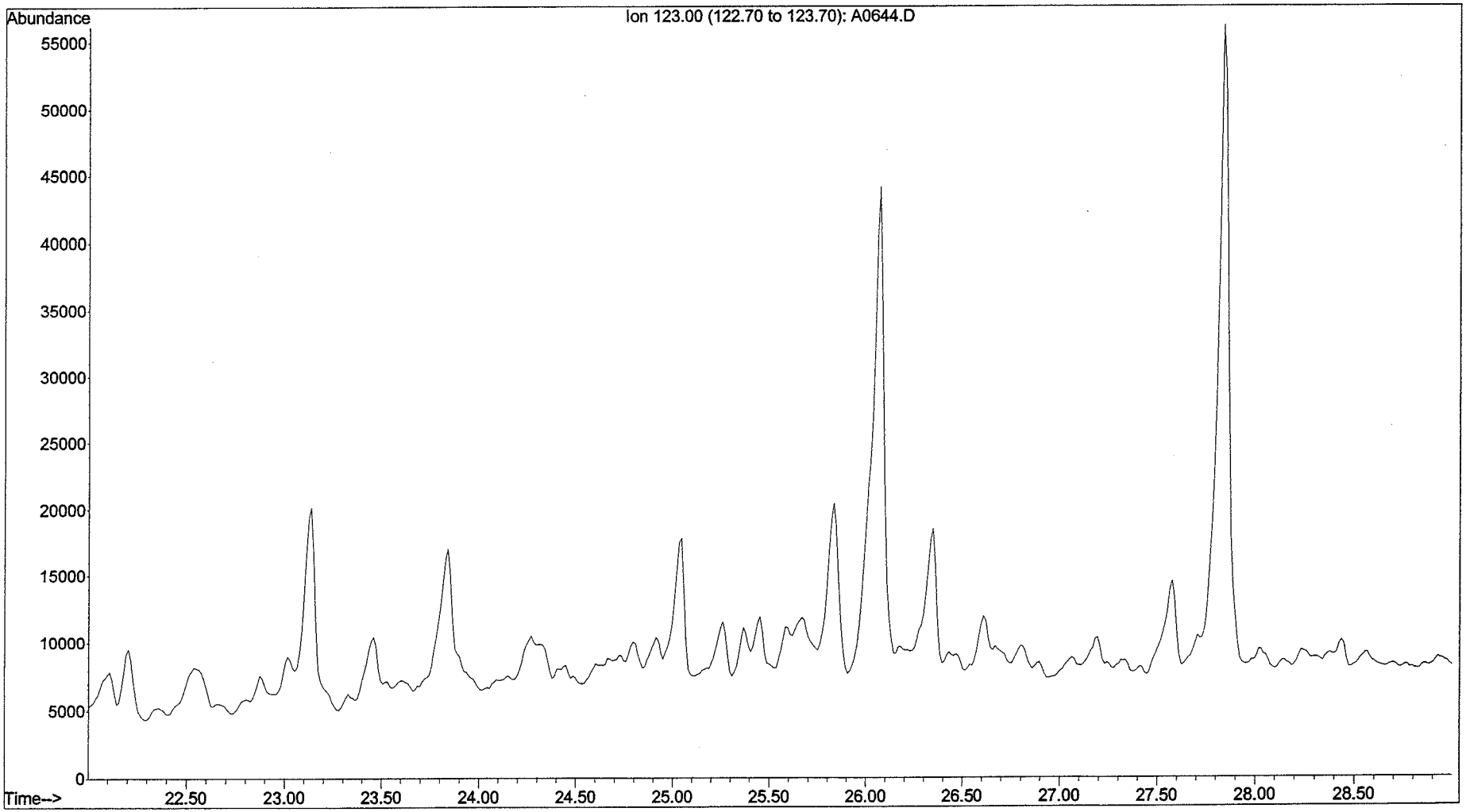
File : H:\A\DATA\SQA339\A1576.D
Operator : TH
Acquired : 19 Feb 2003 12:38 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: UU0137-F1
Misc Info :
Vial Number: 39

Sesquiterpane Biomarkers
NLU-129-SS-2030
U0137



File : Q:\A\DATA\SQA319\A0644.D
Operator : TH
Acquired : 15 Dec 2002 4:16 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0161-F1
Misc Info :
Vial Number: 48

Sesquiterpane Biomarkers
NLU-130-SS-0010
U0161

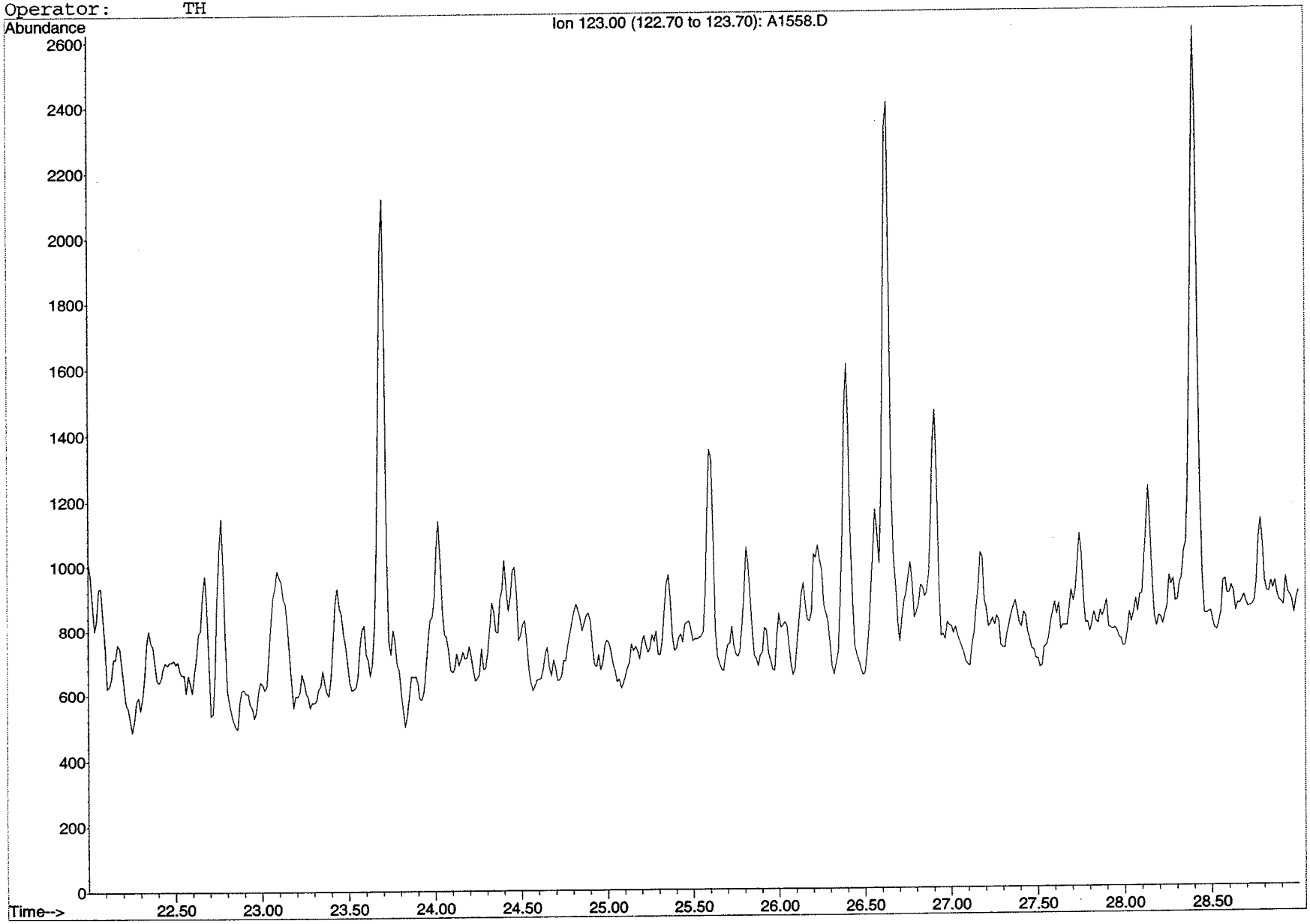


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

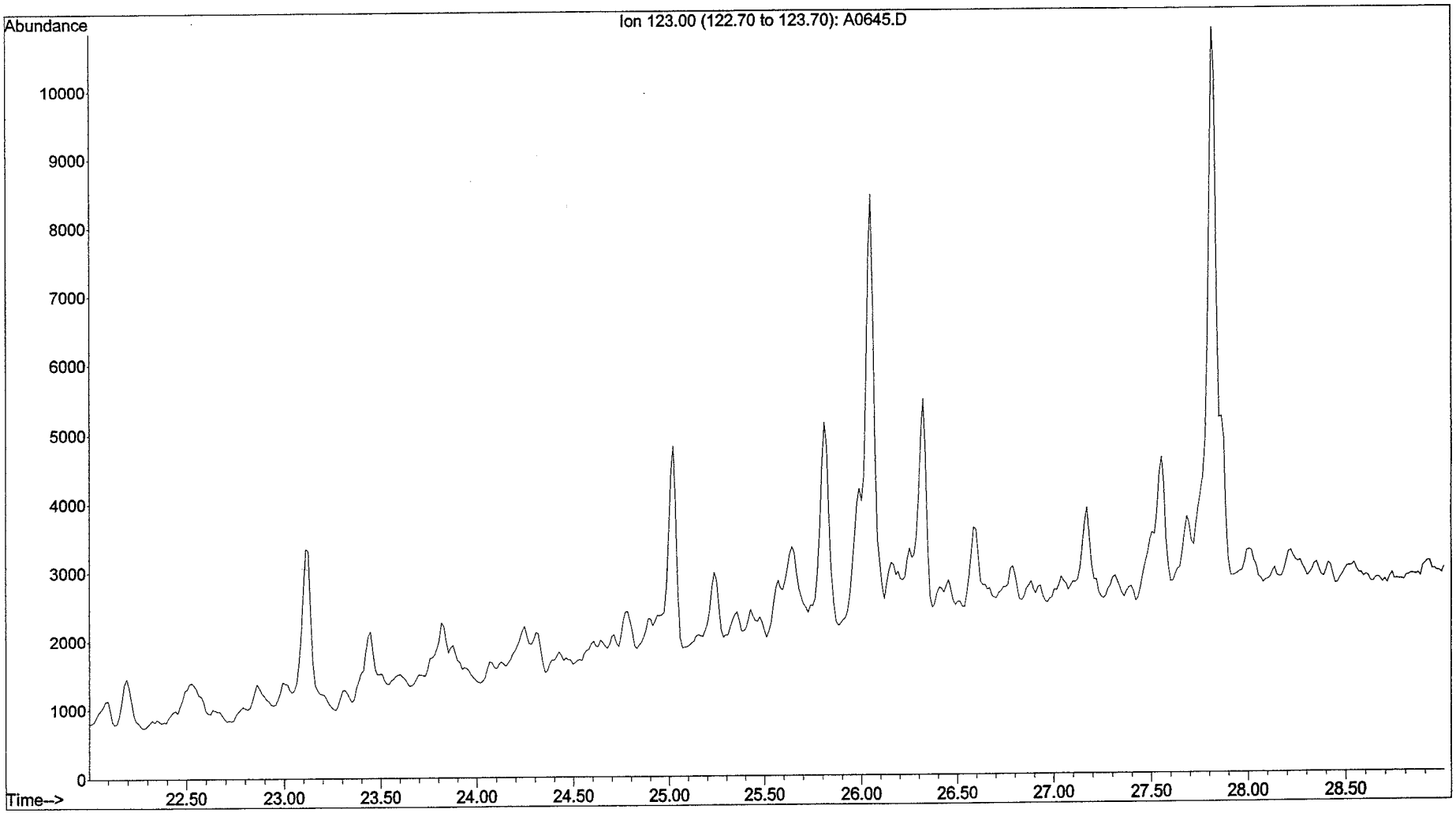
File: H:\A\DATA\SQA339\A1558.D
Date Acquired: 17 Feb 2003 9:29 pm
Method File: BIO1SIM
Sample Name: U74518-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
NLU-131-SS-0010
U4518



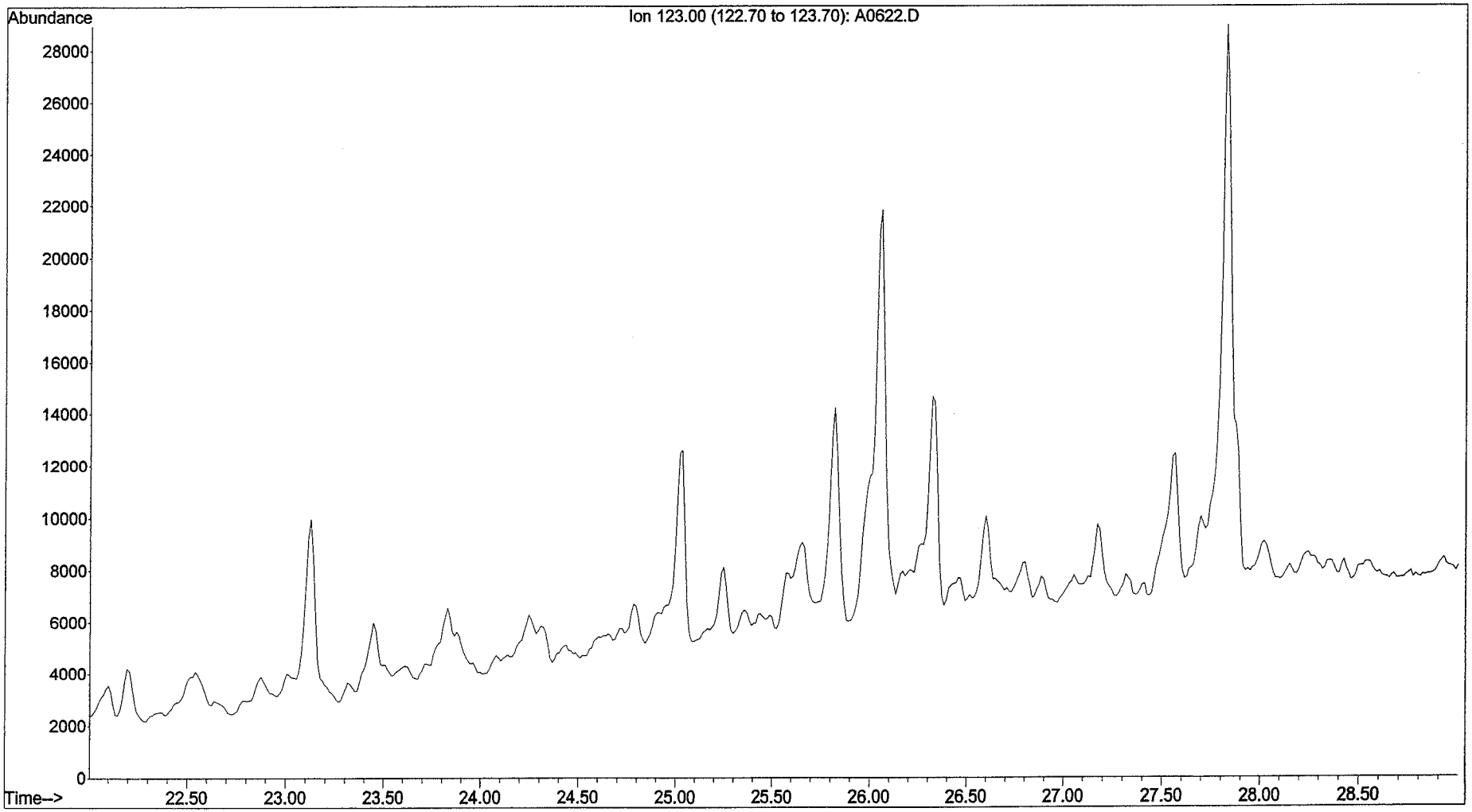
File : Q:\A\DATA\SQA319\A0645.D
Operator : TH
Acquired : 15 Dec 2002 5:49 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0162-F1
Misc Info :
Vial Number: 49

Sesquiterpane Biomarkers
NLU-133-SS-0010
U0162



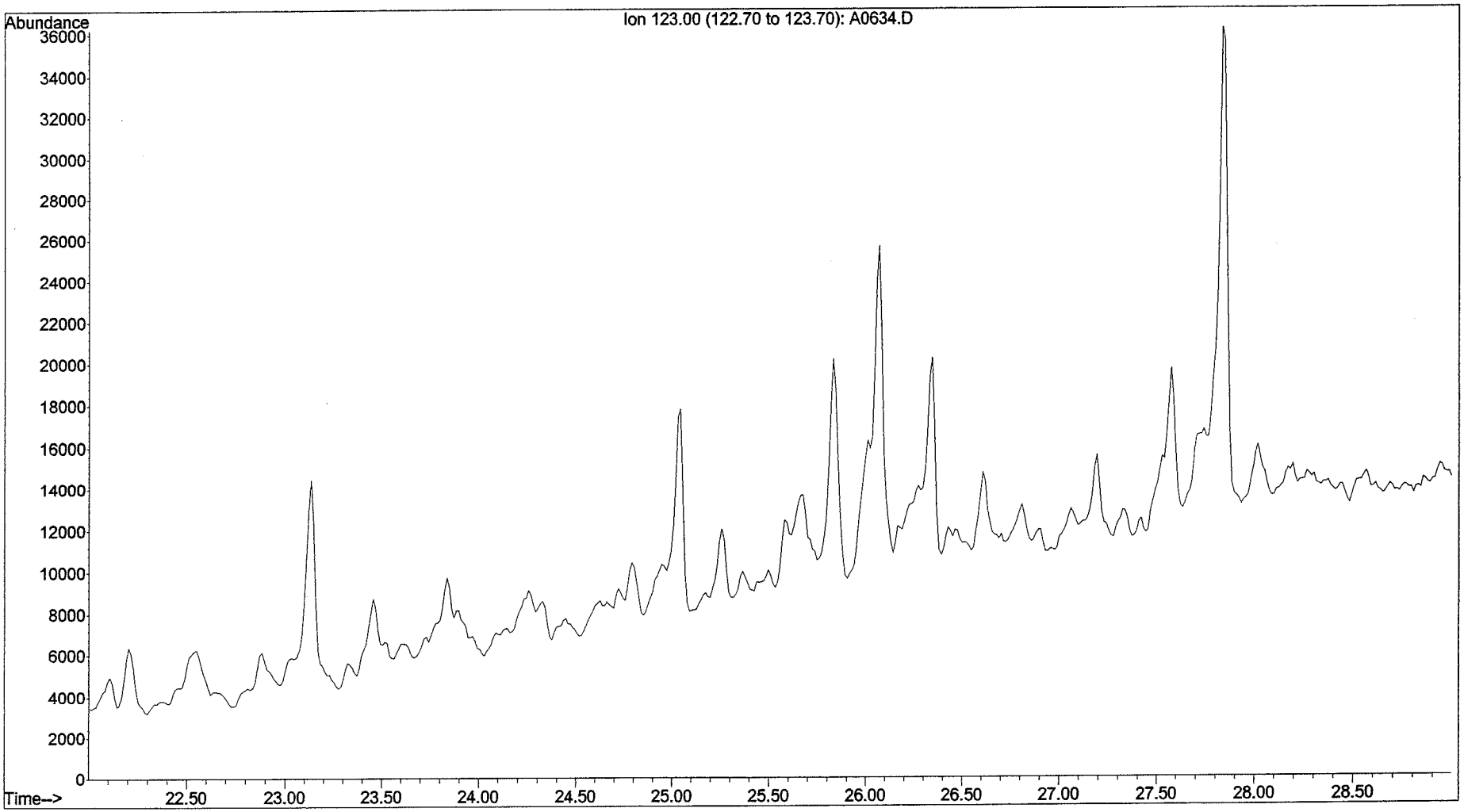
File : Q:\A\DATA\SQA319\A0622.D
Operator : TH
Acquired : 14 Dec 2002 4:55 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0163-F1
Misc Info :
Vial Number: 26

Sesquiterpane Biomarkers
NLU-133-SS-1020
U0163



File : Q:\A\DATA\SQA319\A0634.D
Operator : TH
Acquired : 15 Dec 2002 12:20 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: U0172-F1
Misc Info :
Vial Number: 38

Sesquiterpane Biomarkers
NLU-136-SS-0010
U0172

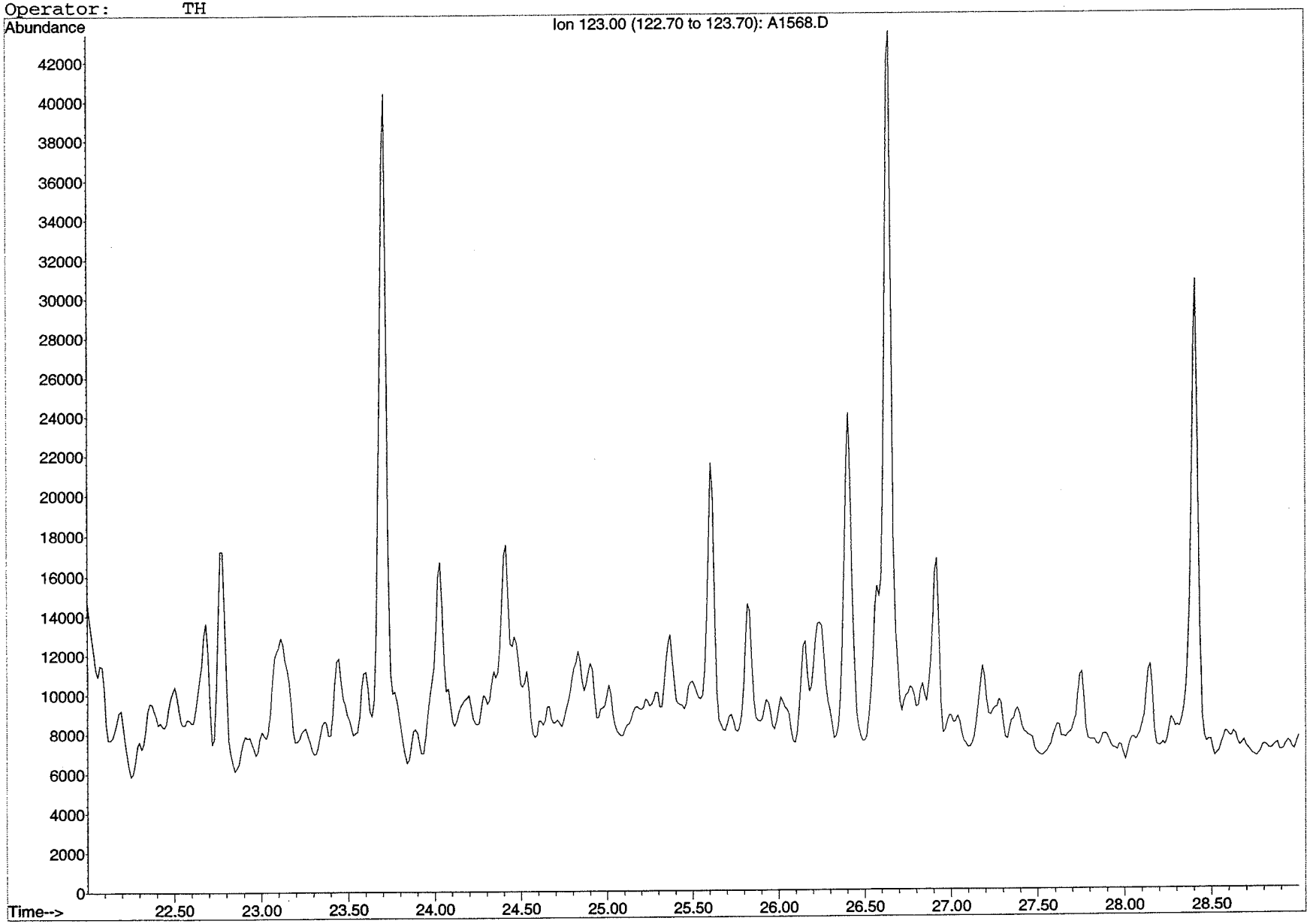


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1568.D
Date Acquired: 18 Feb 2003 12:39 pm
Method File: BIO1SIM
Sample Name: U4514-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
DW-5-1202
U4514

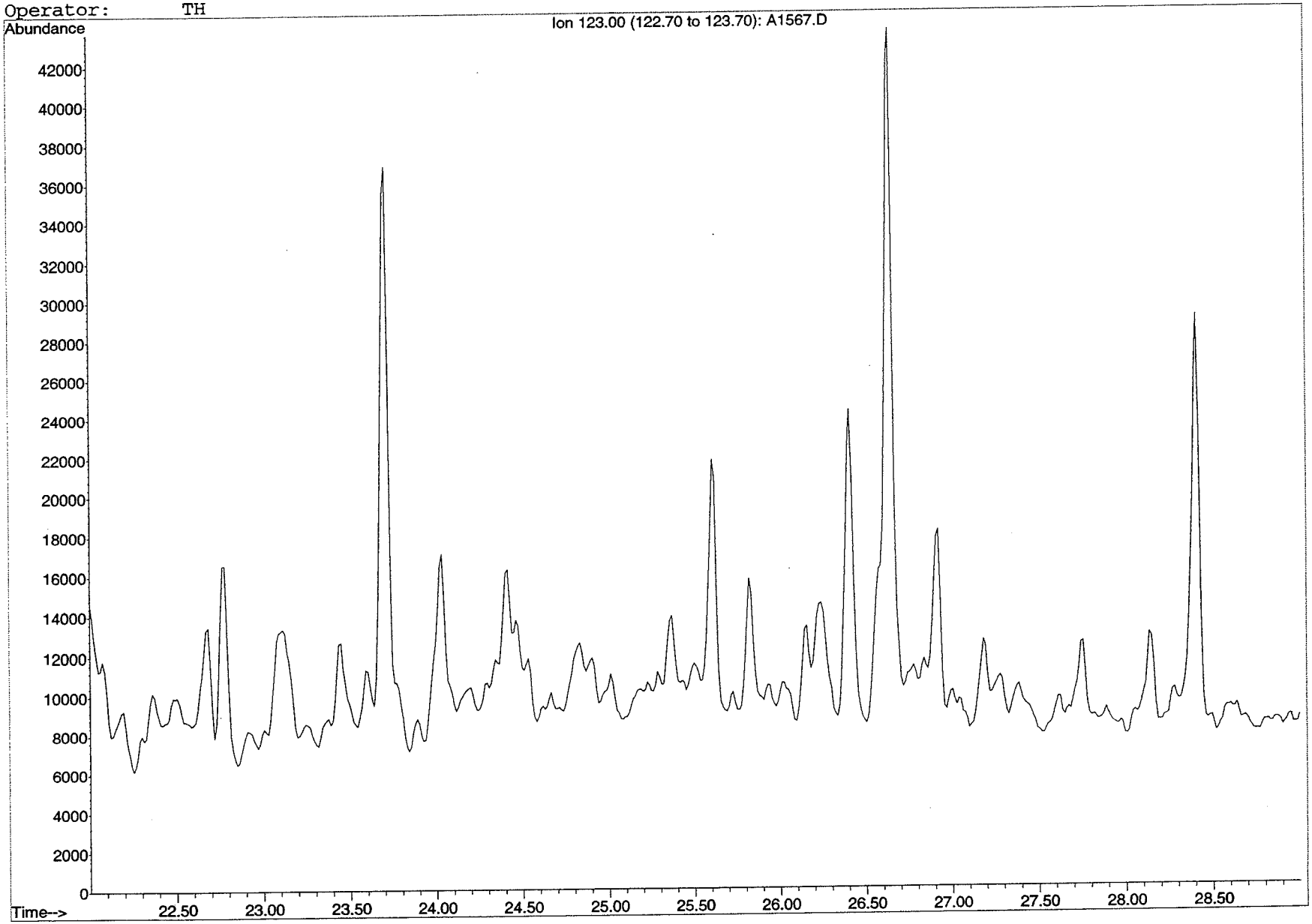


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1567.D
Date Acquired: 18 Feb 2003 11:10 am
Method File: BIO1SIM
Sample Name: U #3754-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
MW-5 Product(T190)
U3754

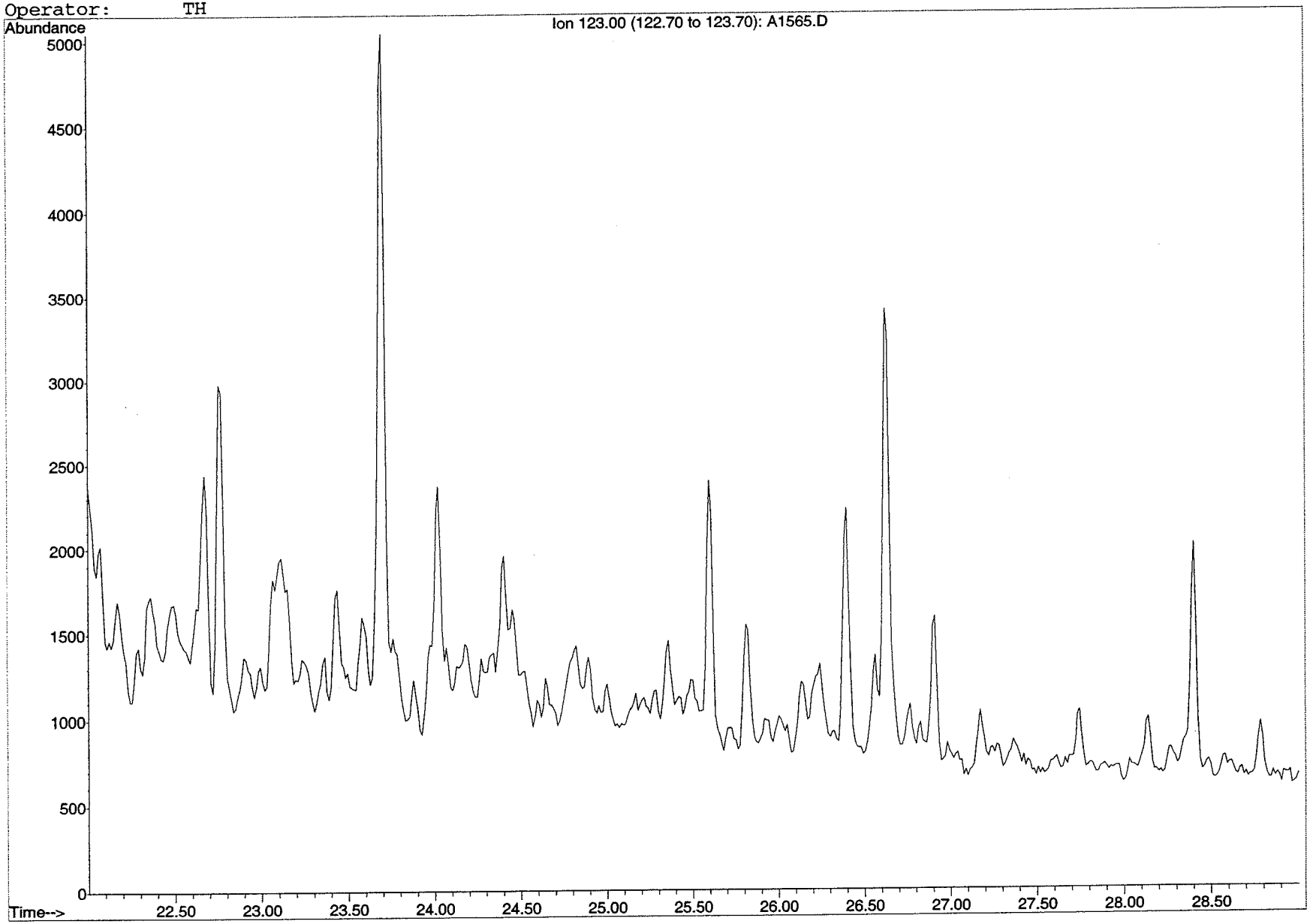


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1565.D
Date Acquired: 18 Feb 2003 8:08 am
Method File: BIO1SIM
Sample Name: U3752-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
GWP Tank (T192)
U3752

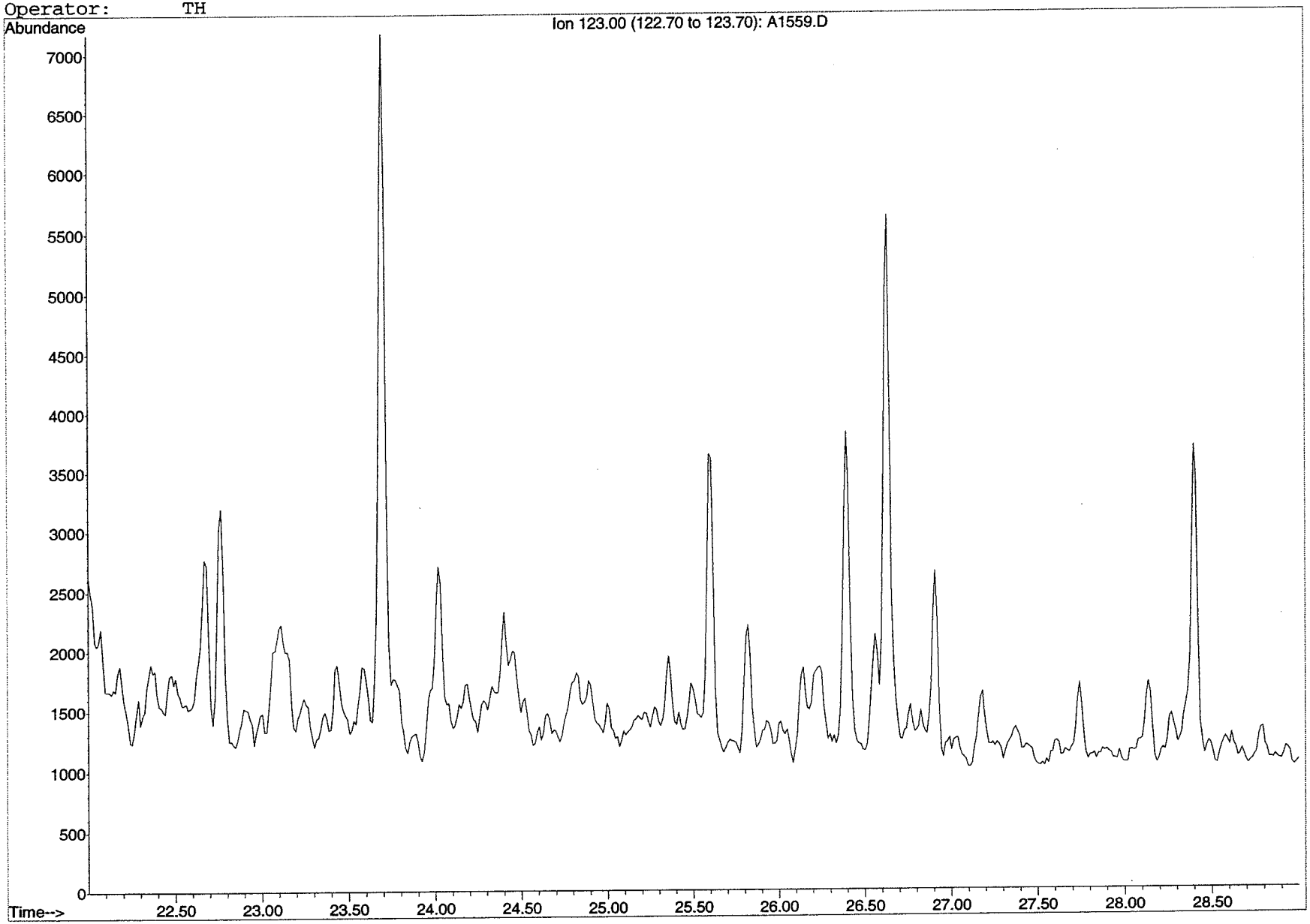


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

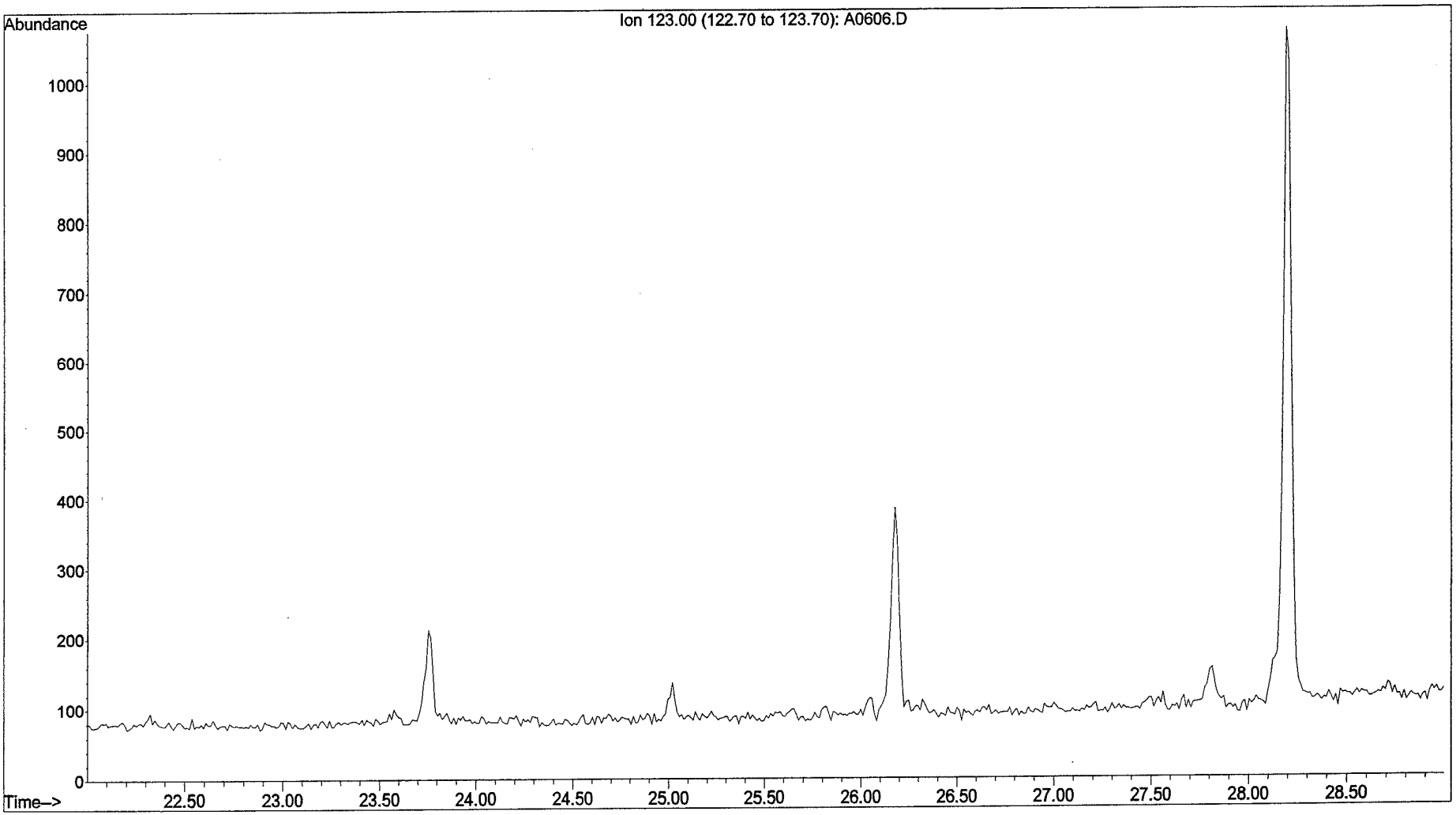
File: H:\A\DATA\SQA339\A1559.D
Date Acquired: 17 Feb 2003 11:00 pm
Method File: BIO1SIM
Sample Name: U 4515-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
SS-1-1202
U4515



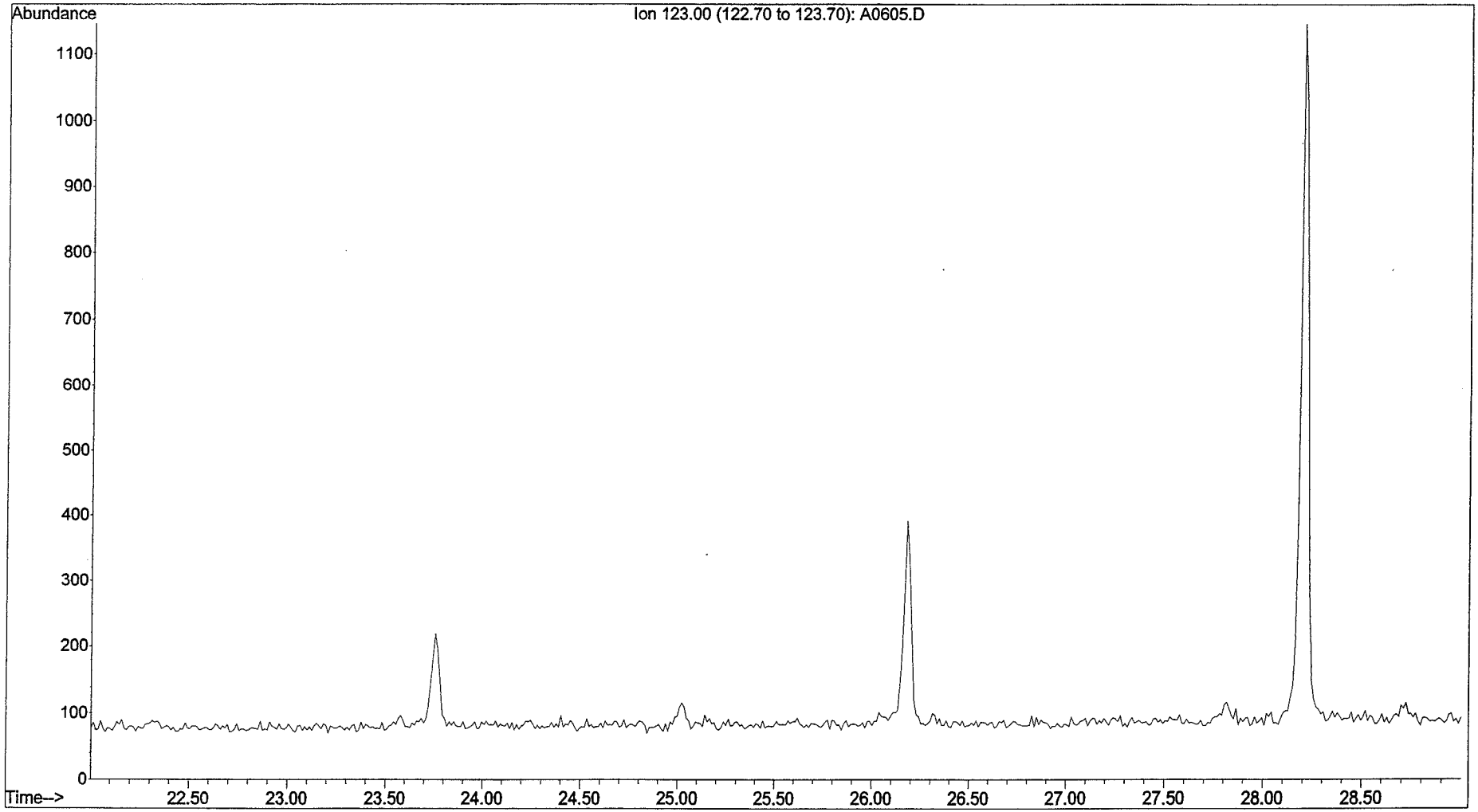
File : Q:\A\DATA\SQA319\A0606.D
Operator : TH
Acquired : 13 Dec 2002 4:10 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB485PB-F1
Misc Info :
Vial Number: 10

Sesquiterpane Biomarkers
Procedural Blank
AB485PB



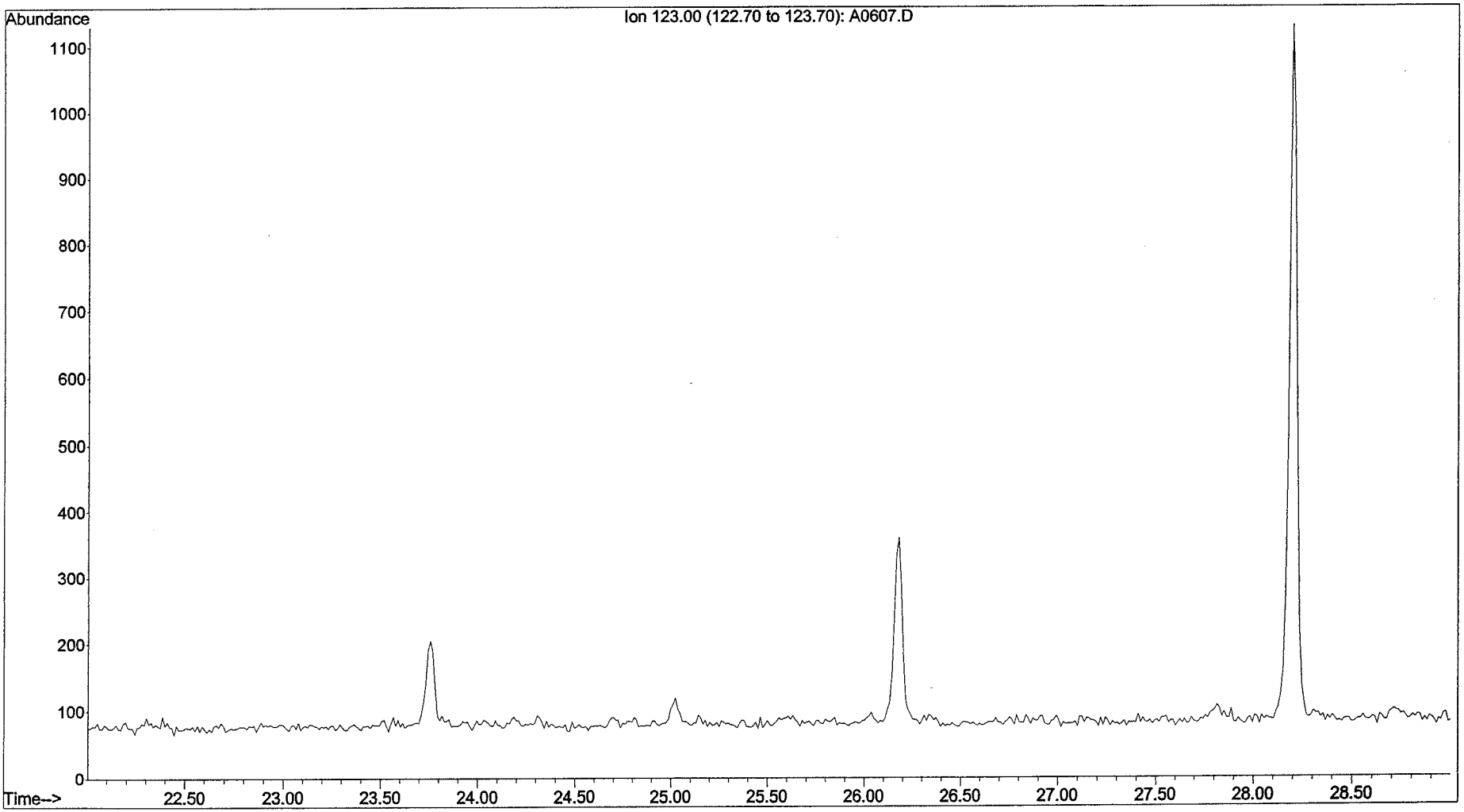
File : Q:\A\DATA\SQA319\A0605.D
Operator : TH
Acquired : 13 Dec 2002 2:34 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB484PB-F1
Misc Info :
Vial Number: 9

Sesquiterpane Biomarkers
Procedural Blank
AB484PB



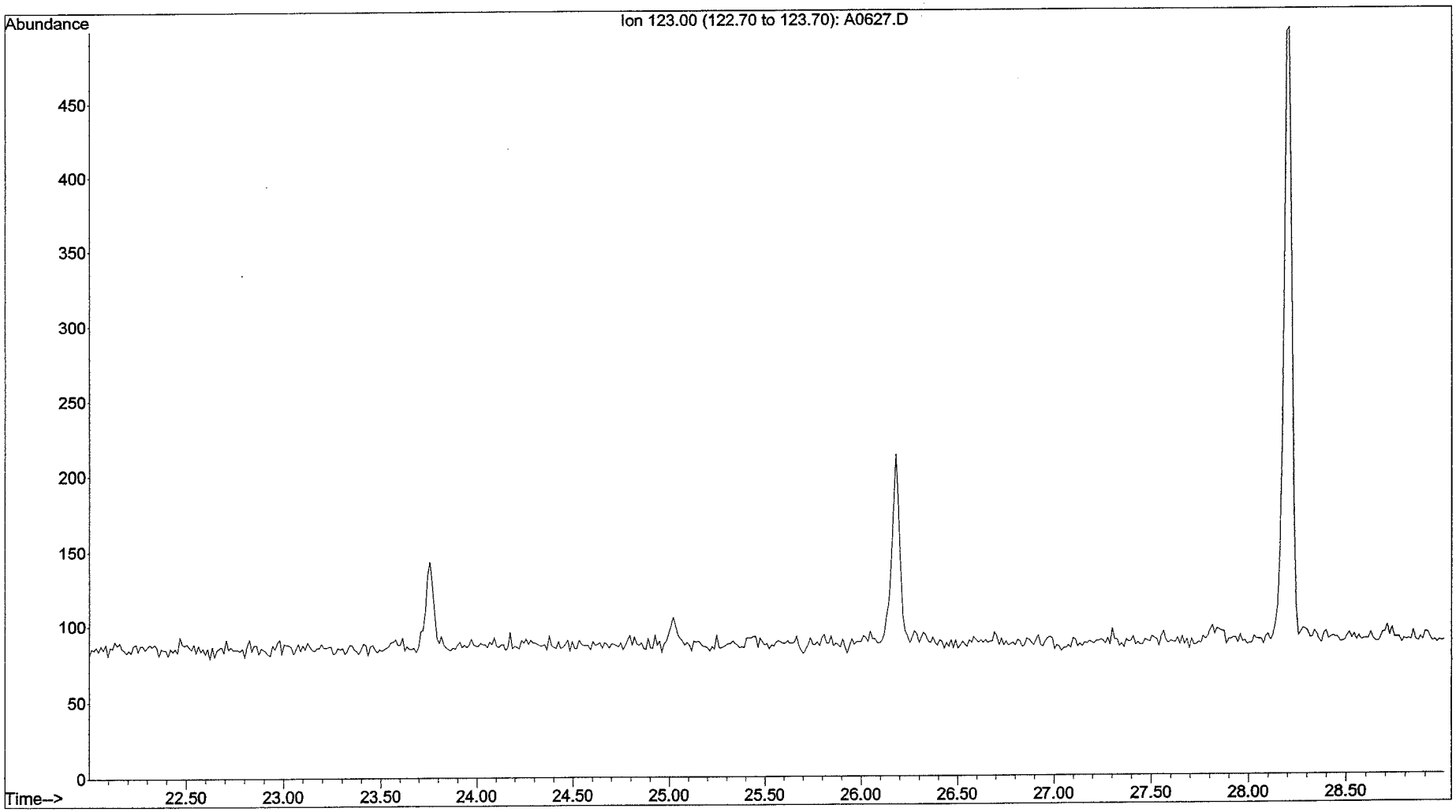
File : Q:\A\DATA\SQA319\A0607.D
Operator : TH
Acquired : 13 Dec 2002 5:44 am using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB486LCS-F1
Misc Info :
Vial Number: 11

Sesquiterpane Biomarkers
Laboratory Control Sample
AB486LCS



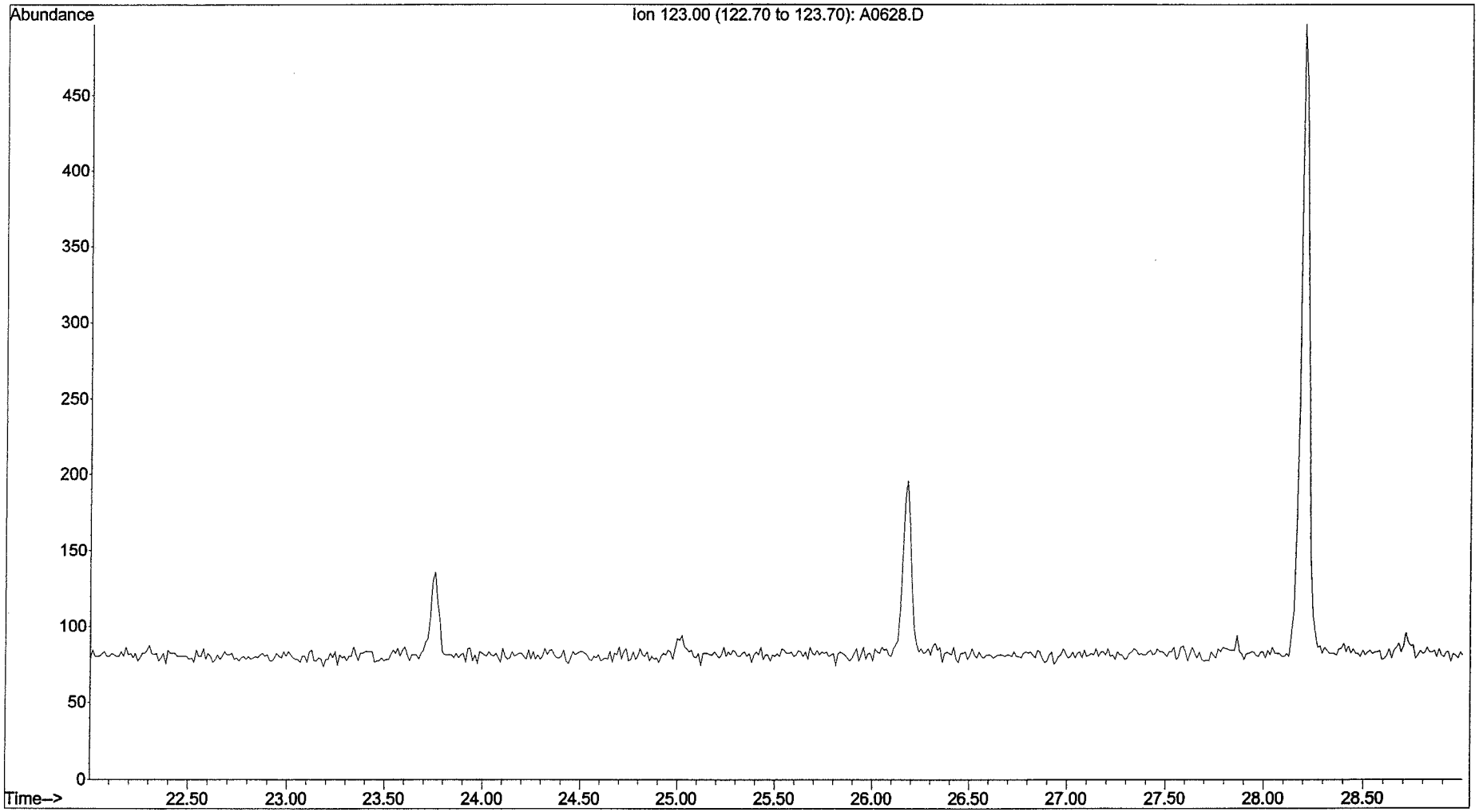
File : Q:\A\DATA\SQA319\A0627.D
Operator : TH
Acquired : 14 Dec 2002 12:58 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB489PB-F1
Misc Info :
Vial Number: 31

Sesquiterpane Biomarkers
Procedural Blank
AB489PB



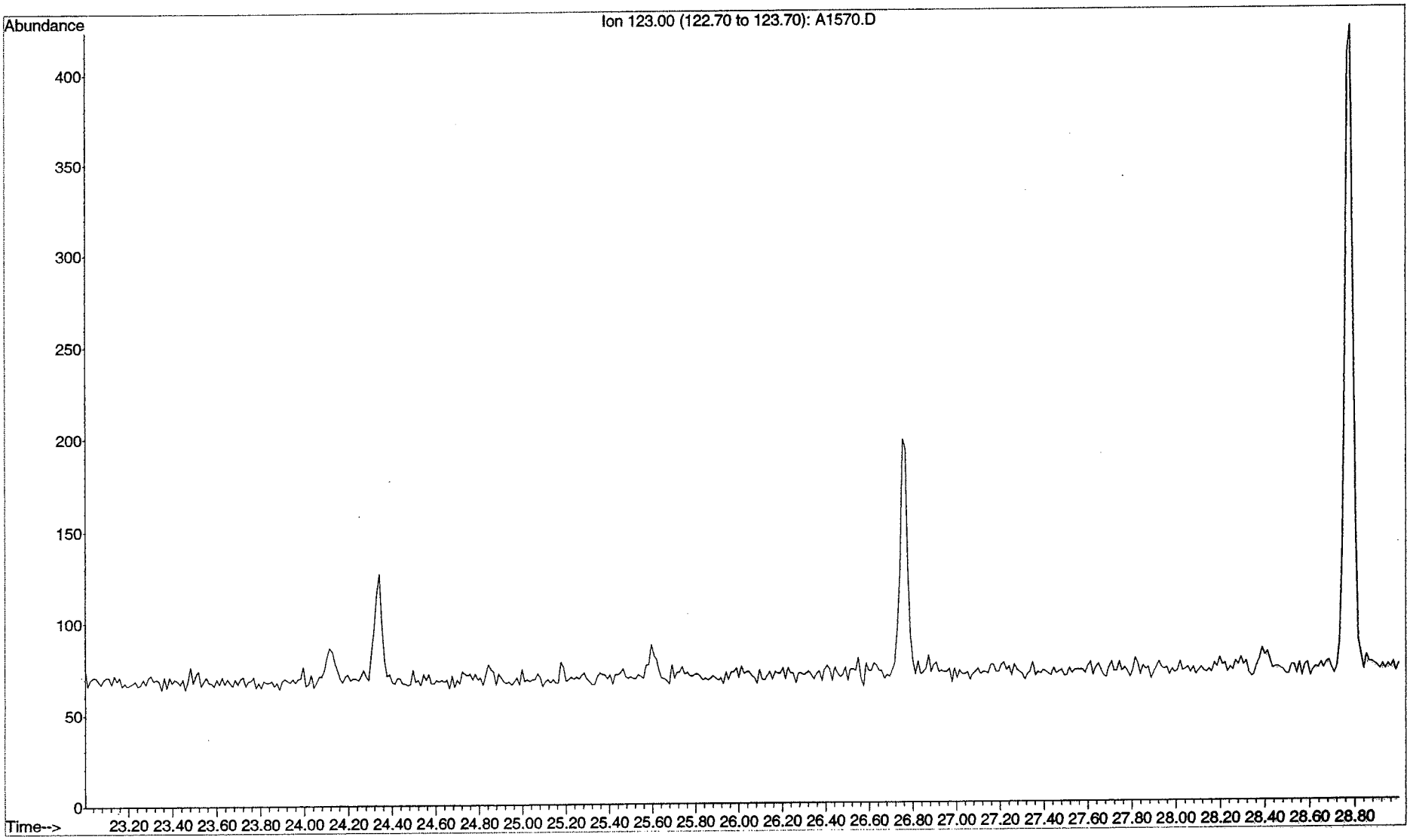
File : Q:\A\DATA\SQA319\A0628.D
Operator : TH
Acquired : 14 Dec 2002 2:33 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB490LCS-F1
Misc Info :
Vial Number: 32

Sesquiterpane Biomarkers
Laboratory Control Sample
AB490LCS



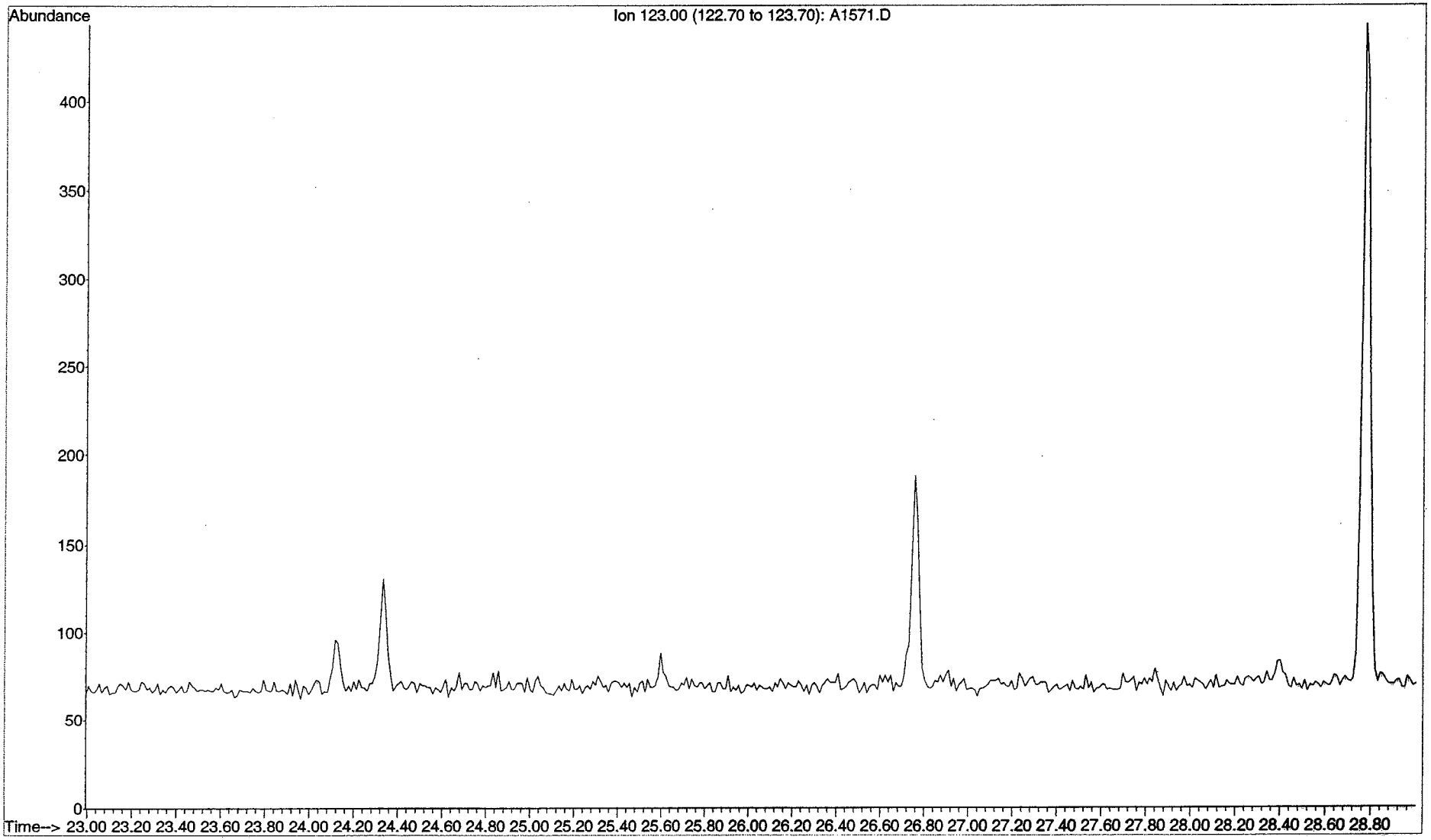
File : H:\A\DATA\SQA339\A1570.D
Operator : TH
Acquired : 18 Feb 2003 3:38 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB851PB
Misc Info :
Vial Number: 33

Sesquiterpane Biomarkers
Procedural Blank
AB851PB



File : H:\A\DATA\SQA339\A1571.D
Operator : TH
Acquired : 18 Feb 2003 5:07 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: AB852LCS
Misc Info :
Vial Number: 34

Sesquiterpane Biomarkers
Laboratory Control Sample
AB852LCS

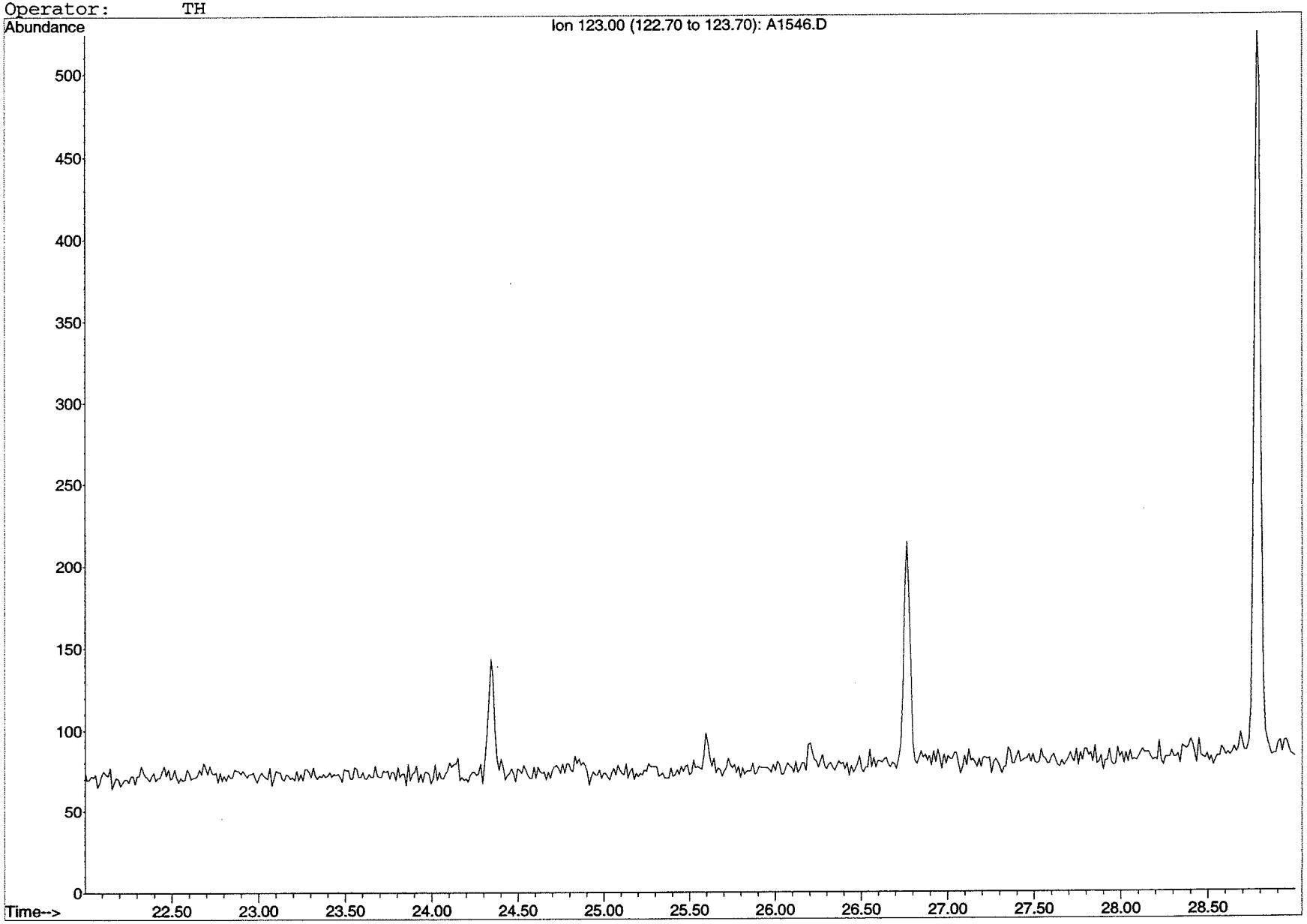


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1546.D
Date Acquired: 17 Feb 2003 3:32 am
Method File: BIO1SIM
Sample Name: BB142PB-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB142PB

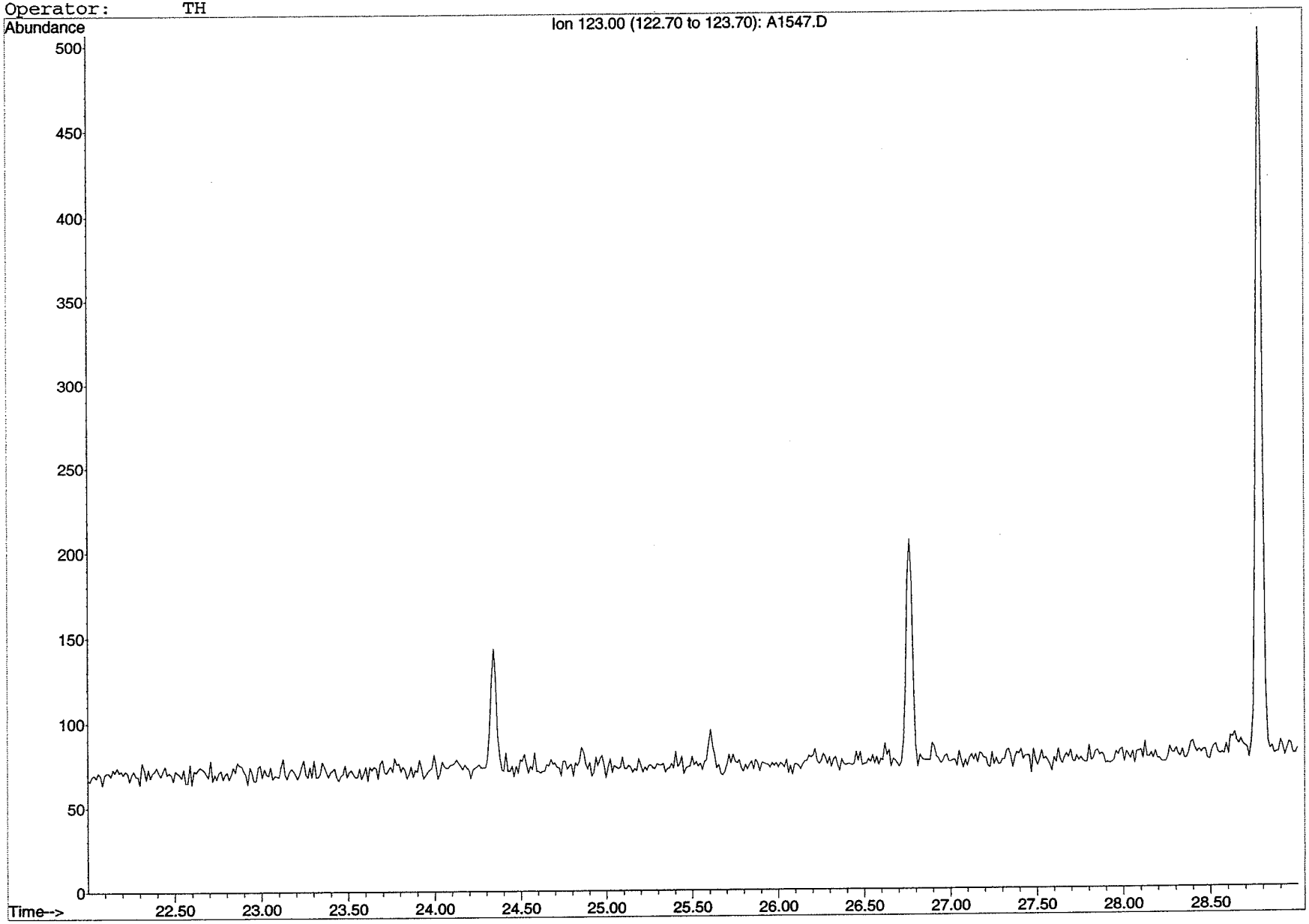


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1547.D
Date Acquired: 17 Feb 2003 5:02 am
Method File: BIO1SIM
Sample Name: BB143LCS-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB143LCS

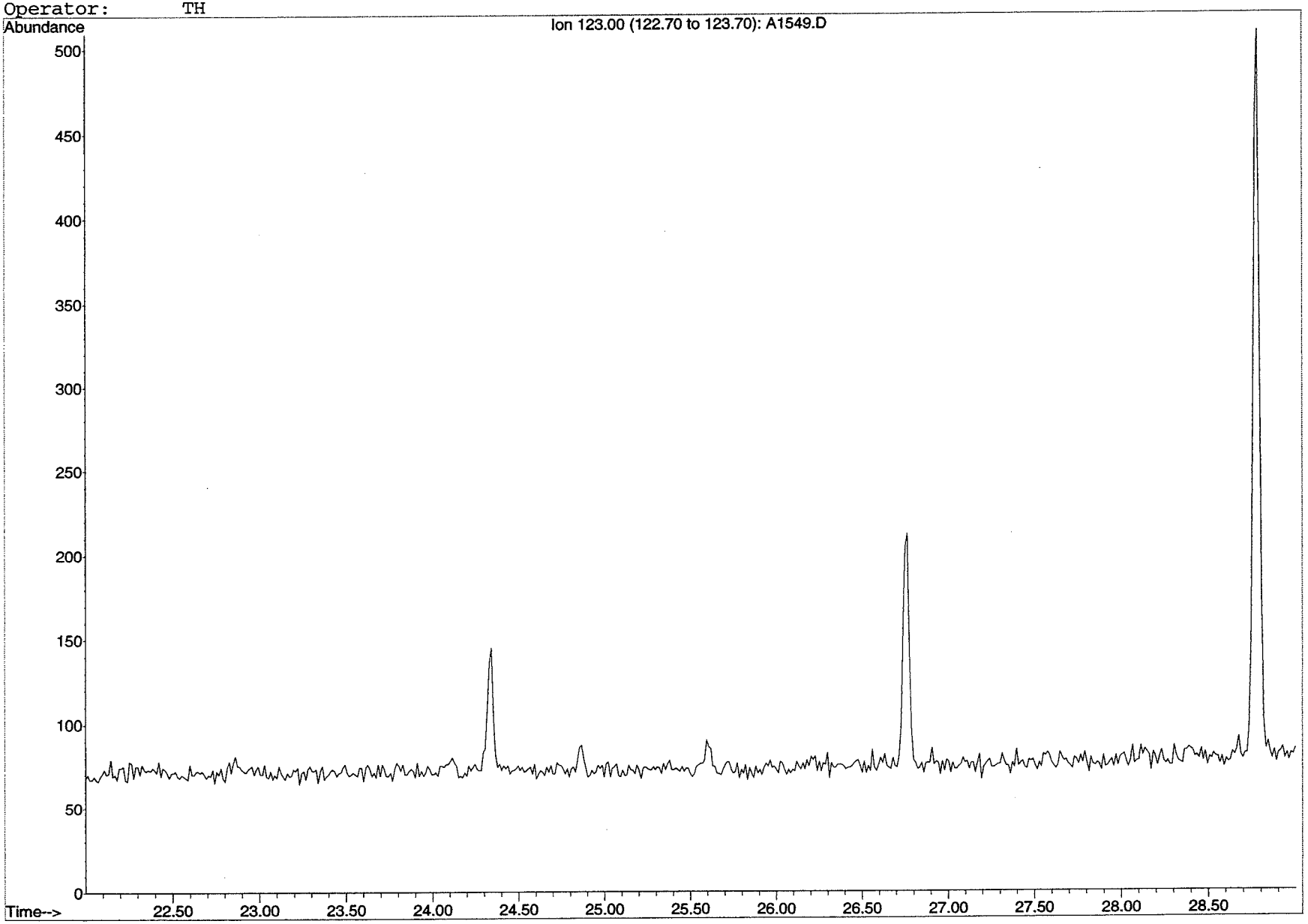


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1549.D
Date Acquired: 17 Feb 2003 8:01 am
Method File: BIO1SIM
Sample Name: BB146PB-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB146PB

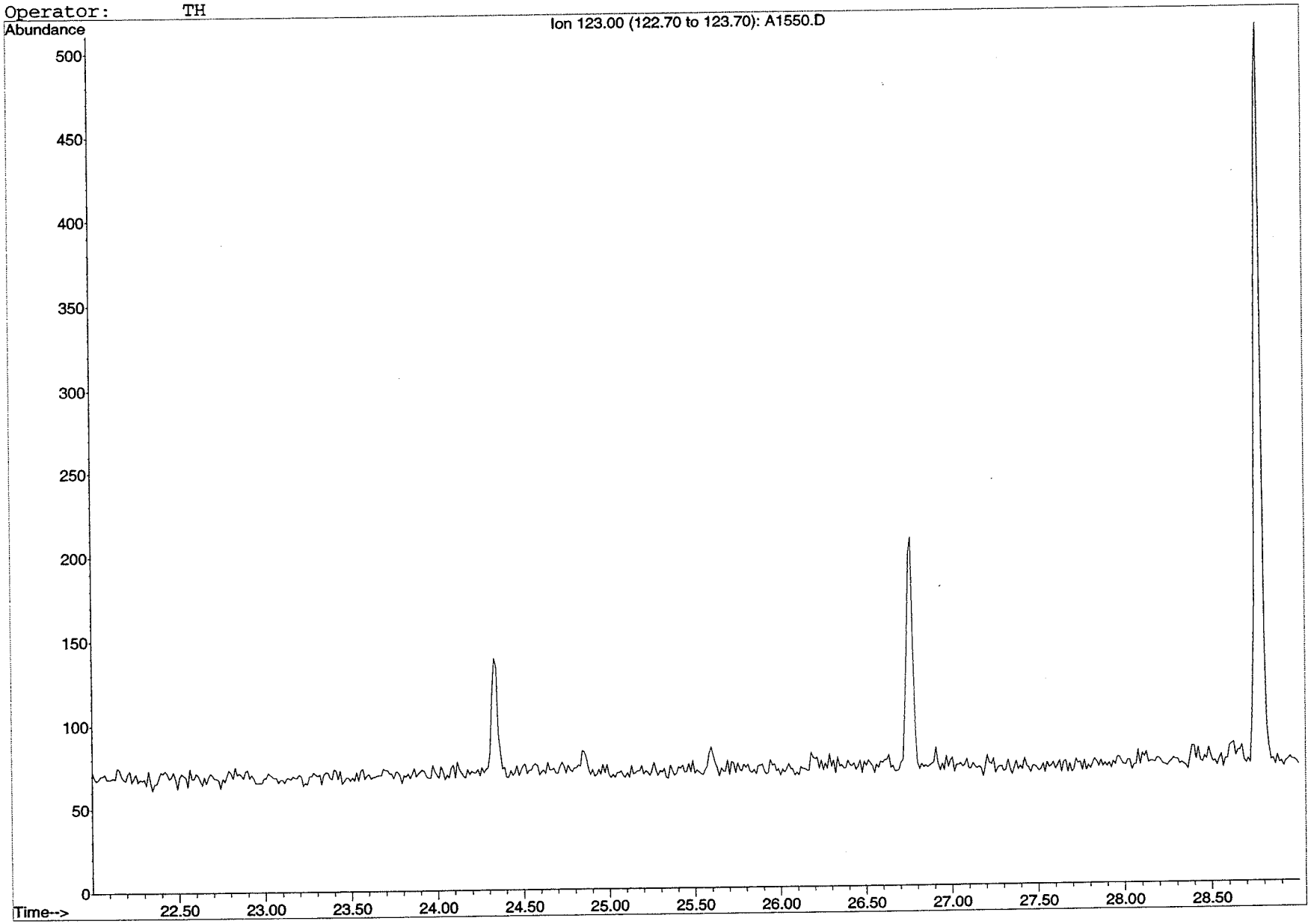


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1550.D
Date Acquired: 17 Feb 2003 9:30 am
Method File: BIO1SIM
Sample Name: BB147LCS-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB147LCS

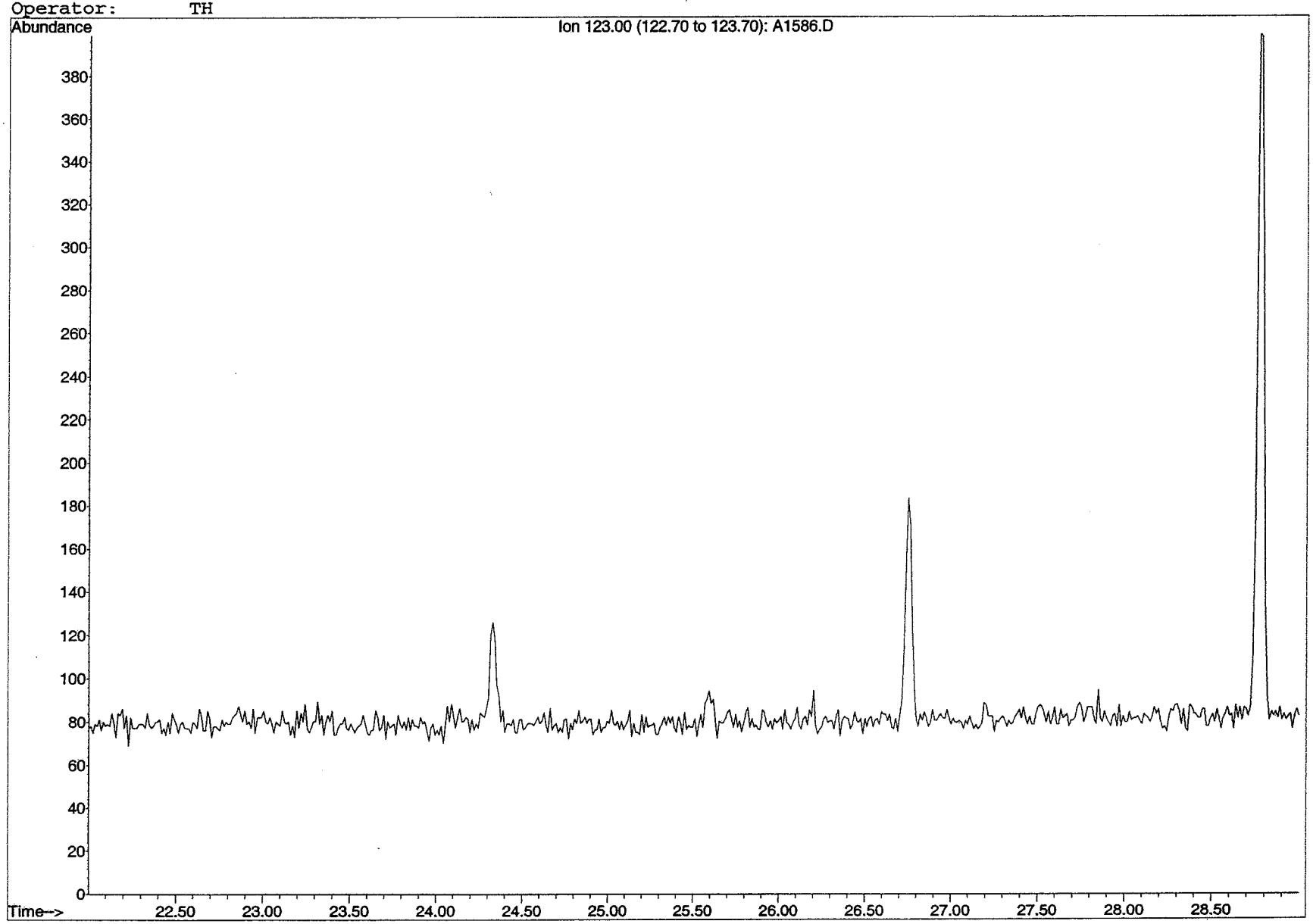


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1586.D
Date Acquired: 19 Feb 2003 7:00 pm
Method File: BIO1SIM
Sample Name: BB278PB-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB278PB

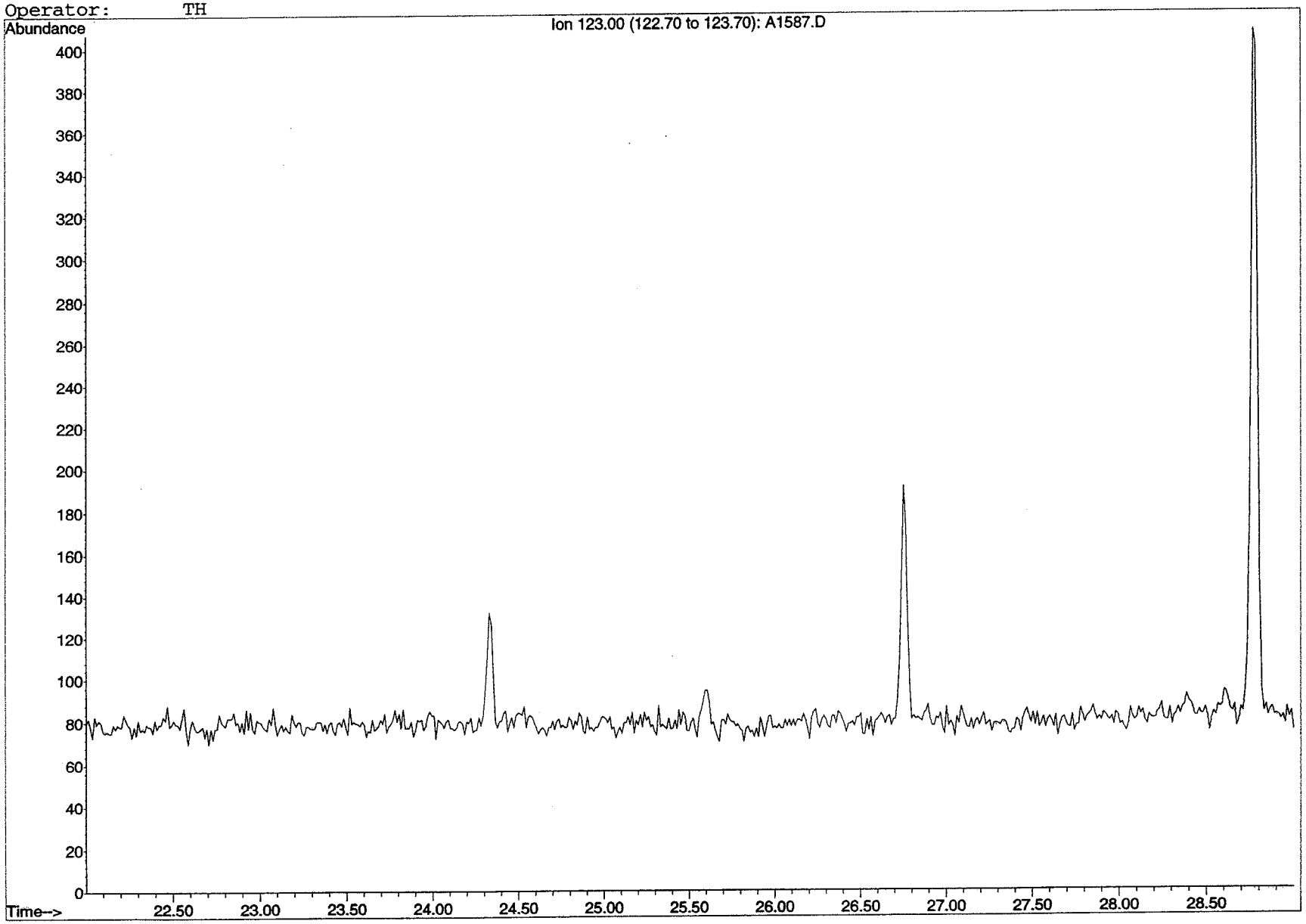


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1587.D
Date Acquired: 19 Feb 2003 8:30 pm
Method File: BIO1SIM
Sample Name: BB279LCS-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB279LCS

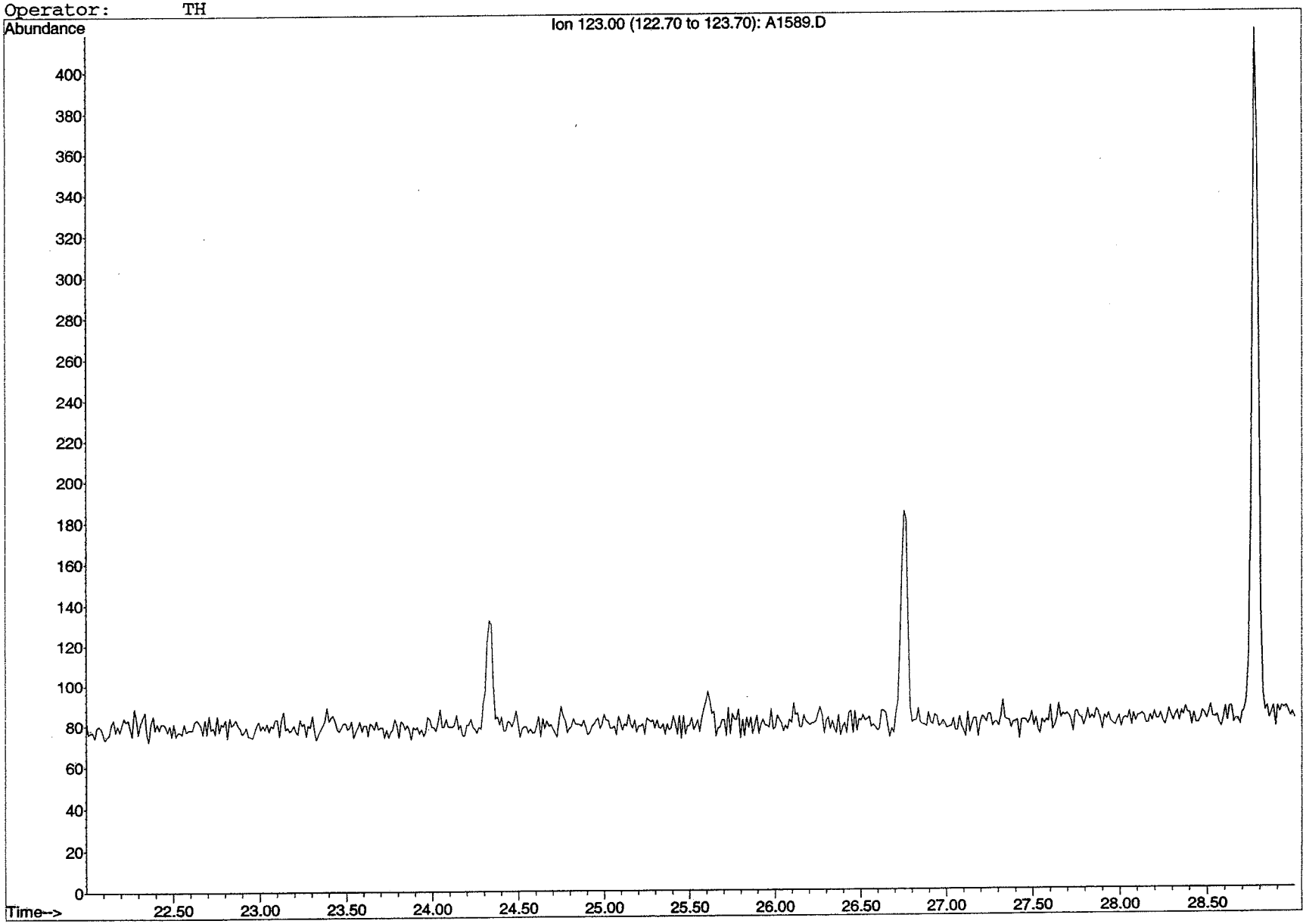


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1589.D
Date Acquired: 19 Feb 2003 11:31 pm
Method File: BIO1SIM
Sample Name: BB362PB-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB362PB

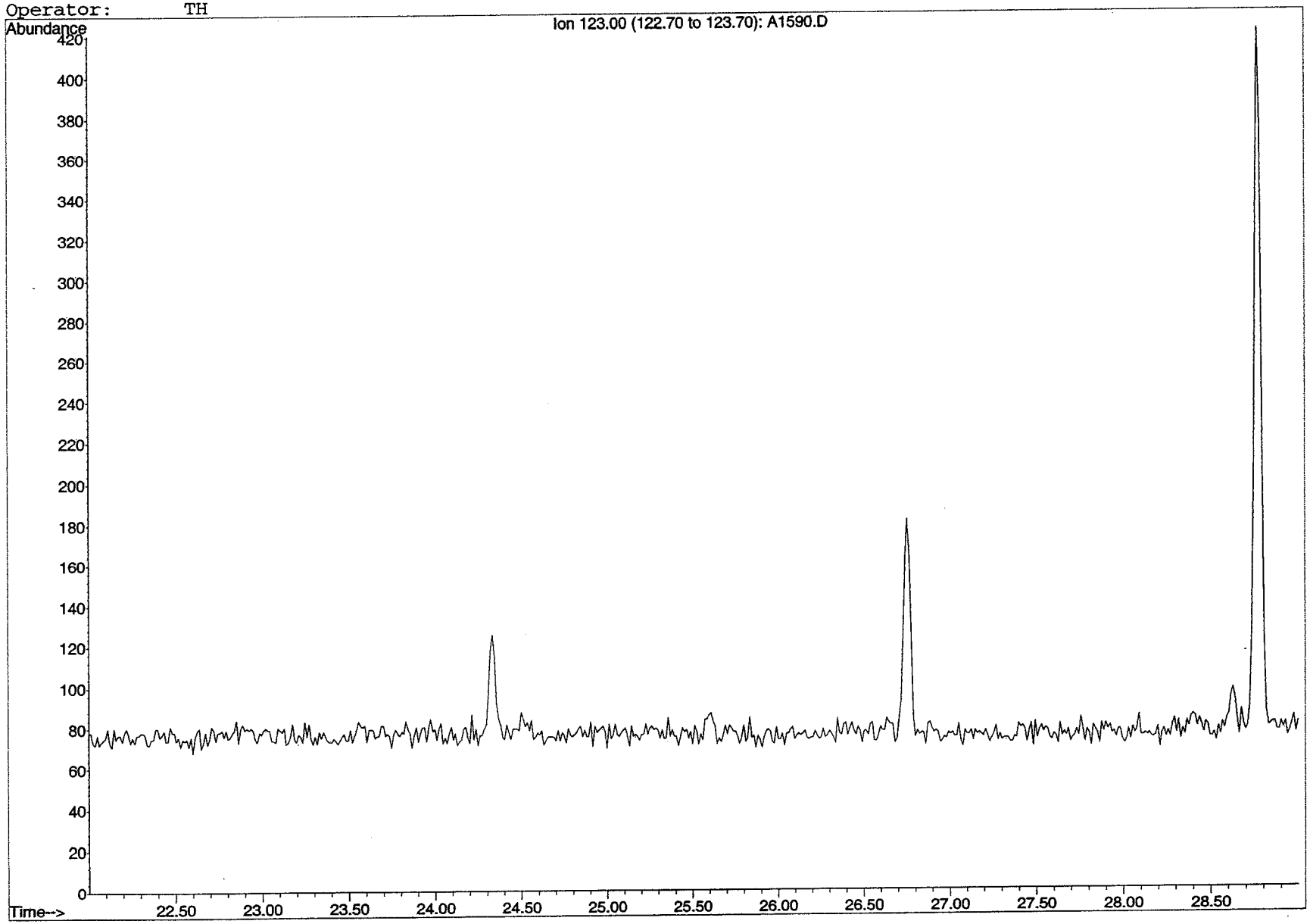


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1590.D
Date Acquired: 20 Feb 2003 1:02 am
Method File: BIO1SIM
Sample Name: BB363LCS-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB363LCS

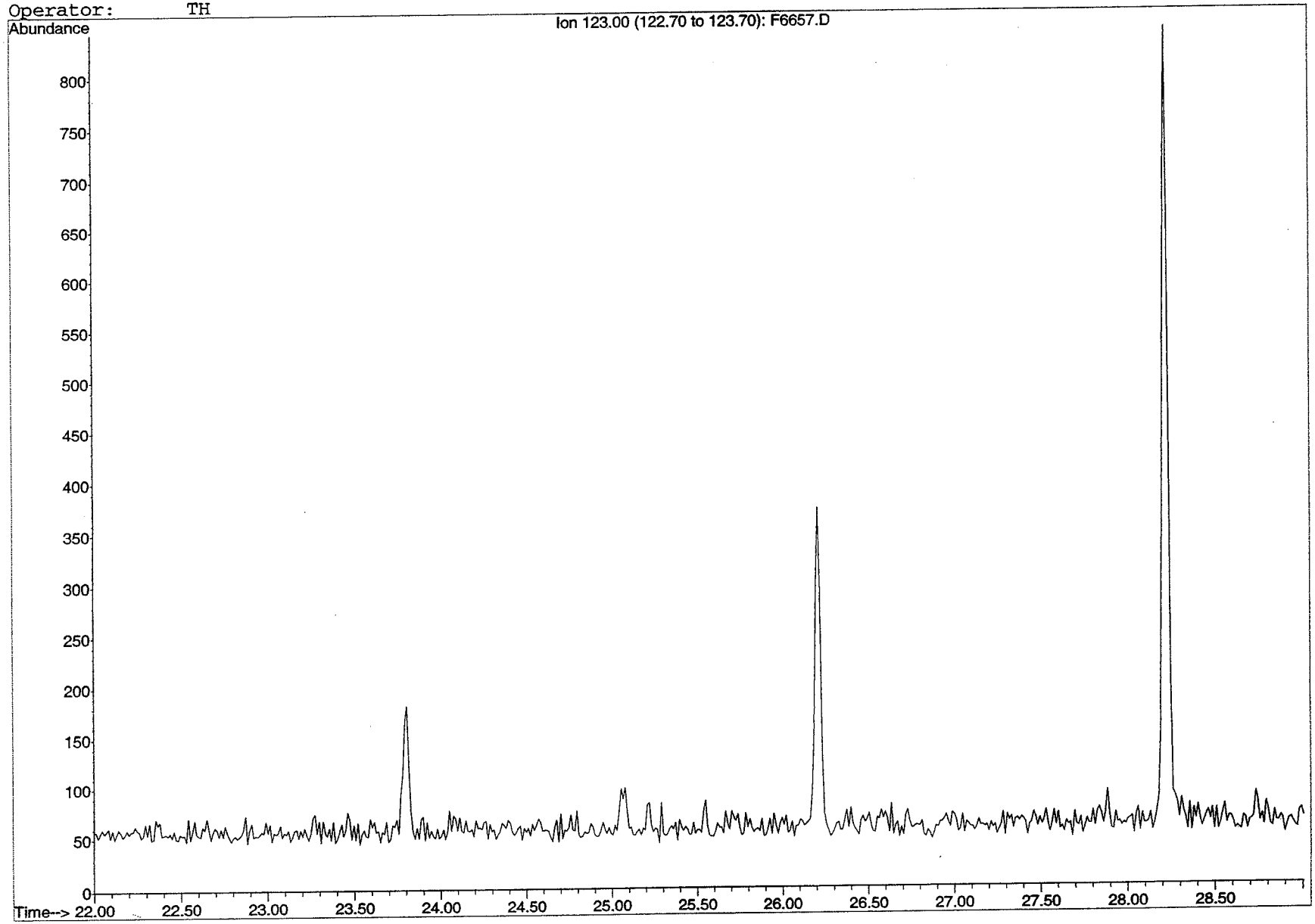


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6657.D
Date Acquired: 5 Mar 2003 5:40 am
Method File: BIO1SIM
Sample Name: BB426PB-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB426PB

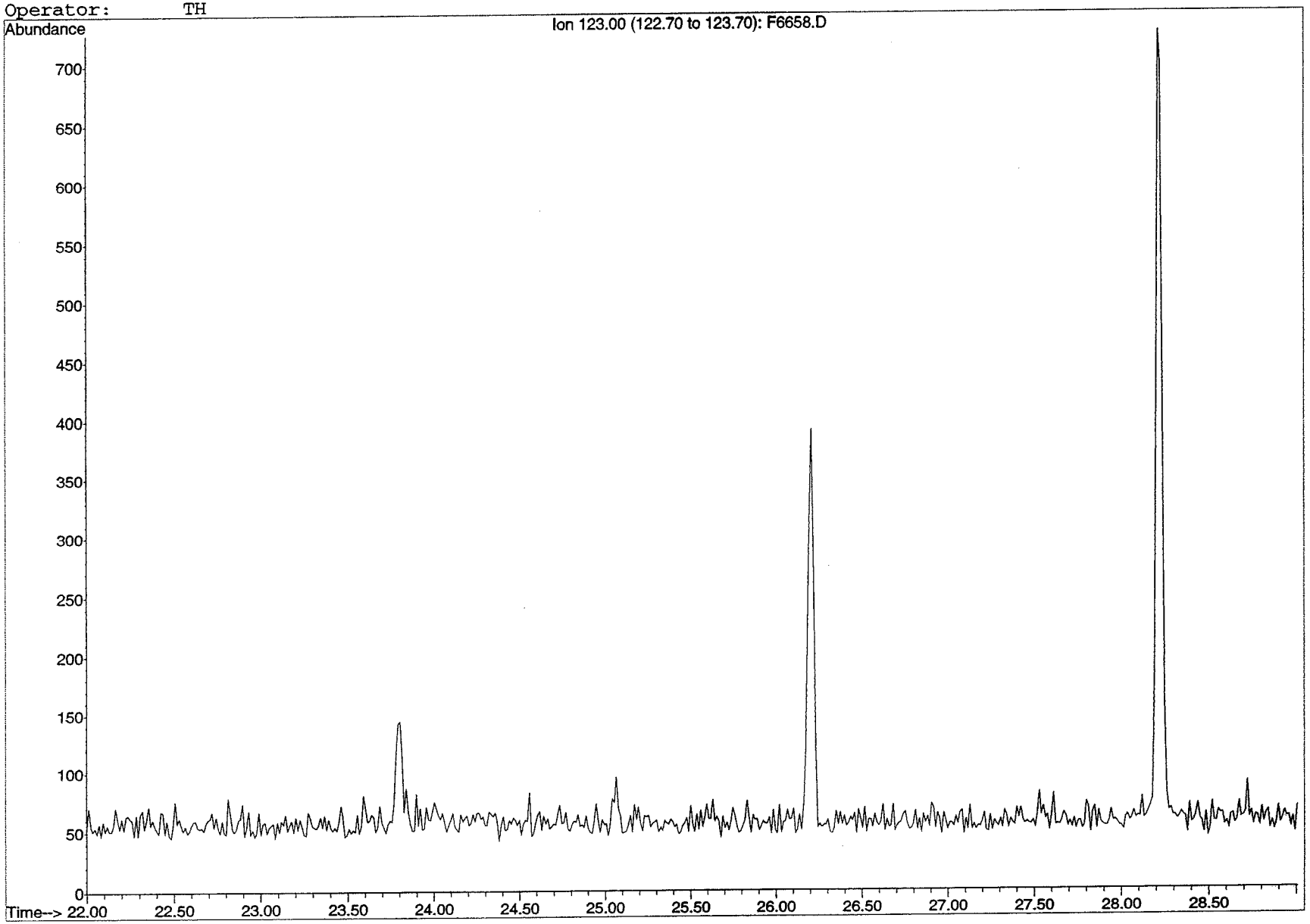


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6658.D
Date Acquired: 5 Mar 2003 7:13 am
Method File: BIO1SIM
Sample Name: BB427LCS-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB427LCS

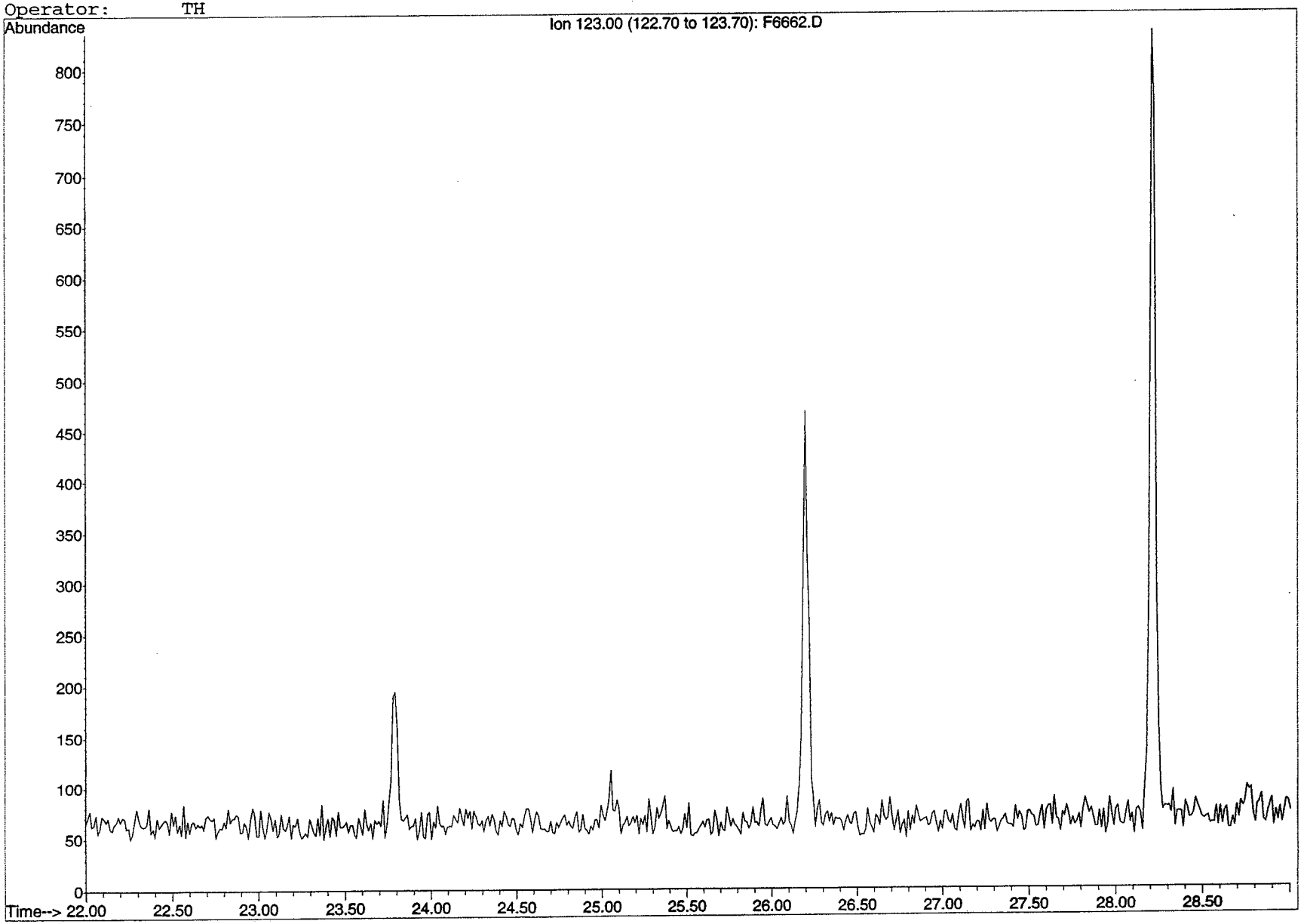


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6662.D
Date Acquired: 5 Mar 2003 1:24 pm
Method File: BIO1SIM
Sample Name: BB501PB-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Procedural Blank
BB501PB

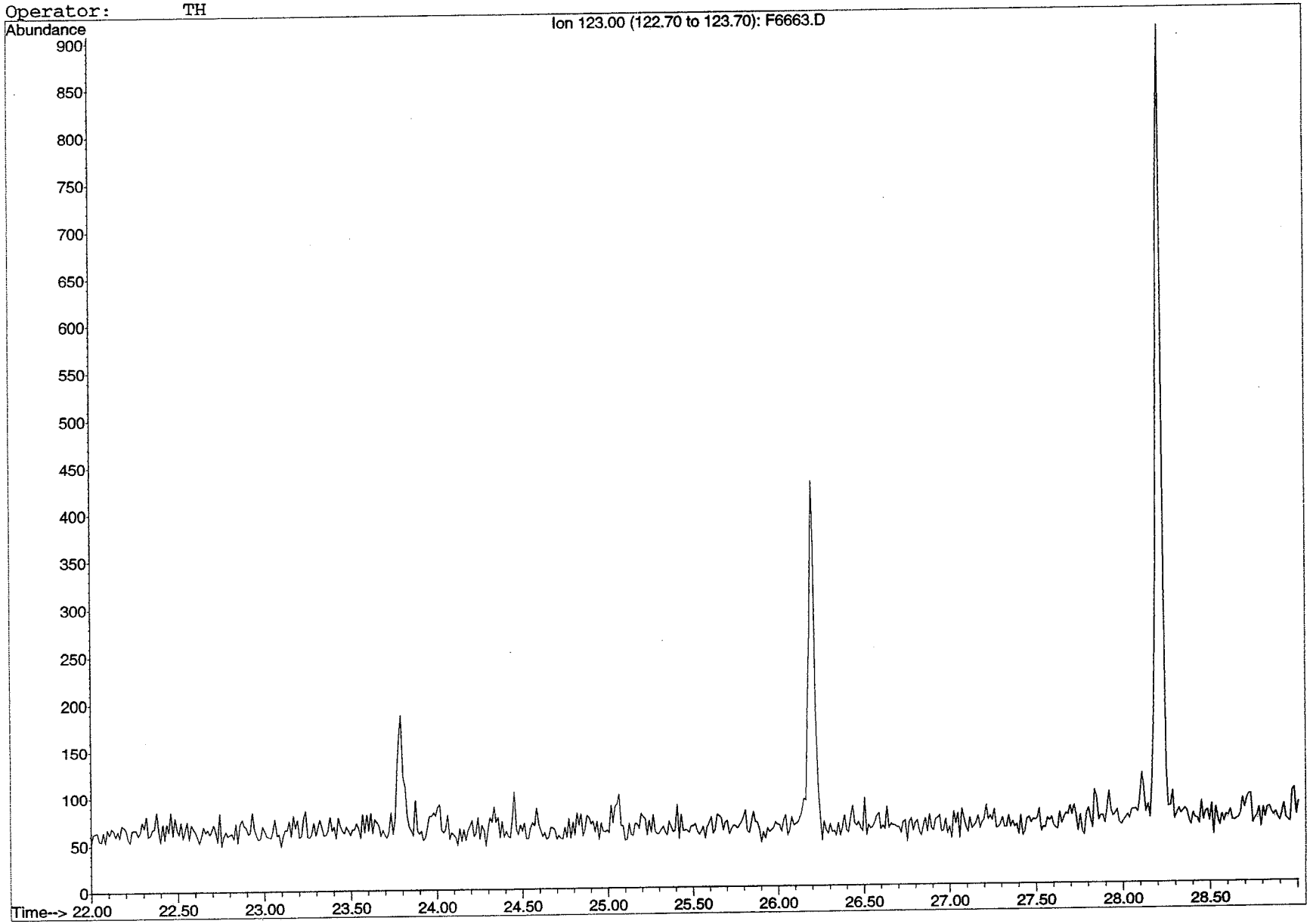


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

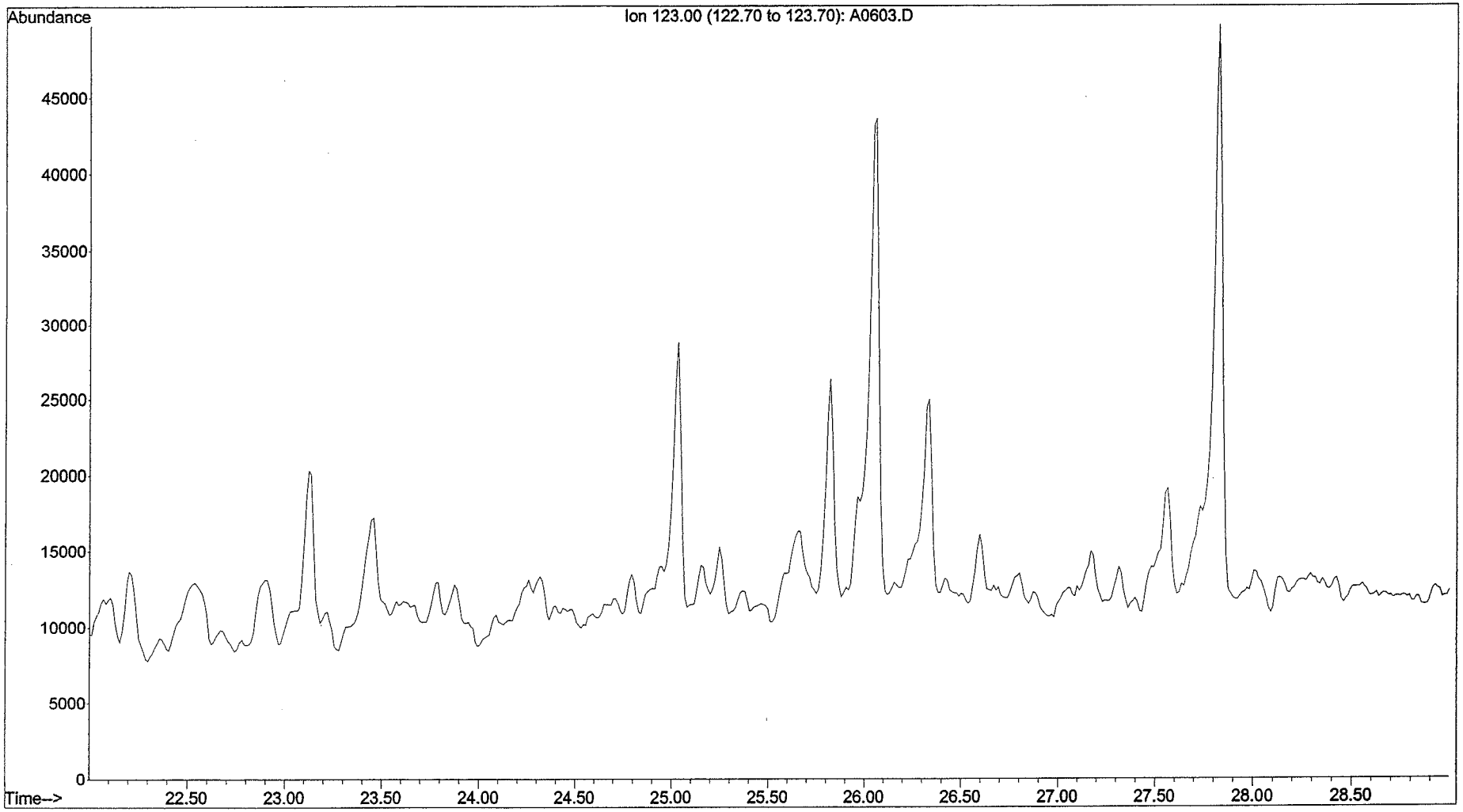
File: H:\F\DATA\SQF171\F6663.D
Date Acquired: 5 Mar 2003 2:56 pm
Method File: BIO1SIM
Sample Name: BB478LCS-D-F1
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Laboratory Control Sample
BB478LCS



File : G:\A\DATA\SQA319\A0603.D
Operator : TH
Acquired : 12 Dec 2002 11:23 pm using AcqMethod BIO1SIM
Instrument : GC/MS Ins
Sample Name: FX46 NSC
Misc Info :
Vial Number: 7

Sesquiterpane Biomarkers
Reference Crude Oil
FX46

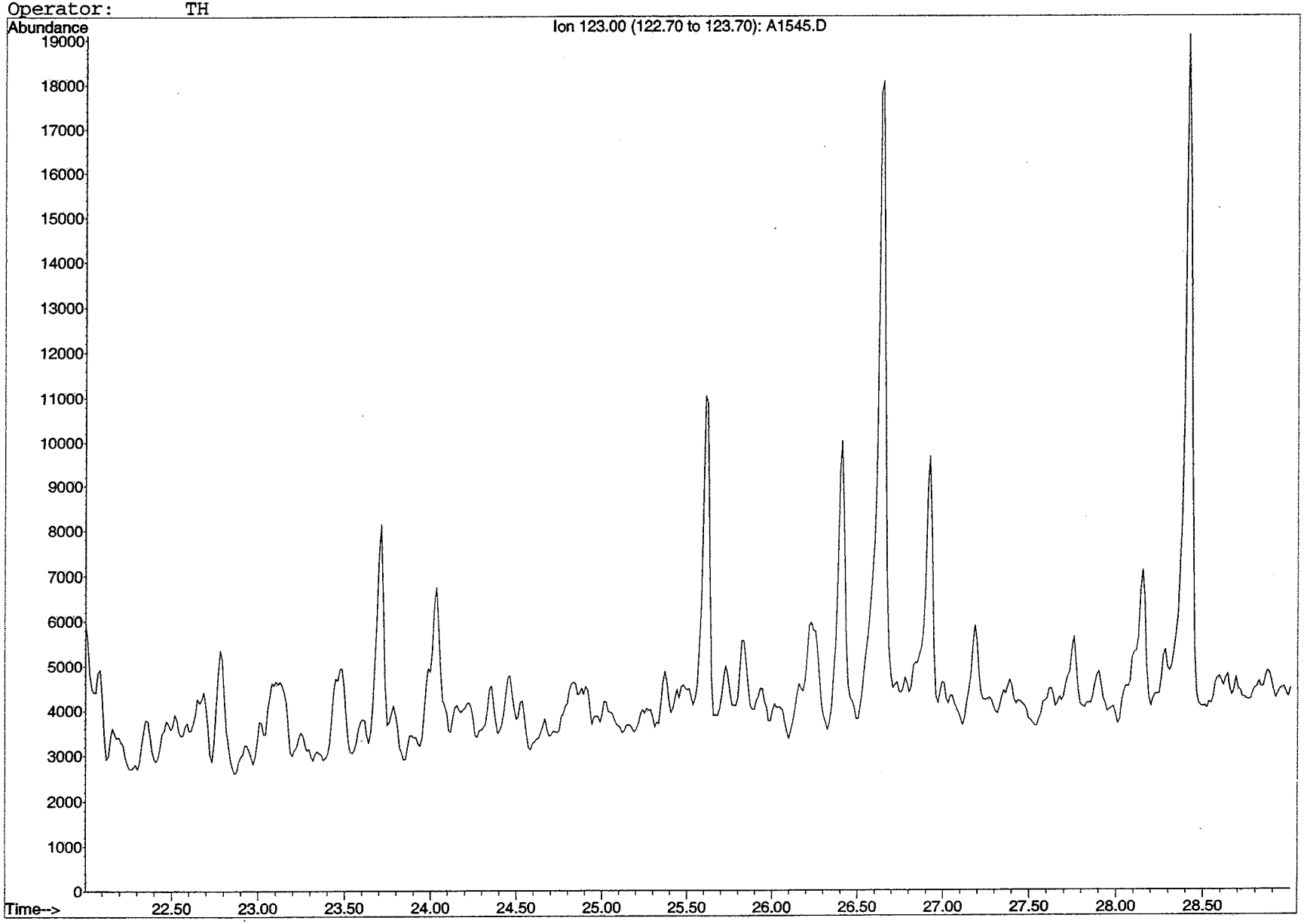


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1545.D
Date Acquired: 17 Feb 2003 2:01 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Reference Crude Oil
FX46

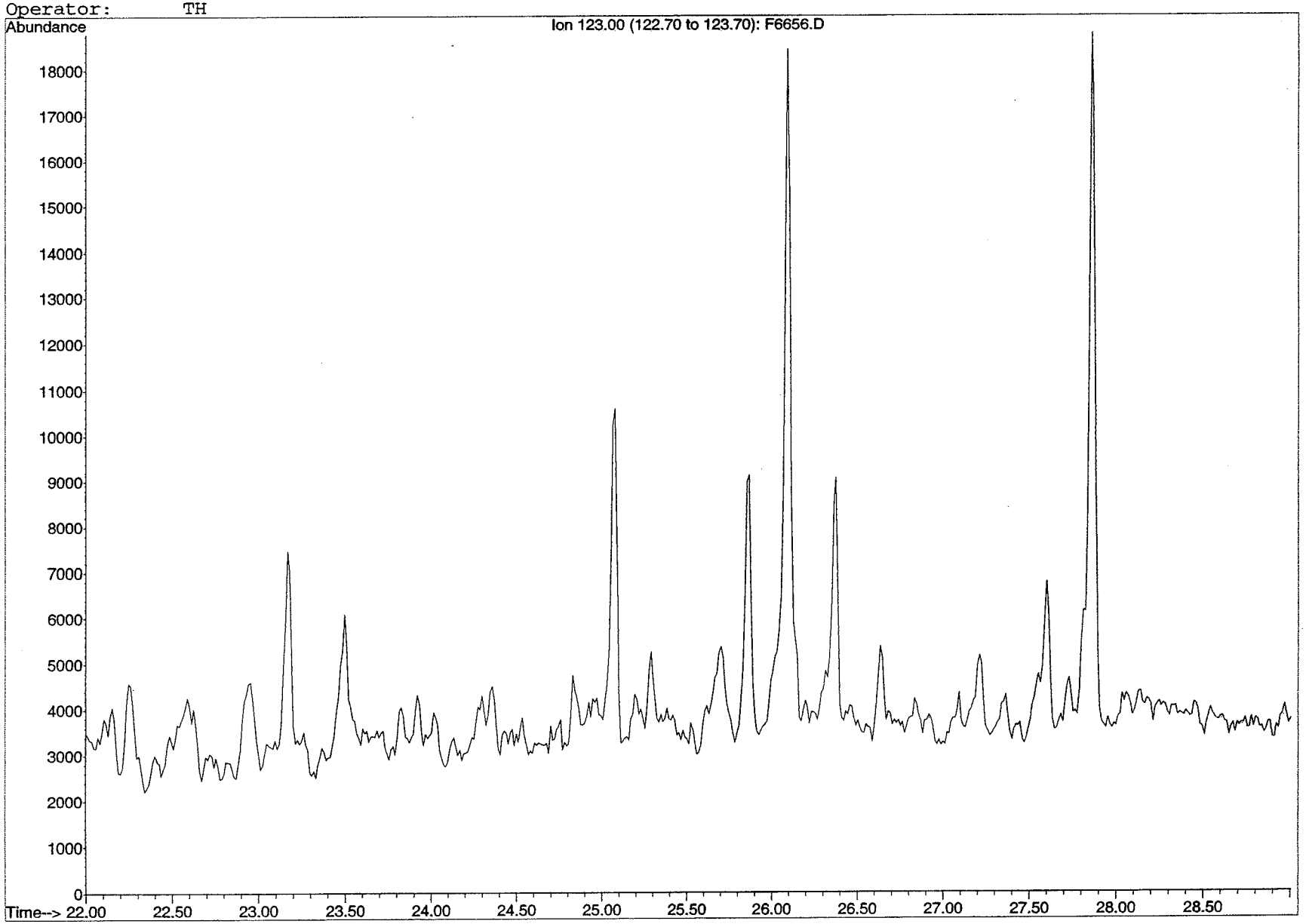


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6656.D
Date Acquired: 5 Mar 2003 4:05 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

Sesquiterpane Biomarkers
Reference Crude Oil
FX46



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Prepared in Anticipation of Litigation at the Request of Counsel

Battelle
. . . Putting Technology To Work

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
... Putting Technology To Work

Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	AB484PB	
Battelle Batch ID	02-667	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	11/22/02	
Acquired Date	12/14/02	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	10	g
Weight Basis	NA	
Min Reporting Limit	2.5	
Amount Units	µg/kg	
Naphthalene	0.282	J
C1-Naphthalenes	ND	
C2-Naphthalenes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes	ND	
2-Methylnaphthalene	ND	
1-Methylnaphthalene	ND	
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene	ND	
1,5-Dimethylnaphthalene	ND	
Acenaphthylene	ND	
Acenaphthene	ND	
Biphenyl	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	ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/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	ND	
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldibenzothiophene	ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	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	ND	
C1-Chrysenes	ND	
C2-Chrysenes	ND	
C3-Chrysenes	ND	
C4-Chrysenes	ND	
Benzo(b)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perylene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene	ND	
Benzo(g,h,i)perylene	ND	

Surrogate Recoveries (%)	
Naphthalene-d8	92
Phenanthrene-d10	85
Chrysene-d12	84
5b(H)-Cholane	83

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

Not Surrogate Corrected
PB results

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Equipment Blank	
Battelle Sample ID	AB485PB	
Battelle Batch ID	02-667	
Associated Blank	AB484PB	
Field Date	NA	
Receipt Date	NA	
Extraction Date	11/22/02	
Acquired Date	12/14/02	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Wipe	
Sample Size	10	g
Weight Basis	NA	
Min Reporting Limit	2.5	
Amount Units	µg/kg	
Naphthalene	1.47	J
C1-Naphthalenes	ND	
C2-Naphthalenes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes	ND	
2-Methylnaphthalene	ND	
1-Methylnaphthalene	ND	
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene	ND	
1,5-Dimethylnaphthalene	ND	
Acenaphthylene	ND	
Acenaphthene	0.469	J
Biphenyl	ND	
Dibenzofuran	1.87	J
Cadalene	ND	
Fluorene	1.8	J
C1-Fluorenes	3.79	
C2-Fluorenes	ND	
C3-Fluorenes	ND	
2-Methylfluorene	ND	
1-Methylfluorene	0.362	J
Anthracene	ND	
Phenanthrene	13.4	
C1-Phenanthrenes/Anthracenes	3.98	
C2-Phenanthrenes/Anthracenes	ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/Anthracenes	ND	
3-Methylphenanthrene	0.975	J
2/4-Methylphenanthrene	0.99	J
2-Methylanthracene	ND	
9-Methylphenanthrene	0.852	J
1-Methylphenanthrene	0.579	J
2,7-Dimethylphenanthrene	ND	
1,7-Dimethylphenanthrene	ND	
Dibenzothiophene	0.984	J
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldibenzothiophene	ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	ND	
Retene	0.991	J
Fluoranthene	1.01	J
Pyrene	0.754	J
Benzo(b)fluorene	ND	
C1-Fluoranthenes/Pyrenes	ND	
C2-Fluoranthenes/Pyrenes	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)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perylene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene	ND	
Benzo(g,h,i)perylene	ND	

Surrogate Recoveries (%)	
Naphthalene-d8	92
Phenanthrene-d10	80
Chrysene-d12	93
5b(H)-Cholane	80

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

Not Surrogate Corrected
PB (2) results

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory 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		12/14/02		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Sediment		
Sample Size		10 g		
Weight Basis		NA		
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			ND	
2-Methylnaphthalene		565		
1-Methylnaphthalene		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			ND	
Fluorene	1001	936		94
C1-Fluorenes			ND	
C2-Fluorenes			ND	
C3-Fluorenes			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			ND	
3-Methylphenanthrene			ND	
2/4-Methylphenanthrene			ND	
2-Methylanthracene			ND	
9-Methylphenanthrene			ND	
1-Methylphenanthrene		687		
2,7-Dimethylphenanthrene			ND	
1,7-Dimethylphenanthrene			ND	
Dibenzothiophene			ND	
C1-Dibenzothiophenes			ND	
C2-Dibenzothiophenes			ND	
C3-Dibenzothiophenes			ND	
C4-Dibenzothiophenes			ND	
4-Methyldibenzothiophene			ND	
2/3-Methyldibenzothiophene			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	
C3-Fluoranthenes/Pyrenes			ND	
Benzo(a)anthracene	1001	1040		104
Chrysene	1001	1020		102
C1-Chrysenes			ND	
C2-Chrysenes			ND	
C3-Chrysenes			ND	
C4-Chrysenes			ND	
Benzo(b)fluoranthene	1001	1080		108
Benzo(j/k)fluoranthene	1000	1080		108
Benzo(a)fluoranthene			ND	
Benzo(e)pyrene	989	1040		105
Benzo(a)pyrene	1001	1080		108
Perylene	1000	1020		102
Indeno(1,2,3-c,d)pyrene	1001	997		100
Dibenz(a,h)anthracene	1000	1070		107
Benzo(g,h,i)perylene	1001	998		100

Surrogate Recoveries (%)	
Naphthalene-d8	88
Phenanthrene-d10	85
Chrysene-d12	98
5b(H)-Cholane	83

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

Not Surrogate Corrected
LCS results

Prepared by Andy Smith
3/27/2003

Battelle
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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		
Analytical 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	25.9	19.2		
Amount Units	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-Methylnaphthalene	172	133	25.6	
1-Methylnaphthalene	90.1	69	NA	
2-Ethylnaphthalene	13.1 J	15 J	NA	
1-Ethylnaphthalene	5.19 J	3.98 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	&
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	&
C3-Fluorenes	390 ME	253 ME	42.6	&
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	829	664	22.1	
C3-Phenanthrenes/Anthracenes	588	451	26.4	
C4-Phenanthrenes/Anthracenes	503	362	32.6	&
3-Methylphenanthrene	139	105	27.9	
2/4-Methylphenanthrene	152	118	25.2	
2-Methylanthracene	98.4	78.3	NA	
9-Methylphenanthrene	188	147	24.5	
1-Methylphenanthrene	103	81.1	NA	
2,7-Dimethylphenanthrene	91.6	77.6	NA	
1,7-Dimethylphenanthrene	56.1	45.4	NA	
Dibenzothiophene	220	169	26.2	
C1-Dibenzothiophenes	194	142	31	&
C2-Dibenzothiophenes	301	224	29.3	
C3-Dibenzothiophenes	423	377	11.5	
C4-Dibenzothiophenes	338	217	43.6	&
4-Methyldibenzothiophene	56.8	39.3	NA	
2/3-Methyldibenzothiophene	59.4	59.2	NA	
1-Methyldibenzothiophene	17.6 J	14.2 J	NA	
Dehydroabietin(e)	ND	ND		
Retene	57.5	37.2	NA	
Fluoranthene	5390	4060	28.1	
Pyrene	6720	5130	26.8	
Benzo(b)fluorene	253	190	28.4	
C1-Fluoranthenes/Pyrenes	2120	1690	22.6	
C2-Fluoranthenes/Pyrenes	994	770	25.4	
C3-Fluoranthenes/Pyrenes	596	343	53.9	&
Benzo(a)anthracene	2500	1960	24.2	
Chrysene	2800	2220	23.1	
C1-Chrysenes	1060	845	22.6	
C2-Chrysenes	770	724	6.16	
C3-Chrysenes	722	486	39.1	&
C4-Chrysenes	295	210	33.7	&
Benzo(b)fluoranthene	3730	2900	25	
Benzo(j/k)fluoranthene	3530	2740	25.2	
Benzo(a)fluoranthene	816	660	21.1	
Benzo(e)pyrene	3940	3030	26.1	
Benzo(a)pyrene	5100	4030	23.4	
Perylene	1810	1420	24.1	
Indeno(1,2,3-c,d)pyrene	4350	3440	23.4	
Dibenz(a,h)anthracene	612	490	22.1	
Benzo(g,h,i)perylene	4660	3670	23.8	
Surrogate Recoveries (%)				
Naphthalene-d8	76	84	10	
Phenanthrene-d10	66	76	17	
Chrysene-d12	78	95	19	
5b(H)-Cholane	110	96	14	

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

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	AB489PB	
Battelle Batch ID	02-668	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	11/22/02	
Acquired Date	12/18/02	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	3.00	g
Weight Basis	DRY	
Min Reporting Limit	6.33	
Amount Units	µg/kg	
Naphthalene	1.17	J
C1-Naphthalenes	ND	
C2-Naphthalenes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes	ND	
2-Methylnaphthalene	ND	
1-Methylnaphthalene	ND	
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene	ND	
1,5-Dimethylnaphthalene	ND	
Acenaphthylene	ND	
Acenaphthene	ND	
Biphenyl	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	ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/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	ND	
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldibenzothiophene	ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	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	ND	
C1-Chrysenes	ND	
C2-Chrysenes	ND	
C3-Chrysenes	ND	
C4-Chrysenes	ND	
Benzo(b)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perylene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene	ND	
Benzo(g,h,i)perylene	ND	

Surrogate Recoveries (%)	
Naphthalene-d8	90
Phenanthrene-d10	85
Chrysene-d12	103
5b(H)-Cholane	88

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

Not Surrogate Corrected
PB results

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory Control Sample	
Battelle Sample ID		AB490LCS	
Battelle Batch ID		02-668	
Associated Blank		AB489PB	
Field Date		NA	
Receipt Date		NA	
Extraction Date		11/22/02	
Acquired Date		12/18/02	
Analytical Method		8270M	
Percent Solids		NA	
Matrix		Sediment	
Sample Size		1.00	
Weight Basis		OIL	
Min Reporting Limit		25.00	
Amount Units	FW67	ng	% Recovery Q
Naphthalene	1001	944	94
C1-Naphthalenes		1180	
C2-Naphthalenes		ND	
C3-Naphthalenes		ND	
C4-Naphthalenes		ND	
2-Methylnaphthalene		ND	
1-Methylnaphthalene		ND	
2-Ethylnaphthalene		ND	
1-Ethylnaphthalene		ND	
2,6/2,7-Dimethylnaphthalene		ND	
1,5-Dimethylnaphthalene		ND	
Acenaphthylene	1000	940	94
Acenaphthene	1000	978	98
Biphenyl	1003	972	97
Dibenzofuran		ND	
Cadalene		ND	
Fluorene	1001	991	99
C1-Fluorenes		ND	
C2-Fluorenes		ND	
C3-Fluorenes		ND	
2-Methylfluorene		ND	
1-Methylfluorene		ND	
Anthracene	1000	960	96
Phenanthrene	1000	997	100
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		ND	
2,7-Dimethylphenanthrene		ND	
1,7-Dimethylphenanthrene		ND	
Dibenzothiophene		ND	
C1-Dibenzothiophenes		ND	
C2-Dibenzothiophenes		ND	
C3-Dibenzothiophenes		ND	
C4-Dibenzothiophenes		ND	
4-Methyldibenzothiophene		ND	
2/3-Methyldibenzothiophene		ND	
1-Methyldibenzothiophene		ND	
Dehydroabietin(e)		ND	
Retene		ND	
Fluoranthene	1000	1060	106
Pyrene	1000	1090	109
Benzo(b)fluorene		ND	
C1-Fluoranthenes/Pyrenes		ND	
C2-Fluoranthenes/Pyrenes		ND	
C3-Fluoranthenes/Pyrenes		ND	
Benzo(a)anthracene	1001	1140	114
Chrysene	1001	1150	115
C1-Chrysenes		ND	
C2-Chrysenes		ND	
C3-Chrysenes		ND	
C4-Chrysenes		ND	
Benzo(b)fluoranthene	1001	1100	110
Benzo(j/k)fluoranthene	1000	1110	111
Benzo(a)fluoranthene		ND	
Benzo(e)pyrene	989	1030	104
Benzo(a)pyrene	1001	1020	102
Perylene	1000	921	92
Indeno(1,2,3-c,d)pyrene	1001	828	83
Dibenz(a,h)anthracene	1000	960	96
Benzo(g,h,i)perylene	1001	821	82

Surrogate Recoveries (%)	
Naphthalene-d8	92
Phenanthrene-d10	85
Chrysene-d12	104
5b(H)-Cholane	87

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

Not Surrogate Corrected
LCS results

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	NLU-112-SS-2030	NLU-112-SS-2030		
Battelle Sample ID	U0101	U0101DUP		
Battelle Batch ID	02-668	02-668		
Associated Blank	AB489PB	AB489PB		
Field Date	37574	37574		
Receipt Date	37575	37575		
Extraction Date	37582	37582		
Acquired Date	37613.72153	37609.75894		
Analytical Method	8270M	8270M		
Percent Solids	18.29 %	18.29 %		
Matrix	Sediment	Sediment		
Sample Size	1.93 g	1.95 g		
Weight Basis	DRY	DRY		
Min Reporting Limit	40.50	45.80		
Amount Units	µg/kg	µg/kg	RPD(%)	Q
Naphthalene	22600	23300	3.05	
C1-Naphthalenes	4000	4060	1.49	
C2-Naphthalenes	21600	22600	4.52	
C3-Naphthalenes	24400	24700	1.22	
C4-Naphthalenes	10300	10500	1.92	
2-Methylnaphthalene	2310	2330	0.862	
1-Methylnaphthalene	1660	1720	3.55	
2-Ethylnaphthalene	426	467	9.18	
1-Ethylnaphthalene	378	402	6.66	
2,6/2,7-Dimethylnaphthalene	7090	7470	5.22	
1,5-Dimethylnaphthalene	1000	1070	6.76	
Acenaphthylene	7330	8080	9.73	
Acenaphthene	52400	55100	5.02	
Biphenyl	3900	4060	4.02	
Dibenzofuran	3330	3270	1.82	
Cadalene	90	108	NA	
Fluorene	28000	29000	3.51	
C1-Fluorenes	10200	10500	2.9	
C2-Fluorenes	7900	7750	1.92	
C3-Fluorenes	5490	5780	5.15	
2-Methylfluorene	1890	2120	11.5	
1-Methylfluorene	2440	2370	2.91	
Anthracene	54400 D	60100 D	9.96	
Phenanthrene	271000 D	299000 D	9.82	
C1-Phenanthrenes/Anthracenes	55500	56100	1.08	
C2-Phenanthrenes/Anthracenes	25400	26900	5.74	
C3-Phenanthrenes/Anthracenes	8810	9250	4.87	
C4-Phenanthrenes/Anthracenes	3160	3080	2.56	
3-Methylphenanthrene	14200	14800	4.14	
2/4-Methylphenanthrene	14700	14500	1.37	
2-Methylanthracene	6590	6590	0	
9-Methylphenanthrene	12000	12200	1.65	
1-Methylphenanthrene	7200	6860	4.84	
2,7-Dimethylphenanthrene	1940	1670	15	
1,7-Dimethylphenanthrene	2000	1850	7.79	
Dibenzothiophene	38100	39200	2.85	
C1-Dibenzothiophenes	10600	10900	2.79	
C2-Dibenzothiophenes	7490	7510	0.267	
C3-Dibenzothiophenes	3980	4010	0.751	
C4-Dibenzothiophenes	1210	1260	4.05	
4-Methyldibenzothiophene	3590	3650	1.66	
2/3-Methyldibenzothiophene	3990	4060	1.74	
1-Methyldibenzothiophene	1040	1020	1.94	
Dehydroabietin(e)	ND	ND		
Retene	1020	617	49.2	&
Fluoranthene	294000 D	322000 D	9.09	
Pyrene	356000 D	395000 D	10.4	
Benzo(b)fluorene	7930	8050	1.5	
C1-Fluoranthenes/Pyrenes	62000	61700	0.485	
C2-Fluoranthenes/Pyrenes	11600	12300	5.86	
C3-Fluoranthenes/Pyrenes	3580	3750	4.84	
Benzo(a)anthracene	62400 D	69400 D	10.6	
Chrysene	79400 D	84600 D	6.34	
C1-Chrysenes	17600	16800	6.59	
C2-Chrysenes	6490	6480	0.154	
C3-Chrysenes	2190	2350	7.05	
C4-Chrysenes	ND	ND		
Benzo(b)fluoranthene	50800 D	54100 D	6.29	
Benzo(j/k)fluoranthene	60300 D	66600 D	9.93	
Benzo(a)fluoranthene	19700	21100	6.86	
Benzo(e)pyrene	62400 D	75000 D	16.3	
Benzo(a)pyrene	106000 D	118000 D	10.7	
Perylene	34000	35900	5.44	
Indeno(1,2,3-c,d)pyrene	79100 D	84200 D	6.25	
Dibenz(a,h)anthracene	3690	3740	1.34	
Benzo(g,h,i)perylene	94700 D	97600 D	3.22	
Surrogate Recoveries (%)				
Naphthalene-d8	86	87	1.02	
Phenanthrene-d10	90	85	5.79	
Chrysene-d12	101	99	2.55	
5b(H)-Cholane	91	96	5.08	

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

Prepared by Andy Smith
3/27/2003

Battelle
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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	
Extraction Date	01/09/03	
Acquired Date	02/25/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Sediment	
Sample Size	7	g
Weight Basis	NA	
Min Reporting Limit	3.61	
Amount Units	µg/kg	
Naphthalene	2.18	J
C1-Naphthalenes	2.23	J
C2-Naphthalenes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes	ND	
2-Methylnaphthalene	1.38	J
1-Methylnaphthalene	0.723	J
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene	0.258	J
1,5-Dimethylnaphthalene	ND	
Acenaphthylene	ND	
Acenaphthene	ND	
Biphenyl	0.229	J
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	ND	
C3-Phenanthrenes/Anthracenes	ND	
C4-Phenanthrenes/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	ND	
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldibenzothiophene	ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	ND	
Retene	ND	
Fluoranthene	ND	
Pyrene	0.228	J
Benzo(b)fluorene	ND	
C1-Fluoranthenes/Pyrenes	ND	
C2-Fluoranthenes/Pyrenes	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)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perylene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene	ND	
Benzo(g,h,i)perylene	ND	

Surrogate Recoveries (%)	
Naphthalene-d8	94
Phenanthrene-d10	86
Chrysene-d12	94
5b(H)-Cholane	82

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

Not Surrogate Corrected
PB results

Prepared by Andy Smith
3/27/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory Control Sample		
Battelle Sample ID		AB852LCS		
Battelle Batch ID		03-0023		
Associated Blank		AB851PB		
Field Date		NA		
Receipt Date		NA		
Extraction Date		01/09/03		
Acquired Date		02/25/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Sediment		
Sample Size		7 g		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67	ng		% Recovery Q
Naphthalene	1001	881		88
C1-Naphthalenes		1040		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
2-Methylnaphthalene		534		
1-Methylnaphthalene		501		
2-Ethylnaphthalene		ND		
1-Ethylnaphthalene		ND		
2,6/2,7-Dimethylnaphthalene		448		
1,5-Dimethylnaphthalene		ND		
Acenaphthylene	1000	800		80
Acenaphthene	1000	862		86
Biphenyl	1003	862		86
Dibenzofuran		2.54	J	
Cadalene		ND		
Fluorene	1001	898		90
C1-Fluorenes		ND		
C2-Fluorenes		ND		
C3-Fluorenes		ND		
2-Methylfluorene		ND		
1-Methylfluorene		ND		
Anthracene	1000	842		84
Phenanthrene	1000	893		89
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		601		
2,7-Dimethylphenanthrene		ND		
1,7-Dimethylphenanthrene		ND		
Dibenzothiophene		11.3	J	
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		ND		
C4-Dibenzothiophenes		ND		
4-Methyldibenzothiophene		ND		
2/3-Methyldibenzothiophene		ND		
1-Methyldibenzothiophene		ND		
Dehydroabietin(e)		ND		
Retene		ND		
Fluoranthene	1000	893		89
Pyrene	1000	912		91
Benzo(b)fluorene		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		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo(b)fluoranthene	1001	872		87
Benzo(j/k)fluoranthene	1000	990		99
Benzo(a)fluoranthene		ND		
Benzo(e)pyrene	989	883		89
Benzo(a)pyrene	1001	918		92
Perylene	1000	877		88
Indeno(1,2,3-c,d)pyrene	1001	895		89
Dibenz(a,h)anthracene	1000	952		95
Benzo(g,h,i)perylene	1001	936		94

Surrogate Recoveries (%)	
Naphthalene-d8	93
Phenanthrene-d10	84
Chrysene-d12	92
5b(H)-Cholane	81

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

Not Surrogate Corrected
LCS results

Prepared by Andy Smith
3/27/2003

Battelle
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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	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	02/25/03	02/25/03		
Analytical Method	8270M	8270M		
Percent Solids	18.31 %	18.31 %		
Matrix	Sediment	Sediment		
Sample Size	5.76 g	5.73 g		
Weight Basis	DRY	DRY		
Min Reporting Limit	43.8	44.1		
Amount Units	µg/kg	µg/kg	RPD(%)	Q
Naphthalene	12200	11900	2.49	
C1-Naphthalenes	3040	3000	1.32	
C2-Naphthalenes	5540	5390	2.74	
C3-Naphthalenes	7150	6920	3.27	
C4-Naphthalenes	5010	4880	2.83	
2-Methylnaphthalene	1510	1490	1.33	
1-Methylnaphthalene	1510	1500	0.664	
2-Ethylnaphthalene	169	153	NA	
1-Ethylnaphthalene	283	276	2.5	
2,6/2,7-Dimethylnaphthalene	1420	1400	1.42	
1,5-Dimethylnaphthalene	419	414	1.2	
Acenaphthylene	3660	3800	3.75	
Acenaphthene	8530	8250	3.34	
Biphenyl	1950	1870	4.19	
Dibenzofuran	1570	1530	2.58	
Cadalene	ND	ND		
Fluorene	5500	5360	2.58	
C1-Fluorenes	4350	4220	3.03	
C2-Fluorenes	3570	3470	2.84	
C3-Fluorenes	2720	2720	0	
2-Methylfluorene	1170	1200	2.53	
1-Methylfluorene	1170	1090	7.08	
Anthracene	13200	13100	0.76	
Phenanthrene	20900	20600	1.44	
C1-Phenanthrenes/Anthracenes	14600	14600	0	
C2-Phenanthrenes/Anthracenes	11600	11500	0.866	
C3-Phenanthrenes/Anthracenes	6150	6310	2.57	
C4-Phenanthranes/Anthracenes	2330	2500	7.04	
3-Methylphenanthrene	4240	4240	0	
2/4-Methylphenanthrene	1590	1570	1.26	
2-Methylanthracene	2530	2440	3.62	
9-Methylphenanthrene	3940	3850	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	4110	4060	1.22	
C2-Dibenzothiophenes	3870	3590	7.51	
C3-Dibenzothiophenes	2610	2640	1.14	
C4-Dibenzothiophenes	1190	1150	3.42	
4-Methyldibenzothiophene	1600	1570	1.89	
2/3-Methyldibenzothiophene	1270	1260	0.79	
1-Methyldibenzothiophene	424	428	0.939	
Dehydroabietin(e)	ND	ND		
Retene	2850	2800	1.77	
Fluoranthene	181000 D	183000 D	1.1	
Pyrene	226000 D	229000 D	1.32	
Benzo(b)fluorene	4650	4690	0.856	
C1-Fluoranthenes/Pyrenes	36500	36500	0	
C2-Fluoranthenes/Pyrenes	9000	8850	1.66	
C3-Fluoranthenes/Pyrenes	2300	2400	4.26	
Benzo(a)anthracene	59200 D	60100 D	1.51	
Chrysene	75200 D	76500 D	1.71	
C1-Chrysenes	11700	11800	0.851	
C2-Chrysenes	4030	4100	1.72	
C3-Chrysenes	1590	1540	3.19	
C4-Chrysenes	ND	ND		
Benzo(b)fluoranthene	54200 D	55100 D	1.65	
Benzo(j/k)fluoranthene	39900	39100	2.02	
Benzo(a)fluoranthene	15300	15200	0.656	
Benzo(e)pyrene	57800 D	57900 D	0.173	
Benzo(a)pyrene	91500 D	92900 D	1.52	
Perylene	19500	19400	0.514	
Indeno(1,2,3-c,d)pyrene	71500 D	72500 D	1.39	
Dibenz(a,h)anthracene	6990	6800	2.76	
Benzo(g,h,i)perylene	84500 D	85100 D	0.708	
Surrogate Recovaries (%)				
Naphthalene-d8	101	95	6	
Phenanthrene-d10	90	89	2	
Chrysene-d12	101	91	10	
5b(H)-Cholane	103	100	3	

J=Result < Sample RL.
B=Result < 5 x PB.
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NA= Not Applicable.
D= Values reported using secondary dilution factor.
&= Outside of DQO.
ME= Matrix Interference. Estimated Value.

Not Surrogate Corrected
DUP results

Prepared by Andy Smith
3/27/2003

Battelle
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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	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	01/31/03	
Acquired Date	02/17/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size	7.00	g
Weight Basis	NA	
Min Reporting Limit	3.61	
Amount Units	µg/kg	
Naphthalene	1.15	J
C1-Naphthalenes	0.557	J
C2-Naphthalenes		ND
C3-Naphthalenes		ND
C4-Naphthalenes		ND
2-Methylnaphthalene	0.334	J
1-Methylnaphthalene	0.195	J
2-Ethylnaphthalene		ND
1-Ethylnaphthalene		ND
2,6/2,7-Dimethylnaphthalene		ND
1,5-Dimethylnaphthalene		ND
Acenaphthylene		ND
Acenaphthene		ND
Biphenyl		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	0.31	J
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		ND
2,7-Dimethylphenanthrene		ND
1,7-Dimethylphenanthrene		ND
Dibenzothiophene		ND
C1-Dibenzothiophenes		ND
C2-Dibenzothiophenes		ND
C3-Dibenzothiophenes		ND
C4-Dibenzothiophenes		ND
4-Methyldibenzothiophene		ND
2/3-Methyldibenzothiophene		ND
1-Methyldibenzothiophene		ND
Dehydroabietin(e)		ND
Retene		ND
Fluoranthene	0.193	J
Pyrene	0.217	J
Benzo(b)fluorene		ND
C1-Fluoranthenes/Pyrenes		ND
C2-Fluoranthenes/Pyrenes		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)fluoranthene		ND
Benzo(j/k)fluoranthene		ND
Benzo(a)fluoranthene		ND
Benzo(e)pyrene		ND
Benzo(a)pyrene		ND
Perylene		ND
Indeno(1,2,3-c,d)pyrene		ND
Dibenz(a,h)anthracene		ND
Benzo(g,h,i)perylene		ND

Surrogate Recoveries (%)	
Naphthalene-d8	93
Phenanthrene-d10	88
Chrysene-d12	88
5b(H)-Cholane	79

J=Result < Sample RL.
ND= Not Detected.
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&= Outside of DQO.
B= Result >5*Sample RL.

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory Control Sample		
Battelle Sample ID		BB143LCS-D		
Battelle Batch ID		03-0100		
Associated Blank		AB851PB		
Field Date		NA		
Receipt Date		NA		
Extraction Date		01/31/03		
Acquired Date		02/17/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Solid		
Sample Size		1.00		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67/FX61	ng		% Recovery Q
Naphthalene	1502	1430		95
C1-Naphthalenes		1800		
C2-Naphthalenes			ND	
C3-Naphthalenes			ND	
C4-Naphthalenes			ND	
2-Methylnaphthalene		928		
1-Methylnaphthalene		869		
2-Ethylnaphthalene			ND	
1-Ethylnaphthalene			ND	
2,6/2,7-Dimethylnaphthalene		837		
1,5-Dimethylnaphthalene			ND	
Acenaphthylene	1500	1240		83
Acenaphthene	1501	1350		90
Biphenyl	1504	1380		92
Dibenzofuran		477		
Cadalene			ND	
Fluorene	1501	1440		96
C1-Fluorenes			ND	
C2-Fluorenes			ND	
C3-Fluorenes			ND	
2-Methylfluorene			ND	
1-Methylfluorene			ND	
Anthracene	1501	1400		93
Phenanthrene	1504	1460		97
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			ND	
2,7-Dimethylphenanthrene			ND	
1,7-Dimethylphenanthrene			ND	
Dibenzothiophene		433		
C1-Dibenzothiophenes			ND	
C2-Dibenzothiophenes			ND	
C3-Dibenzothiophenes			ND	
C4-Dibenzothiophenes			ND	
4-Methyldibenzothiophene			ND	
2/3-Methyldibenzothiophene			ND	
1-Methyldibenzothiophene			ND	
Dehydroabietin(e)			ND	
Retene			ND	
Fluoranthene	1512	1380		91
Pyrene	1501	1380		92
Benzo(b)fluorene			ND	
C1-Fluoranthenes/Pyrenes			ND	
C2-Fluoranthenes/Pyrenes			ND	
C3-Fluoranthenes/Pyrenes			ND	
Benzo(a)anthracene	1502	1330		89
Chrysene	1503	1350		90
C1-Chrysenes			ND	
C2-Chrysenes			ND	
C3-Chrysenes			ND	
C4-Chrysenes			ND	
Benzo(b)fluoranthene	1502	1230		82
Benzo(j/k)fluoranthene	1501	1480		99
Benzo(a)fluoranthene			ND	
Benzo(e)pyrene	1483	1230		83
Benzo(a)pyrene	1501	1250		83
Perylene	1500	1220		81
Indeno(1,2,3-c,d)pyrene	1501	1090		73
Dibenz(a,h)anthracene	1501	1160		77
Benzo(g,h,i)perylene	1502	1220		81

Surrogate Recoveries (%)	
Naphthalene-d8	96
Phenanthrene-d10	94
Chrysene-d12	89
5b(H)-Cholane	83

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

Not Surrogate Corrected
LCS results

Prepared by Ted Healey
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank
Battelle Sample ID	BB146PB-D
Battelle Batch ID	03-0100
Associated Blank	NA
Field Date	NA
Receipt Date	NA
Extraction Date	02/06/03
Acquired Date	02/18/03
Analytical Method	8270M
Percent Solids	NA
Matrix	Oily Material
Sample Size	511.00 mg
Weight Basis	NA
Min Reporting Limit	0.0494
Amount Units	mg/kg

Naphthalene	0.00307 J
C1-Naphthalenes	ND
C2-Naphthalenes	ND
C3-Naphthalenes	ND
C4-Naphthalenes	ND
2-Methylnaphthalene	ND
1-Methylnaphthalene	ND
2-Ethylnaphthalene	ND
1-Ethylnaphthalene	ND
2,6/2,7-Dimethylnaphthalene	ND
1,5-Dimethylnaphthalene	ND
Acenaphthylene	ND
Acenaphthene	ND
Biphenyl	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	ND
C3-Phenanthrenes/Anthracenes	ND
C4-Phenanthrenes/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	ND
C1-Dibenzothiophenes	ND
C2-Dibenzothiophenes	ND
C3-Dibenzothiophenes	ND
C4-Dibenzothiophenes	ND
4-Methyldibenzothiophene	ND
2/3-Methyldibenzothiophene	ND
1-Methyldibenzothiophene	ND
Dehydroabietin(e)	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	ND
C1-Chrysenes	ND
C2-Chrysenes	ND
C3-Chrysenes	ND
C4-Chrysenes	ND
Benzo(b)fluoranthene	ND
Benzo(j/k)fluoranthene	ND
Benzo(a)fluoranthene	ND
Benzo(e)pyrene	ND
Benzo(a)pyrene	ND
Perylene	ND
Indeno(1,2,3-c,d)pyrene	ND
Dibenz(a,h)anthracene	ND
Benzo(g,h,i)perylene	ND

Surrogate Recoveries (%)	
Naphthalene-d8	96
Phenanthrene-d10	93
Chrysene-d12	101
5b(H)-Cholane	81

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

Not Surrogate Corrected
PB (2) results

Prepared by Ted Healey
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory Control Sample		
Battelle Sample ID		BB147LCS-D		
Battelle Batch ID		03-0100		
Associated Blank		BB146PB-D		
Field Date		NA		
Receipt Date		NA		
Extraction Date		02/06/03		
Acquired Date		02/18/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Oily Material		
Sample Size		1.00		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67/FX61	ng		% Recovery Q
Naphthalene	1502	1400		93
C1-Naphthalenes		1810		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
2-Methylnaphthalene		934		
1-Methylnaphthalene		882		
2-Ethylnaphthalene		ND		
1-Ethylnaphthalene		ND		
2,6/2,7-Dimethylnaphthalene		852		
1,5-Dimethylnaphthalene		ND		
Acenaphthylene	1500	1300		87
Acenaphthene	1501	1370		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	1501	1460		97
Phenanthrene	1504	1520		101
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		ND		
2,7-Dimethylphenanthrene		ND		
1,7-Dimethylphenanthrene		ND		
Dibenzothiophene		450		
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		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		ND		
C2-Fluoranthenes/Pyrenes		ND		
C3-Fluoranthenes/Pyrenes		ND		
Benzo(a)anthracene	1502	1490		99
Chrysene	1503	1450		97
C1-Chrysenes		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo(b)fluoranthene	1502	1410		94
Benzo(j/k)fluoranthene	1501	1630		109
Benzo(e)fluoranthene		ND		
Benzo(e)pyrene	1483	1380		93
Benzo(a)pyrene	1501	1440		96
Perylene	1500	1440		96
Indeno(1,2,3-c,d)pyrene	1501	1460		97
Dibenz(a,h)anthracene	1501	1460		97
Benzo(g,h,i)perylene	1502	1460		97
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.

Not Surrogate Corrected
LCS (2) results

Prepared by Ted Healey
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	Procedural Blank	
Battelle Sample ID	BB278PB	
Battelle Batch ID	03-0137	
Associated Blank	NA	
Field Date	NA	
Receipt Date	NA	
Extraction Date	02/11/03	
Acquired Date	02/25/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size	0.5	g
Weight Basis	NA	
Min Reporting Limit	50.5	
Amount Units	µg/kg	
Naphthalene	9.78	J
C1-Naphthalenes	25.6	J
C2-Naphthalenes		ND
C3-Naphthalenes		ND
C4-Naphthalenes		ND
2-Methylnaphthalene	15.4	J
1-Methylnaphthalene	8.09	J
2-Ethylnaphthalene		ND
1-Ethylnaphthalene		ND
2,6/2,7-Dimethylnaphthalene		ND
1,5-Dimethylnaphthalene		ND
Acenaphthylene	1.96	J
Acenaphthene		ND
Biphenyl		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	4.05	J
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		ND
2,7-Dimethylphenanthrene		ND
1,7-Dimethylphenanthrene		ND
Dibenzothiophene		ND
C1-Dibenzothiophenes		ND
C2-Dibenzothiophenes		ND
C3-Dibenzothiophenes		ND
C4-Dibenzothiophenes		ND
4-Methyldibenzothiophene		ND
2/3-Methyldibenzothiophene		ND
1-Methyldibenzothiophene		ND
Dehydroabietin(e)		ND
Retene		ND
Fluoranthene	2.62	J
Pyrene	2.77	J
Benzo(b)fluorene		ND
C1-Fluoranthenes/Pyrenes		ND
C2-Fluoranthenes/Pyrenes		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)fluoranthene		ND
Benzo(j/k)fluoranthene		ND
Benzo(a)fluoranthene		ND
Benzo(e)pyrene		ND
Benzo(a)pyrene		ND
Perylene		ND
Indeno(1,2,3-c,d)pyrene		ND
Dibenz(a,h)anthracene		ND
Benzo(g,h,i)perylene		ND

Surrogate Recoveries (%)	
Naphthalene-d8	92
Phenanthrene-d10	87
Chrysene-d12	90
5b(H)-Cholane	90

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

Not Surrogate Corrected
PB results

Prepared by Andy Smith
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory 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		02/25/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Solid		
Sample Size		0.5 g		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67 & FX61	ng		% Recovery Q
Naphthalene	1502	1320		88
C1-Naphthalenes		1600		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
2-Methylnaphthalene		820		
1-Methylnaphthalene		774		
2-Ethylnaphthalene		ND		
1-Ethylnaphthalene		ND		
2,6/2,7-Dimethylnaphthalene		703		
1,5-Dimethylnaphthalene		ND		
Acenaphthylene	1500	1200		80
Acenaphthene	1501	1330		89
Biphenyl	1504	1350		90
Dibenzofuran	500	454		91
Cadalene		ND		
Fluorene	1501	1400		93
C1-Fluorenes		ND		
C2-Fluorenes		ND		
C3-Fluorenes		ND		
2-Methylfluorene		ND		
1-Methylfluorene		ND		
Anthracene	1501	1300		87
Phenanthrene	1504	1420		94
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		ND		
2,7-Dimethylphenanthrene		ND		
1,7-Dimethylphenanthrene		ND		
Dibenzothiophene	501	421		84
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		ND		
C4-Dibenzothiophenes		ND		
4-Methyldibenzothiophene		ND		
2/3-Methyldibenzothiophene		ND		
1-Methyldibenzothiophene		ND		
Dehydroabietin(e)		ND		
Retene		ND		
Fluoranthene	1512	1420		94
Pyrene	1501	1430		95
Benzo(b)fluorene		ND		
C1-Fluoranthenes/Pyrenes		ND		
C2-Fluoranthenes/Pyrenes		ND		
C3-Fluoranthenes/Pyrenes		ND		
Benzo(a)anthracene	1502	1350		90
Chrysene	1503	1410		94
C1-Chrysenes		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo(b)fluoranthene	1502	1340		89
Benzo(j/k)fluoranthene	1501	1500		100
Benzo(a)fluoranthene		ND		
Benzo(e)pyrene	1483	1320		89
Benzo(a)pyrene	1501	1230		82
Perylene	1500	862		57
Indeno(1,2,3-c,d)pyrene	1501	1260		84
Dibenz(a,h)anthracene	1501	1320		88
Benzo(g,h,i)perylene	1502	1310		87

Surrogate Recoveries (%)	
Naphthalene-d8	90
Phenanthrene-d10	89
Chrysene-d12	90
5b(H)-Cholane	90

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

Not Surrogate Corrected
LCS results

Prepared by Andy Smith
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID	NLU-109-2830	NLU-109-2830		
Battelle Sample ID	U0285-D	U0285DUP-D		
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	02/26/03	02/26/03		
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	124	109		
Amount Units	mg/kg	µg/kg	RPD(%)	Q
Naphthalene	44300	44800	1.12	
C1-Naphthalenes	34100	36300	6.25	
C2-Naphthalenes	32900	34900	5.9	
C3-Naphthalenes	17100	17800	4.01	
C4-Naphthalenes	7850	7790	1.81	
2-Methylnaphthalene	8540	8860	3.68	
1-Methylnaphthalene	25500	27500	7.55	
2-Ethylnaphthalene	2430	2600	6.76	
1-Ethylnaphthalene	499	527	NA	
2,6/2,7-Dimethylnaphthalene	9360	9920	5.81	
1,5-Dimethylnaphthalene	1280	1410	9.66	
Acenaphthylene	6450	6010	7.06	
Acenaphthene	58800	61800	4.97	
Biphenyl	2610	2570	1.54	
Dibenzofuran	3480	3640	4.49	
Cadalene	ND	ND		
Fluorene	24300	25400	4.43	
C1-Fluorenes	8100	8600	5.99	
C2-Fluorenes	5440	5560	2.18	
C3-Fluorenes	3100 ME	3470 ME	11.3	
2-Methylfluorene	1860	1760	5.52	
1-Methylfluorene	2150	2160	0.464	
Anthracene	31700	32200	1.56	
Phenanthrene	122000 D	129000 D	5.58	
C1-Phenanthrenes/Anthracenes	37100	38200	2.92	
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-Methylphenanthrene	9650	9870	2.25	
2-Methylanthracene	4280	4350	1.62	
9-Methylphenanthrene	8650	8670	0.231	
1-Methylphenanthrene	5160	5410	4.73	
2,7-Dimethylphenanthrene	978	996	1.62	
1,7-Dimethylphenanthrene	1420	1560	9.4	
Dibenzothiophene	15800	16000	2.53	
C1-Dibenzothiophenes	7170	7360	2.62	
C2-Dibenzothiophenes	4820	5210	7.78	
C3-Dibenzothiophenes	2810	2930	4.16	
C4-Dibenzothiophenes	1020	1080	5.71	
4-Methyldibenzothiophene	2360	2470	4.55	
2/3-Methyldibenzothiophene	2640	2690	1.88	
1-Methyldibenzothiophene	771	782	1.42	
Dehydroabietin(e)	ND	ND		
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	8580	8840	2.98	
C3-Fluoranthenes/Pyrenes	2170	2190	0.917	
Benzo(a)anthracene	32000	31700	0.942	
Chrysene	37500	37300	0.535	
C1-Chrysenes	10200	10300	0.976	
C2-Chrysenes	3720	3460	7.24	
C3-Chrysenes	1470	1470	0	
C4-Chrysenes	ND	ND		
Benzo(b)fluoranthene	25800	25800	0.778	
Benzo(j/k)fluoranthene	30100	29300	2.69	
Benzo(e)fluoranthene	9660	9540	1.25	
Benzo(e)pyrene	29100	28700	1.38	
Benzo(a)pyrene	42500	42000	1.18	
Perylene	11800	11600	1.71	
Indeno(1,2,3-c,d)pyrene	31800	31600	0.631	
Dibenz(a,h)anthracene	4280	4380	2.31	
Benzo(g,h,i)perylene	37000	36300	1.91	
Surrogate Recoveries (%)				
Naphthalene-d8	74	87	16	
Phenanthrene-d10	78	87	11	
Chrysene-d12	77	86	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.

Not Surrogate Corrected
DUP results

Prepared by Andy Smith
3/26/2003

Battelle
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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	02/21/03	
Acquired Date	03/04/03	
Analytical Method	8270M	
Percent Solids	NA	
Matrix	Solid	
Sample Size	0.4	g
Weight Basis	NA	
Min Reporting Limit	63.1	
Amount Units	µg/kg	
Naphthalene	10.3	J
C1-Naphthalenes	6.89	J
C2-Naphthalenes	ND	
C3-Naphthalenes	ND	
C4-Naphthalenes	ND	
2-Methylnaphthalene	3.69	J
1-Methylnaphthalene	2.97	J
2-Ethylnaphthalene	ND	
1-Ethylnaphthalene	ND	
2,6/2,7-Dimethylnaphthalene	ND	
1,5-Dimethylnaphthalene	ND	
Acenaphthylene	ND	
Acenaphthene	ND	
Biphenyl	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	5.65	J
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	ND	
2,7-Dimethylphenanthrene	ND	
1,7-Dimethylphenanthrene	ND	
Dibenzothiophene	ND	
C1-Dibenzothiophenes	ND	
C2-Dibenzothiophenes	ND	
C3-Dibenzothiophenes	ND	
C4-Dibenzothiophenes	ND	
4-Methyldibenzothiophene	ND	
2/3-Methyldibenzothiophene	ND	
1-Methyldibenzothiophene	ND	
Dehydroabietin(e)	ND	
Retene	ND	
Fluoranthene	3.95	J
Pyrene	8.49	J
Benzo(b)fluorene	ND	
C1-Fluoranthenes/Pyrenes	ND	
C2-Fluoranthenes/Pyrenes	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)fluoranthene	ND	
Benzo(j/k)fluoranthene	ND	
Benzo(a)fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(a)pyrene	ND	
Perylene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Dibenz(a,h)anthracene	ND	
Benzo(g,h,i)perylene	ND	

Surrogate Recoveries (%)	
Naphthalene-d8	91
Phenanthrene-d10	83
Chrysene-d12	88
5b(H)-Cholane	79

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

Not Surrogate Corrected
PB results

Prepared by Andy Smith
3/26/2003

Battelle
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Project Name Lake Union Sediment Investigation
Project Number N005443

Client Sample ID		Laboratory Control Sample		
Battelle Sample ID		BB427LCS		
Battelle Batch ID		03-0159		
Associated Blank		BB426PB		
Field Date		NA		
Receipt Date		NA		
Extraction Date		02/21/03		
Acquired Date		03/04/03		
Analytical Method		8270M		
Percent Solids		NA		
Matrix		Solid		
Sample Size		0.4 g		
Weight Basis		NA		
Min Reporting Limit		25.3		
Amount Units	FW67 & FX61	ng		% Recovery Q
Naphthalene	1502	1220		81
C1-Naphthalenes		1480		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
2-Methylnaphthalene		760		
1-Methylnaphthalene		716		
2-Ethylnaphthalene		ND		
1-Ethylnaphthalene		ND		
2,6/2,7-Dimethylnaphthalene		652		
1,5-Dimethylnaphthalene		ND		
Acenaphthylene	1500	1150		77
Acenaphthene	1501	1240		83
Biphenyl	1504	1250		83
Dibenzofuran	500	418		84
Cadalene		ND		
Fluorene	1501	1290		86
C1-Fluorenes		ND		
C2-Fluorenes		ND		
C3-Fluorenes		ND		
2-Methylfluorene		ND		
1-Methylfluorene		ND		
Anthracene	1501	1180		79
Phenanthrene	1504	1280		85
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		ND		
2,7-Dimethylphenanthrene		ND		
1,7-Dimethylphenanthrene		ND		
Dibenzothiophene	501	376		75
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		ND		
C4-Dibenzothiophenes		ND		
4-Methyldibenzothiophene		ND		
2/3-Methyldibenzothiophene		ND		
1-Methyldibenzothiophene		ND		
Dehydroabietin(e)		ND		
Retene		ND		
Fluoranthene	1512	1300		86
Pyrene	1501	1290		86
Benzo(b)fluorene		ND		
C1-Fluoranthenes/Pyrenes		ND		
C2-Fluoranthenes/Pyrenes		ND		
C3-Fluoranthenes/Pyrenes		ND		
Benzo(a)anthracene	1502	1250		83
Chrysene	1503	1300		87
C1-Chrysenes		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo(b)fluoranthene	1502	1190		79
Benzo(j/k)fluoranthene	1501	1270		85
Benzo(e)fluoranthene		ND		
Benzo(e)pyrene	1483	1200		81
Benzo(a)pyrene	1501	1230		82
Perylene	1500	1150		77
Indeno(1,2,3-c,d)pyrene	1501	1150		77
Dibenz(a,h)anthracene	1501	1220		81
Benzo(g,h,i)perylene	1502	1210		81

Surrogate Recoveries (%)	
Naphthalene-d8	85
Phenanthrene-d10	82
Chrysene-d12	85
5b(H)-Cholane	79

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

Not Surrogate Corrected
LCS results

Prepared by Andy Smith
3/26/2003

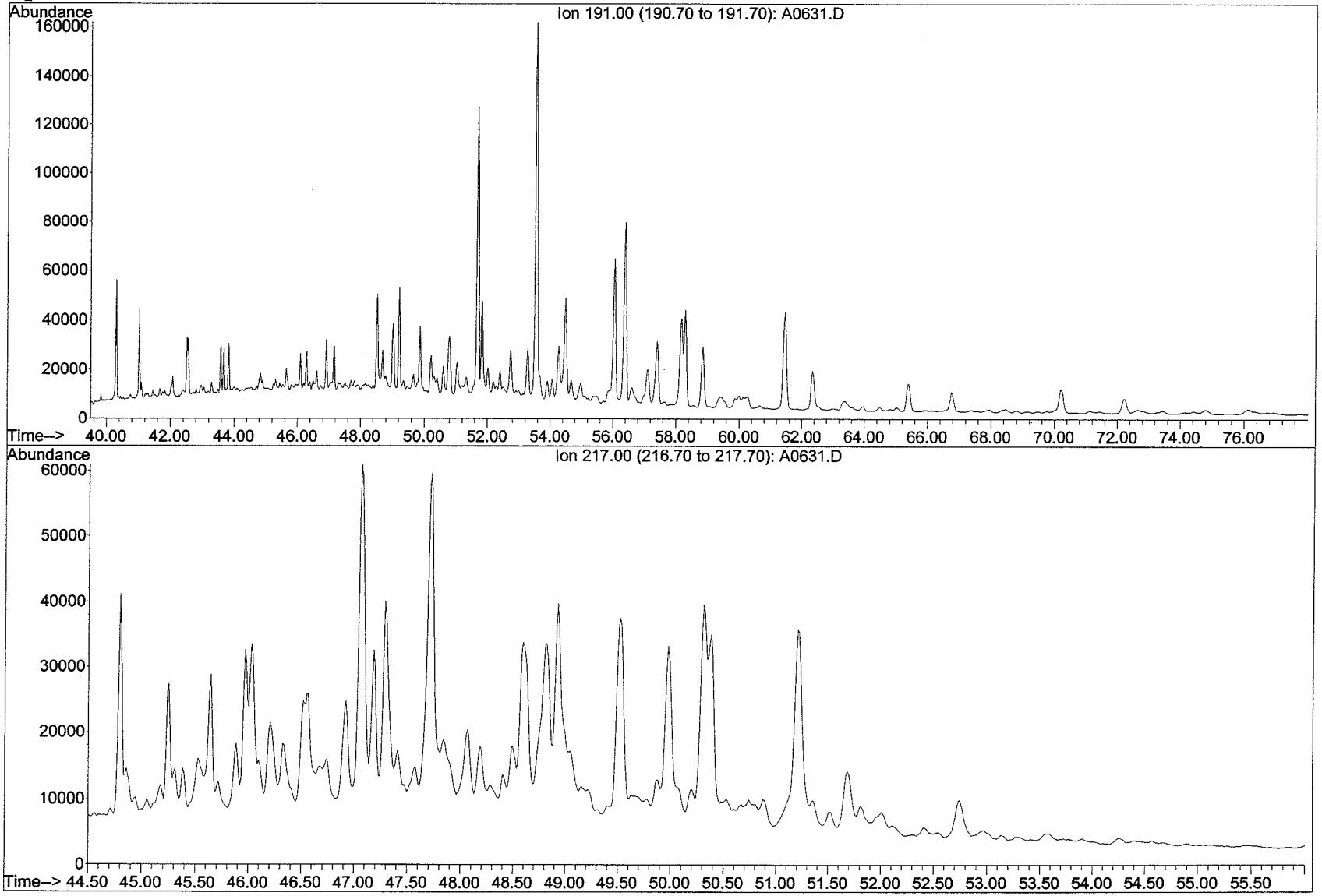
Attachment 3
Triterpane and Sterane Fingerprints
(GC/MS)

BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0631.D
Date Acquired: 14 Dec 2002 7:30 pm
Method File: BIO1SIM
Sample Name: U0169-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-102-SS-0010
U0169

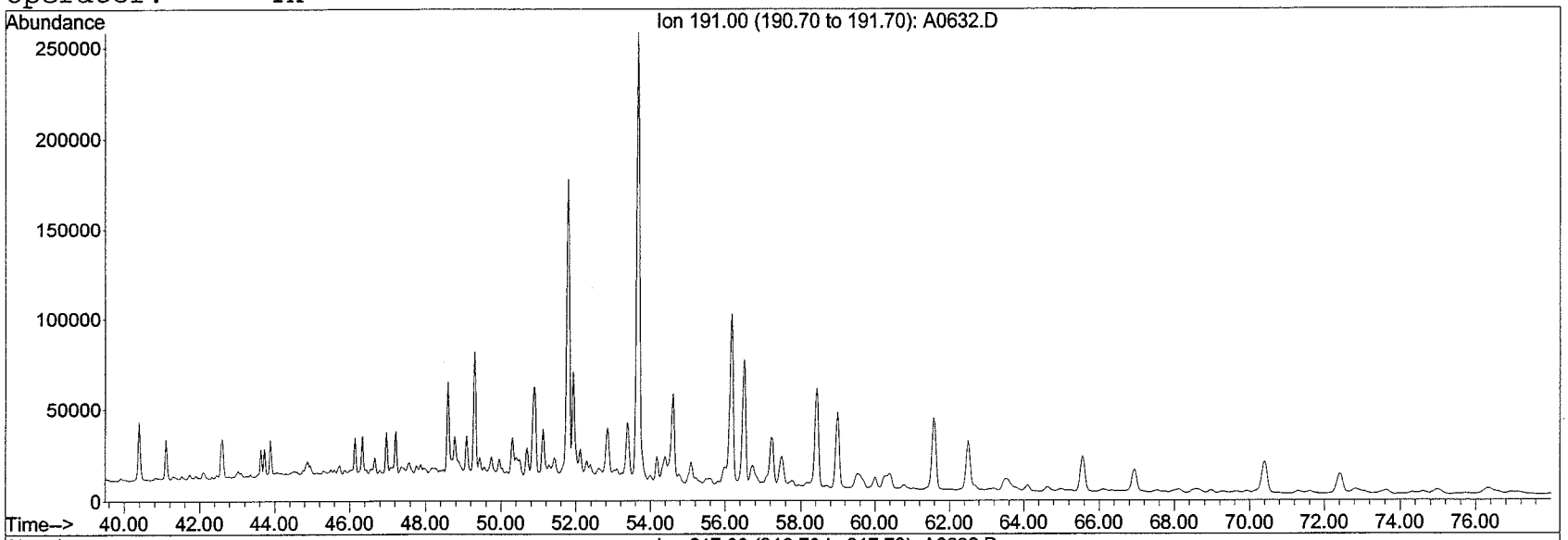


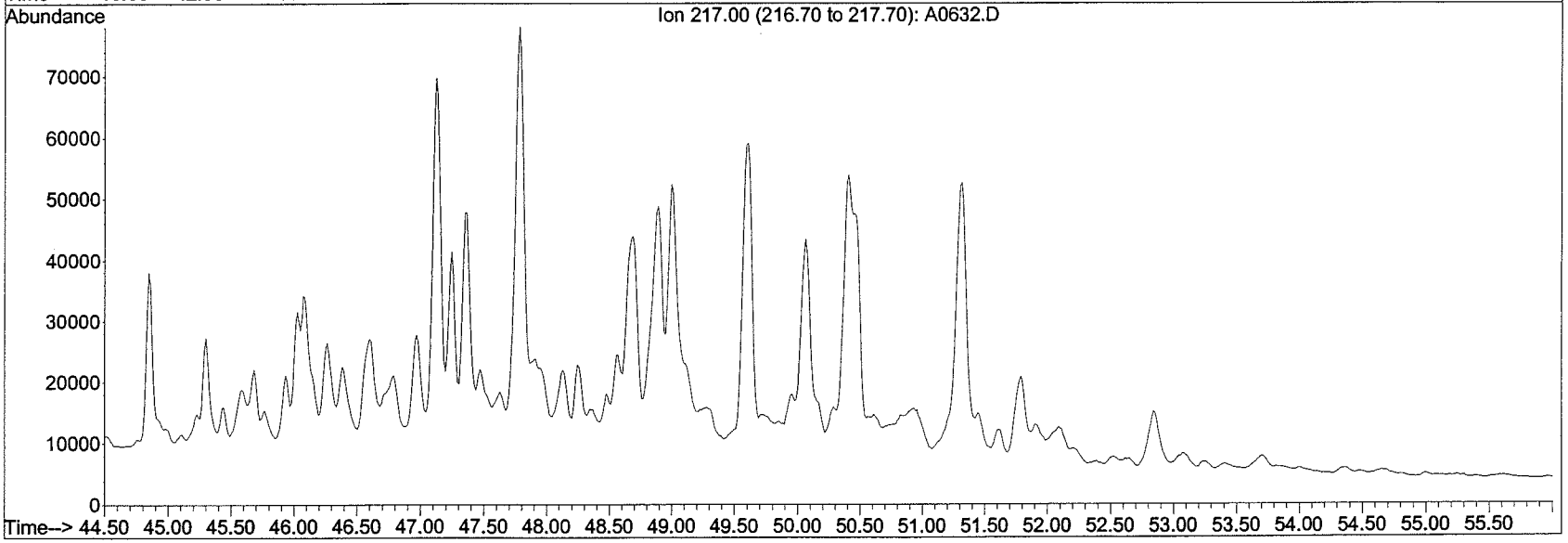
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0632.D
Date Acquired: 14 Dec 2002 9:06 pm
Method File: BIO1SIM
Sample Name: U0170-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-103-SS-0010
U0170



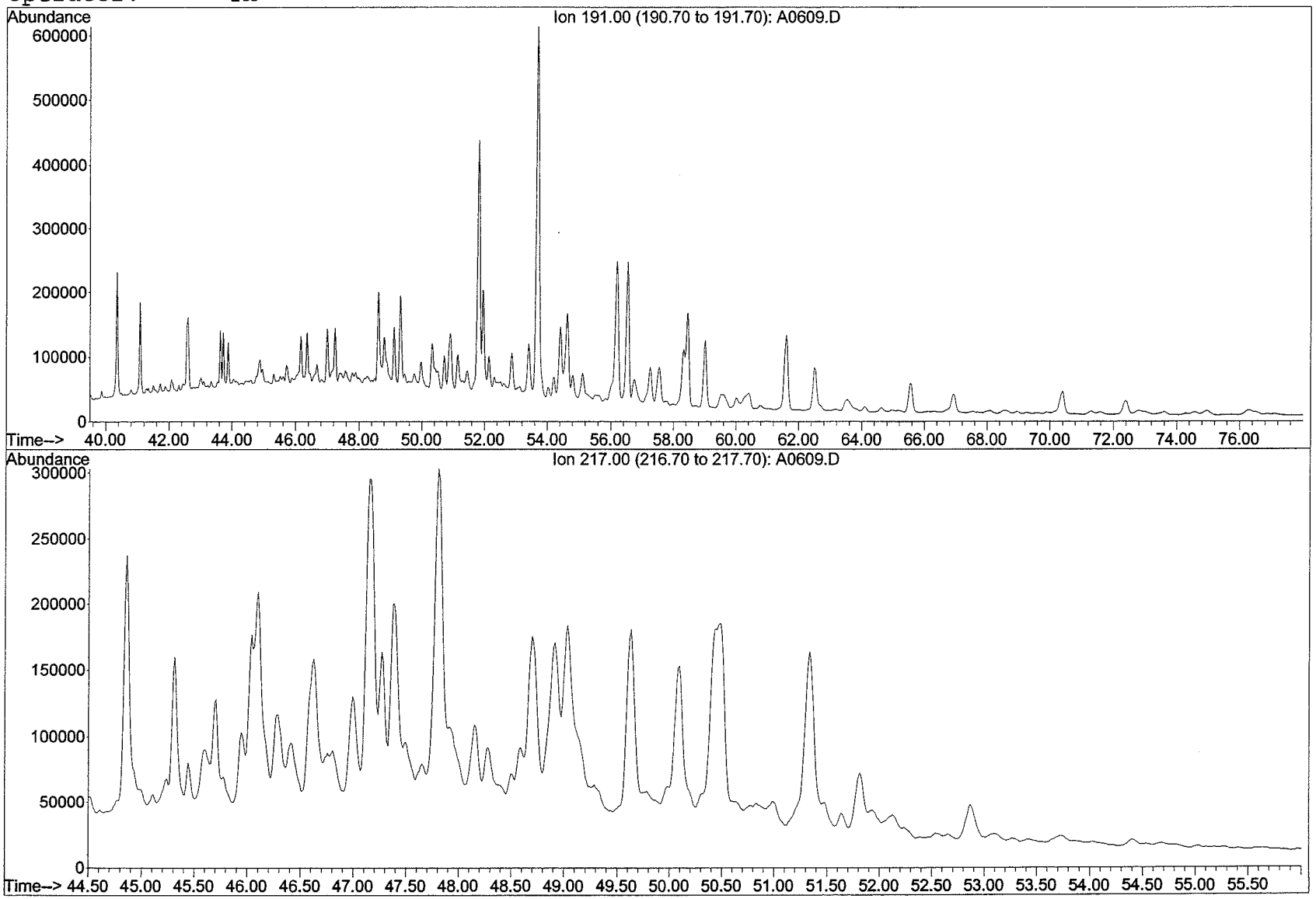


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0609.D
Date Acquired: 13 Dec 2002 8:51 am
Method File: BIO1SIM
Sample Name: U0142-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-104-SS-0010
U0142

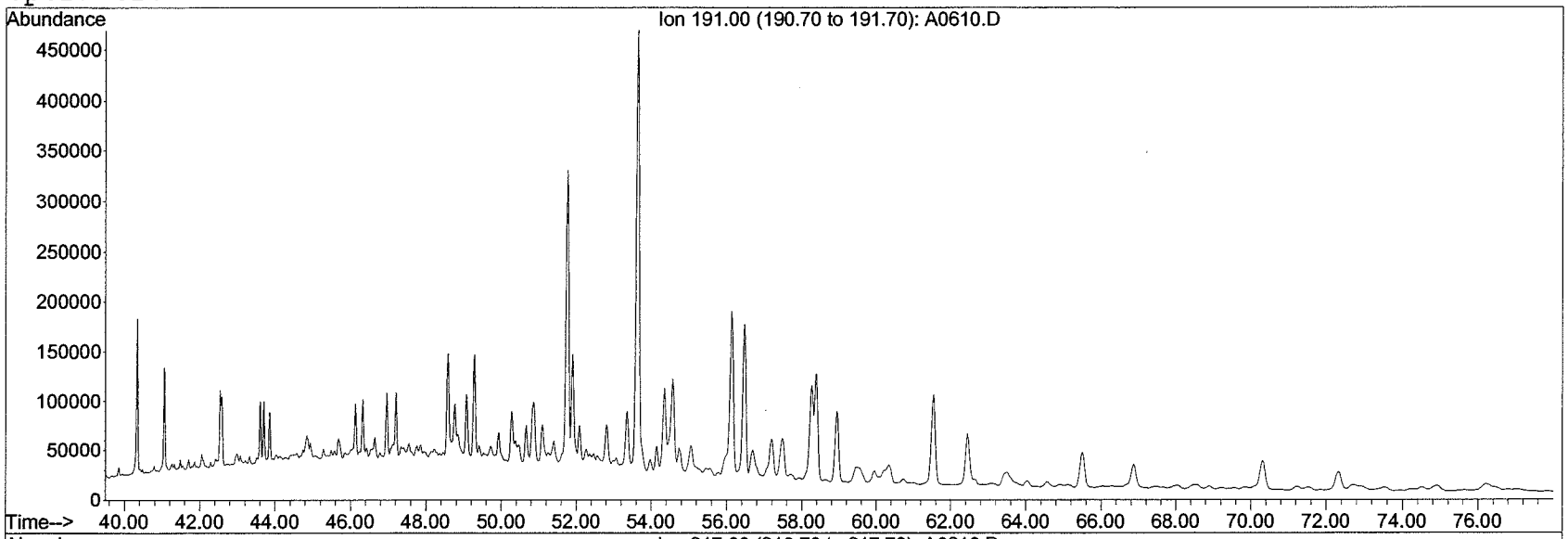


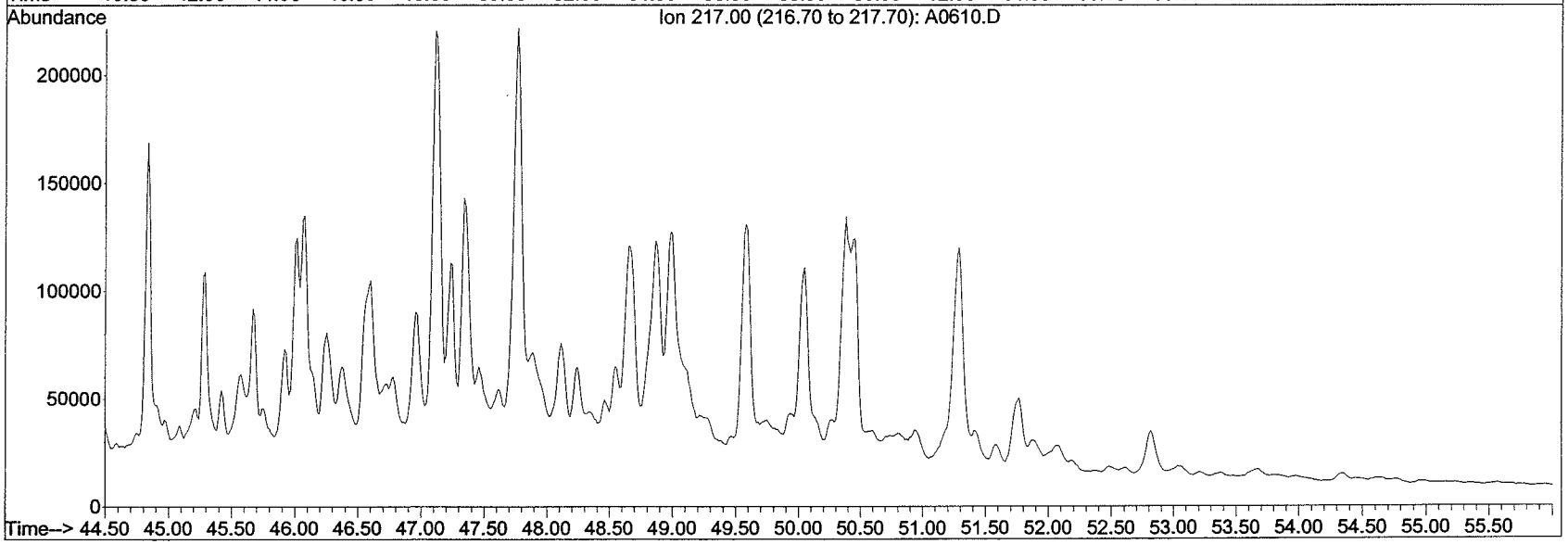
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0610.D
Date Acquired: 13 Dec 2002 10:21 am
Method File: BIO1SIM
Sample Name: U0142DUP-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-104-SS-0010
U0142 Duplicate



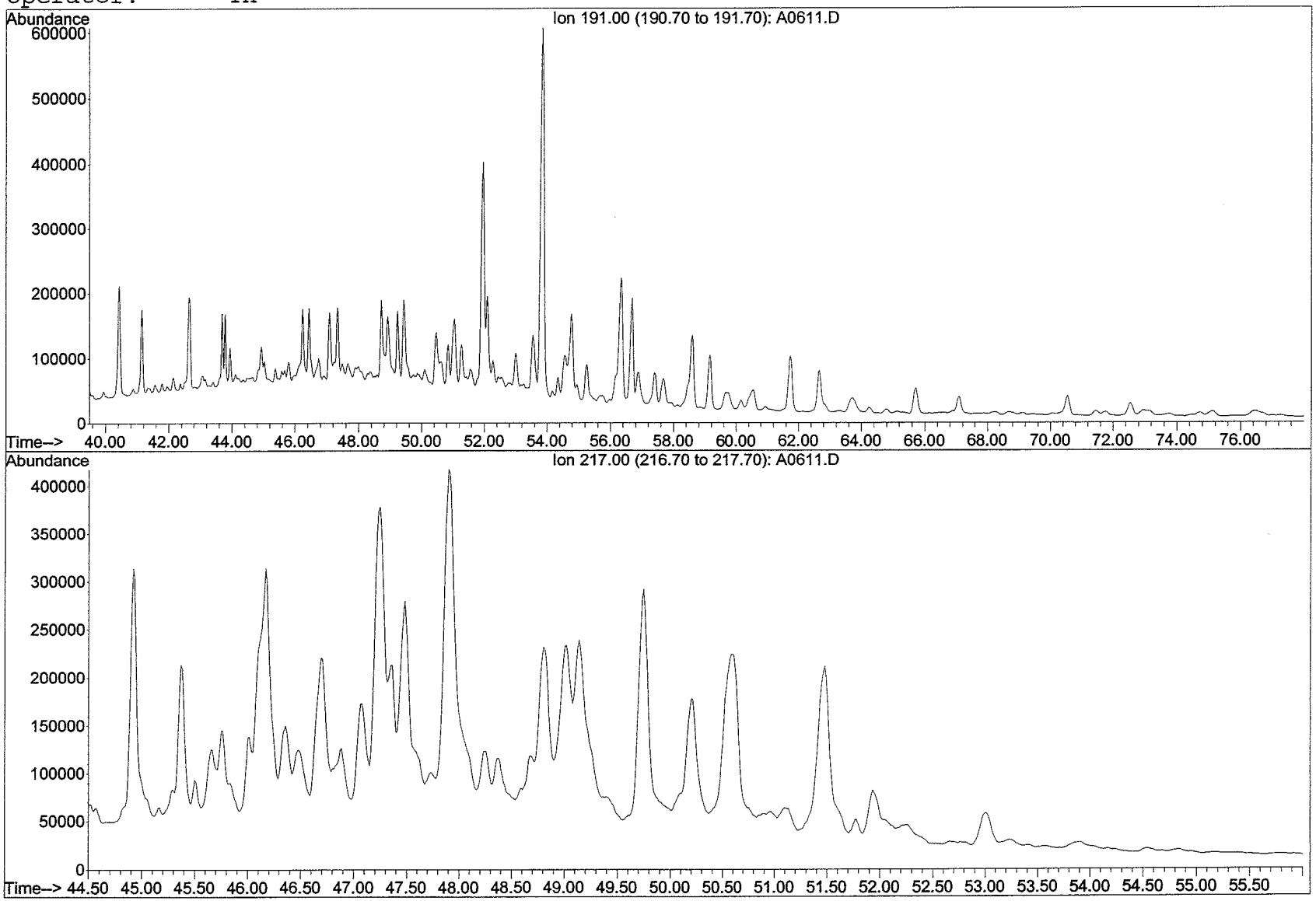


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0611.D
Date Acquired: 13 Dec 2002 11:55 am
Method File: BIO1SIM
Sample Name: U0143-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-105-SS-0010
U0143

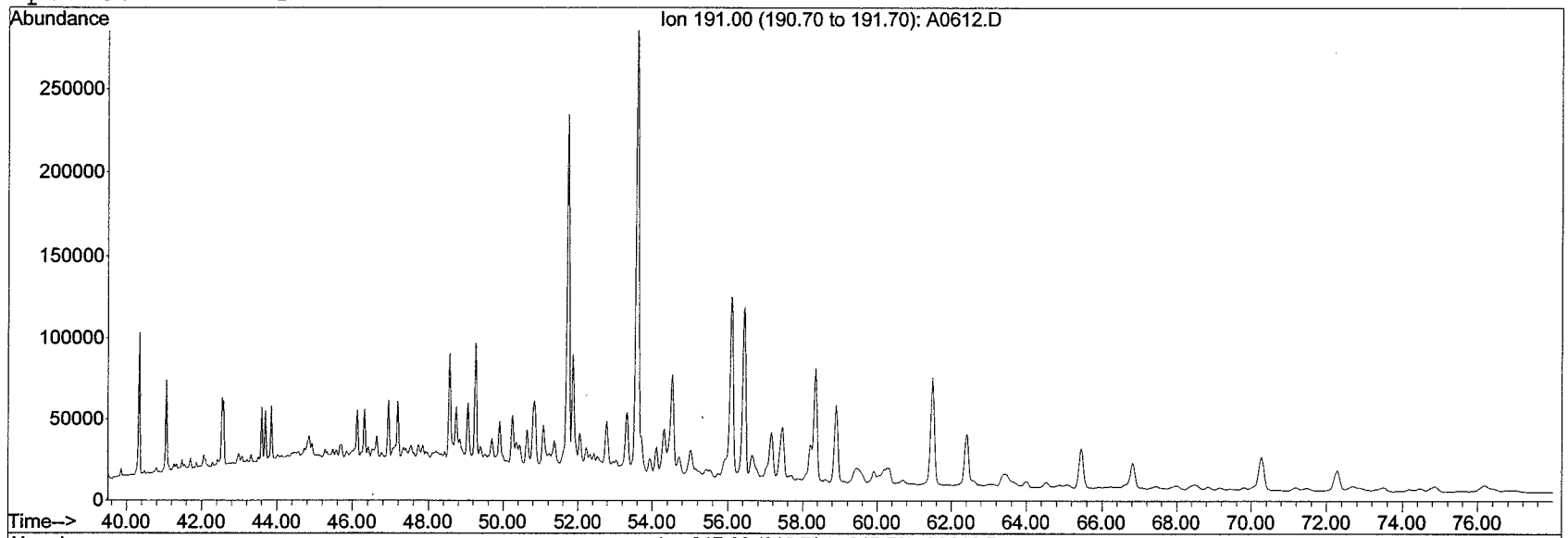


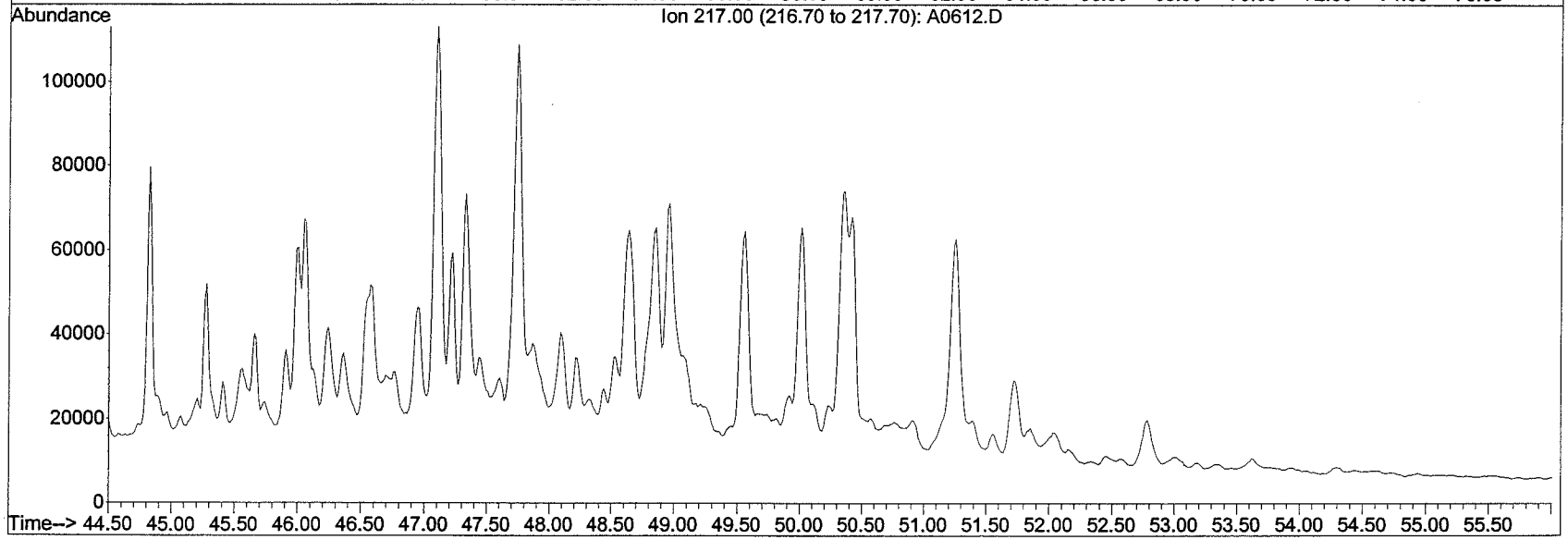
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0612.D
Date Acquired: 13 Dec 2002 1:24 pm
Method File: BIO1SIM
Sample Name: U0144-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-106-SS-0010
U0144



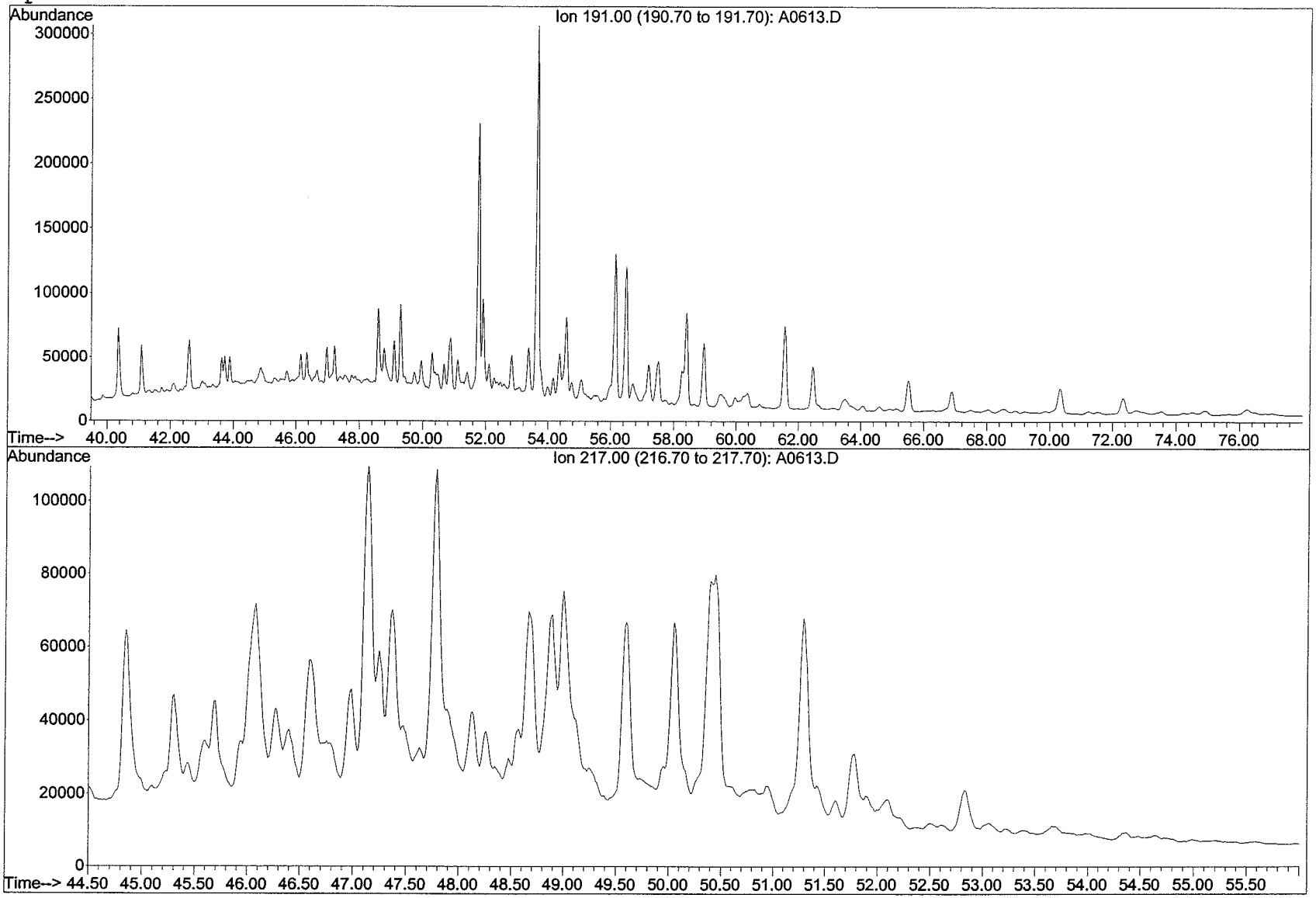


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0613.D
Date Acquired: 13 Dec 2002 2:54 pm
Method File: BIO1SIM
Sample Name: U0145-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-107-SS-0010
U0145

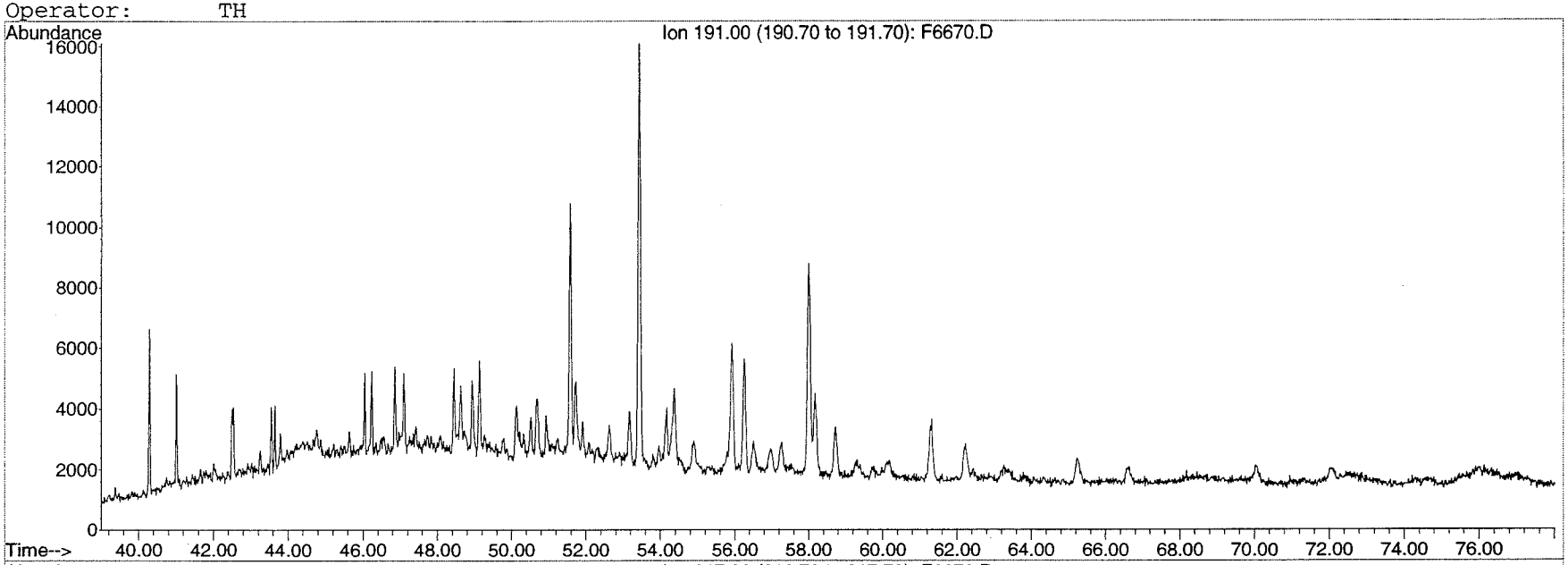


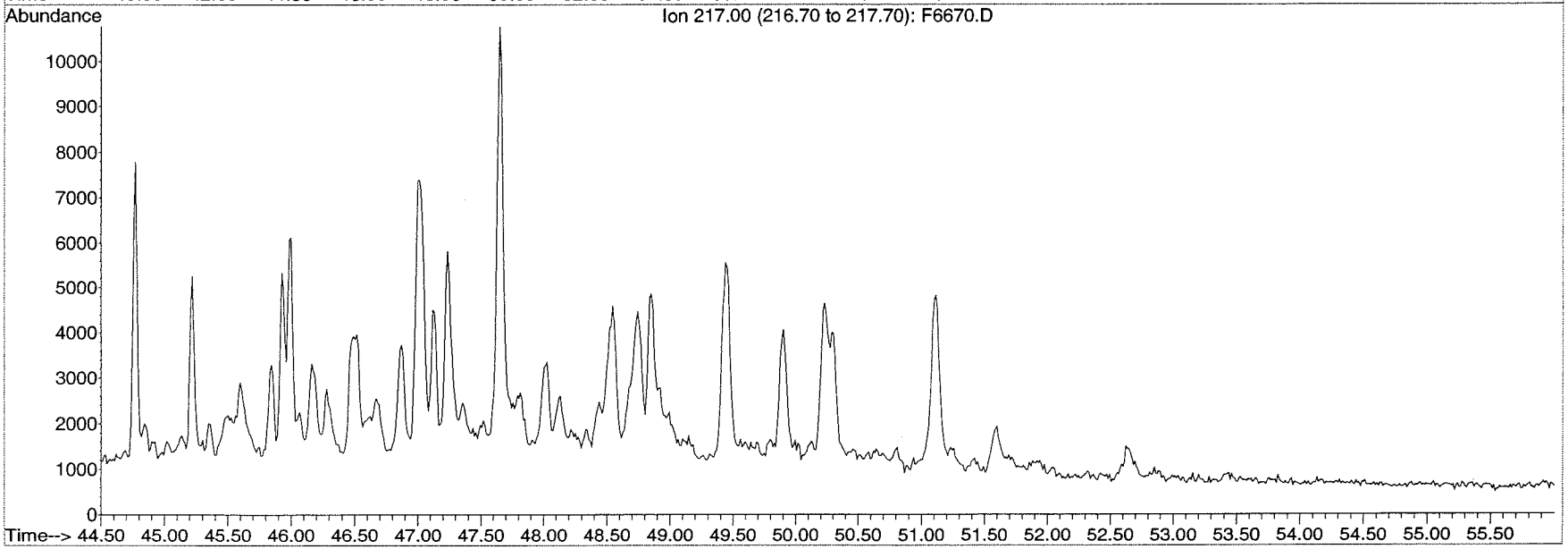
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6670.D
Date Acquired: 6 Mar 2003 11:29 am
Method File: BIO1SIM
Sample Name: U0277-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-109 1214
U0277



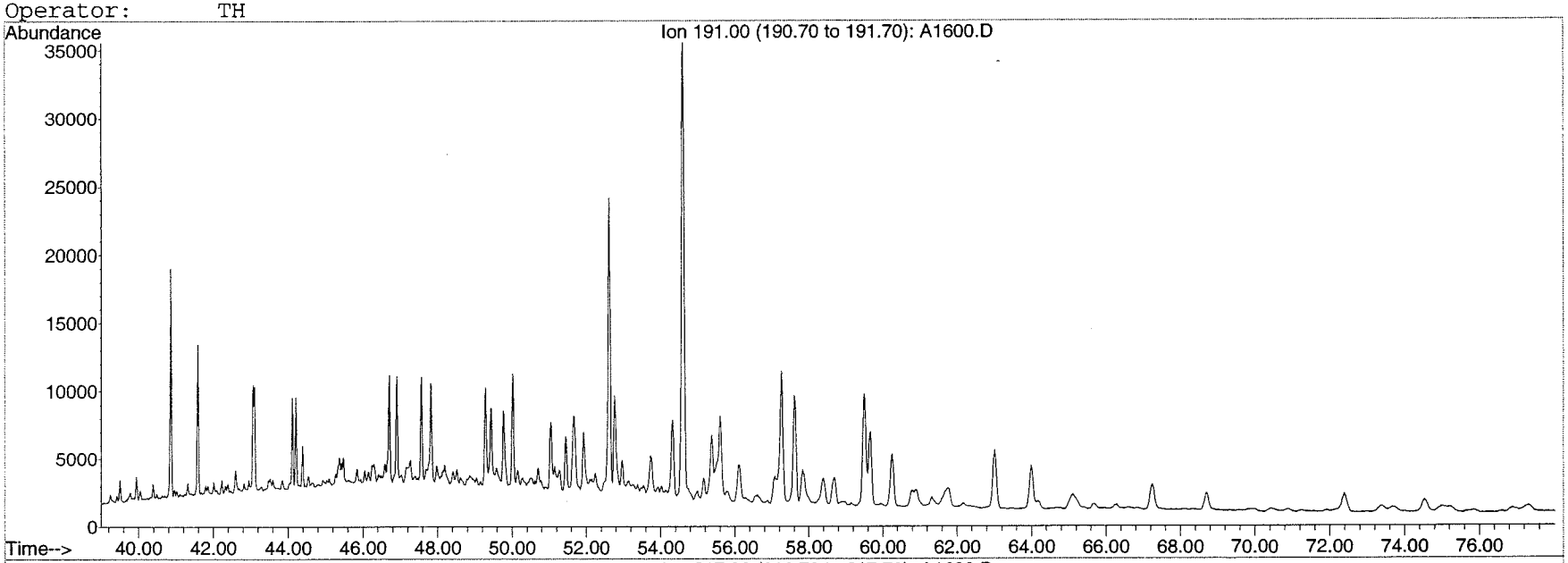


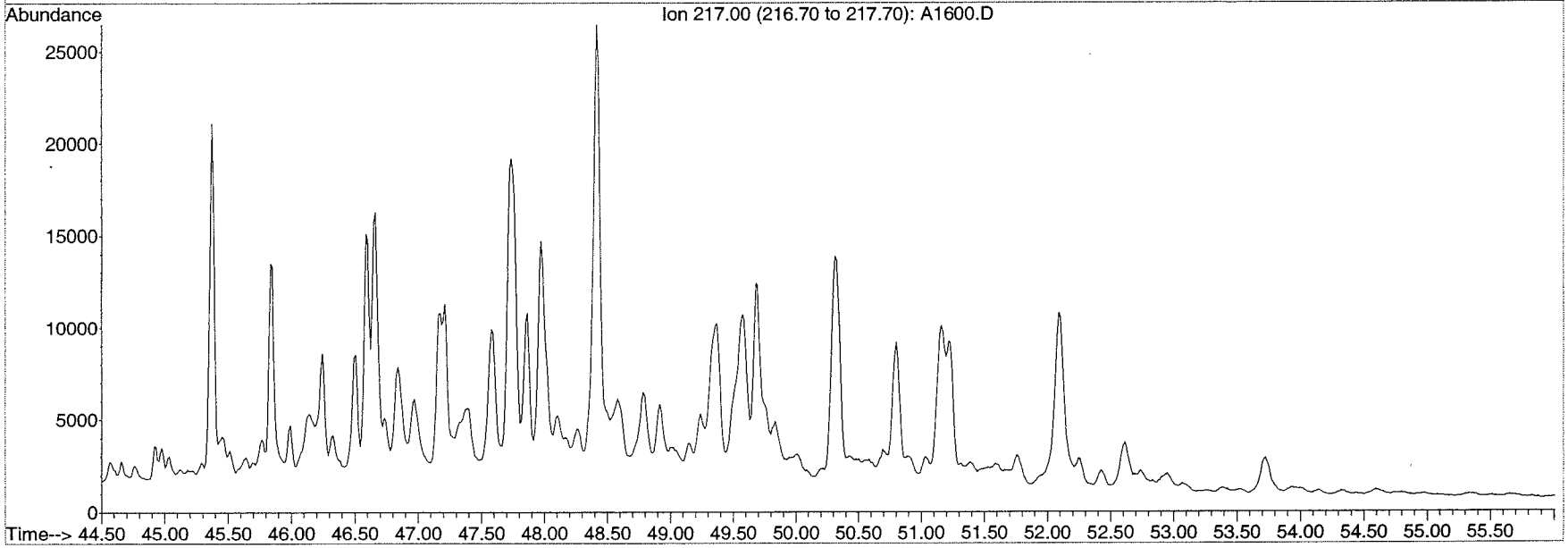
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1600.D
Date Acquired: 20 Feb 2003 7:50 pm
Method File: BIO1SIM
Sample Name: U0285-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-109 2830
U0285



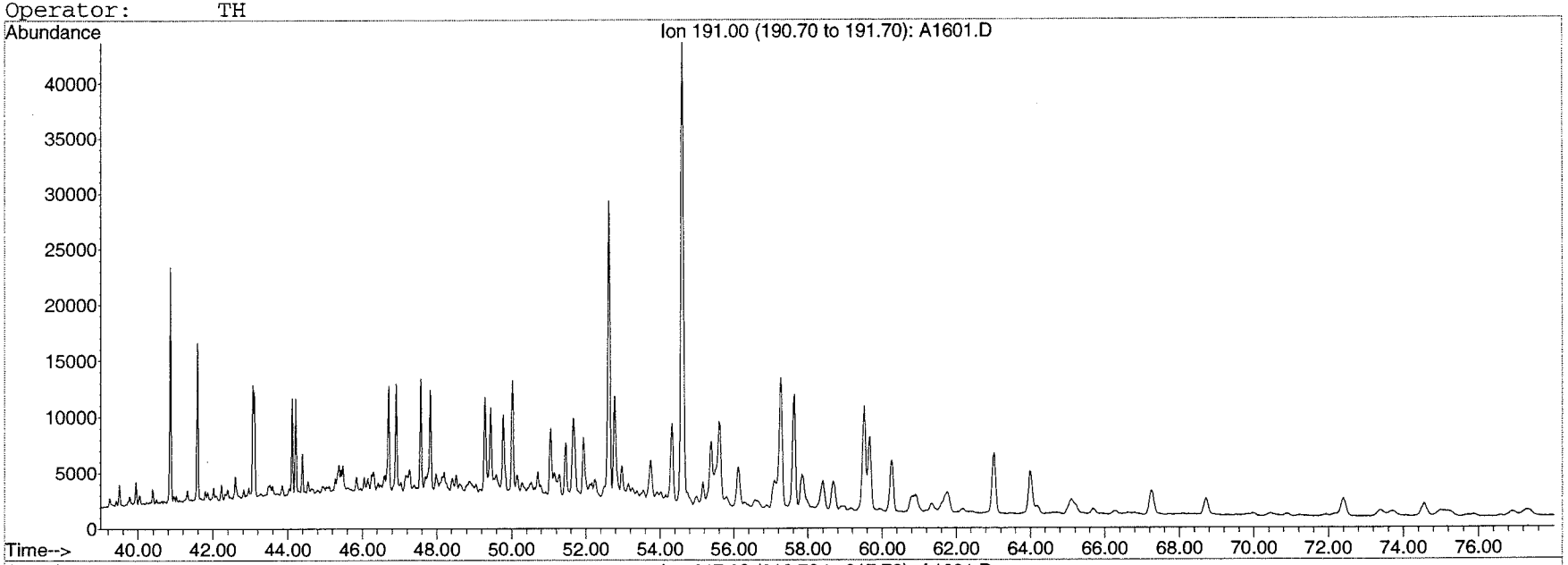


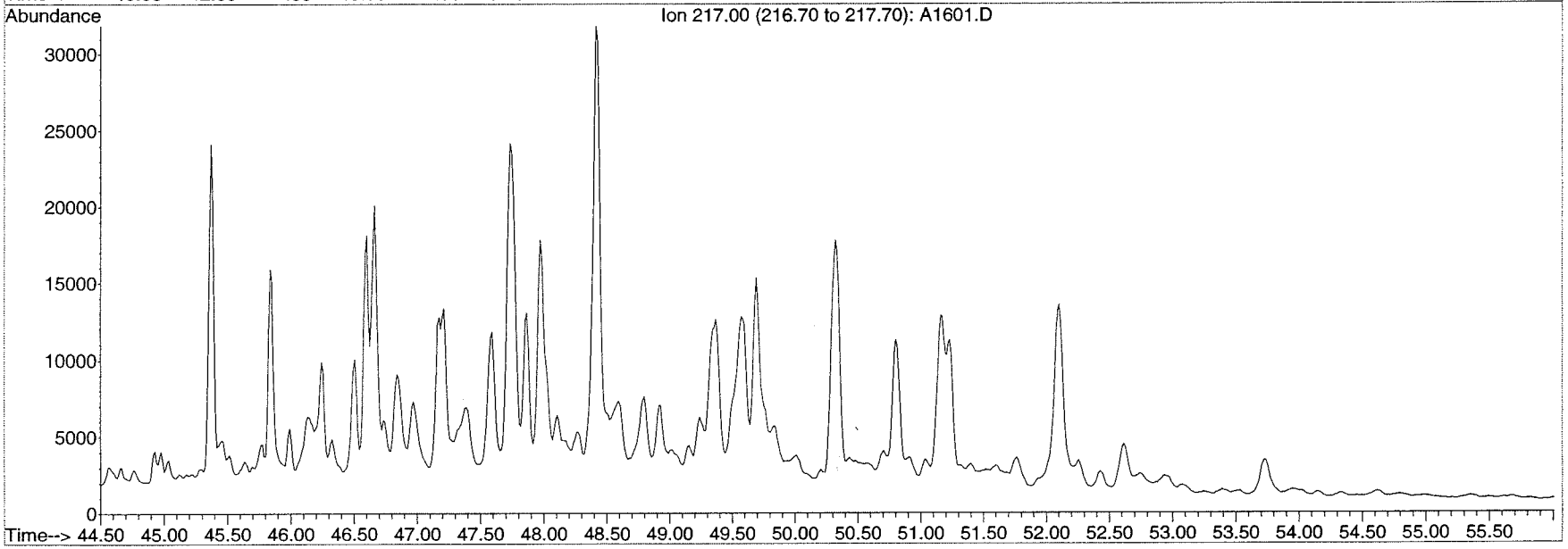
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1601.D
Date Acquired: 20 Feb 2003 9:21 pm
Method File: BIO1SIM
Sample Name: U0285DUP-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-109 2830
U0285 Duplicate



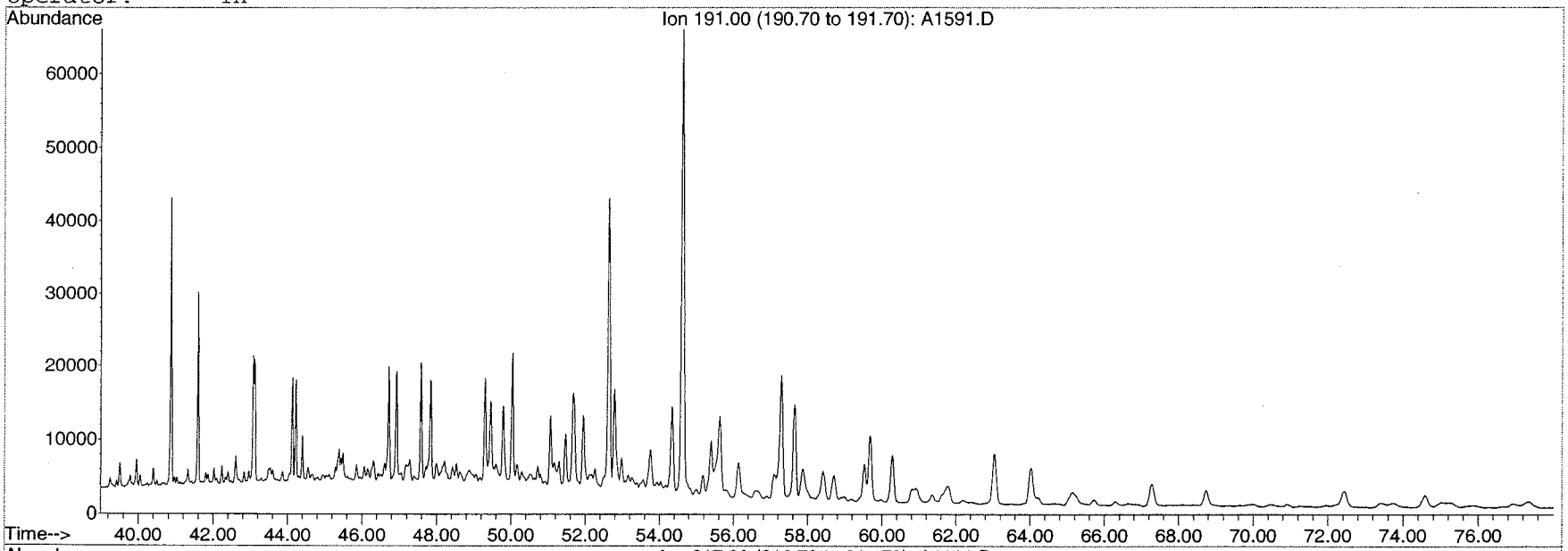


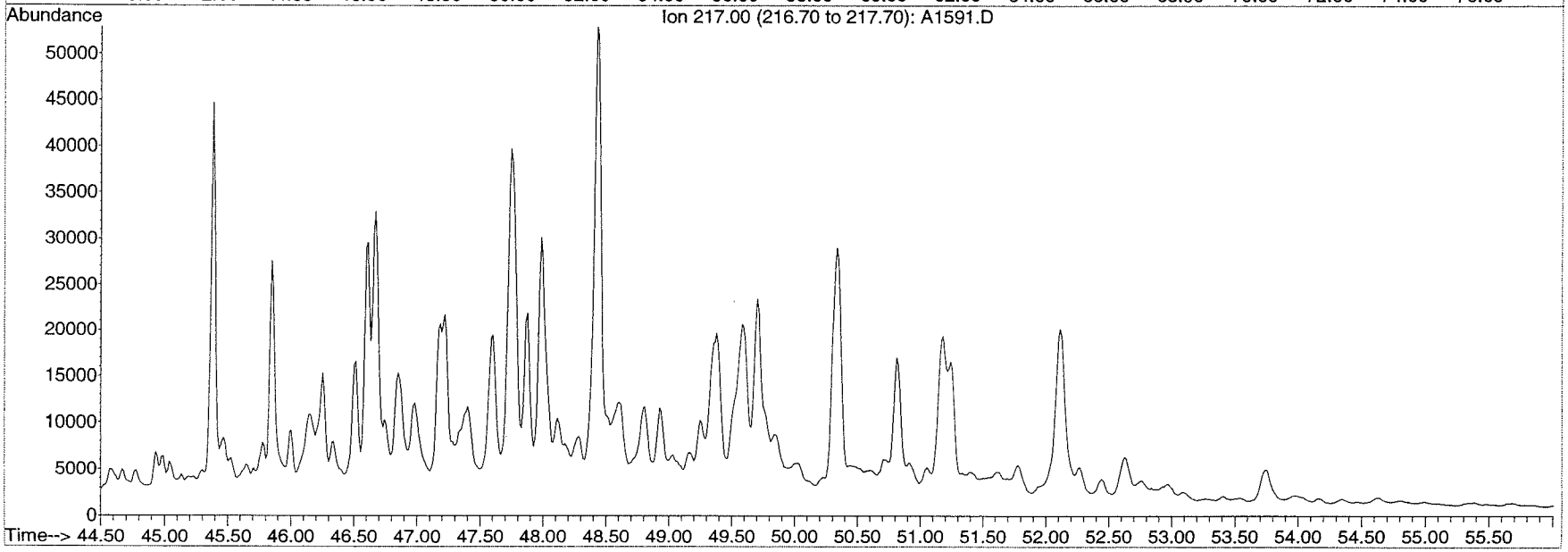
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1591.D
Date Acquired: 20 Feb 2003 2:33 am
Method File: BIO1SIM
Sample Name: U0290-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-109 3840
U0290



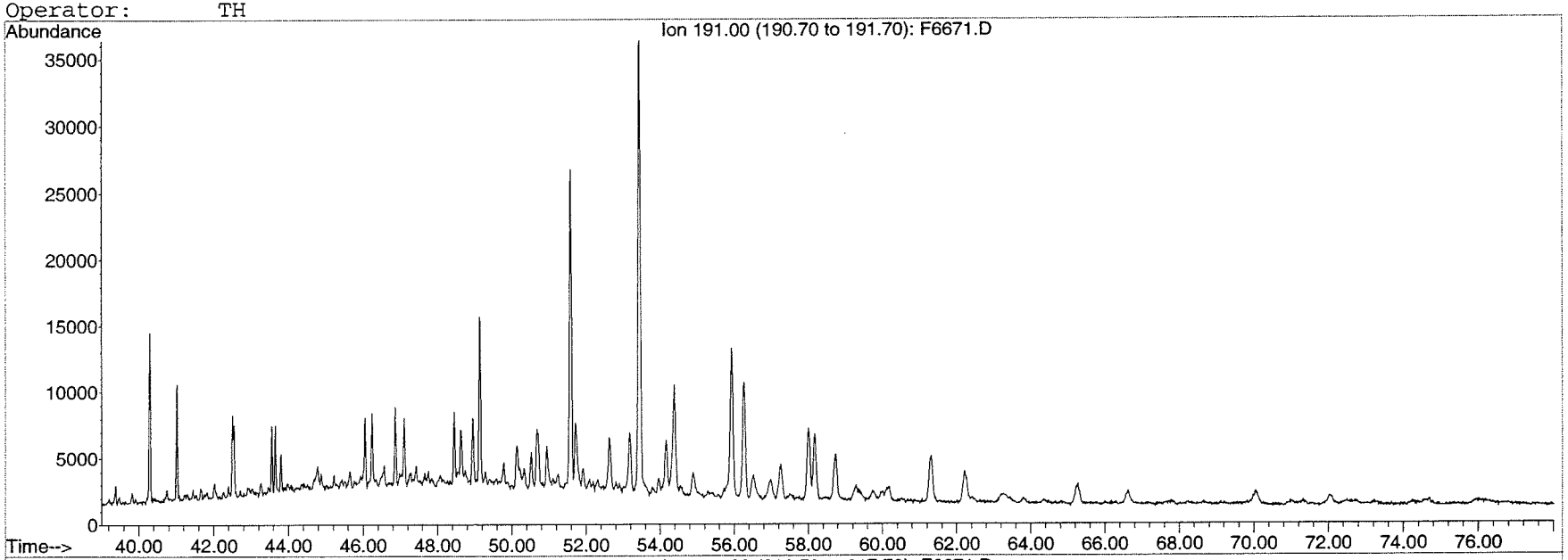


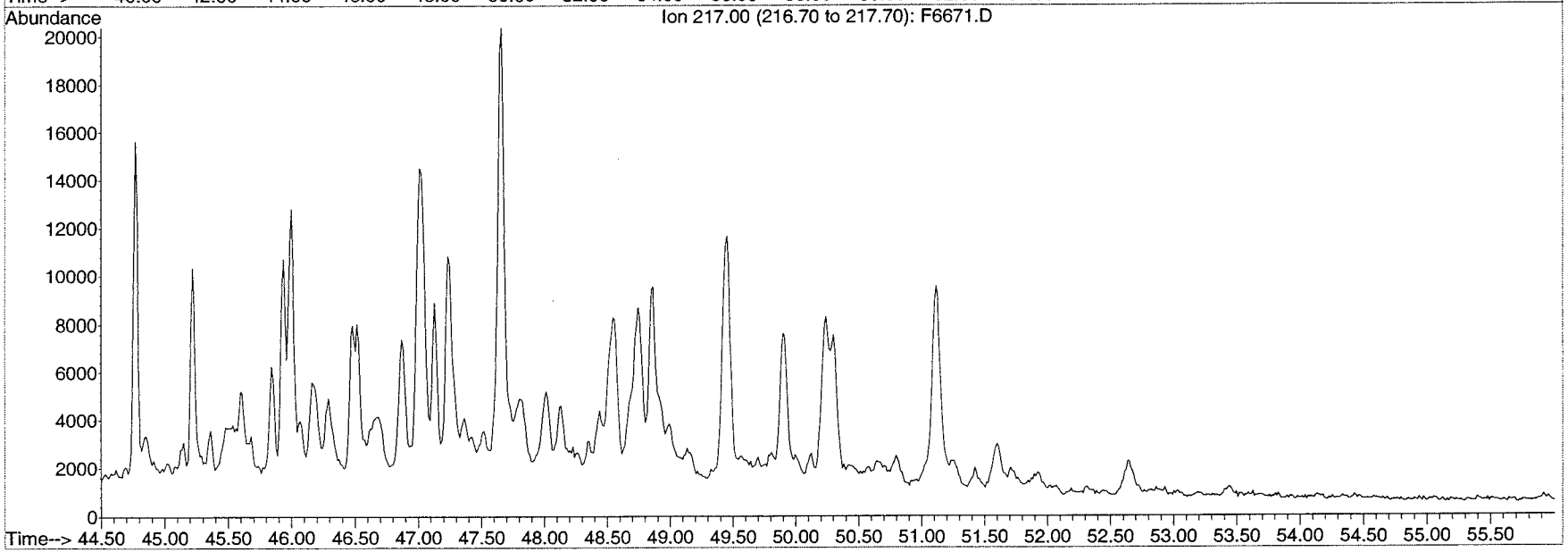
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6671.D
Date Acquired: 6 Mar 2003 12:59 pm
Method File: BIO1SIM
Sample Name: U0353-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-110 0406
U0353



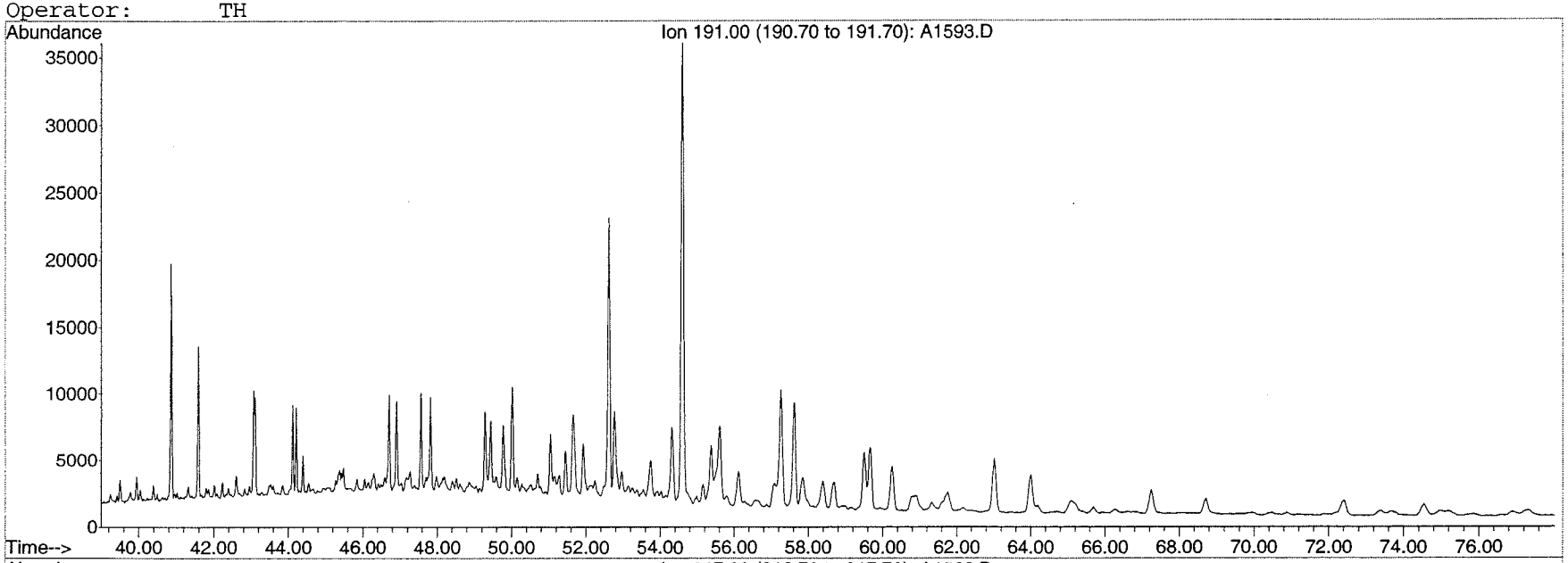


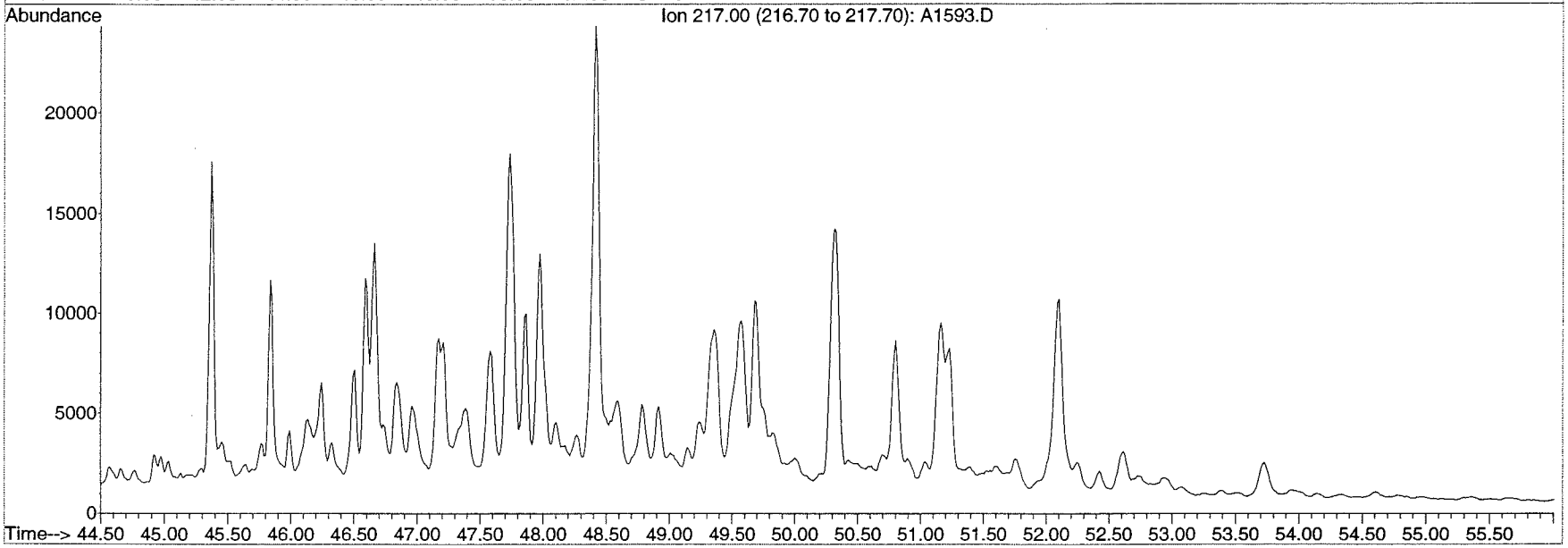
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1593.D
Date Acquired: 20 Feb 2003 5:36 am
Method File: BIO1SIM
Sample Name: U0357-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-110 1214
U0357



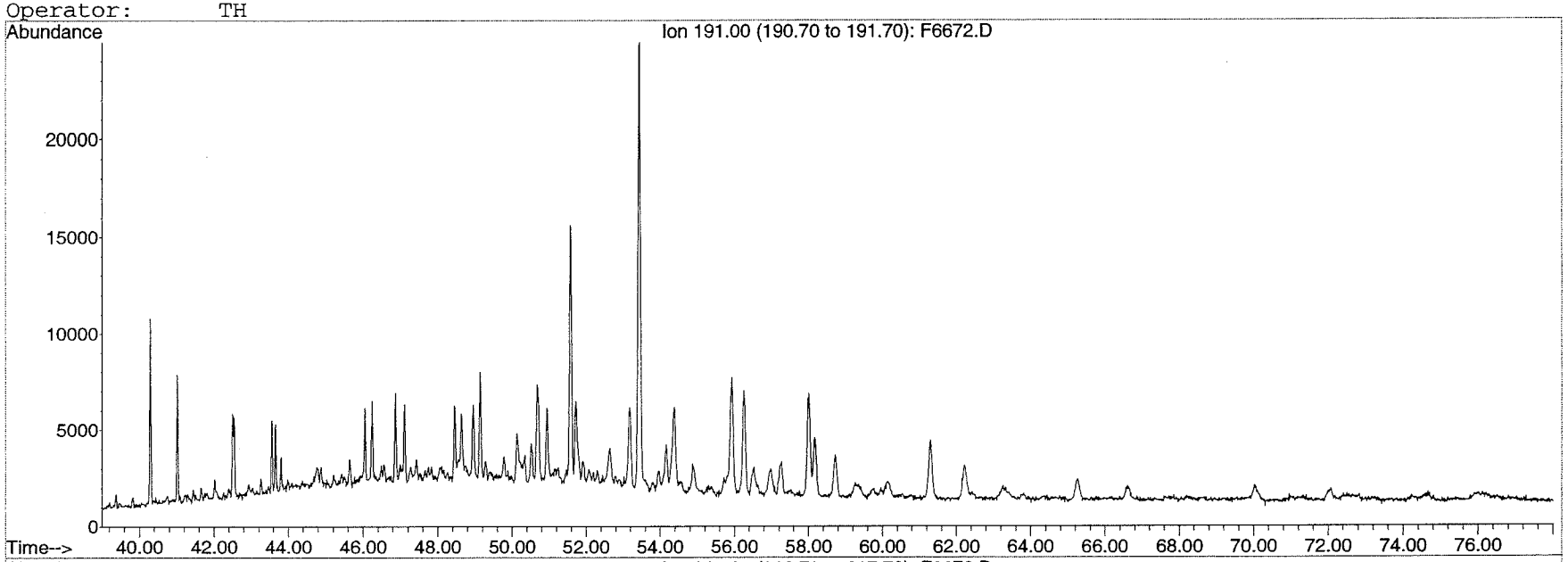


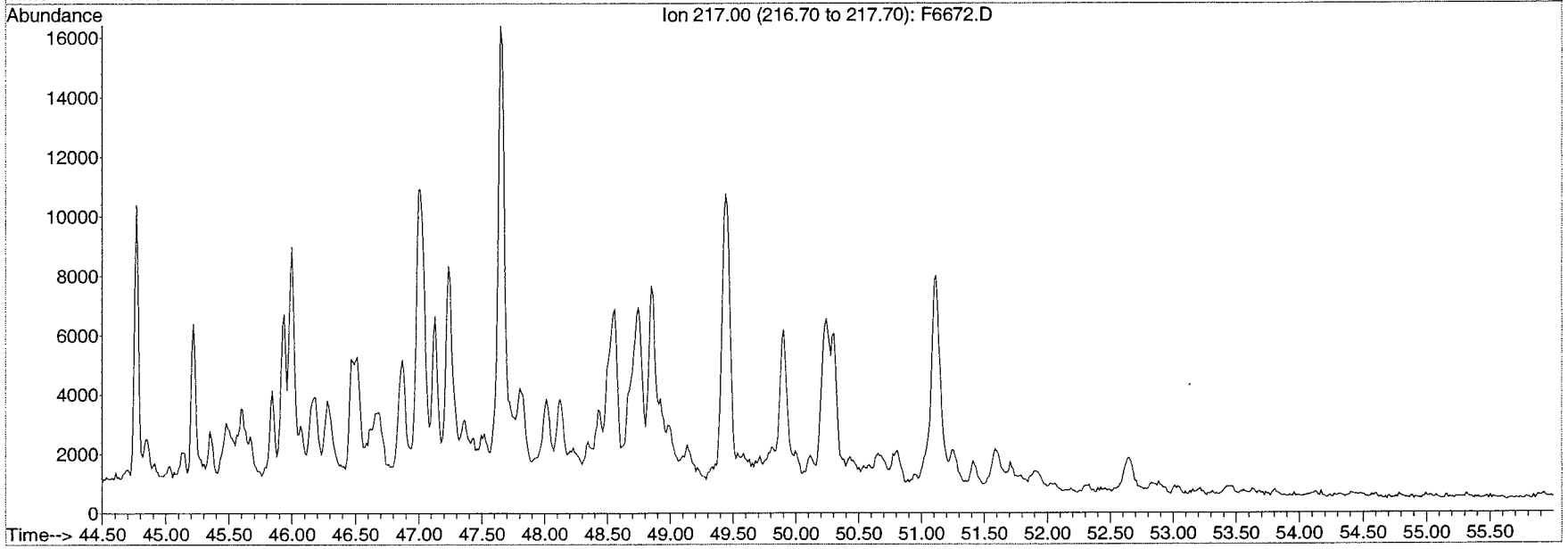
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6672.D
Date Acquired: 6 Mar 2003 2:30 pm
Method File: BIO1SIM
Sample Name: U0361-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-110 2022
U0361



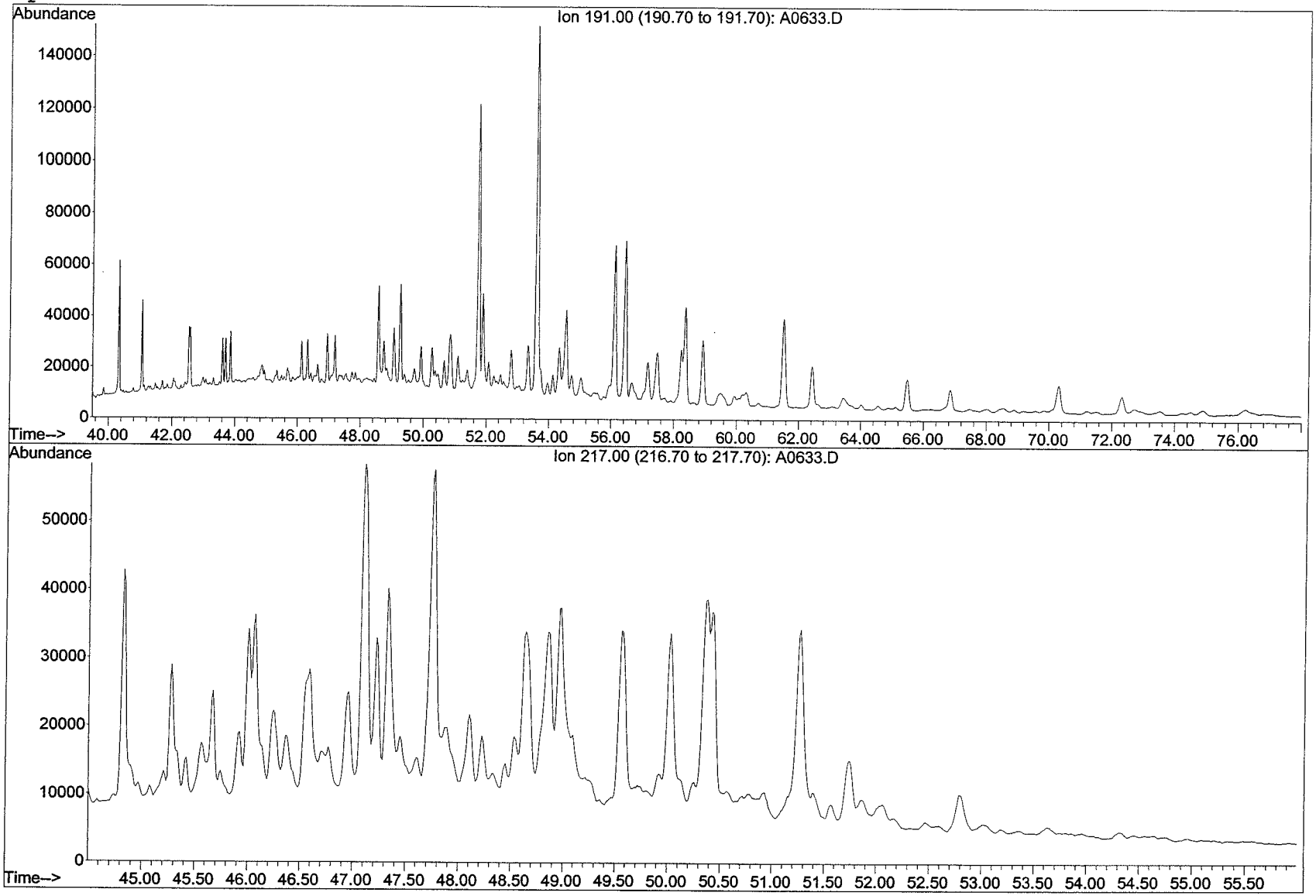


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0633.D
Date Acquired: 14 Dec 2002 10:43 pm
Method File: BIO1SIM
Sample Name: U0171-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-112-SS-0010
U0171

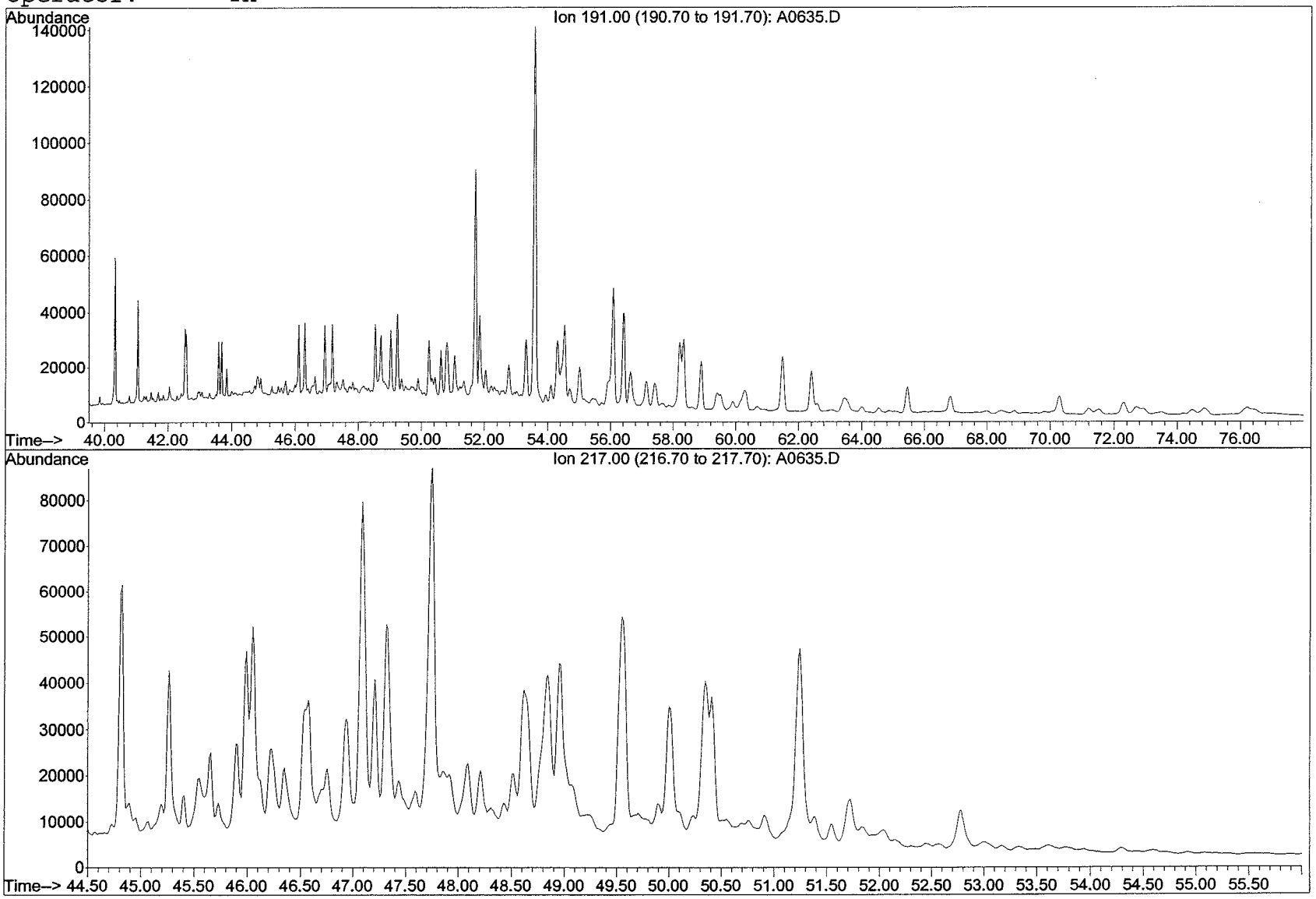


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0635.D
Date Acquired: 15 Dec 2002 1:58 am
Method File: BIO1SIM
Sample Name: U0101-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-112-SS-2030
U0101

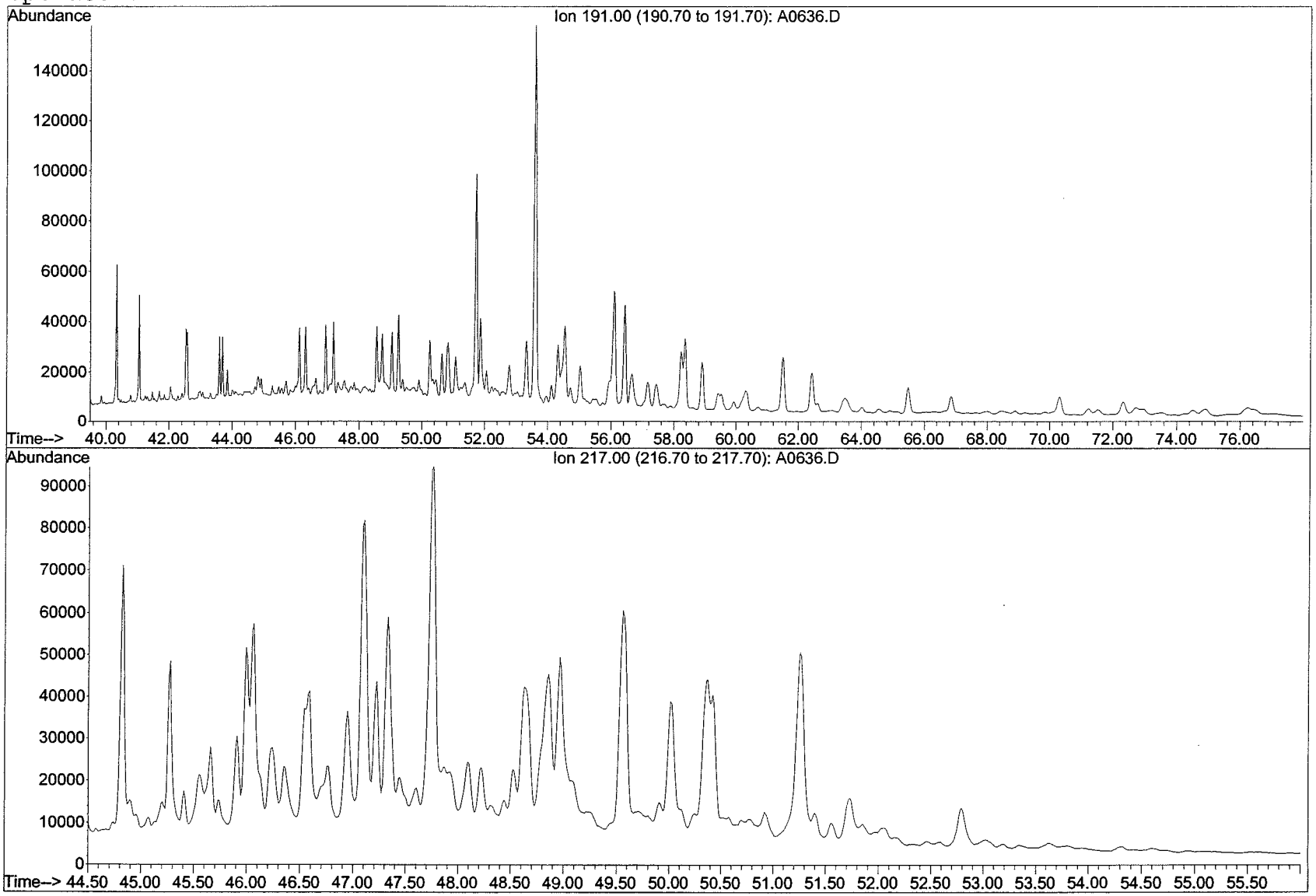


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0636.D
Date Acquired: 15 Dec 2002 3:35 am
Method File: BIO1SIM
Sample Name: U0101DUP-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-112-SS-2030
U0101 Duplicate

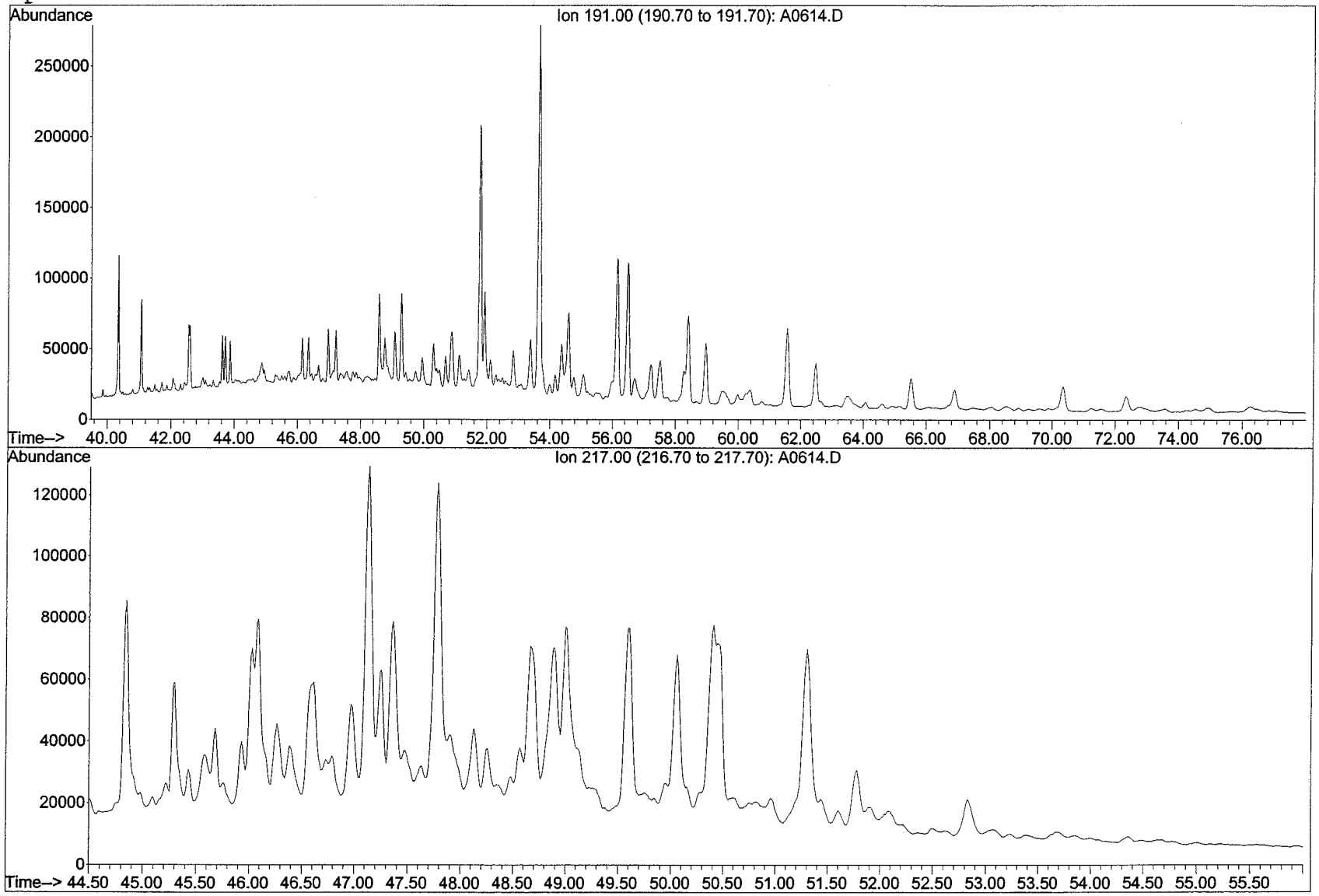


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0614.D
Date Acquired: 13 Dec 2002 4:24 pm
Method File: BIO1SIM
Sample Name: U0146-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-113-SS-0010
U0146

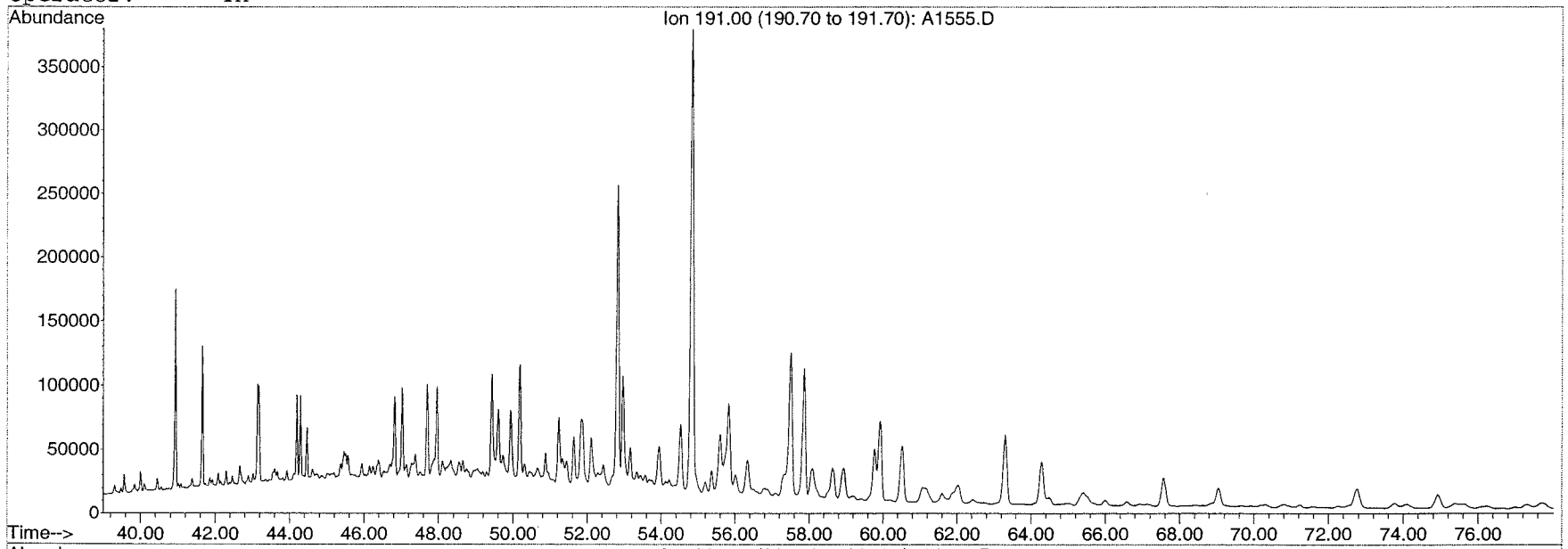


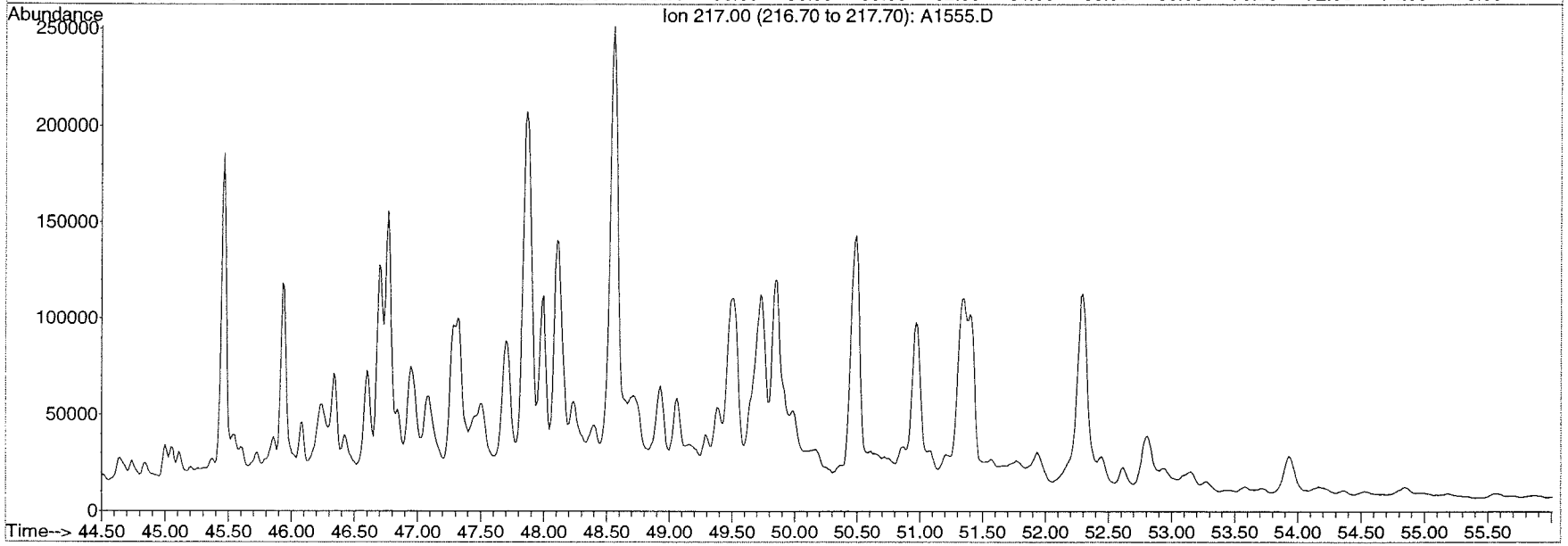
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1555.D
Date Acquired: 17 Feb 2003 4:55 pm
Method File: BIO1SIM
Sample Name: U 0108-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-113-SS-1020
U0108



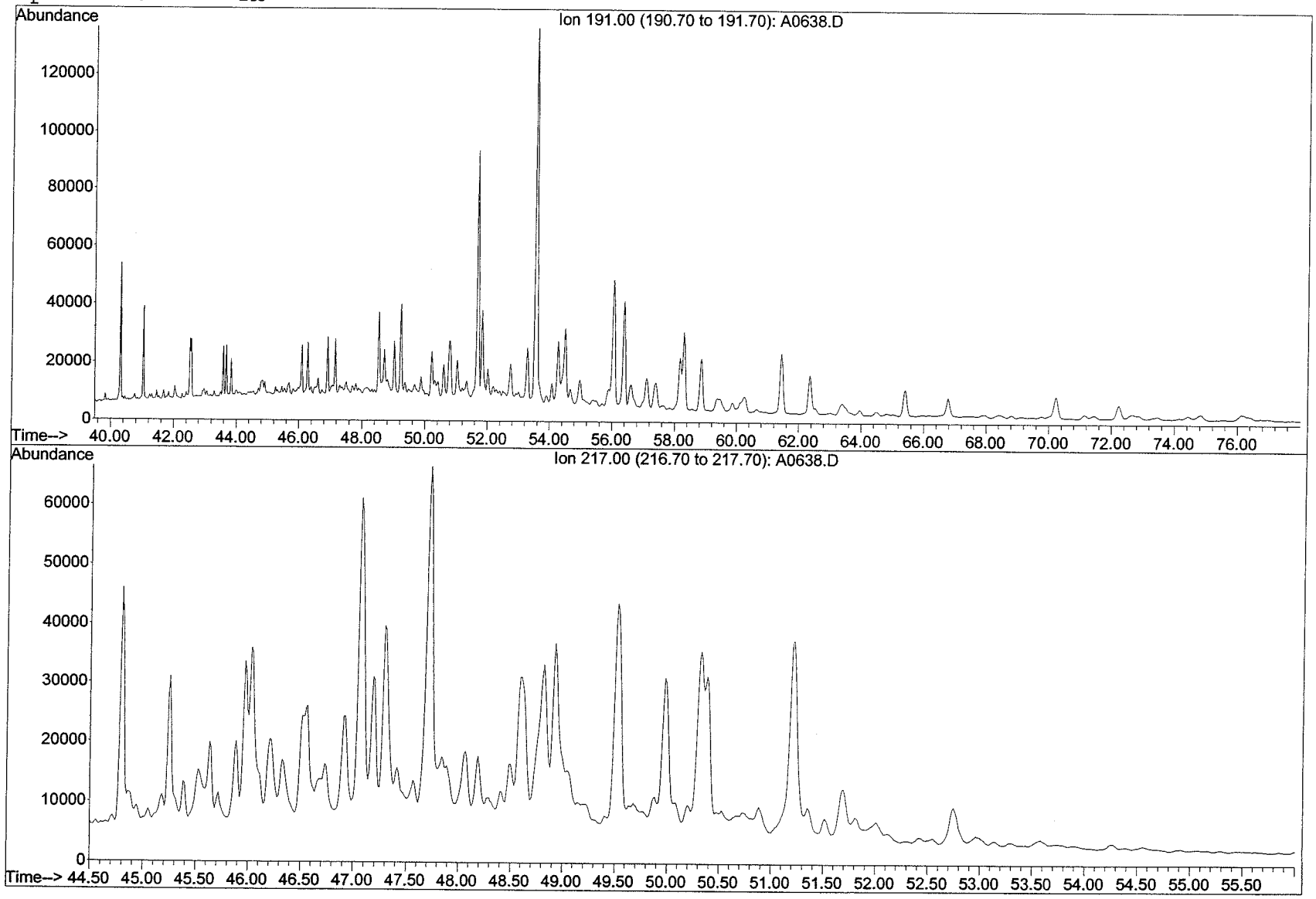


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0638.D
Date Acquired: 15 Dec 2002 6:50 am
Method File: BIO1SIM
Sample Name: U0149-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-115-SS-0010
U0149

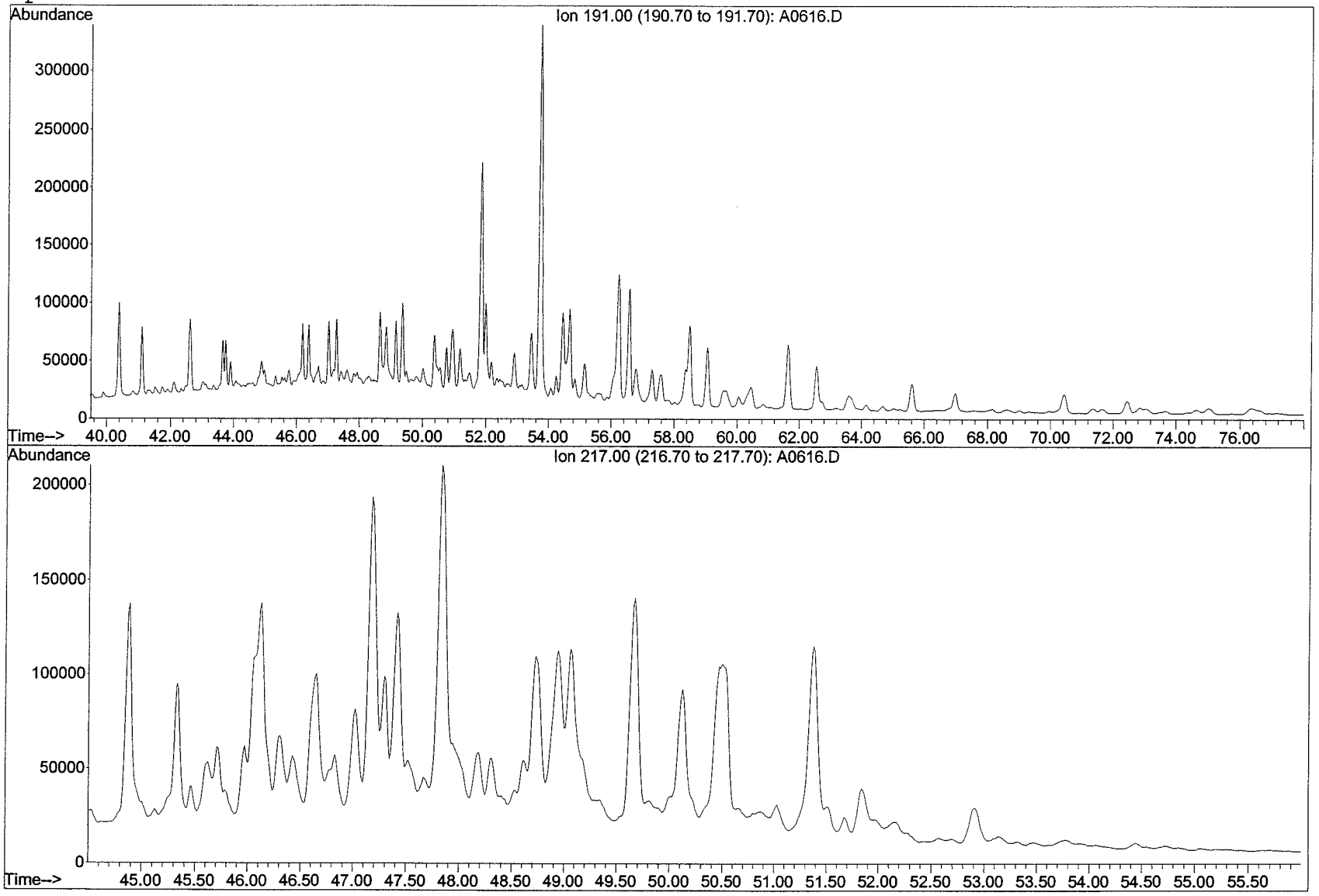


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0616.D
Date Acquired: 13 Dec 2002 7:25 pm
Method File: BIO1SIM
Sample Name: U0150-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-116-SS-0010
U0150

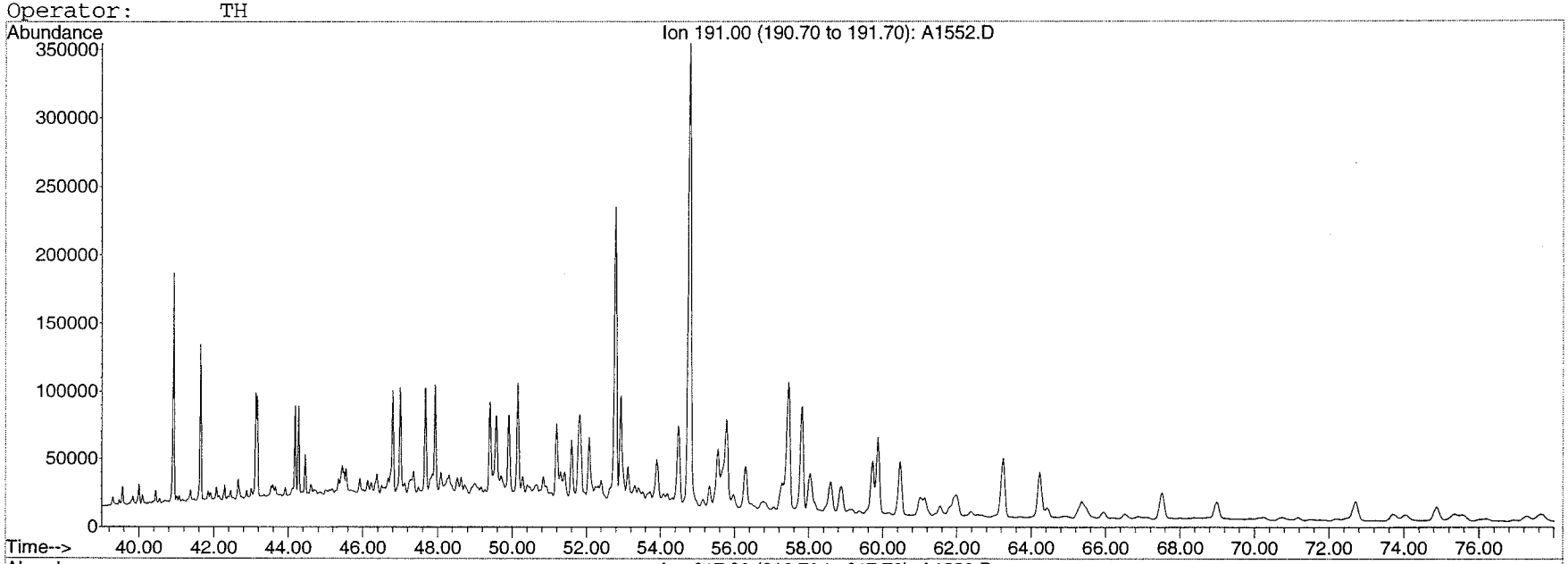


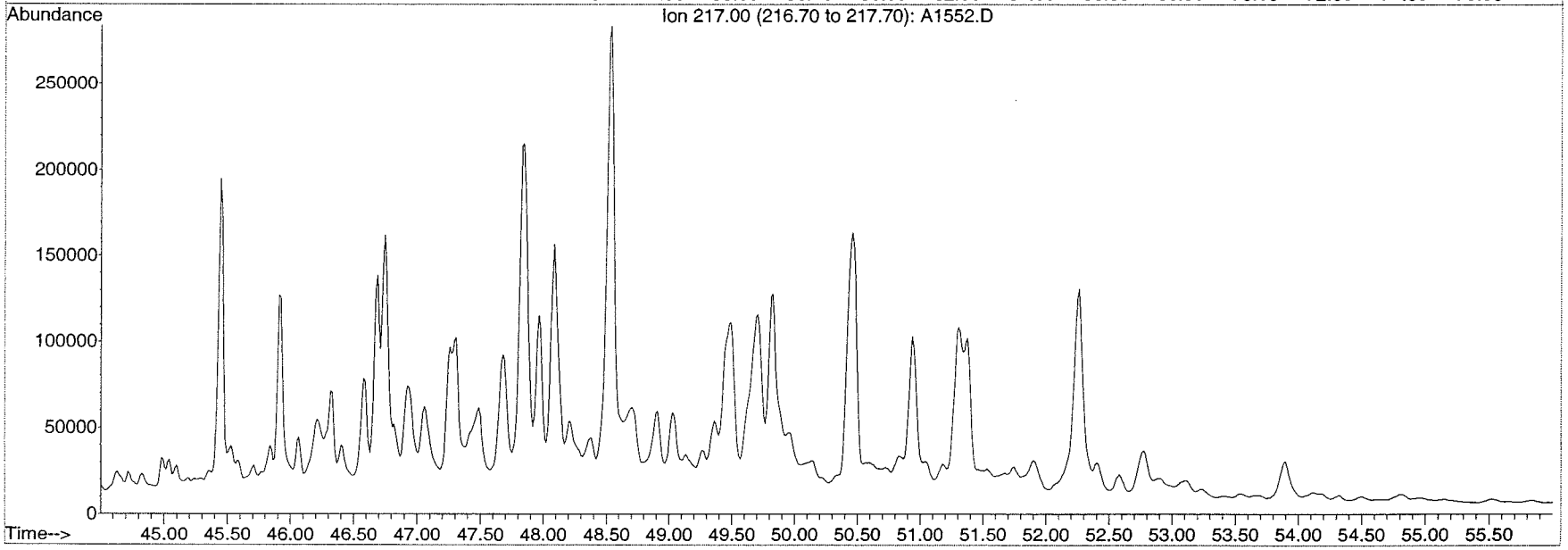
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1552.D
Date Acquired: 17 Feb 2003 12:26 pm
Method File: BIO1SIM
Sample Name: U 0122-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-116-SS-1020
U0122



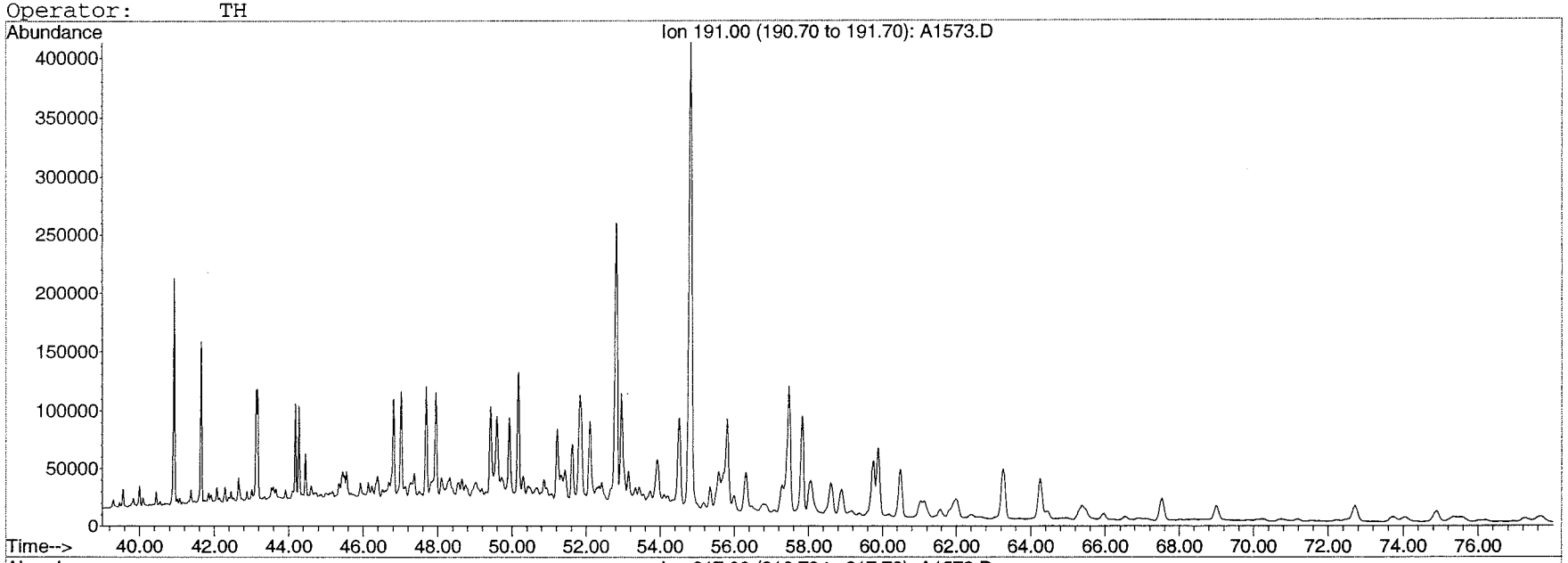


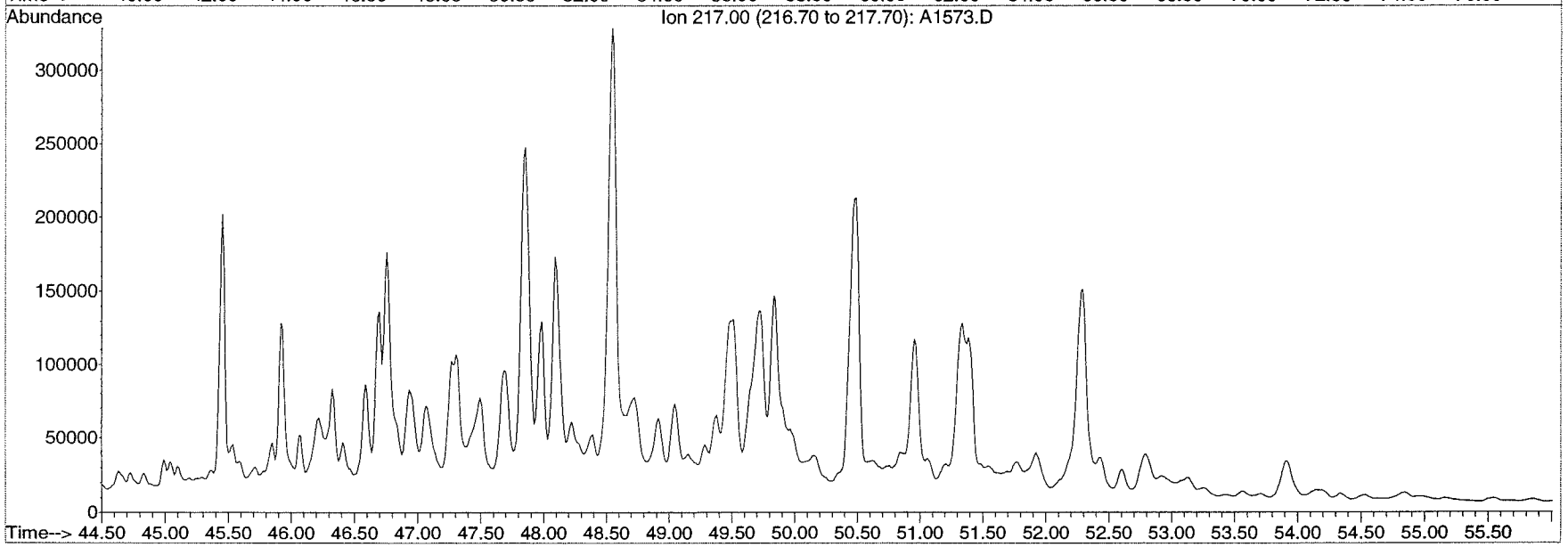
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1573.D
Date Acquired: 18 Feb 2003 8:06 pm
Method File: BIO1SIM
Sample Name: V0123-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-116-SS-2030
U0123



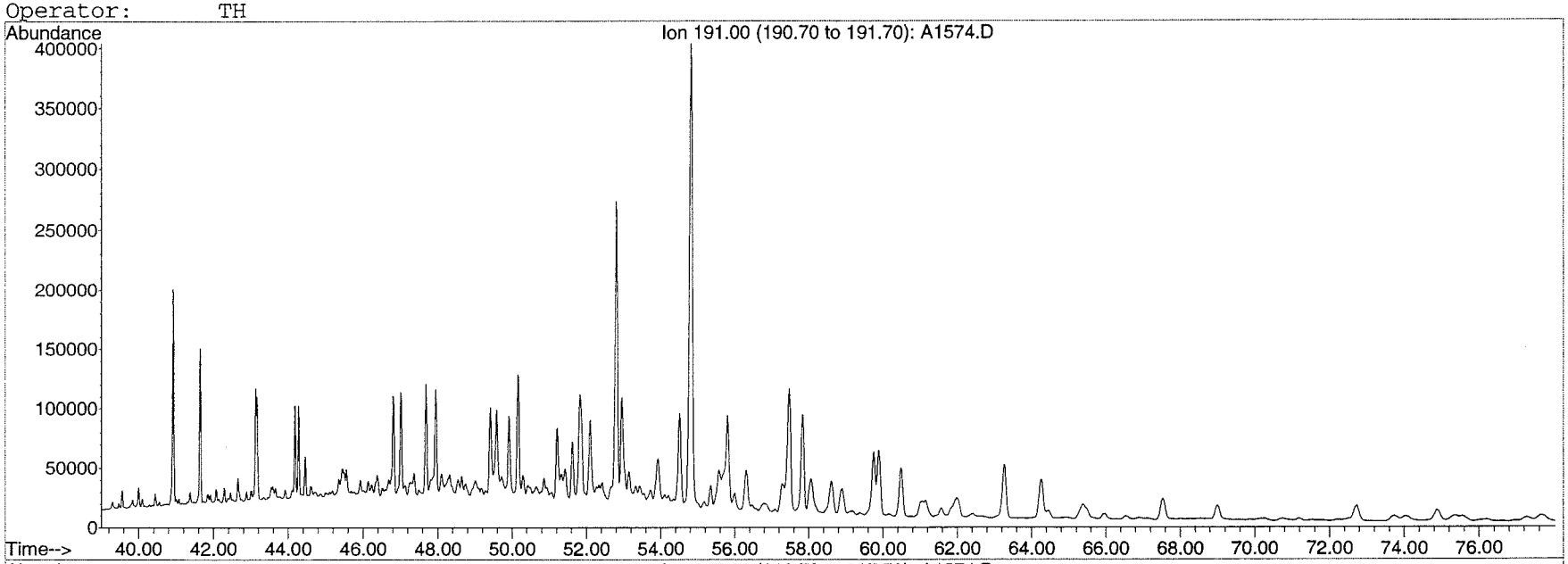


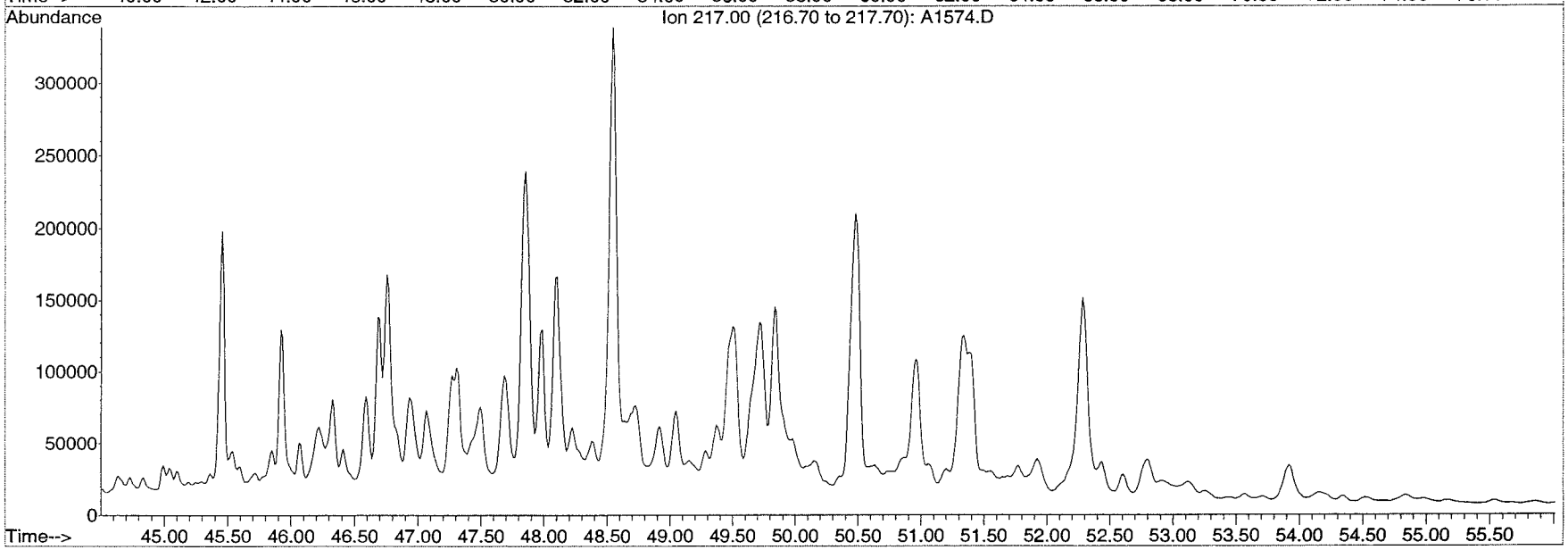
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1574.D
Date Acquired: 18 Feb 2003 9:36 pm
Method File: BIO1SIM
Sample Name: V0123DUP-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-116-SS-2030
U0123 Duplicate



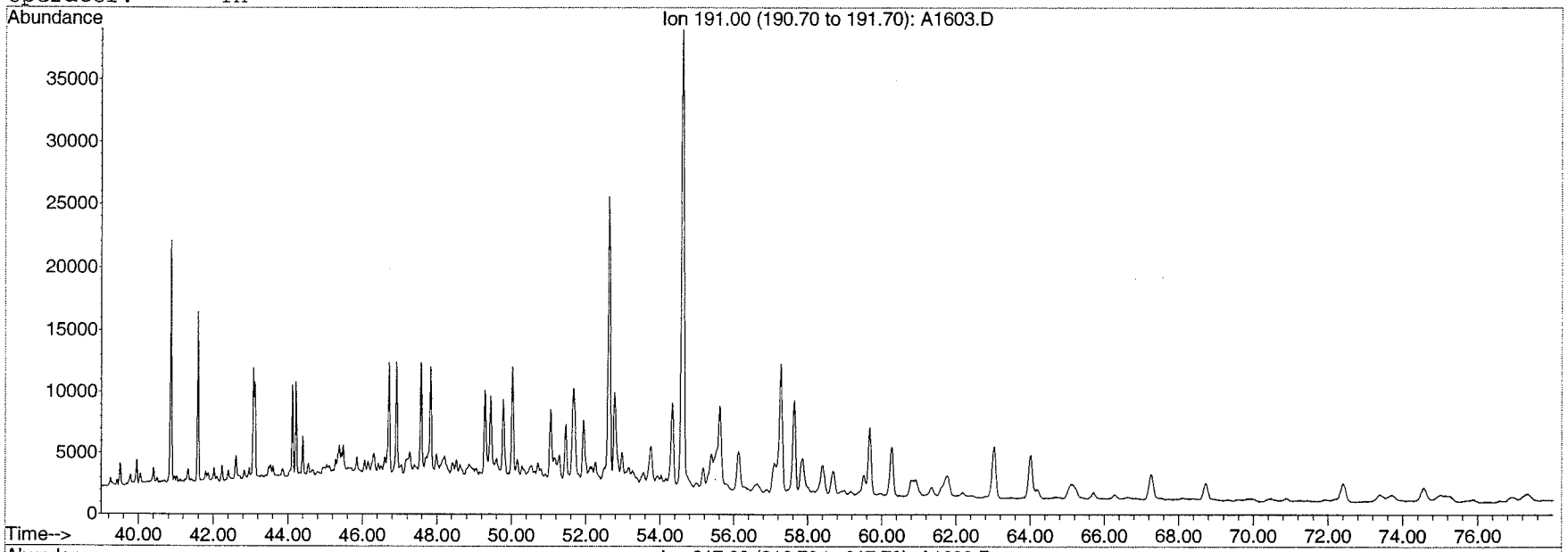


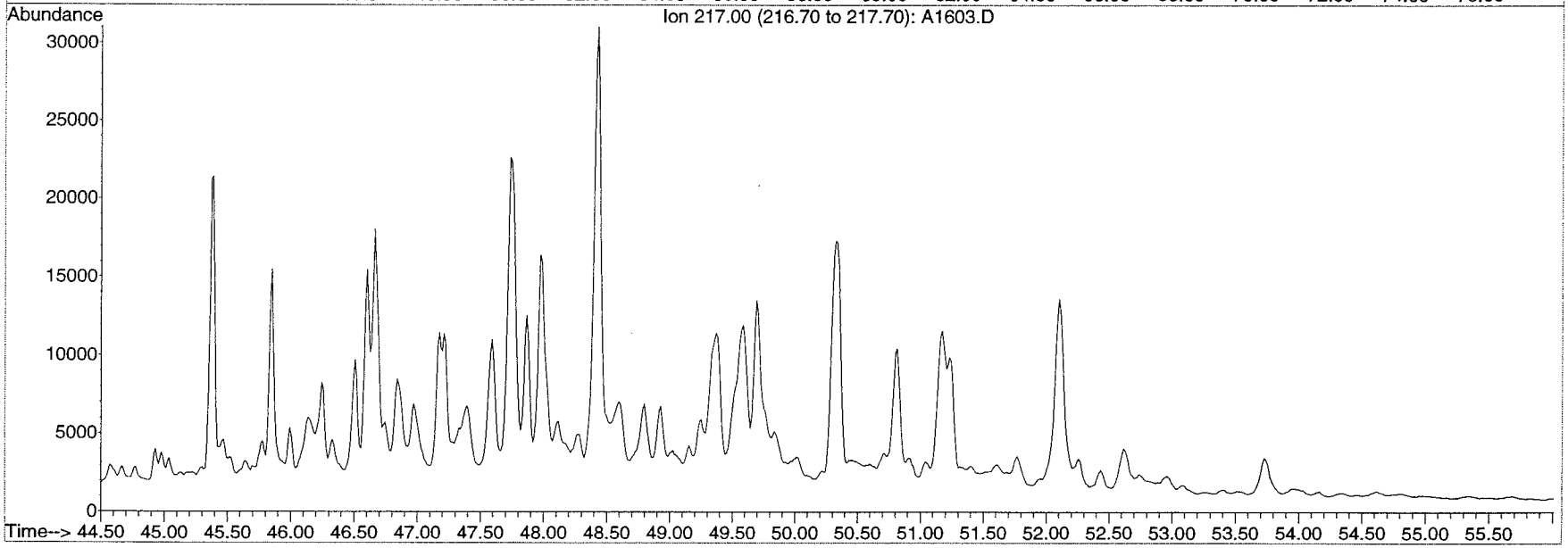
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1603.D
Date Acquired: 21 Feb 2003 12:21 am
Method File: BIO1SIM
Sample Name: U6525-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-117 0010 Composite
U6525



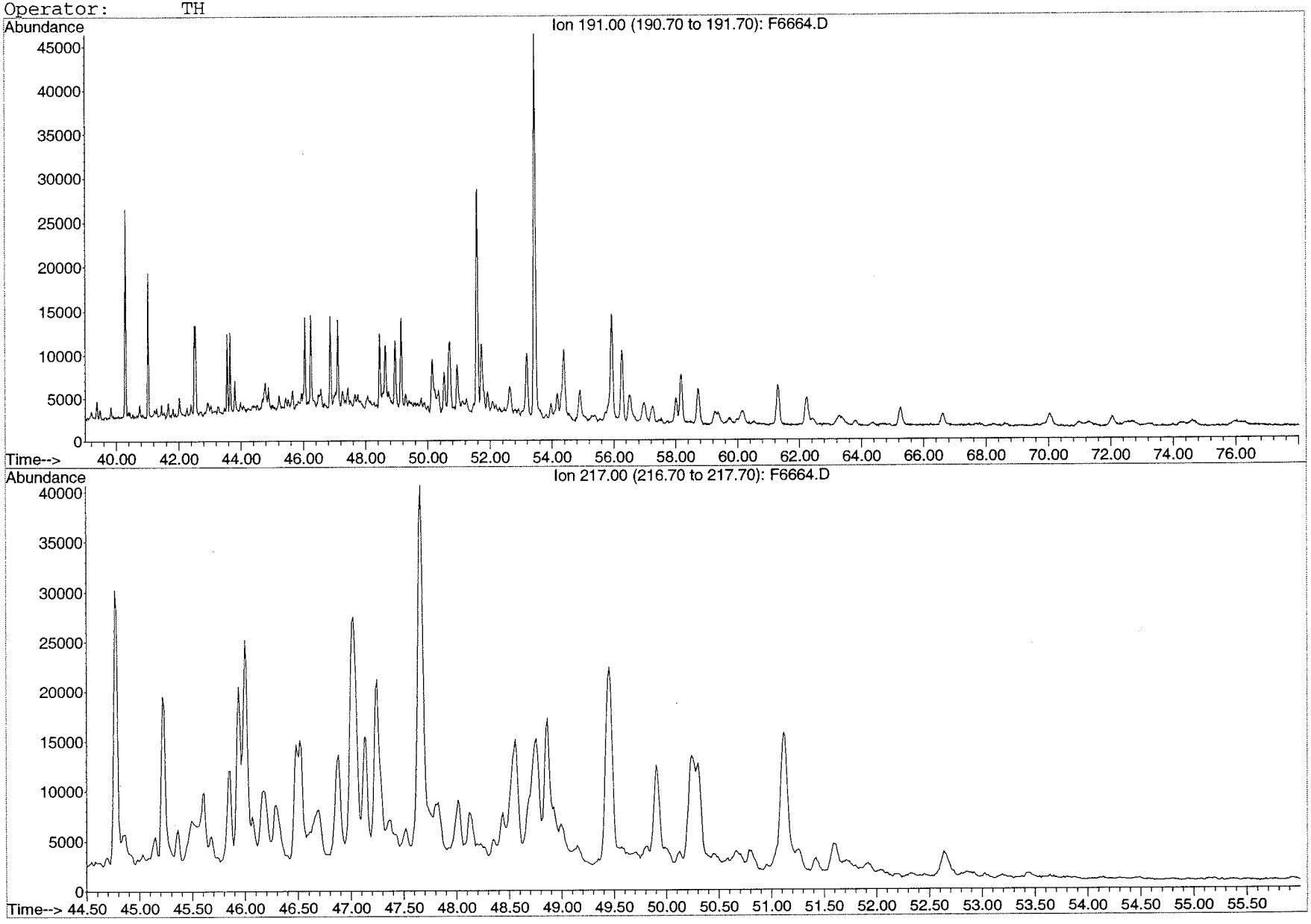


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6664.D
Date Acquired: 5 Mar 2003 4:28 pm
Method File: BIO1SIM
Sample Name: U0387-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-117 0810
U0387

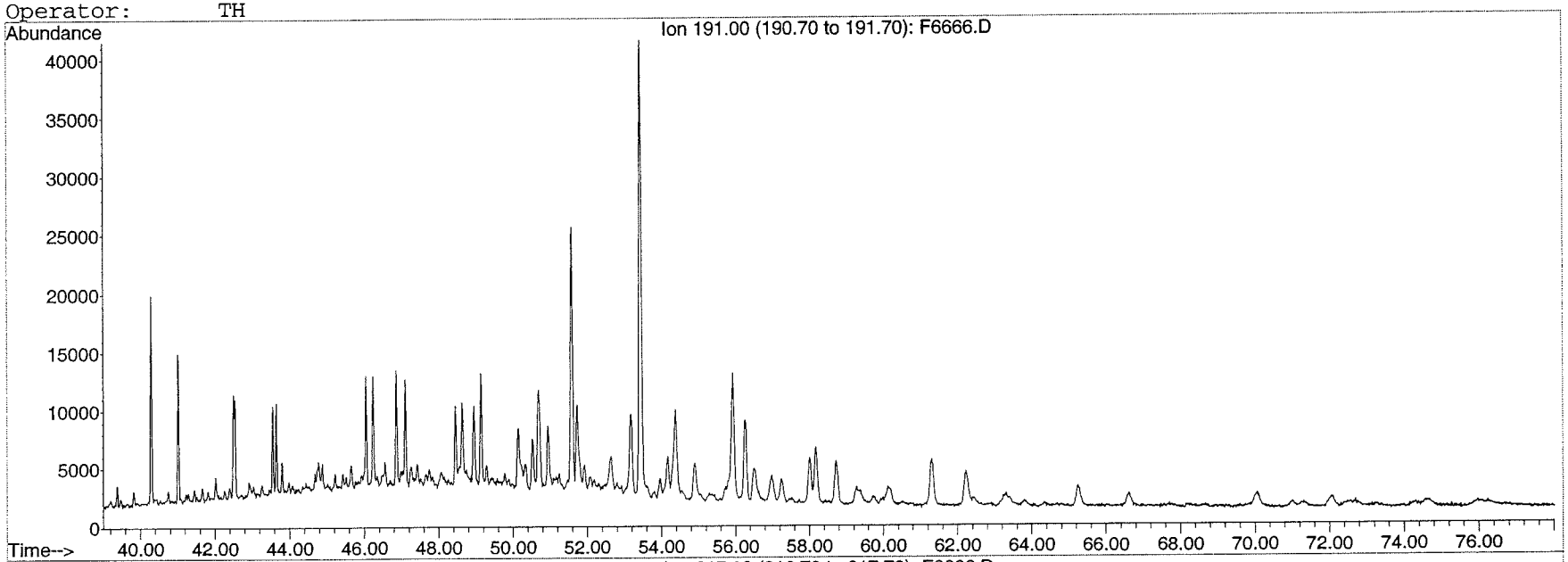


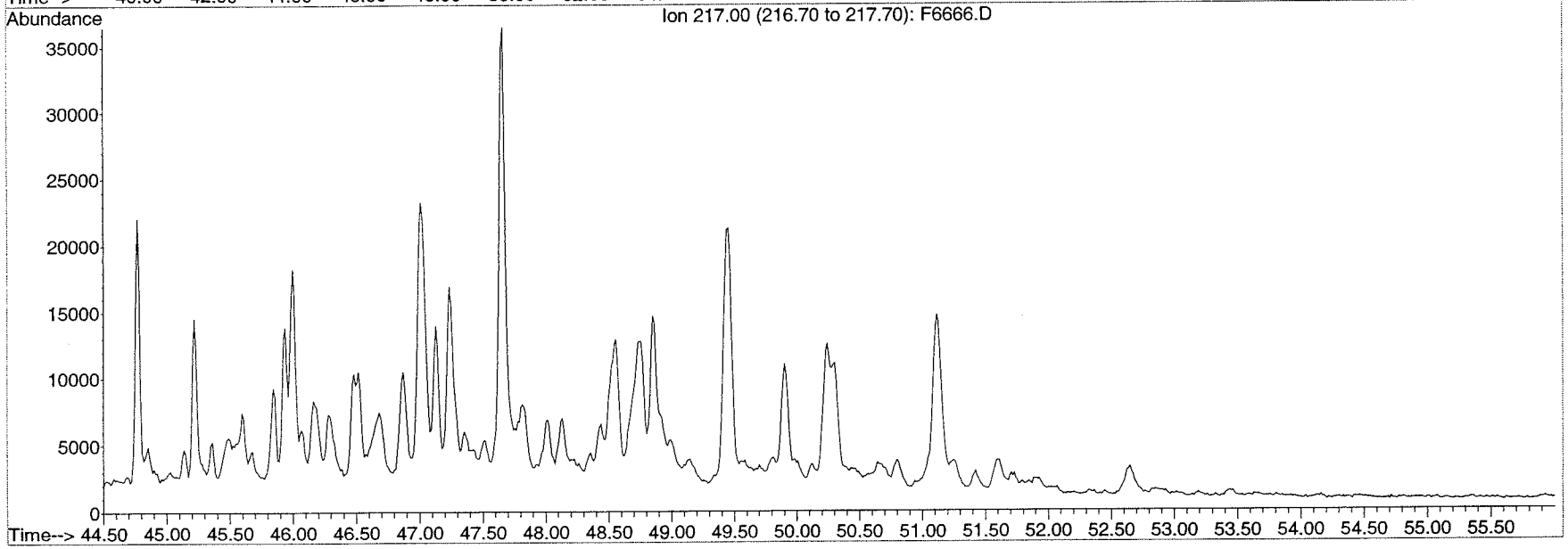
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6666.D
Date Acquired: 5 Mar 2003 7:33 pm
Method File: BIO1SIM
Sample Name: U0397-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-117 2830
U0397



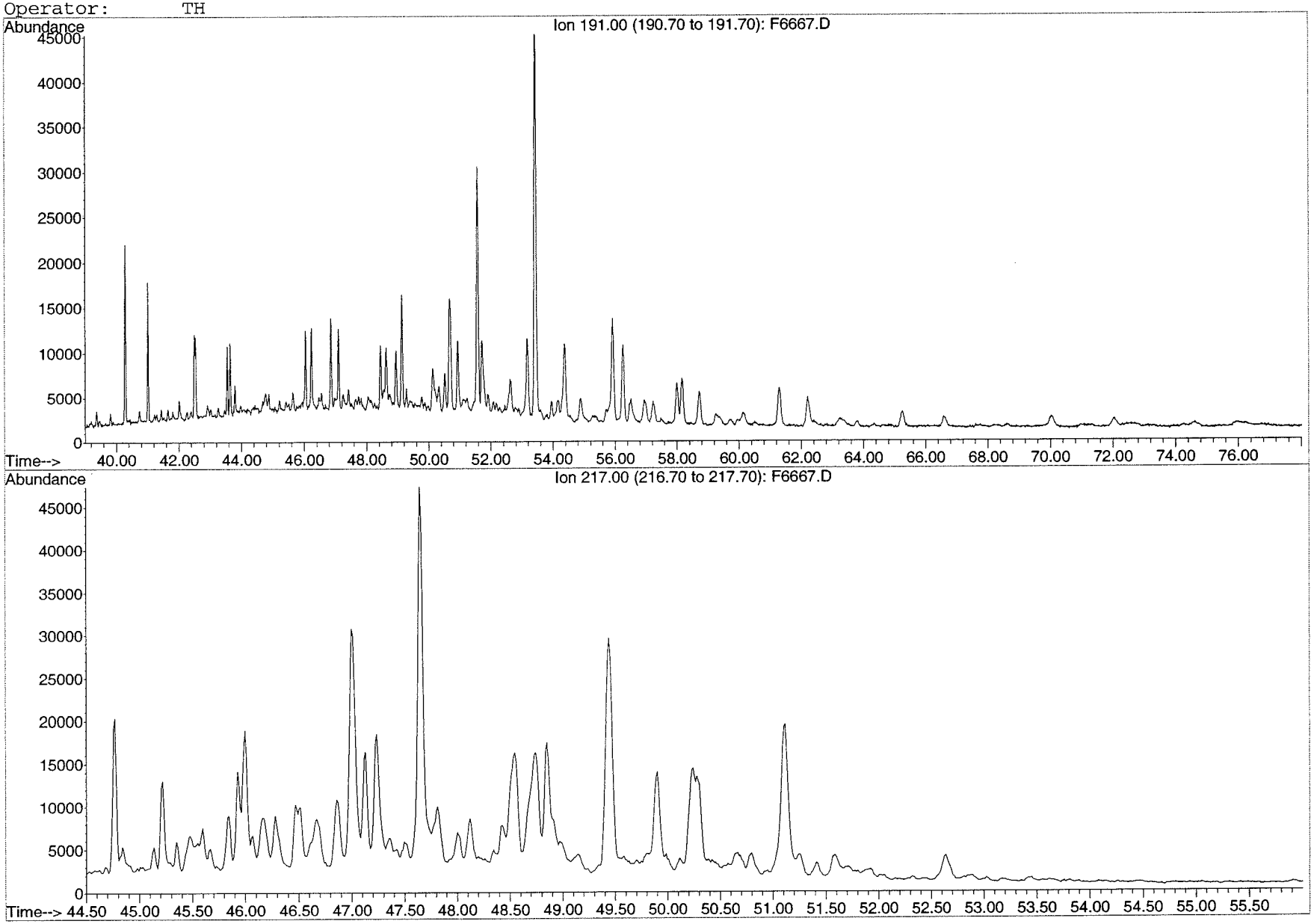


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6667.D
Date Acquired: 5 Mar 2003 9:05 pm
Method File: BIO1SIM
Sample Name: U0407-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-117 4850
U0407

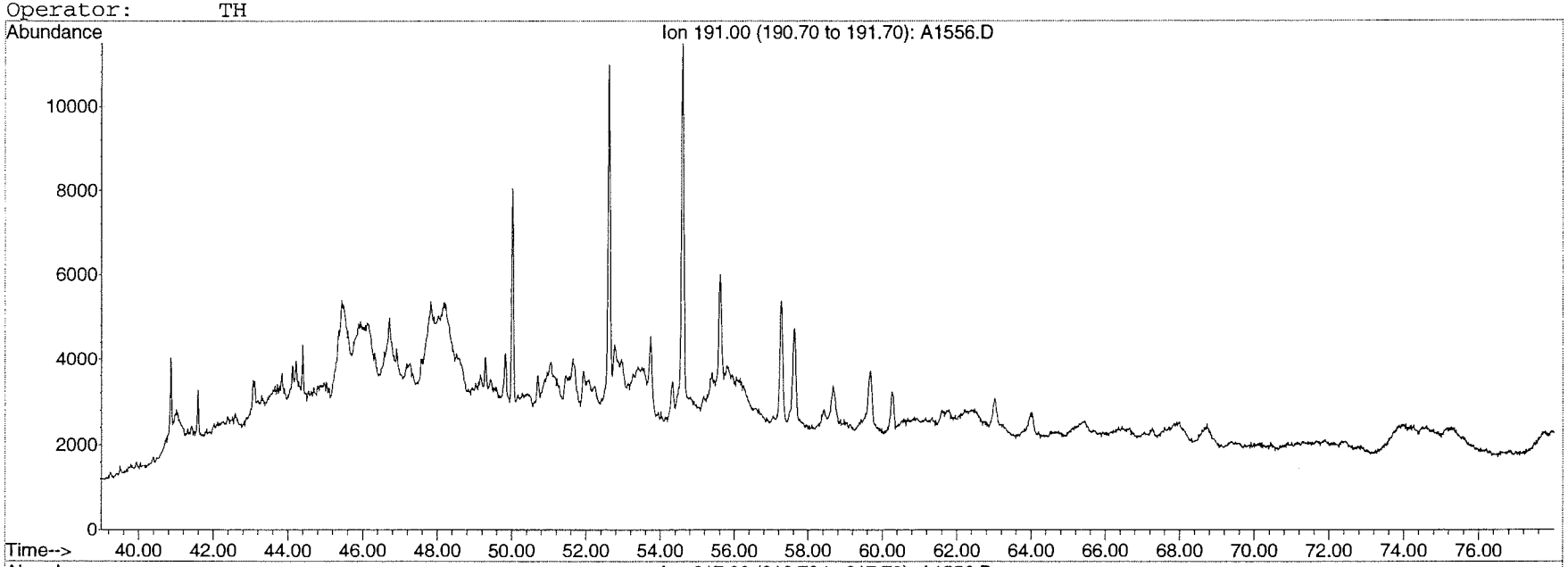


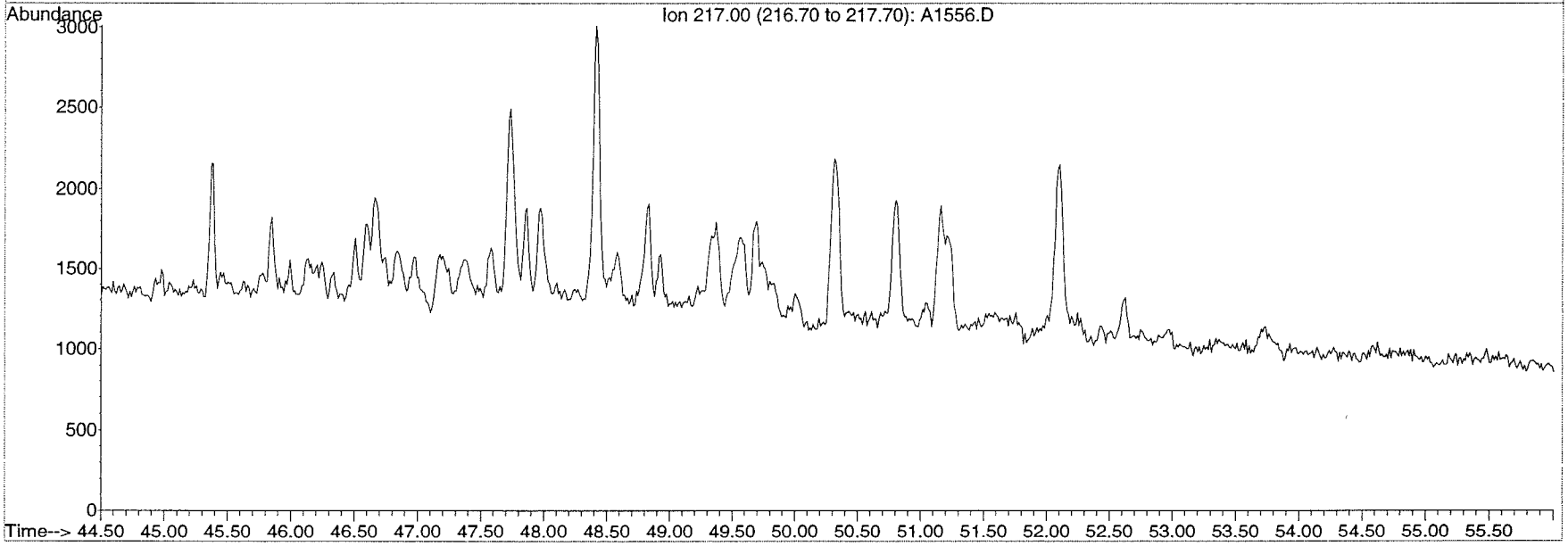
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1556.D
Date Acquired: 17 Feb 2003 6:26 pm
Method File: BIO1SIM
Sample Name: U Y4507-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-117-US-9.6
U4507



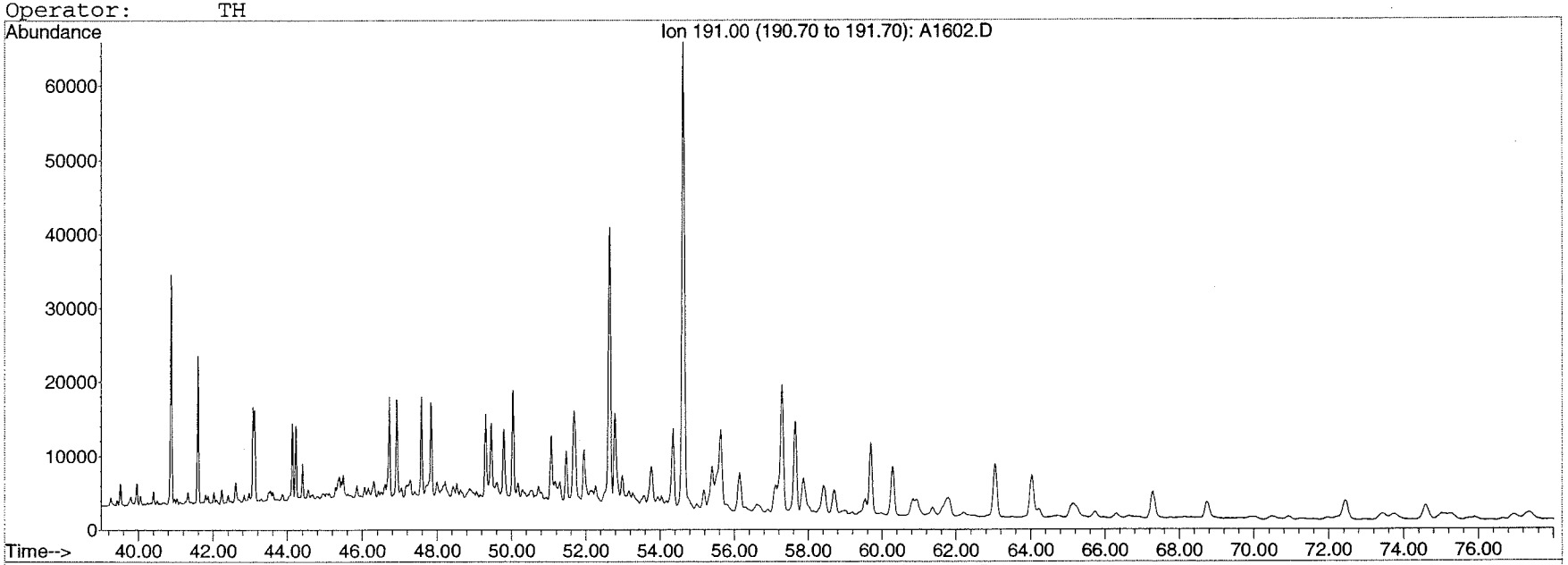


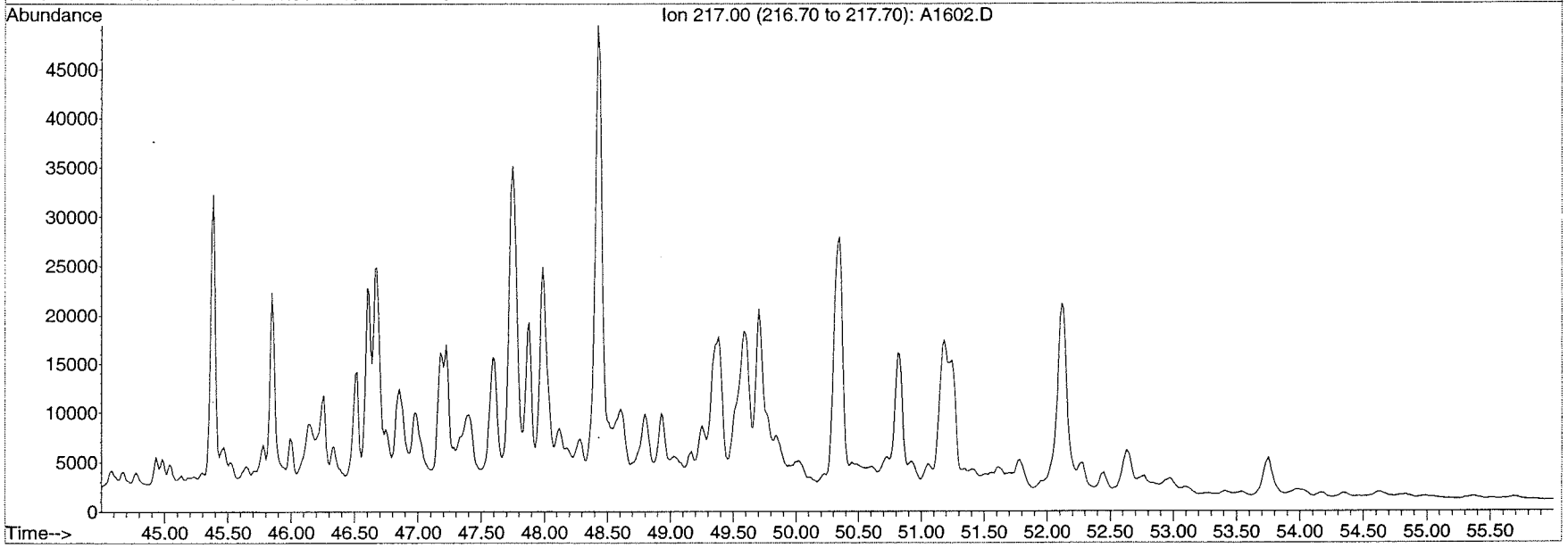
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1602.D
Date Acquired: 20 Feb 2003 10:50 pm
Method File: BIO1SIM
Sample Name: U6524-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-119 0010 Composite
U6524



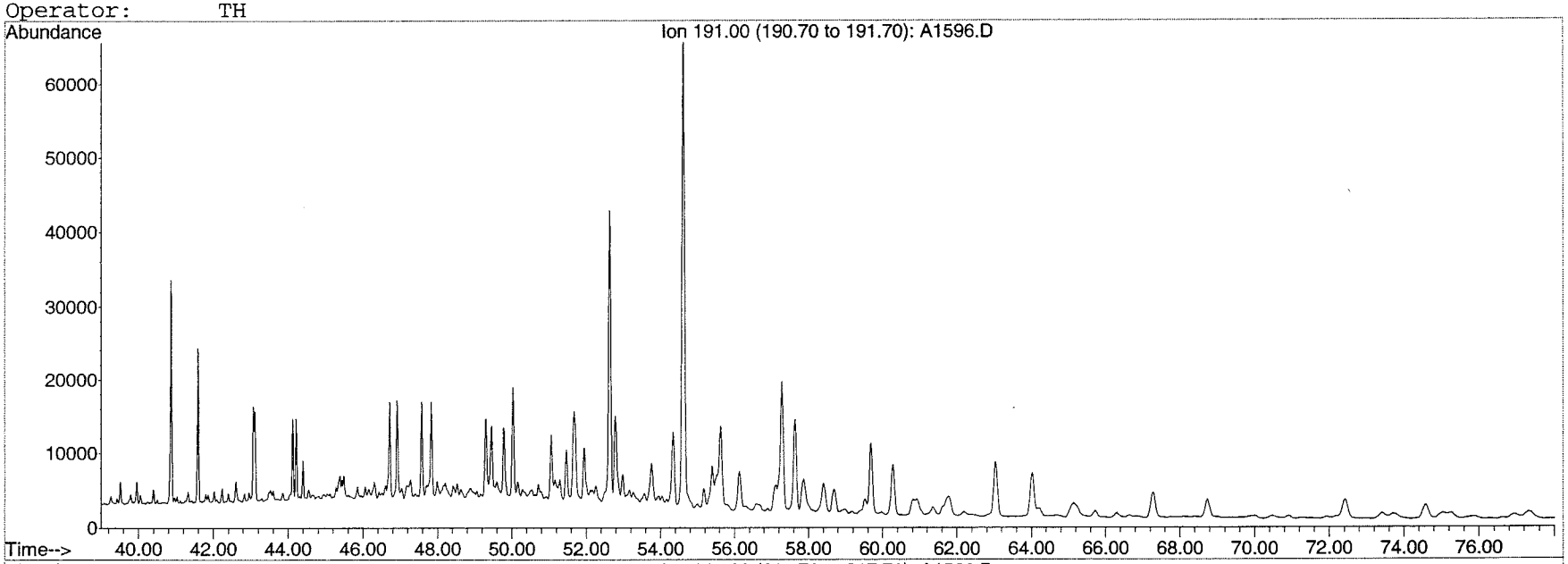


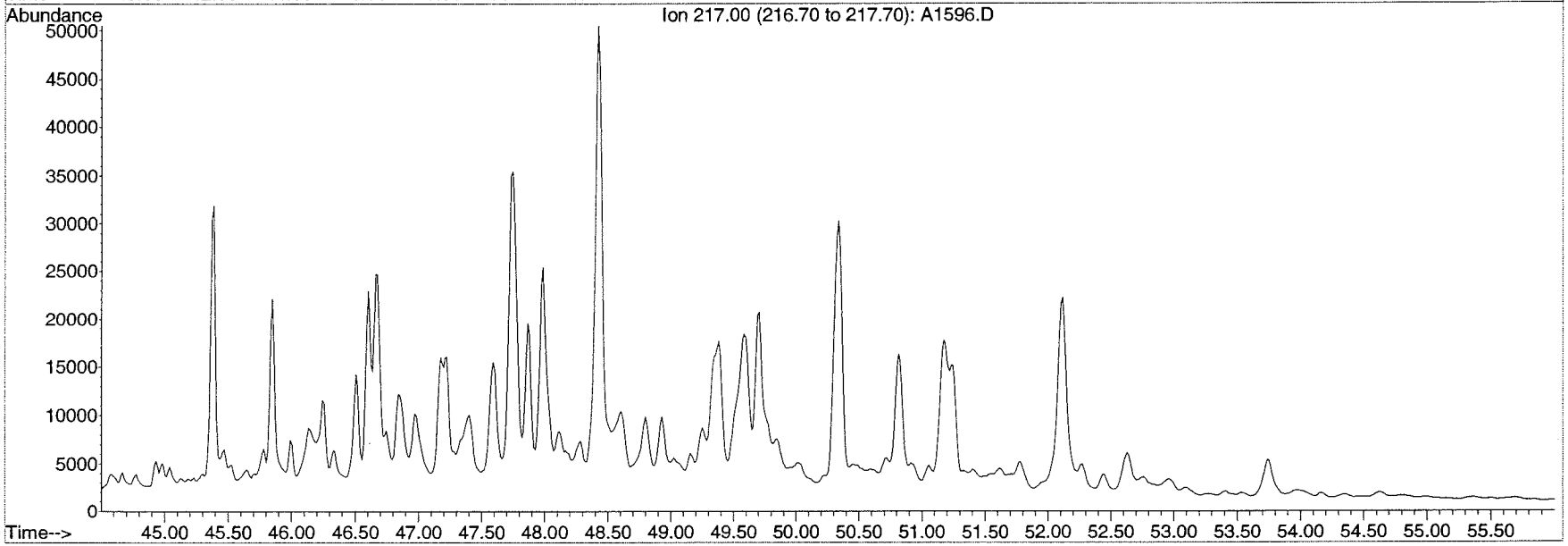
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1596.D
Date Acquired: 20 Feb 2003 10:06 am
Method File: BIO1SIM
Sample Name: U0455-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-119 0608
U0455



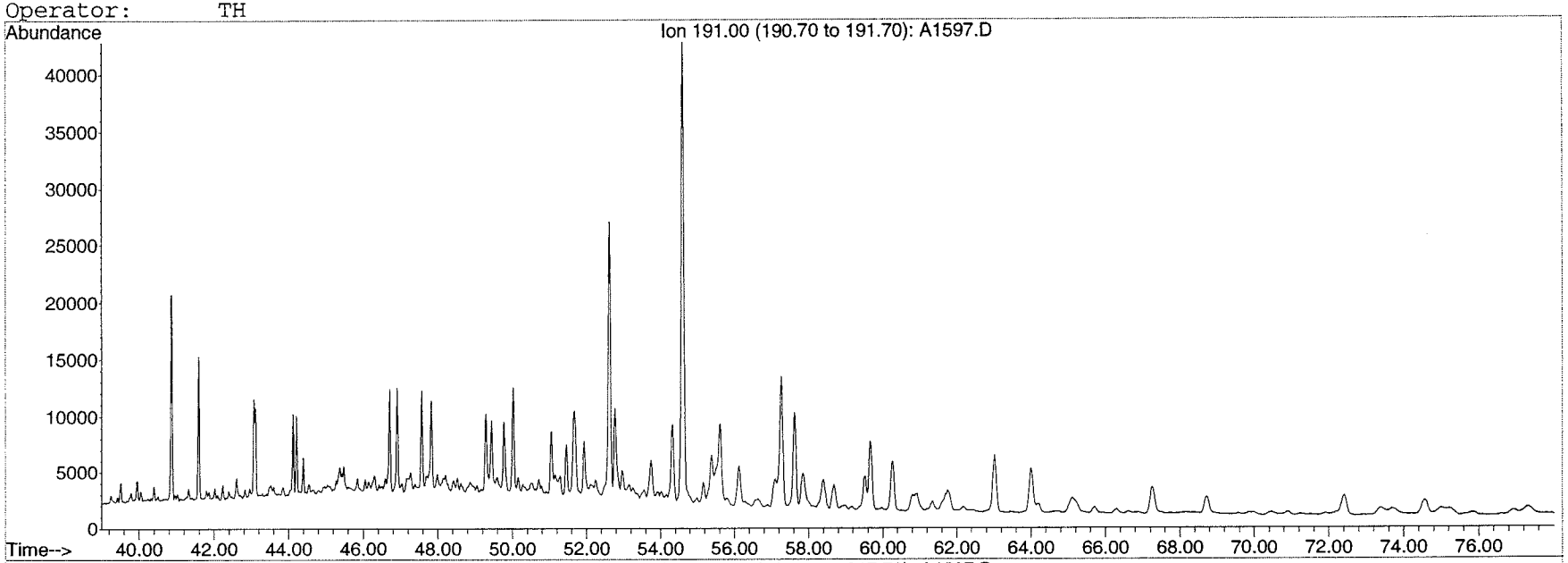


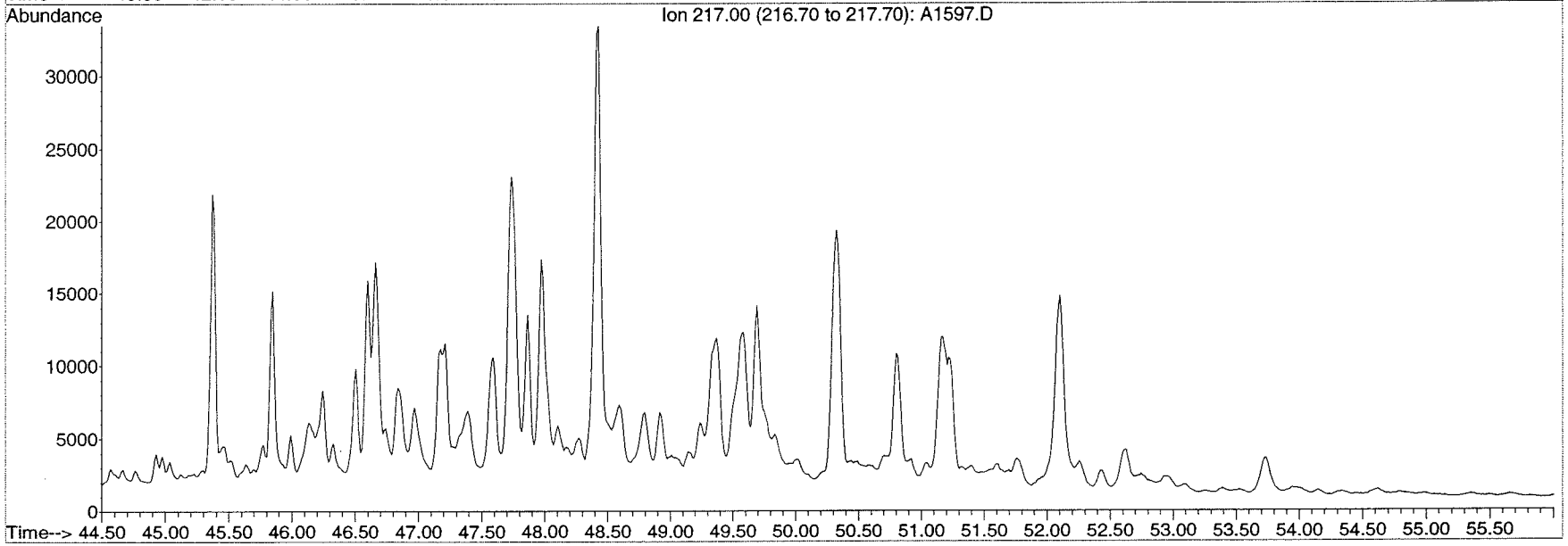
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1597.D
Date Acquired: 20 Feb 2003 1:29 pm
Method File: BIO1SIM
Sample Name: U0460-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-119 1618
U0460



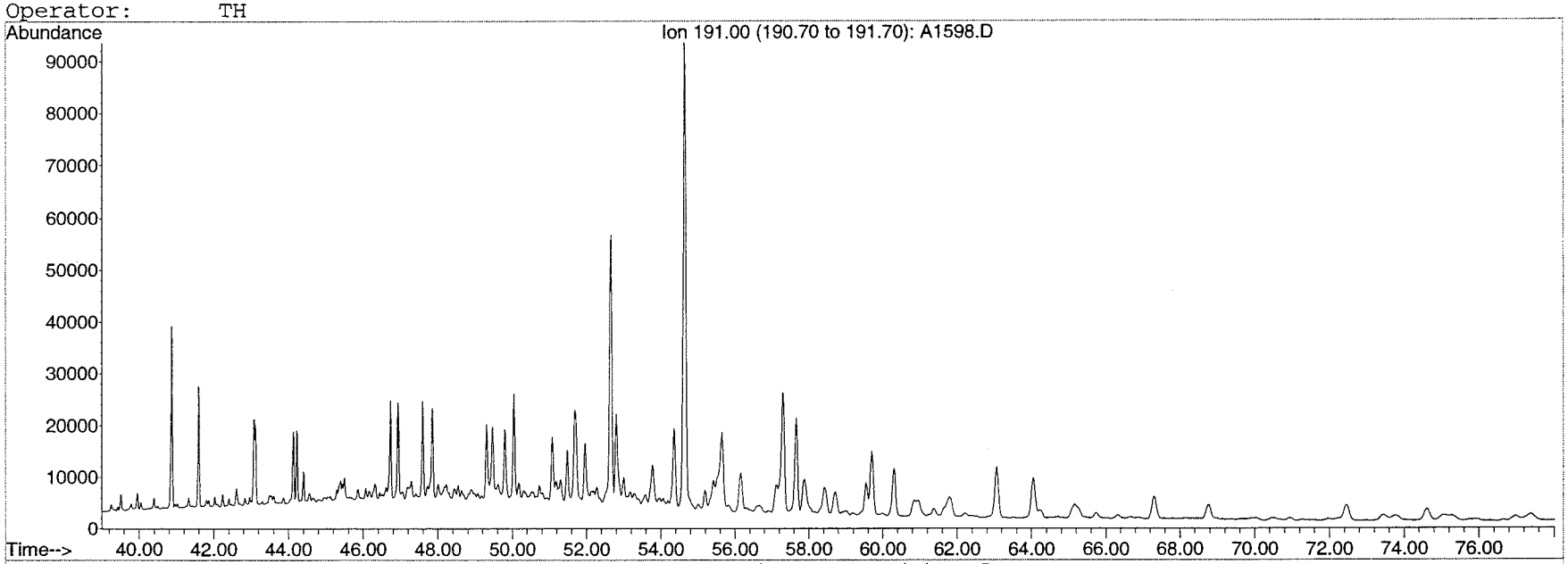


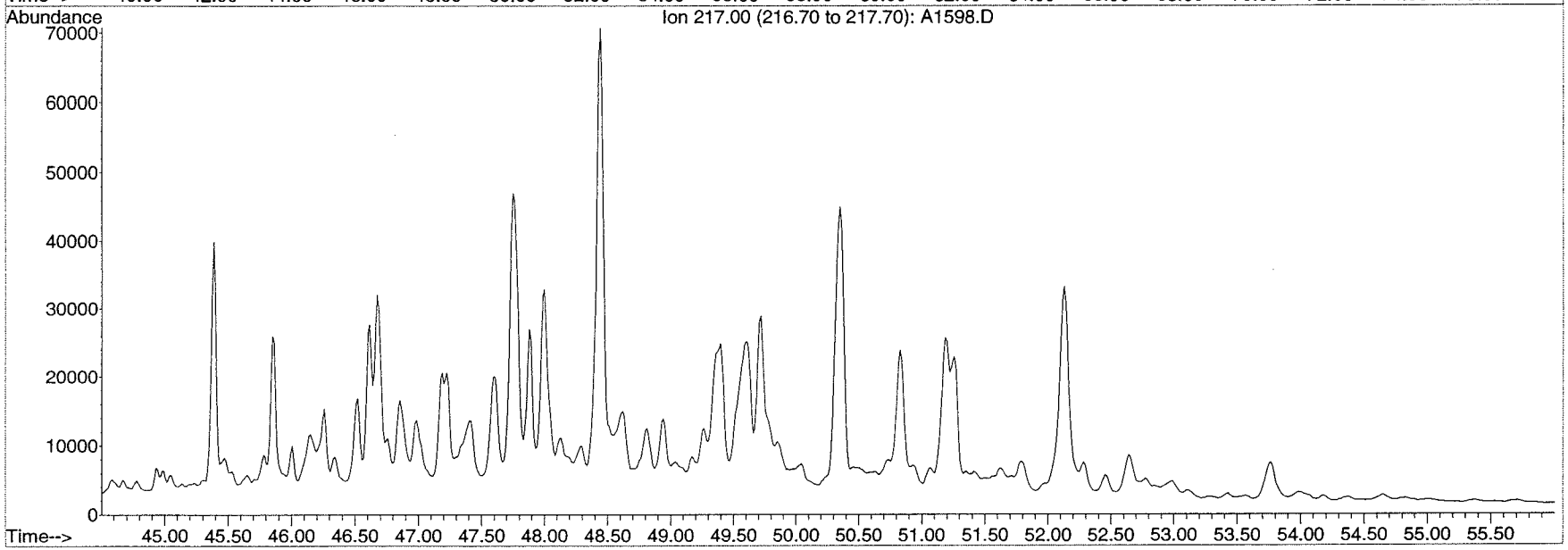
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1598.D
Date Acquired: 20 Feb 2003 4:48 pm
Method File: BIO1SIM
Sample Name: U0464-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-119 2426
U0464



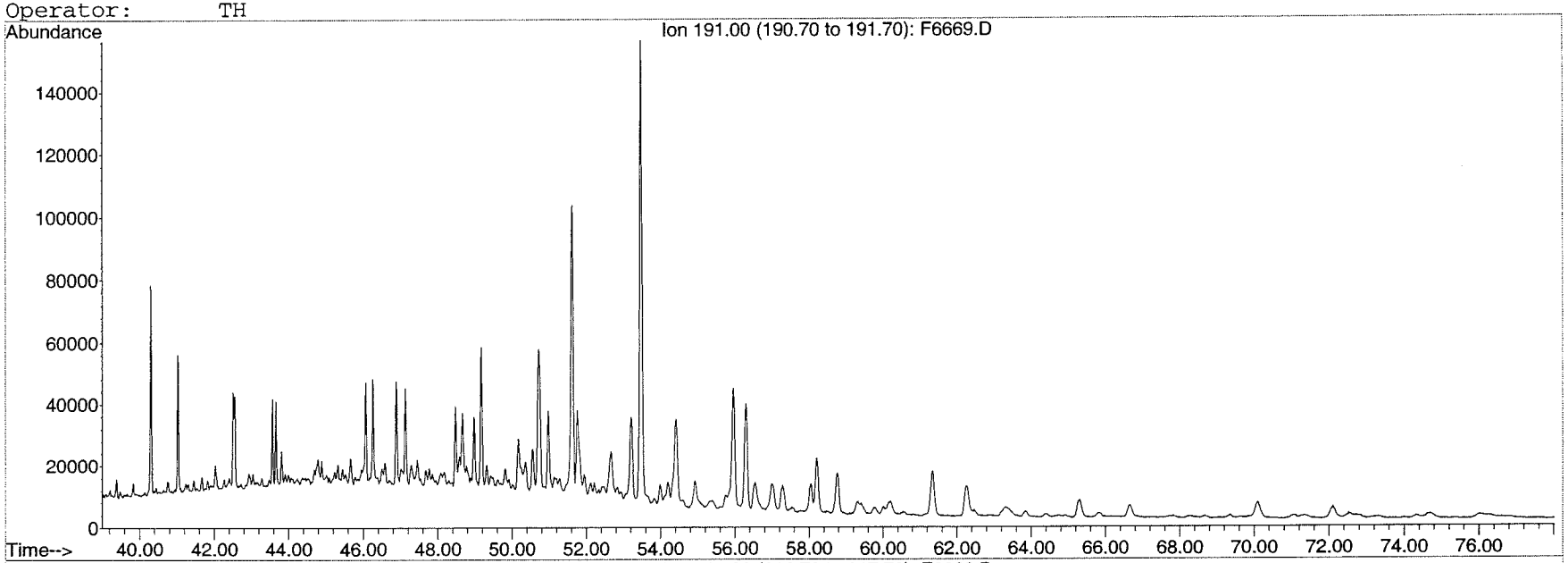


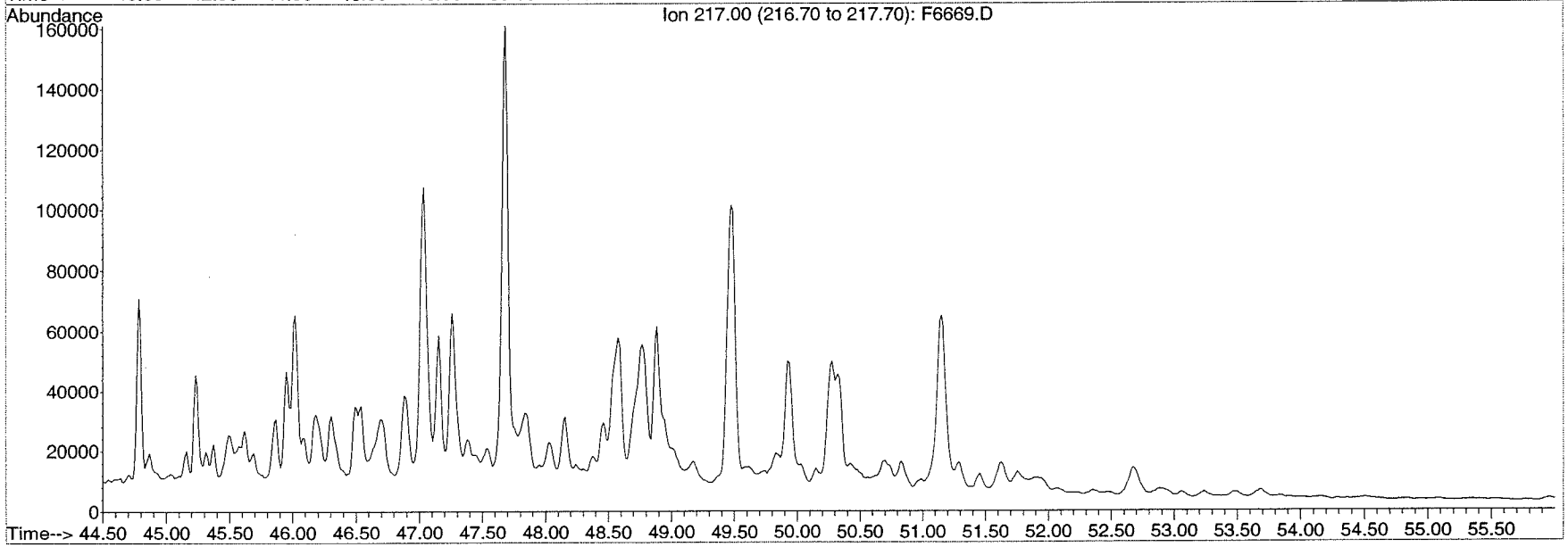
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6669.D
Date Acquired: 6 Mar 2003 9:58 am
Method File: BIO1SIM
Sample Name: U4512-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-119R2-US-0.5
U4512



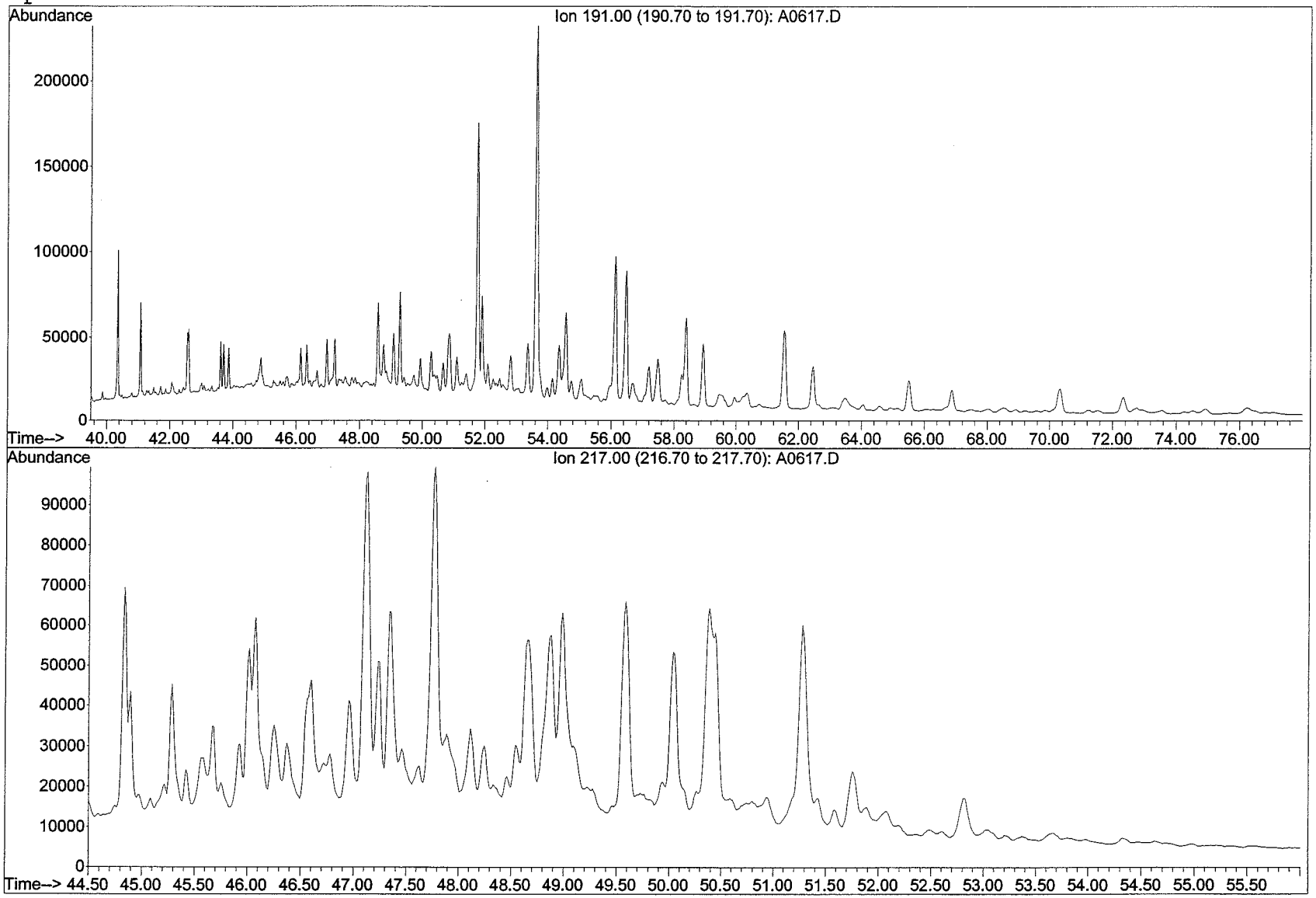


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0617.D
Date Acquired: 13 Dec 2002 8:59 pm
Method File: BIO1SIM
Sample Name: U0151-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-121-SS-0010
U0151

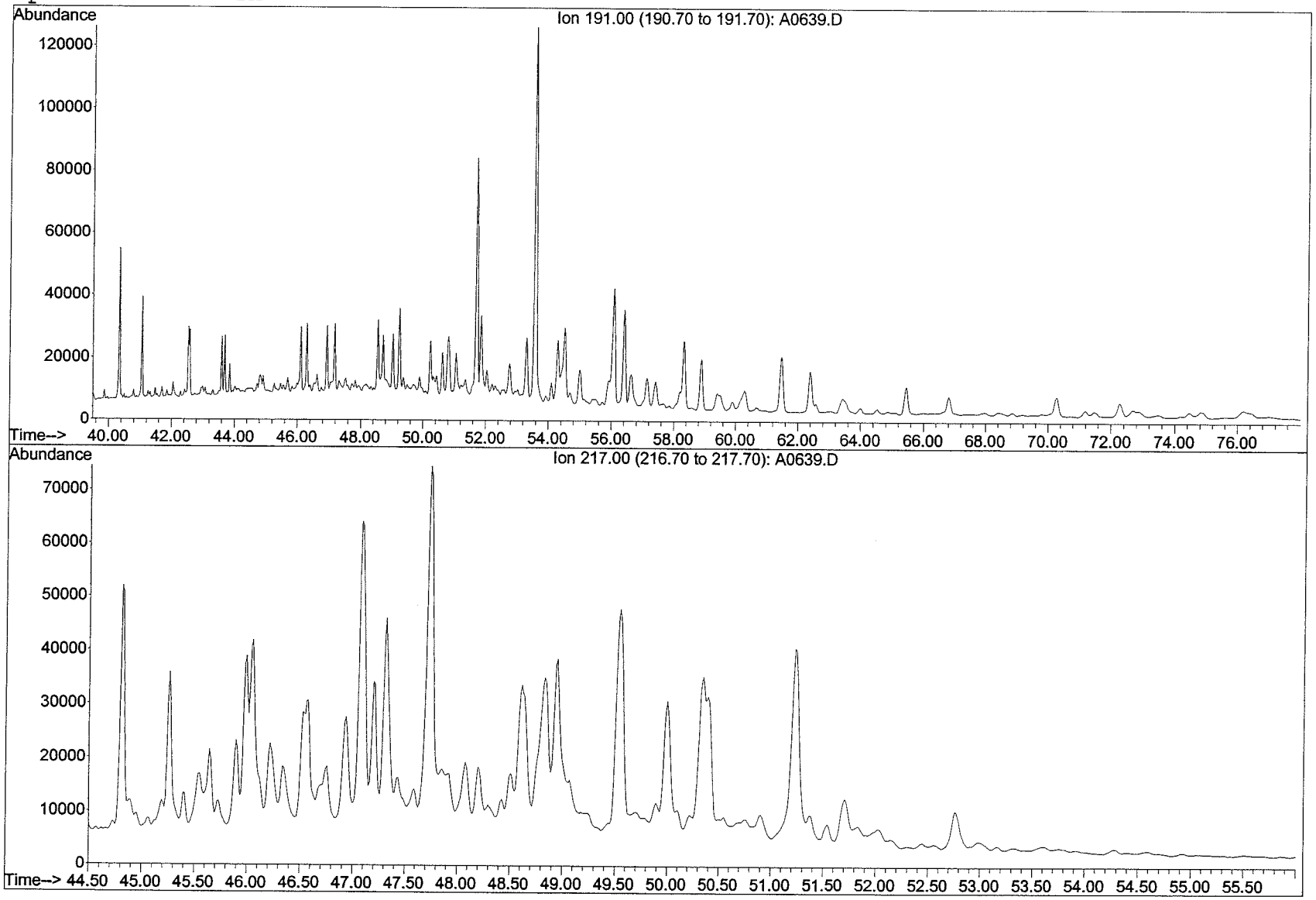


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0639.D
Date Acquired: 15 Dec 2002 8:27 am
Method File: BIO1SIM
Sample Name: U0152-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-121-SS-2030
U0152

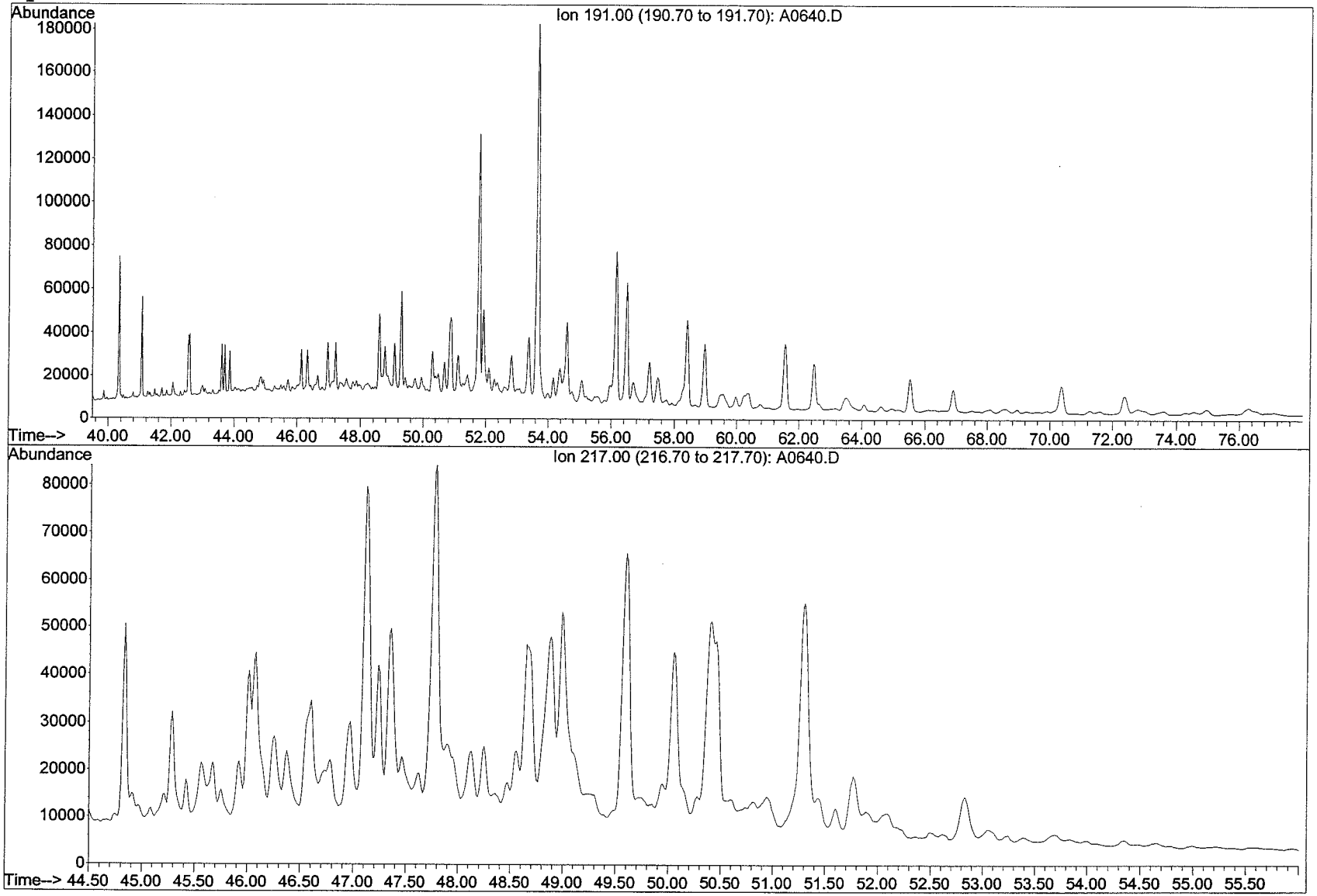


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0640.D
Date Acquired: 15 Dec 2002 10:02 am
Method File: BIO1SIM
Sample Name: U0153-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-122-SS-0010
U0153

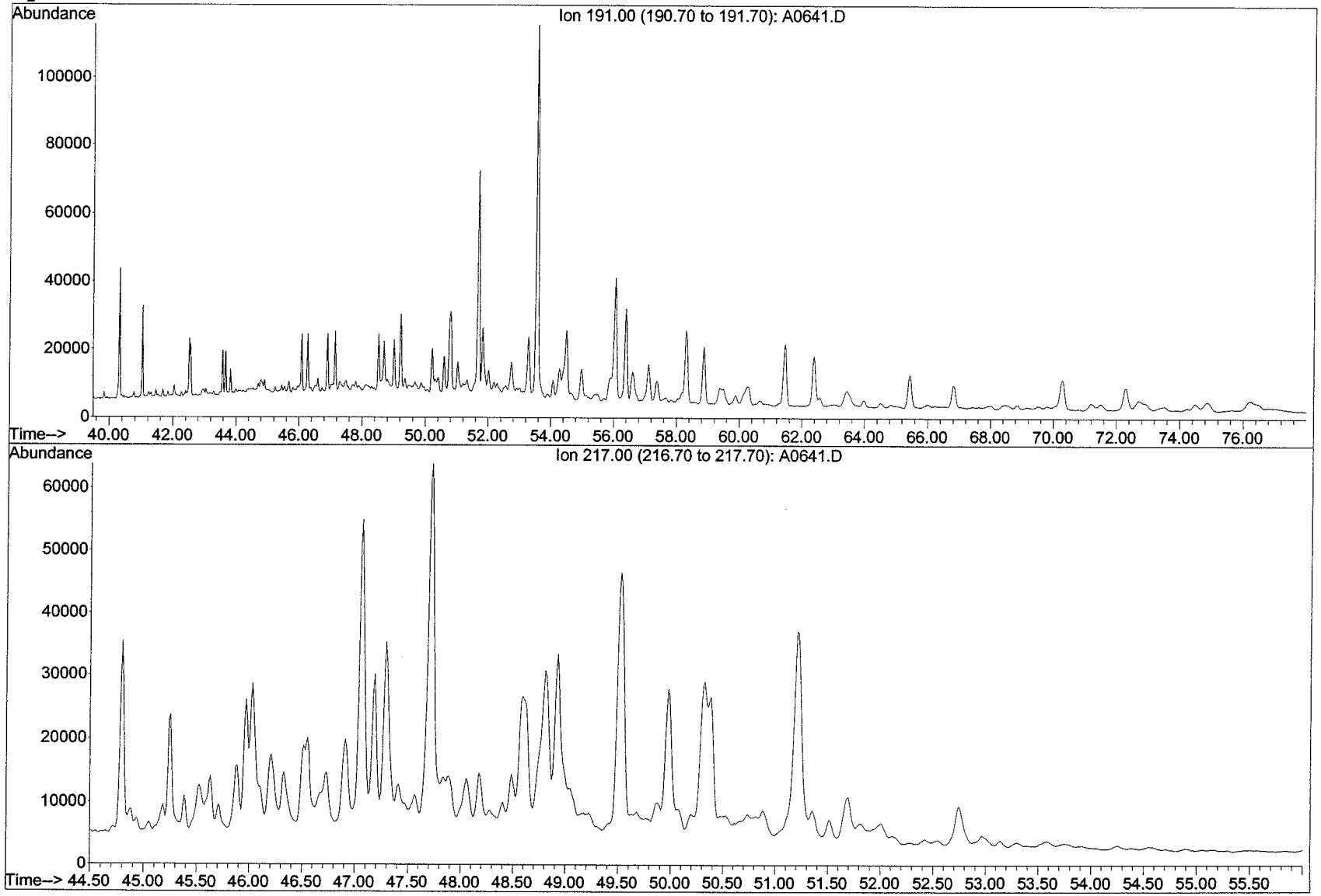


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0641.D
Date Acquired: 15 Dec 2002 11:36 am
Method File: BIO1SIM
Sample Name: U0154-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-122-SS-2030
U0154

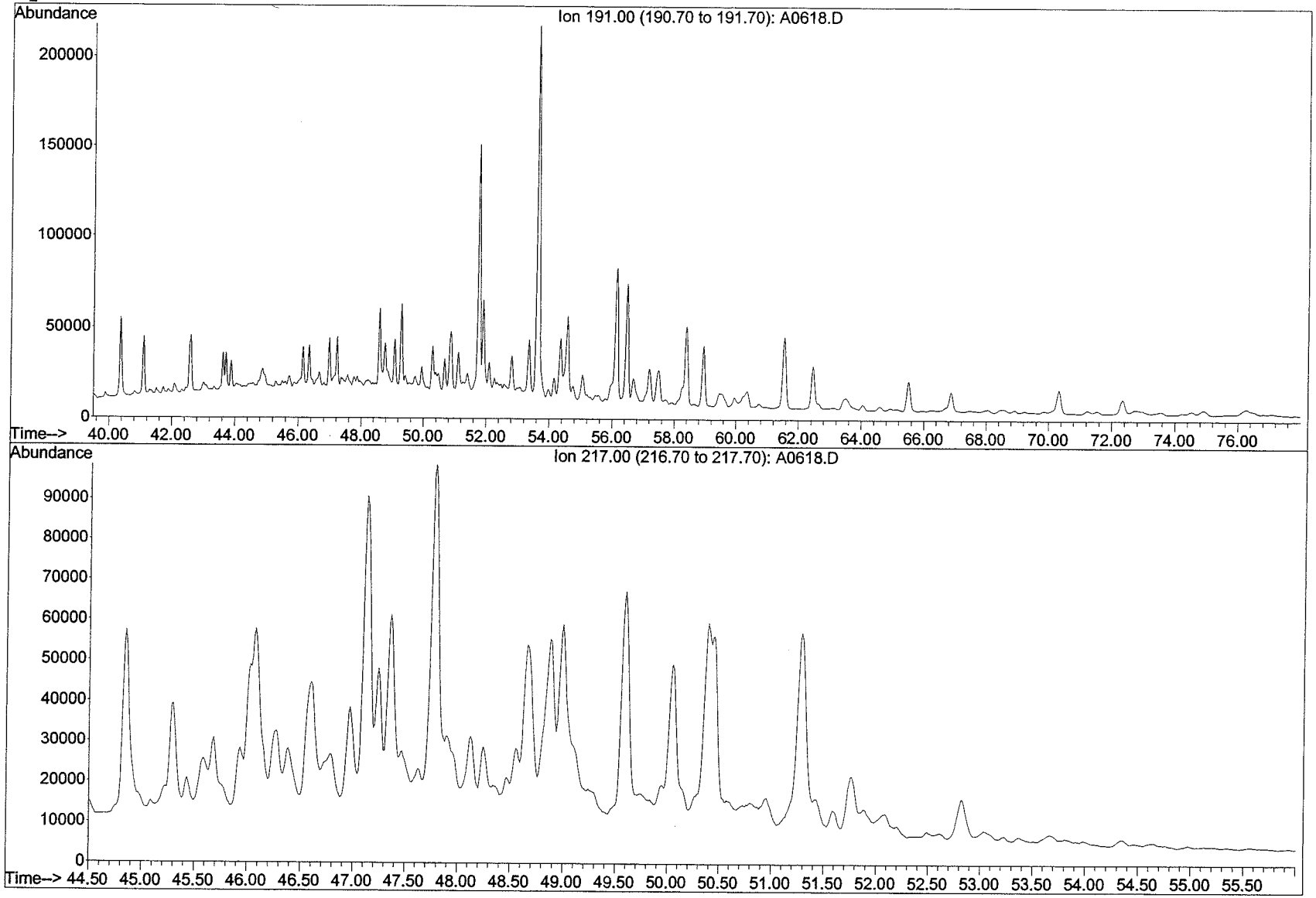


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0618.D
Date Acquired: 13 Dec 2002 10:34 pm
Method File: BIO1SIM
Sample Name: U0155-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-123-SS-0010
U0155

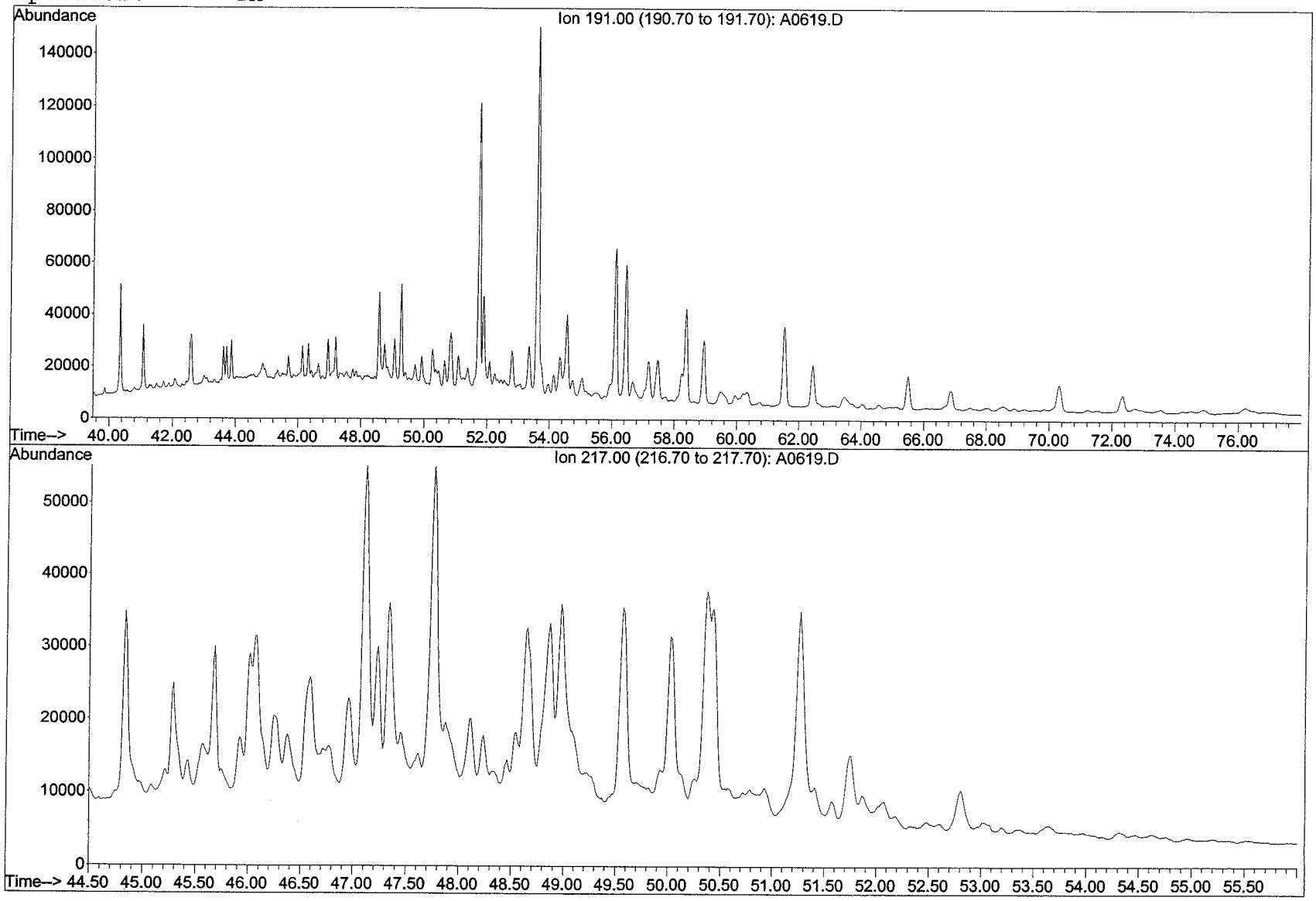


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0619.D
Date Acquired: 14 Dec 2002 12:09 am
Method File: BIO1SIM
Sample Name: U0156-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-124-SS-0010
U0156

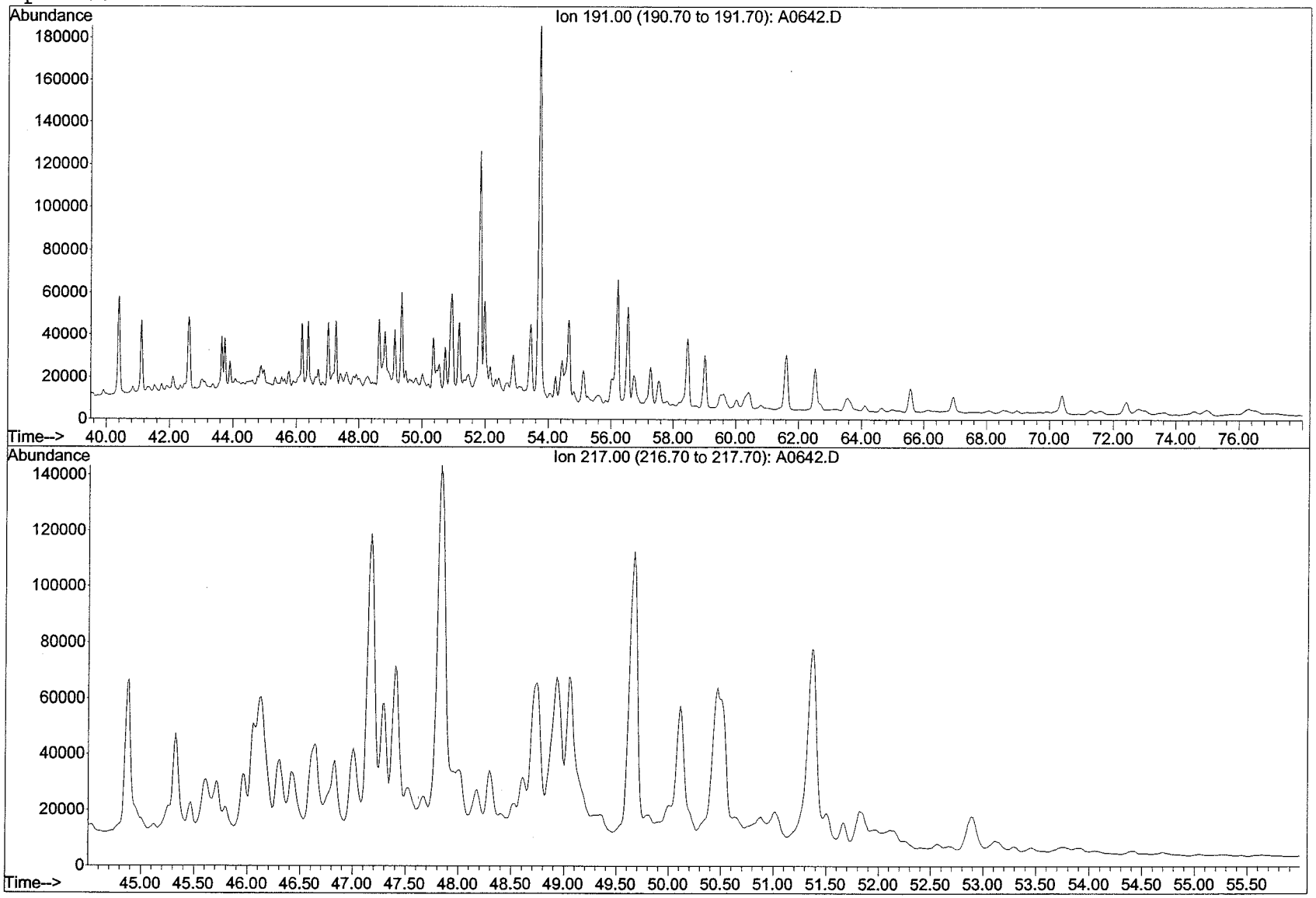


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0642.D
Date Acquired: 15 Dec 2002 1:09 pm
Method File: BIO1SIM
Sample Name: U0157-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-124-SS-2030
U0157

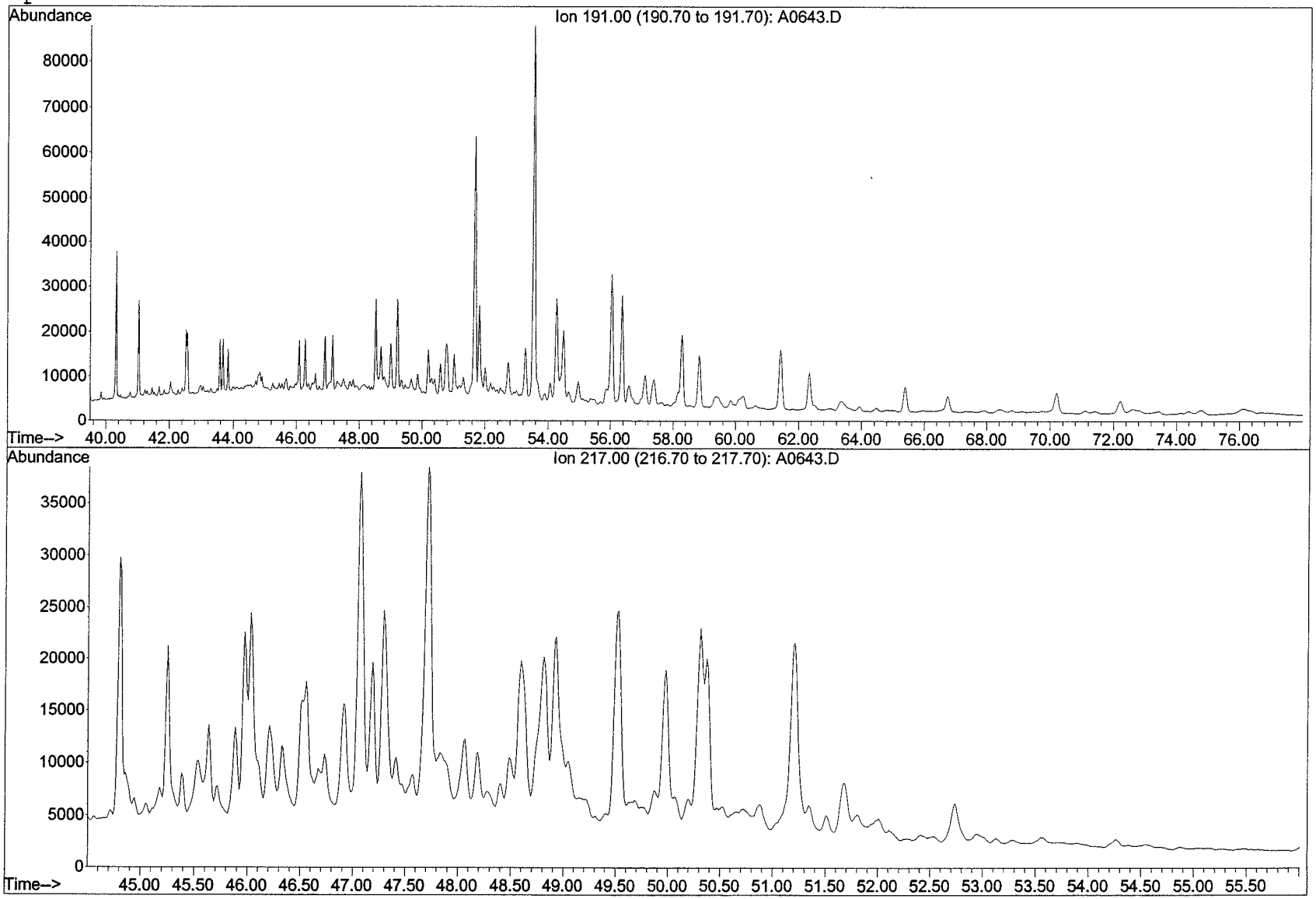


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0643.D
Date Acquired: 15 Dec 2002 2:43 pm
Method File: BIO1SIM
Sample Name: U0158-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-126-SS-0010
U0158

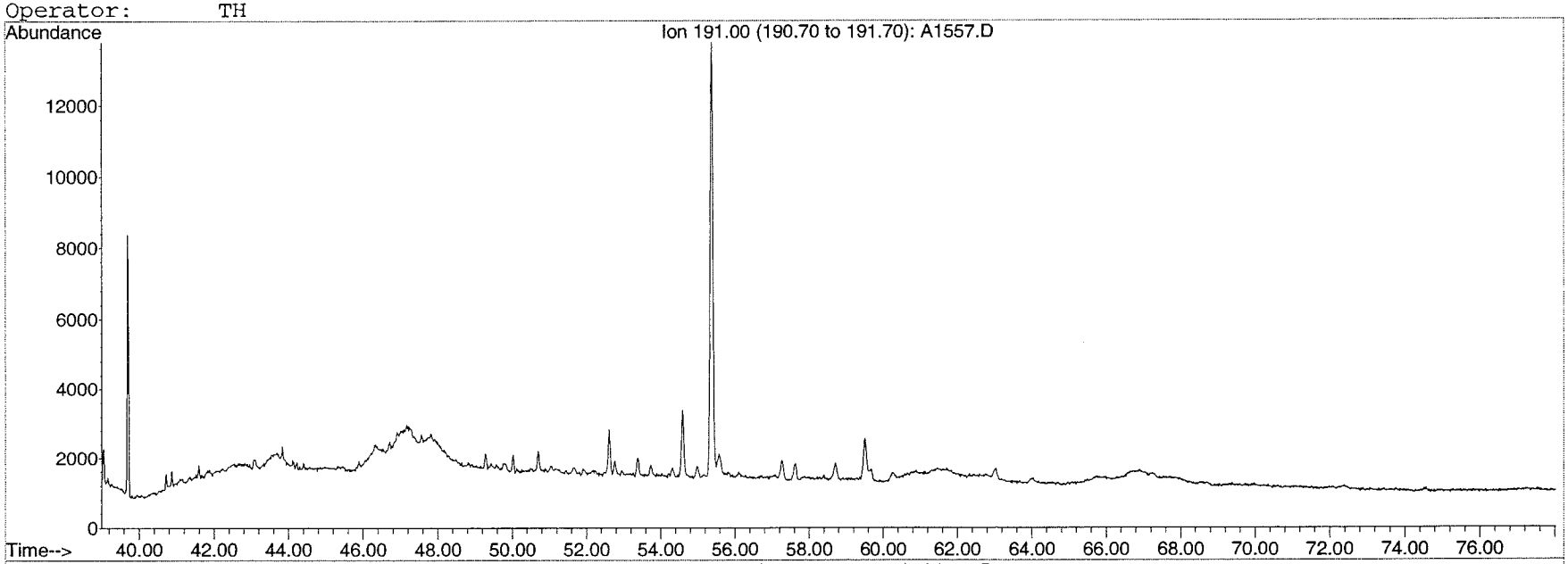


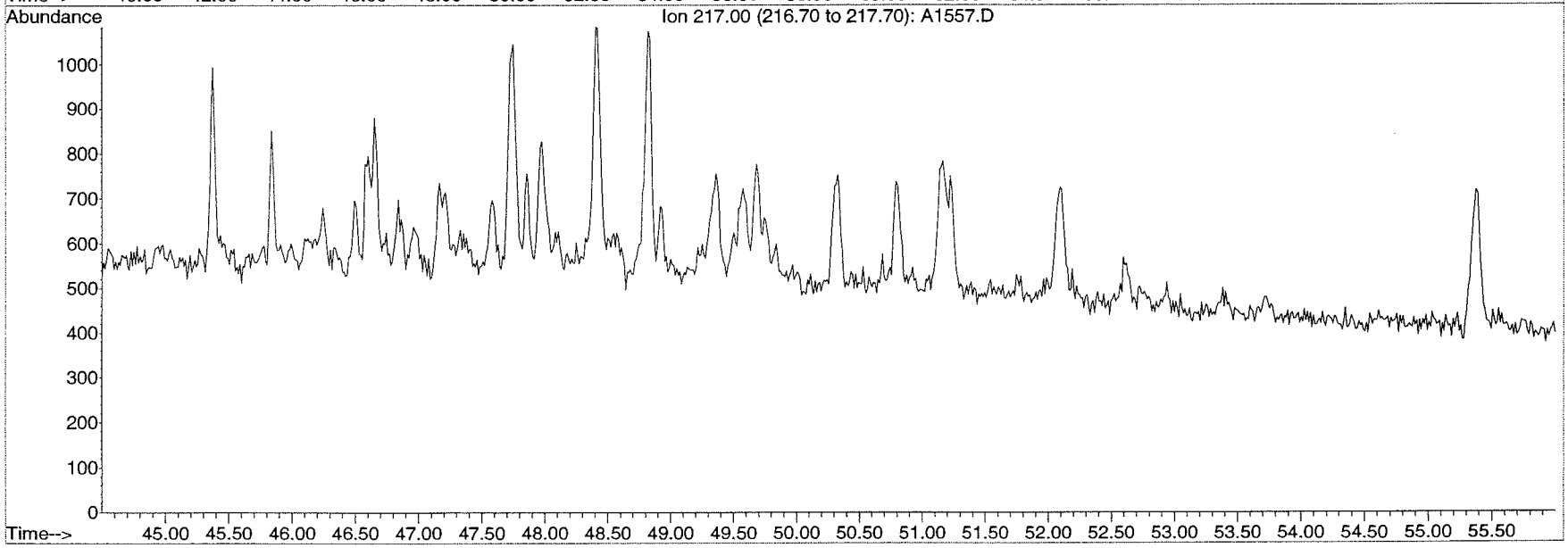
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1557.D
Date Acquired: 17 Feb 2003 7:57 pm
Method File: BIO1SIM
Sample Name: U ~~/~~4517-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-126-SS-0010
U4517



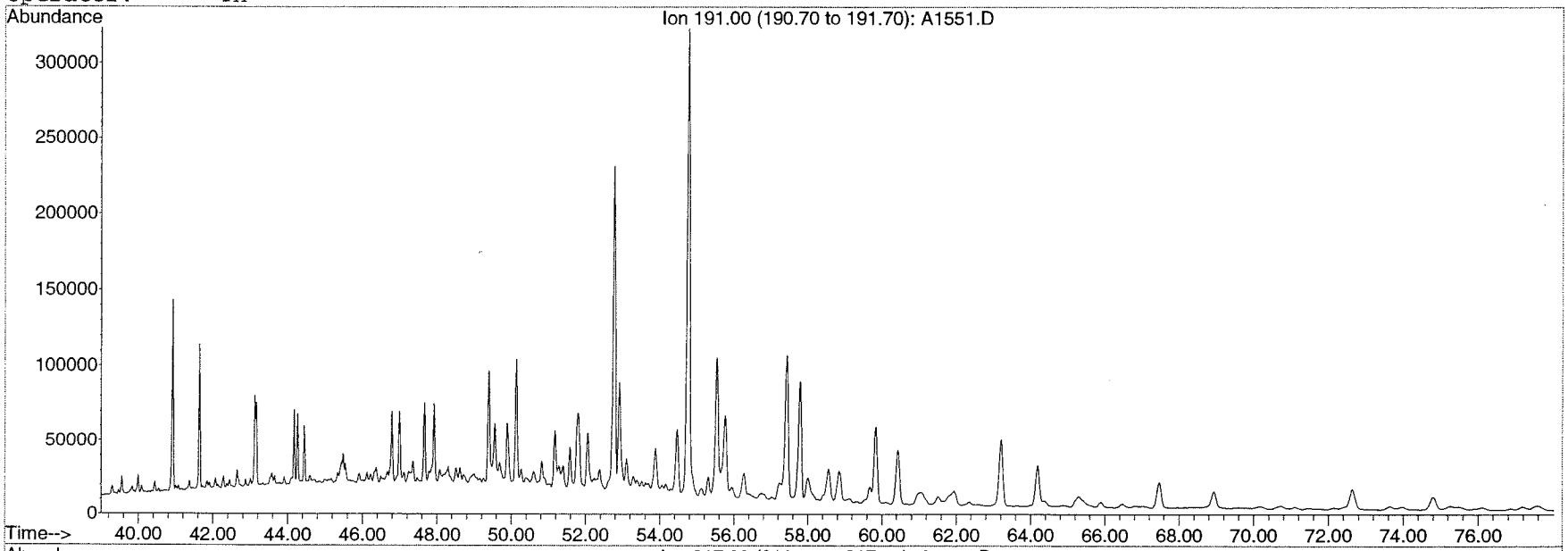


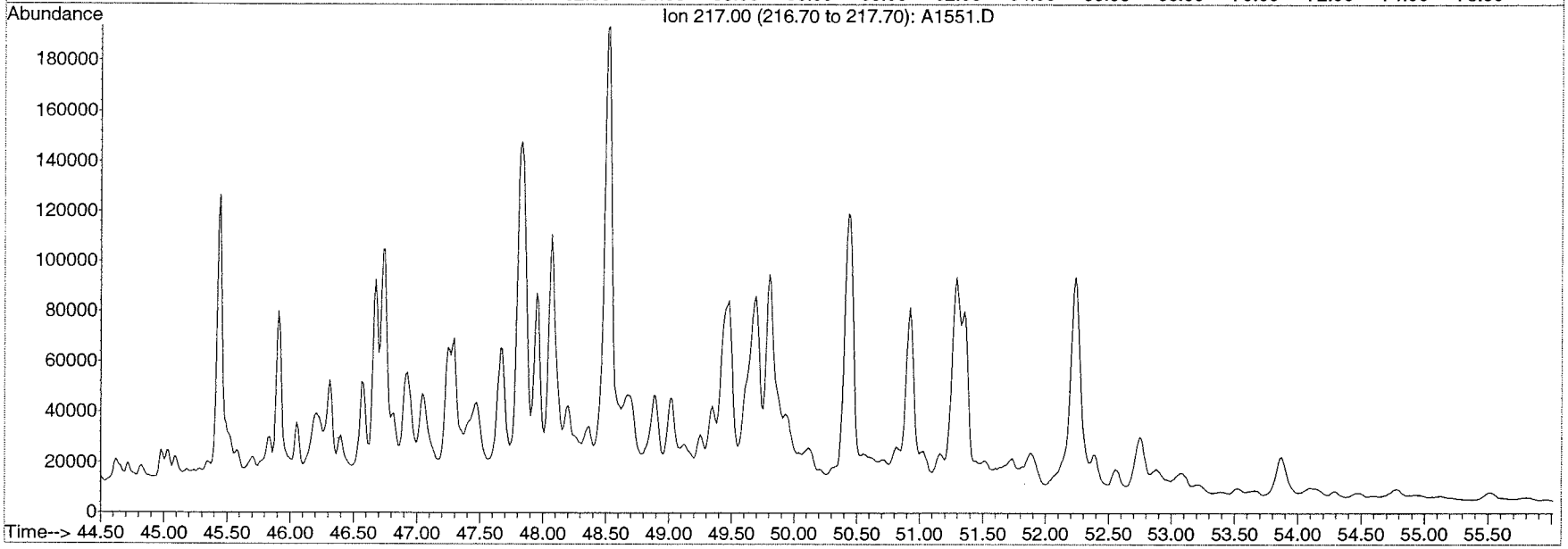
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1551.D
Date Acquired: 17 Feb 2003 10:58 am
Method File: BIO1SIM
Sample Name: U 0097-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-126-SS-1020
U0097



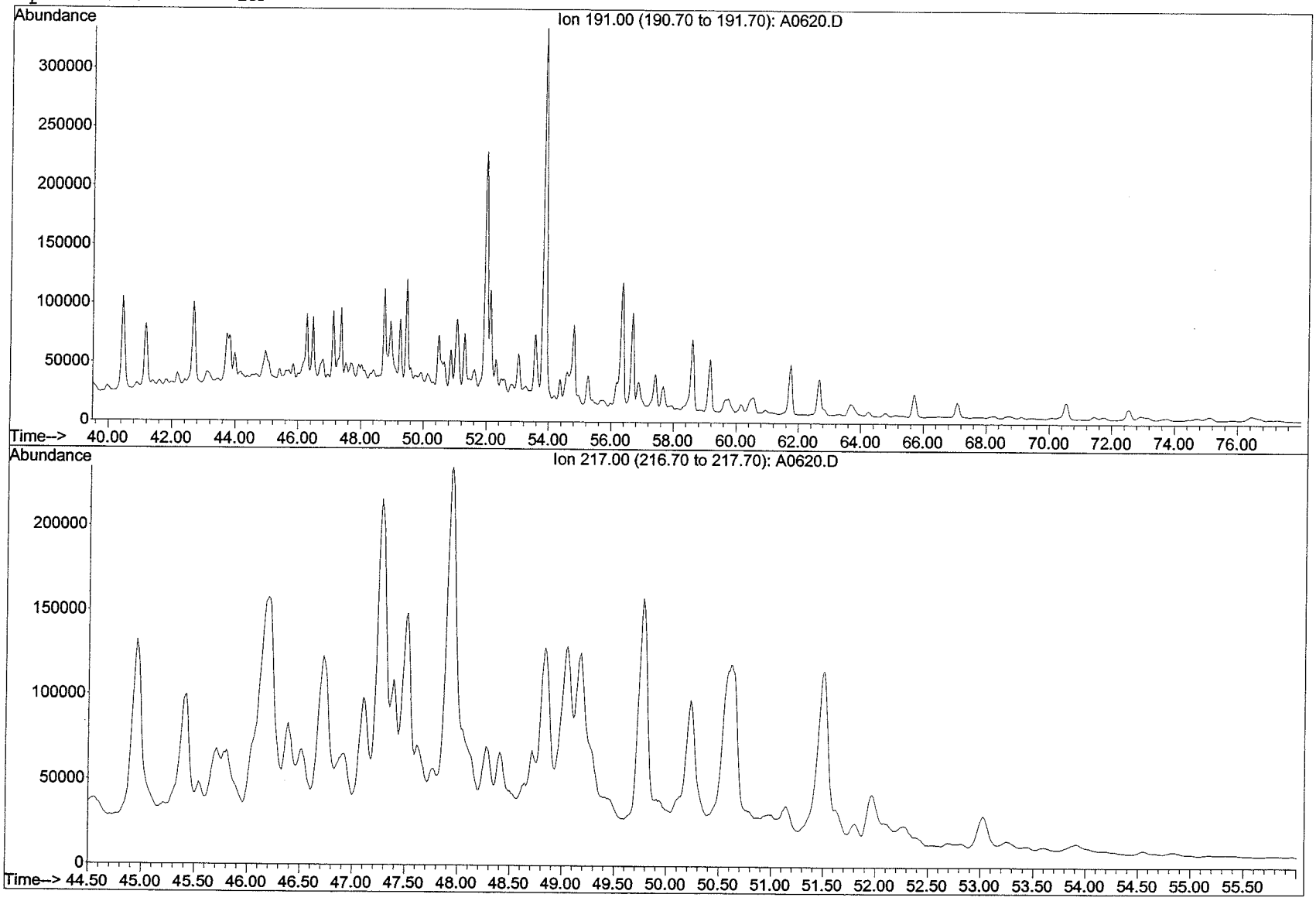


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0620.D
Date Acquired: 14 Dec 2002 1:44 am
Method File: BIO1SIM
Sample Name: U0159-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-127-SS-0010
U0159

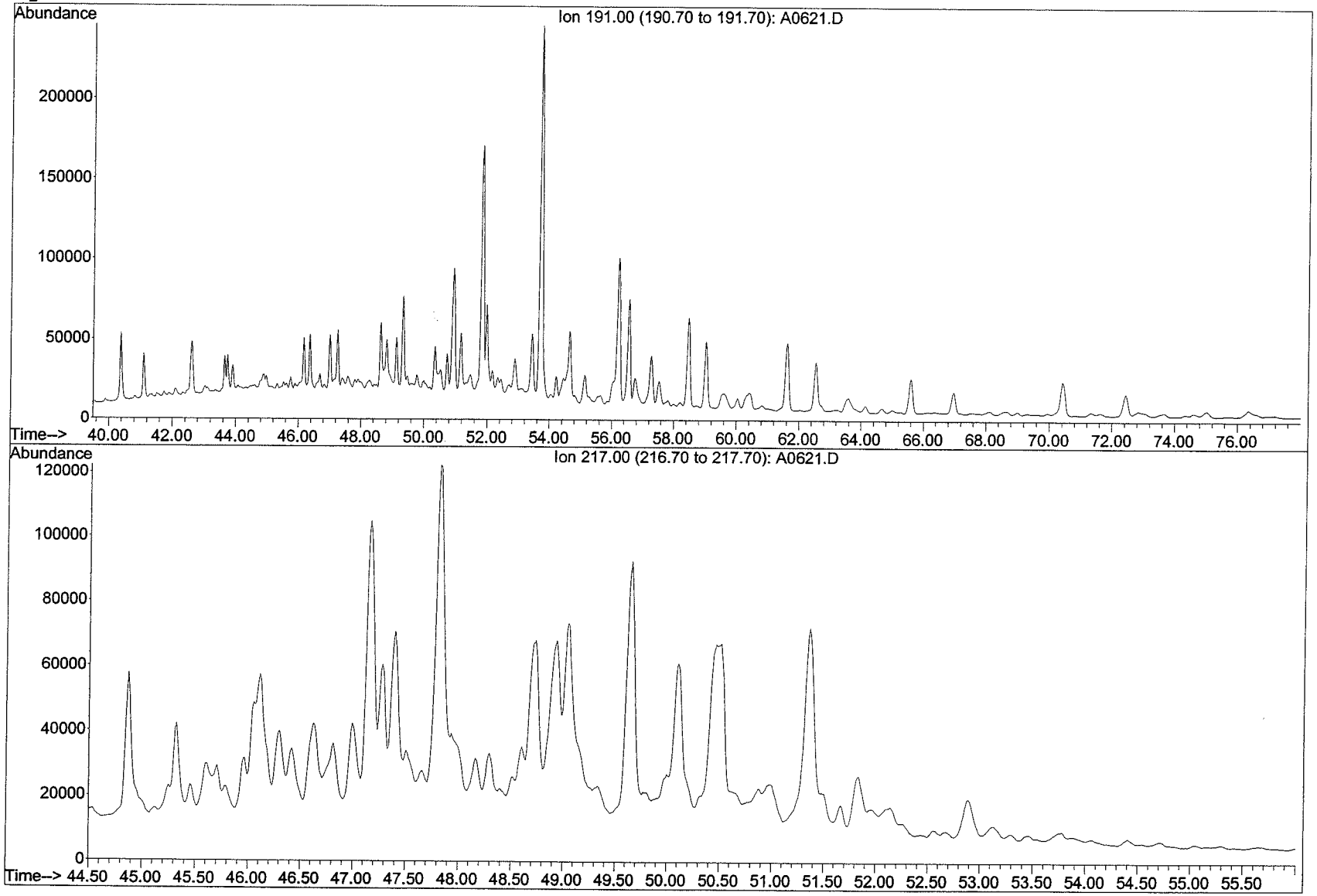


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0621.D
Date Acquired: 14 Dec 2002 3:20 am
Method File: BIO1SIM
Sample Name: U0160-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-128-SS-0010
U0160

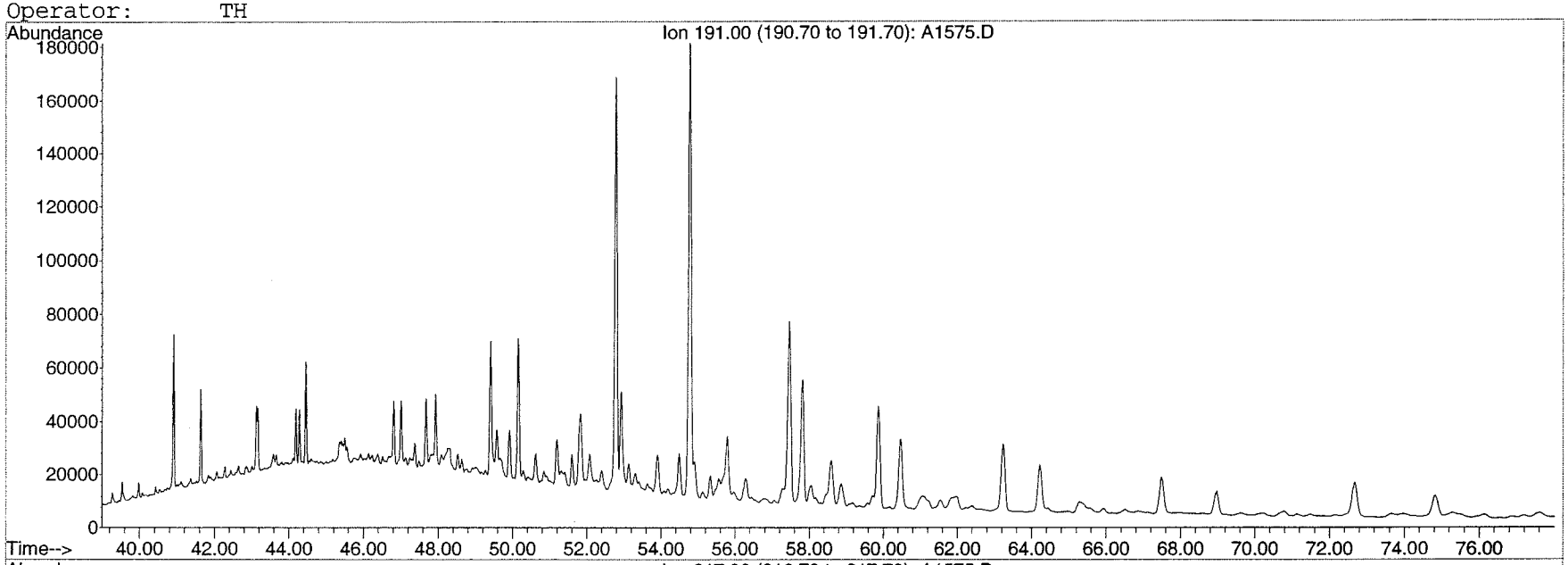


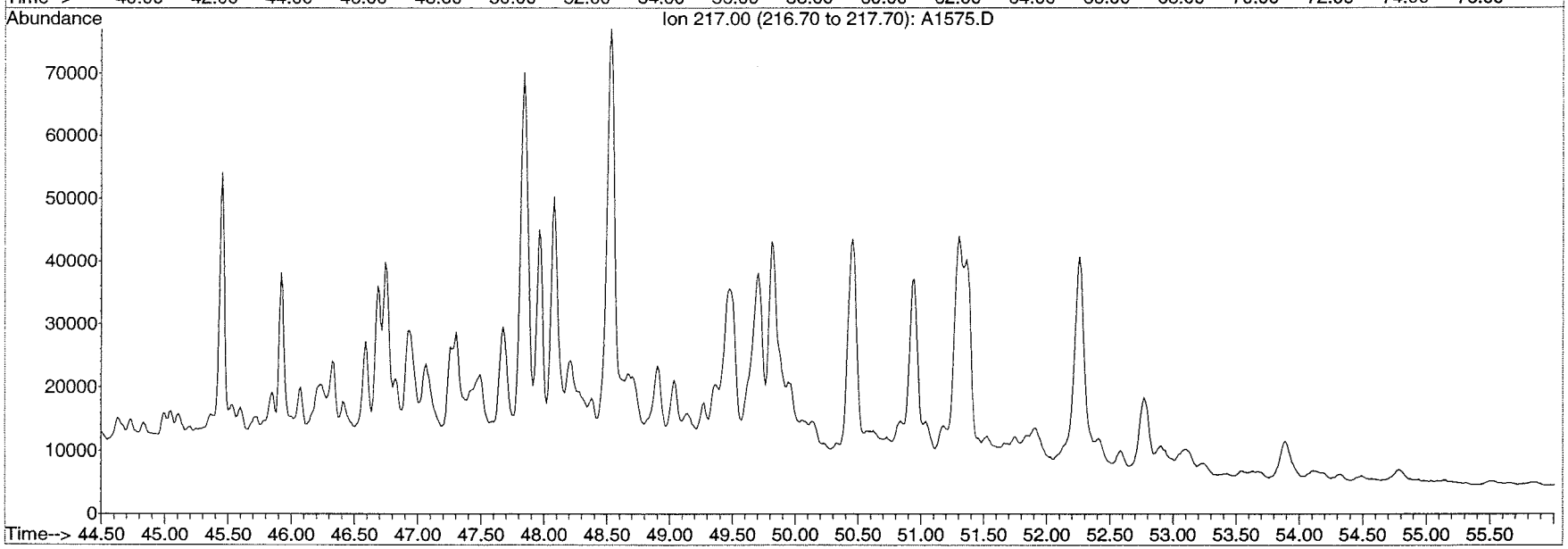
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1575.D
Date Acquired: 18 Feb 2003 11:07 pm
Method File: BIO1SIM
Sample Name: V0135-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-129-SS-0010
U0135



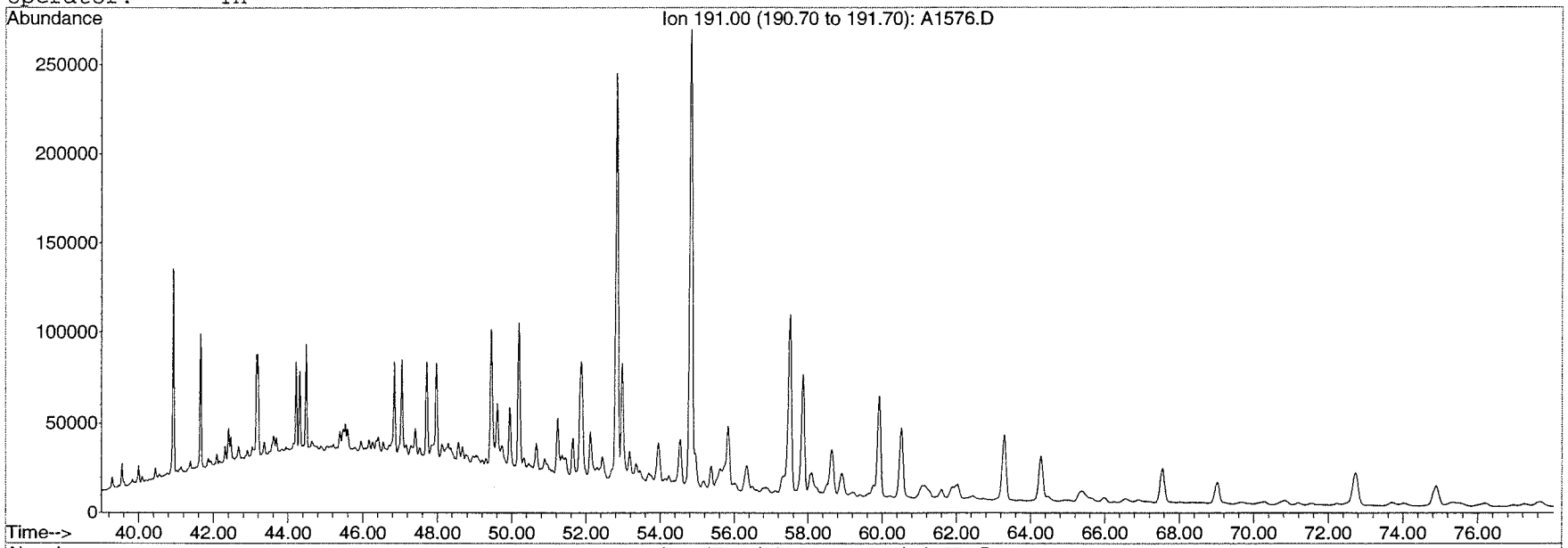


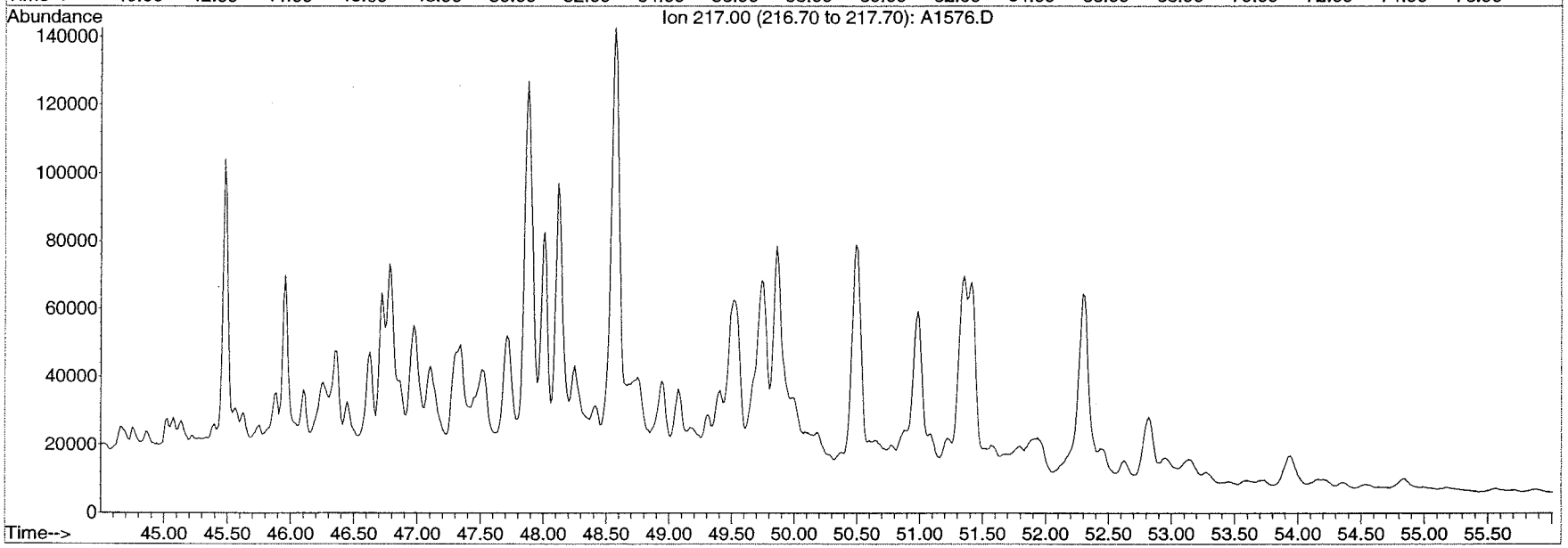
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1576.D
Date Acquired: 19 Feb 2003 12:38 am
Method File: BIO1SIM
Sample Name: V0137-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-129-SS-2030
U0137



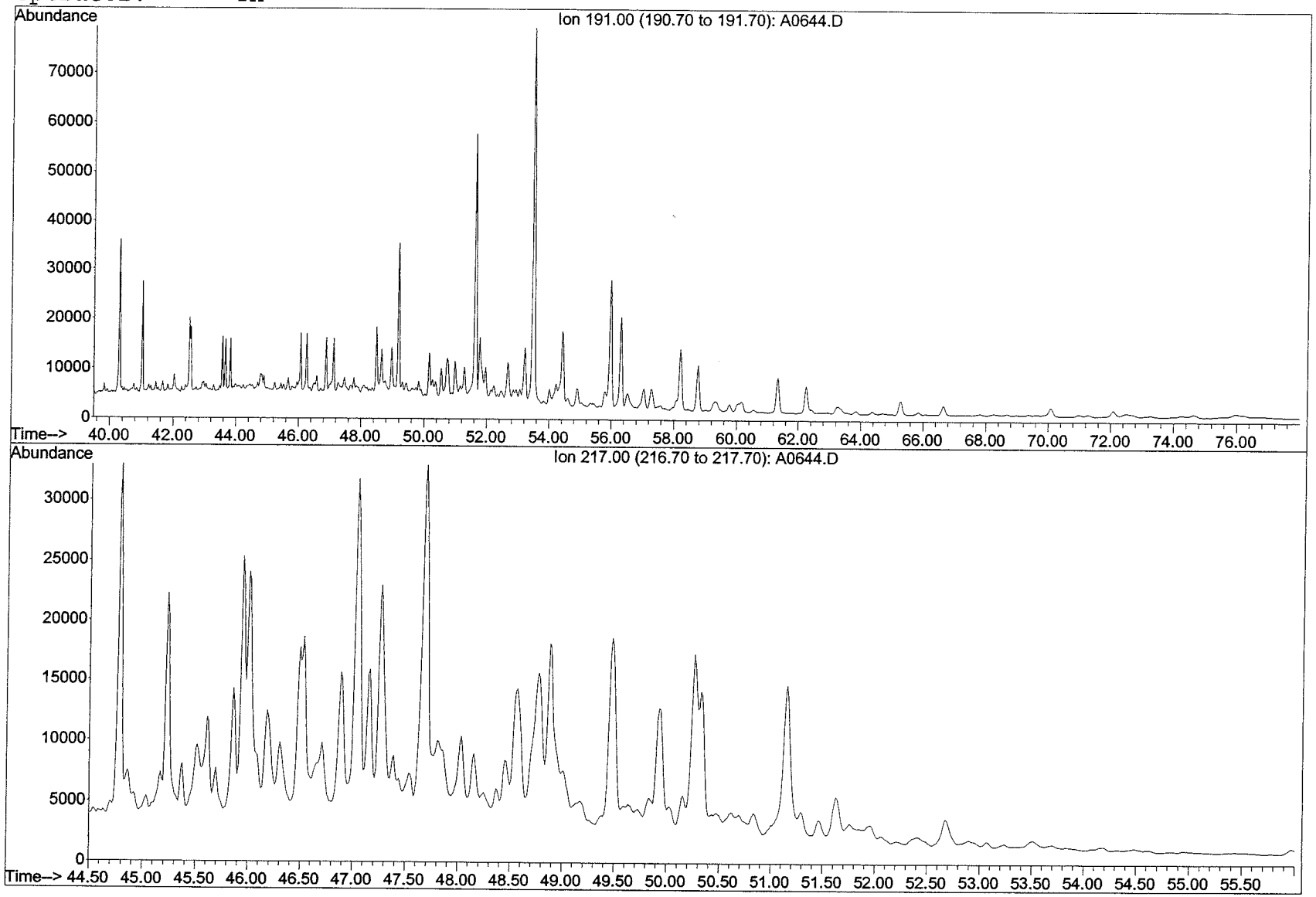


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0644.D
Date Acquired: 15 Dec 2002 4:16 pm
Method File: BIO1SIM
Sample Name: U0161-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-130-SS-0010
U0161

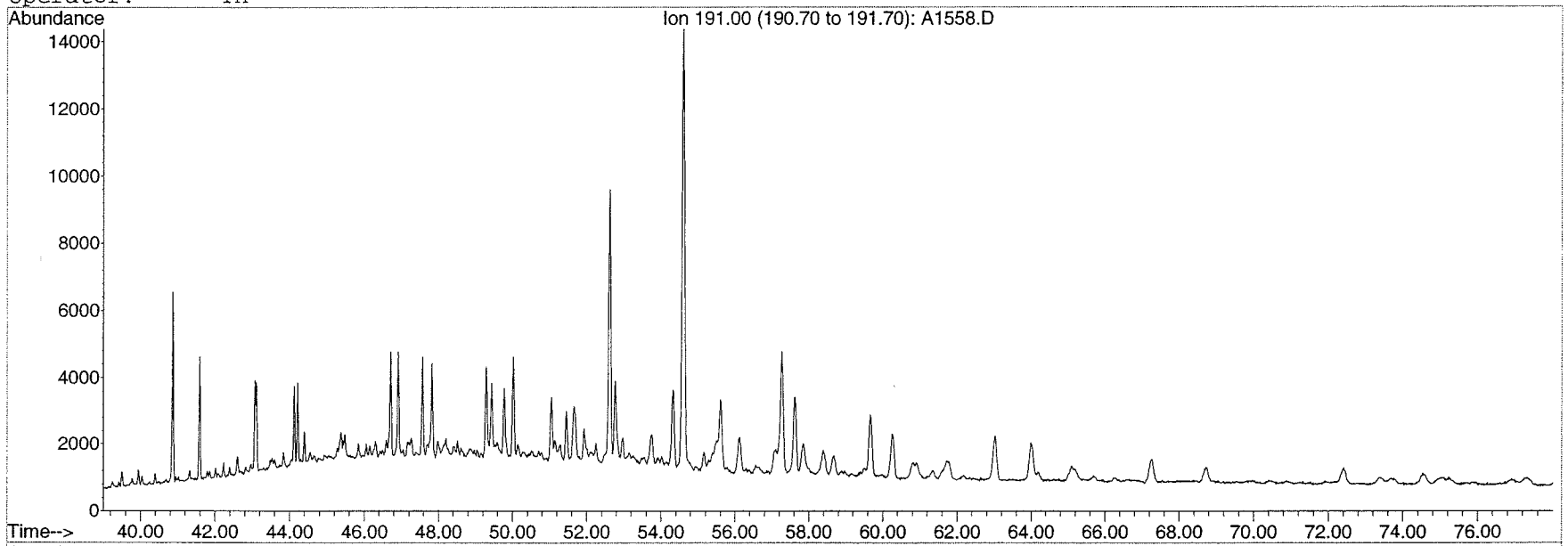


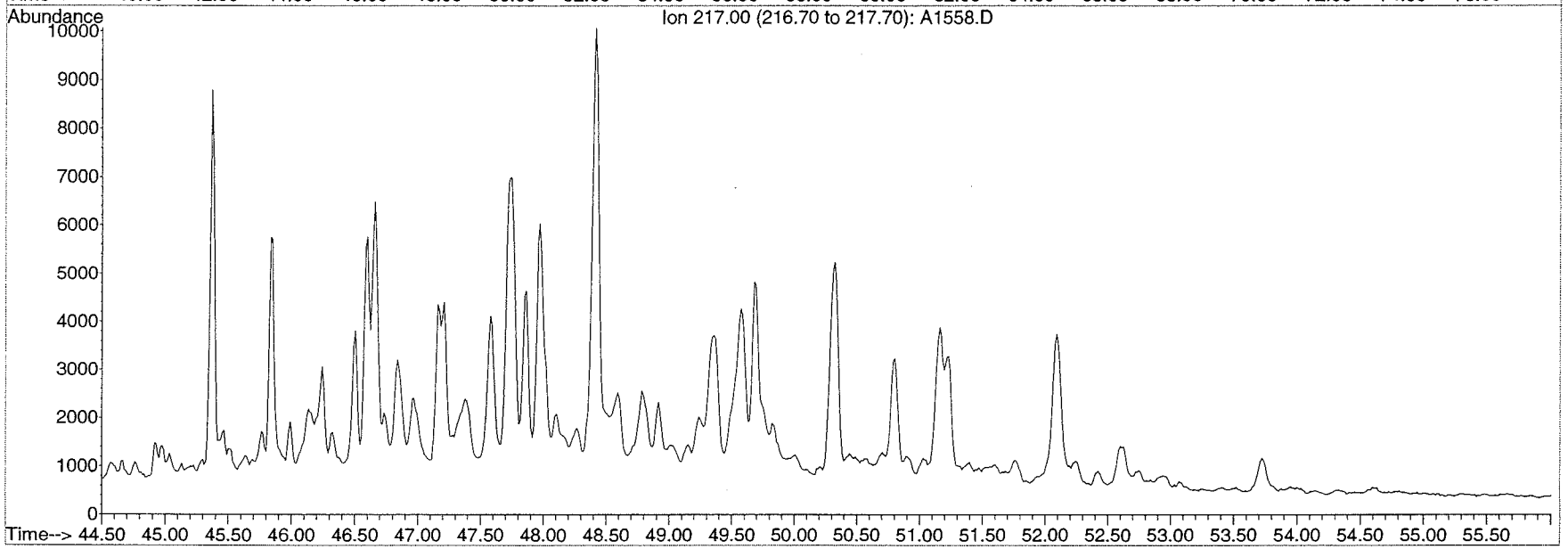
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1558.D
Date Acquired: 17 Feb 2003 9:29 pm
Method File: BIO1SIM
Sample Name: U 4518-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-131-SS-0010
U4518



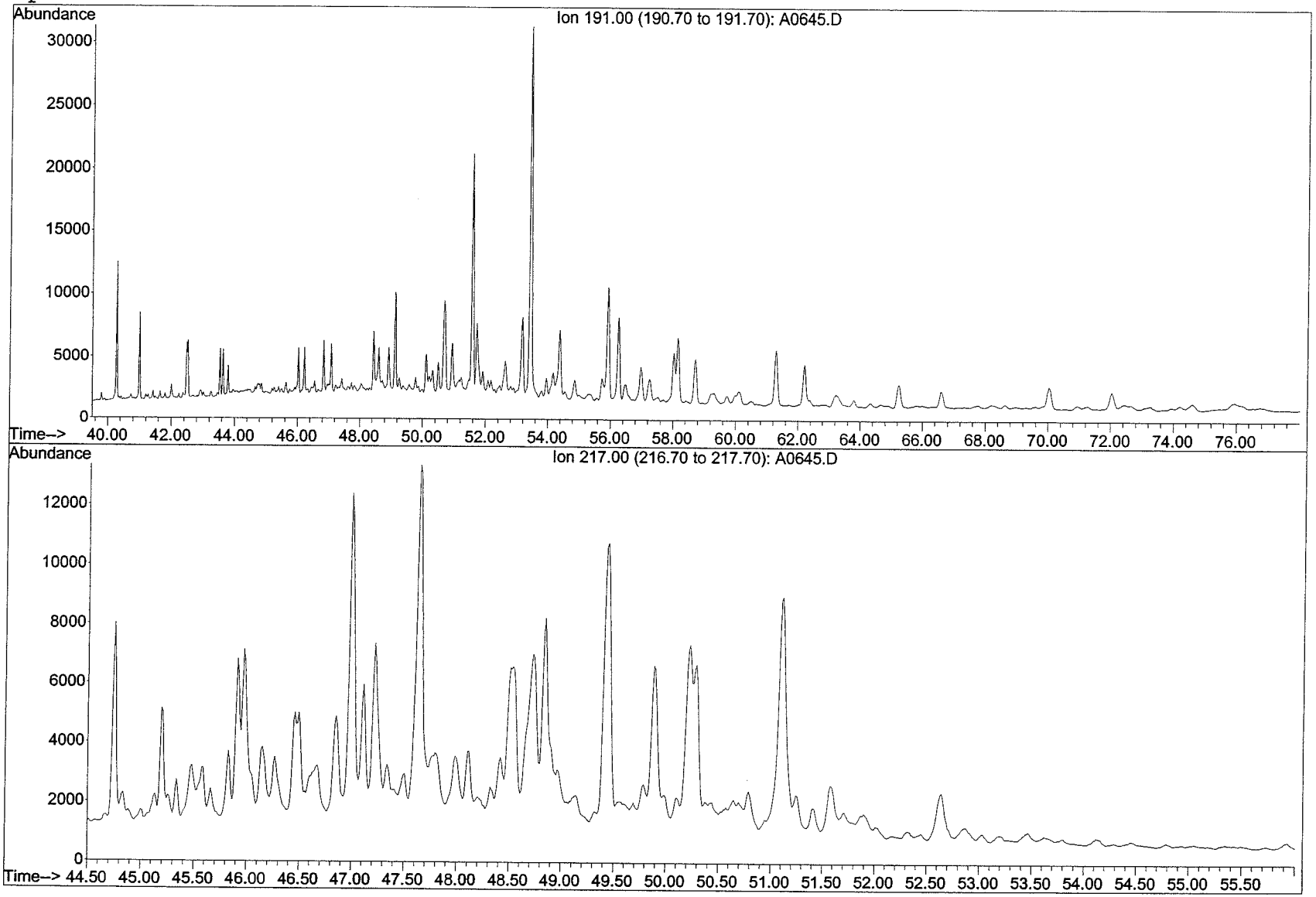


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0645.D
Date Acquired: 15 Dec 2002 5:49 pm
Method File: BIO1SIM
Sample Name: U0162-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-133-SS-0010
U0162

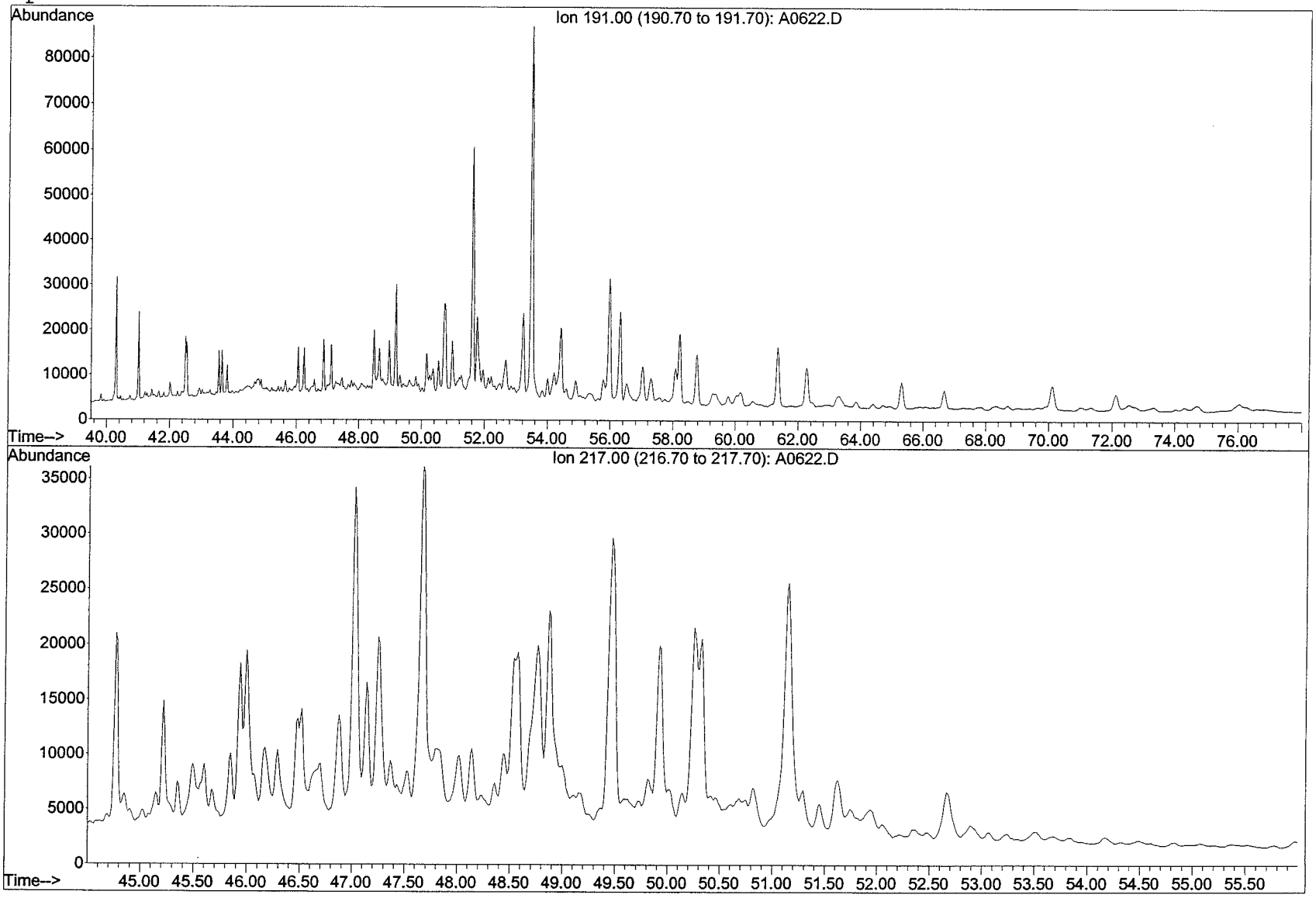


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0622.D
Date Acquired: 14 Dec 2002 4:55 am
Method File: BIO1SIM
Sample Name: U0163-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-133-SS-1020
U0163

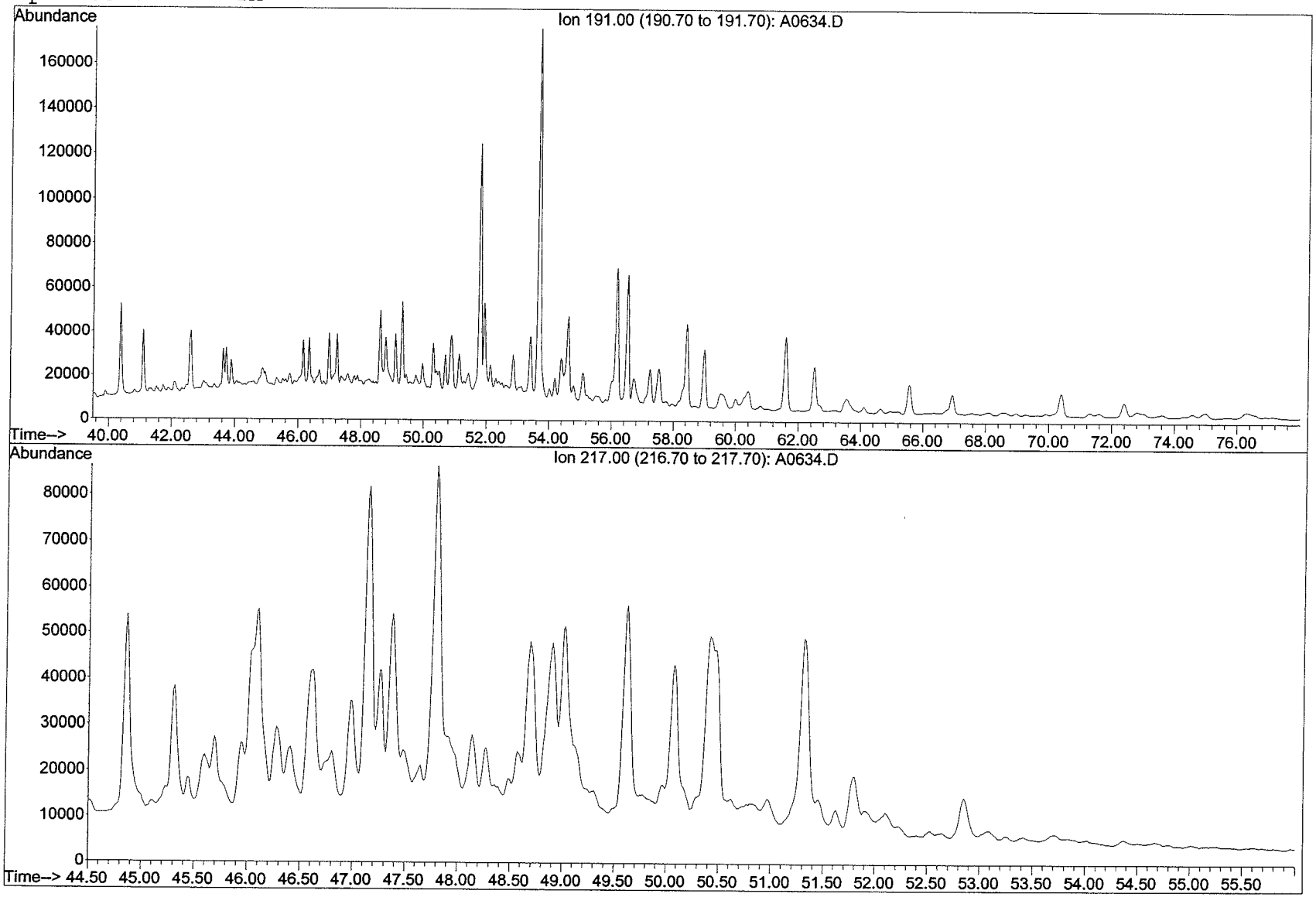


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0634.D
Date Acquired: 15 Dec 2002 12:20 am
Method File: BIO1SIM
Sample Name: U0172-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
NLU-136-SS-0010
U0172

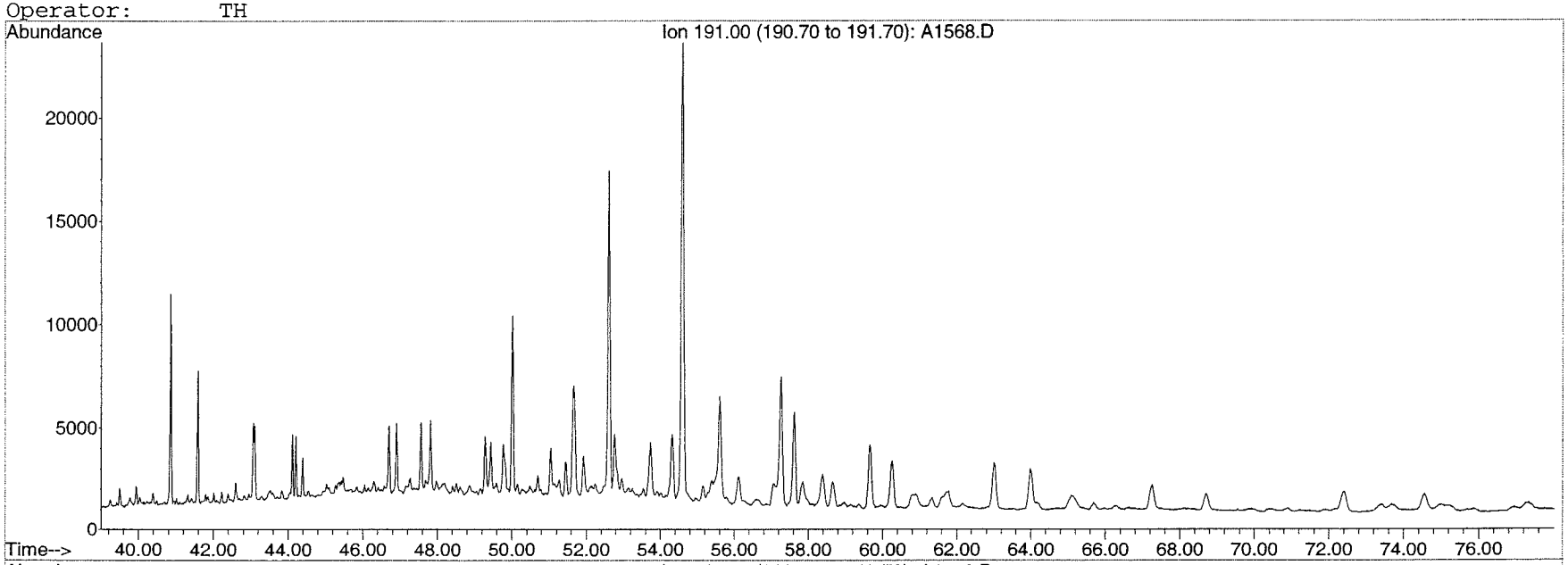


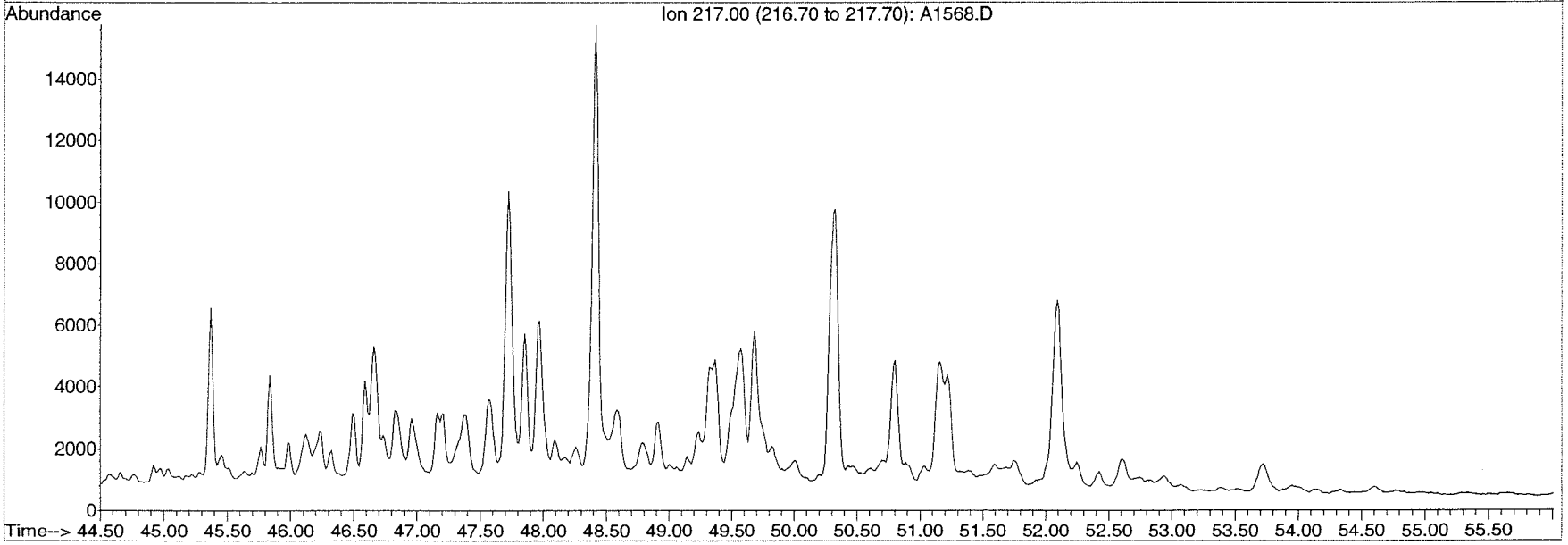
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1568.D
Date Acquired: 18 Feb 2003 12:39 pm
Method File: BIO1SIM
Sample Name: U 4514-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
DW-5-1202
U4514



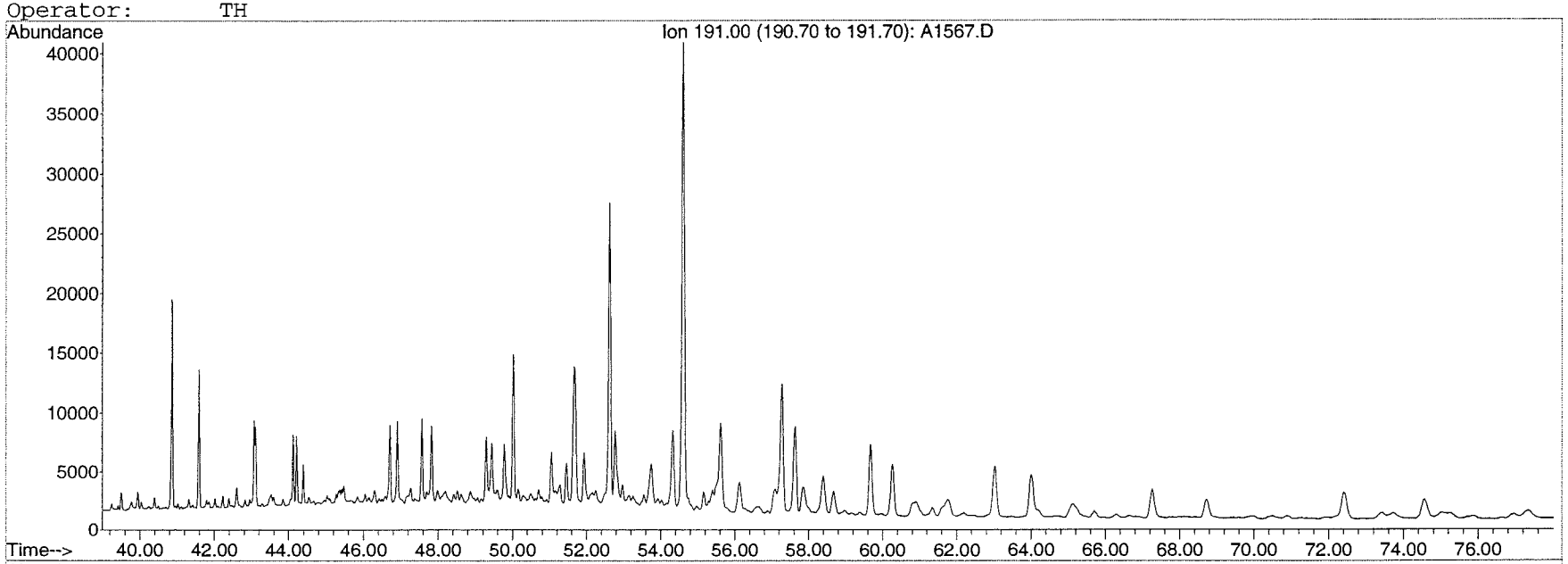


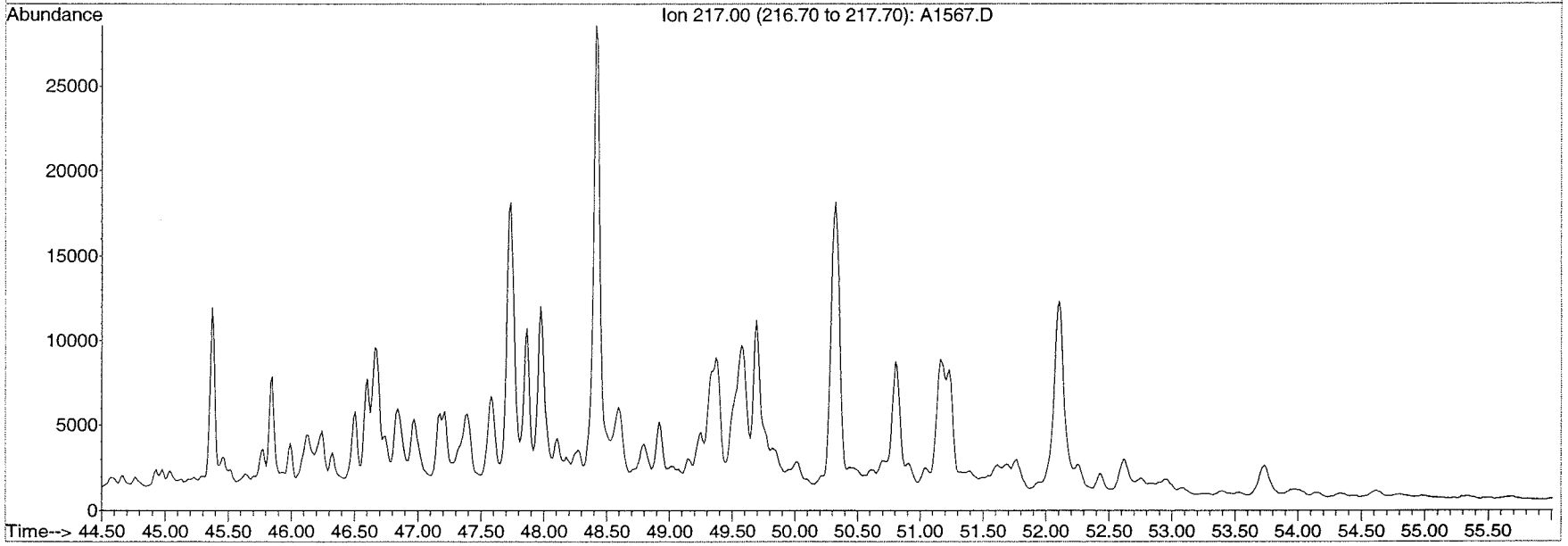
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1567.D
Date Acquired: 18 Feb 2003 11:10 am
Method File: BIO1SIM
Sample Name: U 3754-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
MW-5 Product(T190)
U3754



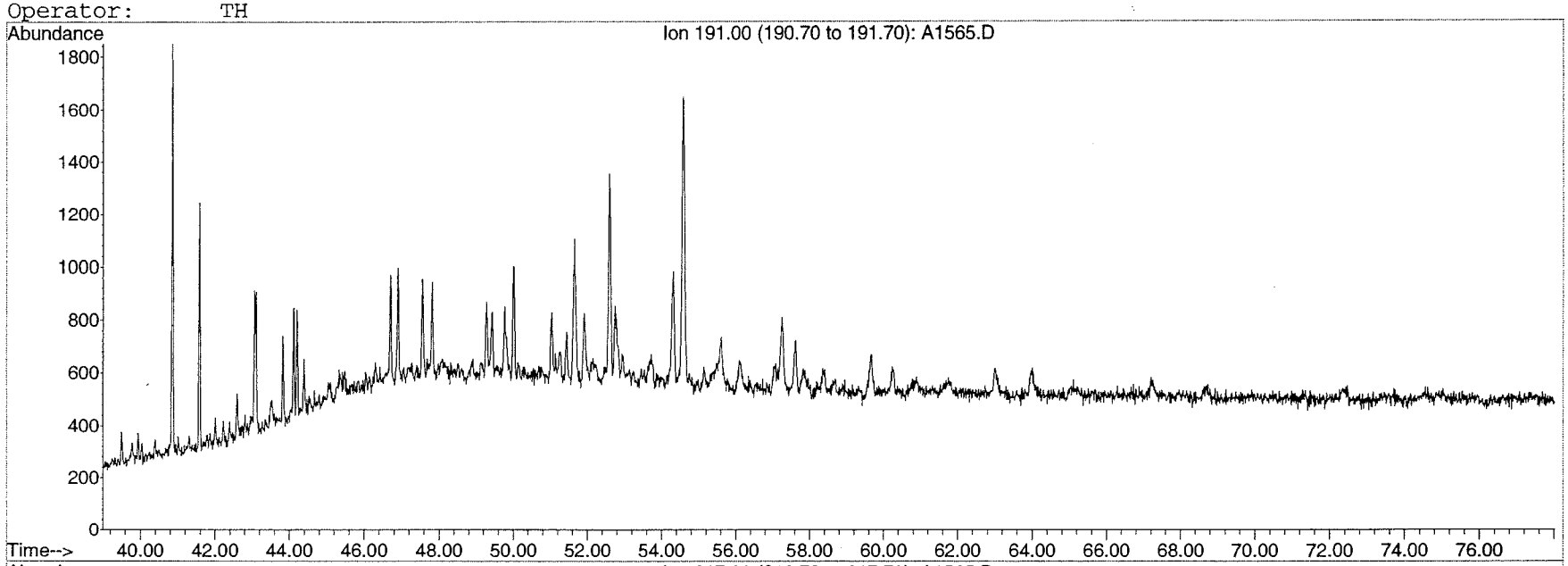


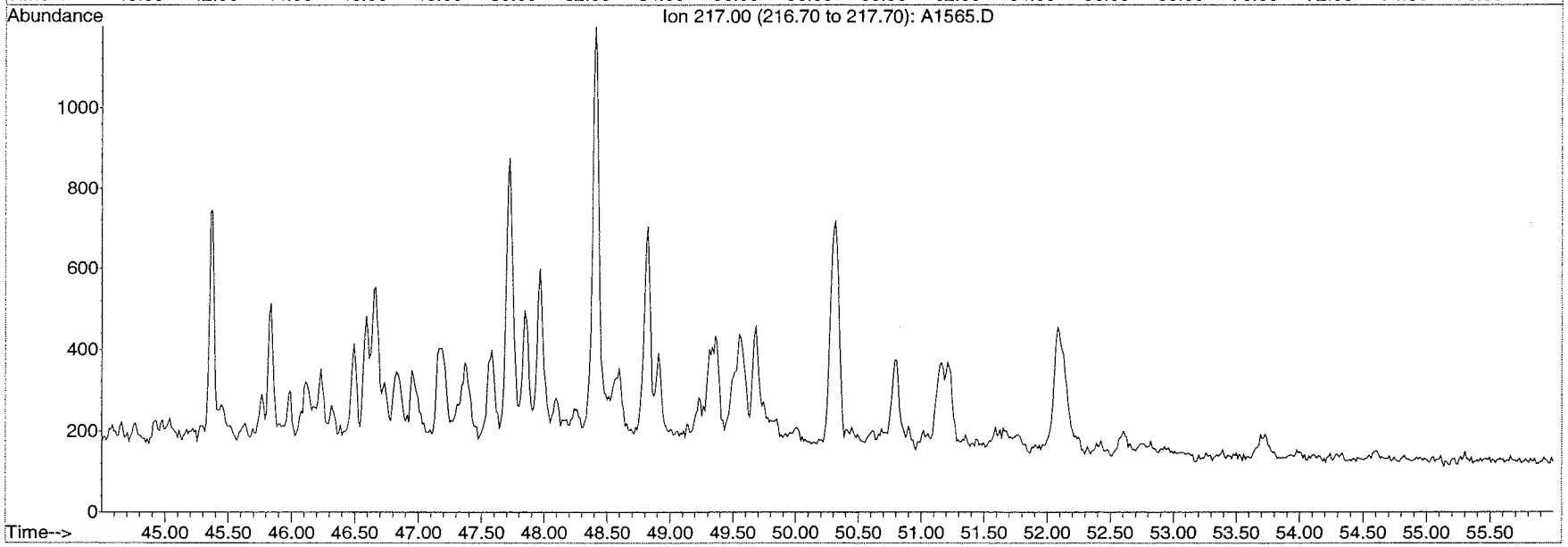
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1565.D
Date Acquired: 18 Feb 2003 8:08 am
Method File: BIO1SIM
Sample Name: U3752-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
GWP Tank (T192)
U3752



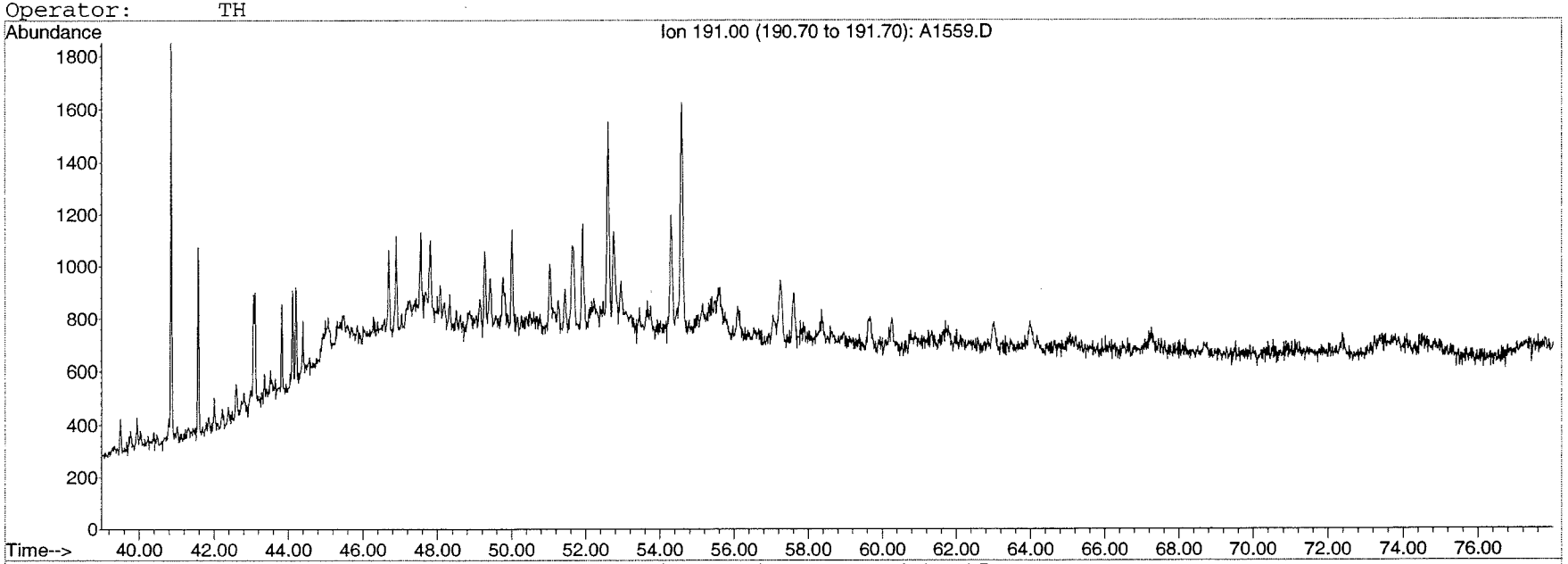


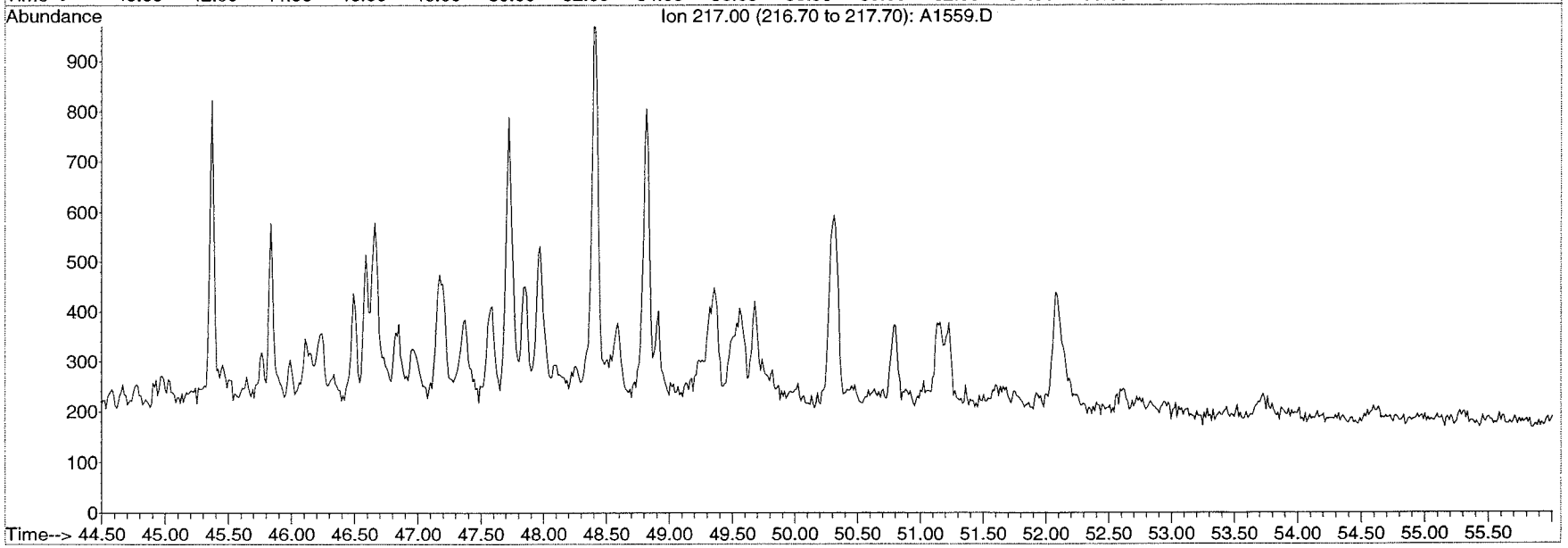
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1559.D
Date Acquired: 17 Feb 2003 11:00 pm
Method File: BIO1SIM
Sample Name: U4515-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
SS-1-1202
U4515



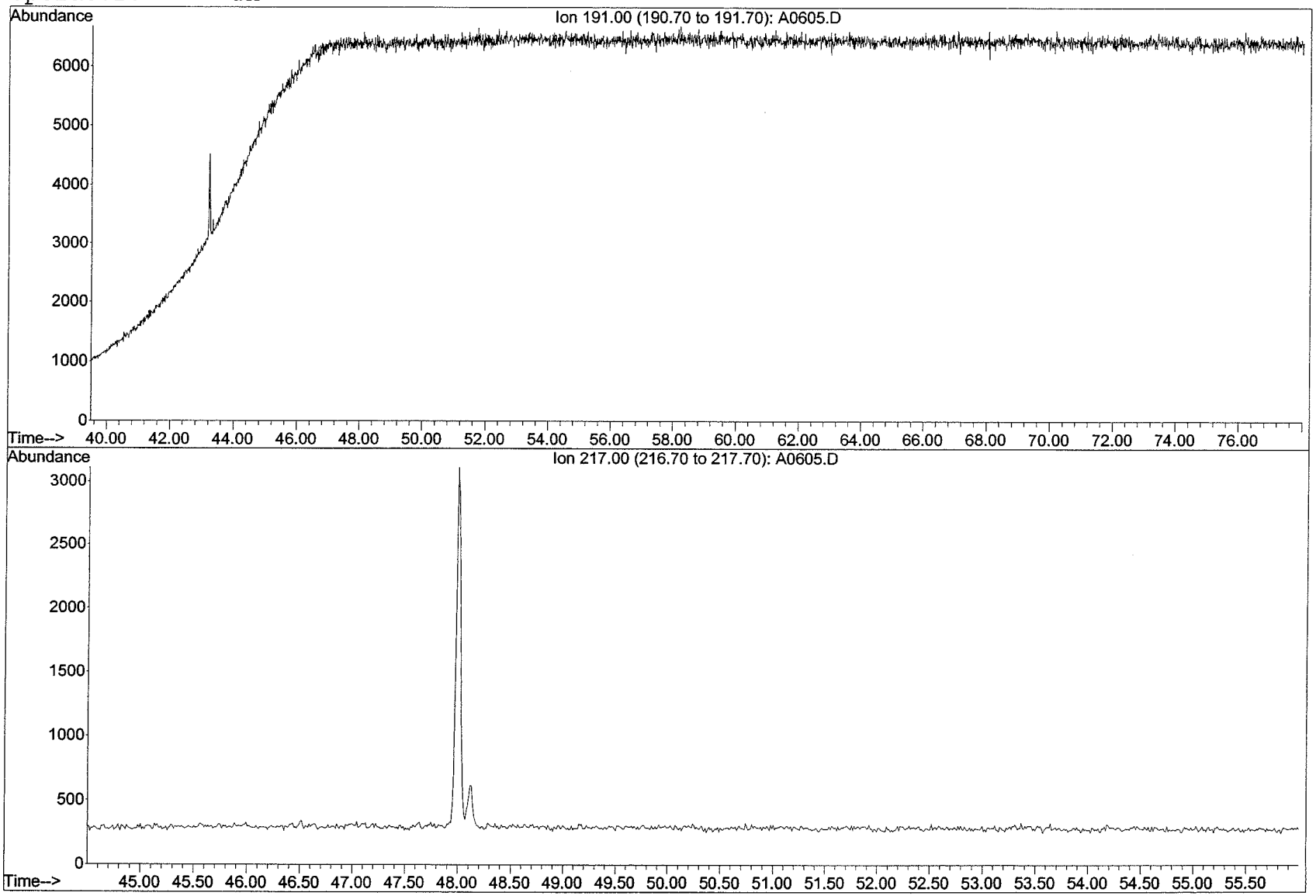


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0605.D
Date Acquired: 13 Dec 2002 2:34 am
Method File: BIO1SIM
Sample Name: AB484PB-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
AB484PB

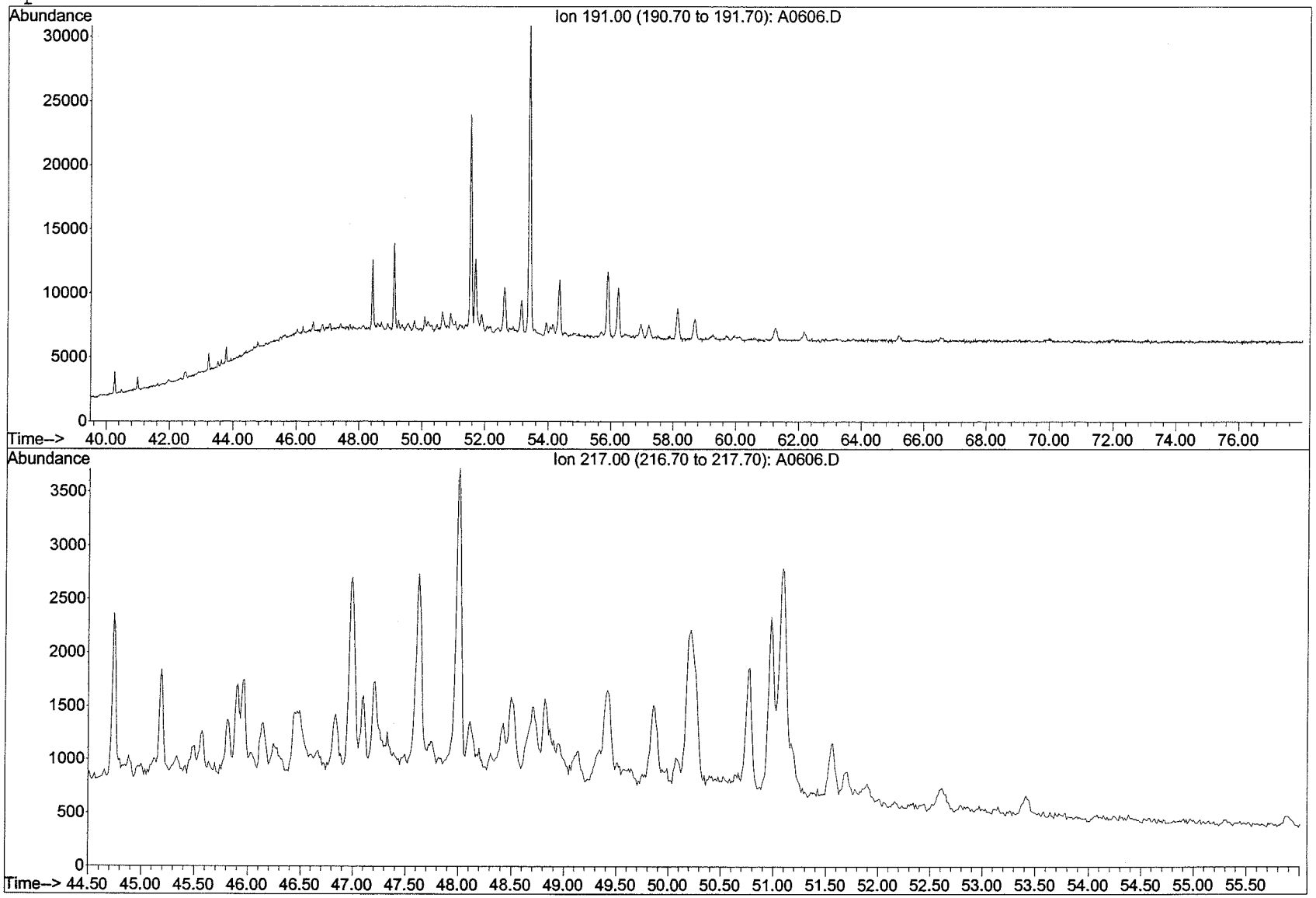


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0606.D
Date Acquired: 13 Dec 2002 4:10 am
Method File: BIO1SIM
Sample Name: AB485PB-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
AB485PB

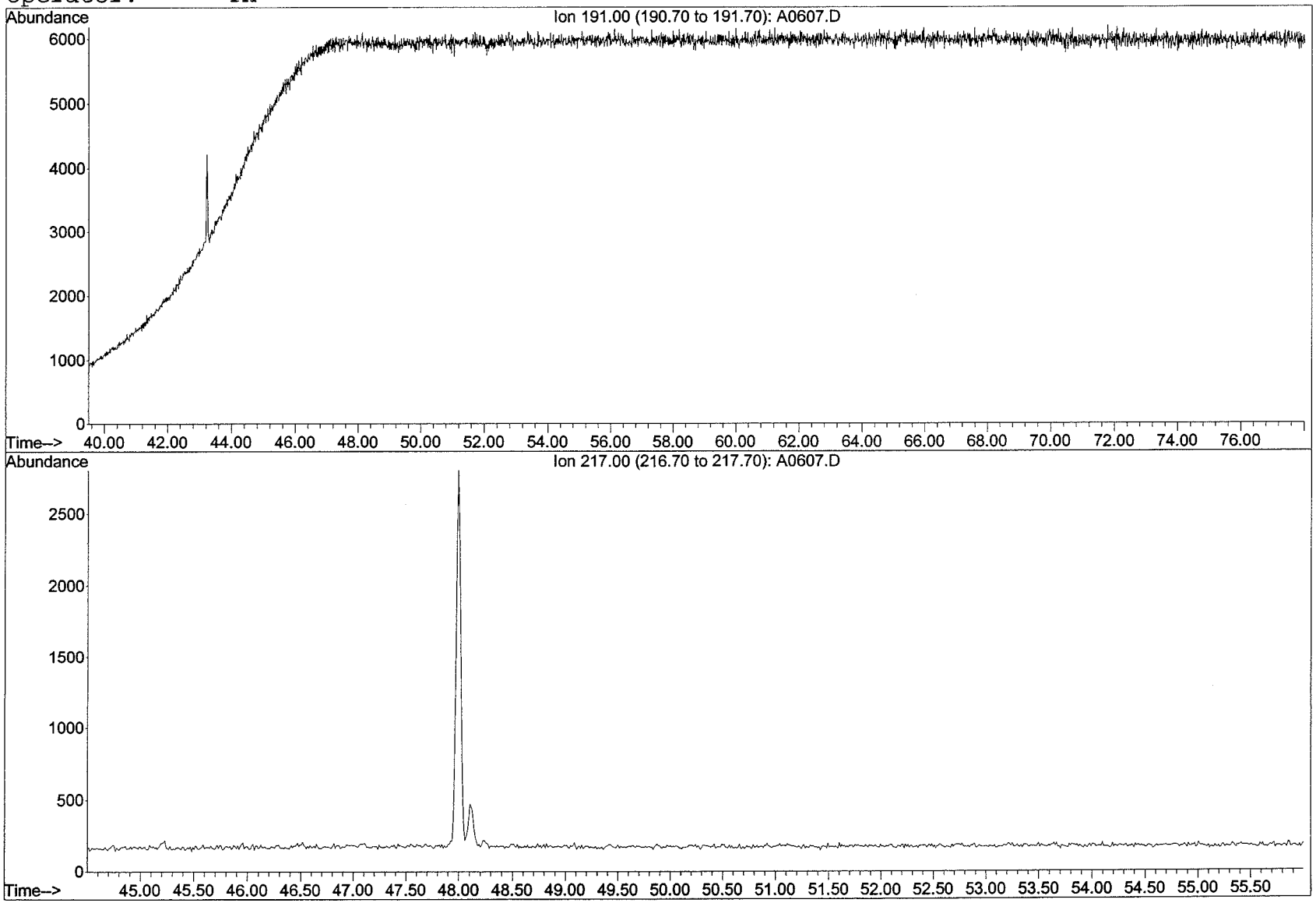


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0607.D
Date Acquired: 13 Dec 2002 5:44 am
Method File: BIO1SIM
Sample Name: AB486LCS-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
AB486LCS

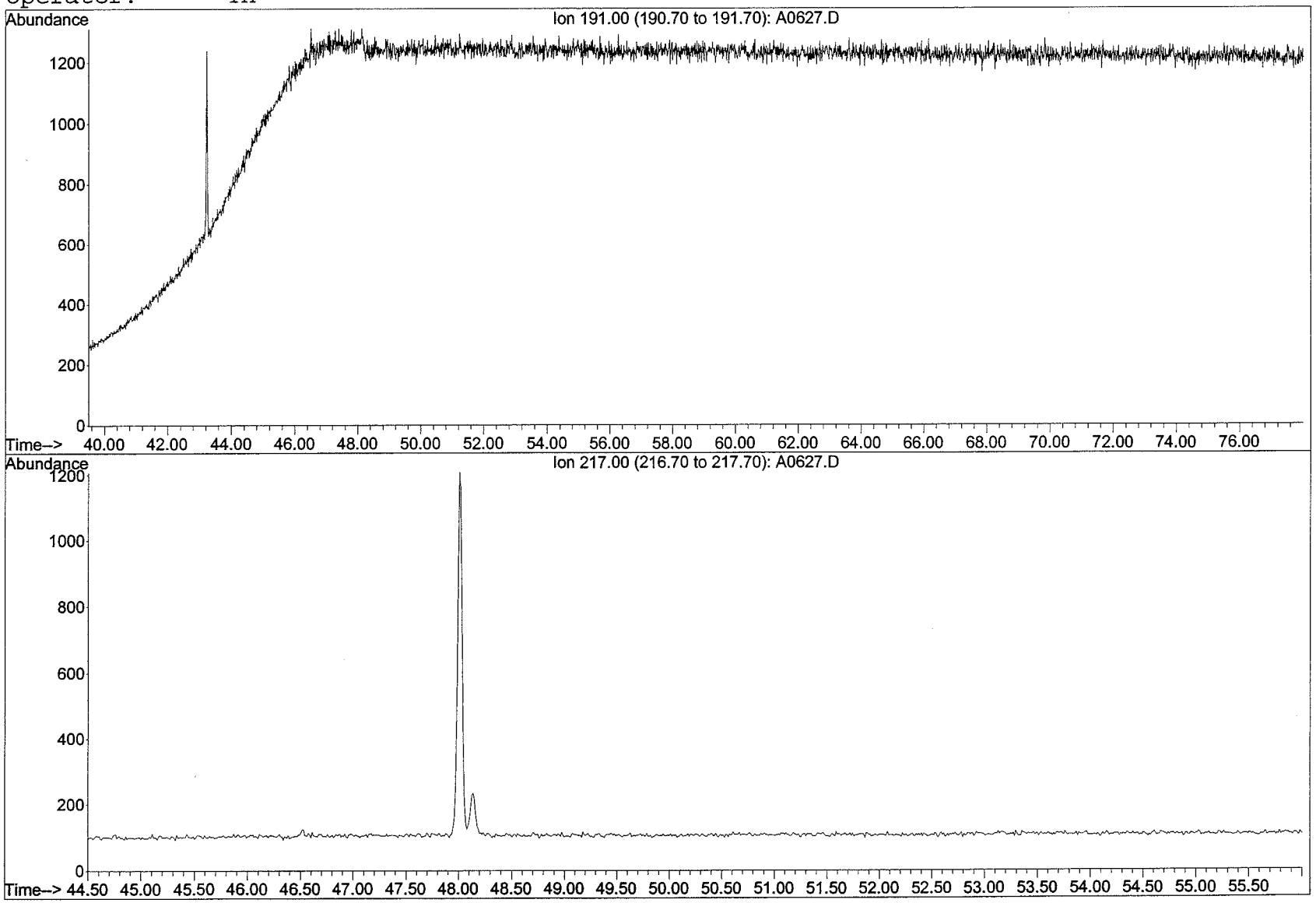


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0627.D
Date Acquired: 14 Dec 2002 12:58 pm
Method File: BIO1SIM
Sample Name: AB489PB-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
AB489PB

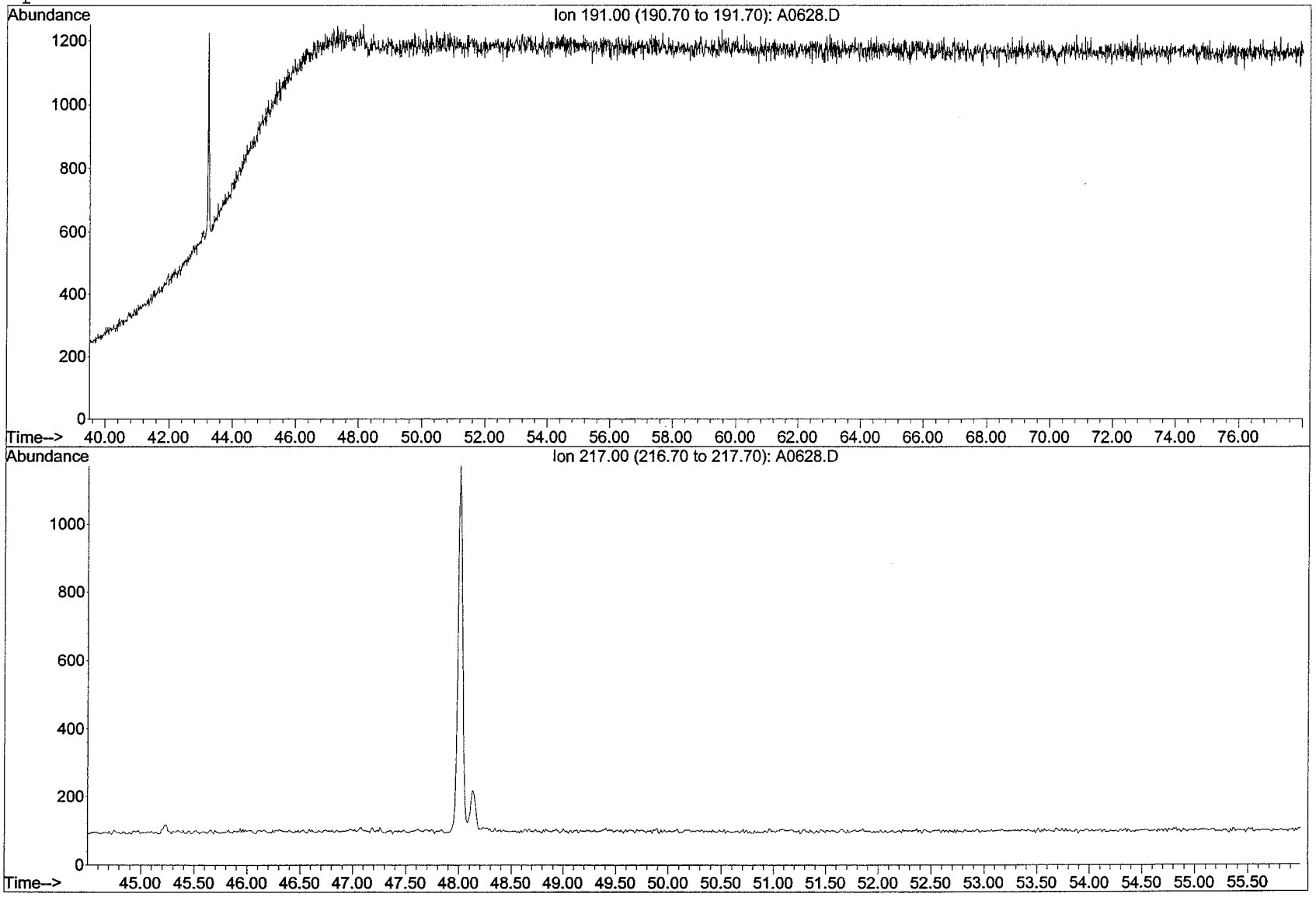


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: Q:\A\DATA\SQA319\A0628.D
Date Acquired: 14 Dec 2002 2:33 pm
Method File: BIO1SIM
Sample Name: AB490LCS-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
AB490LCS

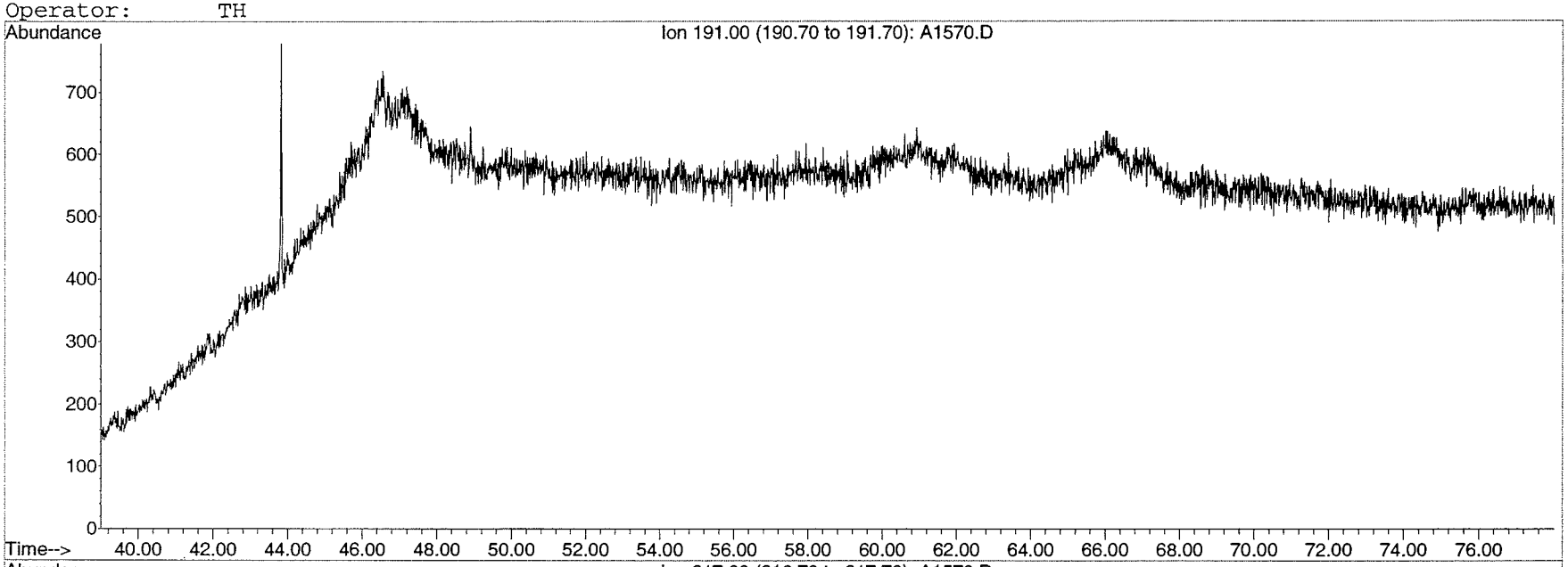


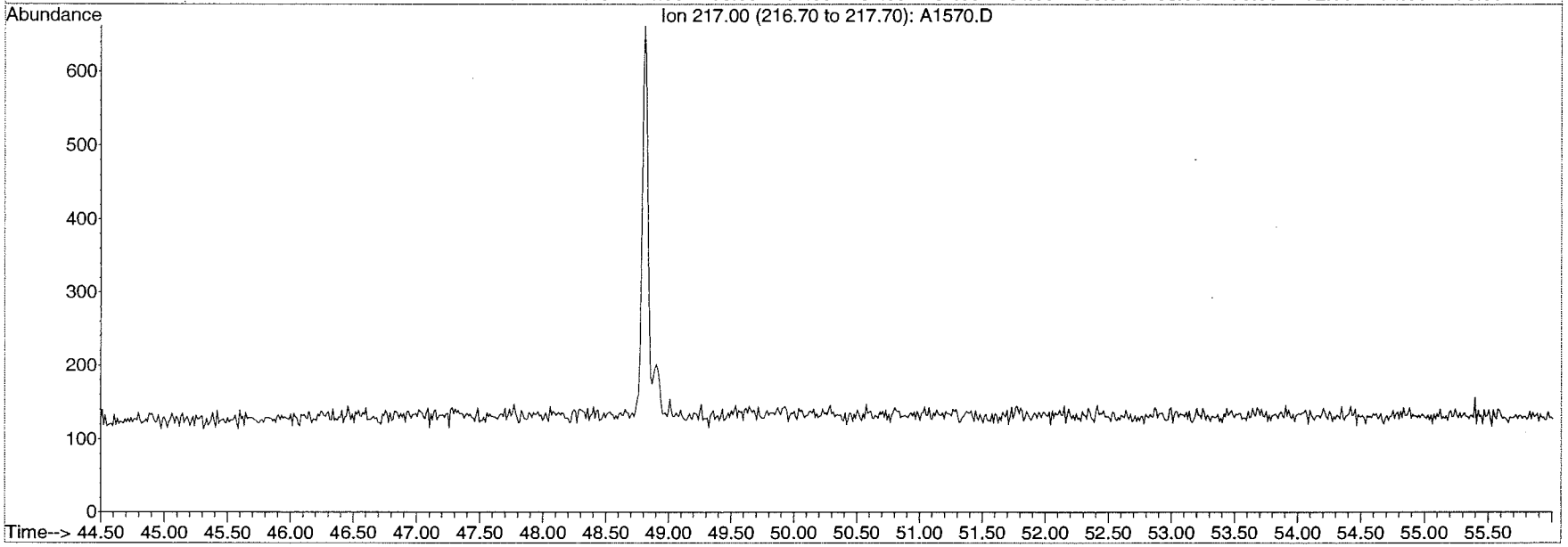
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1570.D
Date Acquired: 18 Feb 2003 3:38 pm
Method File: BIO1SIM
Sample Name: AB851PB
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
AB851PB



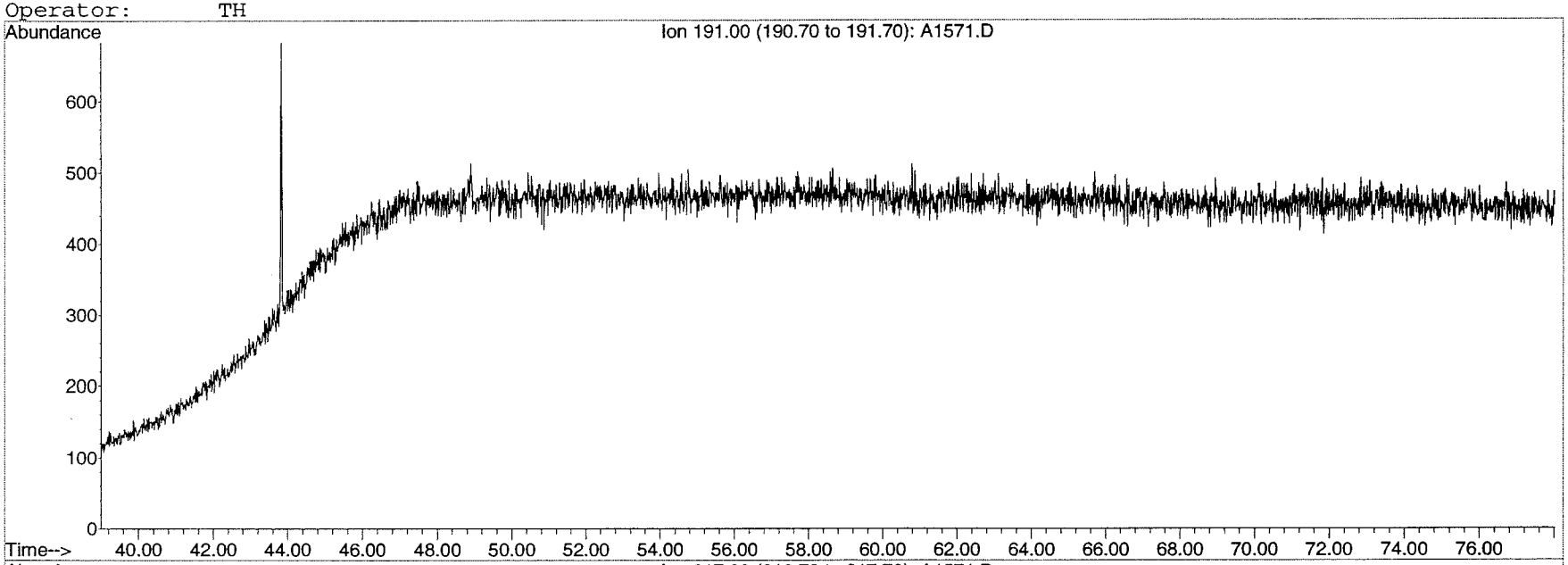


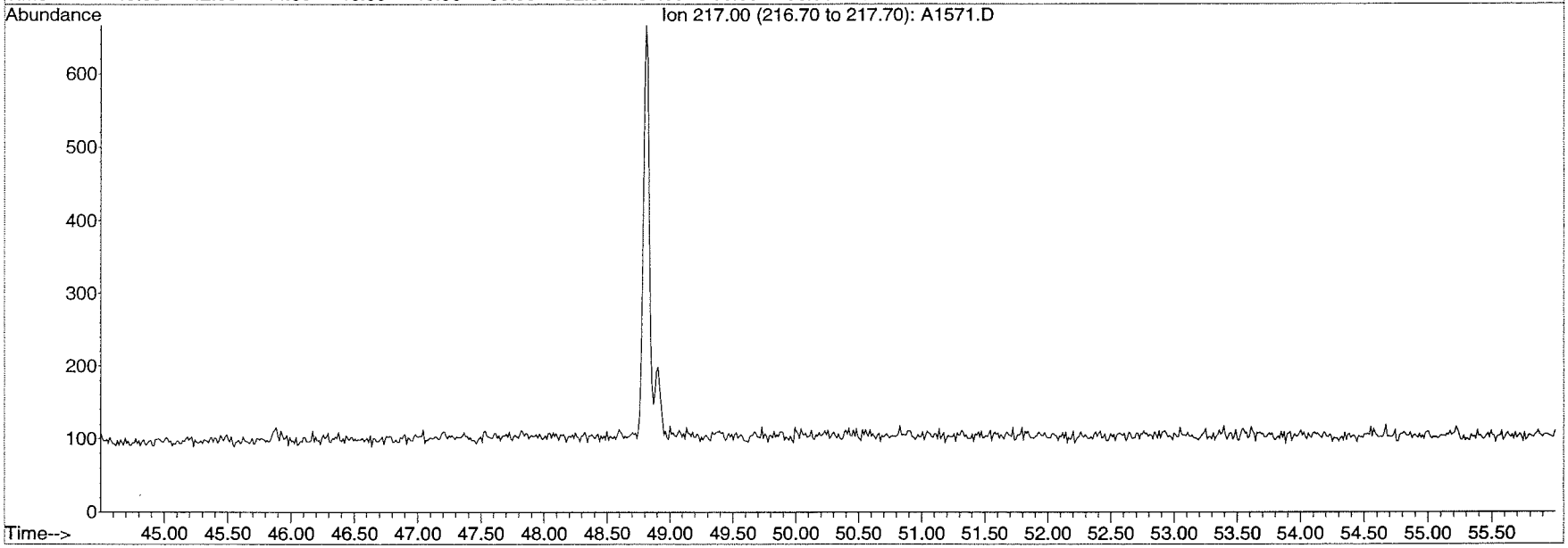
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1571.D
Date Acquired: 18 Feb 2003 5:07 pm
Method File: BIO1SIM
Sample Name: AB852LCS
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
AB852LCS



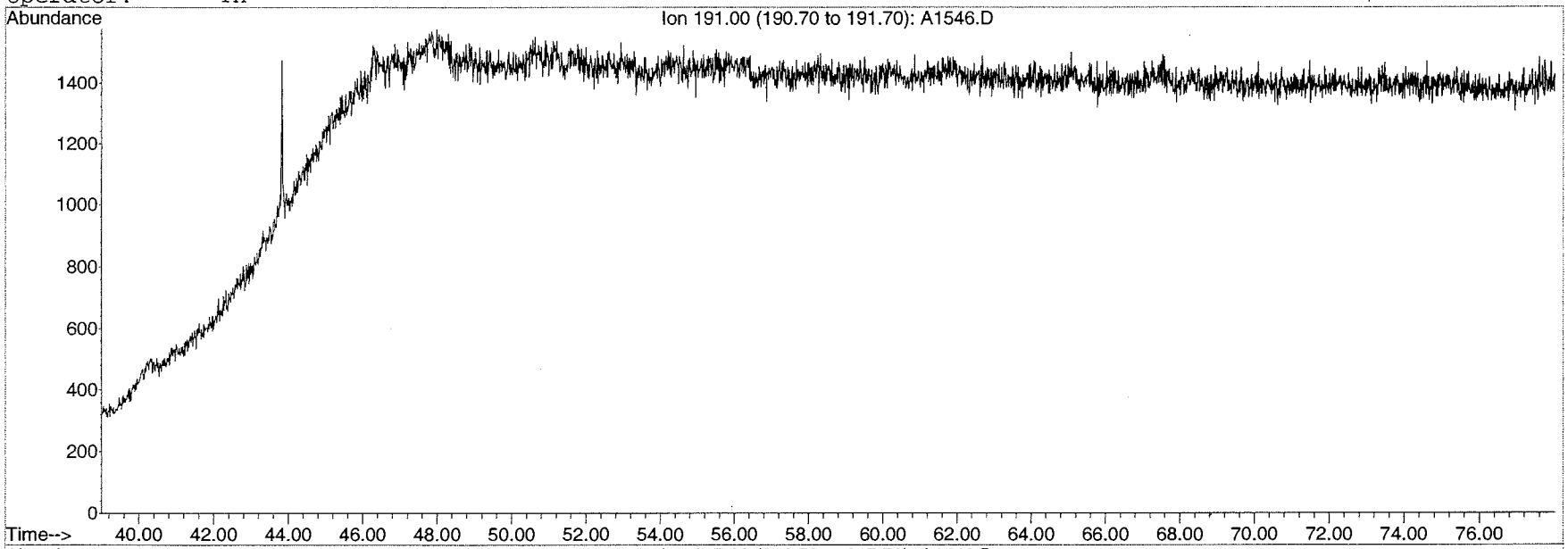


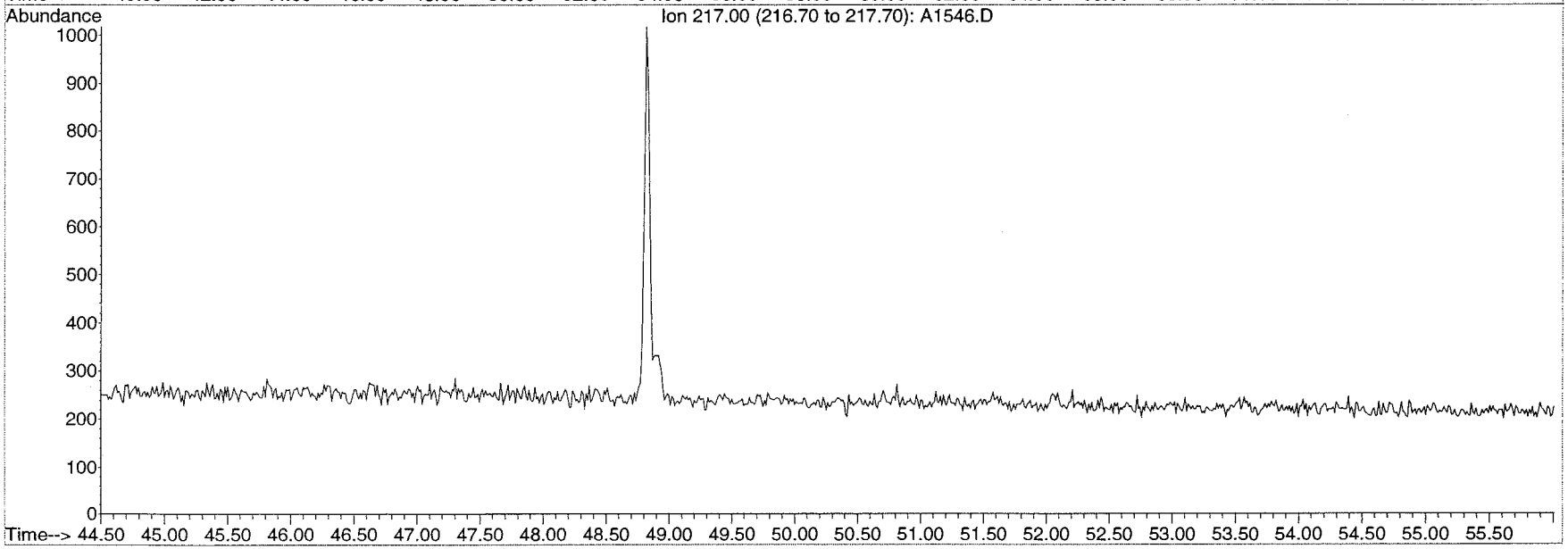
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1546.D
Date Acquired: 17 Feb 2003 3:32 am
Method File: BIO1SIM
Sample Name: BB142PB-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB142PB



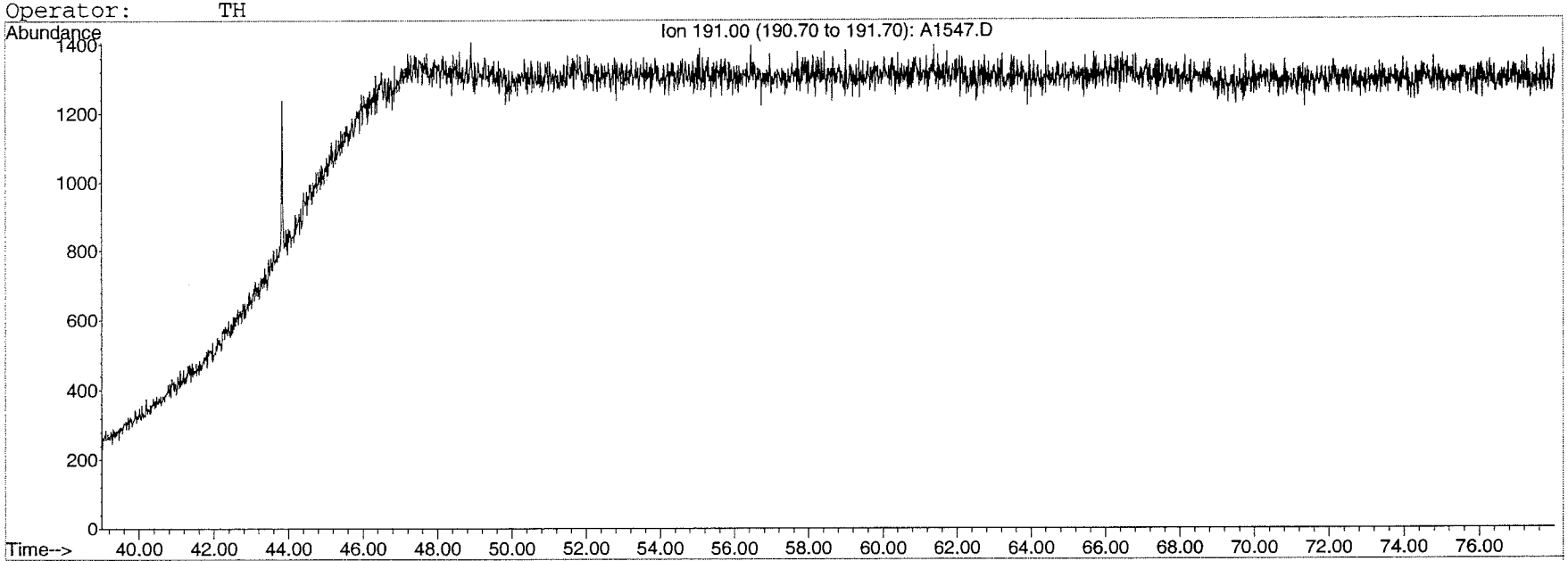


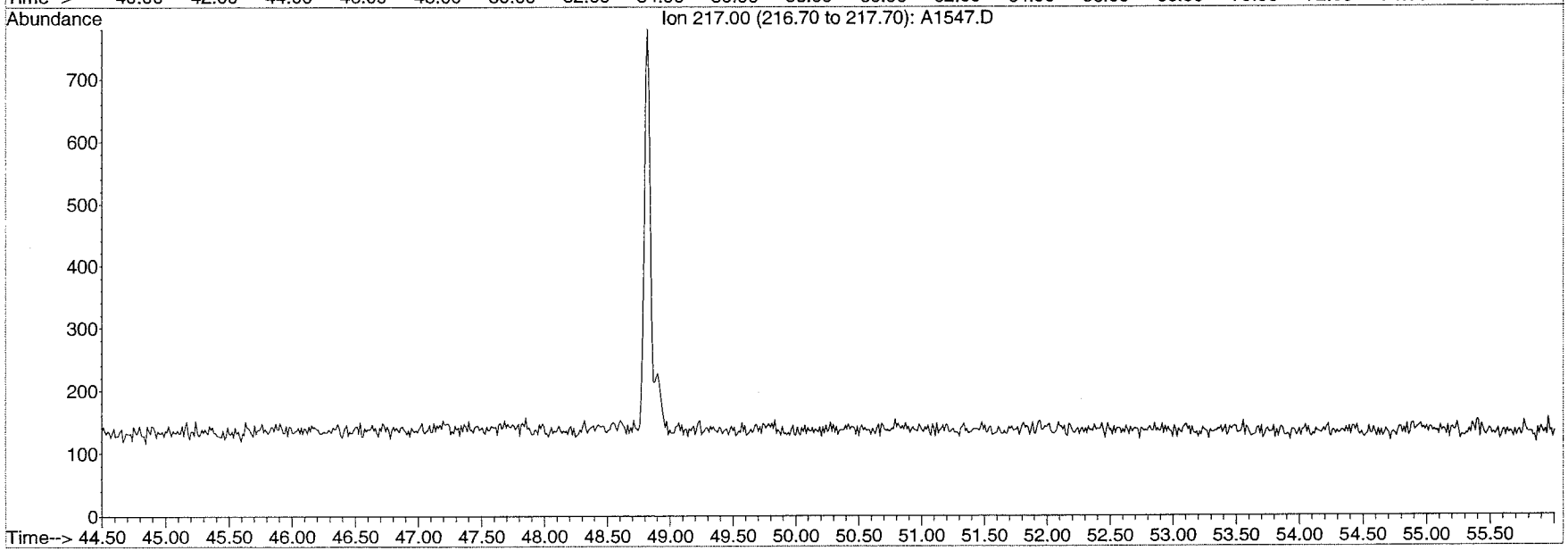
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1547.D
Date Acquired: 17 Feb 2003 5:02 am
Method File: BIO1SIM
Sample Name: BB143LCS-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB143LCS



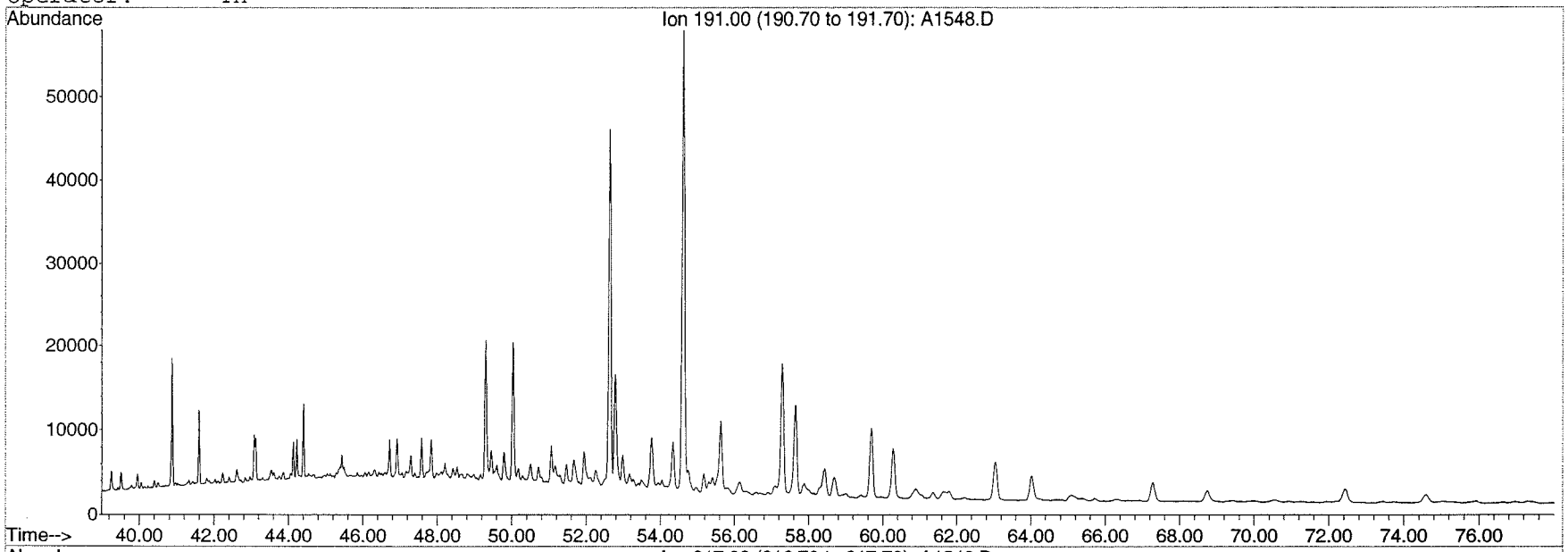


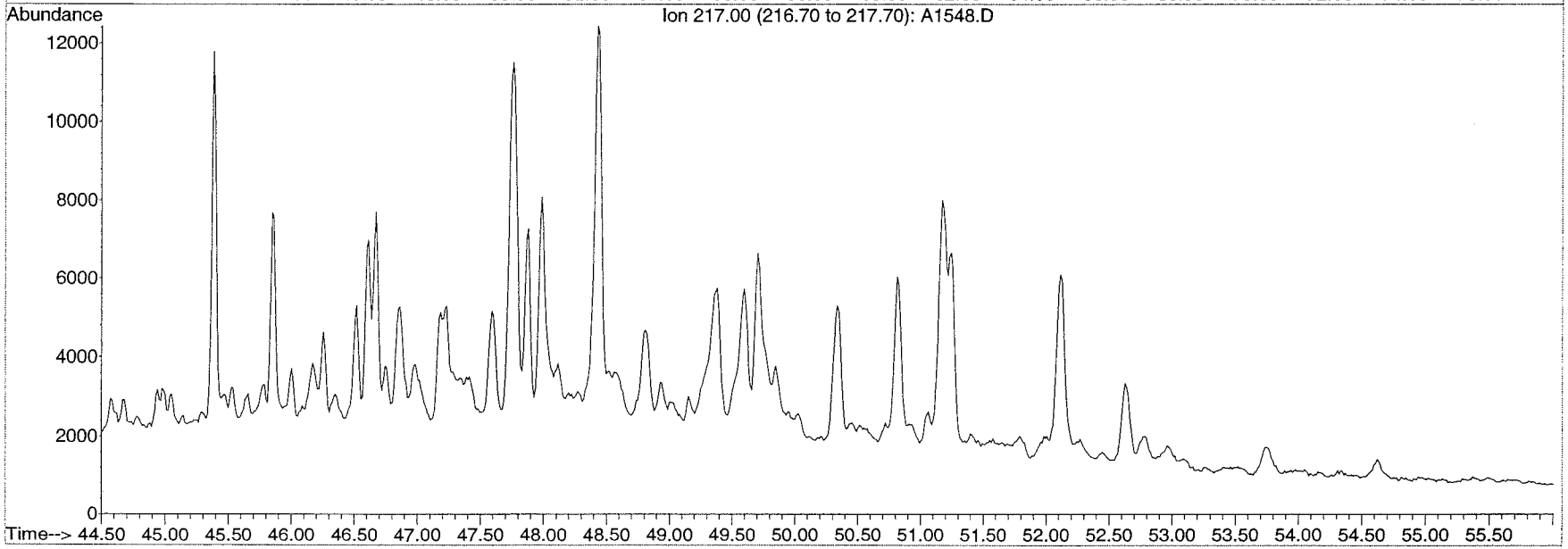
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1548.D
Date Acquired: 17 Feb 2003 6:33 am
Method File: BIO1SIM
Sample Name: BB144SRM-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Standard Reference Material (NIST 1944)
BB144SRM



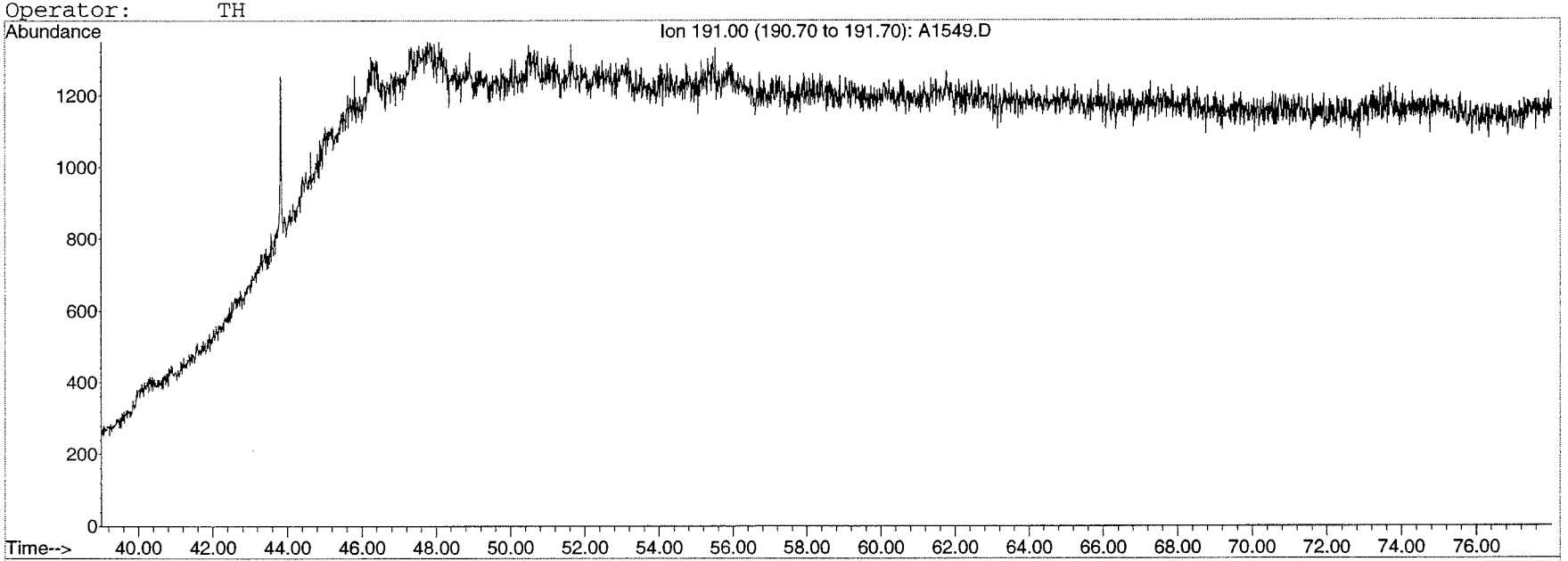


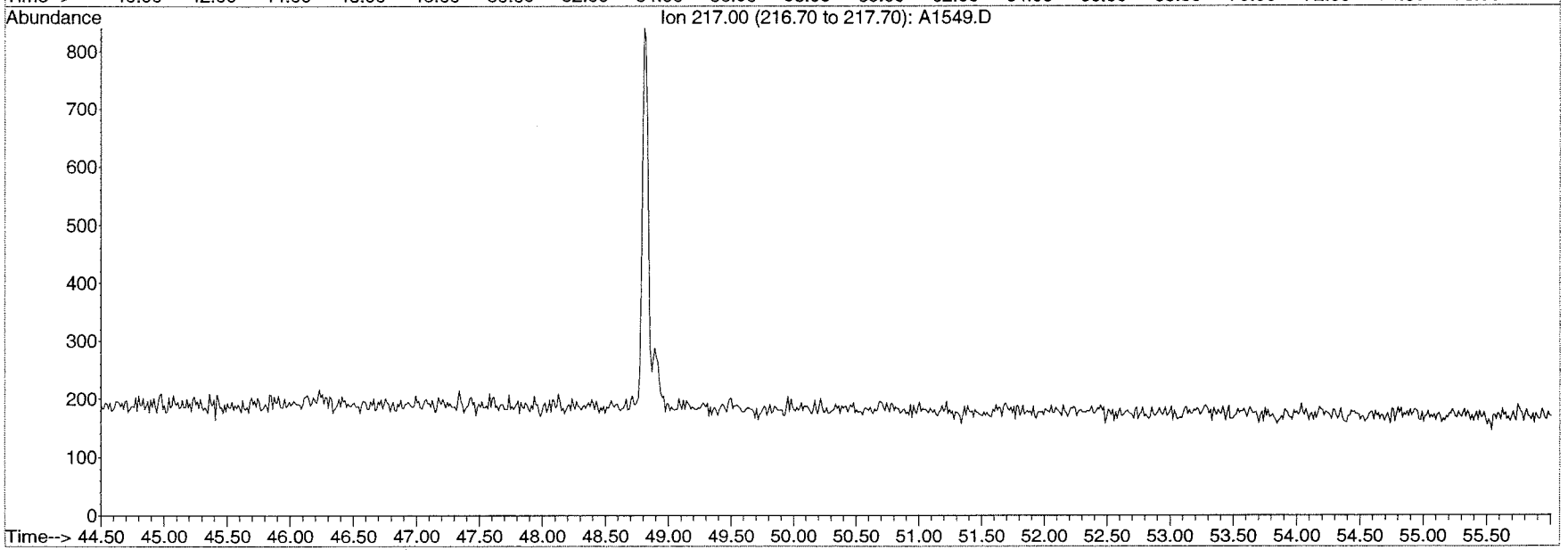
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1549.D
Date Acquired: 17 Feb 2003 8:01 am
Method File: BIO1SIM
Sample Name: BB146PB-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB146PB



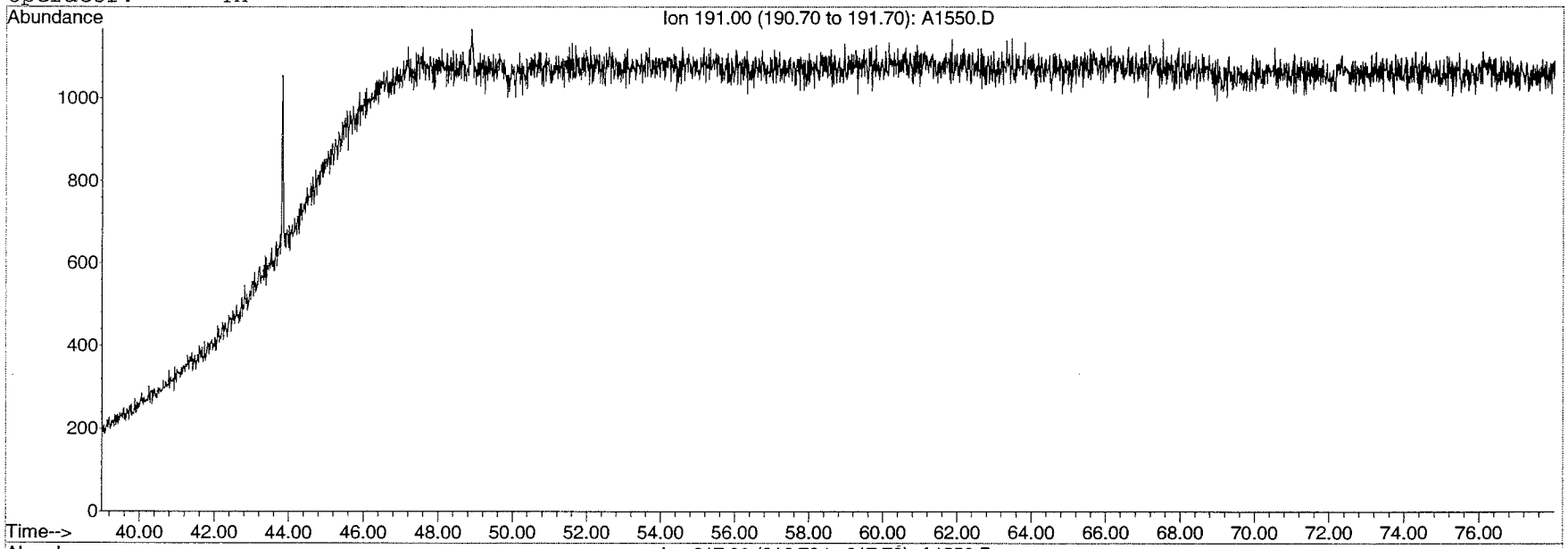


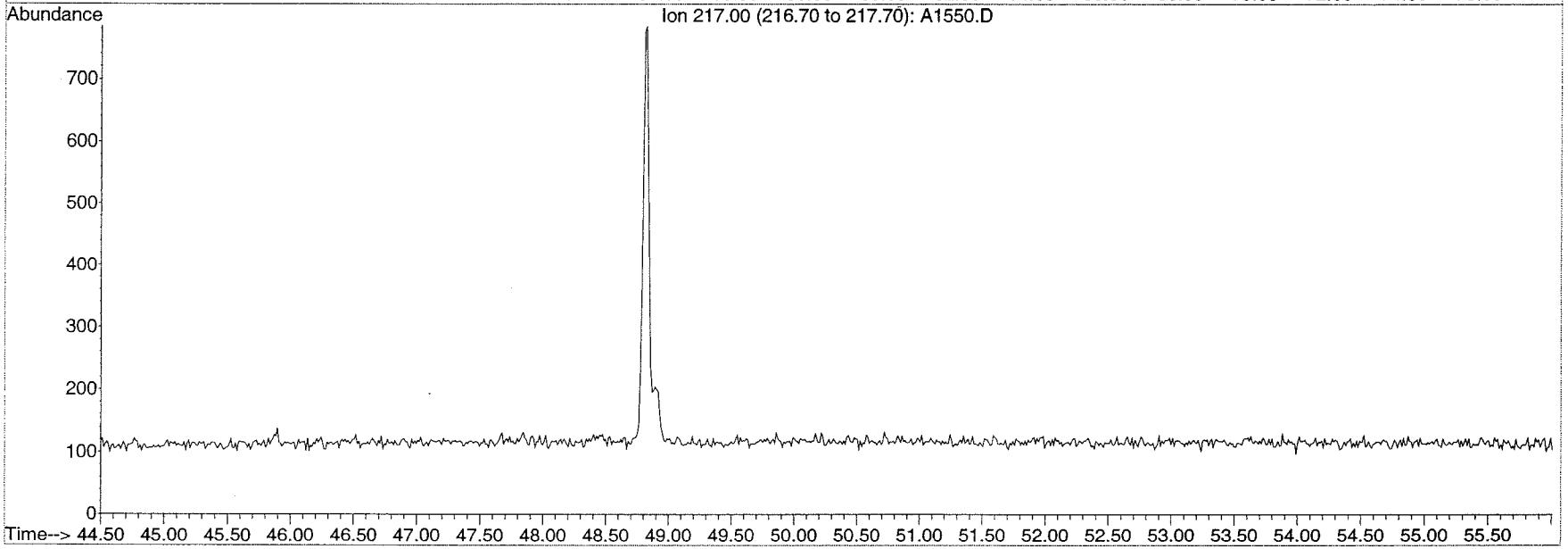
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1550.D
Date Acquired: 17 Feb 2003 9:30 am
Method File: BIO1SIM
Sample Name: BB147LCS-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB147LCS



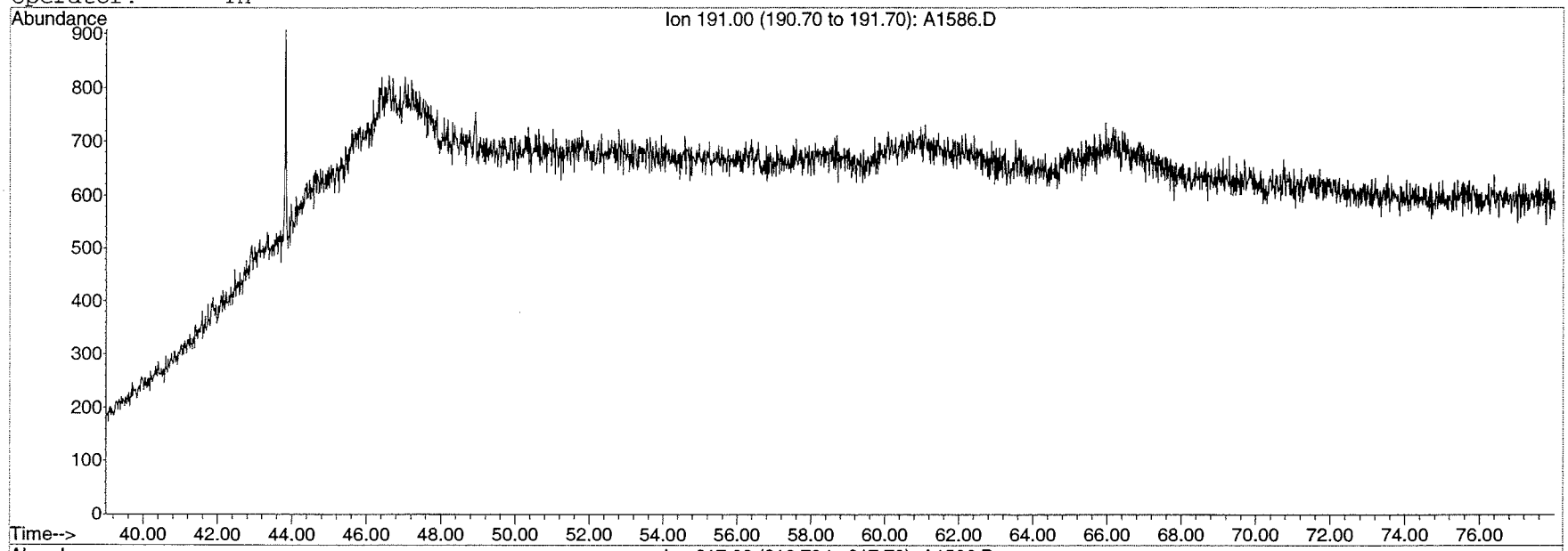


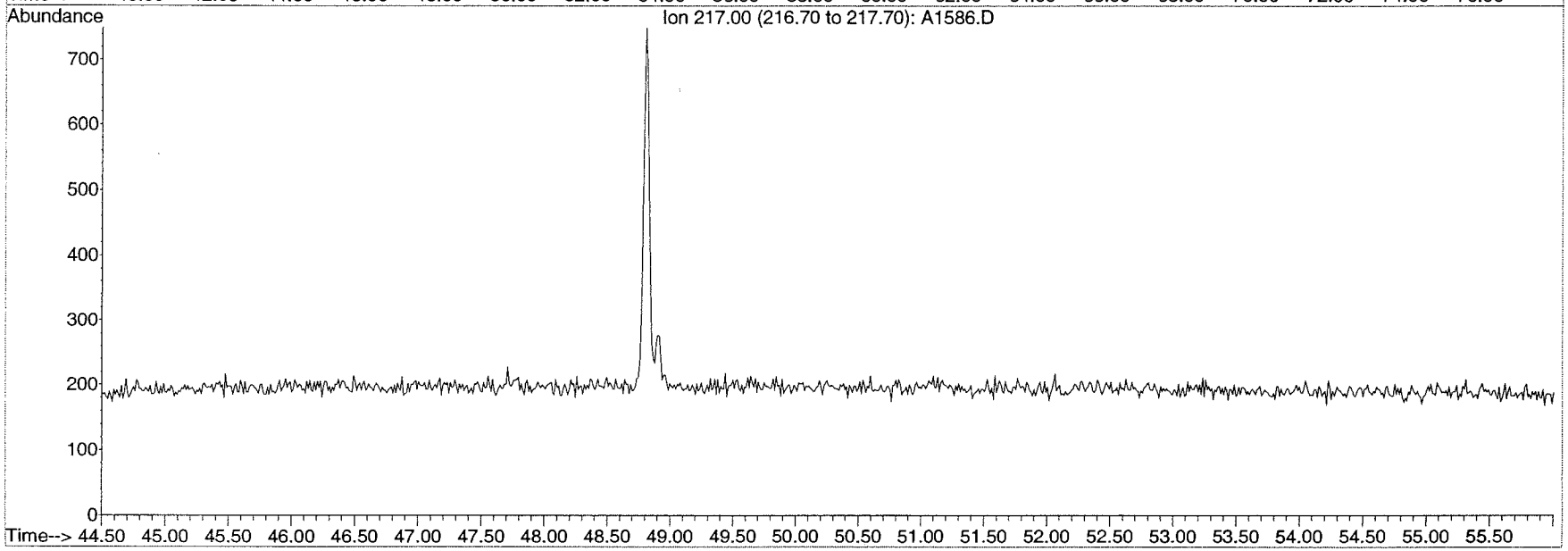
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1586.D
Date Acquired: 19 Feb 2003 7:00 pm
Method File: BIO1SIM
Sample Name: BB278PB-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB278PB



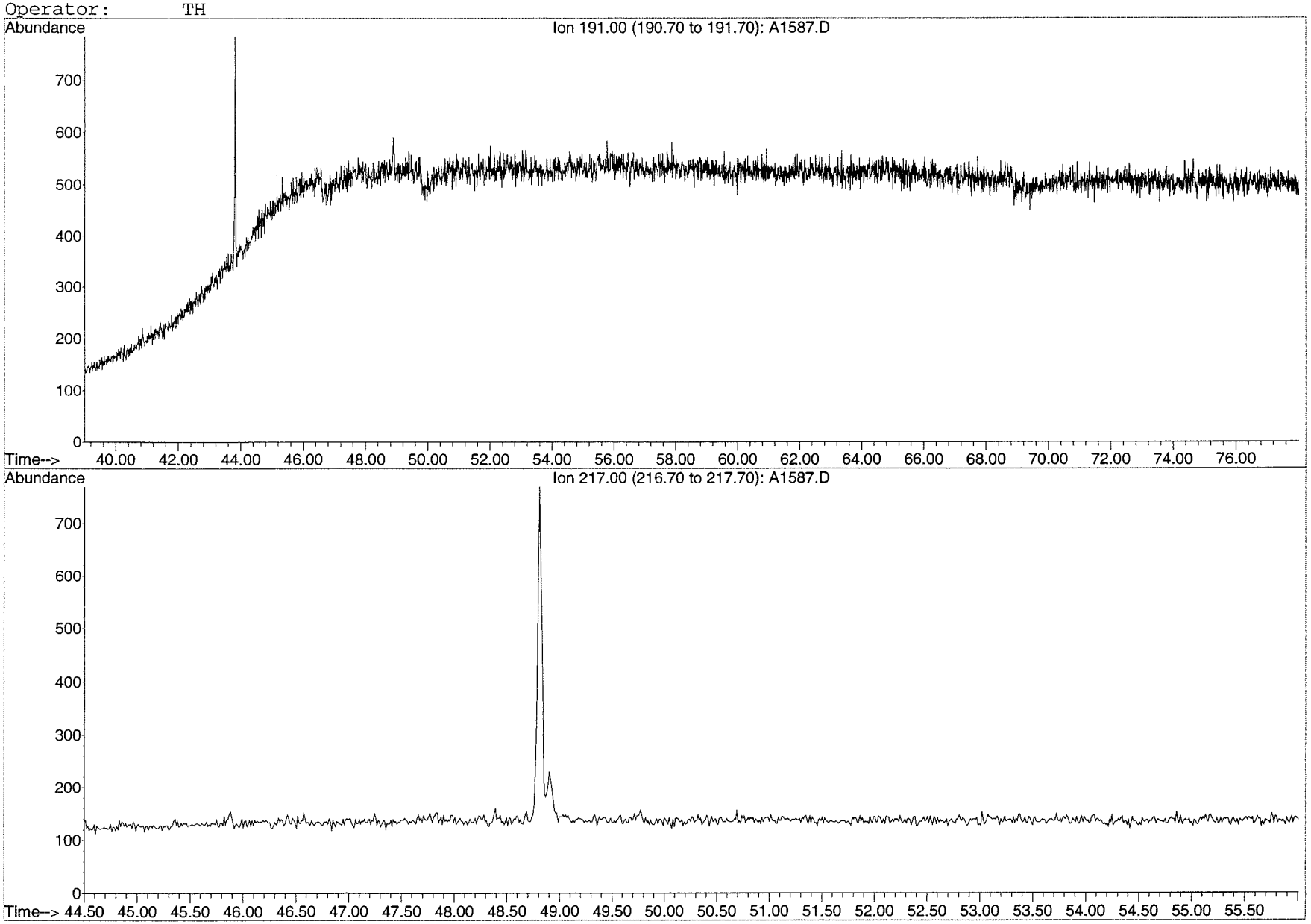


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1587.D
Date Acquired: 19 Feb 2003 8:30 pm
Method File: BIO1SIM
Sample Name: BB279LCS-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB279LCS

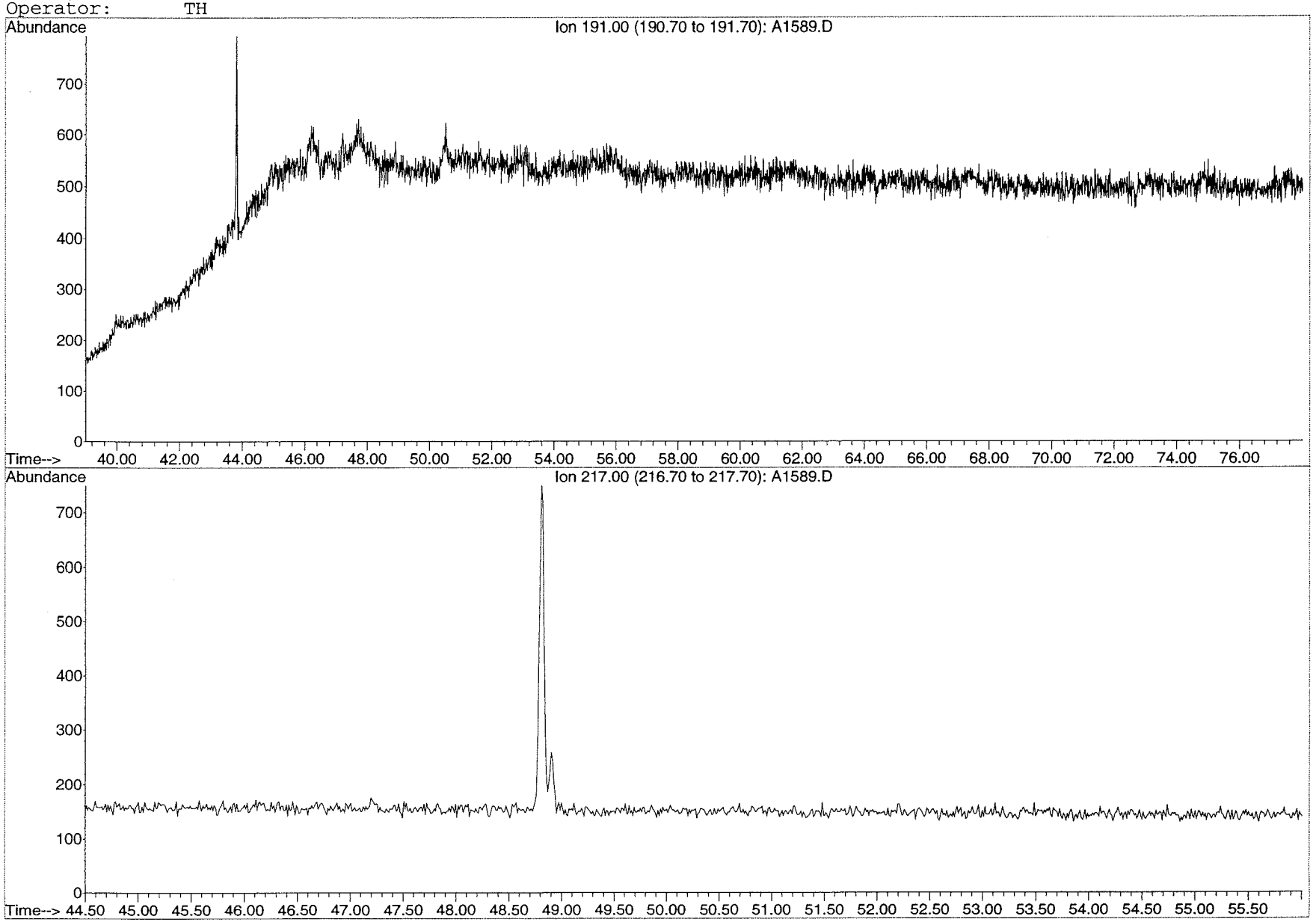


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1589.D
Date Acquired: 19 Feb 2003 11:31 pm
Method File: BIO1SIM
Sample Name: BB362PB-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB362PB

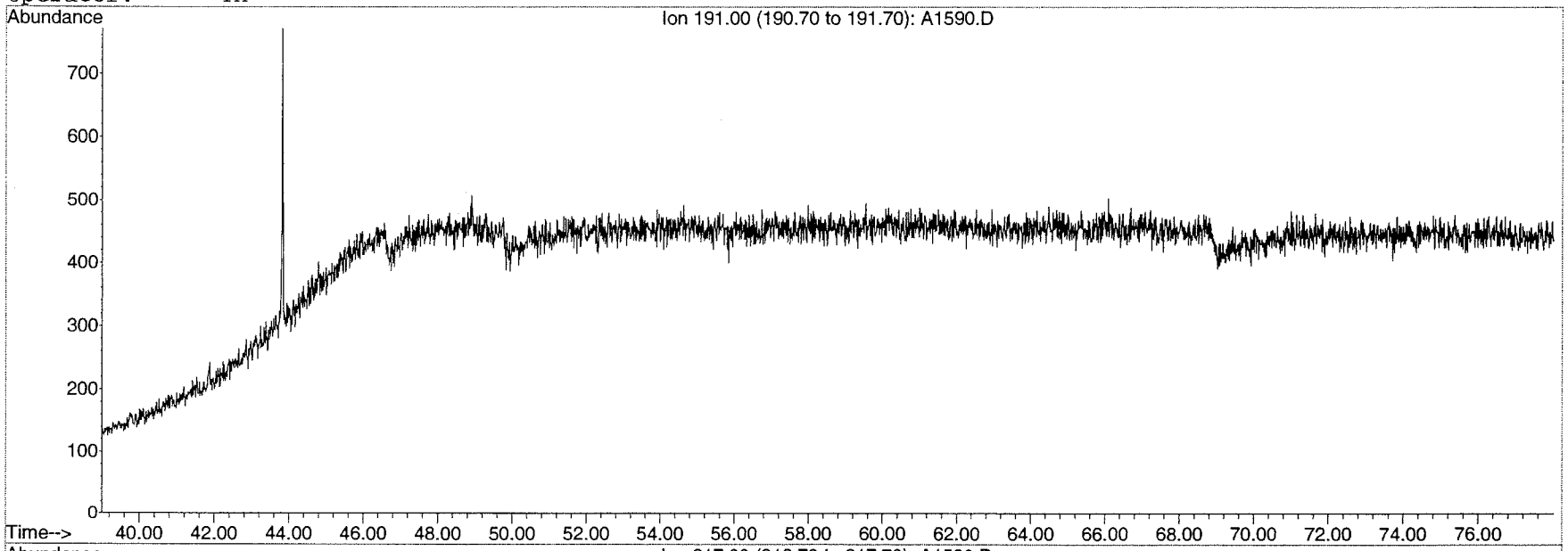


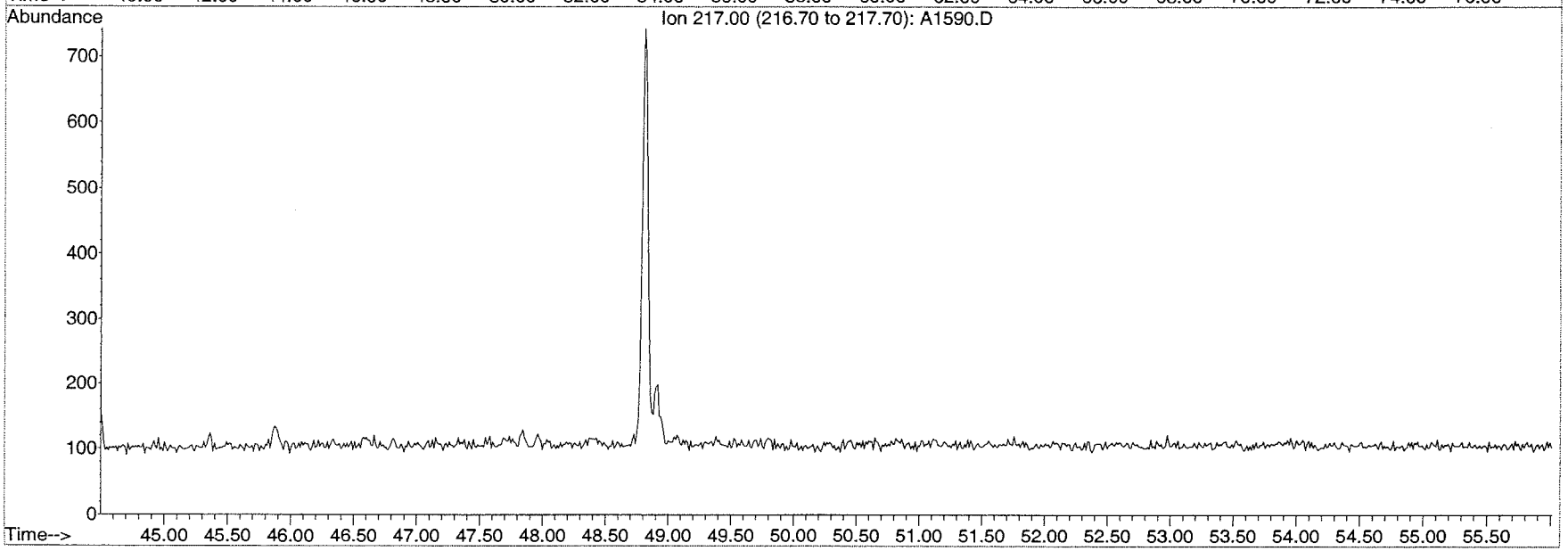
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1590.D
Date Acquired: 20 Feb 2003 1:02 am
Method File: BIO1SIM
Sample Name: BB363LCS-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB363LCS



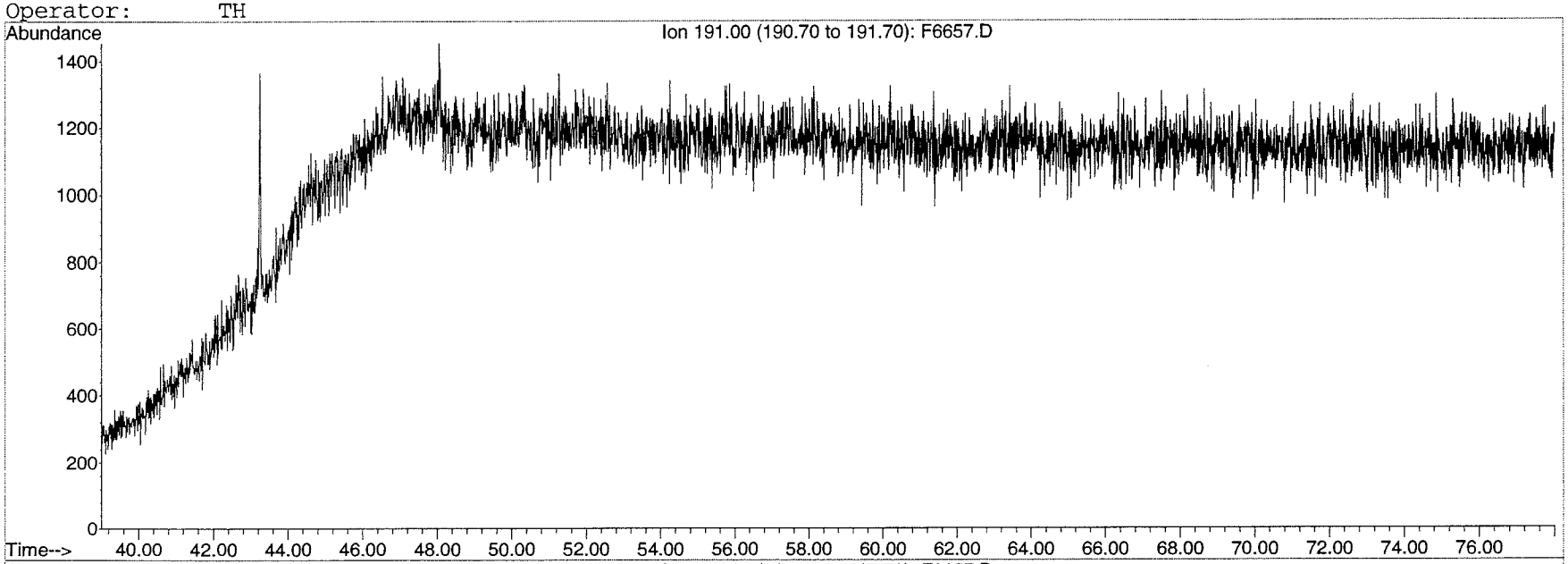


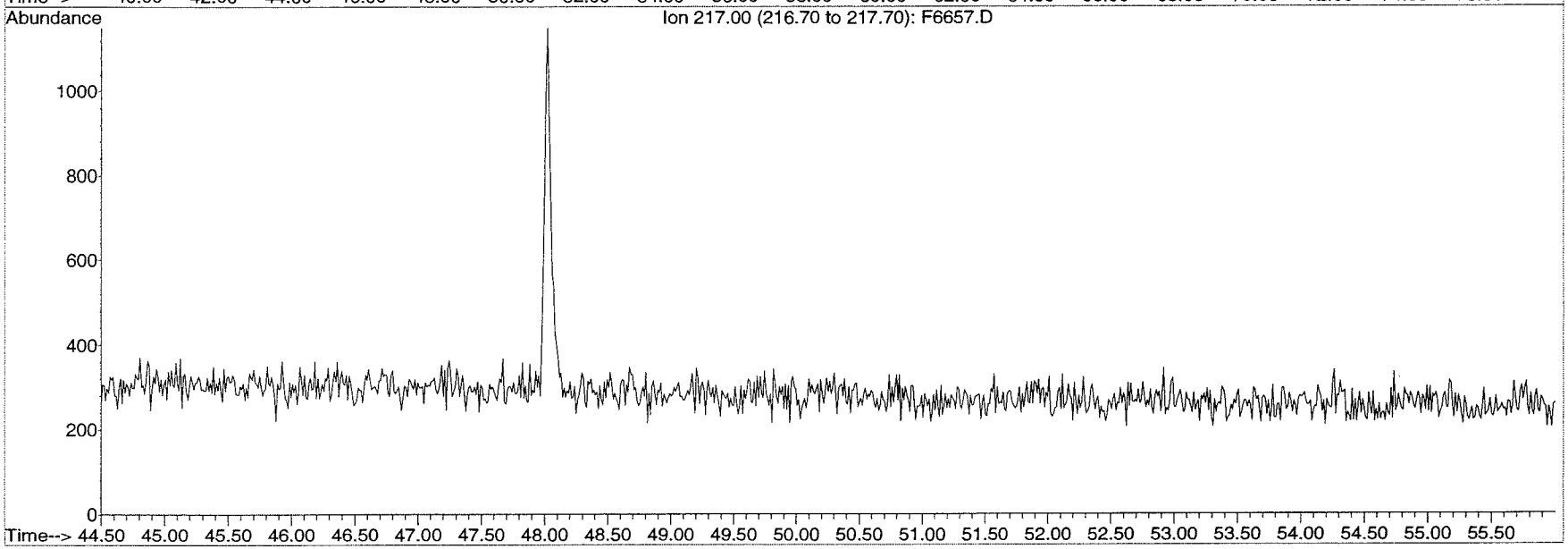
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6657.D
Date Acquired: 5 Mar 2003 5:40 am
Method File: BIO1SIM
Sample Name: BB426PB-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB426PB



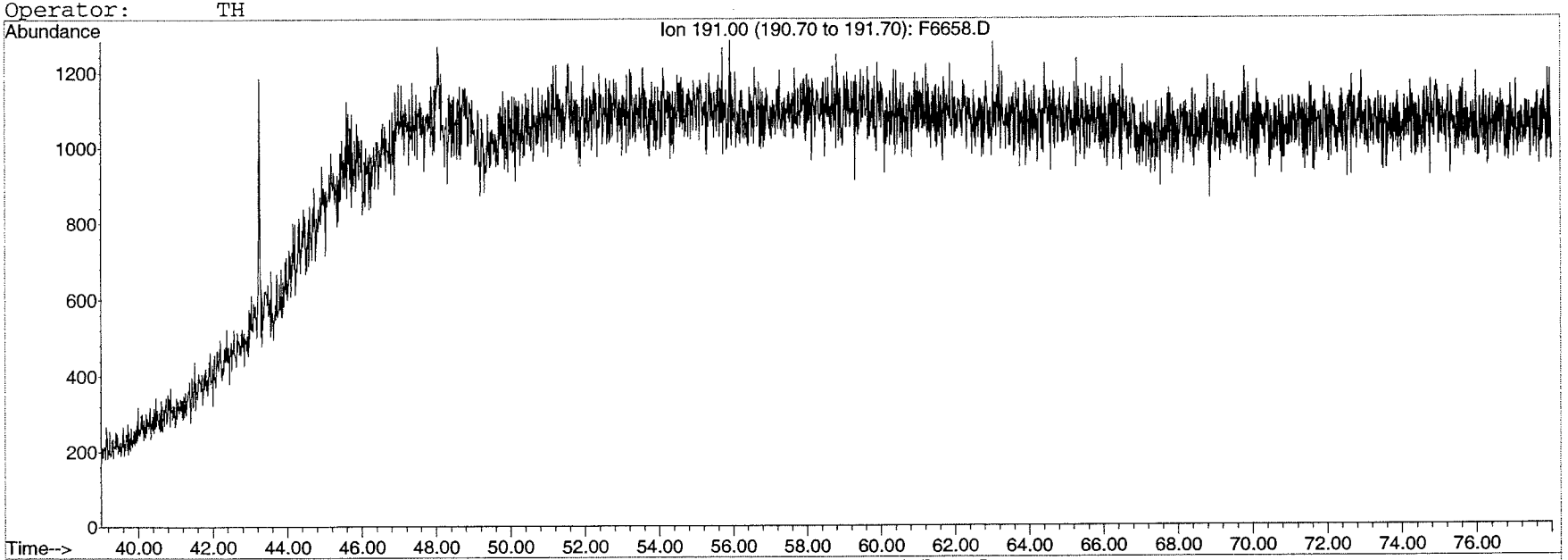


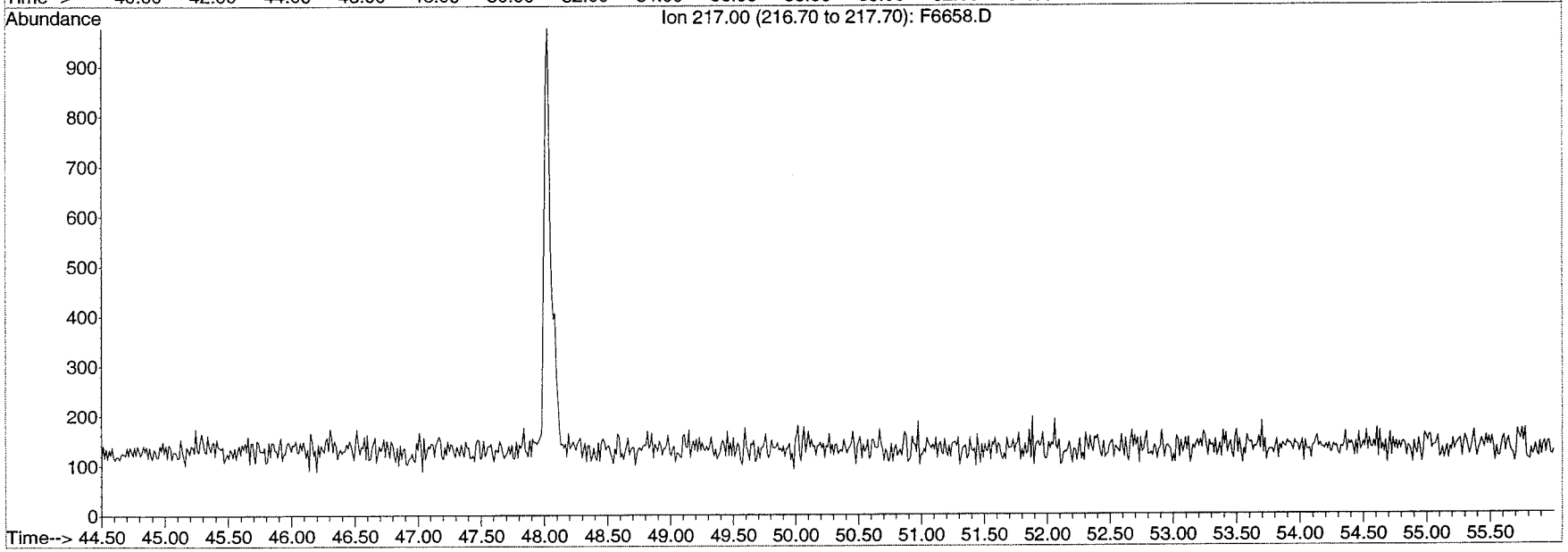
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6658.D
Date Acquired: 5 Mar 2003 7:13 am
Method File: BIO1SIM
Sample Name: BB427LCS-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB427LCS



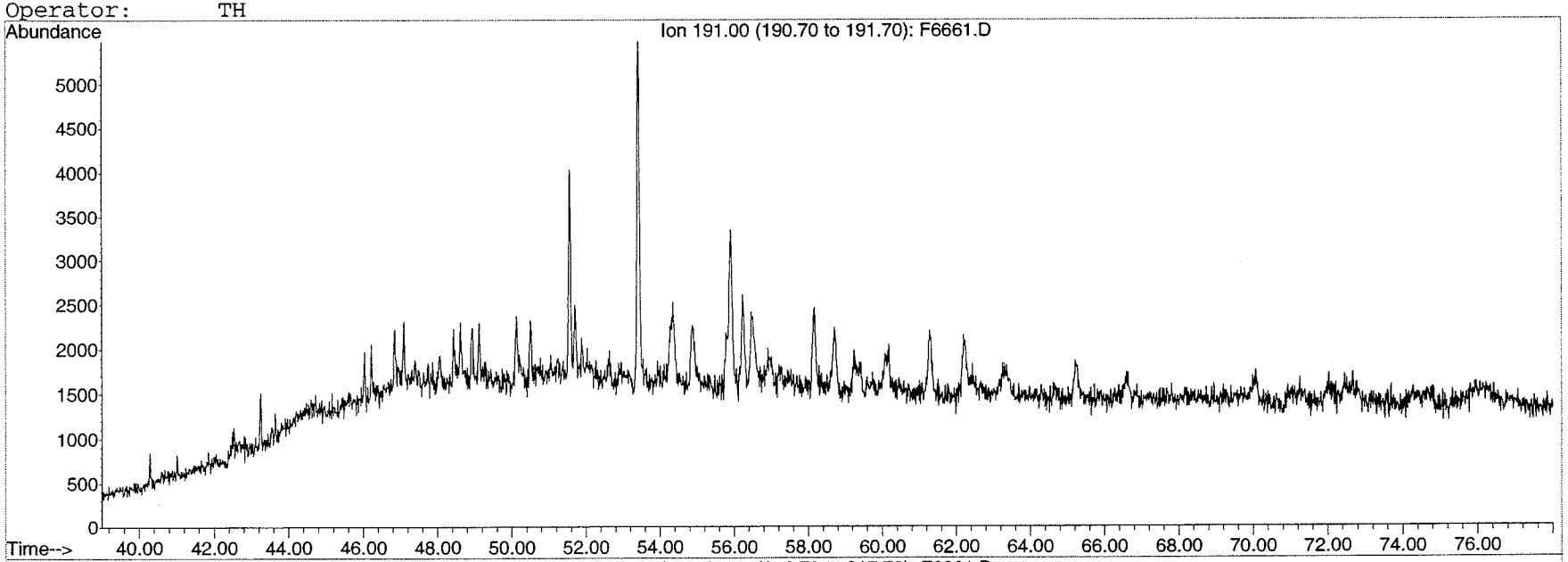


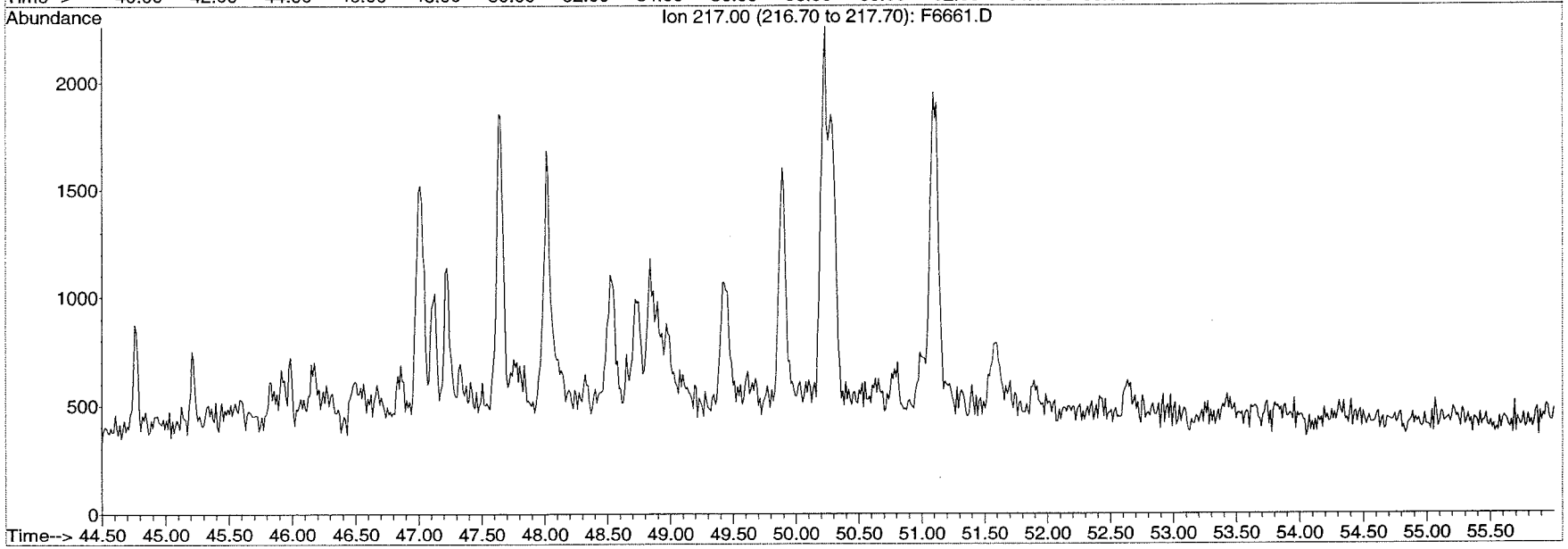
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6661.D
Date Acquired: 5 Mar 2003 11:52 am
Method File: BIO1SIM
Sample Name: BB430PB-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB430PB



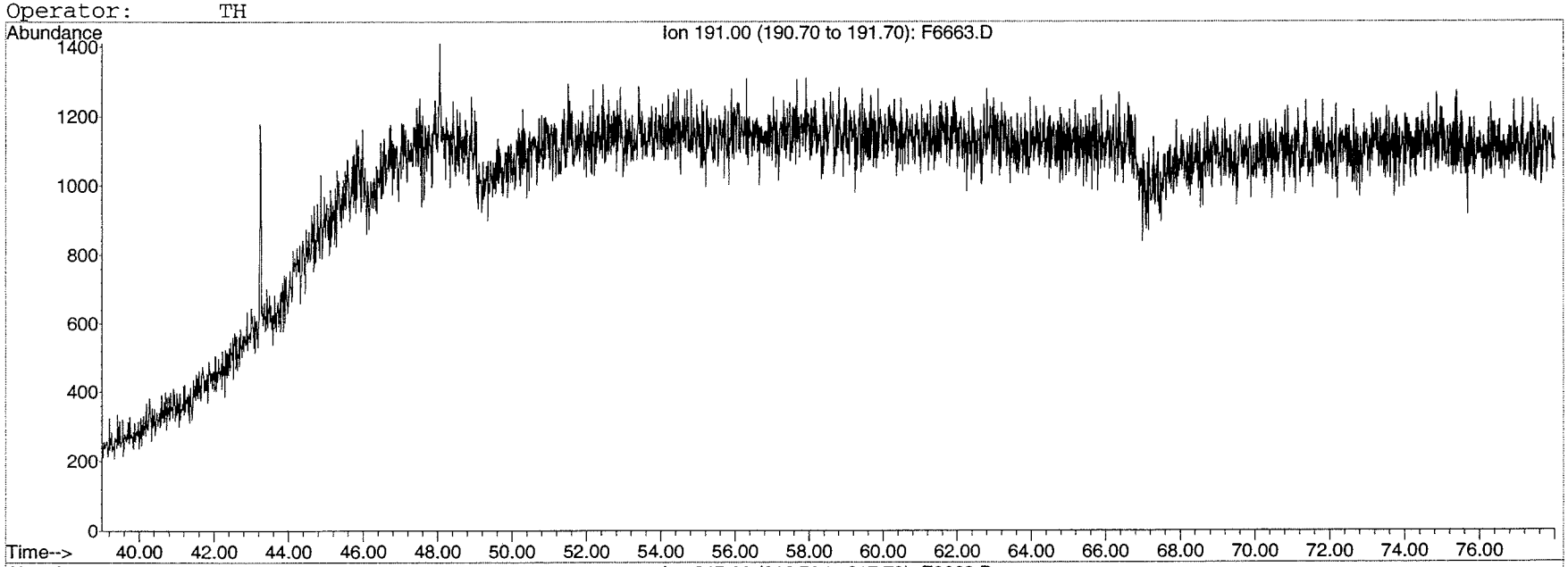


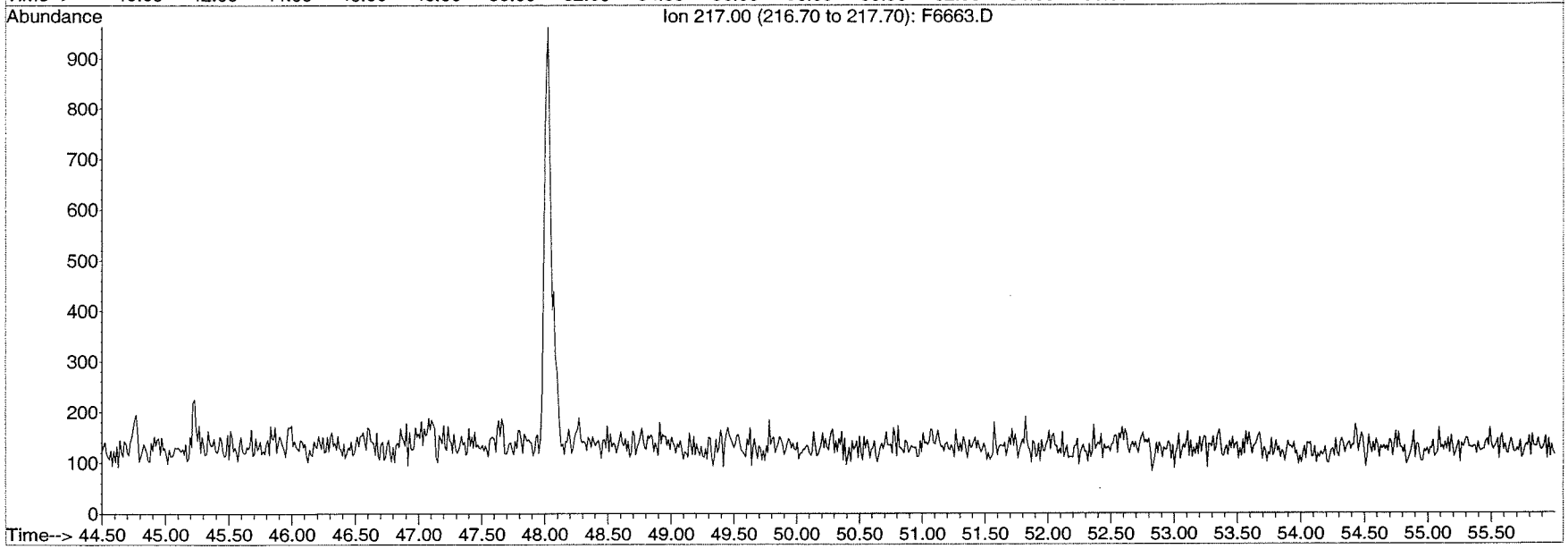
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6663.D
Date Acquired: 5 Mar 2003 2:56 pm
Method File: BIO1SIM
Sample Name: BB478LCS-D-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB478LCS



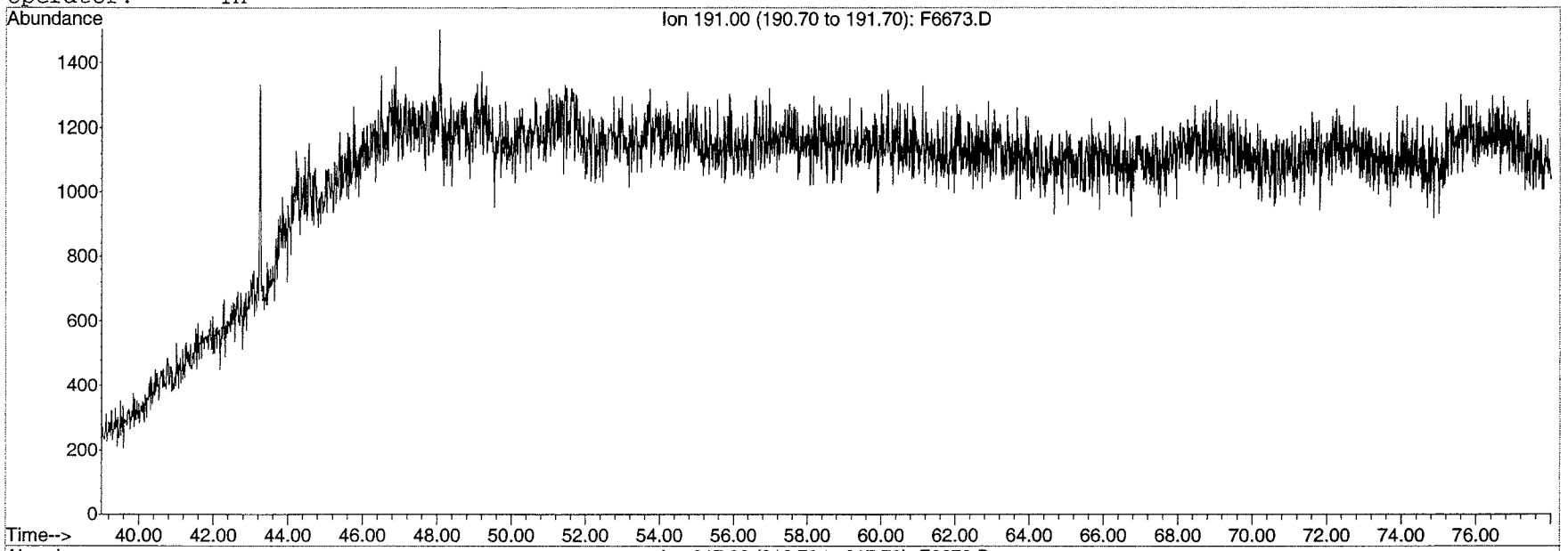


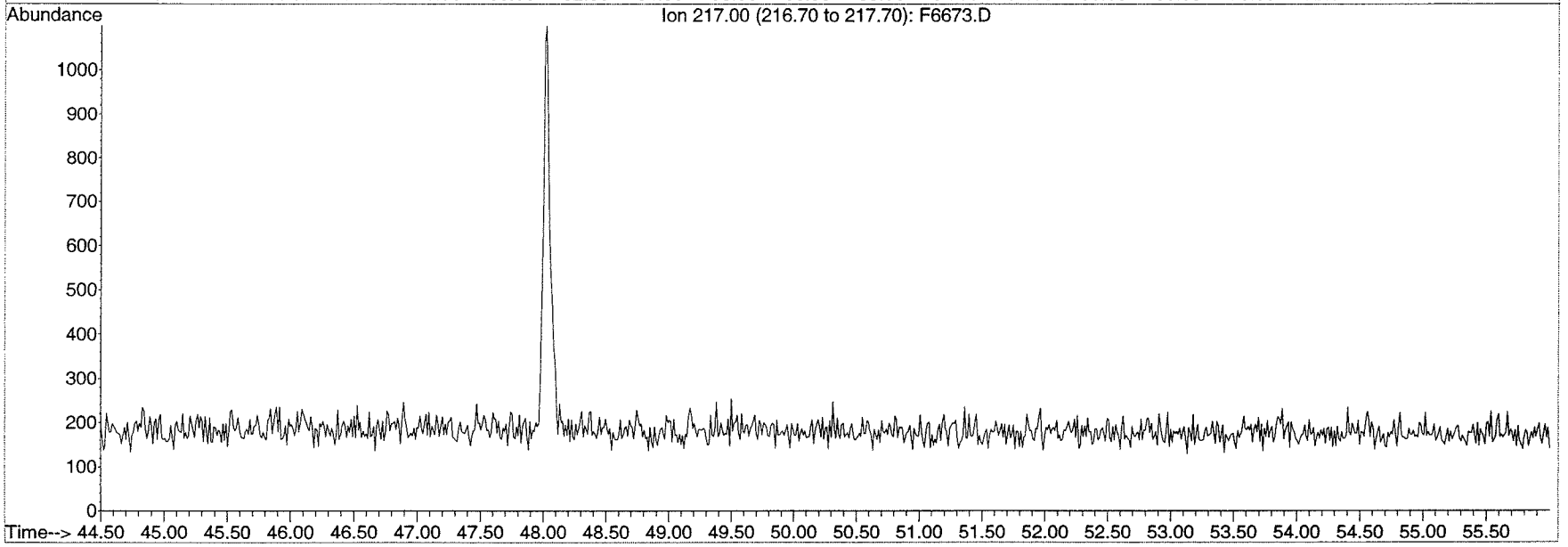
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6673.D
Date Acquired: 6 Mar 2003 4:01 pm
Method File: BIO1SIM
Sample Name: BB534LCS
Misc Info:
Operator: TH

Triterpanes and Steranes
Laboratory Control Sample
BB534LCS



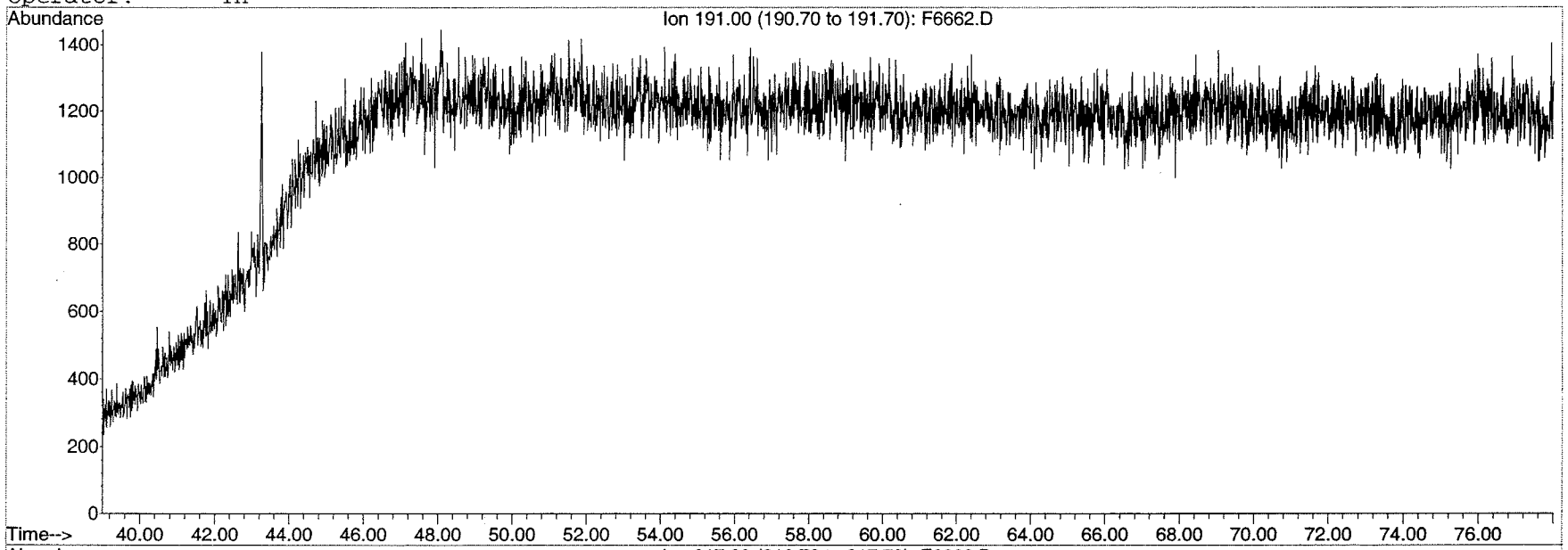


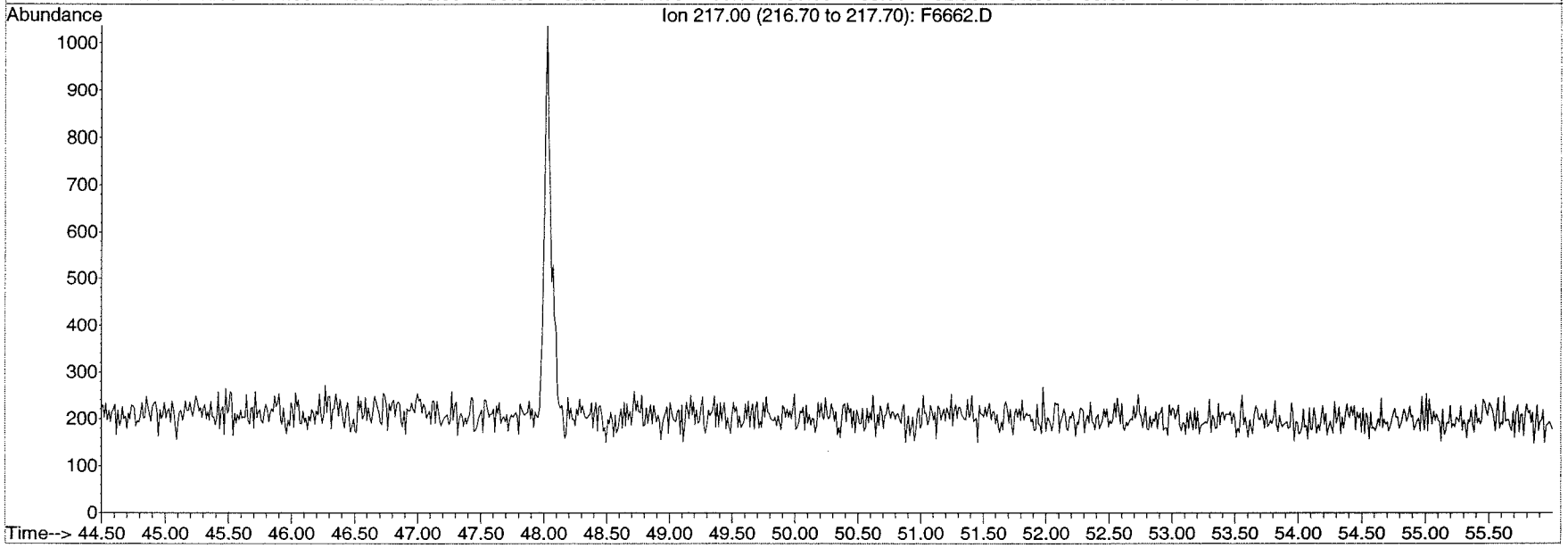
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\F\DATA\SQF171\F6662.D
Date Acquired: 5 Mar 2003 1:24 pm
Method File: BIO1SIM
Sample Name: BB501PB-F1
Misc Info:
Operator: TH

Triterpanes and Steranes
Procedural Blank
BB501PB



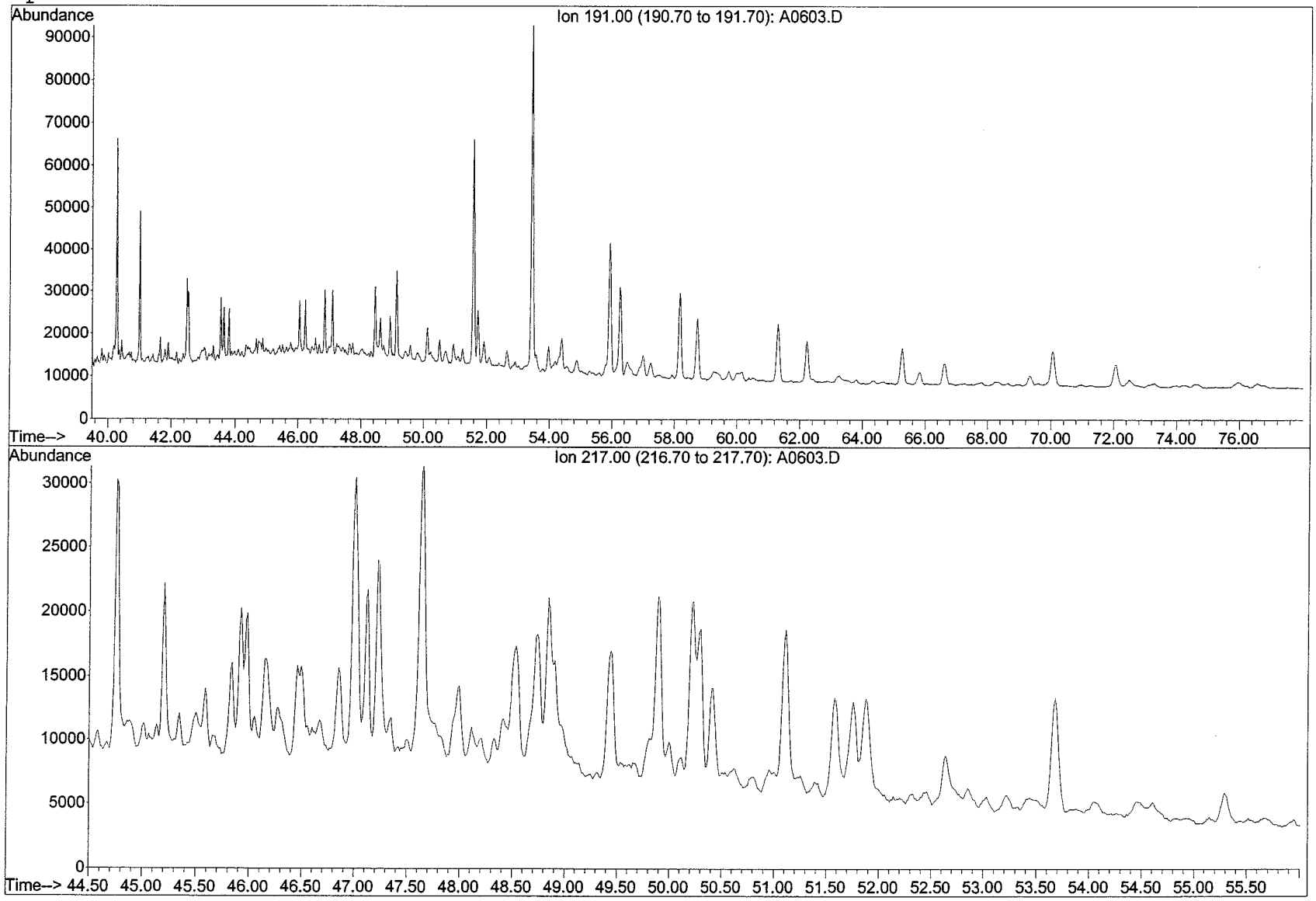


BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: G:\A\DATA\SQA319\A0603.D
Date Acquired: 12 Dec 2002 11:23 pm
Method File: BIO1SIM
Sample Name: FX46 NSC
Misc Info:
Operator: TH

Triterpanes and Steranes
Reference Crude Oil
FX46

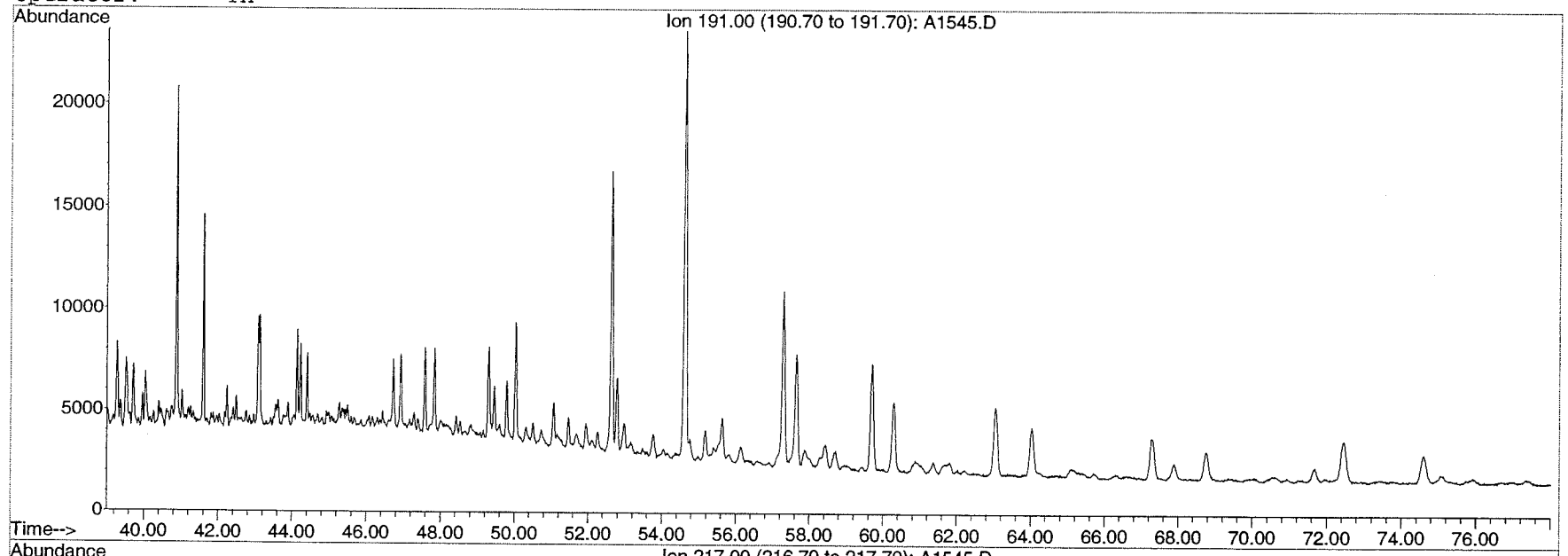


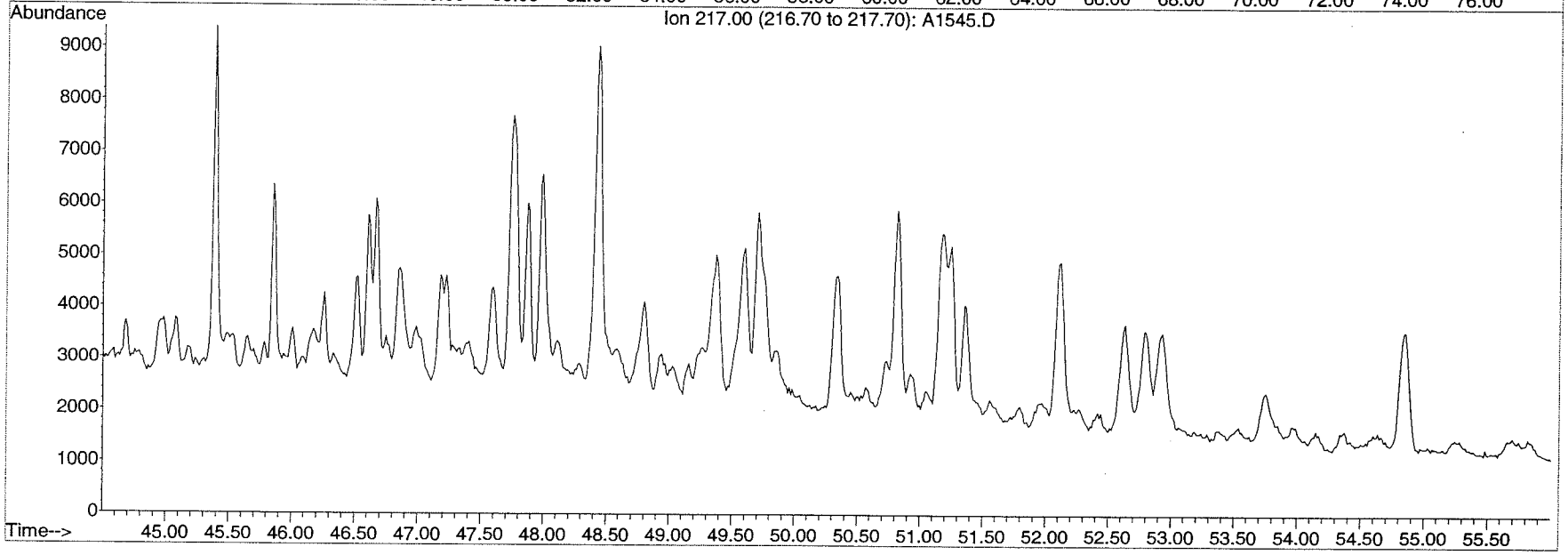
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

File: H:\A\DATA\SQA339\A1545.D
Date Acquired: 17 Feb 2003 2:01 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

Triterpanes and Steranes
Reference Crude Oil
FX46



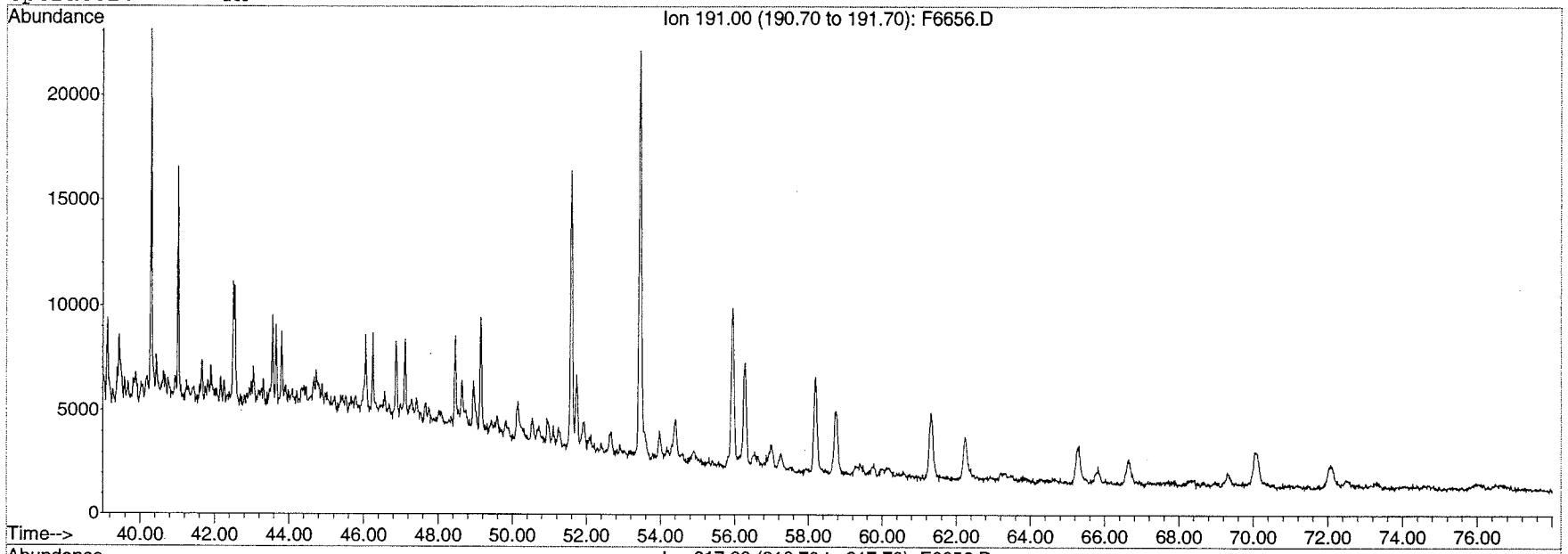


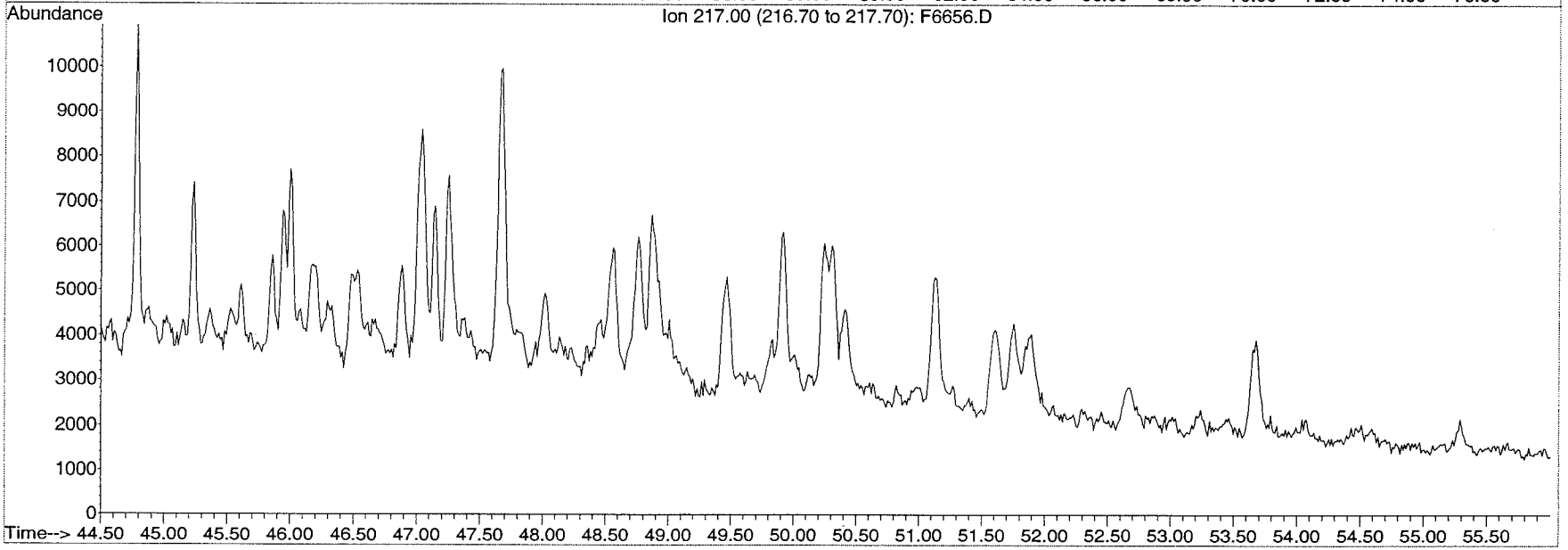
BATTELLE

GC/MS EXTRACTED ION CHROMATOGRAM

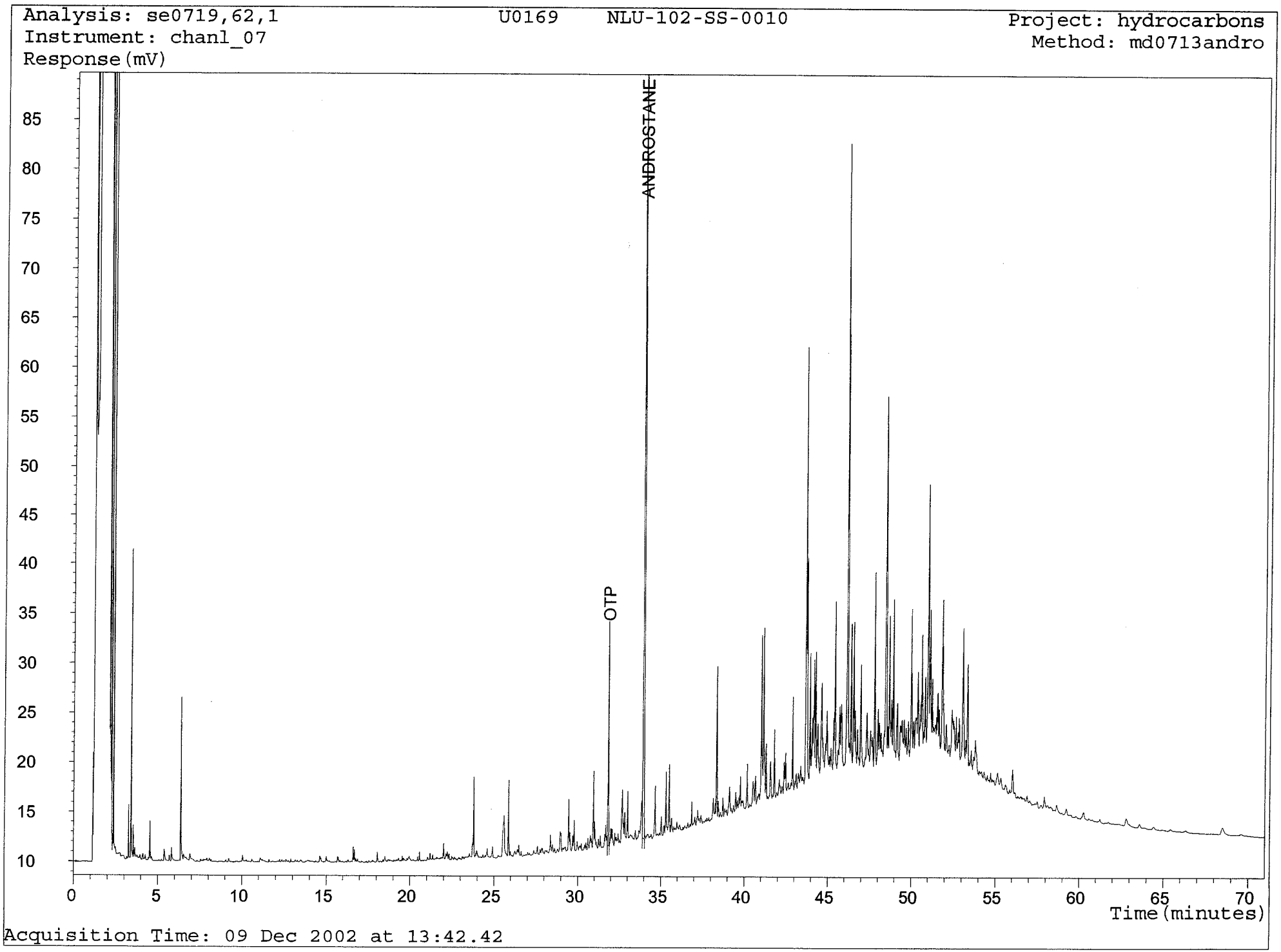
File: H:\F\DATA\SQF171\F6656.D
Date Acquired: 5 Mar 2003 4:05 am
Method File: BIO1SIM
Sample Name: FX46
Misc Info:
Operator: TH

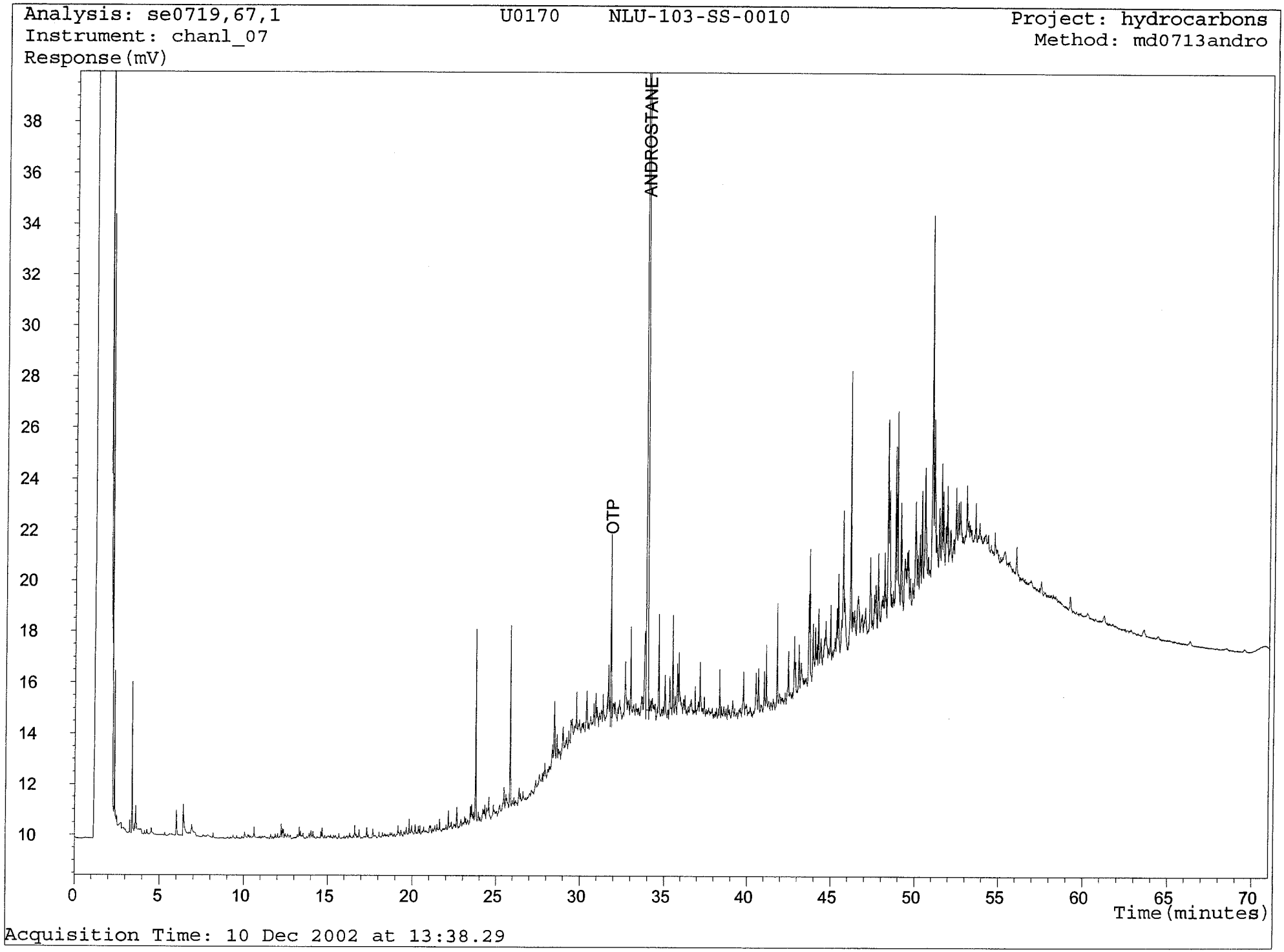
Triterpanes and Steranes
Reference Crude Oil
FX46

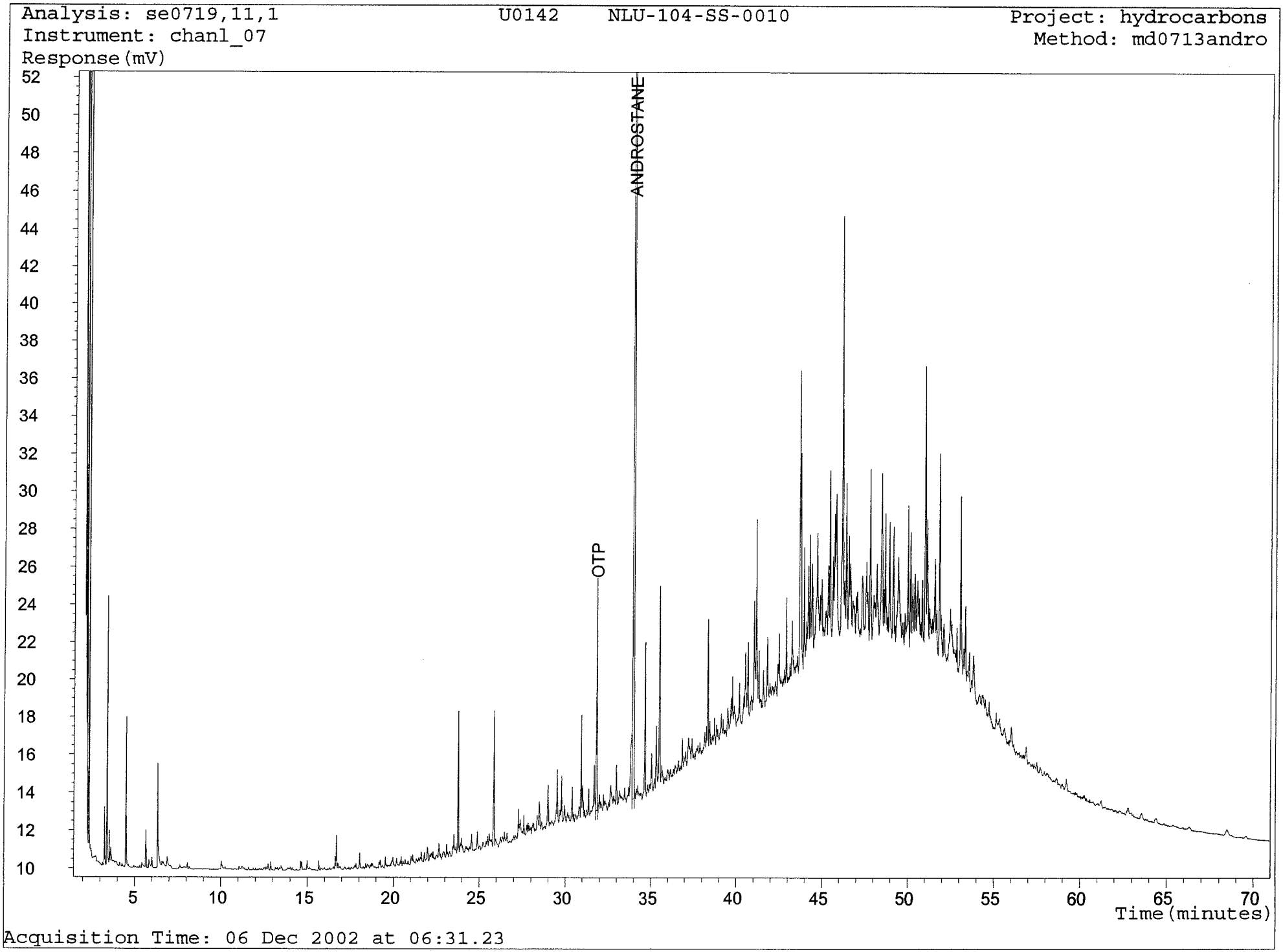


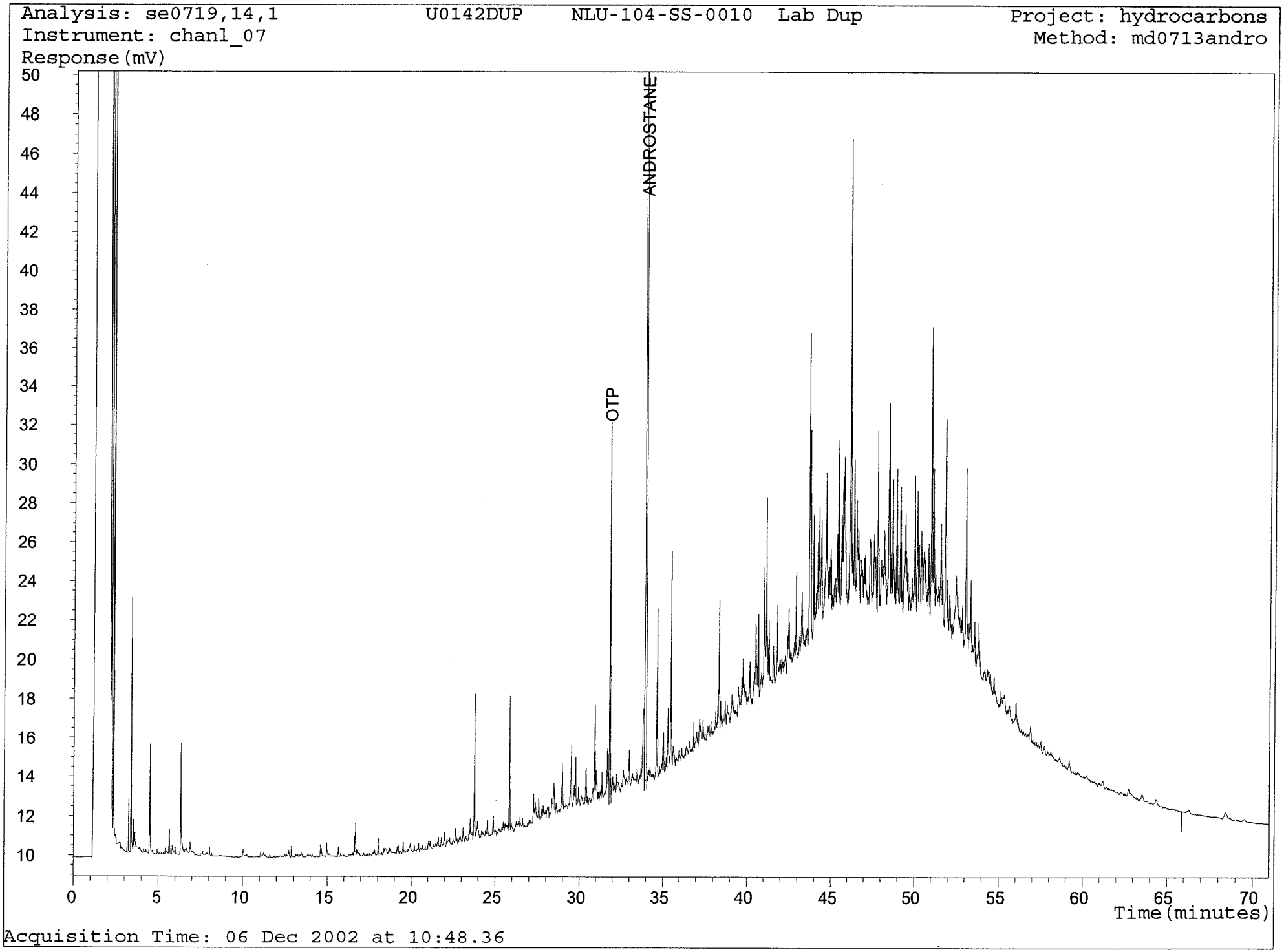


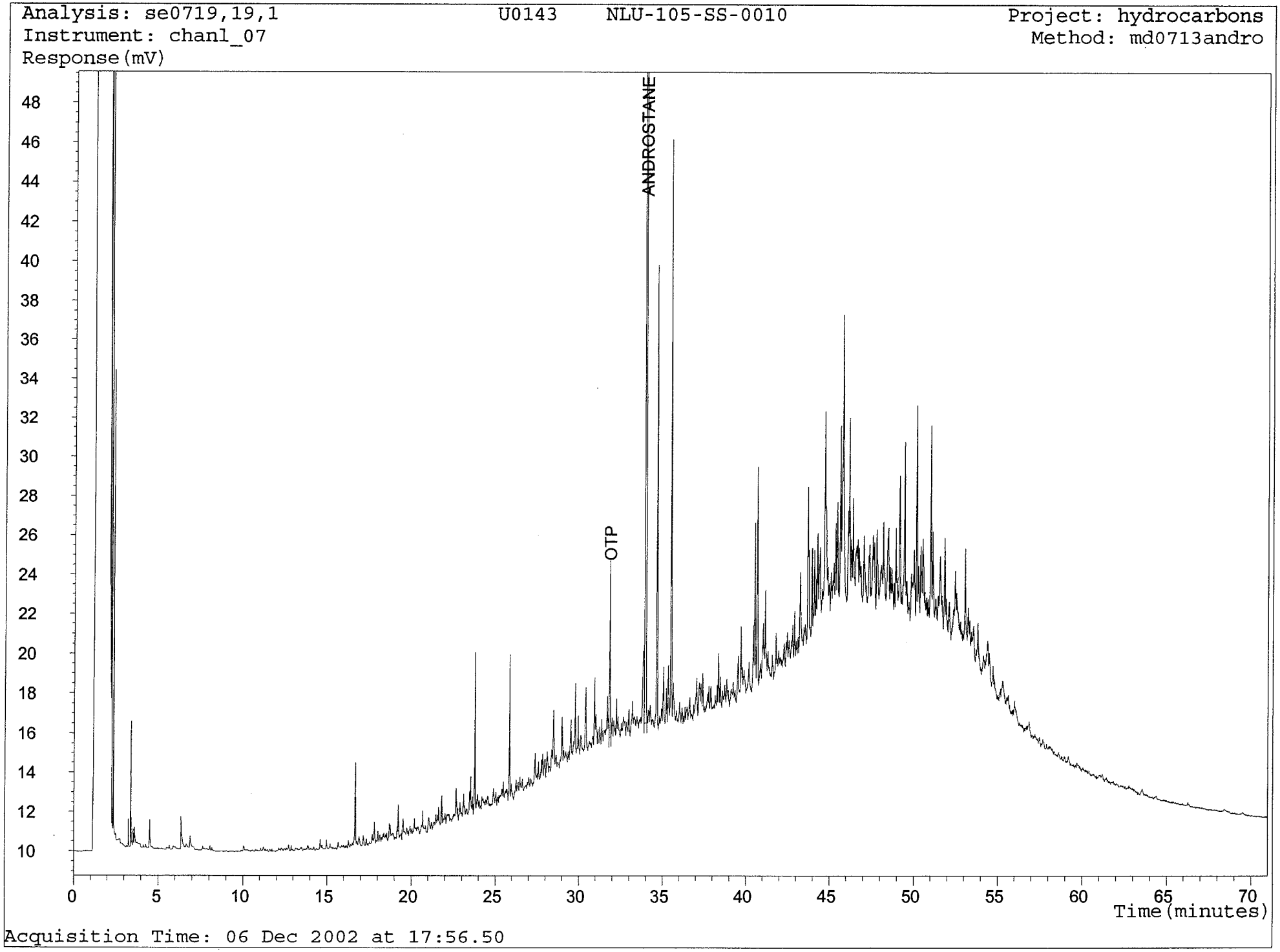
Attachment 1
High Resolution Hydrocarbon Fingerprints
(GC/FID)

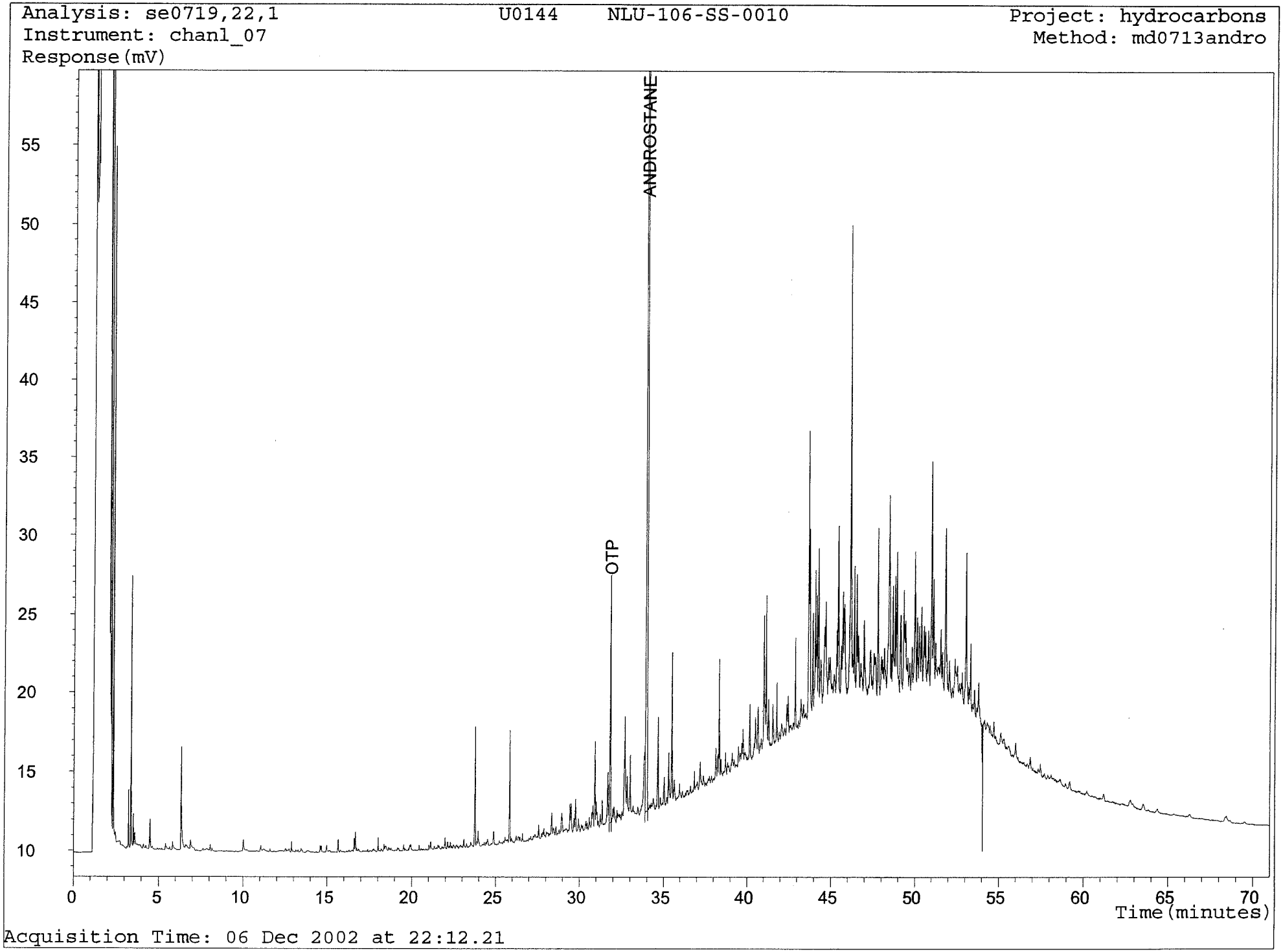

Analysis: se0719,62,1
U0169
NLU-102-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Dec 2002 at 13:42.42

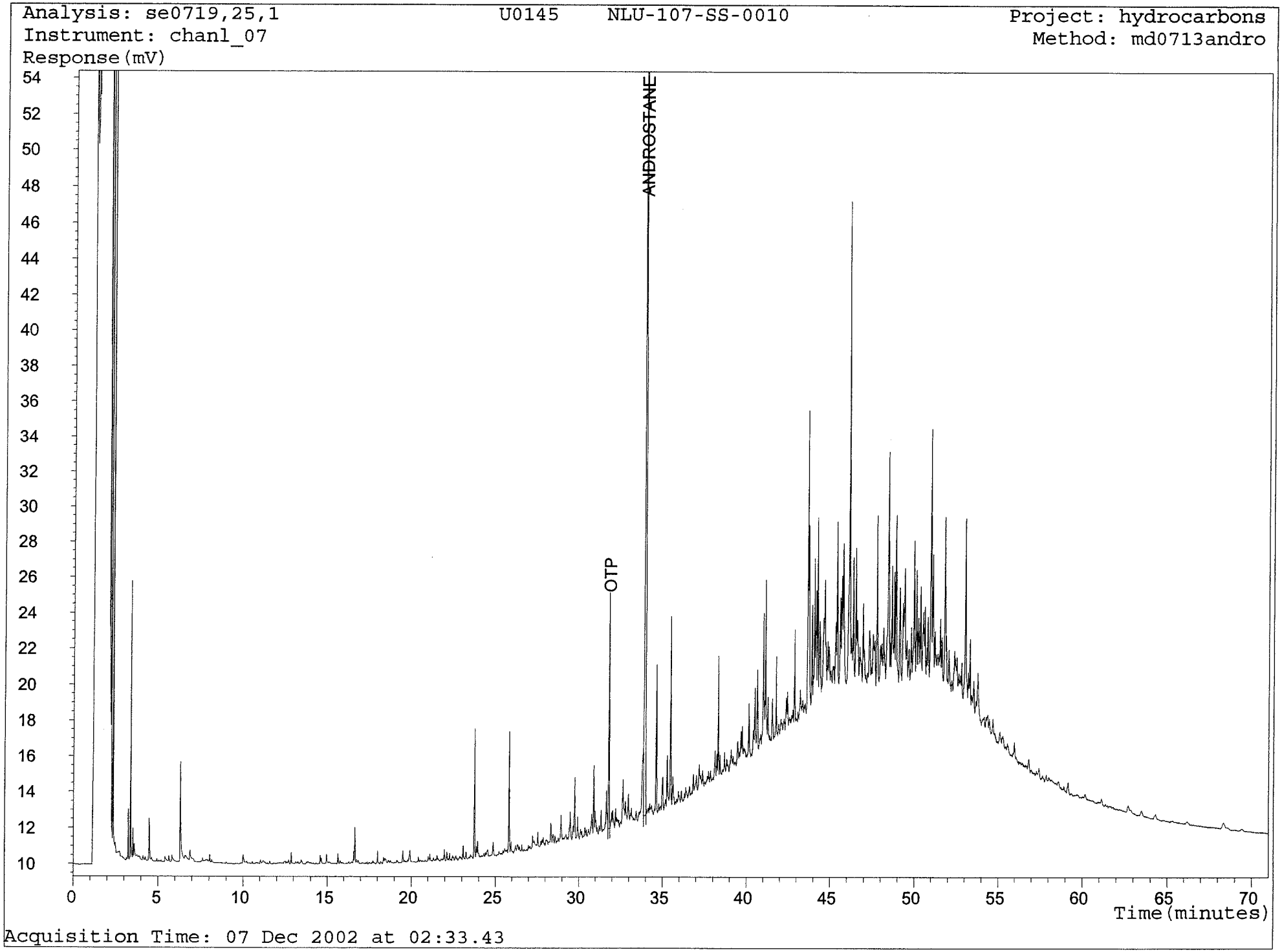

Analysis: se0719,67,1
U0170
NLU-103-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Dec 2002 at 13:38.29

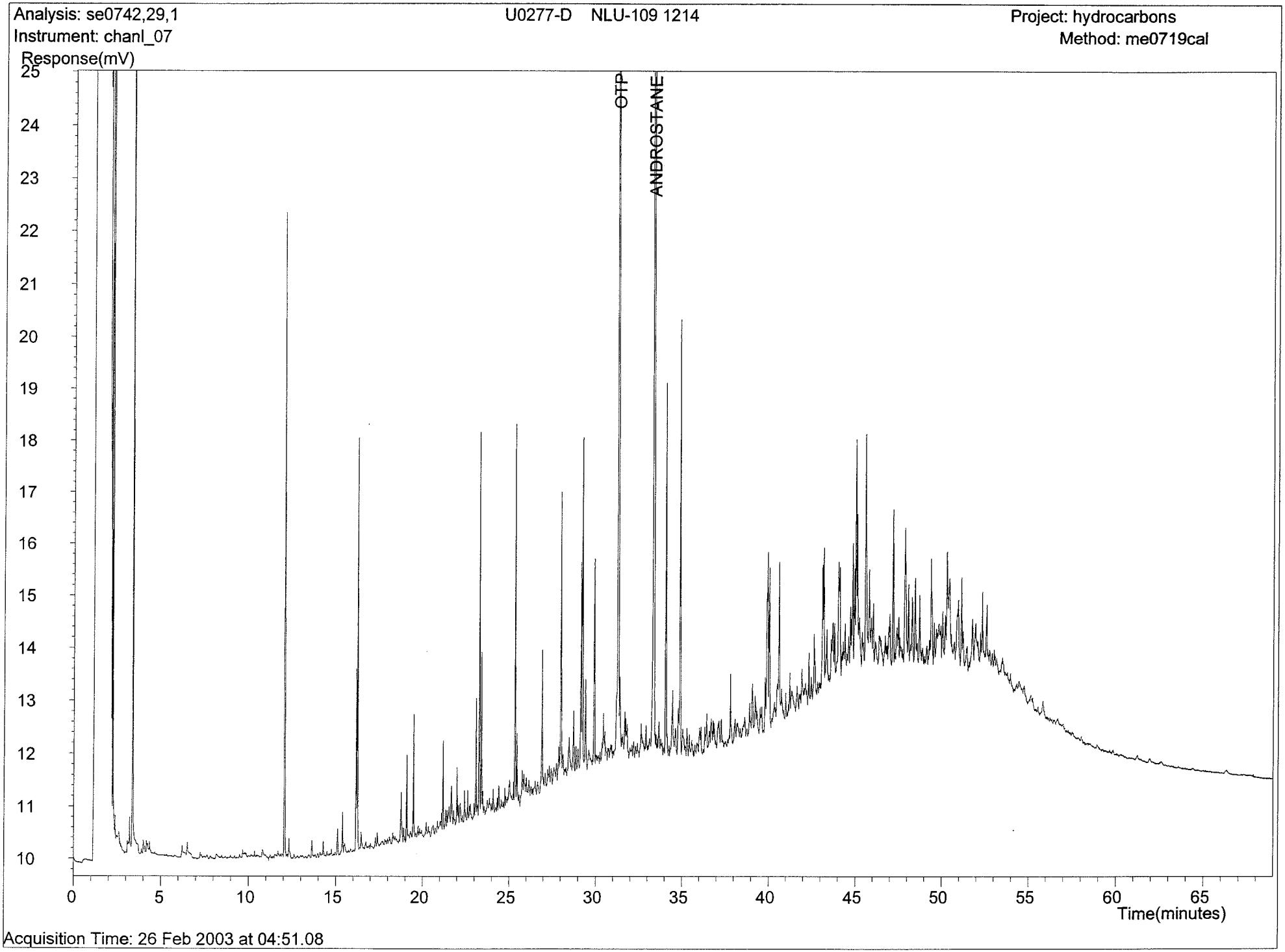

Analysis: se0719,11,1
U0142
NLU-104-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
ANDROSTANE
OTP
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 06 Dec 2002 at 06:31.23

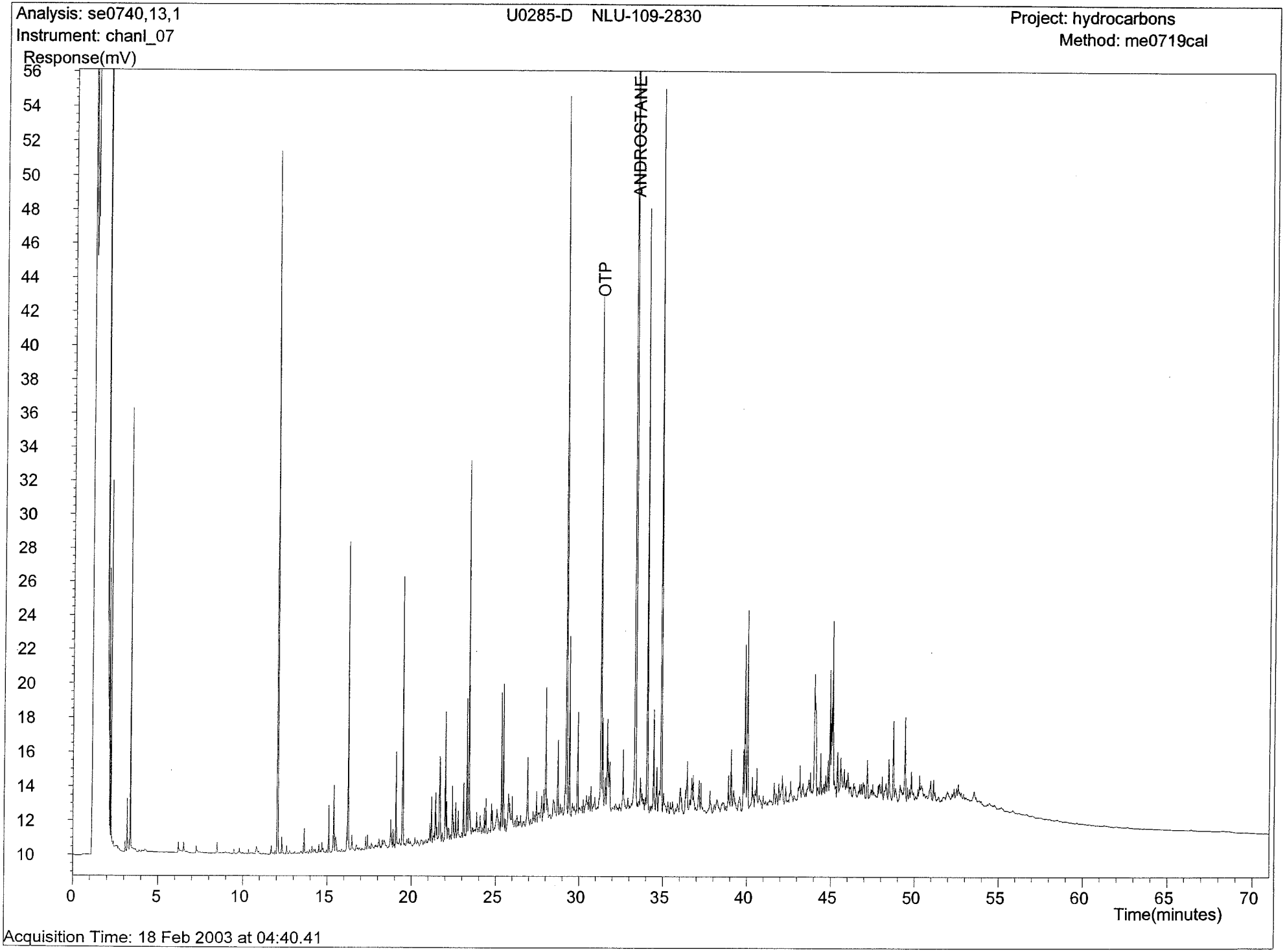

Analysis: se0719,14,1
U0142DUP
NLU-104-SS-0010 Lab Dup
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 06 Dec 2002 at 10:48.36

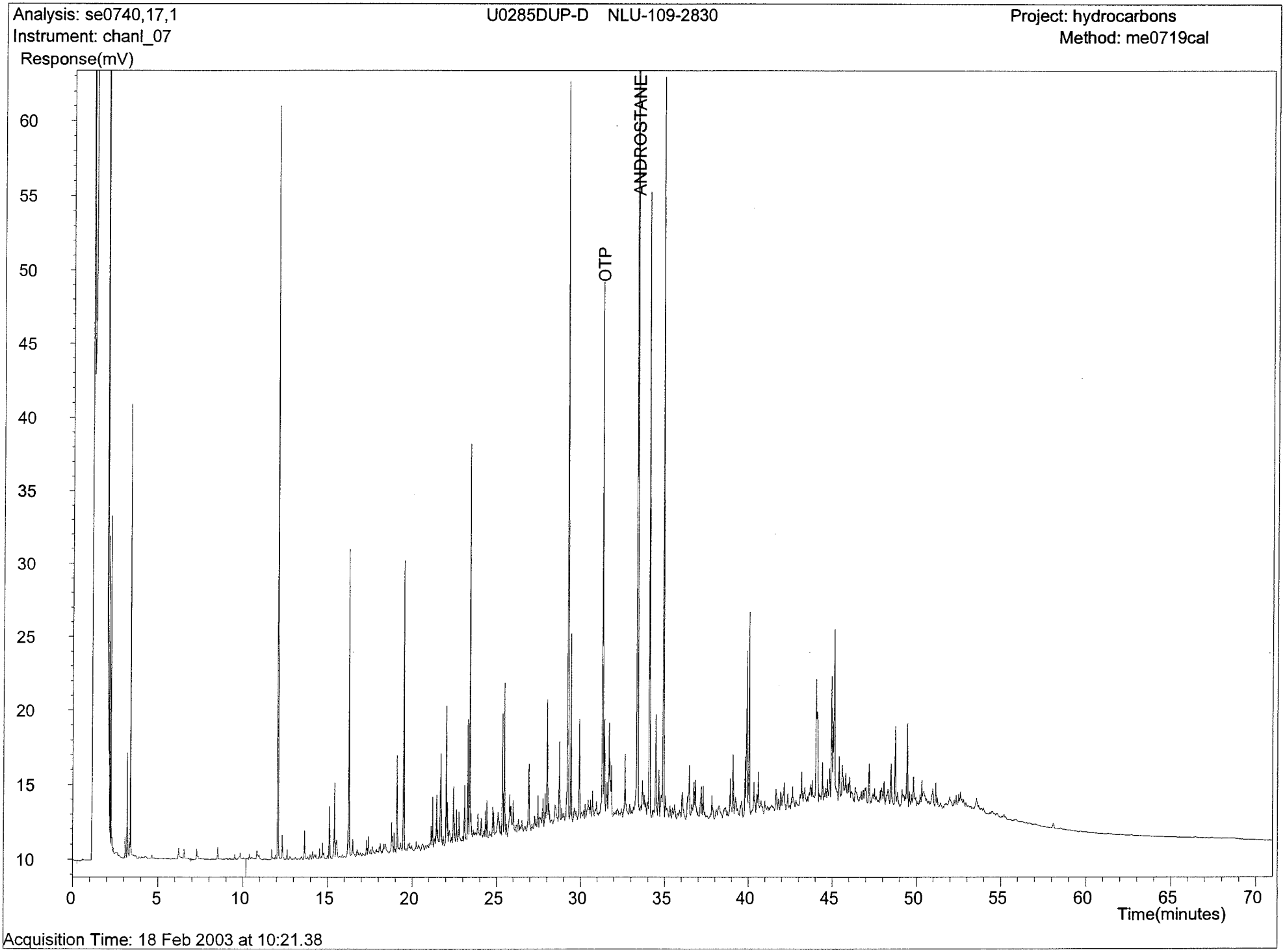

Analysis: se0719,19,1
U0143
NLU-105-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 06 Dec 2002 at 17:56.50

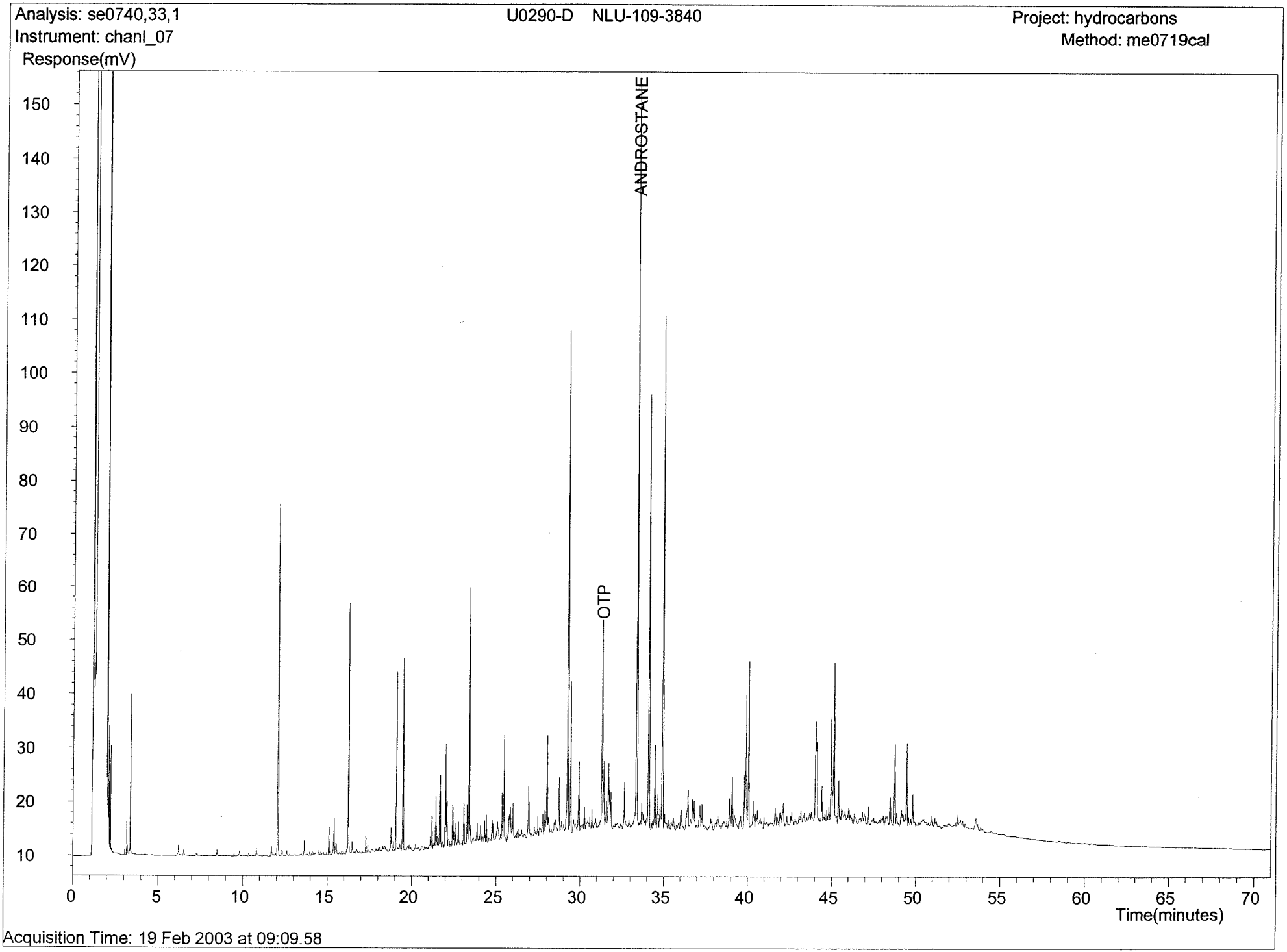

Analysis: se0719,22,1
U0144
NLU-106-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 06 Dec 2002 at 22:12.21

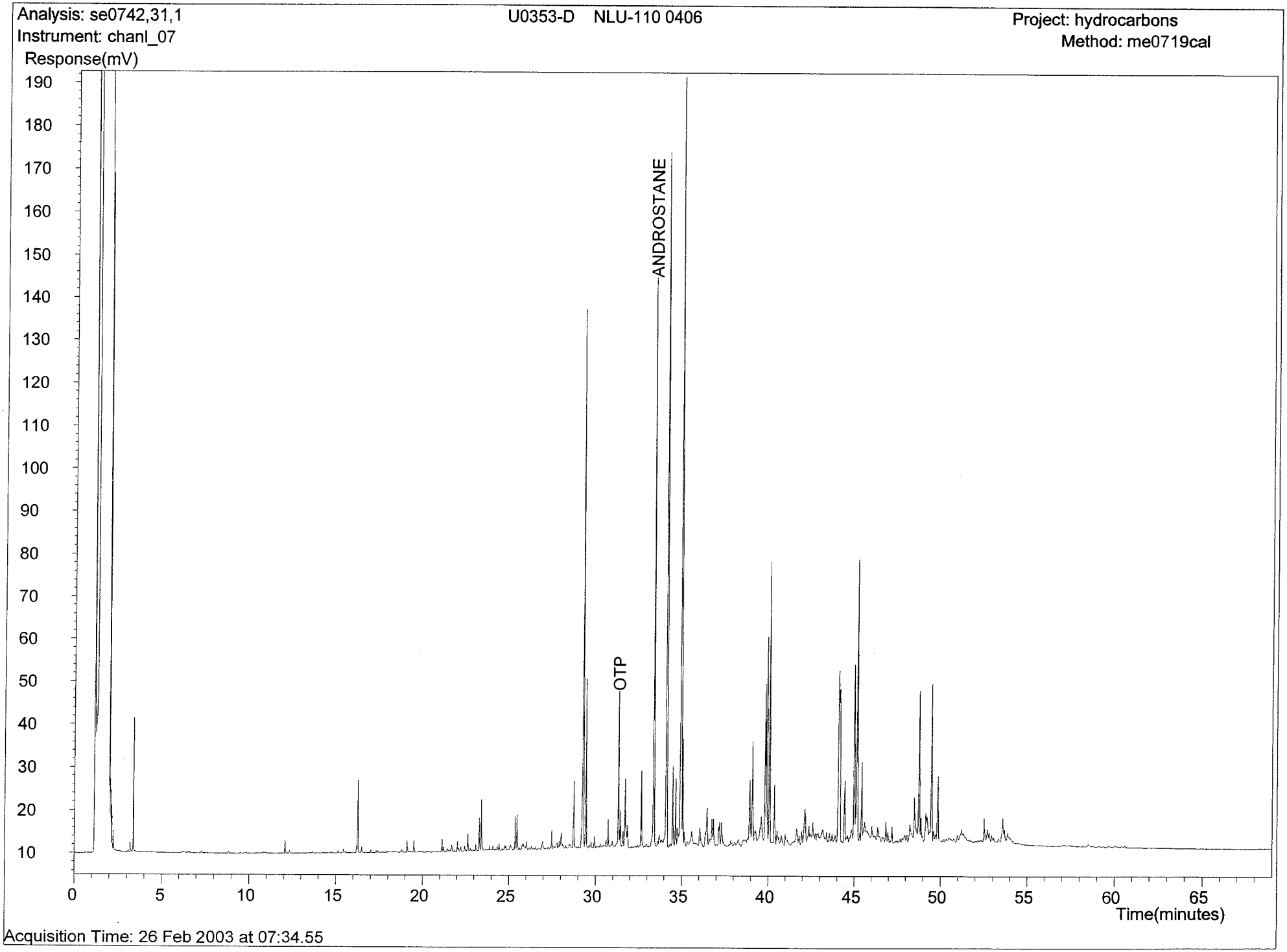

Analysis: se0719,25,1
U0145
NLU-107-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Dec 2002 at 02:33.43

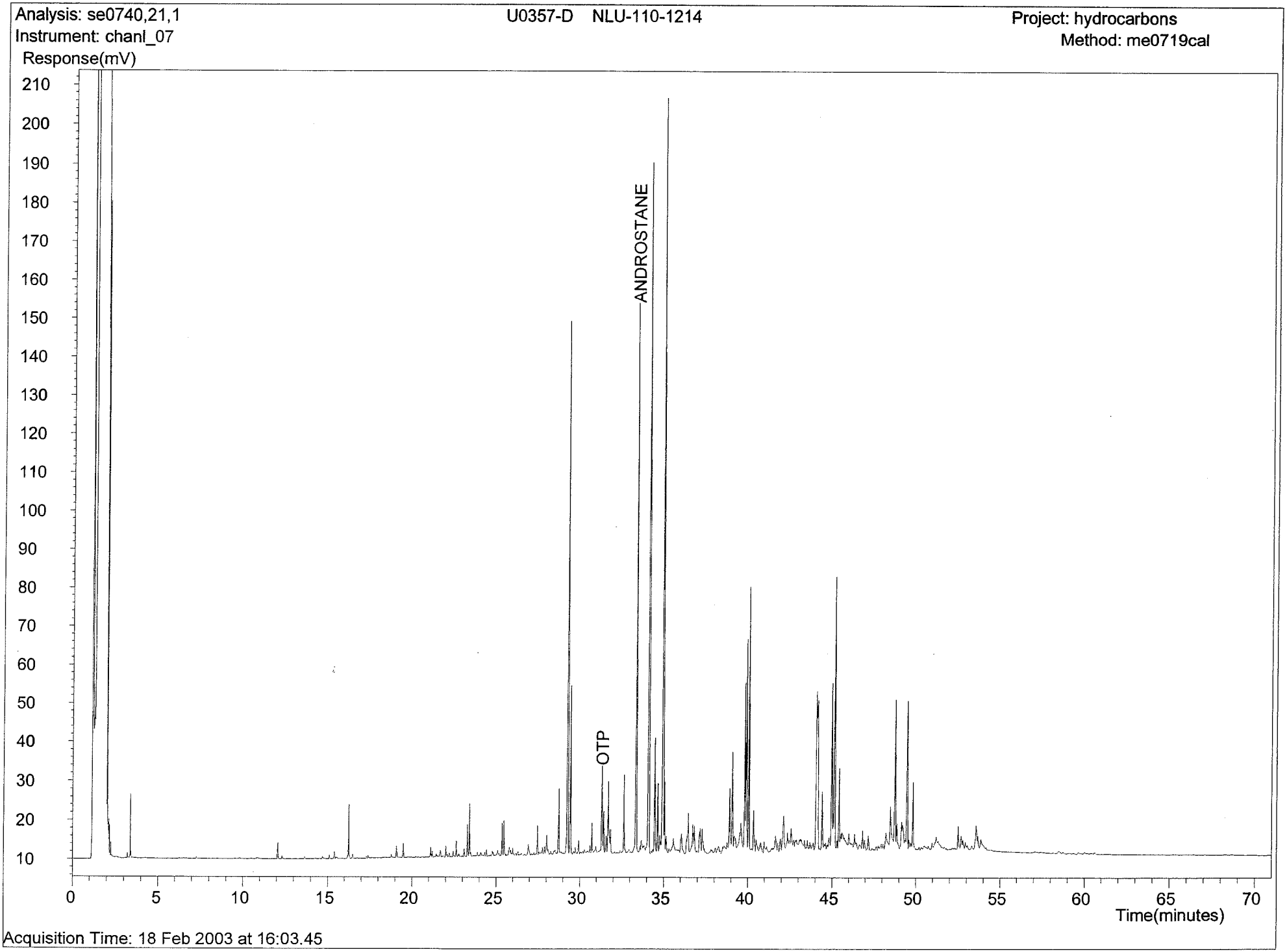

Analysis: se0742,29,1
Instrument: chanl_07
U0277-D NLU-109 1214
Project: hydrocarbons
Method: me0719cal
Response(mV)
OTP
ANDROSTANE
Time(minutes)
Acquisition Time: 26 Feb 2003 at 04:51.08

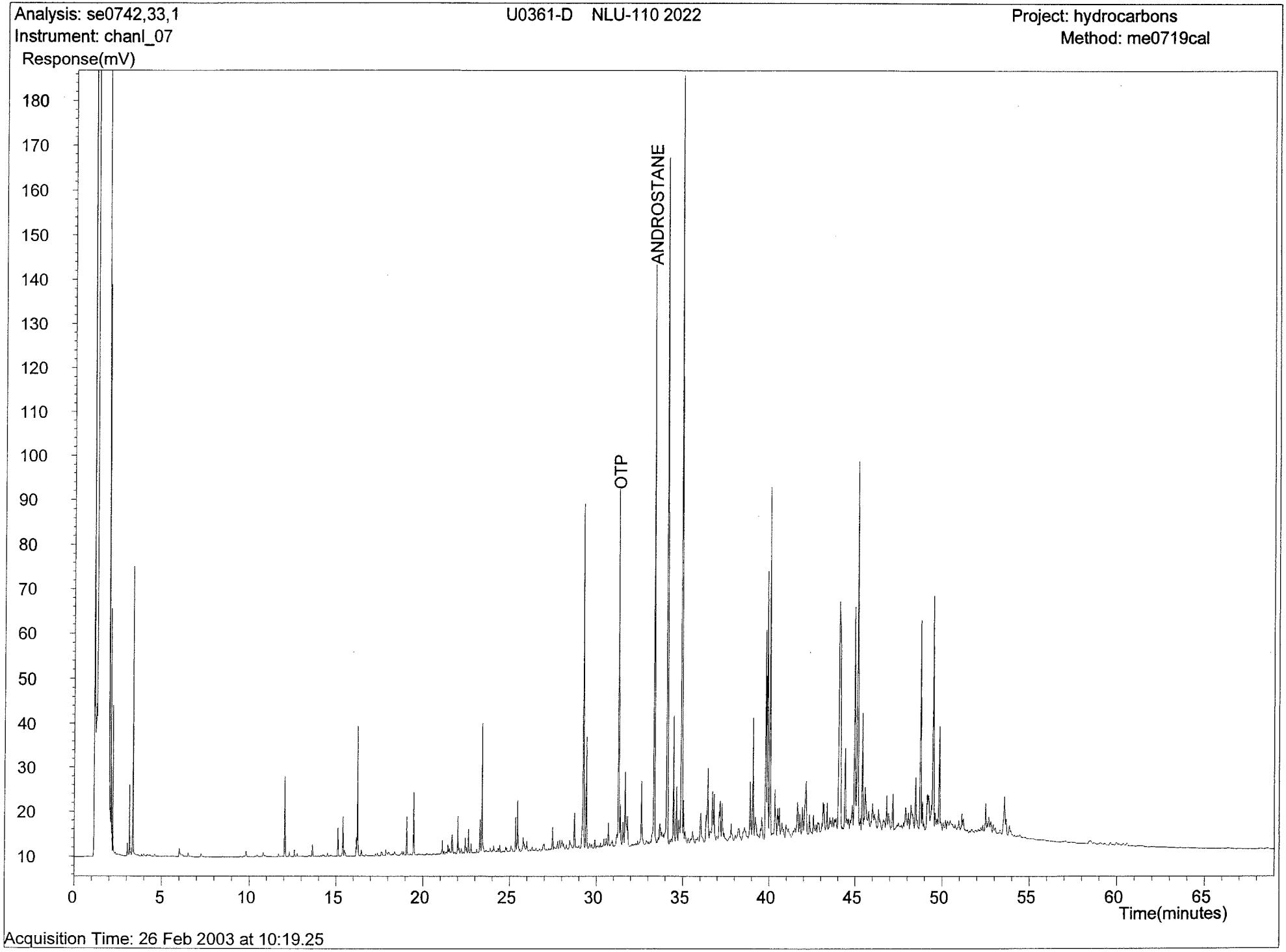

Analysis: se0740,13,1
Instrument: chanl_07
U0285-D NLU-109-2830
Project: hydrocarbons
Method: me0719cal
Response(mV)
56
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 18 Feb 2003 at 04:40.41

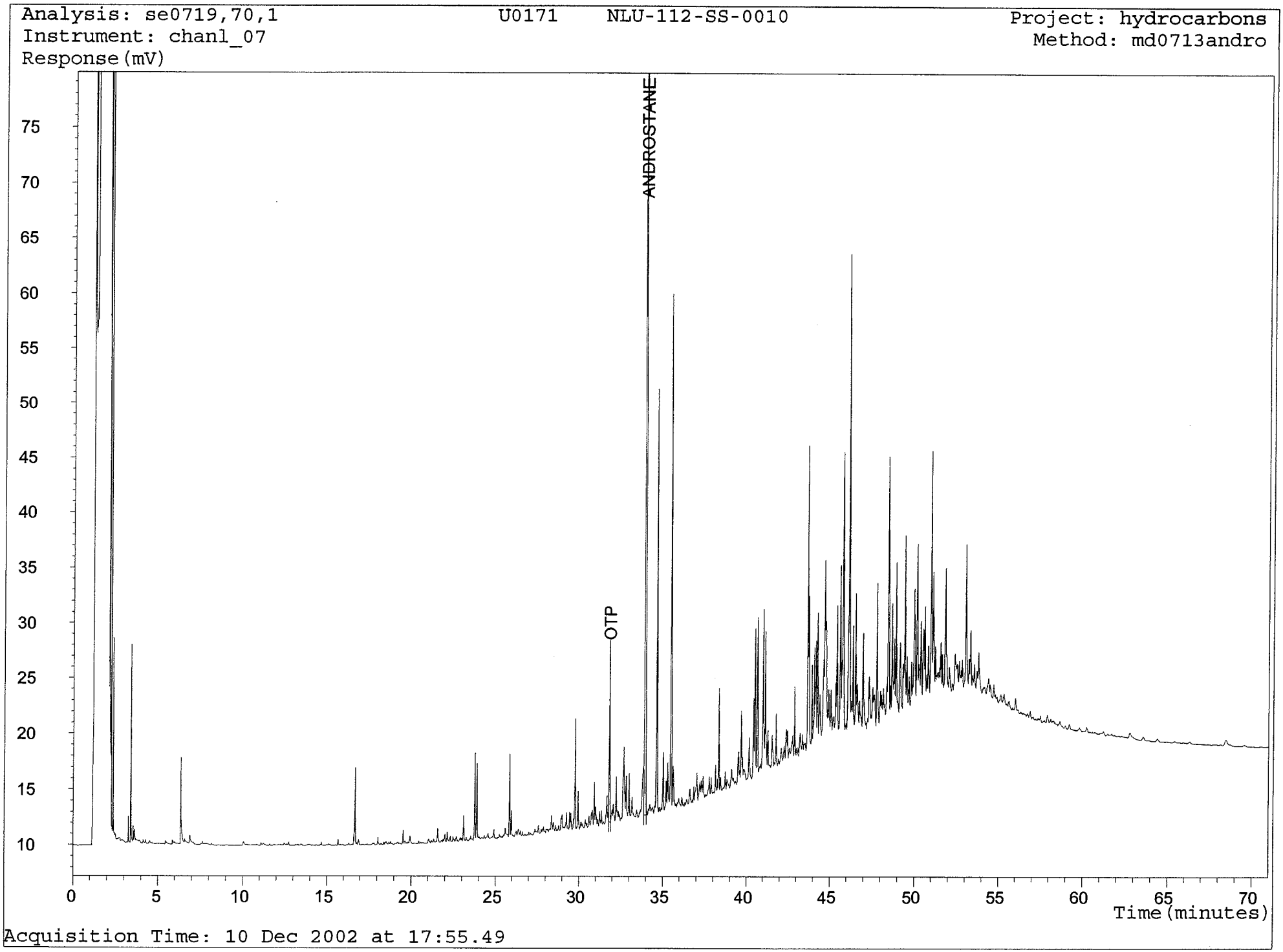

Analysis: se0740,17,1
Instrument: chanl_07
U0285DUP-D NLU-109-2830
Project: hydrocarbons
Method: me0719cal
Response(mV)
OTP
ANDROSTANE
Time(minutes)
Acquisition Time: 18 Feb 2003 at 10:21.38

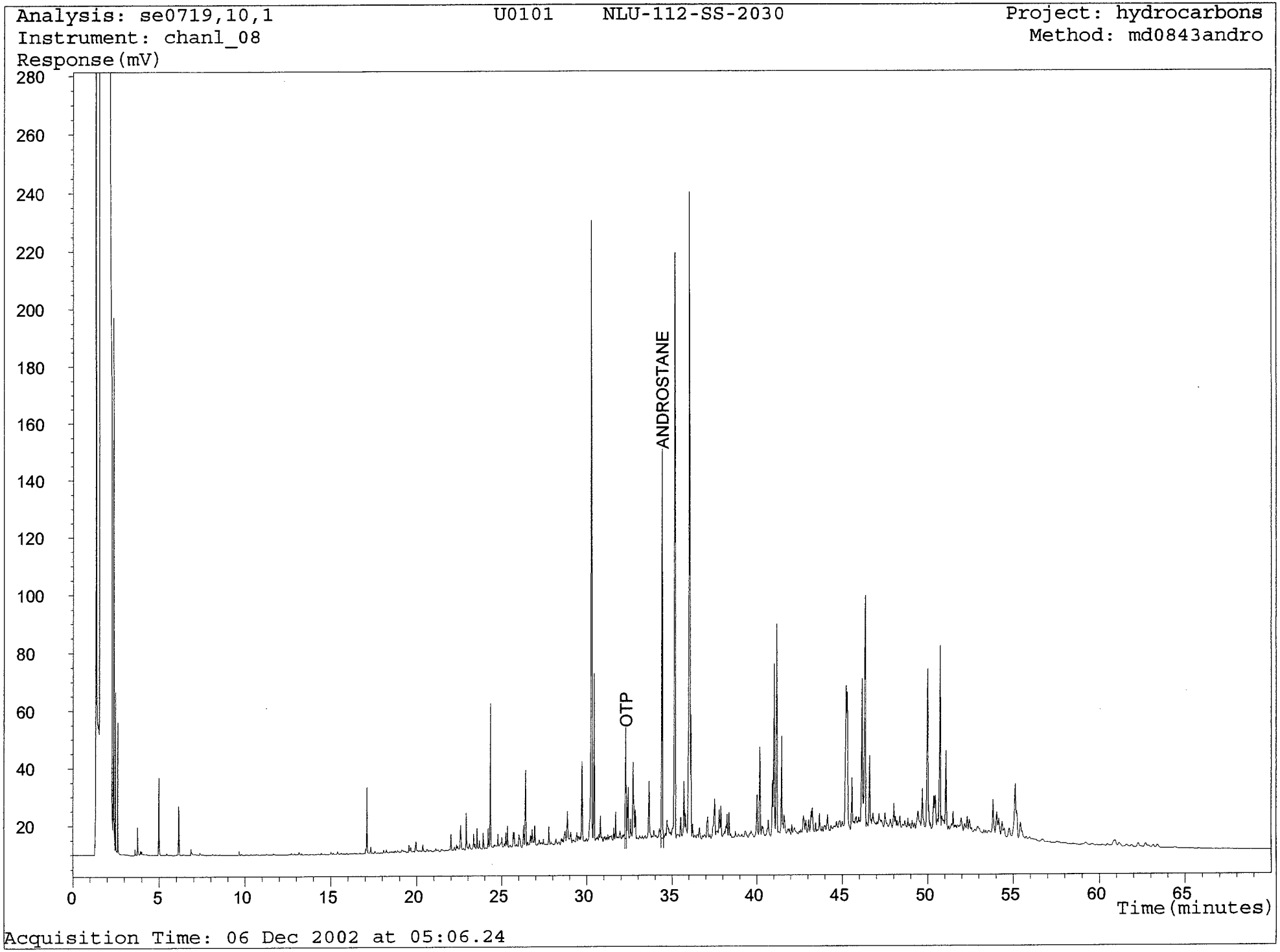

Analysis: se0740,33,1
Instrument: chanl_07
U0290-D NLU-109-3840
Project: hydrocarbons
Method: me0719cal
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 19 Feb 2003 at 09:09.58

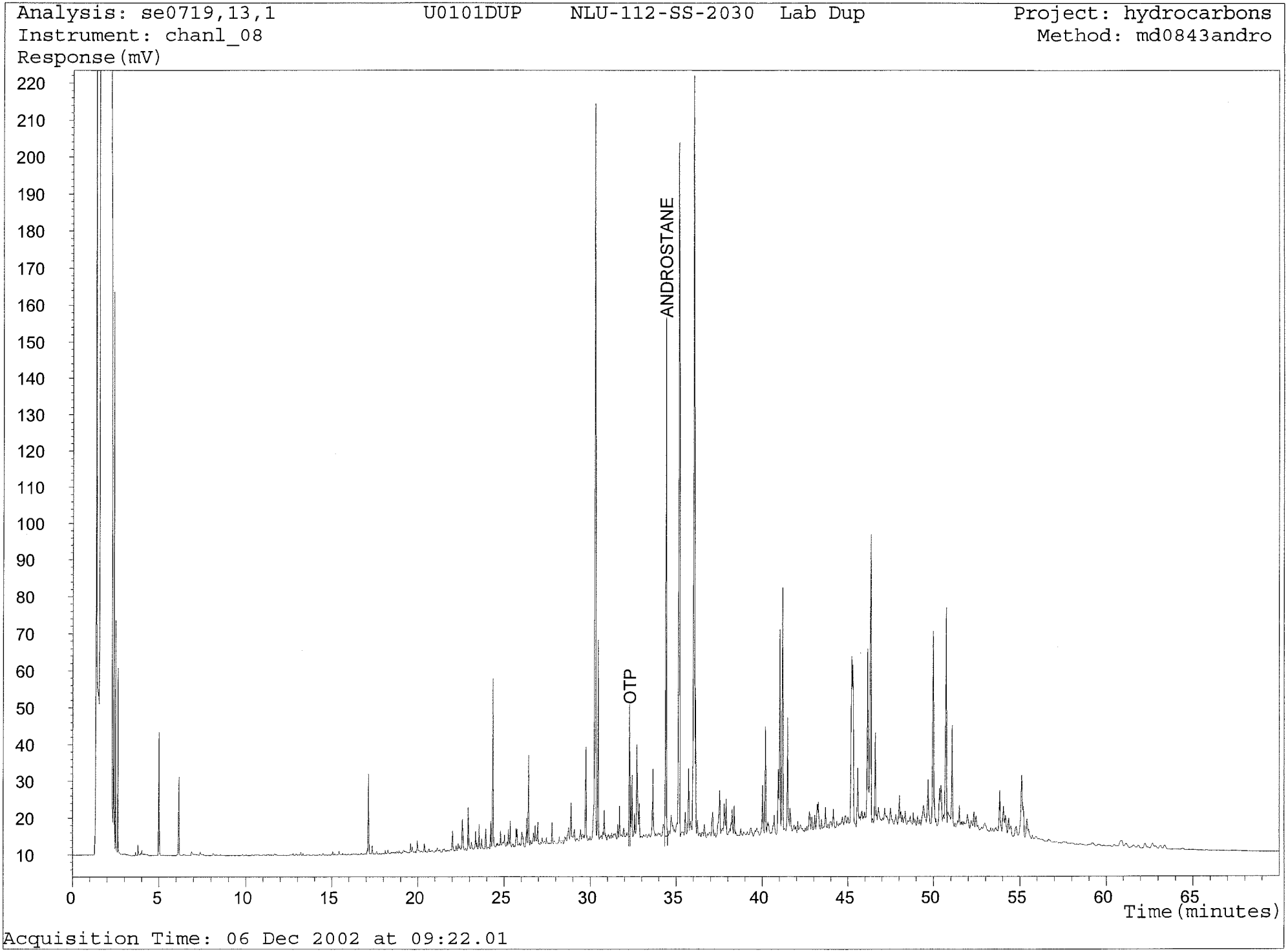

Analysis: se0742,31,1
Instrument: chanl_07
U0353-D NLU-110 0406
Project: hydrocarbons
Method: me0719cal
Response(mV)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 26 Feb 2003 at 07:34.55

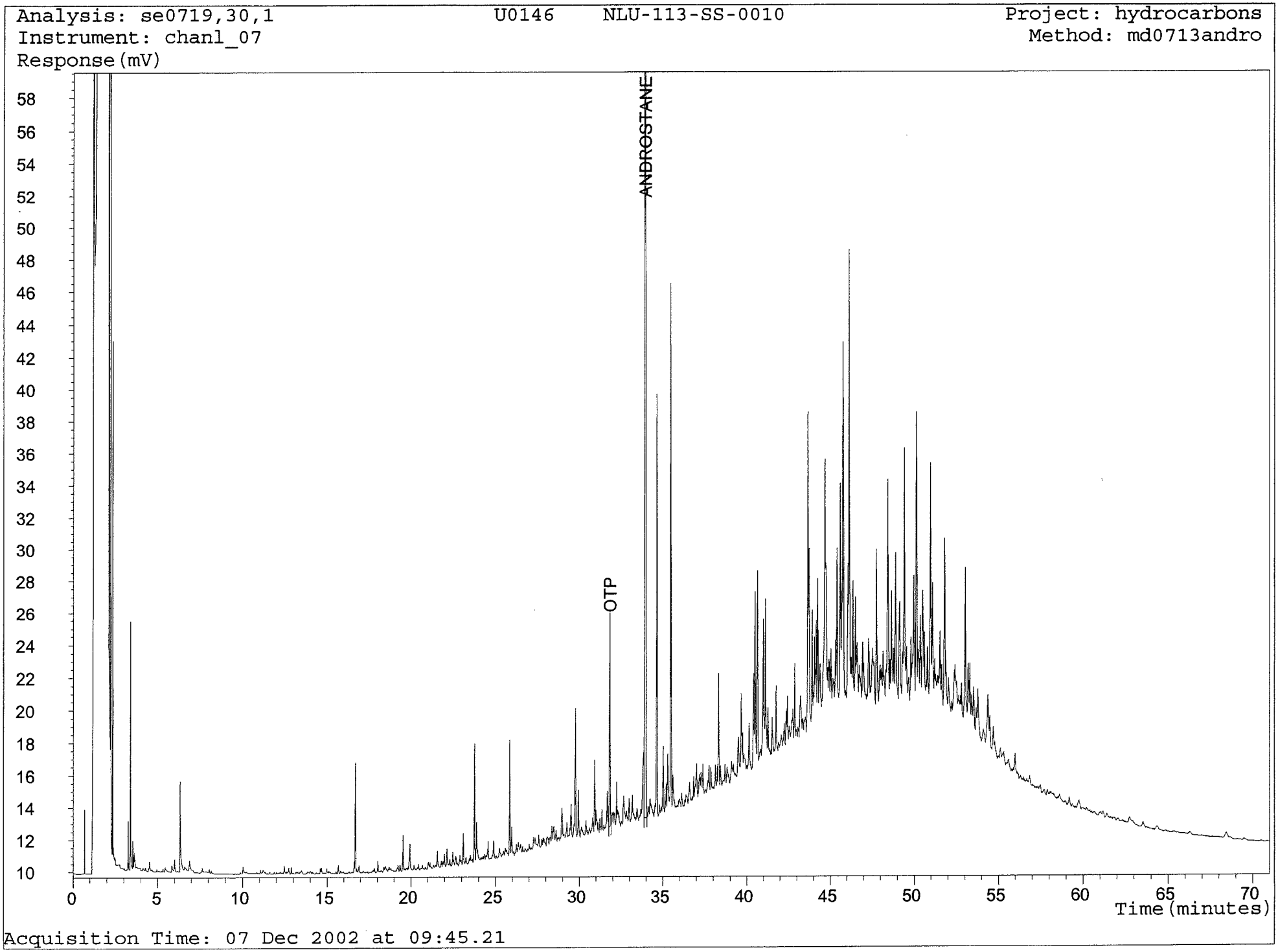

Analysis: se0740,21,1
Instrument: chanl_07
U0357-D NLU-110-1214
Project: hydrocarbons
Method: me0719cal
Response(mV)
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 18 Feb 2003 at 16:03.45

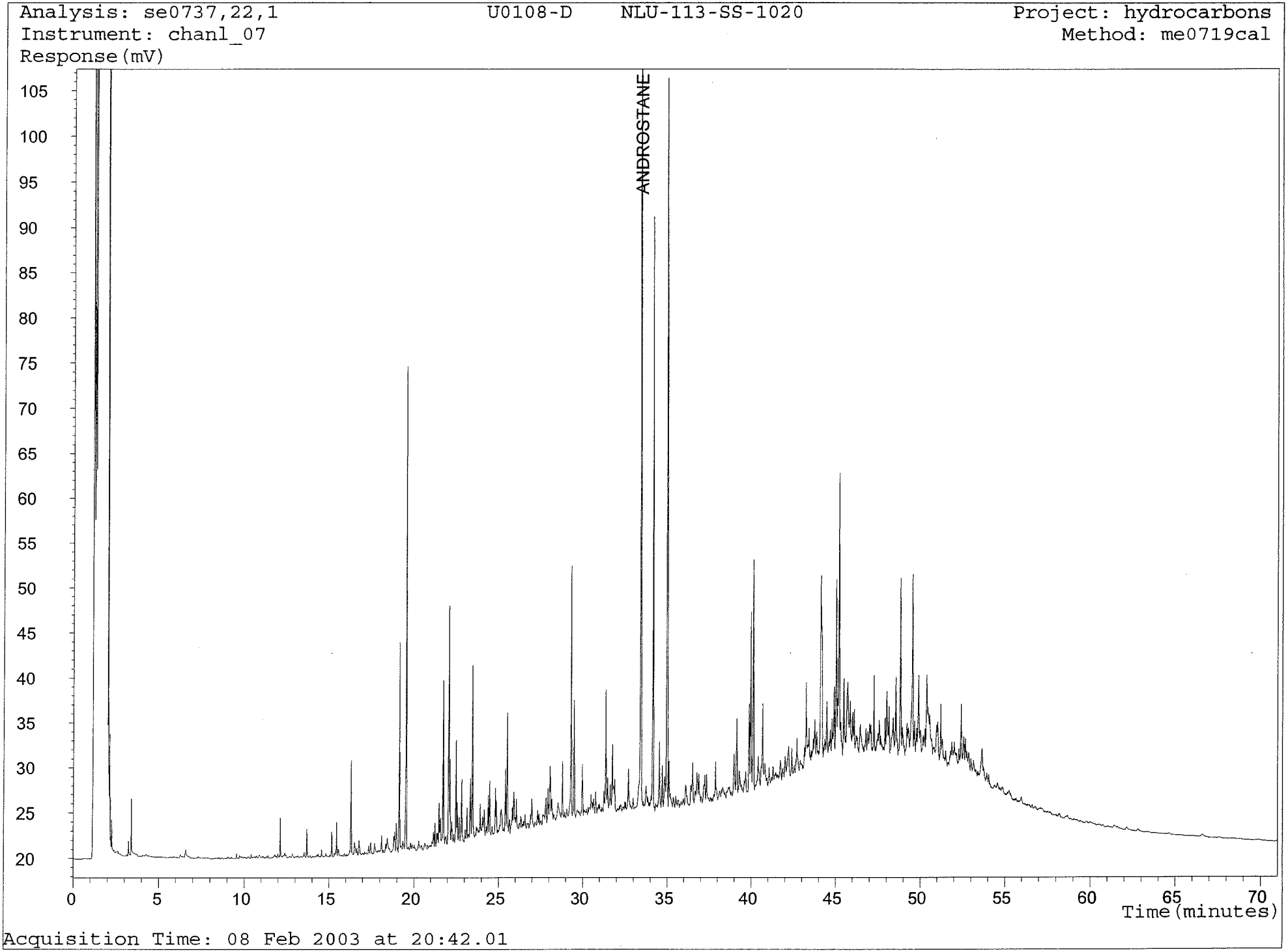

Analysis: se0742,33,1
Instrument: chanl_07
U0361-D NLU-110 2022
Project: hydrocarbons
Method: me0719cal
Response(mV)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 26 Feb 2003 at 10:19.25

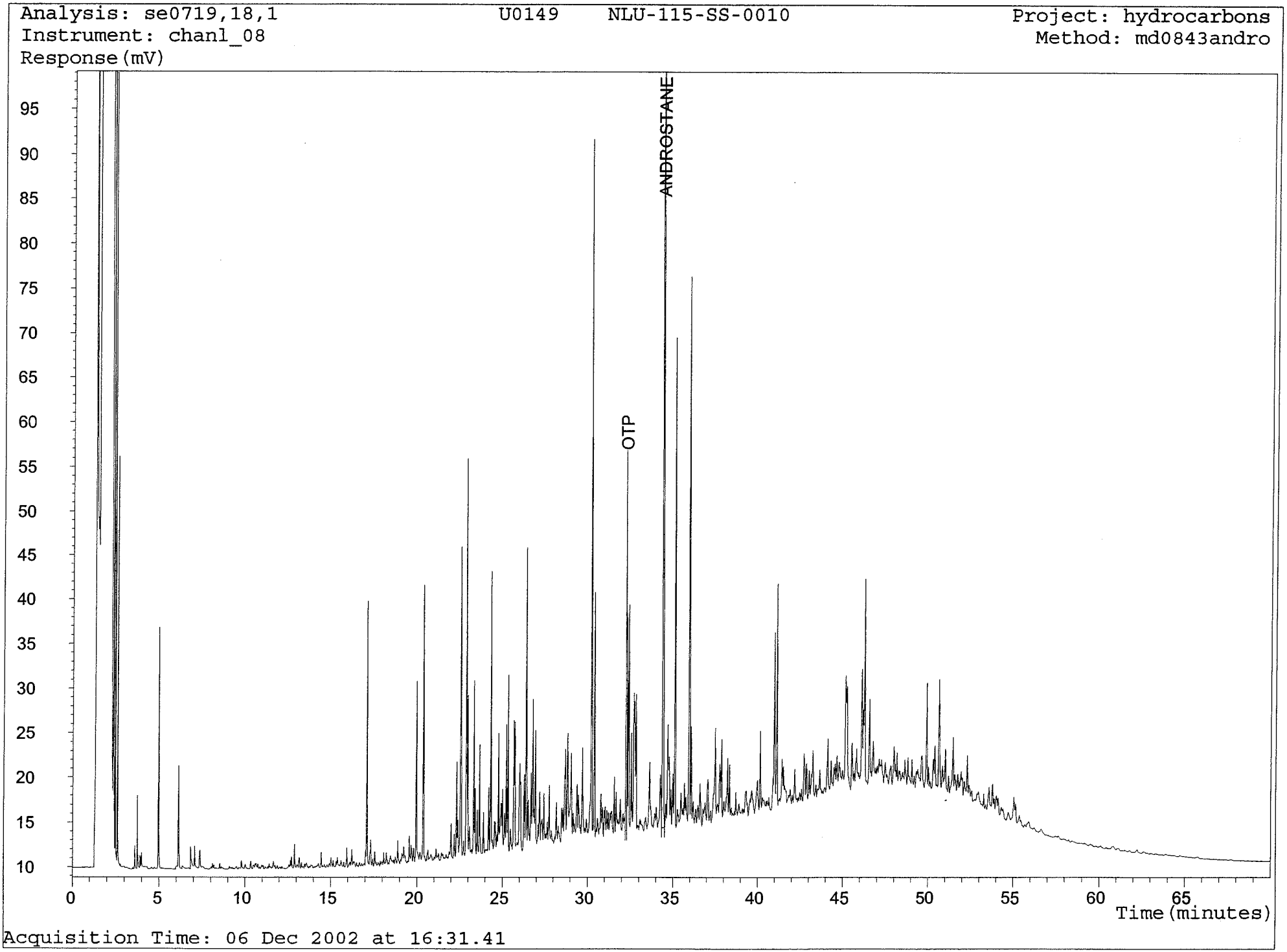

Analysis: se0719,70,1
U0171
NLU-112-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
75
70
65
60
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Dec 2002 at 17:55.49

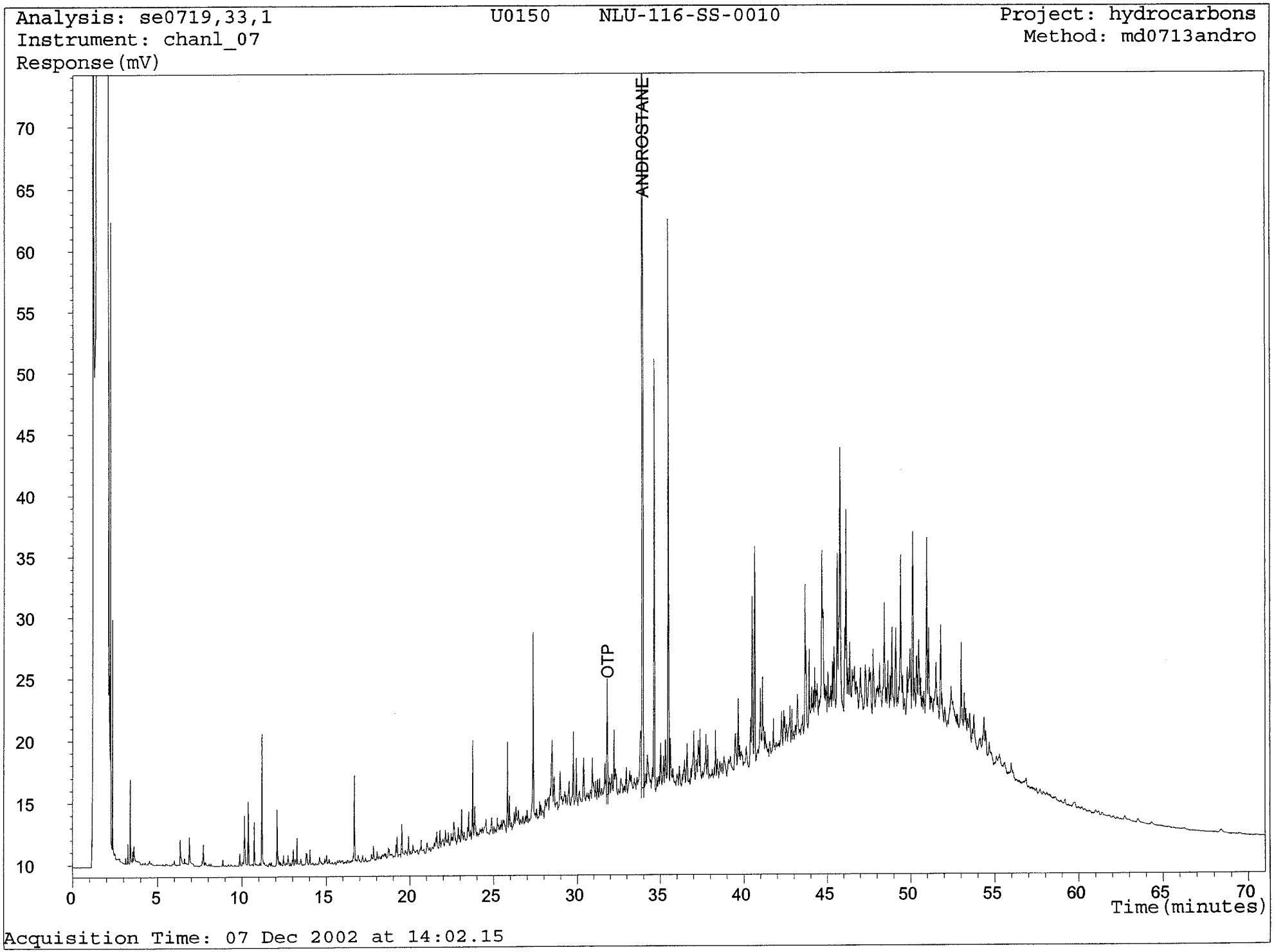

Analysis: se0719,10,1
U0101 NLU-112-SS-2030
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
280
260
240
220
200
180
160
140
120
100
80
60
40
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 05:06.24

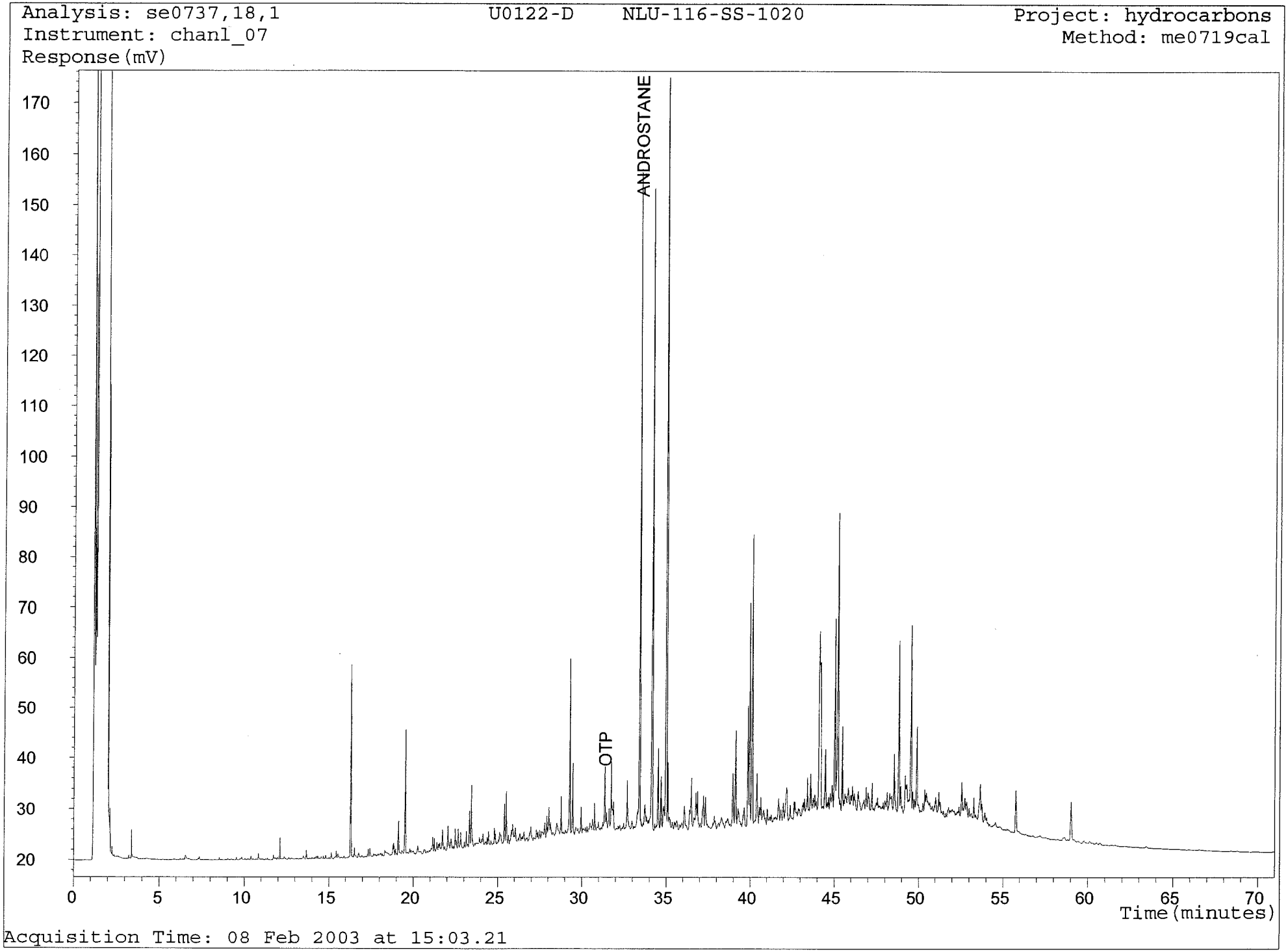

Analysis: se0719,13,1
U0101DUP
NLU-112-SS-2030 Lab Dup
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 09:22.01


Analysis: se0719,30,1
U0146
NLU-113-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 07 Dec 2002 at 09:45.21


Analysis: se0737,22,1
U0108-D
NLU-113-SS-1020
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
ANDROSTANE
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 08 Feb 2003 at 20:42.01

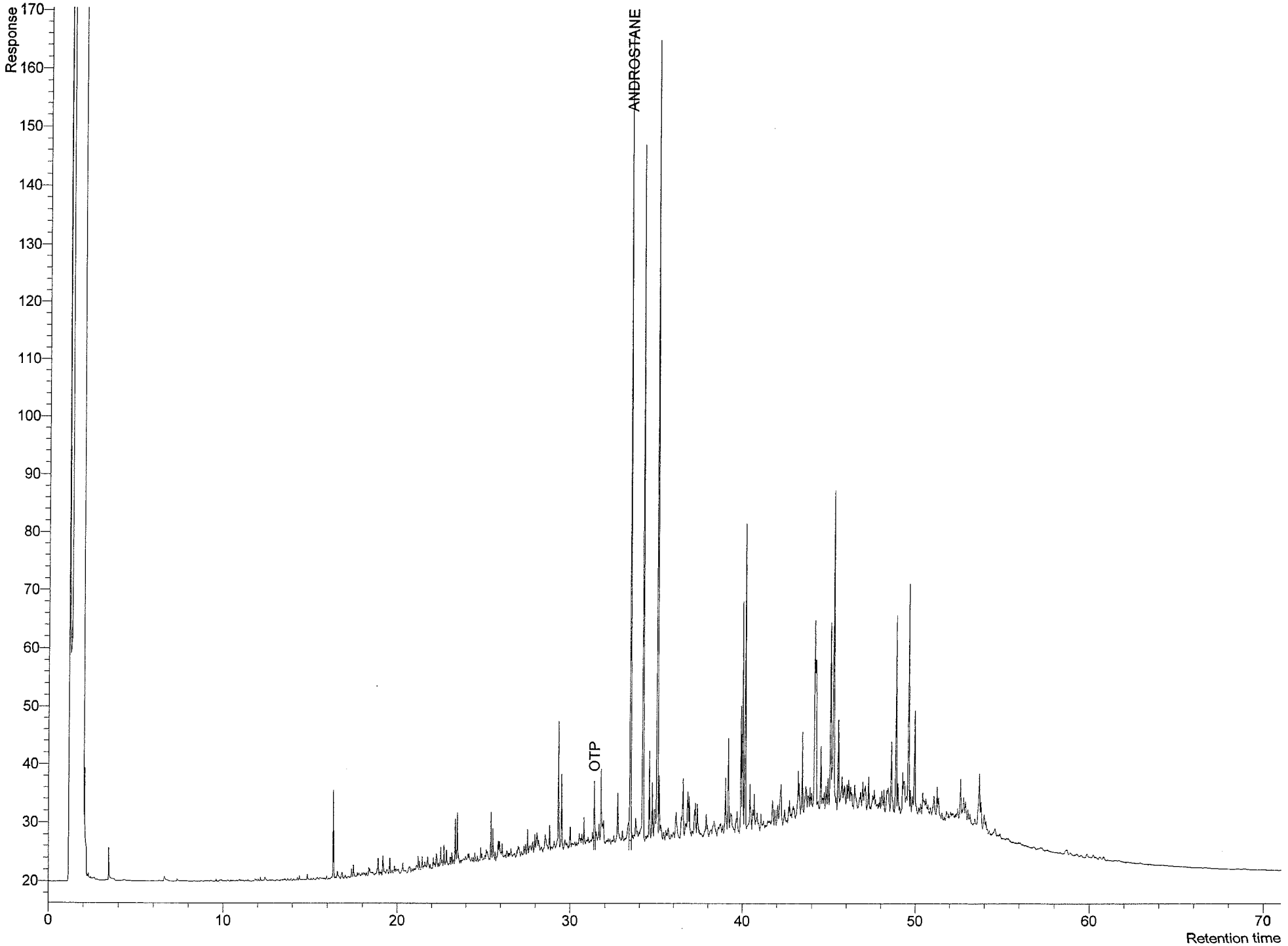

Analysis: se0719,18,1
U0149
NLU-115-SS-0010
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 16:31.41


Analysis: se0719,33,1
U0150
NLU-116-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
70
65
60
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Dec 2002 at 14:02.15


Analysis: se0737,18,1
U0122-D
NLU-116-SS-1020
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 08 Feb 2003 at 15:03.21

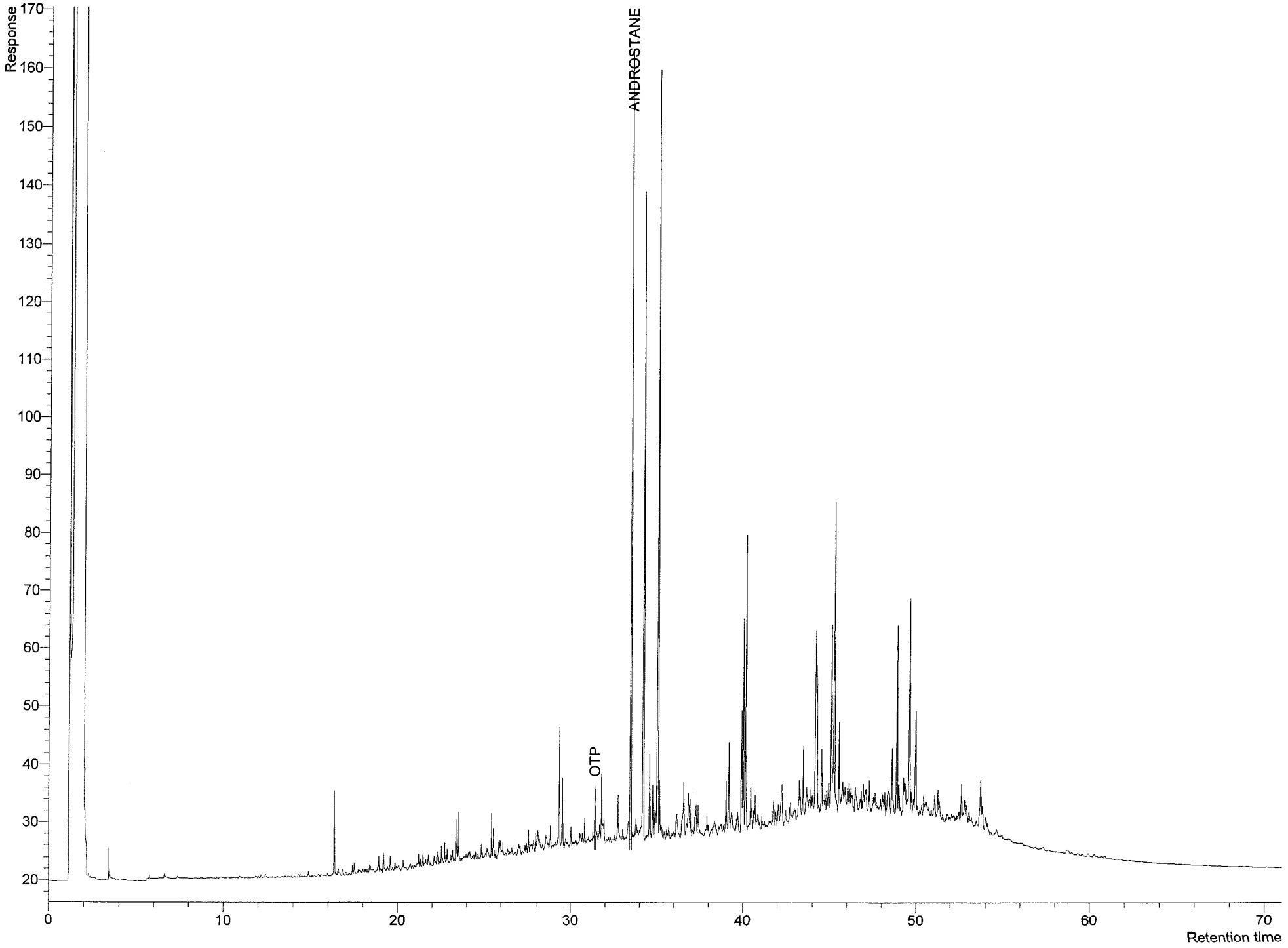
U0123-D NLU-116-SS-2030 (10,1)
Acquired Monday, January 13, 2003 11:53:16 PM

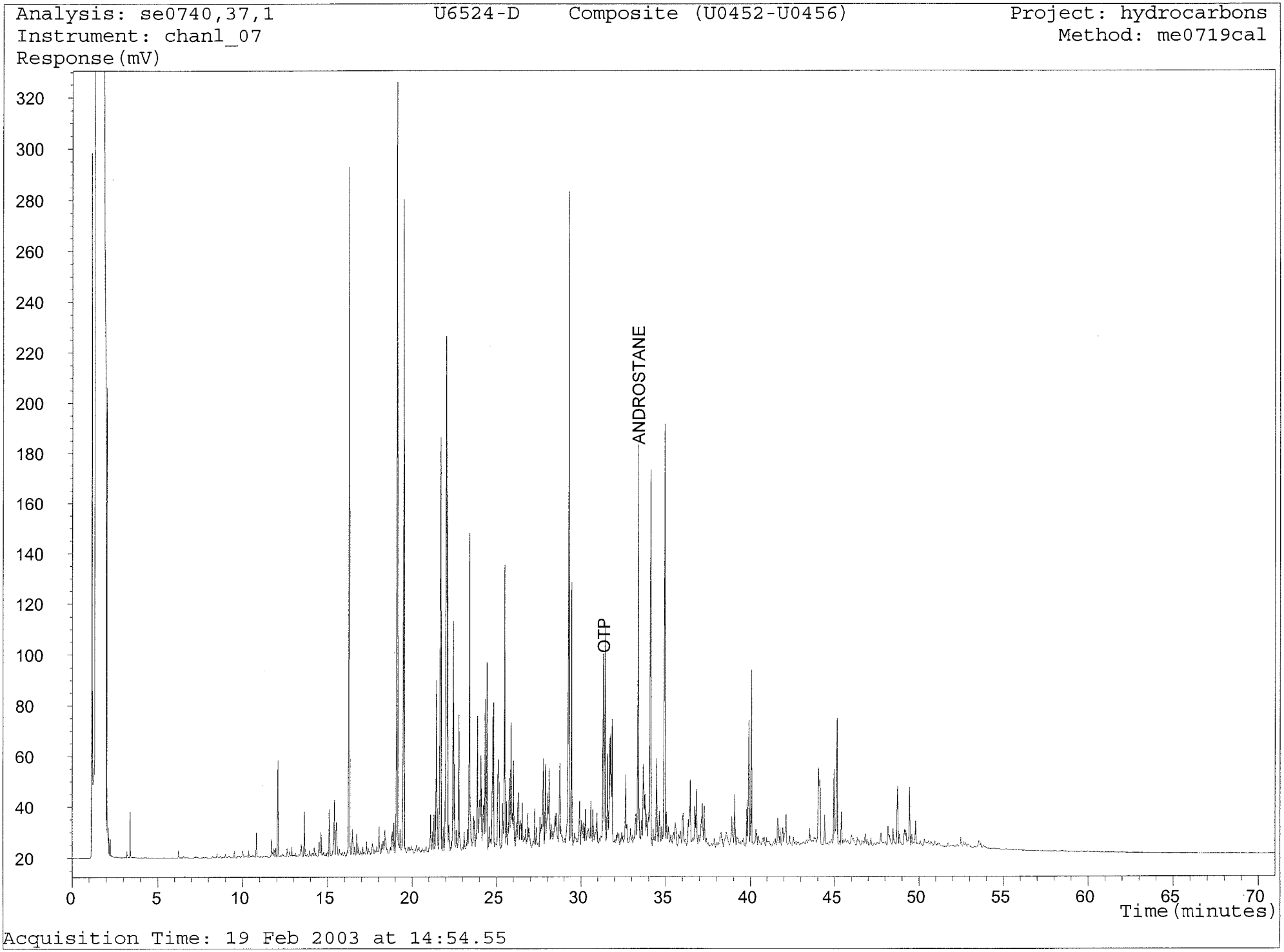
hydrocarbon,Chanl_07.se0730,10,1

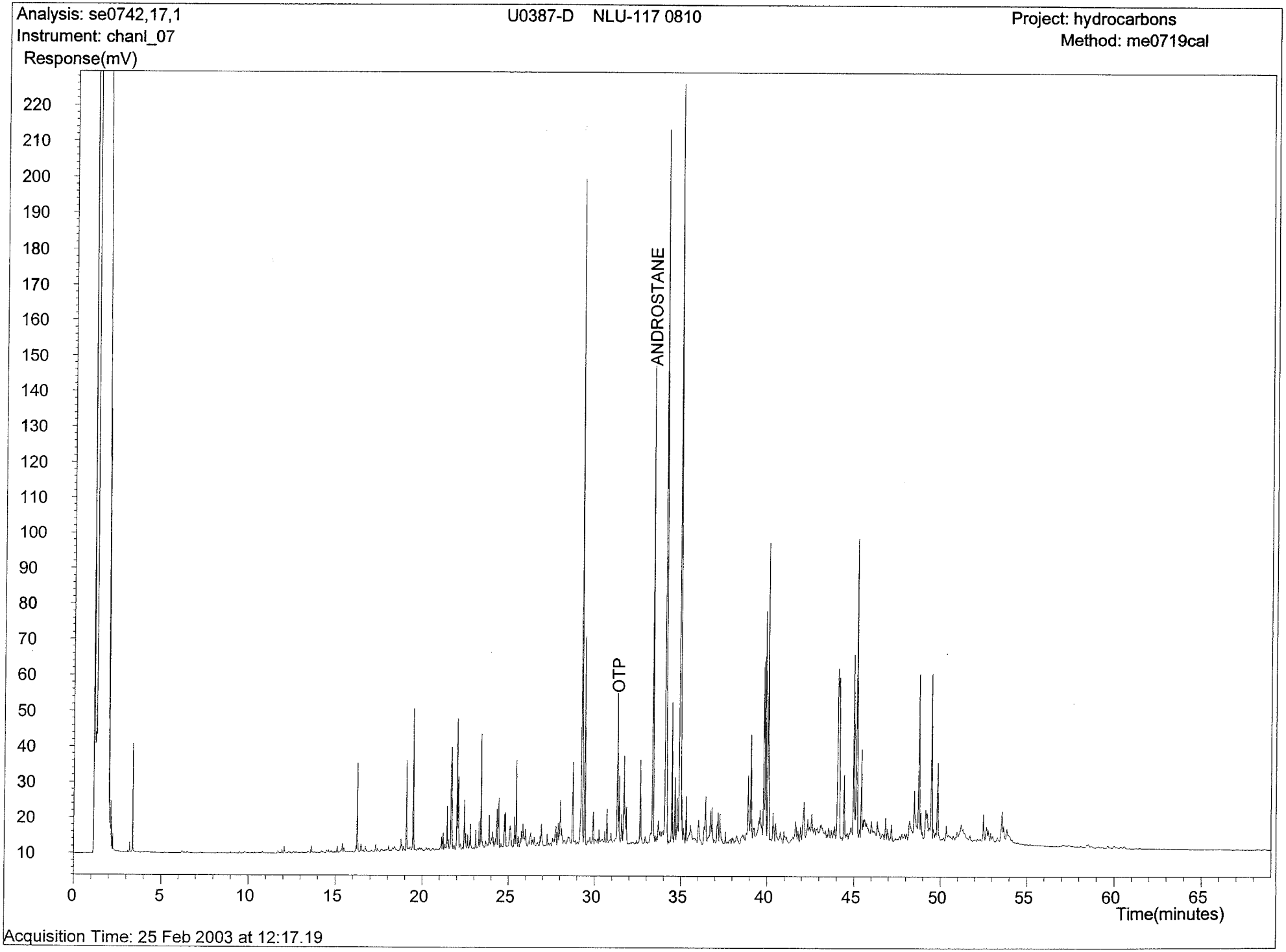


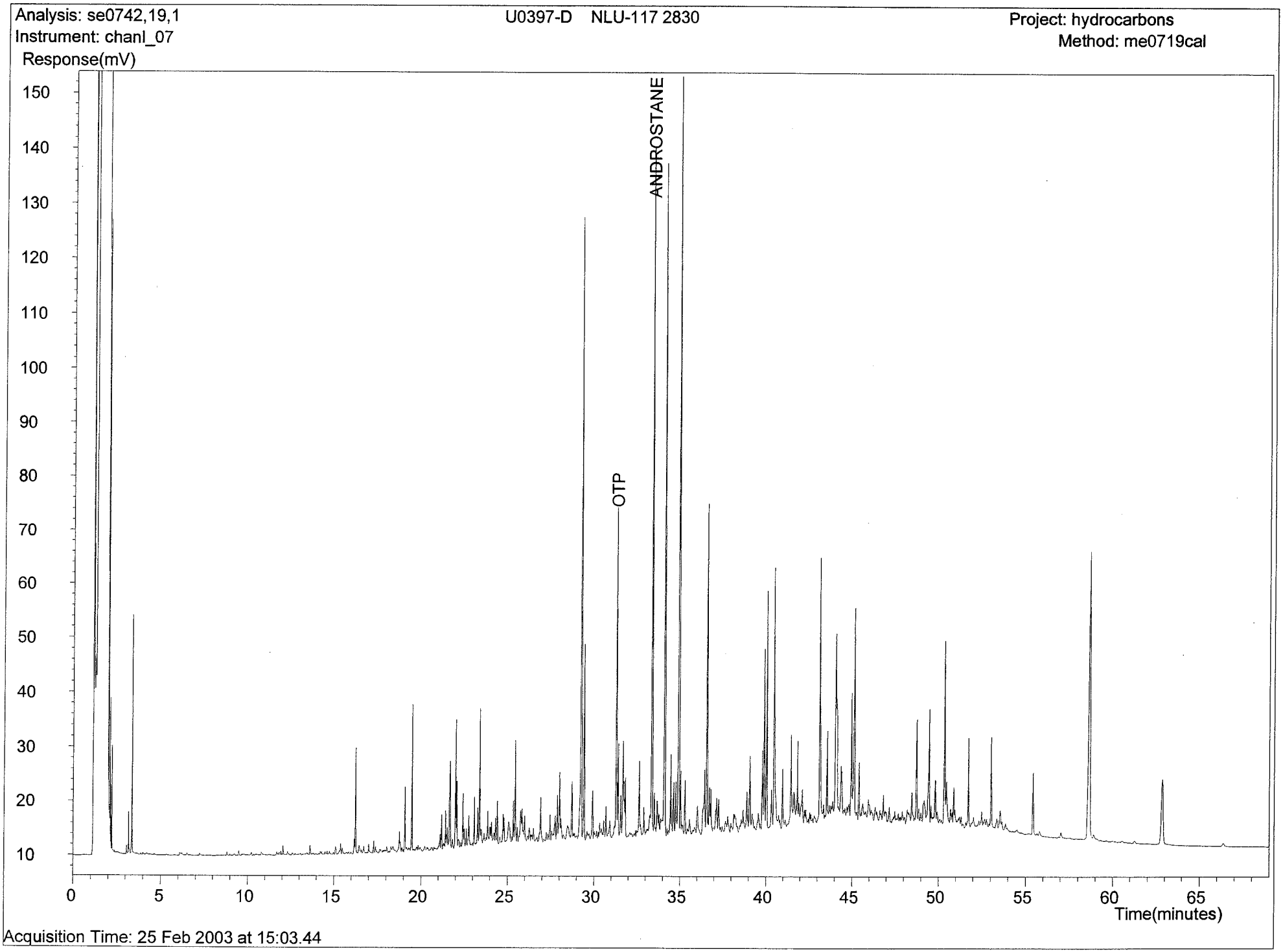
U0123DUP-D NLU-116-SS-2030 (15,1)
Acquired Tuesday, January 14, 2003 6:52:56 AM

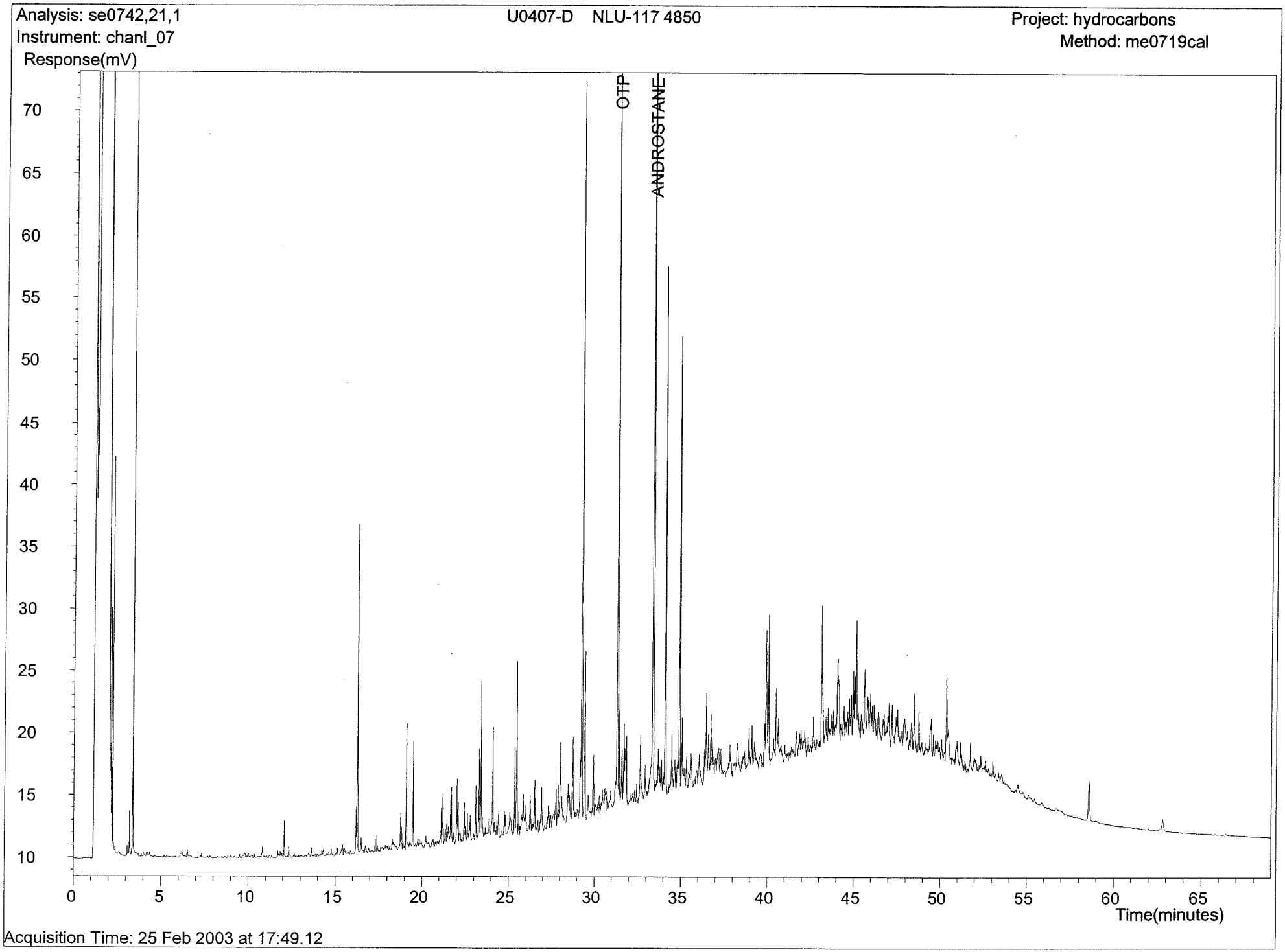
hydrocarbon,Chanl_07.se0730,15,1

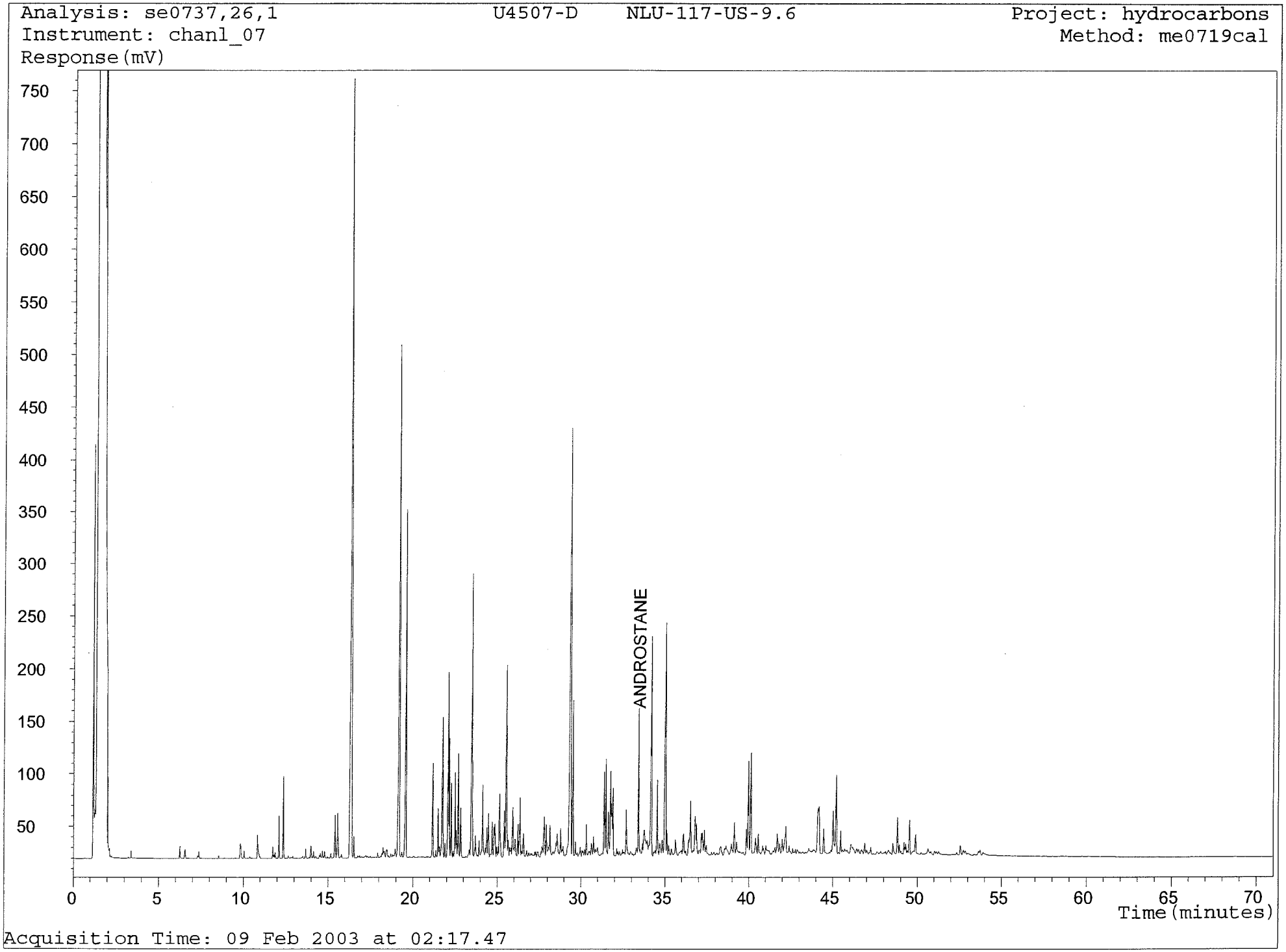


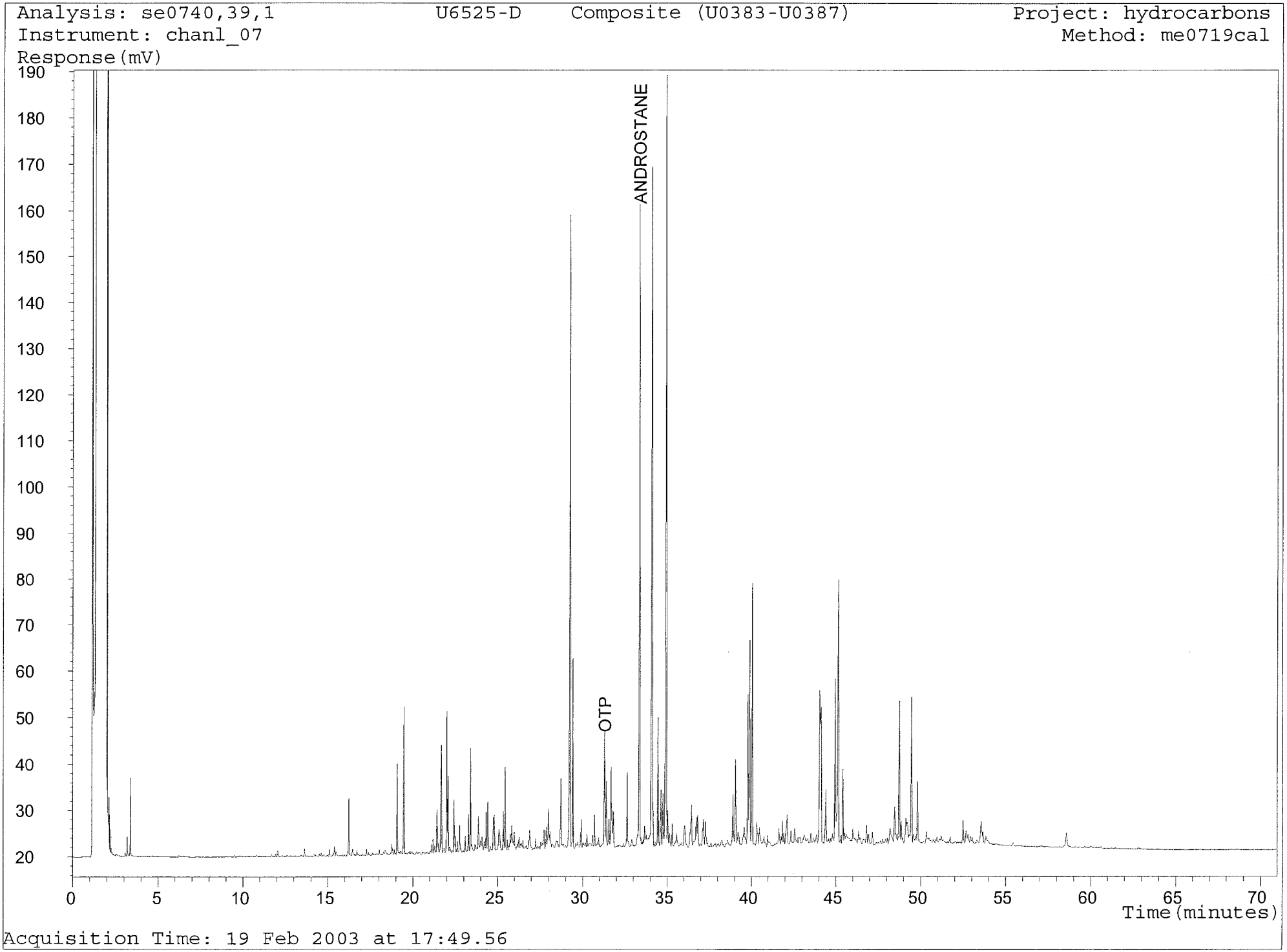

Analysis: se0740,37,1
U6524-D Composite (U0452-U0456)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 19 Feb 2003 at 14:54.55

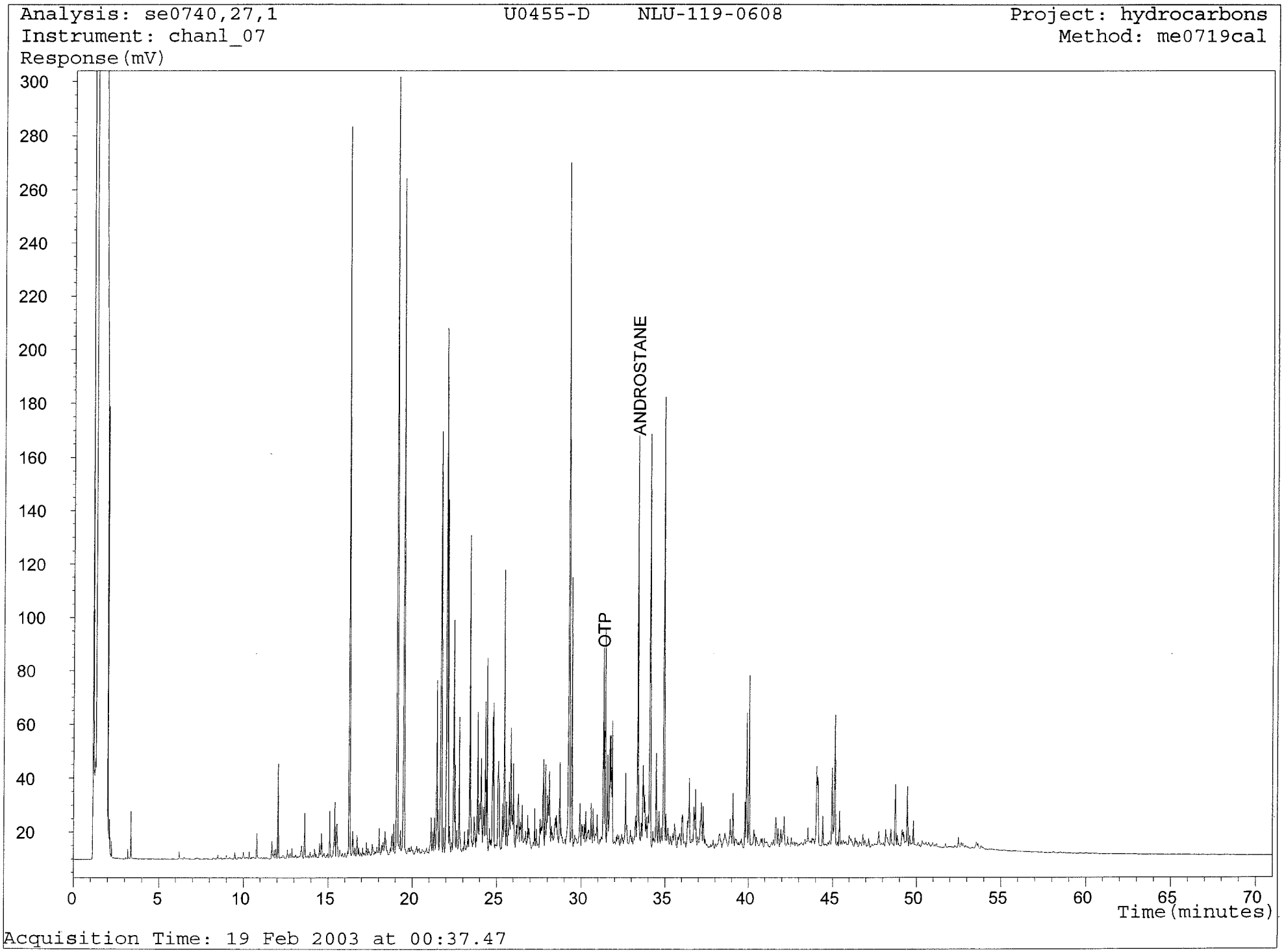

Analysis: se0742,17,1
Instrument: chanl_07
U0387-D NLU-117 0810
Project: hydrocarbons
Method: me0719cal
Response(mV)
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 25 Feb 2003 at 12:17.19

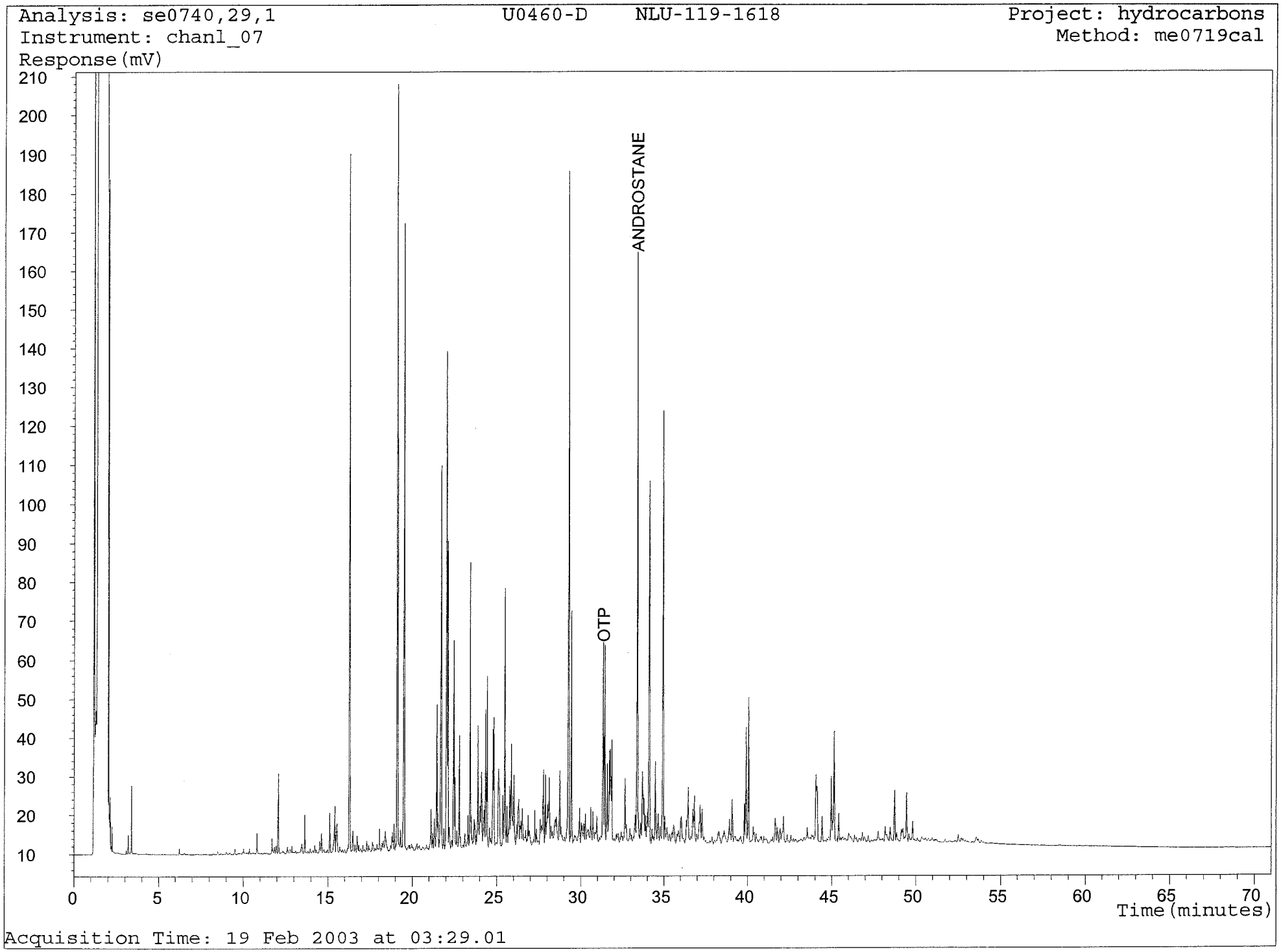

Analysis: se0742,19,1
Instrument: chanl_07
U0397-D NLU-117 2830
Project: hydrocarbons
Method: me0719cal
Response(mV)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 25 Feb 2003 at 15:03.44

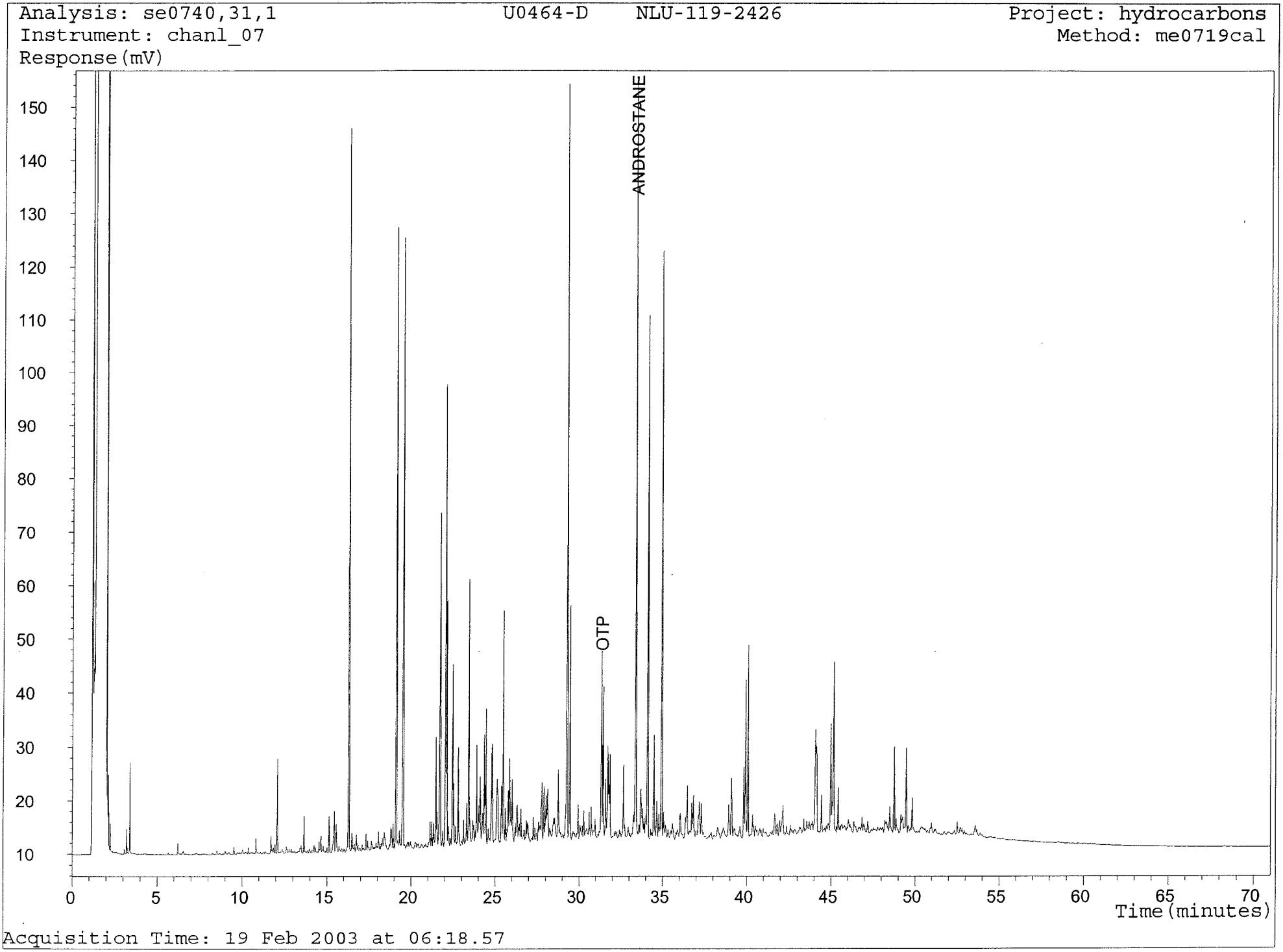

Analysis: se0742,21,1
Instrument: chanl_07
Response(mV)
U0407-D NLU-117 4850
Project: hydrocarbons
Method: me0719cal
OTP
ANDROSTANE
70
65
60
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 25 Feb 2003 at 17:49.12

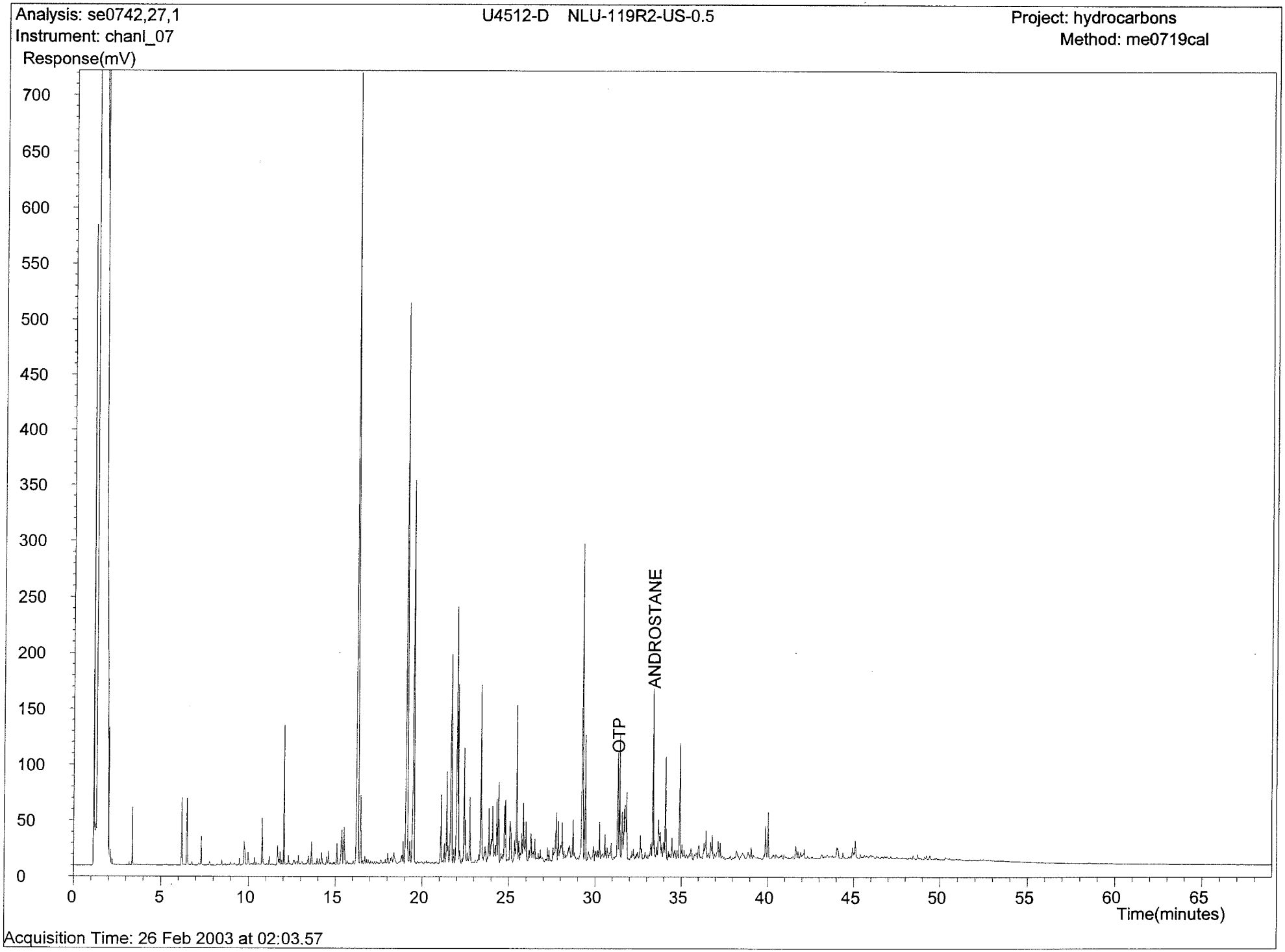

Analysis: se0737,26,1
U4507-D
NLU-117-US-9.6
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Feb 2003 at 02:17.47

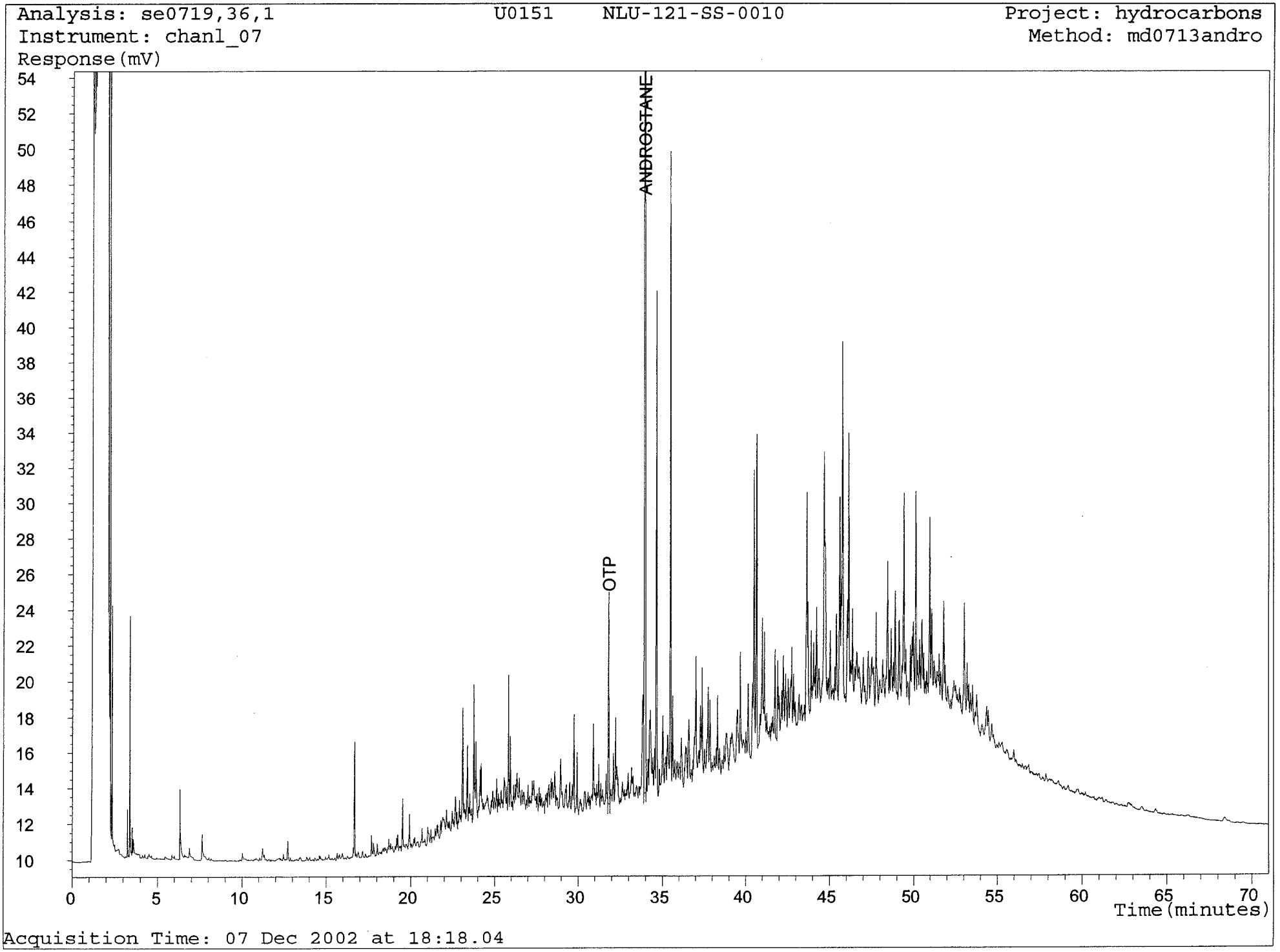

Analysis: se0740,39,1
U6525-D
Composite (U0383-U0387)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 19 Feb 2003 at 17:49.56

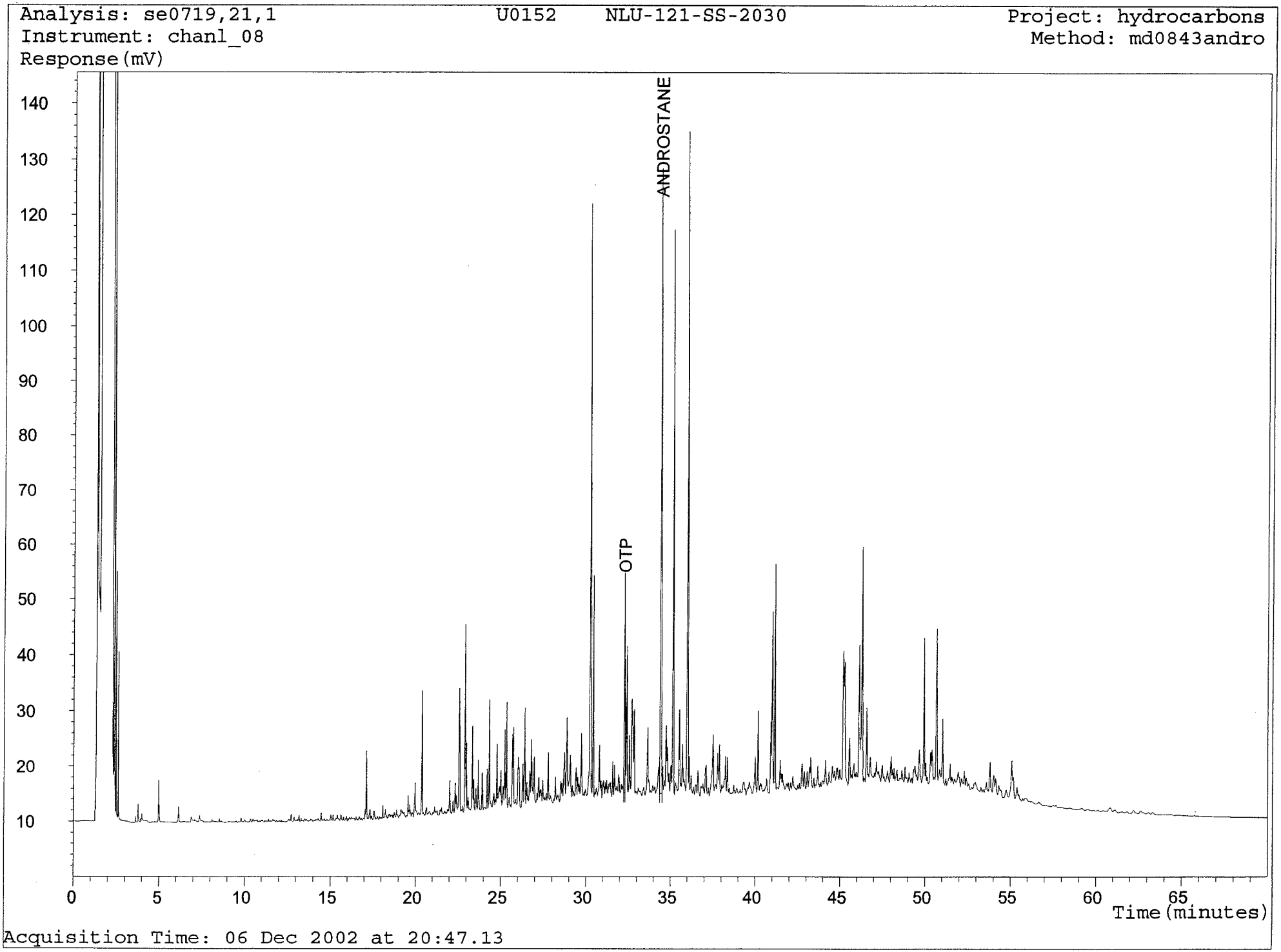

Analysis: se0740,27,1
U0455-D NLU-119-0608
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
ANDROSTANE
OTP
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70
Time(minutes)
Acquisition Time: 19 Feb 2003 at 00:37.47

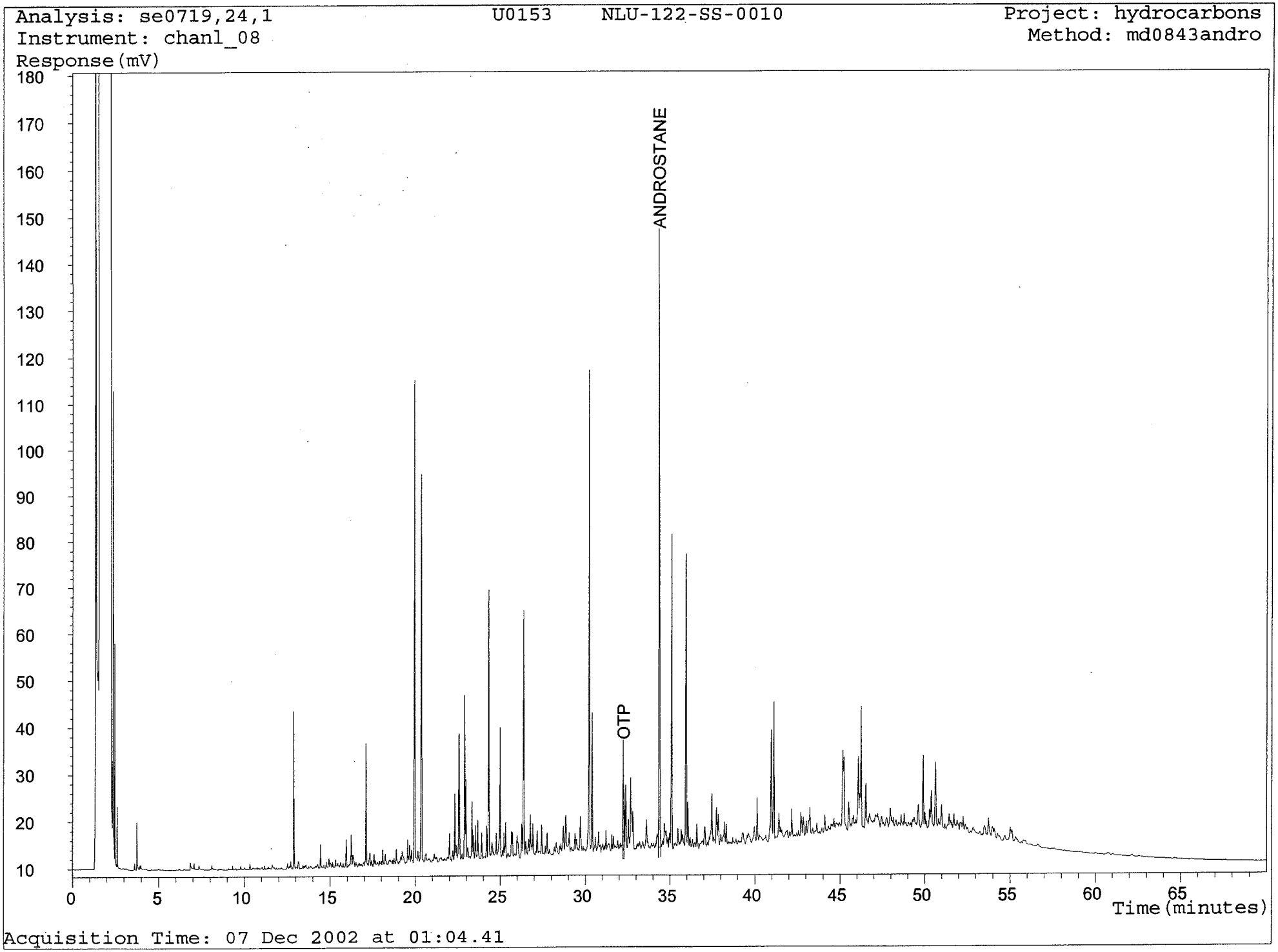

Analysis: se0740,29,1
U0460-D NLU-119-1618
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 19 Feb 2003 at 03:29.01

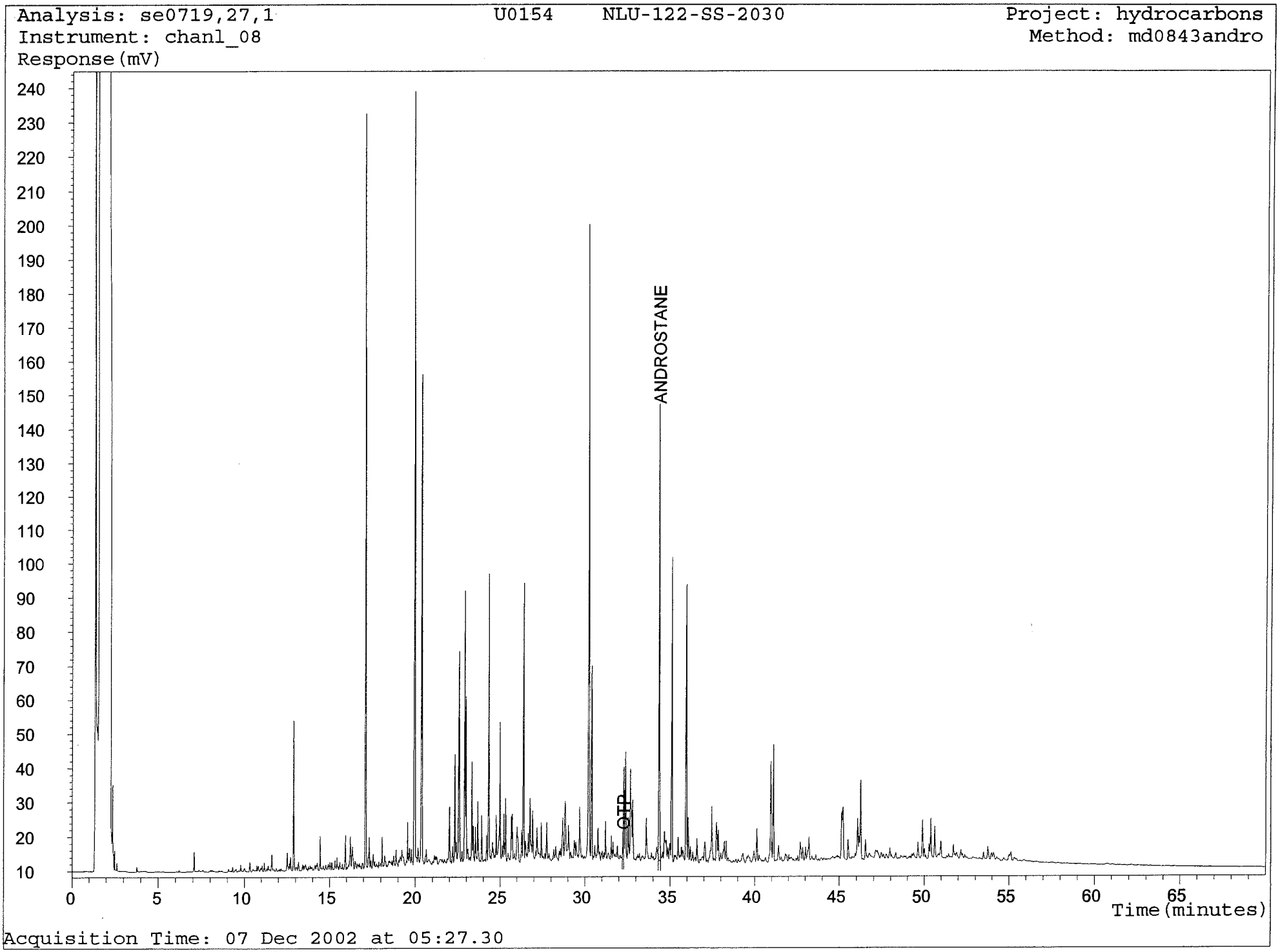

Analysis: se0740,31,1
U0464-D
NLU-119-2426
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 19 Feb 2003 at 06:18.57

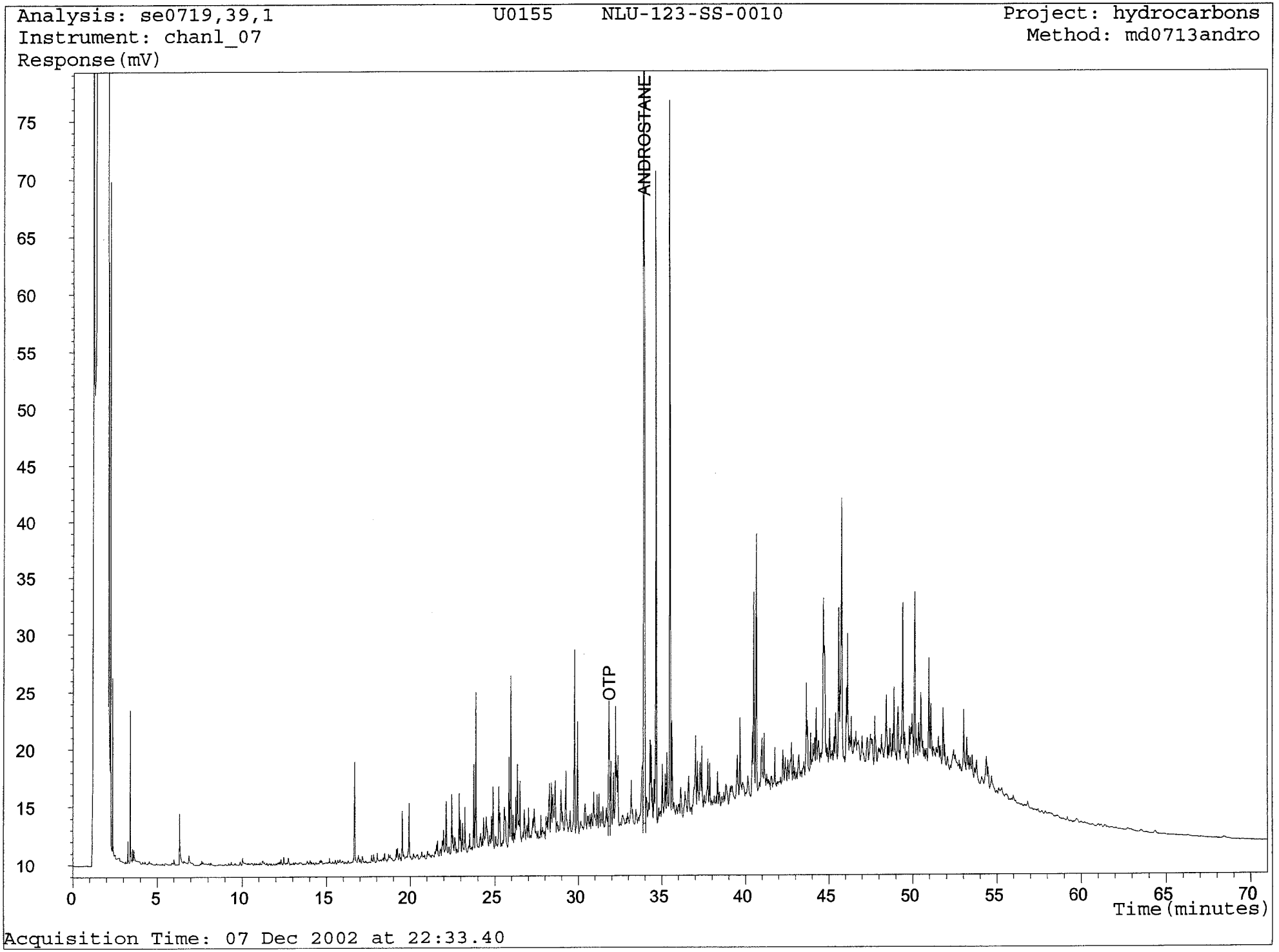

Analysis: se0742,27,1
Instrument: chanl_07
U4512-D NLU-119R2-US-0.5
Project: hydrocarbons
Method: me0719cal
Response(mV)
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
OTP
ANDROSTANE
Acquisition Time: 26 Feb 2003 at 02:03.57

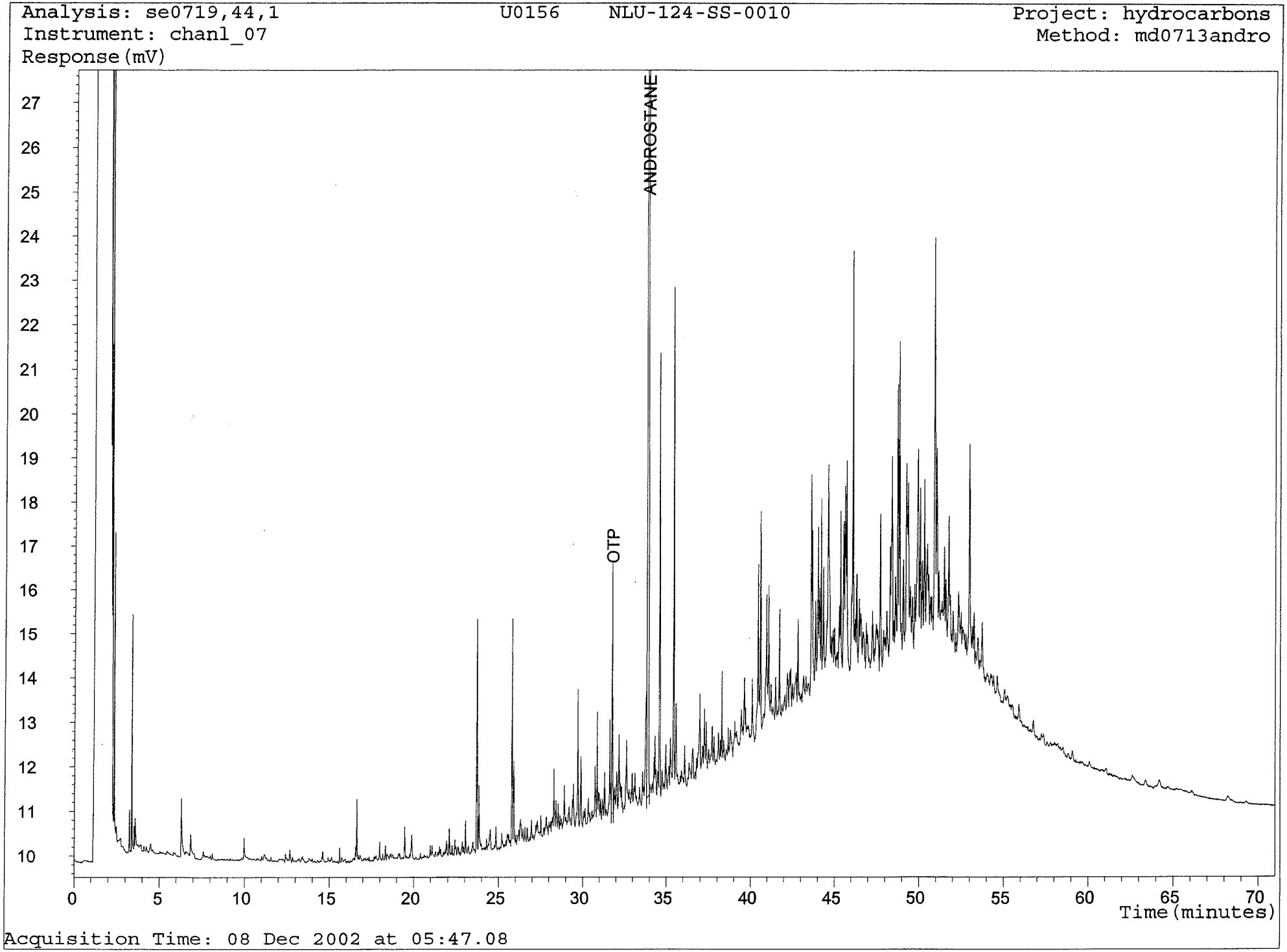

Analysis: se0719,36,1
U0151
NLU-121-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Dec 2002 at 18:18.04

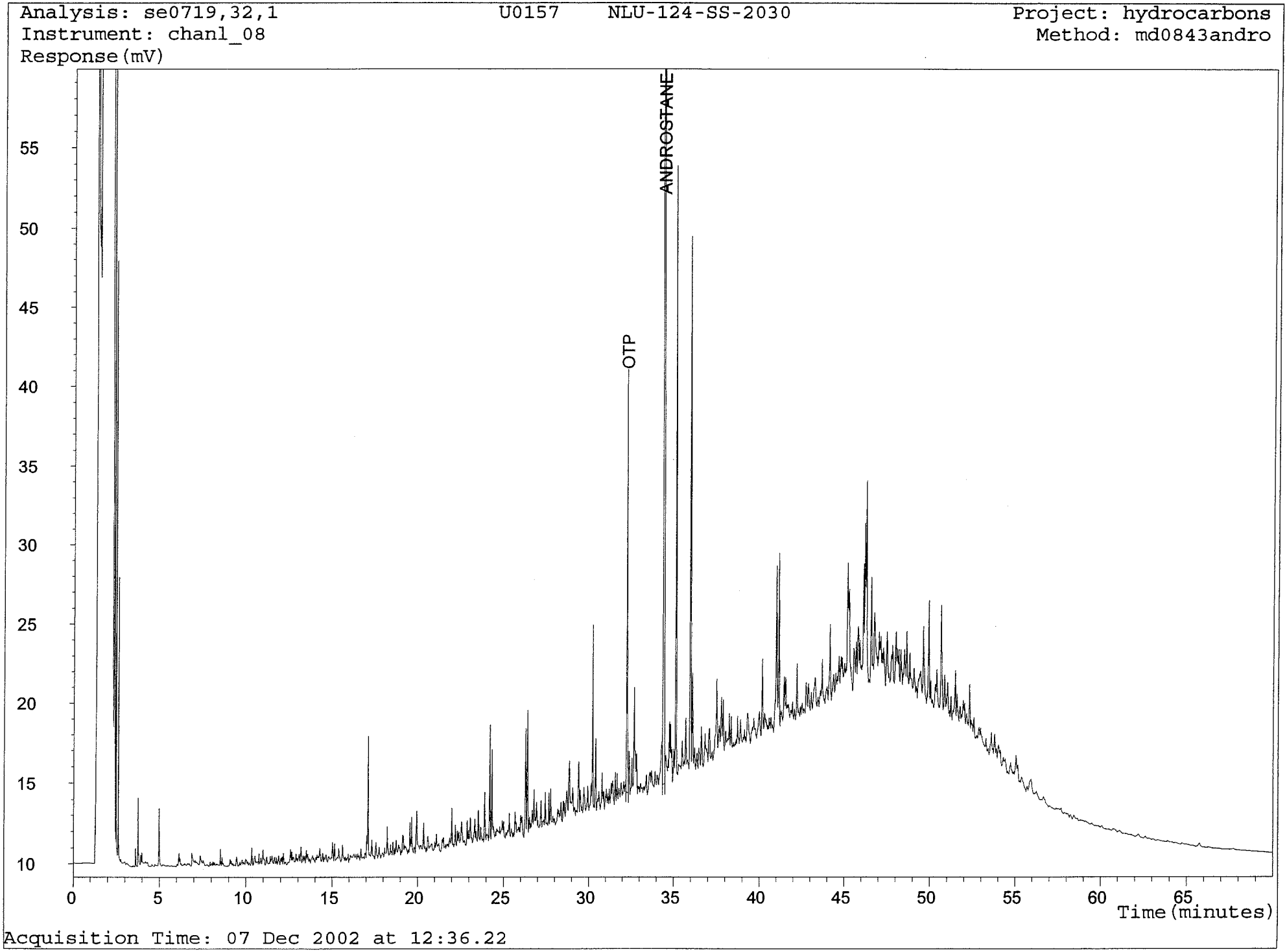

Analysis: se0719,21,1
U0152
NLU-121-SS-2030
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
ANDROSTANE
OTP
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 20:47.13

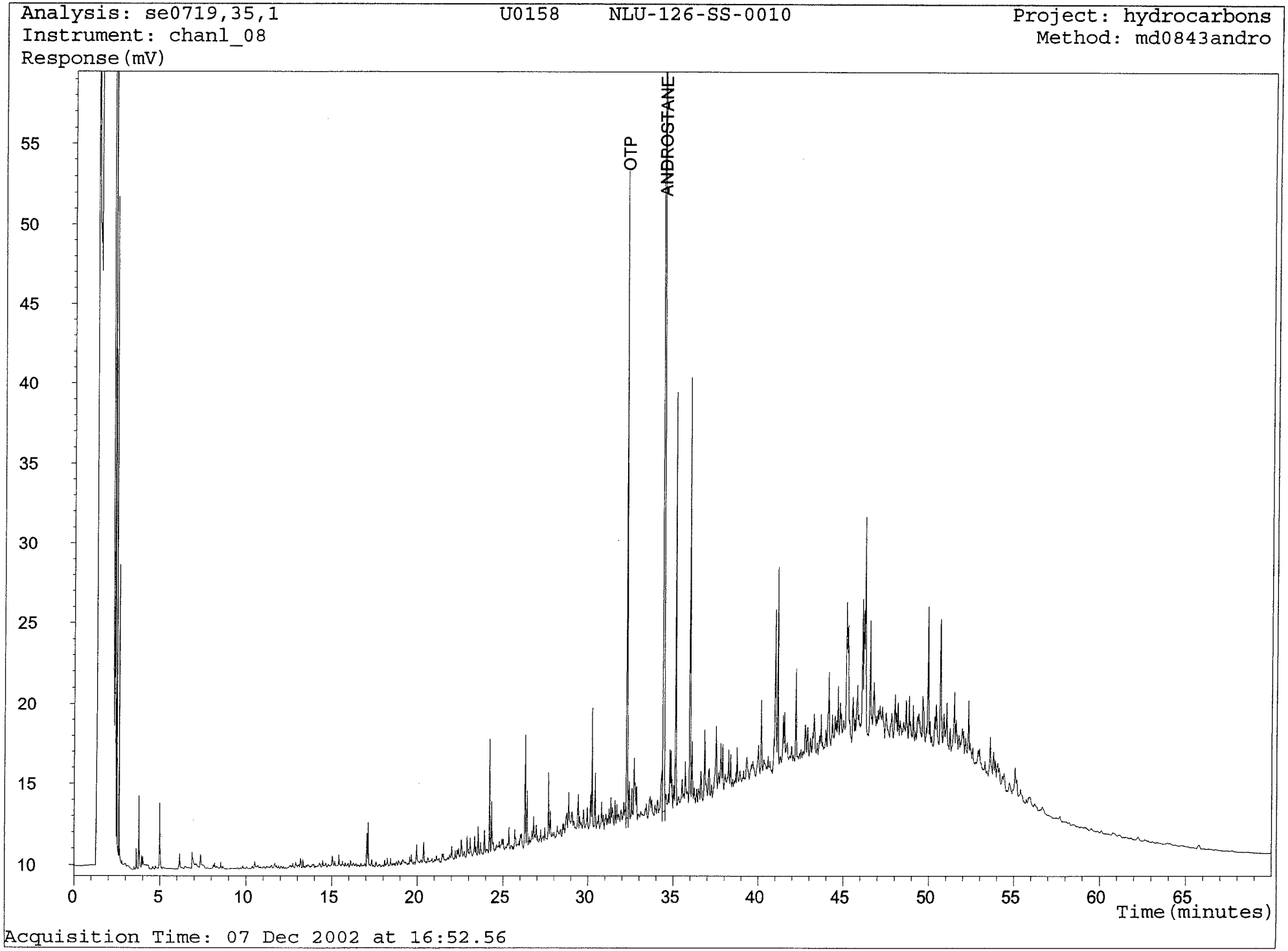

Analysis: se0719,24,1
U0153
NLU-122-SS-0010
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 07 Dec 2002 at 01:04.41

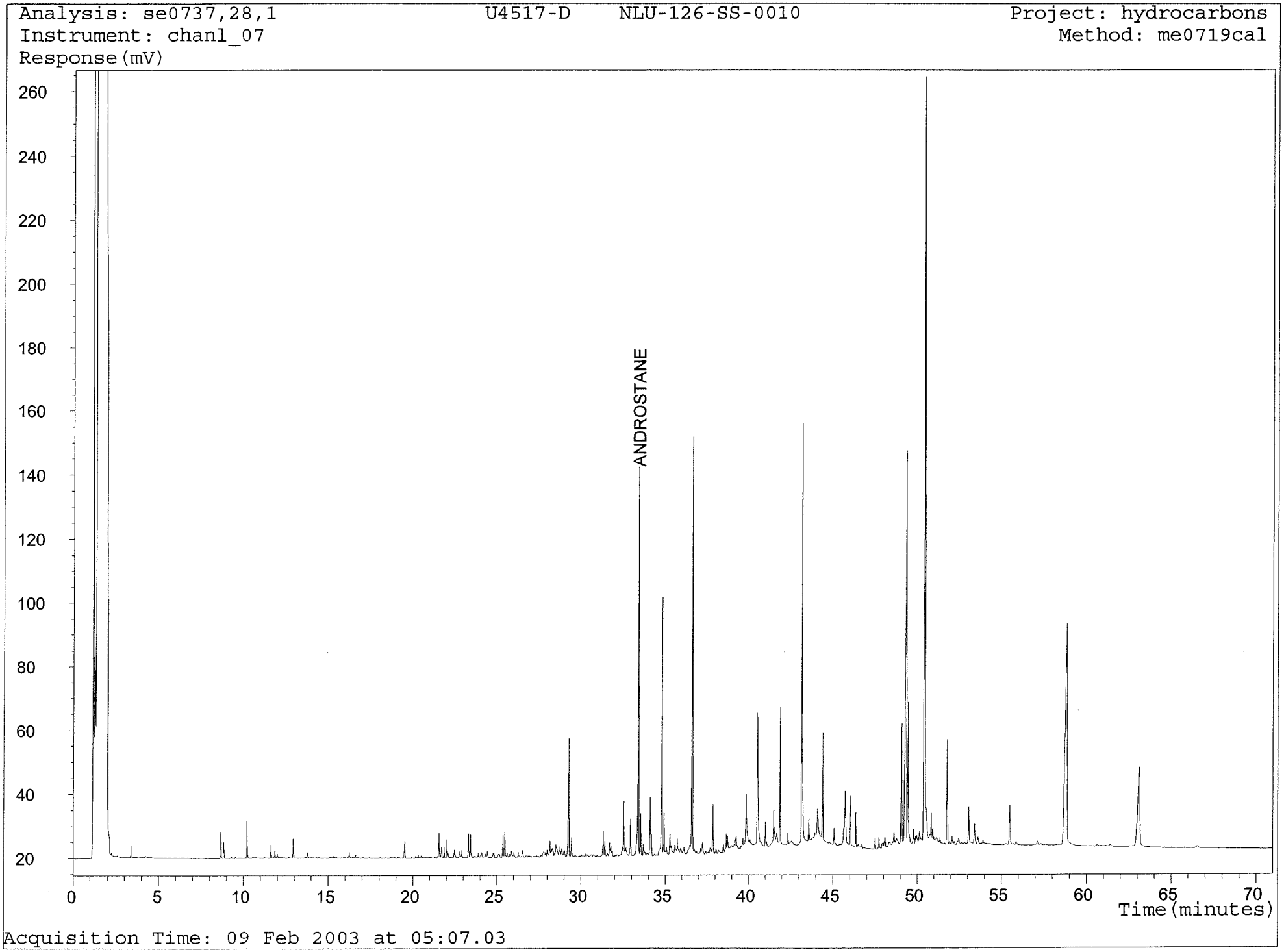

Analysis: se0719,27,1
U0154
NLU-122-SS-2030
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 07 Dec 2002 at 05:27.30

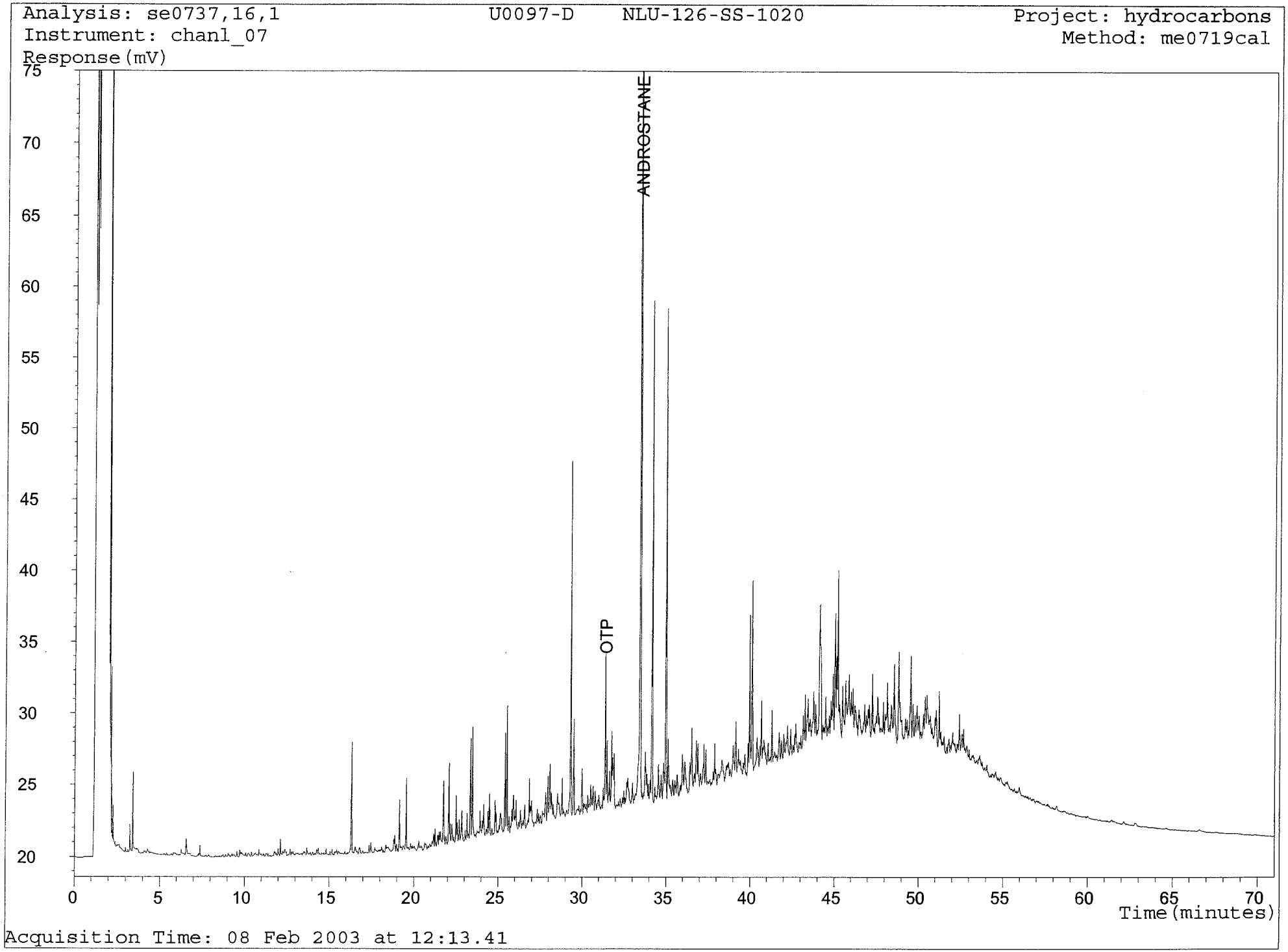

Analysis: se0719,39,1
U0155
NLU-123-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
75
70
65
60
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Dec 2002 at 22:33.40

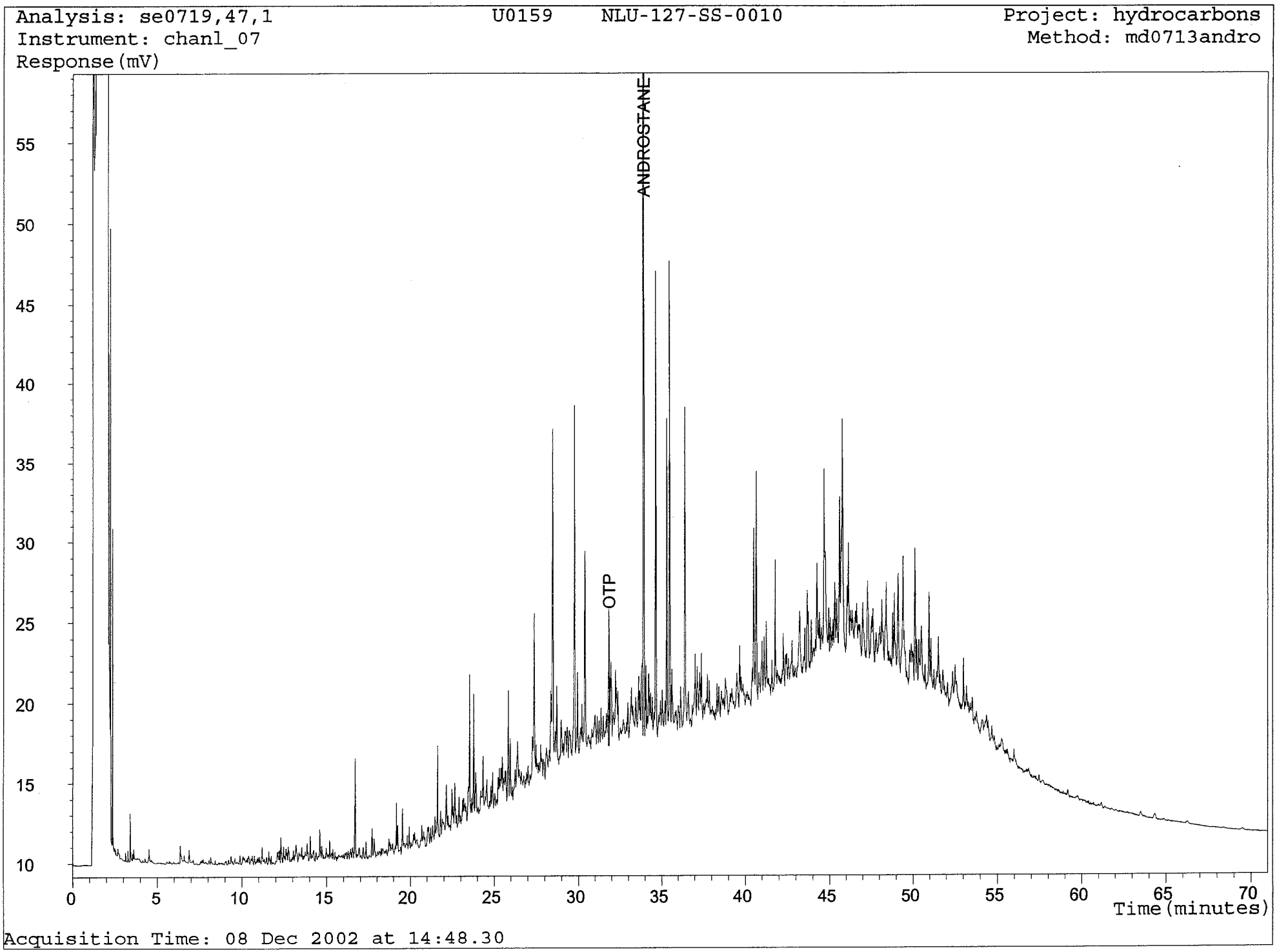

Analysis: se0719,44,1
U0156
NLU-124-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 08 Dec 2002 at 05:47.08

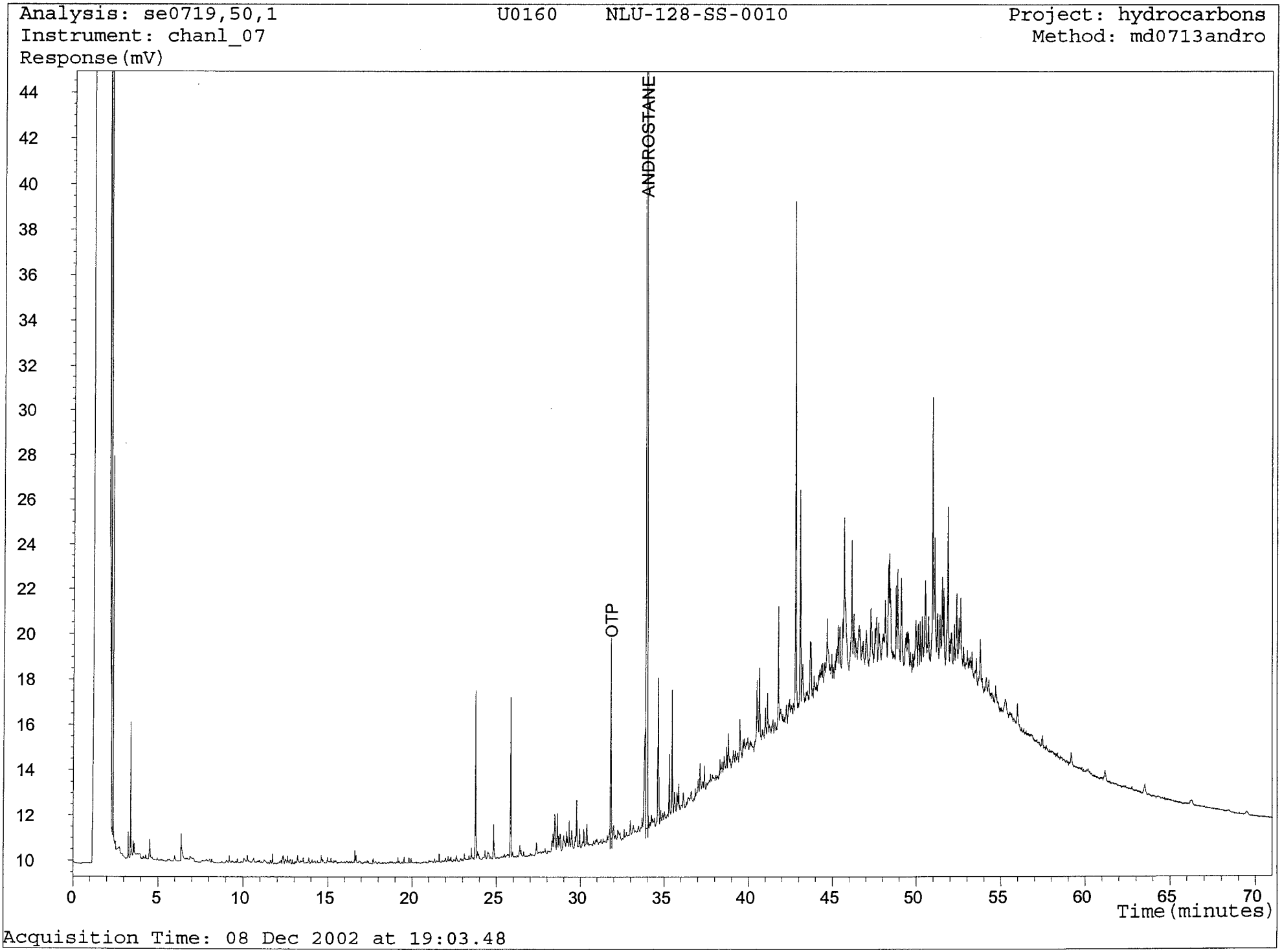

Analysis: se0719,32,1
U0157
NLU-124-SS-2030
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response (mV)
ANDROSTANE
OTP
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time (minutes)
Acquisition Time: 07 Dec 2002 at 12:36.22


Analysis: se0719,35,1
U0158
NLU-126-SS-0010
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
OTP
ANDROSTANE
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 07 Dec 2002 at 16:52.56


Analysis: se0737,28,1
U4517-D
NLU-126-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
260
240
220
200
180
160
140
120
100
80
60
40
20
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Feb 2003 at 05:07.03

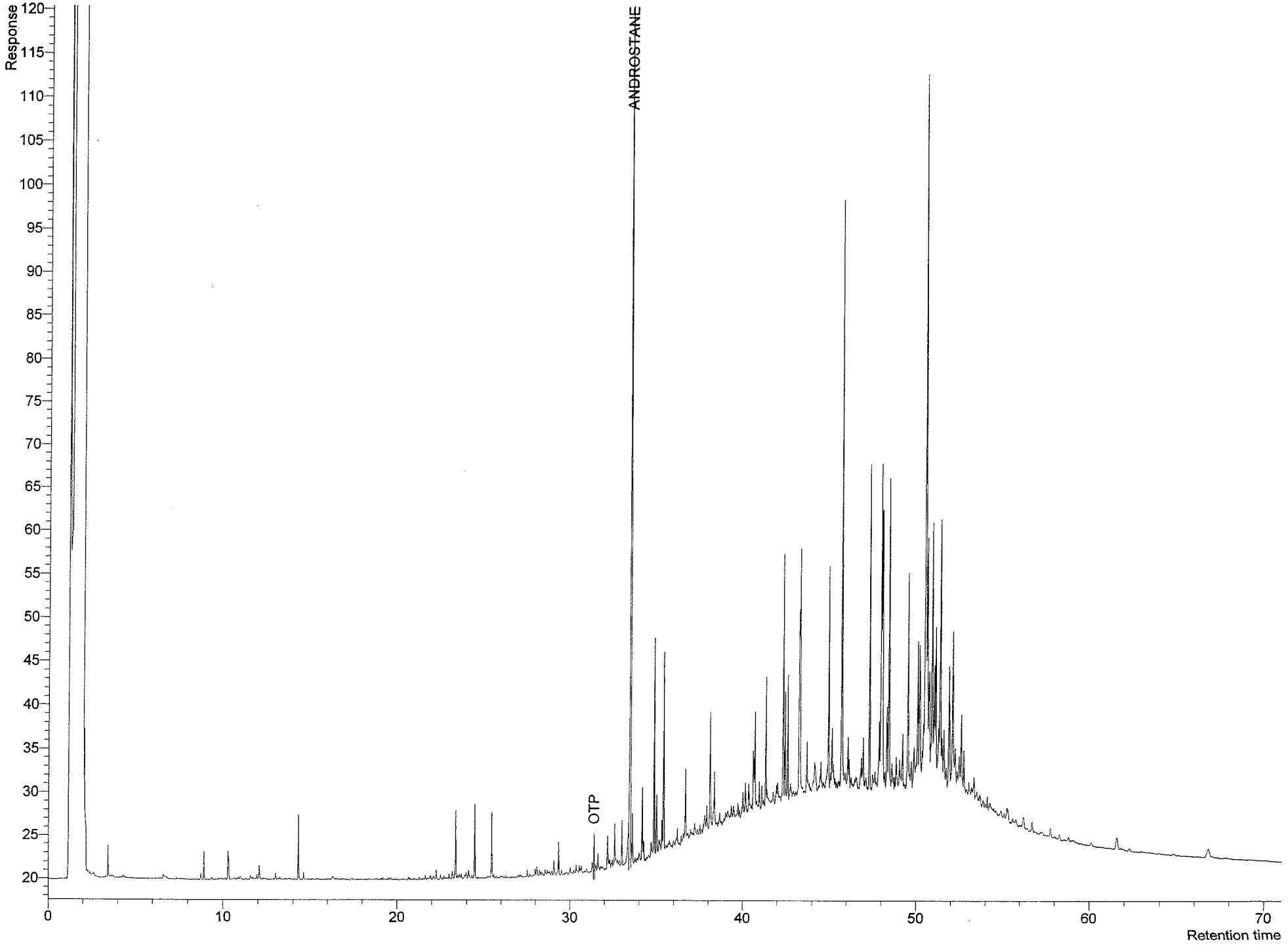

Analysis: se0737,16,1
U0097-D
NLU-126-SS-1020
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
75
70
65
60
55
50
45
40
35
30
25
20
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 08 Feb 2003 at 12:13.41


Analysis: se0719,47,1
U0159
NLU-127-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
55
50
45
40
35
30
25
20
15
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 08 Dec 2002 at 14:48.30


Analysis: se0719,50,1
U0160
NLU-128-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 08 Dec 2002 at 19:03.48

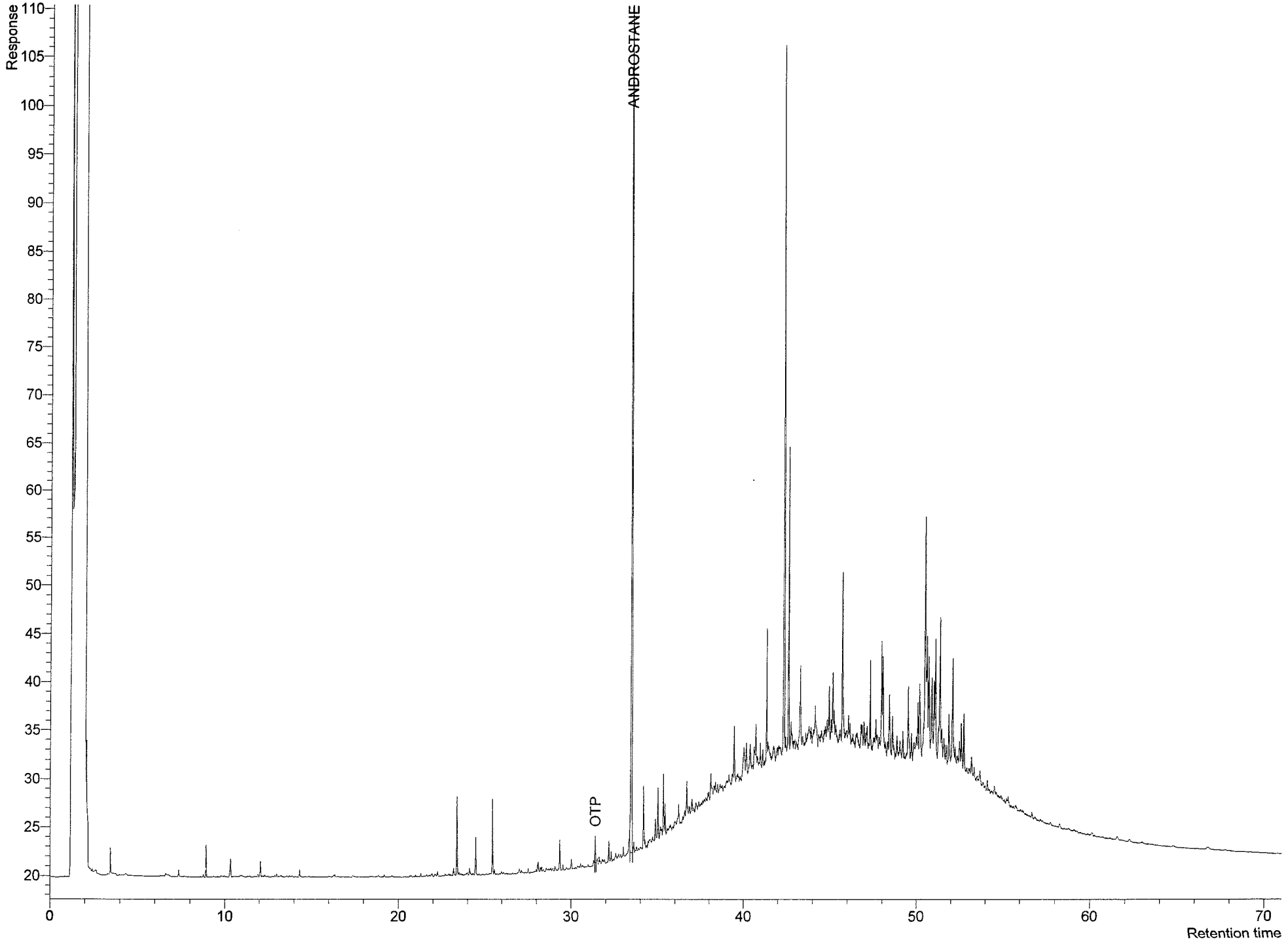
U0135-D NLU-129-SS-0010 (18,1)
Acquired Tuesday, January 14, 2003 11:00:24 AM

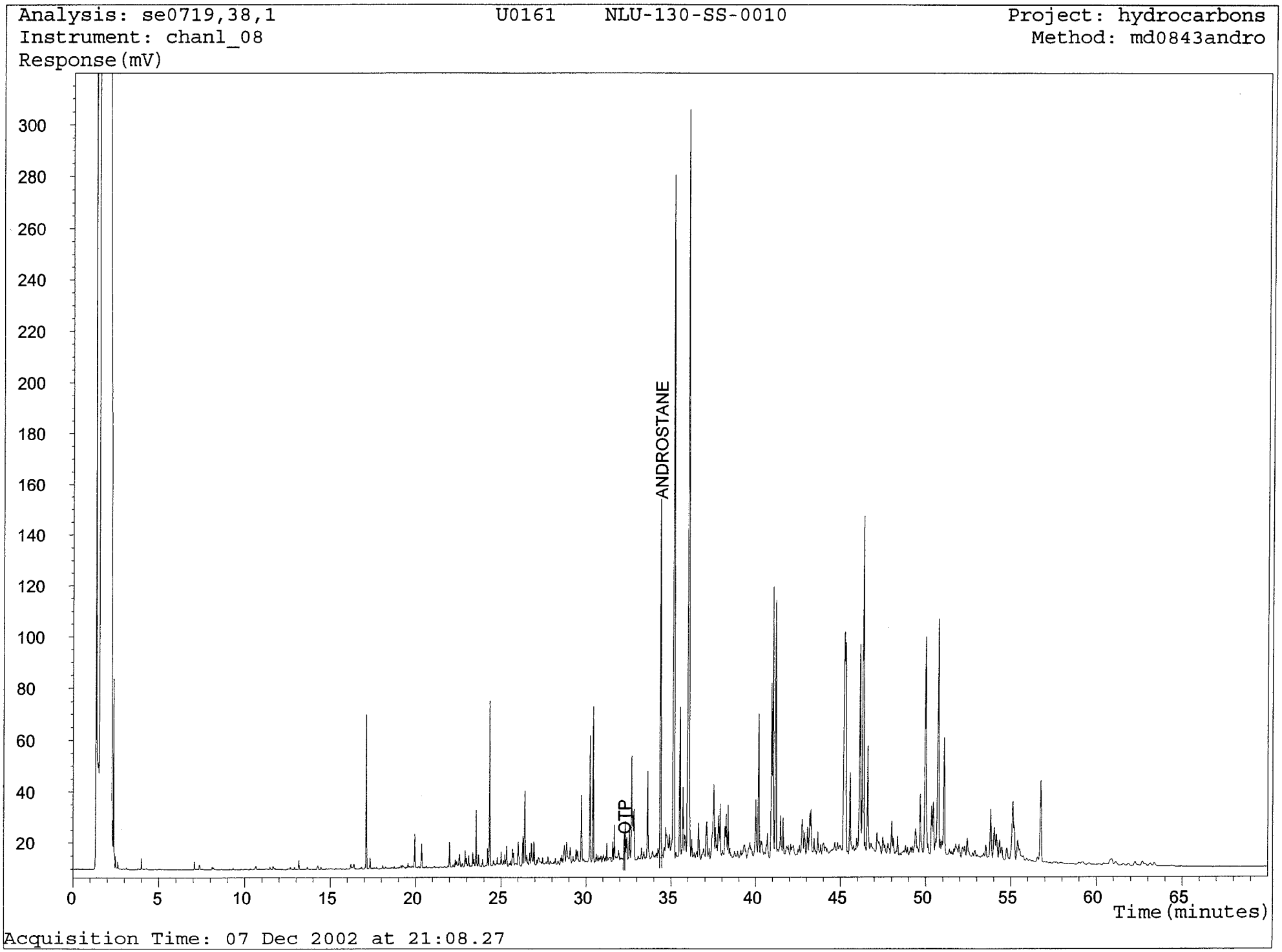
hydrocarbon,Chanl_07.se0730,18,1

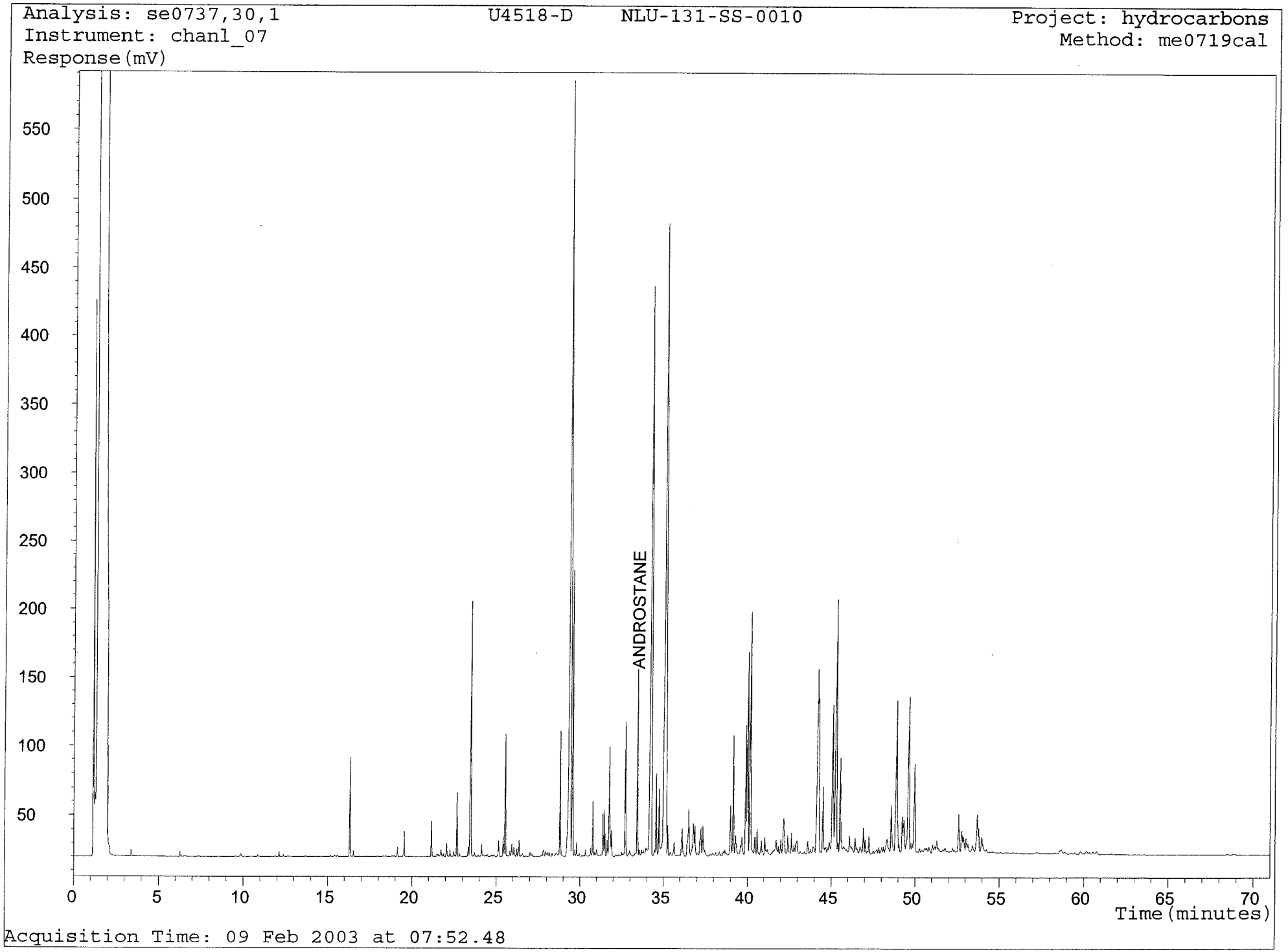


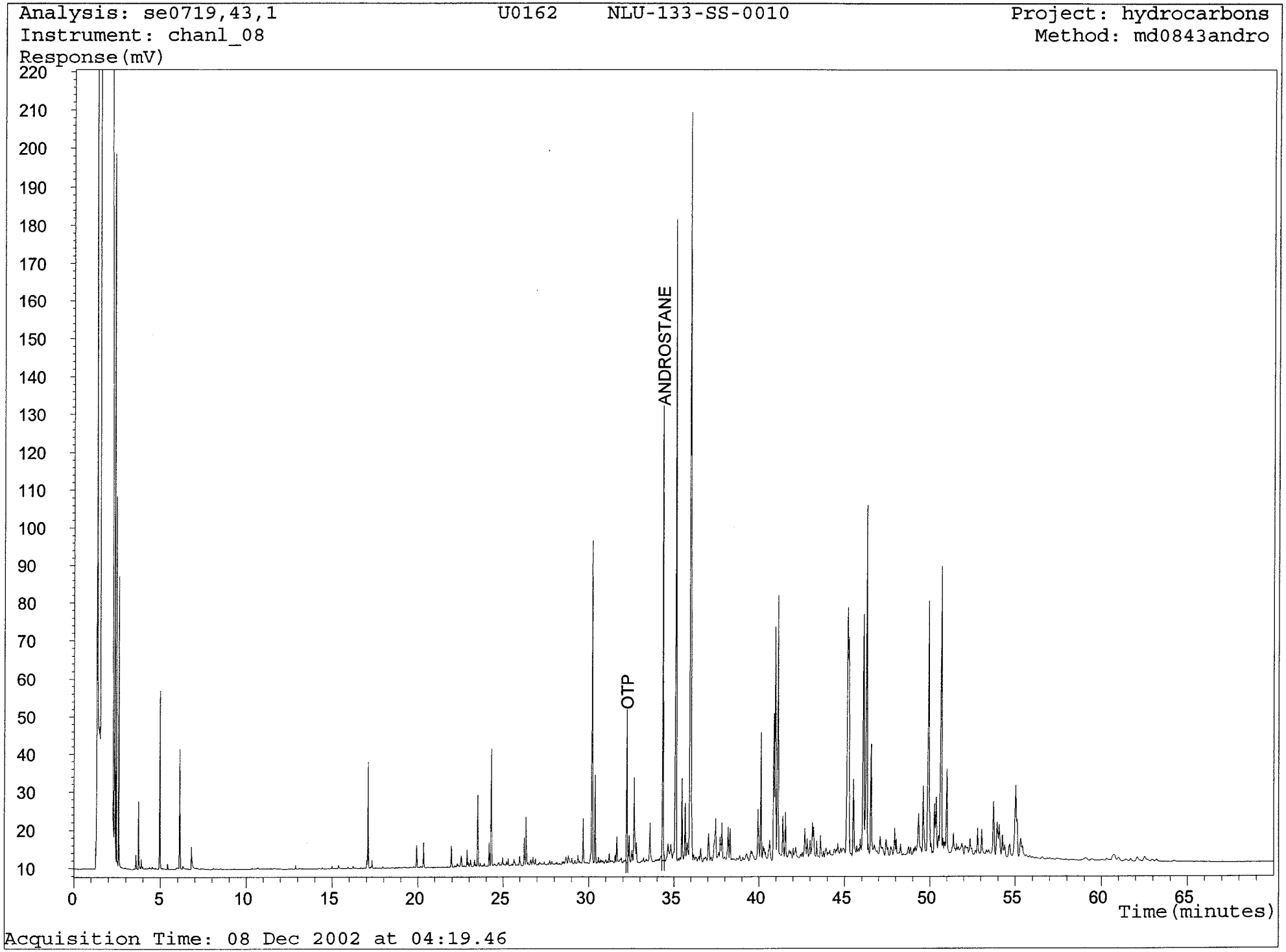
U0137-D NLU-129-SS-2030 (21,1)
Acquired Tuesday, January 14, 2003 3:10:38 PM

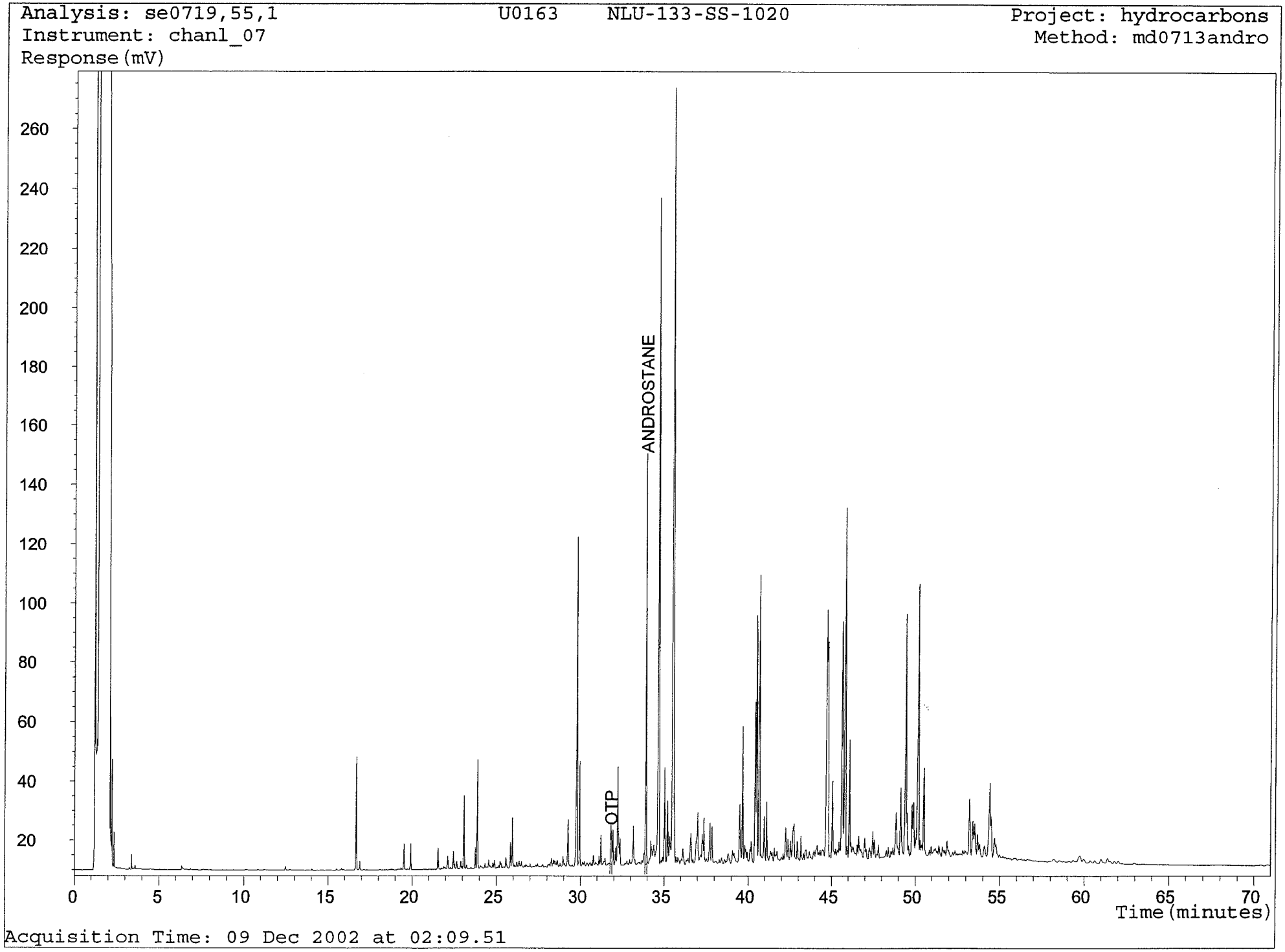
hydrocarbon,Chanl_07.se0730,21,1

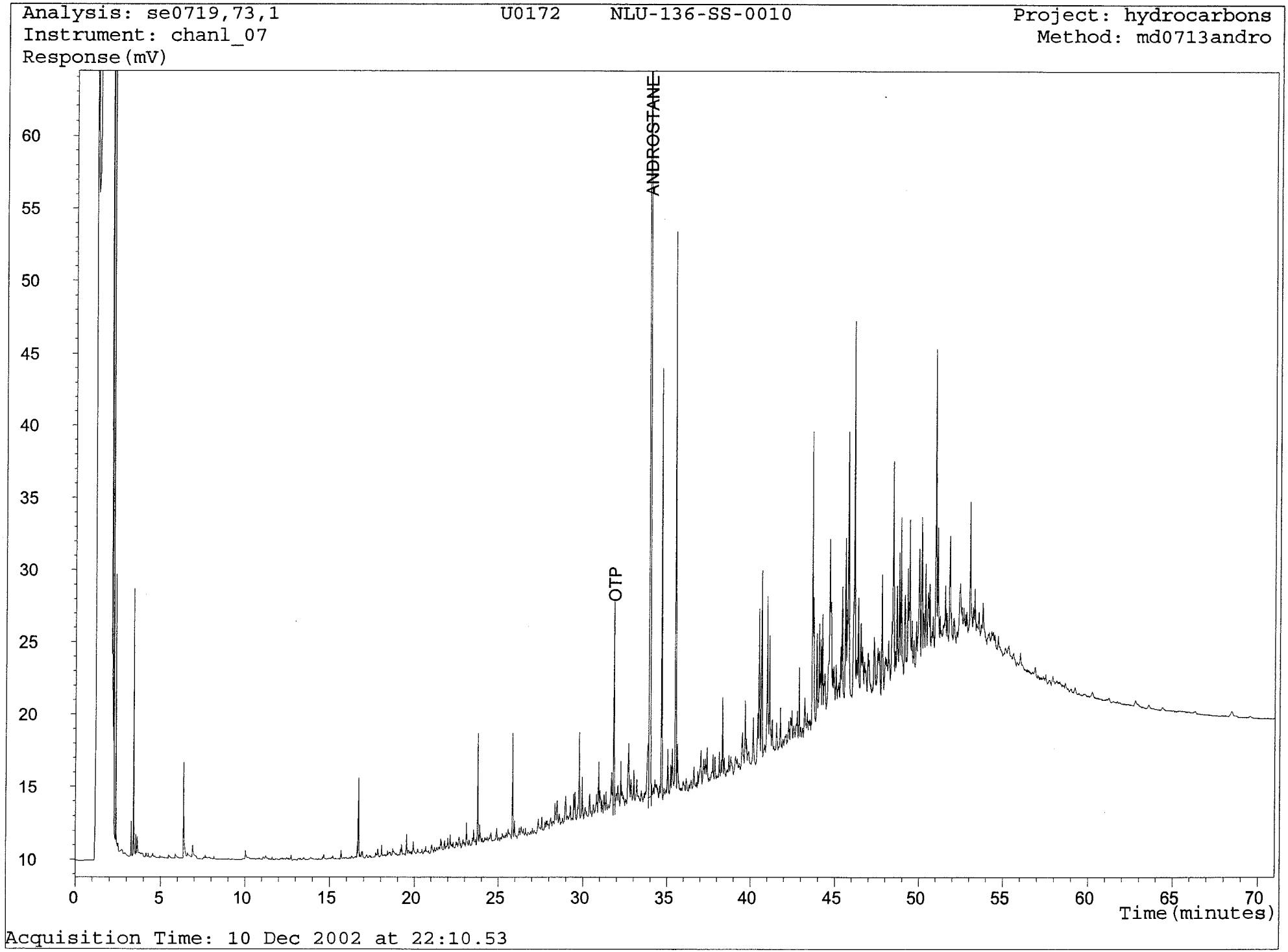


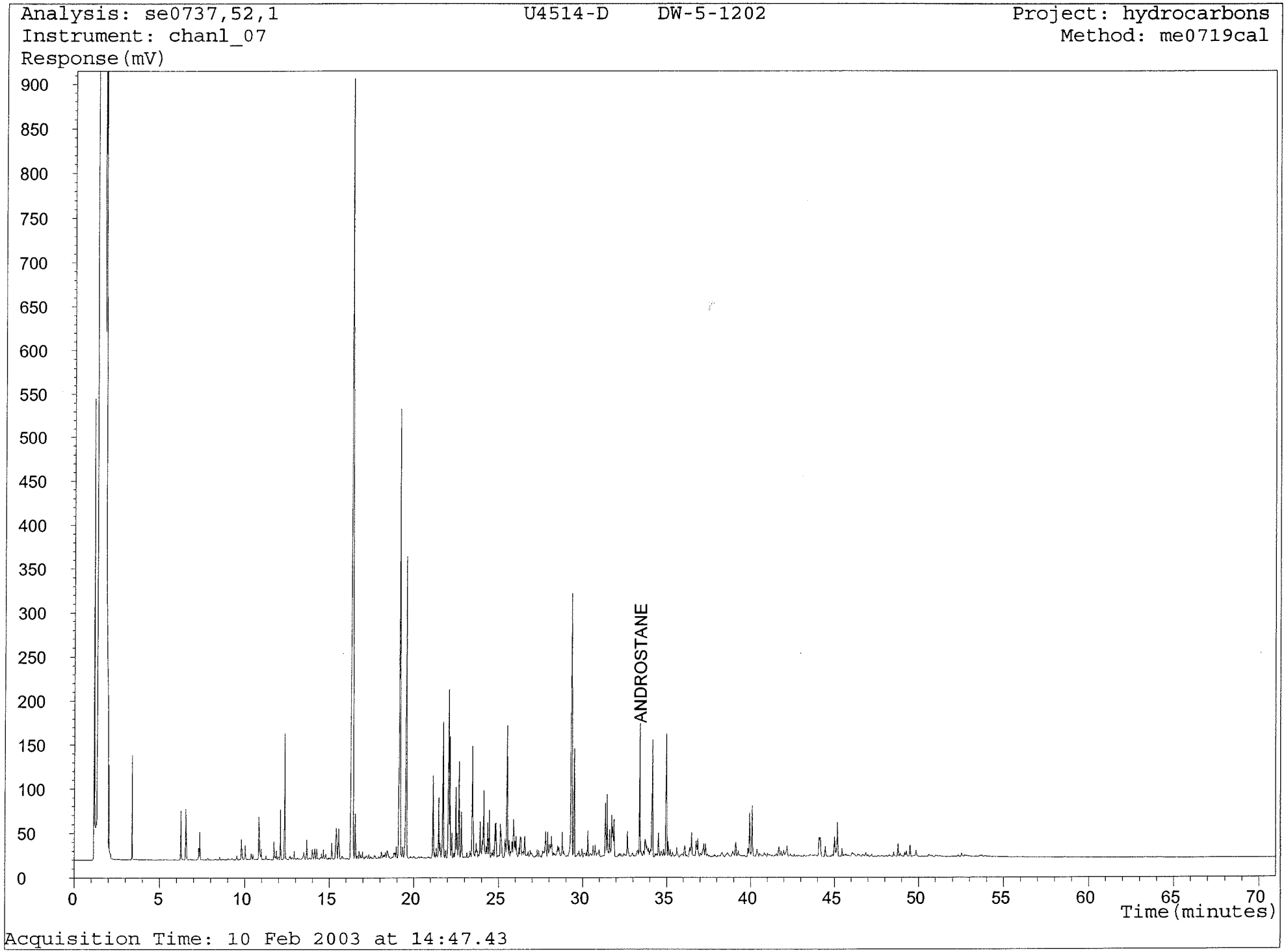

Analysis: se0719,38,1
U0161
NLU-130-SS-0010
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response (mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time (minutes)
Acquisition Time: 07 Dec 2002 at 21:08.27

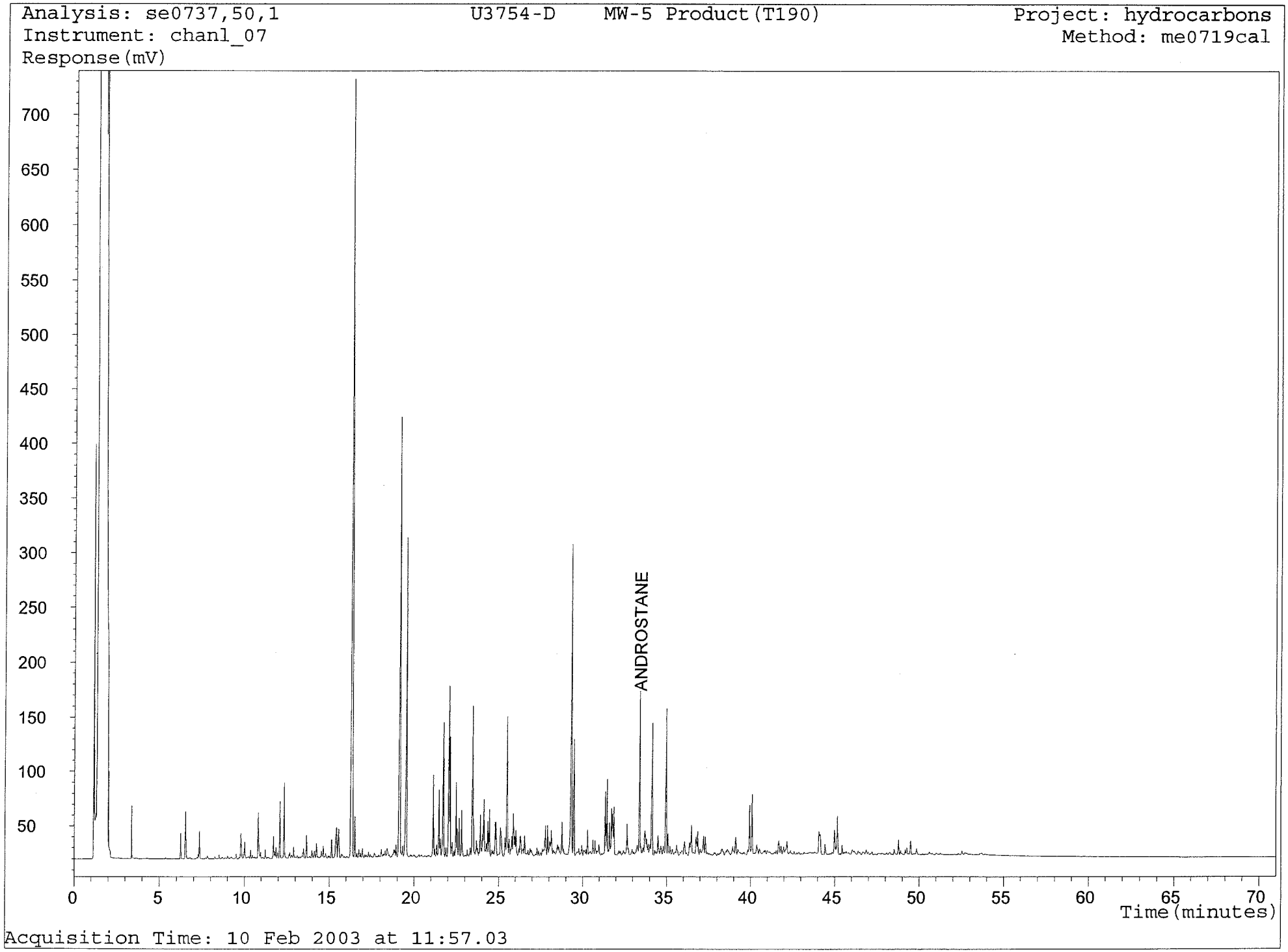

Analysis: se0737,30,1
U4518-D
NLU-131-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
550
500
450
400
350
300
250
200
150
100
50
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Feb 2003 at 07:52.48

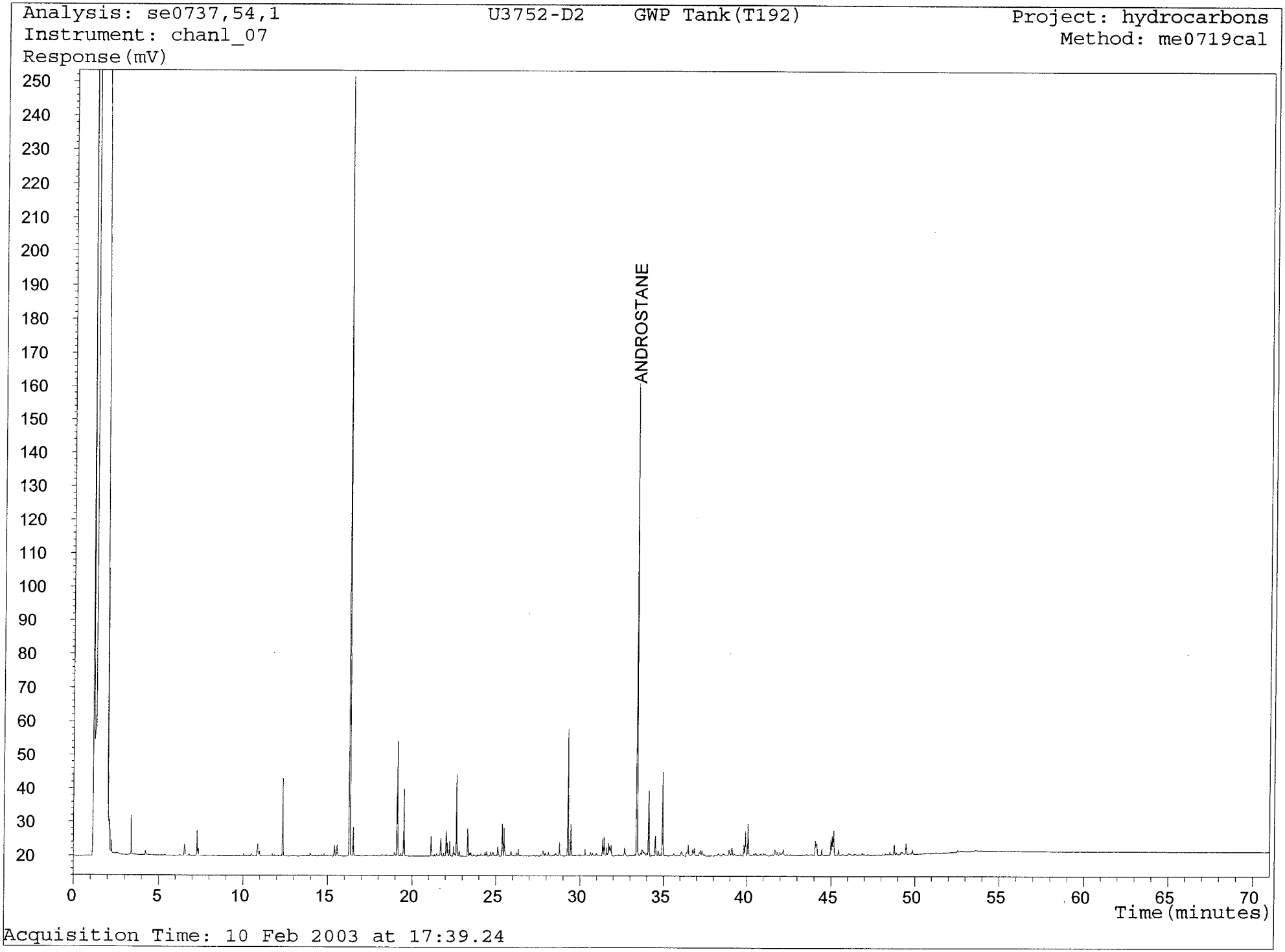

Analysis: se0719,43,1
U0162
NLU-133-SS-0010
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 08 Dec 2002 at 04:19.46

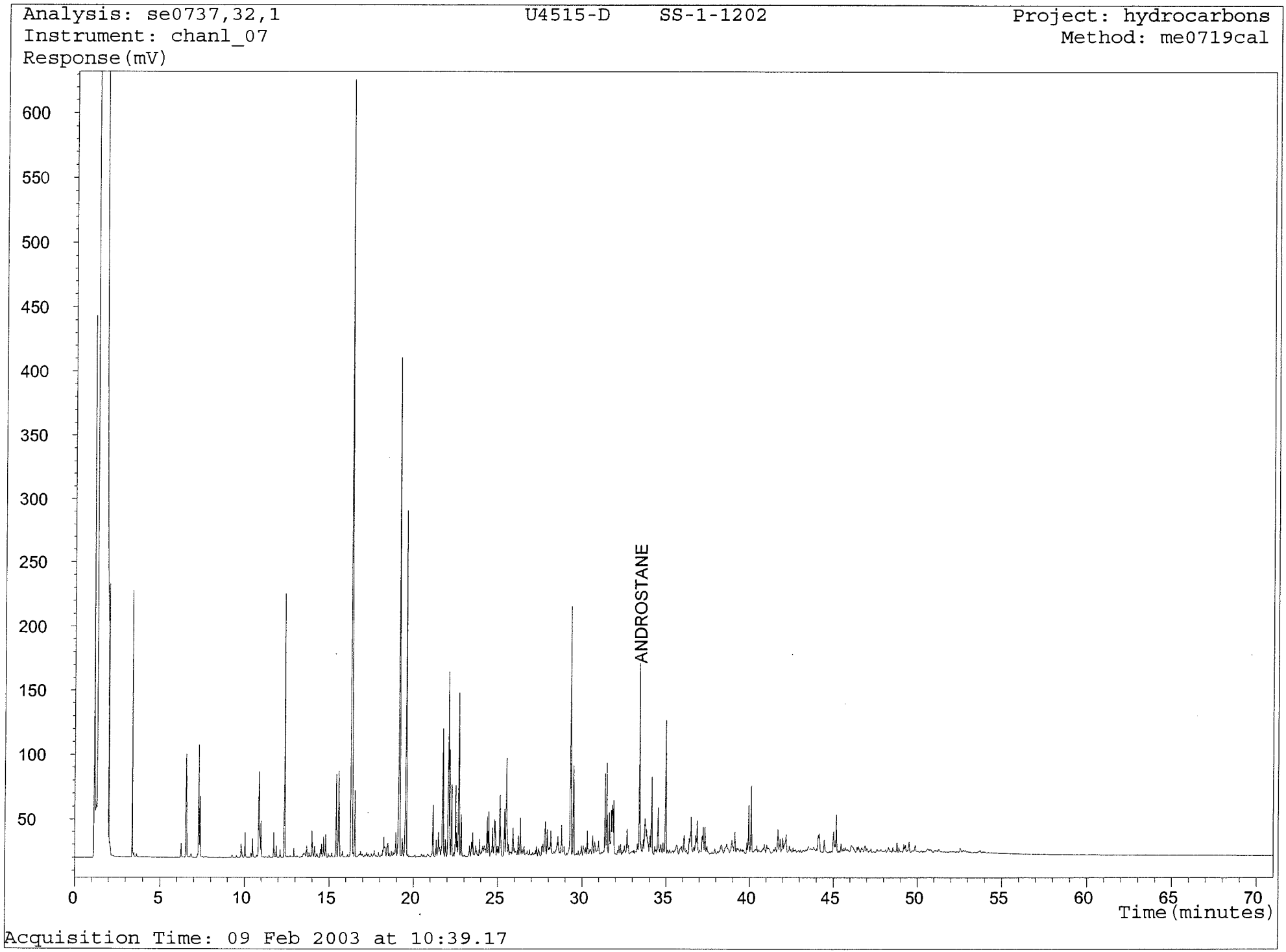

Analysis: se0719,55,1
U0163
NLU-133-SS-1020
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
260
240
220
200
180
160
140
120
100
80
60
40
20
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Dec 2002 at 02:09.51

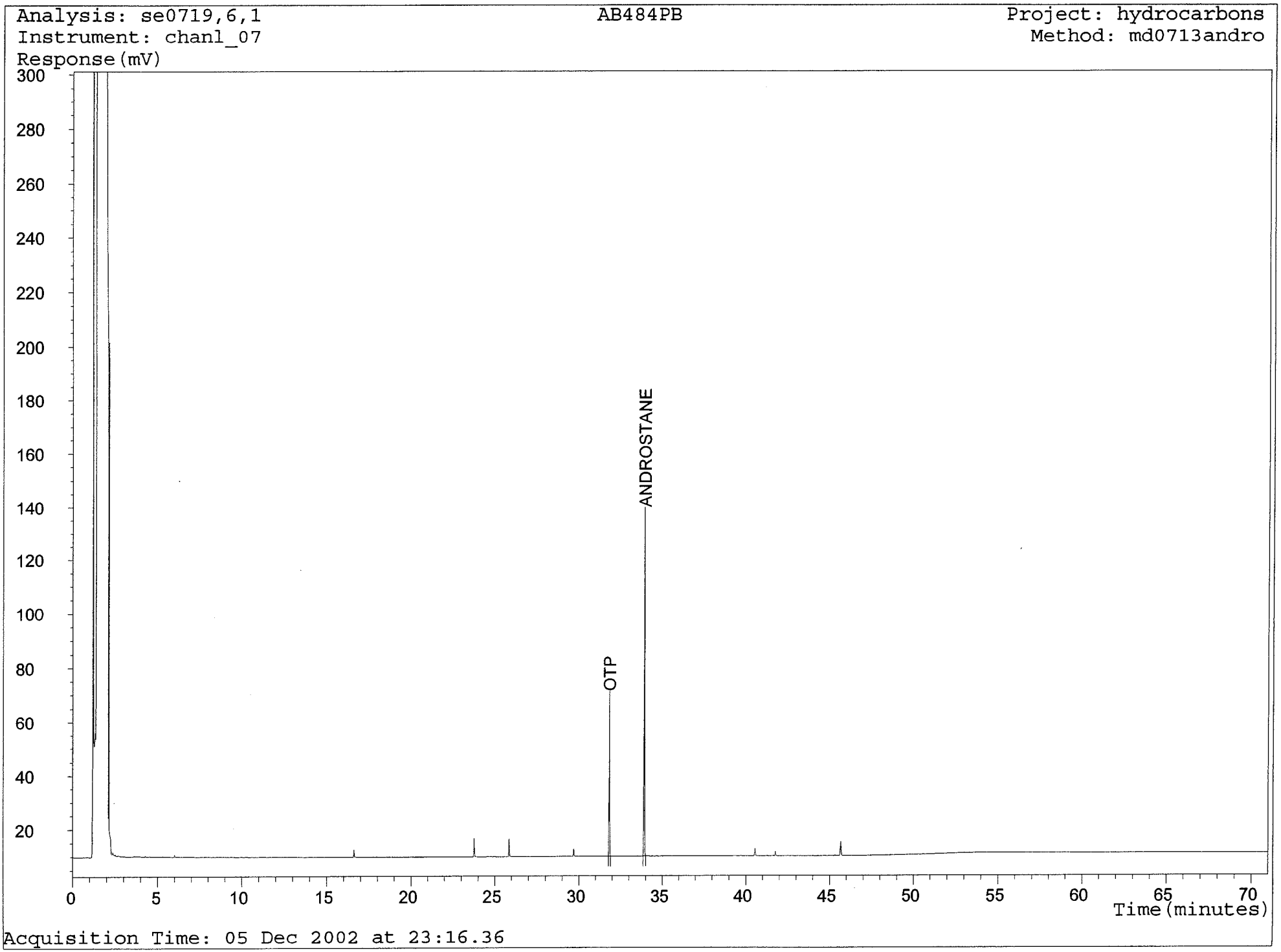

Analysis: se0719,73,1
U0172
NLU-136-SS-0010
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
ANDROSTANE
OTP
10
15
20
25
30
35
40
45
50
55
60
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Dec 2002 at 22:10.53

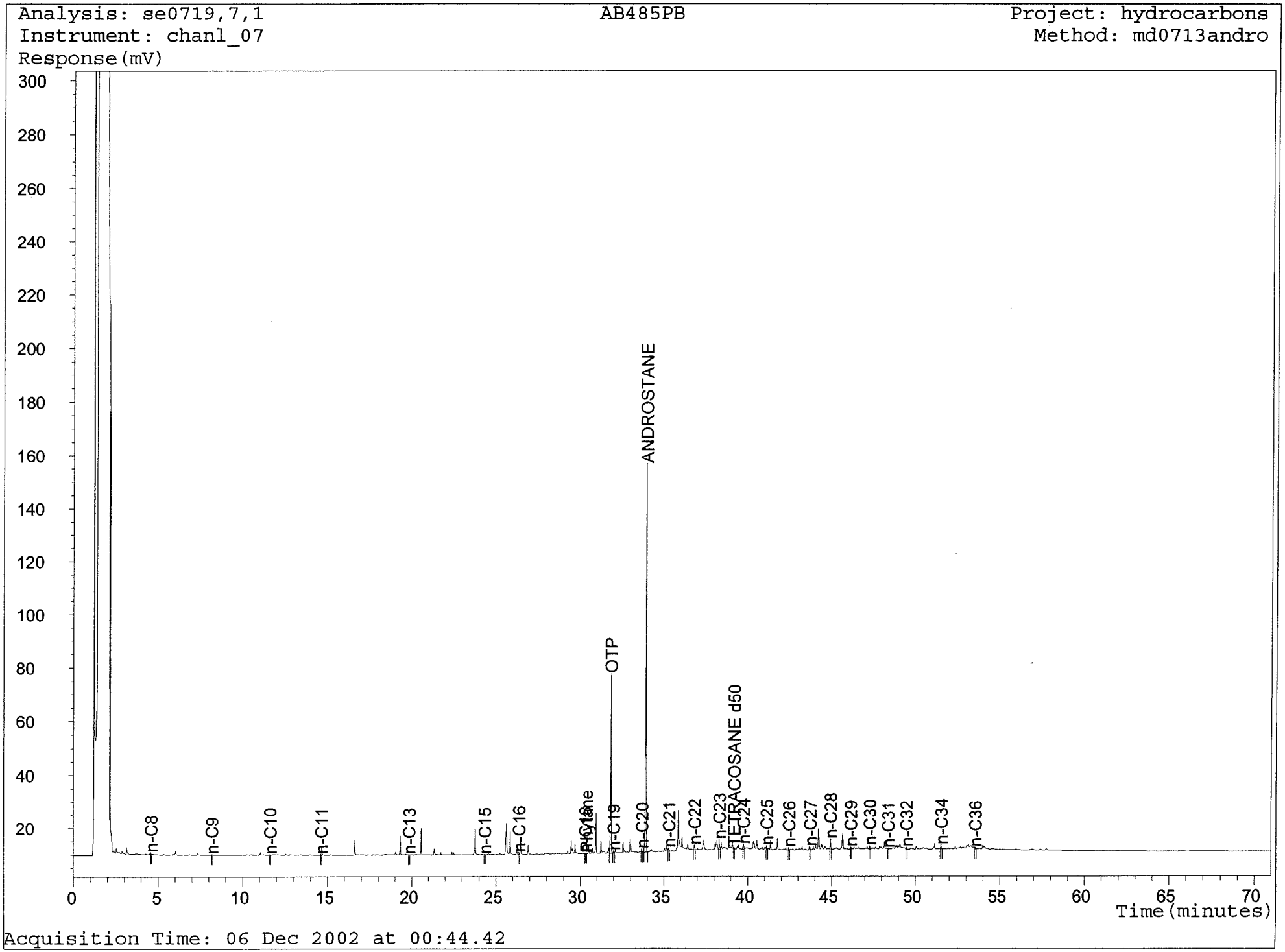

Analysis: se0737,52,1
U4514-D DW-5-1202
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Feb 2003 at 14:47.43

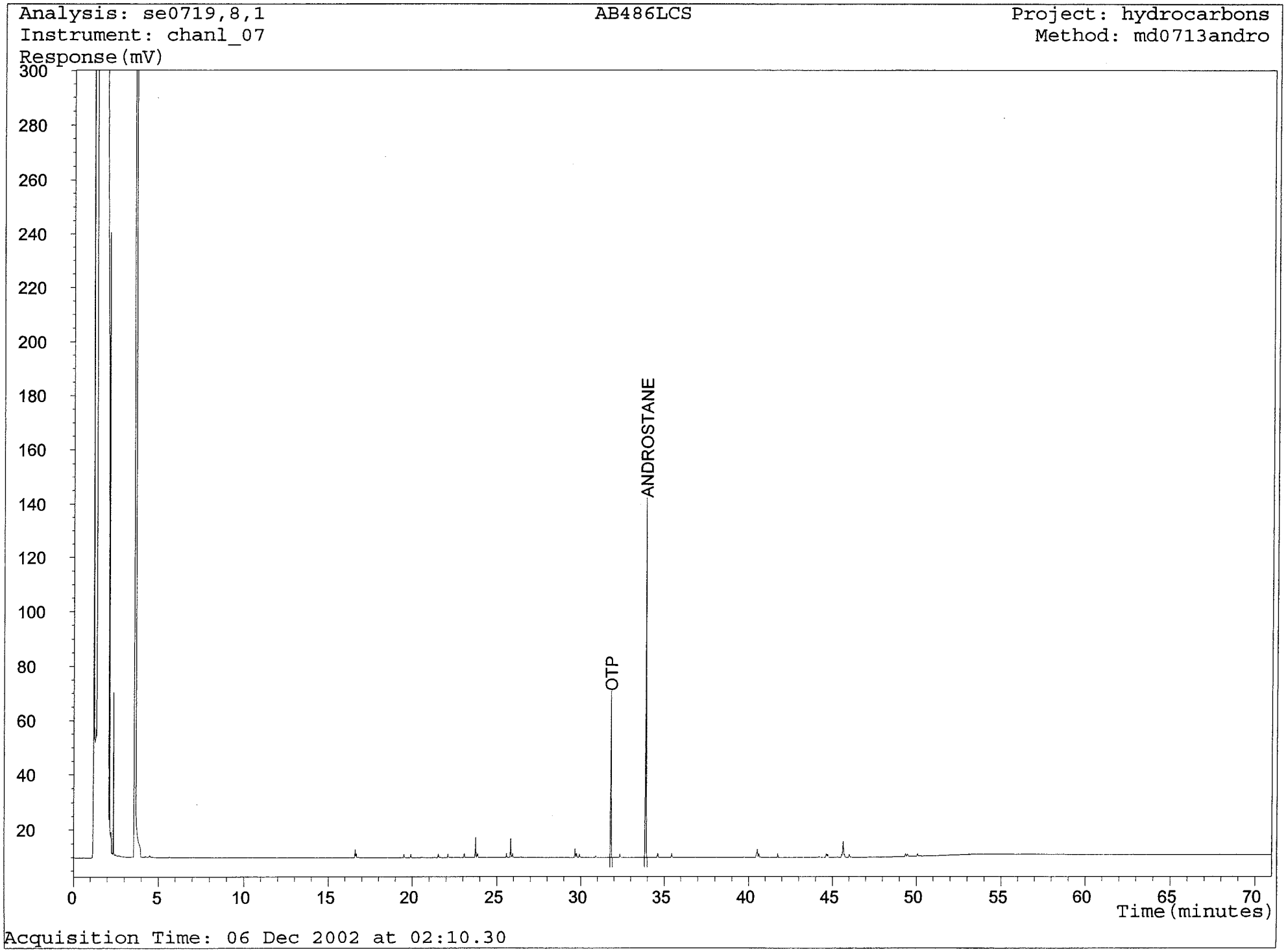

Analysis: se0737,50,1
U3754-D MW-5 Product(T190)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
700
650
600
550
500
450
400
350
300
250
200
150
100
50
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Feb 2003 at 11:57.03

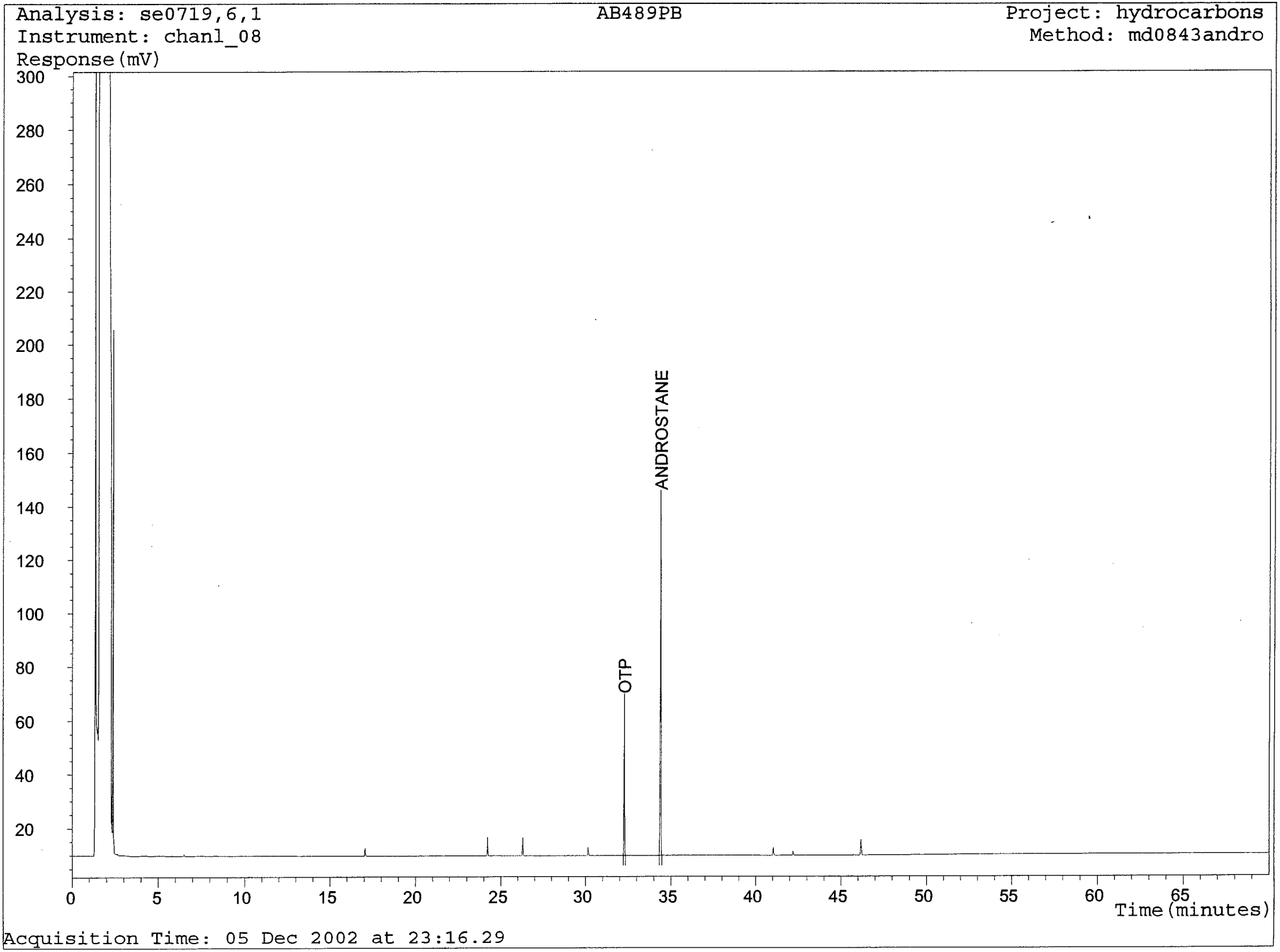

Analysis: se0737,54,1
U3752-D2
GWP Tank(T192)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 10 Feb 2003 at 17:39.24

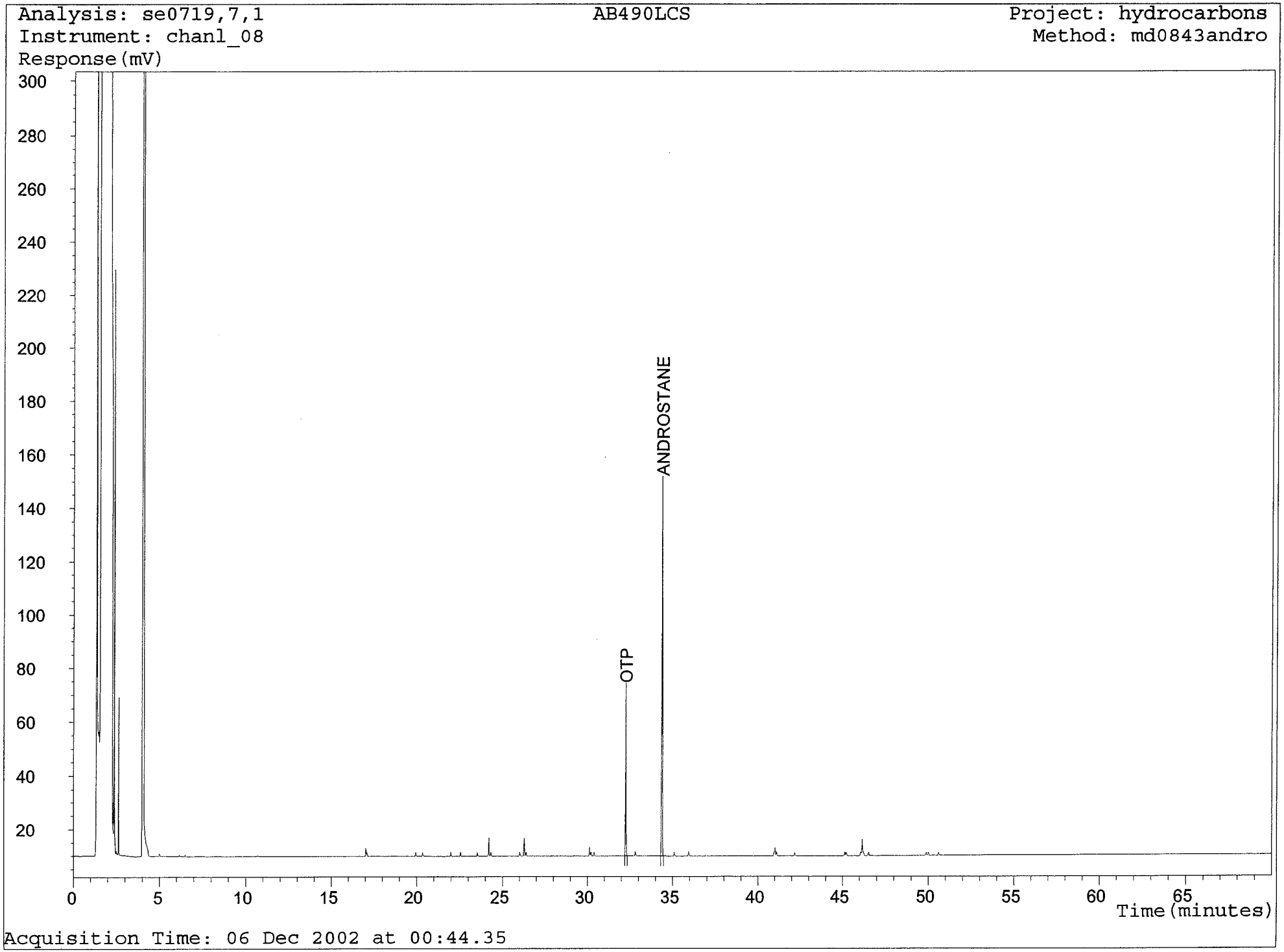

Analysis: se0737,32,1
U4515-D SS-1-1202
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
600
550
500
450
400
350
300
250
200
150
100
50
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 09 Feb 2003 at 10:39.17


Analysis: se0719,6,1
AB484PB
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 05 Dec 2002 at 23:16.36


Analysis: se0719,7,1
AB485PB
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
n-C8
n-C9
n-C10
n-C11
n-C13
n-C15
n-C16
n-C18
Phytane
n-C19
OTP
ANDROSTANE
n-C20
n-C21
n-C22
n-C23
TETRACOSANE d50
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C34
n-C36
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 06 Dec 2002 at 00:44.42

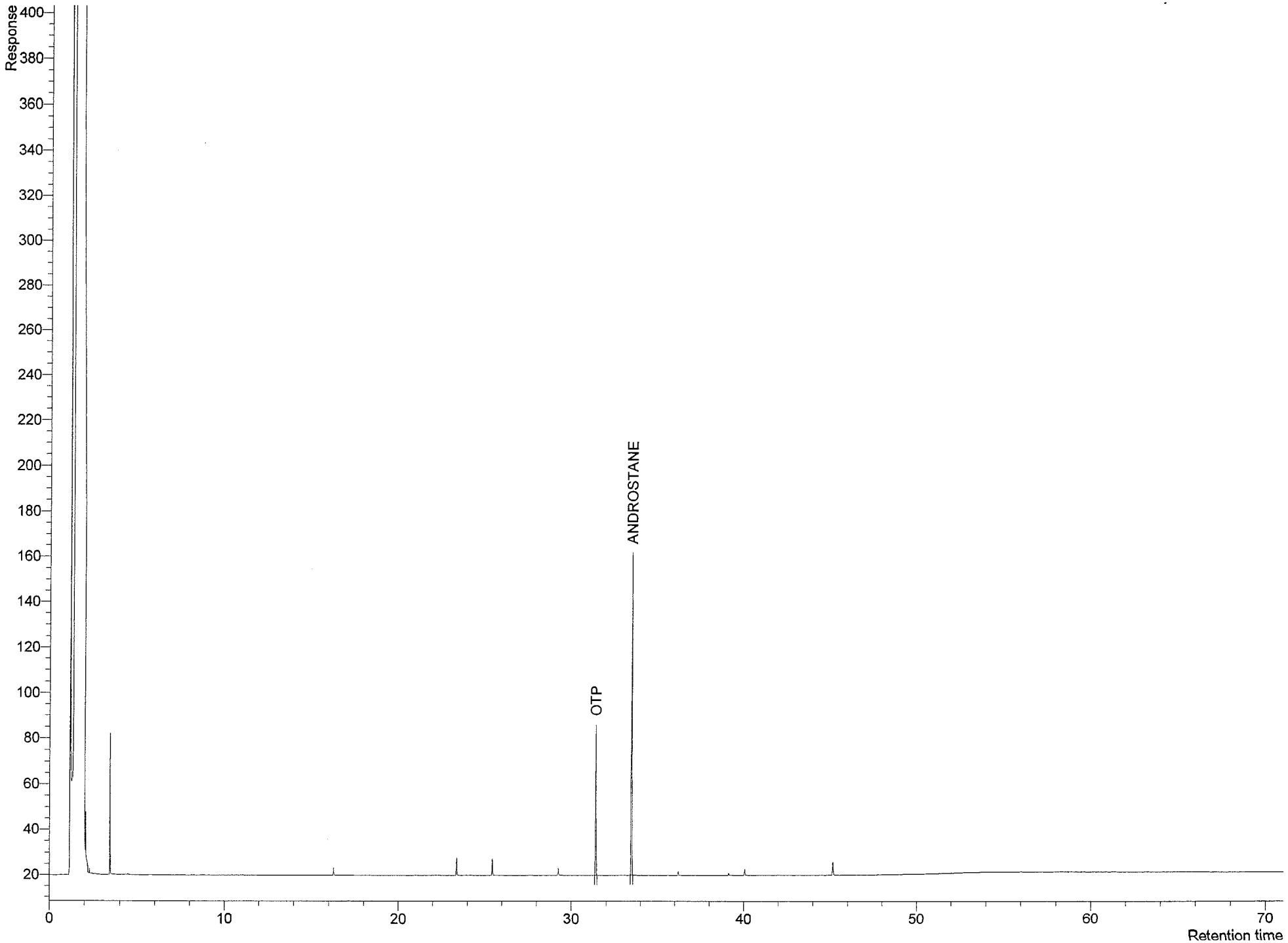

Analysis: se0719,8,1
AB486LCS
Project: hydrocarbons
Instrument: chanl_07
Method: md0713andro
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 06 Dec 2002 at 02:10.30


Analysis: se0719,6,1
AB489PB
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 05 Dec 2002 at 23:16.29


Analysis: se0719,7,1
AB490LCS
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 00:44.35

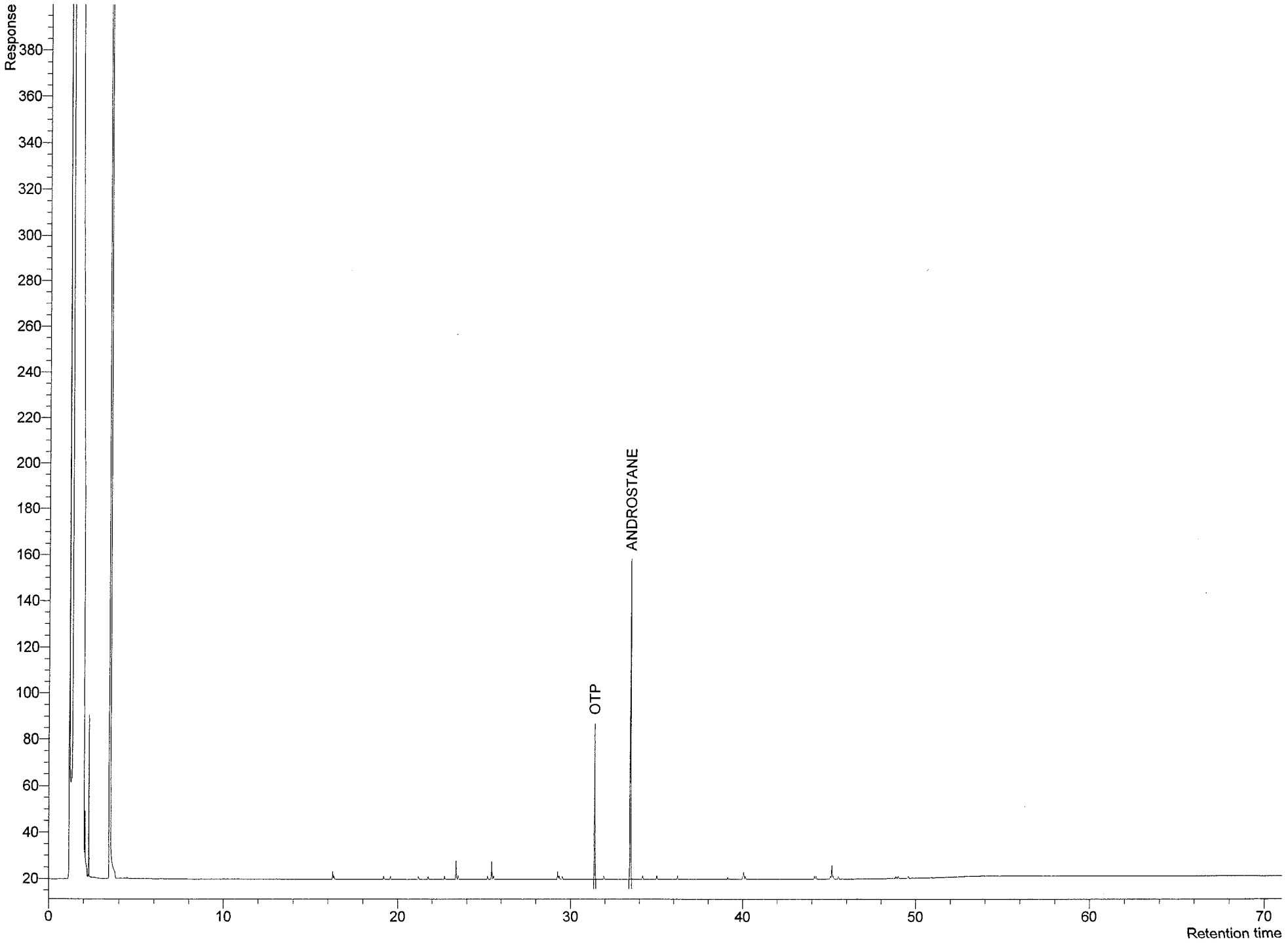
AB851PB (6,1)
Acquired Monday, January 13, 2003 6:17:36 PM

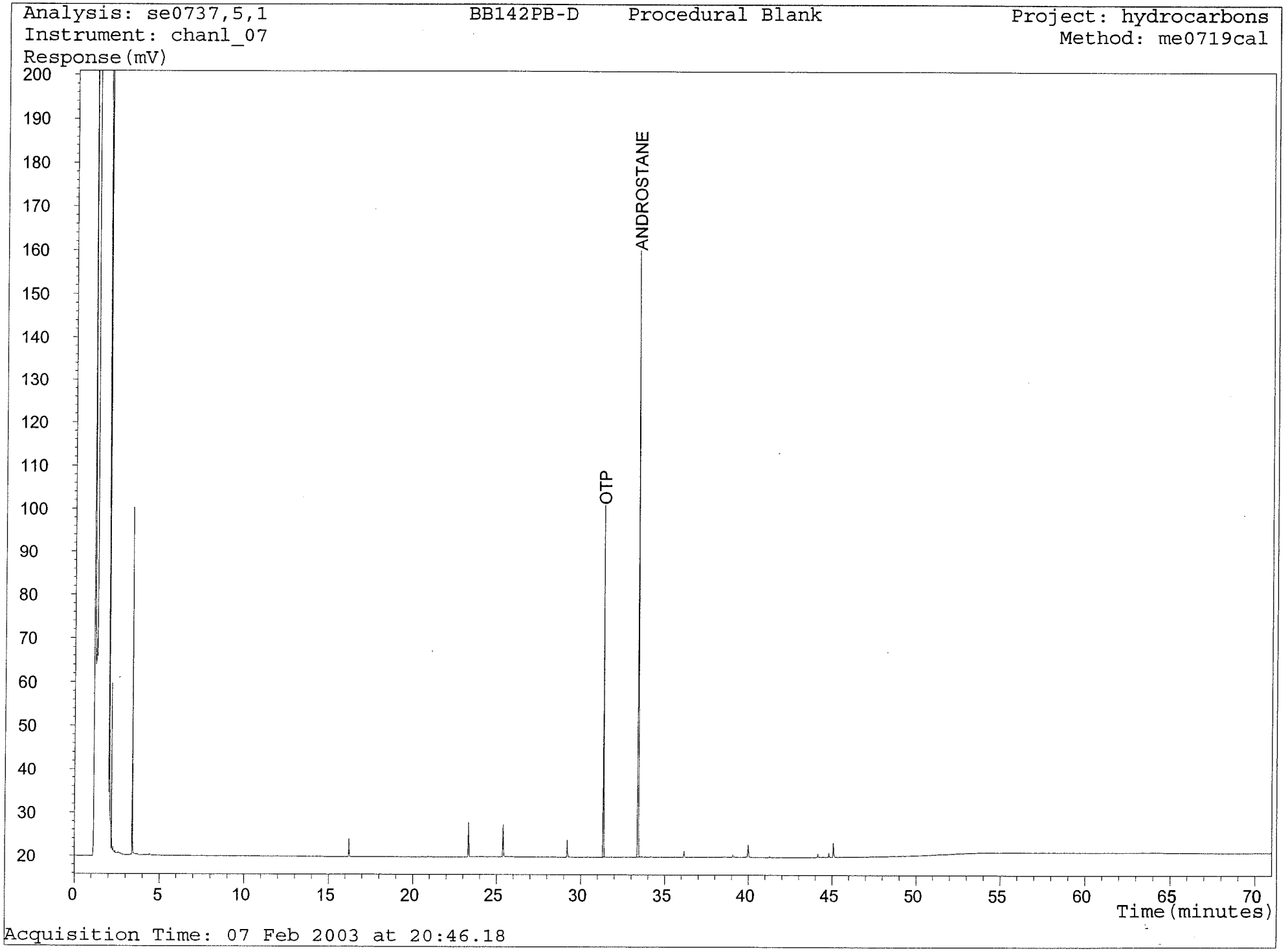
hydrocarbon,Chanl_07.se0730,6,1

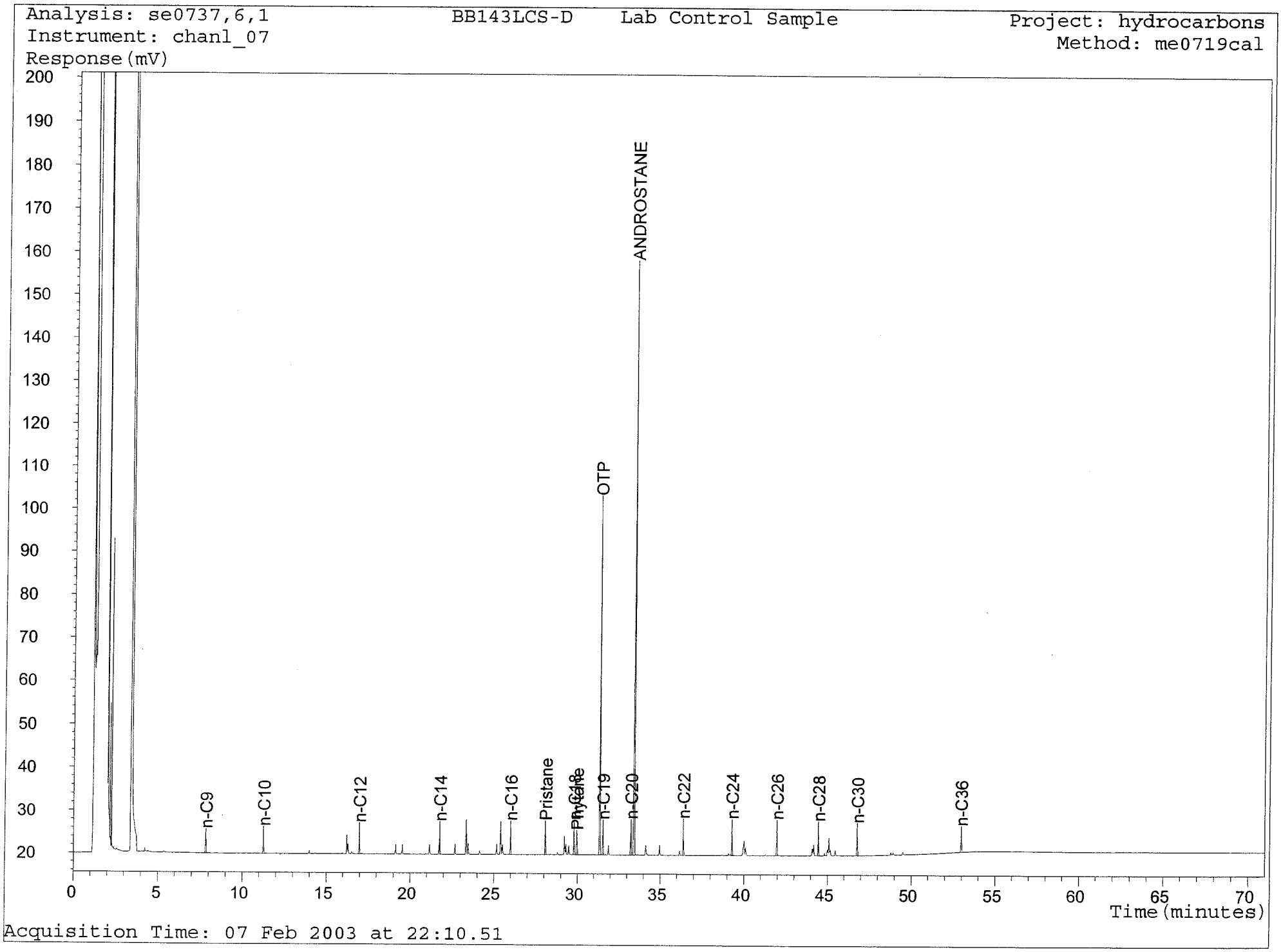


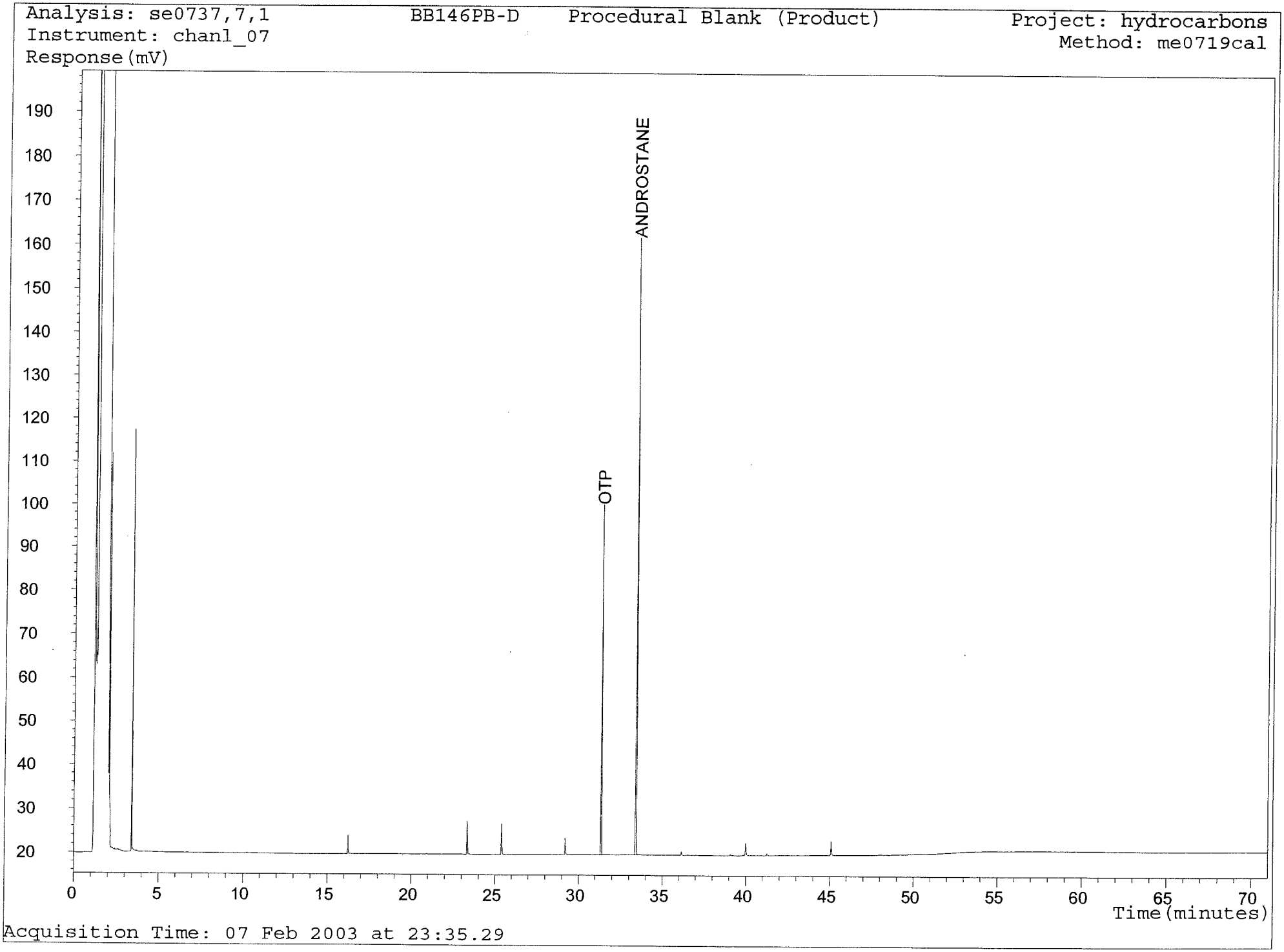
AB852LCS (7,1)
Acquired Monday, January 13, 2003 7:41:45 PM

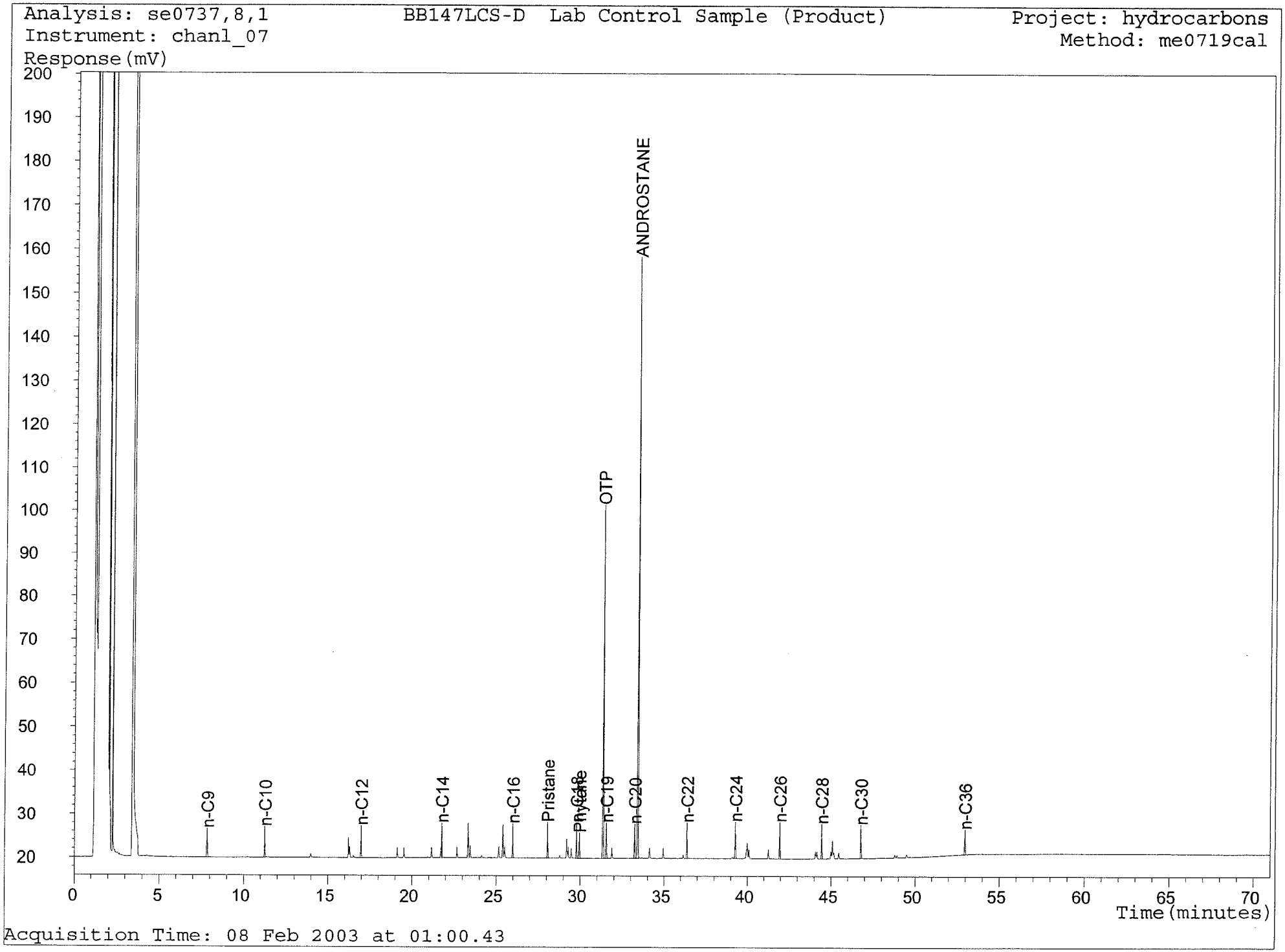
hydrocarbon,Chanl_07.se0730,7,1

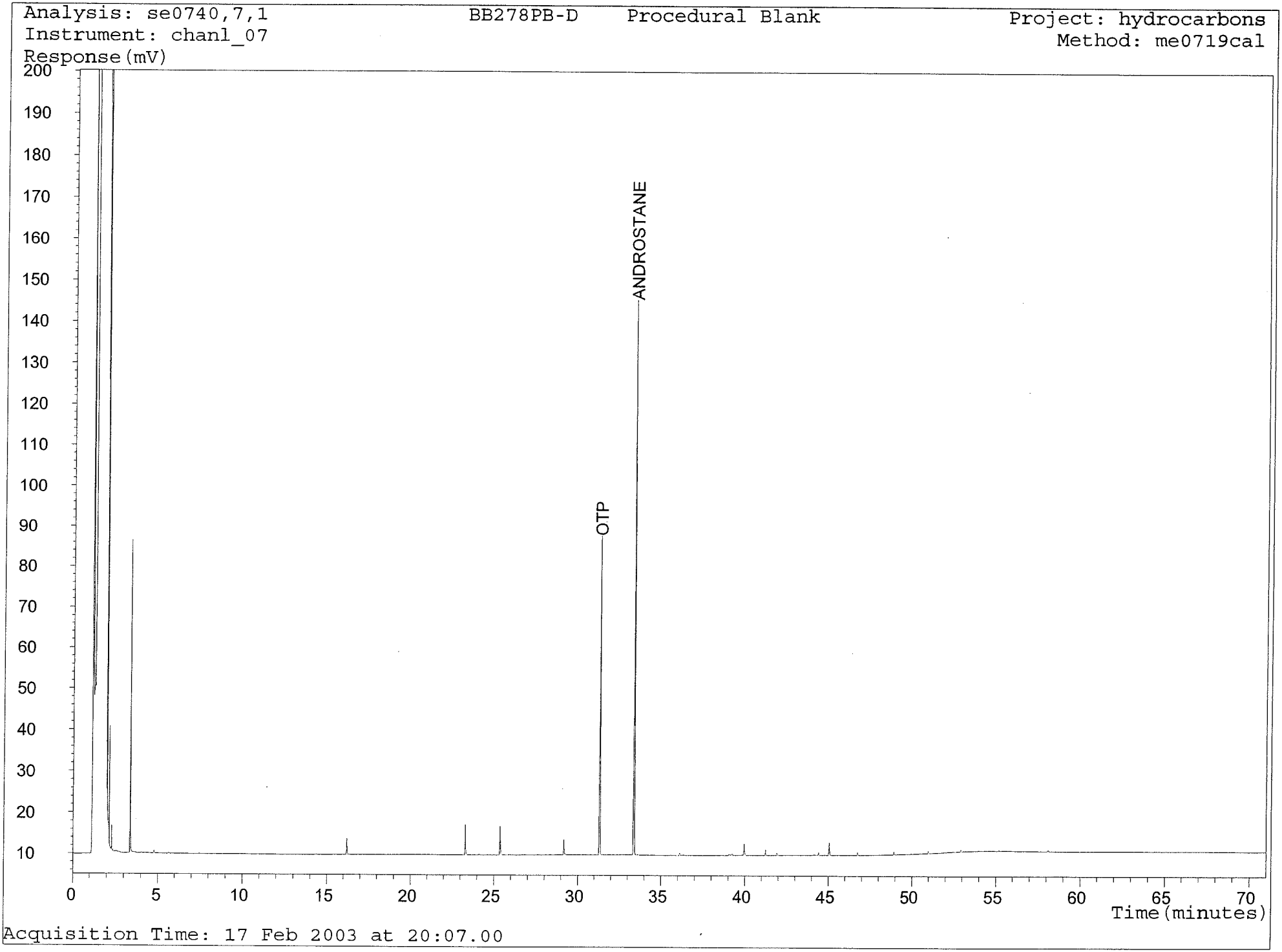


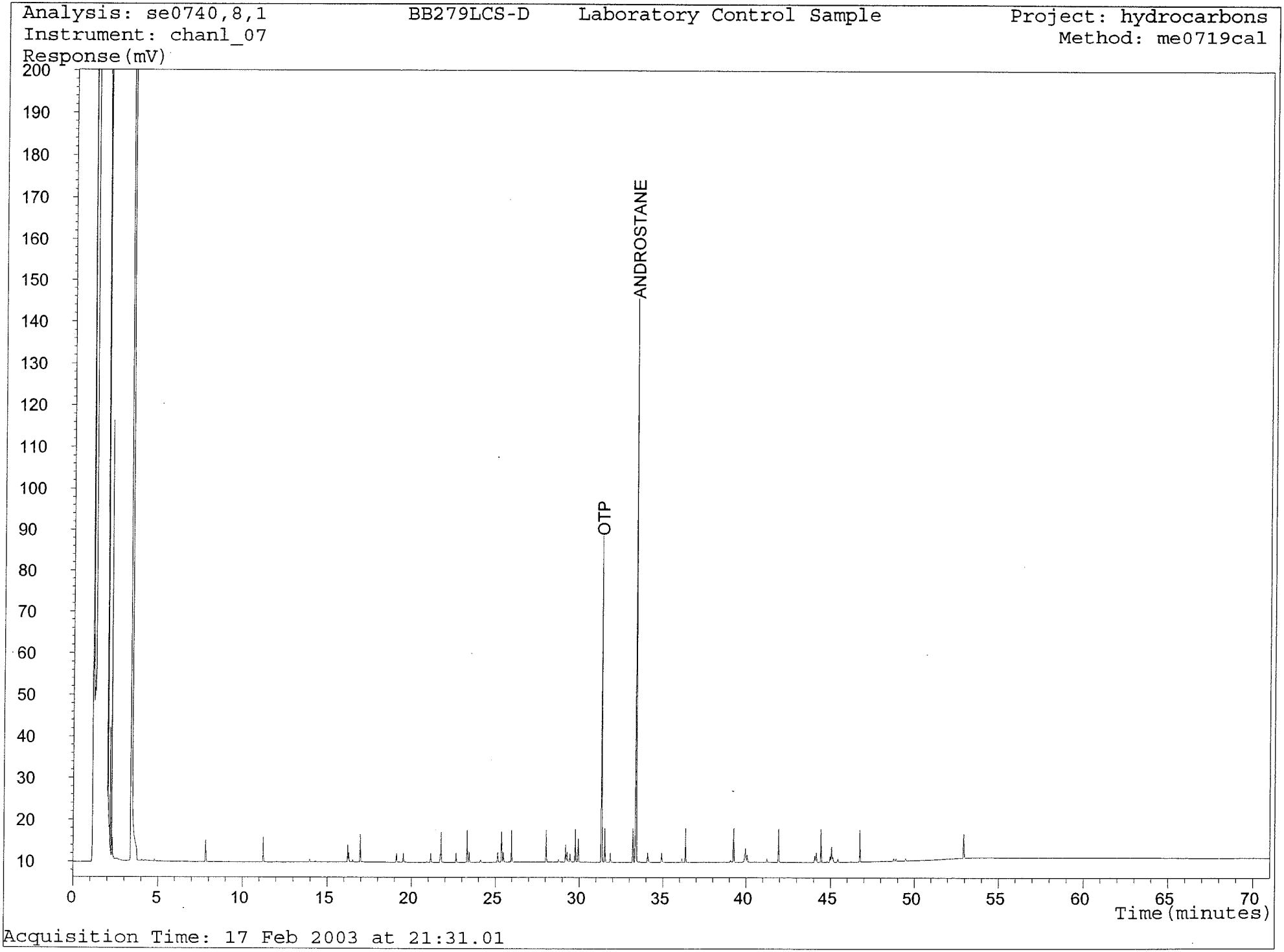

Analysis: se0737,5,1
BB142PB-D Procedural Blank
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Feb 2003 at 20:46.18

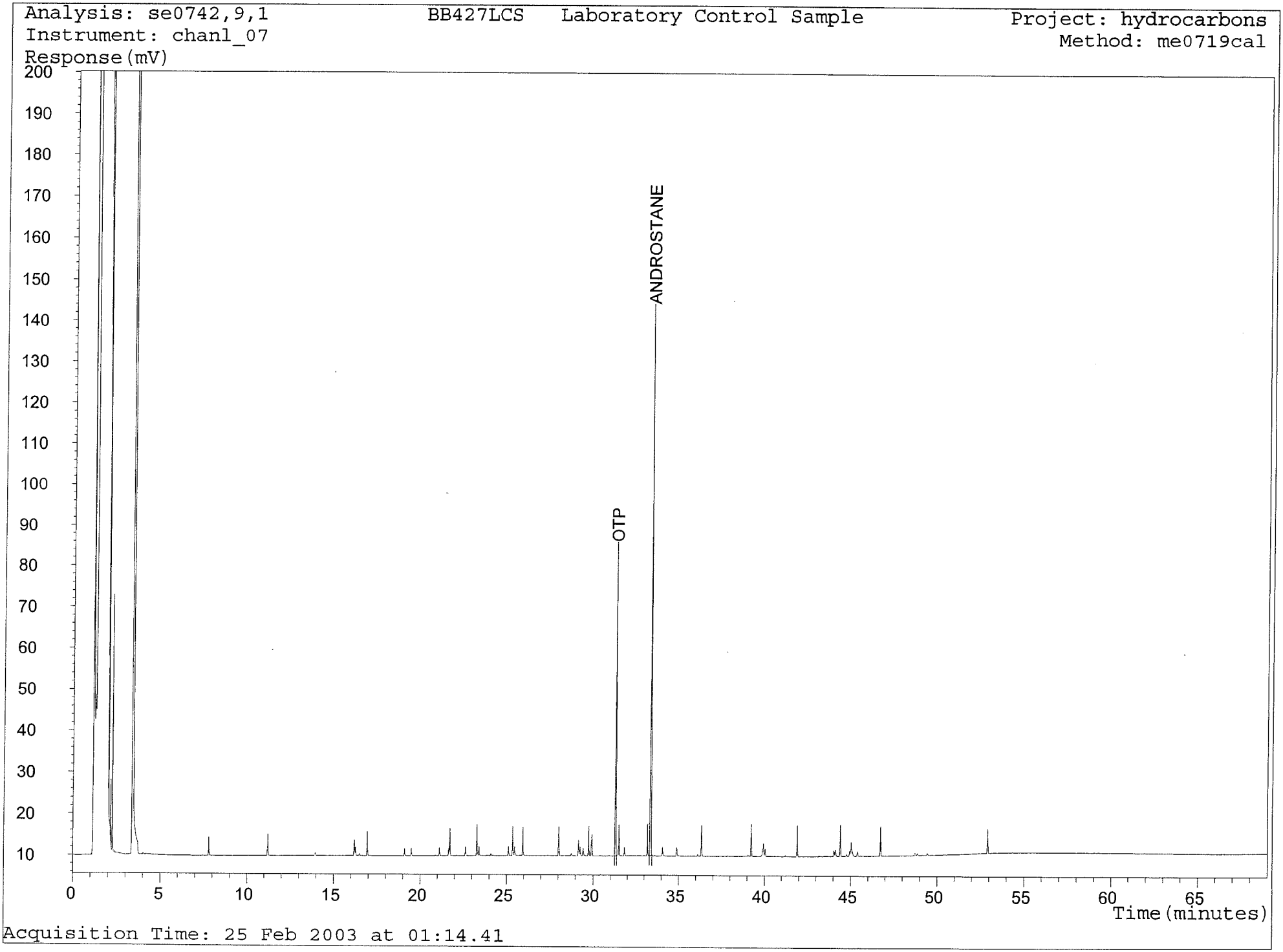

Analysis: se0737,6,1
Instrument: chanl_07
Response(mV)
BB143LCS-D Lab Control Sample
Project: hydrocarbons
Method: me0719cal
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ANDROSTANE
OTP
n-C9
n-C10
n-C12
n-C14
n-C16
Pristane
Phytane
n-C18
n-C19
n-C20
n-C22
n-C24
n-C26
n-C28
n-C30
n-C36
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 07 Feb 2003 at 22:10.51

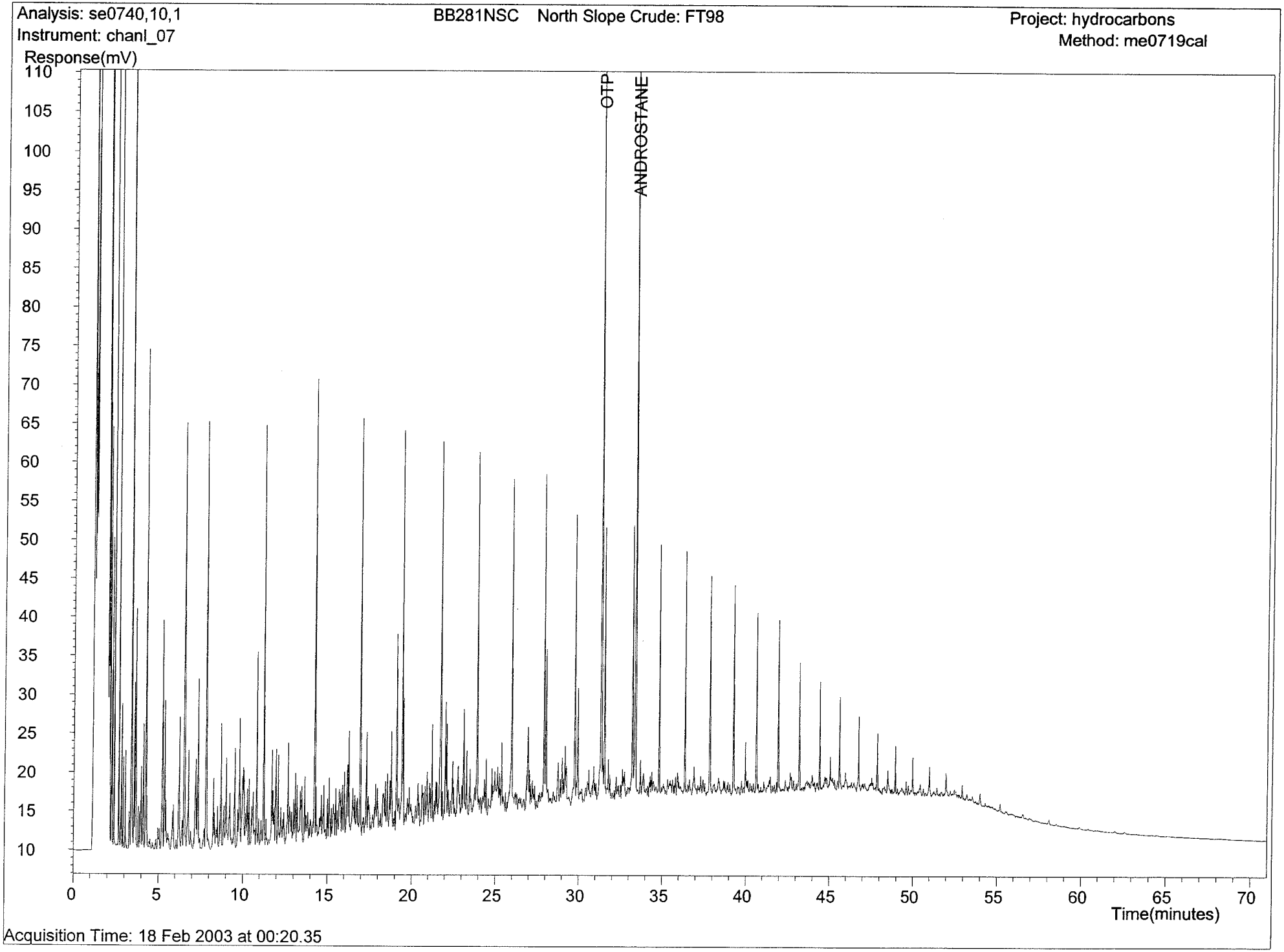

Analysis: se0737,7,1
BB146PB-D
Procedural Blank (Product)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
ANDROSTANE
OTP
Time(minutes)
Acquisition Time: 07 Feb 2003 at 23:35.29

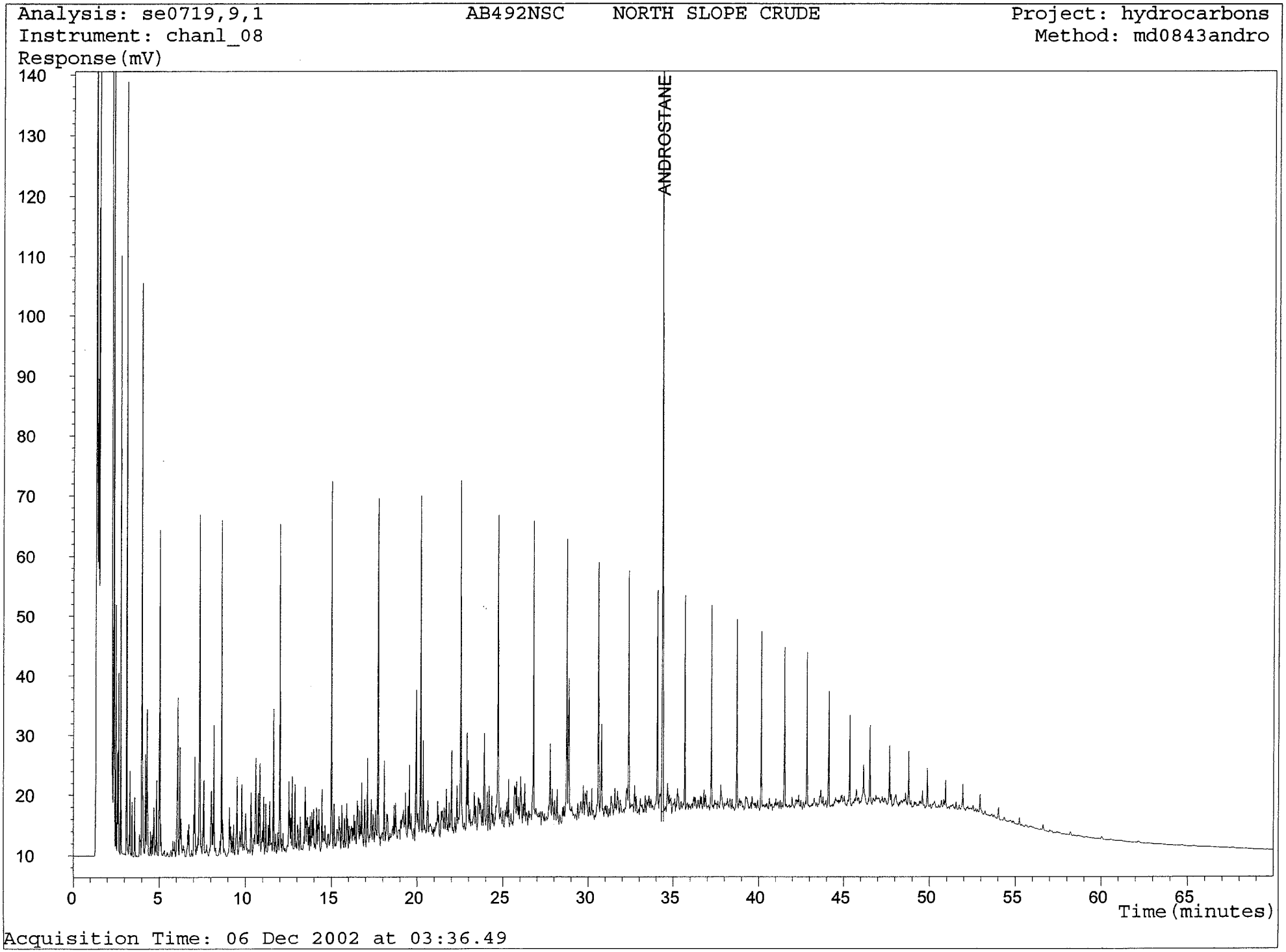

Analysis: se0737,8,1
BB147LCS-D Lab Control Sample (Product)
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ANDROSTANE
OTP
n-C9
n-C10
n-C12
n-C14
n-C16
Pristane
Phytane
n-C18
n-C19
n-C20
n-C22
n-C24
n-C26
n-C28
n-C30
n-C36
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 08 Feb 2003 at 01:00.43


Analysis: se0740,7,1
BB278PB-D Procedural Blank
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 17 Feb 2003 at 20:07.00


Analysis: se0740,8,1
BB279LCS-D
Laboratory Control Sample
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 17 Feb 2003 at 21:31.01


Analysis: se0742,9,1
BB427LCS Laboratory Control Sample
Project: hydrocarbons
Instrument: chanl_07
Method: me0719cal
Response(mV)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ANDROSTANE
OTP
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 25 Feb 2003 at 01:14.41


Analysis: se0740,10,1
Instrument: chanl_07
BB281NSC North Slope Crude: FT98
Project: hydrocarbons
Method: me0719cal
Response(mV)
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
OTP
ANDROSTANE
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Time(minutes)
Acquisition Time: 18 Feb 2003 at 00:20.35


Analysis: se0719,9,1
AB492NSC
NORTH SLOPE CRUDE
Project: hydrocarbons
Instrument: chanl_08
Method: md0843andro
Response(mV)
ANDROSTANE
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Time(minutes)
Acquisition Time: 06 Dec 2002 at 03:36.49

Attachment 2
PAH Concentrations
(GC/MS)

Battelle
... Putting Technology To Work

Lake Union Sediment
Project Name Investigation
Project Number N005443

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	11/15/02
Extraction Date	11/22/02	11/22/02	11/22/02	11/22/02	11/22/02
Acquired Date	12/18/02	12/18/02	12/14/02	12/14/02	12/14/02
Analytical Method	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
Naphthalene	371	21.6	1010	2110	693
C1-Naphthalenes	129	18.4	269	353	207
C2-Naphthalenes	260	125	334	496	449
C3-Naphthalenes	260	151	308	515	433
C4-Naphthalenes	224	222	355	990	280
2-Methylnaphthalene	80.6	7.8 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	9.88 J	6.34 J
2,6/2,7-Dimethylnaphthalene	96.4	52.5	149	244	207
1,5-Dimethylnaphthalene	13 J	6.8 J	13.1 J	21 J	17.1 J
Acenaphthylene	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	148	89.1
Cadalene	10.2 J	29.6	7.06 J	20.5 J	5.65 J
Fluorene	176	32.7	213	351	195
C1-Fluorenes	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	46.1
1-Methylfluorene	31.3	7.97 J	33.1	94.6	40.5
Anthracene	356	139	677	1240	568
Phenanthrene	1050	348	1560	1870	1190
C1-Phenanthrenes/Anthracenes	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-Methylphenanthrene	136	56.2	152	128	173
2-Methylanthracene	78.6	35.1	98.4	198	111
9-Methylphenanthrene	128	56	188	250	178
1-Methylphenanthrene	83.4	45.1	103	114	109
2,7-Dimethylphenanthrene	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	171
C2-Dibenzothiophenes	134	216	301	660	188
C3-Dibenzothiophenes	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	ND	ND
Retene	67.9	122	57.5	69.7	47.2
Fluoranthene	1930	902	5390	14000	3540
Pyrene	2150	767	6720	18400	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	1750
Chrysene	1360	500	2800	7890	2250
C1-Chrysenes	524	219	1060	1680	849
C2-Chrysenes	374	175	770	1020	684
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	1850	606
Benzo(e)pyrene	892	341	3940	7510	2620
Benzo(a)pyrene	1100	474	5100	11200	3520
Perylene	618	136	1810	3250	1270
Indeno(1,2,3-c,d)pyrene	696	280	4350	8660	3160
Dibenz(a,h)anthracene	148	69.2	612	1160	438
Benzo(g,h,i)perylene	688	251	4660	9170	3320
Surrogate Recoveries (%)					
Naphthalene-d8	83	96	76	77	77
Phenanthrene-d10	87	88	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.
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-107-SS-0010	NLU-109 1214	NLU-109-2830	NLU-109-3840	NLU-110 0406
Battelle Sample ID	U0145	U0277-D	U0285-D	U0290-D2	U0353-D2
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	12/14/02	03/05/03	02/26/03	02/27/03	03/05/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	12.1 %	21.36 %	23.08 %	28.21 %	28.81 %
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
Naphthalene	1270	19000	44300	105000	82100
C1-Naphthalenes	480	6020	34100	95800	11700
C2-Naphthalenes	602	4340	32900	77900	13800
C3-Naphthalenes	402	2840	17100	35900	16200
C4-Naphthalenes	353	1930	7650	14500	8080
2-Methylnaphthalene	254	2440	8540	45900	5650
1-Methylnaphthalene	222	3560	25500	49700	5890
2-Ethylnaphthalene	29.2	265	2430	6690	654 J
1-Ethylnaphthalene	12 J	72.2 J	499	1150	350 J
2,6/2,7-Dimethylnaphthalene	256	1280	9380	21100	3560
1,5-Dimethylnaphthalene	21.2 J	199	1280	2760	877 J
Acenaphthylene	546	1490	6450	10400	14500
Acenaphthene	387	7660	58800	116000	44200
Biphenyl	184	762	2610	4470	10200
Dibenzofuran	204	633	3480	6020	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	6700	4840 ME
2-Methylfluorene	45.8	213	1860	2950	2090
1-Methylfluorene	60.4	312	2150	4220	2840
Anthracene	911	4490	31700	68900	151000
Phenanthrene	2140	16100	122000 D	249000	568000
C1-Phenanthrenes/Anthracenes	1070	5550	37100	71600	84200
C2-Phenanthrenes/Anthracenes	1070	4030	16500	35500	35600
C3-Phenanthrenes/Anthracenes	555	2500	6950	15600	14400
C4-Phenanthrenes/Anthracenes	399	941	2120	5100	5810
3-Methylphenanthrene	220	1300	9460	16400	18500
2/4-Methylphenanthrene	220	1440	9650	19600	23600
2-Methylanthracene	158	619	4280	8490	9040
9-Methylphenanthrene	252	1280	8650	15800	19100
1-Methylphenanthrene	139	827	5160	10800	13000
2,7-Dimethylphenanthrene	104	413	978	3770	5260
1,7-Dimethylphenanthrene	78.3	404	1420	3050	3180
Dibenzothiophene	308	2070	15600	29300	75500
C1-Dibenzothiophenes	244	1120 ME	7170	13400	18600
C2-Dibenzothiophenes	304	1160	4820	9240	9180
C3-Dibenzothiophenes	296	1120	2810	5600	4870
C4-Dibenzothiophenes	217	578	1020	2240	2040
4-Methyldibenzothiophene	60.8	392	2360	4390	5650
2/3-Methyldibenzothiophene	88.5	431	2640	4840	6360
1-Methyldibenzothiophene	23.6 J	117	771	1540	1800
Dehydroabietin(e)	ND	ND	ND	ND	ND
Retene	65.1	955	1940	5000	11900
Fluoranthene	5610	18400	92900	223000	628000
Pyrene	6560	22800	134000 D	280000	978000
Benzo(b)fluorene	281	744	3860	8220	13700
C1-Fluoranthenes/Pyrenes	2580	6890	33200	68300	125000
C2-Fluoranthenes/Pyrenes	1260	2430	8580	18500	20600
C3-Fluoranthenes/Pyrenes	669	790	2170	4240	5210
Benzo(a)anthracene	3010	7350	32000	72400	238000
Chrysene	3570	8880	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)fluoranthene	4260	6840	30100	67200	236000
Benzo(a)fluoranthene	1070	1960	9660	21300	86900
Benzo(e)pyrene	4860	6840	29100	64400	230000
Benzo(a)pyrene	6410	9490	42500	101000	371000
Perylene	2140	2840	11800	26200	93200
Indeno(1,2,3-c,d)pyrene	5470	7320	31800	73200	280000
Dibenz(a,h)anthracene	782	979	4280	9840	27800
Benzo(g,h,i)perylene	5640	8720	37000	84700	310000
Surrogate Recoveries (%)					
Naphthalene-d8	80	78	74	114	114
Phenanthrene-d10	76	85	76	85	79
Chrysene-d12	91	84	77	94	87
5b(H)-Cholane	92	78	83	85	77

J=Result < Sample RL.
ND= Not Detected.
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Lake Union Sediment
Project Name 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	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
Extraction Date	02/11/03	02/21/03	11/22/02	11/22/02	11/22/02
Acquired Date	02/27/03	03/06/03	12/18/02	12/23/02	12/17/02
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	30.97 %	24.27 %	11.3 %	16.29 %	12.8 %
Matrix	Solid	Solid	Sediment	Sediment	Sediment
Sample Size	0.83 g	0.47 g	3.5 g	1.93 g	4.34 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	200	537	25.5	40.50	24
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	55000	30100	3820	22600	3750
C1-Naphthalenes	17300	14200	874	4000	1360
C2-Naphthalenes	19800	11600	955	21600	1270
C3-Naphthalenes	20500	4660	636	24400	1010
C4-Naphthalenes	10400	1960	569	10300	920
2-Methylnaphthalene	7510	5260	456	2310	798
1-Methylnaphthalene	9790	8890	211	1660	544
2-Ethylnaphthalene	1160	584	59.3	426	59.6
1-Ethylnaphthalene	421	312 J	28.4	376	34.2
2,6/2,7-Dimethylnaphthalene	5460	2700	380	7090	447
1,5-Dimethylnaphthalene	890	671	57.7	1000	73.4
Acenaphthylene	17800	5350	1440	7330	1160
Acenaphthene	55400	32700	4180	52400	1450
Biphenyl	10400	2980	716	3900	579
Dibenzofuran	5160	1660	246	3330	307
Cadalene	ND	ND	12.5 J	90	19.5 J
Fluorene	39700	13200	1490	28000	1090
C1-Fluorenes	17000	3700	567	10200	915
C2-Fluorenes	12600	2630	536	7900	662
C3-Fluorenes	6710 ME	1780 ME	457 ME	5490	641 ME
2-Methylfluorene	3720	704	103	1890	163
1-Methylfluorene	4160	888	117	2440	164
Anthracene	188000	28200	2490	54400 D	1910
Phenanthrene	715000 D	95500	6150	271000 D	4980
C1-Phenanthrenes/Anthracenes	123000	29400	2170	55500	2140
C2-Phenanthrenes/Anthracenes	47700	17100	1820	25400	1990
C3-Phenanthrenes/Anthracenes	17700	6490	837	8810	1020
C4-Phenanthrenes/Anthracenes	5810	2250	371	3160	403
3-Methylphenanthrene	29700	5680	462	14200	405
2/4-Methylphenanthrene	33000	7410	412	14700	388
2-Methylanthracene	15100	3690	369	6590	345
9-Methylphenanthrene	28200	7280	608	12000	578
1-Methylphenanthrene	17700	4980	308	7200	259
2,7-Dimethylphenanthrene	2470	1960	150	1940	158
1,7-Dimethylphenanthrene	4010	1710	133	2000	131
Dibenzothiophene	92100	11600	1210	38100	900
C1-Dibenzothiophenes	23100	5160	526	10600	546
C2-Dibenzothiophenes	13100	4320	566	7490	620
C3-Dibenzothiophenes	6080	2360	430	3980	508
C4-Dibenzothiophenes	2010	1000	250	1210	243
4-Methyldibenzothiophene	8000	1890	186	3590	200
2/3-Methyldibenzothiophene	8760	1910	205	3990	180
1-Methyldibenzothiophene	2320	551	53.4	1040	54.8
Dehydroabietin(e)	ND	ND	ND	ND	ND
Retene	5570	3930	96.6	1020	81.1
Fluoranthene	1060000 D	232000	24400	294000 D	15700
Pyrene	1240000 D	285000	30100	356000 D	20100
Benzo(b)fluorene	21400	7260	819	7930	611
C1-Fluoranthenes/Pyrenes	181000	63400	6750	62000	5540
C2-Fluoranthenes/Pyrenes	29800	13800	1810	11600	2010
C3-Fluoranthenes/Pyrenes	6540	2890	784	3580	718
Benzo(a)anthracene	318000 D	84700	10500	62400 D	7010
Chrysene	386000 D	109000	11100	79400 D	7980
C1-Chrysenes	45700	20600	2650	17800	1960
C2-Chrysenes	10600 ME	5080 ME	1210	6490	993
C3-Chrysenes	3800	1580	724	2190	560
C4-Chrysenes	ND	ND	676	ND	497
Benzo(b)fluoranthene	268000 D	79700	13700	50800 D	10500
Benzo(j/k)fluoranthene	262000	84200	11800	60300 D	8310
Benzo(a)fluoranthene	98700	25700	3290	19700	2580
Benzo(e)pyrene	298000 D	87900	13200	62400 D	10600
Benzo(a)pyrene	480000 D	143000	20100	106000 D	15500
Perylene	124000	40100	6110	34000	4900
Indeno(1,2,3-c,d)pyrene	359000 D	103000	13800	79100 D	13200
Dibenz(a,h)anthracene	44600	9100	1750	3690	1470
Benzo(g,h,i)perylene	410000 D	136000	14200	94700 D	13600
Surrogate Recoveries (%)					
Naphthalene-d8	89	87	80	86	79
Phenanthrene-d10	84	74	81	90	81
Chrysene-d12	87	81	95	101	81
5b(H)-Cholane	87	74	95	91	95

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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	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	03/01/03	12/19/02	12/17/02	02/18/03	02/25/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	18.34 %	15.86 %	19.4 %	18.36 %	18.31 %
Matrix	Solid	Sediment	Sediment	Solid	Sediment
Sample Size	5.87 g	1.67 g	6.37 g	5.55 g	5.76 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	30.7	41.60	24.6	45.5	43.8
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	7090	30000	3500	37400	12200
C1-Naphthalenes	33400	34900	1280	22100	3040
C2-Naphthalenes	32100	95900	1760	12800	5540
C3-Naphthalenes	13200	68700	2370	13300	7150
C4-Naphthalenes	4160	25000	3160 ME	8650	5010
2-Methylnaphthalene	10000	13700	777	4420	1510
1-Methylnaphthalene	23400	21100	494	17700	1510
2-Ethylnaphthalene	1060	3850	89.8	538	189
1-Ethylnaphthalene	563	1310	56.1	449	283
2,6/2,7-Dimethylnaphthalene	8780	28600	570	3110	1420
1,5-Dimethylnaphthalene	1610	4550	100	891	419
Acenaphthylene	2330	5770	1620	4480	3860
Acenaphthene	14200	35000	1500	12800	8530
Biphenyl	1050	1390	485	2950	1950
Dibenzofuran	1170	5100	419	2740	1570
Cadalene	ND	ND	46.7	ND	ND
Fluorene	10100	35600	1590	11700	5500
C1-Fluorenes	3980	25600	1970	6580	4350
C2-Fluorenes	2370	17500	2280	5190	3570
C3-Fluorenes	1430	8250	1650	3260	2720
2-Methylfluorene	910	7100	483	1740	1170
1-Methylfluorene	1030	6310	503	1650	1170
Anthracene	10600	31400	2410	13600	13200
Phenanthrene	20600	84800 D	3700	33200	20900
C1-Phenanthrenes/Anthracenes	10300	61400	3660	19300	14600
C2-Phenanthrenes/Anthracenes	6460	44400	5560	15200	11600
C3-Phenanthrenes/Anthracenes	2840	15500	3180	5420	6150
C4-Phenanthrenes/Anthracenes	992	4130	1090	1660	2330
3-Methylphenanthrene	2880	21200	534	5860	4240
2/4-Methylphenanthrene	1850	20200	391	2390	1590
2-Methylanthracene	1560	10300	772	3050	2530
9-Methylphenanthrene	2450	16800	1180	5070	3940
1-Methylphenanthrene	1620	10700	808	3150	2310
2,7-Dimethylphenanthrene	411	2700	461	1090	554
1,7-Dimethylphenanthrene	468	3140	338	1030	926
Dibenzothiophene	5030	12900	1150	9500	5600
C1-Dibenzothiophenes	2500	14500	1520	5500	4110
C2-Dibenzothiophenes	1870	11000	1980	4420	3870
C3-Dibenzothiophenes	1170	5820	1390	2180	2610
C4-Dibenzothiophenes	526	1760	625	829	1190
4-Methyldibenzothiophene	923	5030	629	2070	1800
2/3-Methyldibenzothiophene	857	4810	428	1670	1270
1-Methyldibenzothiophene	251	1430	187	527	424
Dehydroabietin(e)	ND	ND	ND	ND	ND
Retene	806	397	127	1590	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	4650
C1-Fluoranthenes/Pyrenes	13400	45800	10100	32100	36500
C2-Fluoranthenes/Pyrenes	3390	17800	3870	8050	9000
C3-Fluoranthenes/Pyrenes	880	6150	1490	1840	2300
Benzo(a)anthracene	15500	25900	8880	64100 D	59200 D
Chrysene	19400	29700	10900	72900 D	75200 D
C1-Chrysenes	4040	17800	4020	9750	11700
C2-Chrysenes	1680	9200	2220	3440	4030
C3-Chrysenes	798	3980	1180	1280	1590
C4-Chrysenes	ND	1470	530	ND	ND
Benzo(b)fluoranthene	17100	18600	9680	43400	54200 D
Benzo(j/k)fluoranthene	18200	17800	8340	46900	39900
Benzo(a)fluoranthene	5720	5380	2480	16100	15300
Benzo(e)pyrene	18900	17200	9480	45200	57800 D
Benzo(a)pyrene	28500	27900	14500	90200 D	91500 D
Perylene	8640	7050	4170	20500	19500
Indeno(1,2,3-c,d)pyrene	23600	18400	10800	73500 D	71500 D
Dibenz(a,h)anthracene	2850	3030	1590	6780	6990
Benzo(g,h,i)perylene	27000	14800	11100	74600 D	84500 D
Surrogate Recoveries (%)					
Naphthalene-d8	95	78	86	90	101
Phenanthrene-d10	88	81	84	70	90
Chrysene-d12	92	93	87	75	101
5b(H)-Cholane	96	104	107	98	103

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-117-0010 Composite (U0383, U0384, U0385, U0386, U0387)	NLU-117 0810	NLU-117 2630	NLU-117 4850	NLU-117-US-9.6
Battelle Sample ID	U6525-D2	U0387-D2	U0397-D2	U0407-D2	U4507-D3
Battelle Batch ID	03-0137	03-0159	03-0159	03-0159	03-0100
Associated Blank	BB278PB	BB426PB	BB426PB	BB426PB	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	8270M	8270M	8270M
Percent Solids	32.43 %	27.62 %	22.52 %	26.72 %	87.86 %
Matrix	Solid	Solid	Solid	Solid	Solid
Sample Size	0.88 g	0.33 g	0.3 g	0.39 g	10.10 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	1860	1913	1200	647	8250
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	53000	100000	51200	37800	3210000
C1-Naphthalenes	140000	175000	67300	16500	1800000
C2-Naphthalenes	241000	289000	116000	15700	835000
C3-Naphthalenes	119000	155000	65400	12100	224000
C4-Naphthalenes	39100	51800	23500	8260	36700
2-Methylnaphthalene	52400	66700	20000	8730	1140000
1-Methylnaphthalene	87000	108000	47100	7660	657000
2-Ethylnaphthalene	12300	15800	5900	687	31000
1-Ethylnaphthalene	2450	2910	1800	253 J	5900 J
2,6/2,7-Dimethylnaphthalene	75200	91500	32200	4500	247000
1,5-Dimethylnaphthalene	7850	9000	4660	778	29300
Acenaphthylene	11900	17900	10000	3600	208000
Acenaphthene	102000	140000	71800	19200	766000
Biphenyl	7140	13800	6380	4070	203000
Dibenzofuran	14100	19200	12500	15600	187000
Cadalene	ND	ND	ND	ND	ND
Fluorene	81000	108000	56800	22400	526000
C1-Fluorenes	33700	42000	24700	7280	148000
C2-Fluorenes	21700	28500	16900	5620	50100
C3-Fluorenes	11000	13800	9450	4020	10600
2-Methylfluorene	6160	7980	5200	1220	22800
1-Methylfluorene	9380	11700	6520	2050	35600
Anthracene	200000	263000	102000	21600	350000
Phenanthrene	716000	981000	388000	95800	1650000
C1-Phenanthrenes/Anthracenes	163000	210000	125000	35500	558000
C2-Phenanthrenes/Anthracenes	7340	92400	56900	21800	172000
C3-Phenanthrenes/Anthracenes	23800	32900	19000 ME	11200	32400
C4-Phenanthrenes/Anthracenes	7210	9540	86700	5580	6460
3-Methylphenanthrene	37500	48400	28000	8040	132000
2/4-Methylphenanthrene	48000	58900	34000	9920	156000
2-Methylanthracene	19500	24500	14000	4880	51500
9-Methylphenanthrene	35700	45600	27600	6860	116000
1-Methylphenanthrene	24200	31100	20400	5550	99200
2,7-Dimethylphenanthrene	7470	8320	4560	2280	18500
1,7-Dimethylphenanthrene	5080	6880	5440	2620	19100
Dibenzothiophene	69000	130000	37600	12000	69100
C1-Dibenzothiophenes	28600	37300	21500	6800	40800
C2-Dibenzothiophenes	17500	23200	15600	5100	20400
C3-Dibenzothiophenes	8300	11700	8030	3230	6600
C4-Dibenzothiophenes	2550	4180	3180	1850	ND
4-Methyldibenzothiophene	10200	13300	7470	2170	14500
2/3-Methyldibenzothiophene	10500	13600	7570	2700	13900
1-Methyldibenzothiophene	2920	3730	2480	682	5070 J
Dehydroabietin(e)	ND	ND	34000	ND	ND
Retene	10300	12400	357000	10900	6780
Fluoranthene	884000	1160000	406000	70200	727000
Pyrene	1060000	1370000	513000	61900	762000
Benzo(b)fluorene	19500	26300	12300	4740	41000
C1-Fluoranthenes/Pyrenes	161000	228000	113000	28200	324000
C2-Fluoranthenes/Pyrenes	28400	40300	26200	9460	67500
C3-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	61800
C2-Chrysenes	9800	14800 ME	10100	3220	19500
C3-Chrysenes	3320	5620	3230	1750	ND
C4-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	28900	3800	33800
Benzo(e)pyrene	236000	343000	86800	9590	100000
Benzo(a)pyrene	388000	555000	141000	14500	193000
Perylene	98100	143000	37400	4070	34400
Indeno(1,2,3-c,d)pyrene	284000	419000	92900	9040	75700
Dibenz(a,h)anthracene	33800	48400	9850	1420	12700
Benzo(g,h,i)perylene	328000	487000	121000	10800	82700
Surrogate Recoveries (%)					
Naphthalene-d8	181 &	117	99	92	1895 &
Phenanthrene-d10	94	84	80	79	161 &
Chrysene-d12	107	92	88	79	344 &
5b(H)-Cholane	88	73	75	78	79

J=Result < Sample RL.
ND= Not Detected.
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&= 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-119-0010 Composite (U0452, U0453, U0454, U0455, U0456)	NLU-119-0608	NLU-119-1618	NLU-119-2426	NLU-119R2-US-0.5
Battelle Sample ID	U6524-D2	U0455-D2	U0460-D2	U0464-D2	U4512-D2
Battelle Batch ID	03-0137	03-0137	03-0137	03-0137	03-0159
Associated Blank	BB278PB	BB278PB	BB278PB	BB278PB	BB428PB
Field Date	11/18/02	11/18/02	11/18/02	11/18/02	11/21/02
Receipt Date	11/21/02	11/21/02	11/21/02	11/21/02	01/29/03
Extraction Date	02/11/03	02/11/03	02/11/03	02/11/03	02/21/03
Acquired Date	02/27/03	02/27/03	02/27/03	02/27/03	03/05/03
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	21.3 %	17.92 %	21.01 %	22.77 %	45.79 %
Matrix	Solid	Solid	Solid	Solid	Solid
Sample Size	0.45 g	0.37 g	0.26 g	0.5 g	1.01 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	2810	3410	4860	2530	834
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	2290000	2210000	2020000	789000	2860000 D
C1-Naphthalenes	3340000	3100000	2650000	841000	1400000
C2-Naphthalenes	3570000	3320000	2700000	873000	983000
C3-Naphthalenes	1720000	1620000	1300000	410000	402000
C4-Naphthalenes	454000	420000	350000	104000	91000
2-Methylnaphthalene	1860000	1710000	1470000	427000	863000
1-Methylnaphthalene	1480000	1380000	1180000	413000	518000
2-Ethylnaphthalene	174000	158000	124000	34500	52100
1-Ethylnaphthalene	35400	33100	26700	9410	8550
2,6/2,7-Dimethylnaphthalene	1060000	989000	803000	280000	300000
1,5-Dimethylnaphthalene	119000	110000	88800	29400	33500
Acenaphthylene	82700	81200	62400	27200	20900
Acenaphthene	1060000	980000	808000	284000	335000
Biphenyl	103000	88400	99200	23100	117000
Dibenzofuran	293000	267000	218000	76500	102000
Cadalene	ND	ND	ND	ND	ND
Fluorene	952000	867000	713000	247000	303000
C1-Fluorenes	538000	487000	401000	122000	158000
C2-Fluorenes	321000	305000	248000	68500	83500
C3-Fluorenes	140000	119000	100000	28500	31700
2-Methylfluorene	112000	97100	75900	22200	28400
1-Methylfluorene	148000	134000	107000	32200	40100
Anthracene	898000	860000	705000	274000	239000
Phenanthrene	2710000	2580000	2250000	930000	708000
C1-Phenanthrenes/Anthracenes	1840000	1720000	1420000	427000	536000
C2-Phenanthrenes/Anthracenes	878000	809000	674000	183000	234000
C3-Phenanthrenes/Anthracenes	286000	251000	215000	59000	71500
C4-Phenanthrenes/Anthracenes	51000	47900	42100	13300	15200
3-Methylphenanthrene	479000	436000	350000	104000	137000
2/4-Methylphenanthrene	512000	480000	410000	122000	156000
2-Methylanthracene	212000	201000	162000	48600	62200
9-Methylphenanthrene	373000	340000	280000	85900	102000
1-Methylphenanthrene	253000	240000	206000	64800	74600
2,7-Dimethylphenanthrene	53100	49700	48700	14400	14800
1,7-Dimethylphenanthrene	86000	59800	49400	14700	19100
Dibenzothiophene	314000	299000	246000	94100	88500
C1-Dibenzothiophenes	308000	284000	226000	65300	96200
C2-Dibenzothiophenes	214000	198000	158000	40300	60400
C3-Dibenzothiophenes	97400	83600	68900	18600	24200
C4-Dibenzothiophenes	26100	21100	19900	6010	6370
4-Methyldibenzothiophene	102000	95100	77200	22700	31300
2/3-Methyldibenzothiophene	109000	101000	81800	23900	33900
1-Methyldibenzothiophene	33200	30700	24700	7280	10200
Dehydroabietin(e)	ND	ND	ND	ND	ND
Retene	20000	21800	13800	12300	16900
Fluoranthene	1360000	1350000	1210000	638000	181000
Pyrene	1710000	1700000	1520000	784000	231000
Benzo(b)fluorene	76500	72800	58100	22800	17900
C1-Fluoranthenes/Pyrenes	790000	768000	610000	229000	181000
C2-Fluoranthenes/Pyrenes	251000	234000	190000	61400	63600
C3-Fluoranthenes/Pyrenes	56800	52600	43300	15000	14800
Benzo(a)anthracene	476000	468000	399000	210000	61700
Chrysene	572000	559000	478000	244000	73100
C1-Chrysenes	229000	220000	184000	87000	53700
C2-Chrysenes	87700	80900	65100	24000	22500
C3-Chrysenes	27600	25000	17600	6760	7920
C4-Chrysenes	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	289000	273000	233000	141000	18900
Benzo(j/k)fluoranthene	359000	348000	292000	174000	27900
Benzo(a)fluoranthene	119000	113000	91300	53600	11100
Benzo(e)pyrene	315000	302000	250000	158000	19200
Benzo(a)pyrene	540000	521000	438000	268000	36600
Perylene	130000	124000	103000	63900	7710
Indeno(1,2,3-c,d)pyrene	350000	332000	271000	178000	14600
Dibenz(a,h)anthracene	51200	48400	40200	23900	4330
Benzo(g,h,i)perylene	378000	361000	298000	189000	14600
Surrogate Recoveries (%)					
Naphthalene-d8	176 &	155 &	155 &	153 &	127 &
Phenanthrene-d10	107	90	89	84	84
Chrysene-d12	117	93	104	94	90
5b(H)-Cholane	89	89	87	84	87

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ND= Not Detected.
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Lake Union Sediment
Project Name Investigation
Project Number N005443

Client Sample ID	NLU-121-SS-0010	NLU-121-SS-2030	NLU-122-SS-0010	NLU-122-SS-2030	NLU-123-SS-0010
Battelle Sample ID	U0151	U0152	U0153	U0154	U0155
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	12/17/02	12/19/02	12/19/02	12/19/02	12/17/02
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	3.86 g	1.02 g	4.62 g	1.68 g	4.56 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	34.2	67.50	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	2240	41400	85700	2330000	4480
C2-Naphthalenes	2730	144000	51500	1570000	11400
C3-Naphthalenes	2840	140000	19200	564000	15000
C4-Naphthalenes	4330	51300	742	170000	9100
2-Methylnaphthalene	1290	8600	52400 D	1730000 D	2010
1-Methylnaphthalene	956	32800	40600 D	982000 D	2430
2-Ethylnaphthalene	175	3680	3110	96900	271
1-Ethylnaphthalene	119	1920	601	16400	459
2,6/2,7-Dimethylnaphthalene	745	40100	15500	394000 D	2430
1,5-Dimethylnaphthalene	210	6400	1900	47100	1060
Acenaphthylene	4280	9660	6040	107000	2570
Acenaphthene	2840	46400	43800 D	808000 D	11900
Biphenyl	539	3740	861	68200	726
Dibenzofuran	545	10900	22200	394000	1230
Cadalene	52.1	417	186	956	47.2
Fluorene	3350	39000	41900	838000 D	12800
C1-Fluorenes	3270	43100	8460	241000	9760
C2-Fluorenes	4140	33500	5110	127000	8620
C3-Fluorenes	2610 ME	17400	4000	66300	3190 ME
2-Methylfluorene	778	12100	1760	52500	2480
1-Methylfluorene	816	10200	1740	51600	2250
Anthracene	3370	92900	23700	529000 D	9550
Phenanthrene	4560	259000 D	81700 D	2150000 D	14000
C1-Phenanthrenes/Anthracenes	6780	106000	29300	838000	22200
C2-Phenanthrenes/Anthracenes	12600	91400	18200	339000	16600
C3-Phenanthrenes/Anthracenes	7270	29500	6550	99600	6520
C4-Phenanthrenes/Anthracenes	1930	6940	1920	20300	2700
3-Methylphenanthrene	803	47000	7740	227000	5600
2/4-Methylphenanthrene	625	45200	7530	227000	3740
2-Methylanthracene	2020	20900	4020	100000	3380
9-Methylphenanthrene	1940	38300	5960	153000	5250
1-Methylphenanthrene	884	21700	3790	108000	3040
2,7-Dimethylphenanthrene	808	5930	1060	20800	1090
1,7-Dimethylphenanthrene	861	6190	1360	27600	1080
Dibenzothiophene	1390	33000	7210	180000	6290
C1-Dibenzothiophenes	1990	30500	4790	137000	5580
C2-Dibenzothiophenes	3910	23600	4260	90600	4590
C3-Dibenzothiophenes	2770	11400	2780	43700	2410
C4-Dibenzothiophenes	957	3310	1180	12400	838
4-Methyldibenzothiophene	809	10500	1570	45100	2090
2/3-Methyldibenzothiophene	553	10900	1720	48900	1730
1-Methyldibenzothiophene	240	2950	483	13900	566
Dehydroabietin(e)	ND	ND	ND	ND	ND
Retene	244	800	560	2810	1280
Fluoranthene	24200	259000 D	52900 D	921000 D	55400 D
Pyrene	30700	321000 D	50900 D	861000 D	65500 D
Benzo(b)fluorene	2810	12700	4450	87300	2540
C1-Fluoranthenes/Pyrenes	23500	106000	28200	528000	21500
C2-Fluoranthenes/Pyrenes	9970	27700	9640	132000	7030
C3-Fluoranthenes/Pyrenes	3130	8690	3670	37800	2350
Benzo(a)anthracene	15200	90400	21200	348000	17400
Chrysene	16600	107000	23800	348000	20400
C1-Chrysenes	10100	31500	11300	171000	7070
C2-Chrysenes	5360	11700	5700	66800	3300
C3-Chrysenes	2420	5360	2650	28000	1840
C4-Chrysenes	1010	2020	1150	6660	770
Benzo(b)fluoranthene	13600	73800	16200	179000	15800
Benzo(j/k)fluoranthene	12100	74200	17100	228000	14100
Benzo(a)fluoranthene	4200	20300	4430	59800	4210
Benzo(e)pyrene	12900	73900	13600	145000	15100
Benzo(a)pyrene	20800	102000 D	22300	284000	24000
Perylene	5340	32200	5570	63100	8700
Indeno(1,2,3-c,d)pyrene	13100	76100	14000	143000	16400
Dibenz(a,h)anthracene	2520	10200	2840	36300	2570
Benzo(g,h,i)perylene	12900	74000	11700	103000	16800
Surrogate Recoveries (%)					
Naphthalene-d8	82	100	91	113	77
Phenanthrene-d10	83	97	85	91	77
Chrysene-d12	87	114	98	99	83
5b(H)-Cholane	100	103	105	97	108

J=Result < Sample RL.
ND= Not Detected.
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Lake Union Sediment
Project Name Investigation
Project Number N005443

Client Sample ID	NLU-124-SS-0010	NLU-124-SS-2030	NLU-126-SS-0010	NLU-126-SS-0010 Roofing Material	NLU-126-SS-1020
Battelle Sample ID	U0156	U0157	U0158	U4517-D	U0097-D2
Battelle Batch ID	02-867	02-868	02-868	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	12/17/02	12/23/02	12/19/02	03/02/03	02/18/03
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	3.58 g	2.62 g	2.00 g	7.57 g	9.48 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	43.6	39.70	31.30	41.7	266
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	1890	7010	1990	428	4740
C1-Naphthalenes	1040	2790	1180	3180	3470
C2-Naphthalenes	1550	3840	2390	6280	7190
C3-Naphthalenes	1550	5130	2940	5740	5590
C4-Naphthalenes	1360	5710	3130	1480	3250
2-Methylnaphthalene	611	1650	579	194	1360
1-Methylnaphthalene	417	1090	574	2980	2090
2-Ethylnaphthalene	68.3	150	81	160	206 J
1-Ethylnaphthalene	29.7 J	111	78.7	147	162 J
2,6/2,7-Dimethylnaphthalene	592	1040	638	2230	2120
1,5-Dimethylnaphthalene	98.5	293	191	492	432
Acenaphthylene	1190	1740	1410	99.4	1100
Acenaphthene	2130	5800	2540	6720	4980
Biphenyl	272	599	300	52.7	517
Dibenzofuran	504	1050	526	1680	1480
Cadalene	46.7	113	45.9	ND	ND
Fluorene	2980	8340	2800	8040	5770
C1-Fluorenes	1260	4270	2110	3970	2800
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	2840	4740	3190	5960	4870
Phenanthrene	5040	12800	6260	37200	17000
C1-Phenanthranes/Anthracenes	4330	10800	7020	11700	10400
C2-Phenanthrenes/Anthracenes	4110	10900	8150	3440	8500
C3-Phenanthrenes/Anthracenes	1860	6090	4090	1120 ME	3270
C4-Phenanthrenes/Anthracenes	760	3020	1360	45900	1190
3-Methylphenanthrene	821	2570	1470	3260	2480
2/4-Methylphenanthrene	789	1910	1180	3420	2410
2-Methylanthracene	1020	1930	1310	771	1330
9-Methylphenanthrene	986	2790	1920	2220	2510
1-Methylphenanthrene	596	1480	1050	1920	1680
2,7-Dimethylphenanthrene	306	744	494	238	908
1,7-Dimethylphenanthrene	348	863	568	376	617
Dibenzothiophene	914	2110	1190	2590	2060
C1-Dibenzothiophenes	867	2680	2150	1560	2510
C2-Dibenzothiophenes	1070	3420	3000	863	2890
C3-Dibenzothiophenes	799	2750	2340	410	1840
C4-Dibenzothiophenes	373	1320	1060	ND	848
4-Methyldibenzothiophene	290	1070	818	484	953
2/3-Methyldibenzothiophene	302	1100	709	536	836
1-Methyldibenzothiophene	91.4	324	270	184	334
Dehydroabietin(e)	ND	ND	ND	11900	ND
Retene	183	364	142	24500 D	976
Fluoranthene	15200	42400	20600	17100	25600
Pyrene	16100	40200	24000	13300	27000
Benzo(b)fluorene	1470	2630	1600	459	1510
C1-Fluoranthenes/Pyrenes	9290	18400	12600	4430	11300
C2-Fluoranthenes/Pyrenes	3710	6430	4990	521 ME	3820
C3-Fluoranthenes/Pyrenes	1560	3070	2230	116	1340
Benzo(a)anthracene	7170	13000	10000	1020	8790
Chrysene	6890	13600	12000	1170	10500
C1-Chrysenes	3640	6080	5310	249	3940
C2-Chrysenes	1990	3390	2770	ND	1790
C3-Chrysenes	1040	2160	1490	ND	697
C4-Chrysenes	626	923	499	ND	ND
Benzo(b)fluoranthene	8160	10300	8870	202	7170
Benzo(j/k)fluoranthene	6890	9710	8990	203	8450
Benzo(a)fluoranthene	1630	2300	2060	32.2 J	2150
Benzo(e)pyrene	6800	9260	8430	180	7010
Benzo(a)pyrene	9010	13300	12500	227	10400
Perylene	2740	3620	3190	48.8	2650
Indeno(1,2,3-c,d)pyrene	5890	9450	8140	54	7080
Dibenz(a,h)anthracene	1060	1490	1310	ND	1030
Benzo(g,h,i)perylene	5990	9100	7720	61.6	8020
Surrogate Recoveries (%)					
Naphthalene-d8	70	90	72	84	226 &
Phenanthrene-d10	72	89	72	63	93
Chrysene-d12	72	96	82	66	109
5b(H)-Cholane	99	118	97	93	92

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Lake Union Sediment
Project Name Investigation
Project Number N005443

Client Sample ID	NLU-127-SS-0010	NLU-128-SS-0010	NLU-129-SS-0010	NLU-129-SS-2030	NLU-130-SS-0010
Battelle Sample ID	U0159	U0160	U0135-D	U0137-D	U0161
Battelle Batch ID	02-667	02-667	03-0023	03-0023	02-668
Associated Blank	AB484PB	AB484PB	AB851PB	AB851PB	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	12/17/02	12/17/02	02/25/03	02/26/03	12/19/02
Analytical Method	8270M	8270M	8270M	8270M	8270M
Percent Solids	75 %	81.3 %	20.2 %	24.34 %	81.73 %
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Size	23.62 g	27.45 g	6.45 g	7.72 g	6.46 g
Weight Basis	DRY	DRY	DRY	DRY	DRY
Min Reporting Limit	8.84	5.69	65.2	81.8	36.70
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	1140	40	429	414	59600 D
C1-Naphthalenes	455	29.8	213	335	13800
C2-Naphthalenes	1140	33.4	566	572	16800
C3-Naphthalenes	1600	45.2	419	518	23400
C4-Naphthalenes	1530	58.5	513	578	13000
2-Methylnaphthalene	271	18	130	213	8170
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	347	8.27	262	229	3350
1,5-Dimethylnaphthalene	47.2	1.37 J	17.3 J	16.8 J	1360
Acenaphthylene	298	51.6	279	232	21800
Acenaphthene	613	46.4	310	361	66800 D
Biphenyl	130	9.47	102	113	8620
Dibenzofuran	422	20	364	297	5600
Cadalene	45.1	2.44 J	560	438	75.4
Fluorene	807	31.9	510	615	28200
C1-Fluorenes	548	20.4	263	310	19200
C2-Fluorenes	876	52.7	628	699	14800
C3-Fluorenes	891 ME	83.1 ME	856 ME	1060 ME	8380
2-Methylfluorene	143	4.11 J	45.2 J	55.8 J	3200
1-Methylfluorene	170	5.67 J	70.3	85.7	4390
Anthracene	1310	130	1160	1260	58200 D
Phenanthrene	4980	311	5780	5830	47800 D
C1-Phenanthrenes/Anthracenes	2870	206	2510	2530	58300
C2-Phenanthrenes/Anthracenes	2530	235	3000	2940	52000
C3-Phenanthrenes/Anthracenes	1550	183	2300 ME	2540 ME	25000
C4-Phenanthrenes/Anthracenes	785	118	5060	3570	10700
3-Methylphenanthrene	622	41.1	713	831	12200
2/4-Methylphenanthrene	719	52.3	721	710	6890
2-Methylanthracene	309	33.3	211	213	11600
9-Methylphenanthrene	676	46.4	532	509	14600
1-Methylphenanthrene	439	31.6	358	392	12700
2,7-Dimethylphenanthrene	137	24.1	272	308	2620
1,7-Dimethylphenanthrene	278	29.5	268	309	7880
Dibenzothiophene	494	20.2	308	371	31700
C1-Dibenzothiophenes	709	34	366	447	14600
C2-Dibenzothiophenes	1100	66.4	901	1070	11700
C3-Dibenzothiophenes	1030	90.4	1240	1740	6210
C4-Dibenzothiophenes	584	66.6	867	1240	1960
4-Methyldibenzothiophene	289	11.2	141	178	5140
2/3-Methyldibenzothiophene	249	12.9	136	165	5000
1-Methyldibenzothiophene	94.7	3.61 J	40.9 J	61 J	1410
Dehydroabietin(e)	ND	ND	7520	2540	ND
Retene	255	59.5	23800	13900	4240
Fluoranthene	6460	910	11700	11800	450000 D
Pyrene	6920	844	10100	10200	523000 D
Benzo(b)fluorene	413	45.3	717	819	13700
C1-Fluoranthenes/Pyrenes	3330	370	4770	4820	118000
C2-Fluoranthenes/Pyrenes	1520	177 ME	2130 ME	2470 ME	32400
C3-Fluoranthenes/Pyrenes	759	135	1210	1340	12100
Benzo(a)anthracene	2550	430	4110	4270	126000 D
Chrysene	3180	500	5680	6120	126000 D
C1-Chrysenes	1370	251	2520	4180	40900
C2-Chrysenes	824	179	1340	1900	18000
C3-Chrysenes	537	121	1200	1670	7860
C4-Chrysenes	234	108	670	869	3240
Benzo(b)fluoranthene	2750	416	3790	4910	108000 D
Benzo(j/k)fluoranthene	2360	376	3860	4920	114000 D
Benzo(a)fluoranthene	540	84.4	657	828	38400
Benzo(e)pyrene	2400	322	2910	3990	126000 D
Benzo(a)pyrene	3420	433	3440	4640	203000 D
Perylene	918	127	911	1300	43100 D
Indeno(1,2,3-c,d)pyrene	2420	267	2820	3800	151000 D
Dibenz(a,h)anthracene	386	65.8	582	774	6470
Benzo(g,h,i)perylene	2470	276	2630	3940	167000 D
Surrogate Recoveries (%)					
Naphthalene-d8	91	86	116	133 &	72
Phenanthrene-d10	88	80	93	95	61
Chrysene-d12	84	81	96	106	82
5b(H)-Cholane	108	114	82	97	93

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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-136-SS-0010
Battelle Sample ID	U4518-D2	U0162	U0163	U0172
Battelle Batch ID	03-0100	02-668	02-667	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 Date	03/02/03	12/19/02	12/18/02	12/19/02
Analytical Method	8270M	8270M	8270M	8270M
Percent Solids	36.45 %	86.06 %	88 %	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	µg/kg	µg/kg	µg/kg
Naphthalene	243000	5060	4510	2950
C1-Naphthalenes	54300	1550	1410	732
C2-Naphthalenes	44500	1490	1370	940
C3-Naphthalenes	14200	1110	1040	803
C4-Naphthalenes	3630	698	670	1040
2-Methylnaphthalene	13600	721	715	466
1-Methylnaphthalene	40500	828	697	260
2-Ethylnaphthalene	1760	55.9	32.6	46.5
1-Ethylnaphthalene	1490 J	27.8	22.7	21.8 J
2,6/2,7-Dimethylnaphthalene	10900	435	402	403
1,5-Dimethylnaphthalene	2240	67.7	57.6	44.6
Acenaphthylene	166000	3760	3360	1060
Acenaphthene	780000	6180	5040	751
Biphenyl	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	487 ME	642 ME
2-Methylfluorene	5400	123	128	158
1-Methylfluorene	6560	186	185	166
Anthracene	791000	5560	5840	1970
Phenanthrene	6850000 D	17700 D	17300 D	3720
C1-Phenanthrenes/Anthracenes	288000	4910	5460	2000
C2-Phenanthrenes/Anthracenes	38400	3280	3410	2480
C3-Phenanthrenes/Anthracenes	7540	1620	1440	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	1480	560
1-Methylphenanthrene	42000	689	787	277
2,7-Dimethylphenanthrene	4570	208	215	203
1,7-Dimethylphenanthrene	2630	273	282	162
Dibenzothiophene	476000	3070	2750	887
C1-Dibenzothiophenes	49400	938	1040	689
C2-Dibenzothiophenes	11200	855	886	842
C3-Dibenzothiophenes	3500 ME	602	581	712
C4-Dibenzothiophenes	ND	218	124	326
4-Methyldibenzothiophene	15800	315	358	267
2/3-Methyldibenzothiophene	19100	350	357	227
1-Methyldibenzothiophene	5180	99.1	106	61.9
Dehydroabietin(e)	ND	ND	ND	ND
Retene	2550	85.3	91.4	91.1
Fluoranthene	5280000 D	49700 D	51400 D	18400
Pyrene	6540000 D	84400 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	8750
Chrysene	895000	16600 D	17000 D	10500
C1-Chrysenes	77000	4630	4150	2810
C2-Chrysenes	ND	1790	1550	1300
C3-Chrysenes	ND	696	578	764
C4-Chrysenes	ND	384	458	531
Benzo(b)fluoranthene	696000	14500 D	18700 D	10000
Benzo(j/k)fluoranthene	731000	16700 D	15300 D	8660
Benzo(a)fluoranthene	216000	4960	4300	2470
Benzo(e)pyrene	746000	17900 D	17700 D	10100
Benzo(a)pyrene	1210000	26600 D	25600 D	14800
Perylene	328000	8520	8800 D	4410
Indeno(1,2,3-c,d)pyrene	902000	24900 D	27200 D	10000
Dibenz(a,h)anthracene	85000	959	2960	1420
Benzo(g,h,i)perylene	1000000	29000 D	28400 D	10500
Surrogate Recoveries (%)				
Naphthalene-d8	223 &	84	89	83
Phenanthrene-d10	53	84	86	82
Chrysene-d12	81	99	89	99
5b(H)-Cholane	79	85	81	116

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Lake Union Sediment
Project Name Investigation
Project Number N005443

Client Sample ID	MW-5 Product (T190)	DW-5-1202	GWP Tank (T192)	SS-1-1202
Battelle Sample ID	U3754-D3	U4514-D3	U3752-D2	U4515-D2
Battelle Batch ID	03-0100	03-0100	03-0100	03-0100
Associated Blank	BB146PB	BB146PB	BB146PB	BB146PB
Field Date	01/14/03	12/06/02	01/14/03	12/06/02
Receipt Date	01/15/03	01/29/03	01/15/03	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	506.60 mg	517.80 mg	427.20 mg	447.20 mg
Weight Basis	OIL	OIL	OIL	OIL
Min Reporting Limit	249	244	29.6	28.2
Amount Units	mg/kg	mg/kg	mg/kg	mg/kg
Naphthalene	83500	117000	178000 D	59200 D
C1-Naphthalenes	39900	53000	22800	34600
C2-Naphthalenes	21400	26500	8860	17600
C3-Naphthalenes	7510	8880	2630	6390
C4-Naphthalenes	1940	2170	571	1310
2-Methylnaphthalene	24600	34000	14300	21300
1-Methylnaphthalene	15200	19000	8430	13300
2-Ethylnaphthalene	1170	1280	200	384
1-Ethylnaphthalene	260	290	67.8	133
2,6/2,7-Dimethylnaphthalene	5950	7700	2490	5000
1,5-Dimethylnaphthalene	768	907	296	625
Acenaphthylene	2130	6720	15000	8850
Acenaphthene	9580	8420	656	645
Biphenyl	4850	5990	3670	2570
Dibenzofuran	3760	5390	696	600
Cadalene	ND	ND	ND	ND
Fluorene	9110	10800	5280	5220
C1-Fluorenes	2870	2880	2070	3500
C2-Fluorenes	1320	1250	1040	1900
C3-Fluorenes	534	397	372	590
2-Methylfluorene	487	949	332	563
1-Methylfluorene	739	735	434	800
Anthracene	6870	7770	6160	4640
Phenanthrene	26900	29700	23100	15500
C1-Phenanthrenes/Anthracenes	10800	10400	10000	13000
C2-Phenanthrenes/Anthracenes	4700	4230	4370	5600
C3-Phenanthrenes/Anthracenes	1240	992	1100	1590
C4-Phenanthrenes/Anthracenes	296	184 J	214	274
3-Methylphenanthrene	2610	2530	2350	3080
2/4-Methylphenanthrene	3120	3000	2620	3570
2-Methylanthracene	1080	1110	1260	1540
9-Methylphenanthrene	2140	2000	2110	2840
1-Methylphenanthrene	1810	1720	1430	1900
2,7-Dimethylphenanthrene	613	632	268	318
1,7-Dimethylphenanthrene	392	373	327	386
Dibenzothiophene	2330	1990	3340	1960
C1-Dibenzothiophenes	1720	1330	1960	2220
C2-Dibenzothiophenes	1060	712	1300	1410
C3-Dibenzothiophenes	455	261	488	546
C4-Dibenzothiophenes	137 J	74.8 J	116	123
4-Methyldibenzothiophene	590	466	619	650
2/3-Methyldibenzothiophene	571	456	697	748
1-Methyldibenzothiophene	213 J	145 J	234	256
Dehydroabietin(e)	ND	ND	ND	ND
Retene	259	178 J	ND	ND
Fluoranthene	8840	9890	12700	3940
Pyrene	10600	10700	17100	7780
Benzo(b)fluorene	421	516	888	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	2860	3040	5520	2760
Chrysene	3410	3330	6620	3210
C1-Chrysenes	1510	1190	2980	2840
C2-Chrysenes	500	327	1130	1050
C3-Chrysenes	ND	ND	330	307
C4-Chrysenes	ND	ND	ND	ND
Benzo(b)fluoranthene	1170	1070	3340	776
Benzo(j/k)fluoranthene	1600	1780	4060	1450
Benzo(a)fluoranthene	338	342	1680	664
Benzo(e)pyrene	1290	1140	3700	1220
Benzo(a)pyrene	2270	2320	6460	2290
Perylene	344	337	1530	353
Indeno(1,2,3-c,d)pyrene	705	510	4430	544
Dibenz(a,h)anthracene	138 J	112 J	650	201
Benzo(g,h,i)perylene	812	623	4600	714
Surrogate Recoveries (%)				
Naphthalene-d8	7021 &	7045 &	814 &	808 &
Phenanthrene-d10	235 &	183 &	106	128 &
Chrysene-d12	824 &	1054 &	165 &	164 &
5b(H)-Cholane	80	75	75	79

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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	U0166	U0167	U0168
Battelle Batch ID	02-667	02-667	02-687	02-667
Associated Blank	AB484PB	AB484PB	AB484PB	AB484PB
Field Date	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
Analytical Method	8270M	8270M	8270M	8270M
Percent Solids	NA	NA	NA	NA
Matrix	Wipe	Wipe	Wipe	Wipe
Sample Size	10 g	10 g	10 g	10 g
Weight Basis	NA	NA	NA	NA
Min Reporting Limit	2.5	2.5	2.5	2.5
Amount Units	µg/kg	µg/kg	µg/kg	µg/kg
Naphthalene	5.18	5.4	5.22	5.57
C1-Naphthalenes	2.98	2.72	3.62	3.17
C2-Naphthalenes	6.96	7.61	6.24	14.1
C3-Naphthalenes	10.1	12.7	9.1	24.7
C4-Naphthalenes	ND	11.2	ND	14.9
2-Methylnaphthalene	1.43 J	1.58 J	2.16 J	1.76 J
1-Methylnaphthalene	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	ND
Acenaphthene	1.44 J	1.65 J	1.21 J	ND
Biphenyl	2.43 J	2.8	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-Methylfluorene	1.35 J	0.78 J	1.11 J	ND
1-Methylfluorene	0.398 J	0.46 J	0.278 J	0.792 J
Anthracene	ND	ND	ND	ND
Phenanthrene	4.25	3.74	3.44	8.9
C1-Phenanthrenes/Anthracenes	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	0.324 J	ND
2,7-Dimethylphenanthrene	ND	ND	ND	ND
1,7-Dimethylphenanthrene	ND	ND	ND	ND
Dibenzothiophene	0.48 J	0.366 J	0.411 J	ND
C1-Dibenzothiophenes	ND	ND	ND	ND
C2-Dibenzothiophenes	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	ND
Dehydroabietin(e)	ND	ND	ND	ND
Retene	0.712 J	0.966 J	0.802 J	1.04 J
Fluoranthene	2.64	0.6 J	0.562 J	1.08 J
Pyrene	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	0.78 J	ND	ND	ND
Chrysene	2.8	ND	ND	ND
C1-Chrysenes	ND	ND	ND	ND
C2-Chrysenes	ND	ND	ND	ND
C3-Chrysenes	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND
Benzo(b)fluoranthene	1.58 J	ND	ND	ND
Benzo(j/k)fluoranthene	1.11 J	ND	ND	ND
Benzo(a)fluoranthene	0.472 J	ND	ND	ND
Benzo(e)pyrene	1.63 J	ND	ND	ND
Benzo(a)pyrene	1.05 J	ND	ND	ND
Perylene	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	1.04 J	0.426 J	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	ND
Benzo(g,h,i)perylene	1.11 J	0.616 J	ND	ND
Surrogate Recoveries (%)				
Naphthalene-d8	87	90	90	92
Phenanthrene-d10	86	88	88	90
Chrysene-d12	88	93	99	95
5b(H)-Cholane	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
... Putting Technology To Work

Lake Union Sediment
Project Name Investigation
Project Number N005443

Client Sample ID	
Battelle Sample ID	
Battelle Batch ID	
Associated Blank	
Field Date	
Receipt 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-Naphthalenes	
C4-Naphthalenes	
2-Methylnaphthalene	
1-Methylnaphthalene	
2-Ethylnaphthalene	
1-Ethylnaphthalene	
2,6/2,7-Dimethylnaphthalene	
1,5-Dimethylnaphthalene	
Acenaphthylene	
Acenaphthene	
Biphenyl	
Dibenzofuran	
Cadalene	
Fluorene	
C1-Fluorenes	
C2-Fluorenes	
C3-Fluorenes	
2-Methylfluorene	
1-Methylfluorene	
Anthracene	
Phenanthrene	
C1-Phenanthrenes/Anthracenes	
C2-Phenanthrenes/Anthracenes	
C3-Phenanthrenes/Anthracenes	
C4-Phenanthrenes/Anthracenes	
3-Methylphenanthrene	
2/4-Methylphenanthrene	
2-Methylanthracene	
9-Methylphenanthrene	
1-Methylphenanthrene	
2,7-Dimethylphenanthrene	
1,7-Dimethylphenanthrene	
Dibenzothiophene	
C1-Dibenzothiophenes	
C2-Dibenzothiophenes	
C3-Dibenzothiophenes	
C4-Dibenzothiophenes	
4-Methyldibenzothiophene	
2/3-Methyldibenzothiophene	
1-Methyldibenzothiophene	
Dehydroabietin(e)	
Retene	
Fluoranthene	
Pyrene	
Benzo(b)fluorene	
C1-Fluoranthenes/Pyrenes	
C2-Fluoranthenes/Pyrenes	
C3-Fluoranthenes/Pyrenes	
Benzo(a)anthracene	
Chrysene	
C1-Chrysenes	
C2-Chrysenes	
C3-Chrysenes	
C4-Chrysenes	
Benzo(b)fluoranthene	
Benzo(j/k)fluoranthene	
Benzo(a)fluoranthene	
Benzo(e)pyrene	
Benzo(a)pyrene	
Perylene	
Indeno(1,2,3-c,d)pyrene	
Dibenz(a,h)anthracene	
Benzo(g,h,i)perylene	
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.

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

Enclosures

cc: File FJ19

MDH/esj

FJ19 03-3957 — 03-3959

Chain of Custody Record

72hr

№ 100321

The Retec Group
1011 S.W. Klickitat Way, Suite 207 • Seattle, WA 98134-1162
(206) 624-9349 Phone • (206) 624-2839 Fax
www.retec.com

RETEC

Project Name: GWESS	Project Number: GJPWT04403-963
Send Report To: Ben Howard	Sampler (Print Name): Ben Howard
Address: 1011 SW Klickitat Way	Sampler (Print Name): —
Suite 207	Shipment Method: by hand
Seattle, WA 98134	Airbill Number: —
Phone: (206) 624-9349	Laboratory Receiving: ARI
Fax: (206) 624-2839	

Page 1 of 1

Purchase Order #: _____

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Analysis Requested: SVOCs	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
SS-4-0403	4/2/03	1330	solid	1	X		
SS-5-0403	"	1345	"	1	X		
MW-9 20'	1/16/03	1000	liquid	1	X		

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	[signature] 4/3/03 5:40	4/2/03	1540
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level		Turnaround	
Level I	☐	Routine	☐
Level II	☐	24 Hour	☐
Level III	☐	1 Week	☐
Other	☐	Other _____	

Sample Receipt	
Total # Containers Received?	
COC Seals Present?	
COC Seals Intact?	
Received Containers Intact?	
Temperature?	

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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

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 INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: MB-040303
METHOD BLANK

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

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

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

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 U
95-50-1	1,2-Dichlorobenzene	40,000 U
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 U
98-95-3	Nitrobenzene	40,000 U
78-59-1	Isophorone	40,000 U
88-75-5	2-Nitrophenol	200,000 U
105-67-9	2,4-Dimethylphenol	120,000 U
65-85-0	Benzoic Acid	400,000 U
111-91-1	bis(2-Chloroethoxy) Methane	40,000 U
120-83-2	2,4-Dichlorophenol	120,000 U
120-82-1	1,2,4-Trichlorobenzene	40,000 U
91-20-3	Naphthalene	40,000 U
106-47-8	4-Chloroaniline	120,000 U
87-68-3	Hexachlorobutadiene	80,000 U
59-50-7	4-Chloro-3-methylphenol	80,000 U
91-57-6	2-Methylnaphthalene	40,000 U
77-47-4	Hexachlorocyclopentadiene	200,000 U
88-06-2	2,4,6-Trichlorophenol	200,000 U
95-95-4	2,4,5-Trichlorophenol	200,000 U
91-58-7	2-Chloronaphthalene	40,000 U
88-74-4	2-Nitroaniline	200,000 U
131-11-3	Dimethylphthalate	40,000 U
208-96-8	Acenaphthylene	40,000 U
99-09-2	3-Nitroaniline	240,000 U
83-32-9	Acenaphthene	40,000 U
51-28-5	2,4-Dinitrophenol	400,000 U
100-02-7	4-Nitrophenol	200,000 U
132-64-9	Dibenzofuran	40,000 U
606-20-2	2,6-Dinitrotoluene	200,000 U
121-14-2	2,4-Dinitrotoluene	200,000 U
84-66-2	Diethylphthalate	40,000 U
7005-72-3	4-Chlorophenyl-phenylether	40,000 U
86-73-7	Fluorene	40,000 U
100-01-6	4-Nitroaniline	200,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	400,000 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

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%
2,4,6-Tribromophenol	86.5%	d4-2-Chlorophenol	84.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: SS-4-0403
SAMPLE

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

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

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

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

pH: 6.6

CAS Number	Analyte	µg/kg-as-rec
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
621-64-7	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

ANALYTICAL RESOURCES INCORPORATED

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	µg/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%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: SS-4-0403
SAMPLE

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

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

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

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

pH: 6.6

CAS Number	Analyte	µg/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
120-83-2	2,4-Dichlorophenol	140,000 U
120-82-1	1,2,4-Trichlorobenzene	48,000 U
91-20-3	**Naphthalene**	**91,000**
106-47-8	4-Chloroaniline	140,000 U
87-68-3	Hexachlorobutadiene	95,000 U
59-50-7	4-Chloro-3-methylphenol	95,000 U
91-57-6	**2-Methylnaphthalene**	**190,000**
77-47-4	Hexachlorocyclopentadiene	240,000 U
88-06-2	2,4,6-Trichlorophenol	240,000 U
95-95-4	2,4,5-Trichlorophenol	240,000 U
91-58-7	2-Chloronaphthalene	48,000 U
88-74-4	2-Nitroaniline	240,000 U
131-11-3	Dimethylphthalate	48,000 U
208-96-8	**Acenaphthylene**	**99,000**
99-09-2	3-Nitroaniline	290,000 U
83-32-9	Acenaphthene	48,000 U
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
121-14-2	2,4-Dinitrotoluene	240,000 U
84-66-2	Diethylphthalate	48,000 U
7005-72-3	4-Chlorophenyl-phenylether	48,000 U
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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

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	µg/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%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: SS-4-0403
DILUTION

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

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

Date Extracted: 04/03/03
Date Analyzed: 04/07/03 12:16
Instrument/Analyst: FINN4/LJR
GPC Cleanup: NO

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

pH: 6.6

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

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

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

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.6%	2-Fluorobiphenyl	99.2%
d14-p-Terphenyl	96.0%	d4-1,2-Dichlorobenzene	83.2%
d5-Phenol	84.5%	2-Fluorophenol	82.9%
2,4,6-Tribromophenol	59.5%	d4-2-Chlorophenol	74.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: SS-5-0403
SAMPLE

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

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

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

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

pH: 6.8

CAS Number	Analyte	µg/kg-as-rec
108-95-2	Phenol	200,000 U
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 U
106-46-7	1,4-Dichlorobenzene	98,000 U
100-51-6	Benzyl Alcohol	490,000 U
95-50-1	1,2-Dichlorobenzene	98,000 U
95-48-7	2-Methylphenol	98,000 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	98,000 U
106-44-5	4-Methylphenol	98,000 U
621-64-7	N-Nitroso-Di-N-Propylamine	200,000 U
67-72-1	Hexachloroethane	200,000 U
98-95-3	Nitrobenzene	98,000 U
78-59-1	Isophorone	98,000 U
88-75-5	2-Nitrophenol	490,000 U
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 U
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 U
7005-72-3	4-Chlorophenyl-phenylether	98,000 U
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 U

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

CAS Number	Analyte	µg/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	77.2%	2-Fluorobiphenyl	87.4%
d14-p-Terphenyl	83.6%	d4-1,2-Dichlorobenzene	87.4%
d5-Phenol	77.7%	2-Fluorophenol	79.5%
2,4,6-Tribromophenol	64.3%	d4-2-Chlorophenol	76.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample ID: SS-5-0403
DILUTION

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

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

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

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

pH: 6.8

CAS Number	Analyte	µg/kg-as-rec
108-95-2	Phenol	390,000 U
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

ANALYTICAL RESOURCES INCORPORATED

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

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	µg/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**
120-12-7	**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	Butylbenzylphthalate	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%

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample No: MW-9 20'

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

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

Date extracted: 04/03/03
Date analyzed: 04/05/03 03:21
Instrument: FINN4

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

CAS Number	Analyte	ug/kg
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	400,000 U
67-72-1	Hexachloroethane	400,000 U
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	200,000 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

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

Sample No: MW-9 20'

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

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

Date extracted: 04/03/03
Date analyzed: 04/05/03 03:21
Instrument: FINN4

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

CAS Number	Analyte	ug/kg
121-14-2	2,4-Dinitrotoluene	1,000,000 U
84-66-2	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**
86-74-8	**Carbazole**	**300,000**
120-12-7	**Anthracene**	**2,600,000**
84-74-2	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%

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by GC/MS

Sample No: **MW-9 20'**
DILUTION

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

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

Date extracted: 04/03/03
Date analyzed: 04/07/03 13:51
Instrument: FINN4

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

CAS Number	Analyte	ug/kg
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 U
98-95-3	Nitrobenzene	1,200,000 U
78-59-1	Isophorone	1,200,000 U
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 U
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 U
59-50-7	4-Chloro-3-methylphenol	2,400,000 U
91-57-6	**2-Methylnaphthalene**	**53,000,000**
77-47-4	Hexachlorocyclopentadiene	6,000,000 U
88-06-2	2,4,6-Trichlorophenol	6,000,000 U
95-95-4	2,4,5-Trichlorophenol	6,000,000 U
91-58-7	2-Chloronaphthalene	1,200,000 U
88-74-4	2-Nitroaniline	6,000,000 U
131-11-3	Dimethylphthalate	1,200,000 U
208-96-8	**Acenaphthylene**	**9,000,000**
99-09-2	3-Nitroaniline	7,200,000 U
83-32-9	**Acenaphthene**	**1,400,000**
51-28-5	2,4-Dinitrophenol	12,000,000 U
100-02-7	4-Nitrophenol	6,000,000 U
132-64-9	Dibenzofuran	1,200,000 U
606-20-2	2,6-Dinitrotoluene	6,000,000 U

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

Sample No: MW-9 20'
DILUTION

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

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

Date extracted: 04/03/03
Date analyzed: 04/07/03 13:51
Instrument: FINN4

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

CAS Number	Analyte	ug/kg
121-14-2	2,4-Dinitrotoluene	6,000,000 U
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 U
50-32-8	Benzo(a)pyrene	1,200,000 U
193-39-5	Indeno(1,2,3-cd)pyrene	1,200,000 U
53-70-3	Dibenz(a,h)anthracene	1,200,000 U
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

ANALYTICAL RESOURCES INCORPORATED

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

Sample ID: LCS-040303
LAB CONTROL

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

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

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

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	121%
1,4-Dichlorobenzene	109000	100000	109%
N-Nitroso-Di-N-Propylamine	110000	100000	110%
1,2,4-Trichlorobenzene	963000	100000	96.3%
4-Chloro-3-methylphenol	144000	150000	96.0%
Acenaphthene	105000	100000	105%
4-Nitrophenol	123000	150000	82.0%
2,4-Dinitrotoluene	944000	100000	94.4%
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	102%
d5-Phenol	106%
2-Fluorophenol	104%
2,4,6-Tribromophenol	97.8%
d4-2-Chlorophenol	101%

Results reported in µg/kg

Chain of Custody Record

№ 100321

The Retec Group
1011 S.W. Klickitat Way, Suite 207 • Seattle, WA 98134-1162
(206) 624-9349 Phone • (206) 624-2839 Fax
www.retec.com

RETEC

Project Name: GUPSS	Project Number: GSPWI-04403-963
Send Report To: Ben Howard	Sampler (Print Name): Ben Howard
Address: 1011 SW Klickitat Way	Sampler (Print Name): —
Suite 207	Shipment Method: by hand
Seattle, WA 98134	Airbill Number: —
Phone: (206) 624-9349	Laboratory Receiving: ARI
Fax: (206) 624-2839	

Page 1 of 1

Purchase Order #: _____

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Analysis Requested: SVOCs	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
SS-4-0403	4/2/03	1330	solid	1	X		
SS-5-0403	"	1345	"	1	X		
MW-9 20'	11/16/03	1000	liquid	1	X		

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	[signature] 4/2/03	4/2/03	1540
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level		Turnaround	
Level I	☐	Routine	☐
Level II	☐	24 Hour	☐
Level III	☐	1 Week	☐
Other	☐	Other _____	

Sample Receipt	
Total # Containers Received?	
COC Seals Present?	
COC Seals Intact?	
Received Containers Intact?	
Temperature?	

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

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.

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

Enclosures

cc: file FJ41

MDH/esj

Battelle
. . . Putting Technology To Work

Chain of Custody

FJ411 3.5

03-4111-38

Shipment No: SHP-030403-03

Proj. No:	Proj. Name:
N005443	Lake Union Sediment Investigation

SAMPLERS: Singature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

ARI Metals Analysis

DATE/TIME	BATTELLE ID	CLIENT ID	FIELD LOC	MATRIX	OIL CODE	FID_ALKANE_TIER_1_S	PAH_TIER_1_S	PAH_TIER_3_S	BIOMARKER_TIER_1_S			Copper, Lead, Zinc				Total No of Containers
11/13/02 14:40	U0097	NLU-126-SS-1020		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/11/02 15:27	U0122	NLU-116-SS-1020		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/11/02 15:41	U0123	NLU-116-SS-2030		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/11/02 15:13	U0150	NLU-116-SS-0010		SEDIMENT		☑	☑	☑	☑	☐	☐	☑	☐	☐	☐	1
11/13/02 14:27	U0158	NLU-126-SS-0010		SEDIMENT		☑	☑	☑	☑	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0276	NLU-109 1012		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0277	NLU-109 1214		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0284	NLU-109 2628		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0285	NLU-109 2830		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0289	NLU-109 3638		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 11:32	U0290	NLU-109 3840		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0352	NLU-110 0204		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0353	NLU-110 0406		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0356	NLU-110 1012		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0357	NLU-110 1214		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0360	NLU-110 1820		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 13:40	U0361	NLU-110 2022		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 14:50	U0386	NLU-117 0608		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 14:50	U0387	NLU-117 0810		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1
11/15/02 14:50	U0396	NLU-117 2628		SEDIMENT		☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	1

Relinquished by:	Date/Time:	Received by:	Date/Time:
Jessica Fahey	4/3/2003 3:27 PM		4/4/2003 10:00 AM
Relinquished by:	Date/Time:	Received by:	Date/Time:
		Jim Branson	4/4/2003 1320

Comments:
Sediment Splits

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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 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	1,400	
3050B	04/04/03	6010B	04/08/03	7439-92-1	Lead	20	1,580	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	6	4,800	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-126-SS-1020
DUPLICATE

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 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

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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%	H
Lead	6010B	1,580	2,120	420	129%	N
Zinc	6010B	4,800	5,100	104	288%	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%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-116-SS-1020
SAMPLE

Lab Sample ID: FJ41B
LIMS ID: 03-4112
Matrix: Sediment
Data Release Authorized:
Reported: 04/09/03

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

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-109 1214
SAMPLE

Lab Sample ID: FJ41G
LIMS ID: 03-4117
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: 96.5%

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-109 2628
SAMPLE

Lab Sample ID: FJ41H
LIMS ID: 03-4118
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: 18.9%

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-109 2830
SAMPLE

Lab Sample ID: FJ41I
LIMS ID: 03-4119
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: 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**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-110 0204
SAMPLE

Lab Sample ID: FJ41L
LIMS ID: 03-4122
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: 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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-110 1012
SAMPLE

Lab Sample ID: FJ41N
LIMS ID: 03-4124
Matrix: Sediment
Data Release Authorized: BC
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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-110 1214
SAMPLE

Lab Sample ID: FJ41O
LIMS ID: 03-4125
Matrix: Sediment
Data Release Authorized: BL
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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	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	90	
3050B	04/04/03	6010B	04/08/03	7440-66-6	Zinc	5	130	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: FJ41LCS
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

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.

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

Enclosures

cc: file FJ42

MDH/esj

Battelle
. . . Putting Technology To Work

Chain of Custody

FJ 4/2

Shipment No: SHP-030403-03

Proj. No:	Proj. Name:
N005443	Lake Union Sediment Investigation

SAMPLERS: Singature

ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"

ARI Metals Analysis

DATE/TIME	BATTELLE ID	CLIENT ID	FIELD LOC	MATRIX	OIL CODE	FID_ALKANE_TIER_1_S	PAH_TIER_1_S	PAH_TIER_3_S	BIOMARKER_TIER_1_S				copper, lead + zinc			Total No of Containers
11/15/02 14:50	U0397	NLU-117 2830		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/15/02 14:50	U0406	NLU-117 4648		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0454	NLU-119 0406		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0455	NLU-119 0608		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0459	NLU-119 1416		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0460	NLU-119 1618		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0463	NLU-119 2224		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1
11/18/02 15:40	U0464	NLU-119 2426		SEDIMENT		☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	1

Relinquished by:	Date/Time:	Received by:	Date/Time:
Jessica Fahey JMF	4/3/2003 3:27 PM		4/4/2003 10:00 AM
Relinquished by:	Date/Time:	Received by:	Date/Time:
			4/4/03 1320

Comments:
Sediment Splits

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: FJ42MB
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: 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

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-117 2830
DUPLICATE

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

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	4.1%	+/- 20%	
Zinc	6010B	278	287	3.2%	+/- 20%	

Reported in mg/kg-dry

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

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-117 2830
MATRIX SPIKE

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

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	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%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-117 4648
SAMPLE

Lab Sample ID: FJ42B
LIMS ID: 03-4132
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: 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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

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	3	386	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-119 2224
SAMPLE

Lab Sample ID: FJ42G
LIMS ID: 03-4137
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: 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	8	343	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: NLU-119 2426
SAMPLE

Lab Sample ID: FJ42H
LIMS ID: 03-4138
Matrix: Sediment
Data Release Authorized: BL
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	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: FJ42LCS
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: NA
Date Received: NA

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

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Rd.
Sequim, WA 98382
(360) 683-4151

2/17/03

Core NLU 109 (Confirmed 1/7/03)

S = 0.16

Sample #	Sponsor code	Segment Depth (cm)	Mean Depth (cm)	% Dry Weight	Sediment Age (Years)	Date of Deposition (Year)	Sediment Accumulation 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
X = estimated age of sediment deposition

Battelle Marine Sciences Laboratory
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2/17/03

Core NLU 110 (Confirmed 1/24/03) S = 0.14

Sample #	Sponsor code	Segment Depth (cm)	Mean Depth (cm)	% Dry Weight	Sediment Age (Years)	Date of Deposition (Year)	Sediment Accumulation 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
X = estimated age of sediment deposition

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2/17/03

Core NLU119 (Confirmed 2/3/03)

S = 0.11

Sample #	Sponsor code	Segment Depth (cm)	Mean Depth (cm)	% Dry Weight	Sediment Age (Years)	Date of Deposition (Year)	Sediment Accumulation 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
X = estimated age of sediment deposition

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2/17/03

Core NLU117 (Confirmed 2/17/03)

S = 0.30

Sample #	Sponsor code	Segment Depth (cm)	Mean Depth (cm)	% Dry Weight	Sediment Age (Years)	Date of Deposition (Year)	Sediment Accumulation 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
X = estimated age of sediment deposition

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2/17/03

Core NLU125 (Unconfirmed)

S = 0.043

Sample #	Sponsor code	Segment Depth (cm)	Mean Depth (cm)	% Dry Weight	Sediment Age (Years)	Date of Deposition (Year)	Sediment Accumulation 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
X = estimated age of sediment deposition

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

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.

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. l 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

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.

Floyd|Snider. 2005b. *Gas Works Sediment Western Study Area Data Report.* Prepared for City of Seattle, Seattle Public Utilities. 7 December.

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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.

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Chemical Forensics Sampling Report

Tables

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Table 3.1
Chemical Forensics Samples

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 4.1
Chemical Forensics Chromatogram Relative Quantitations (Hydrocarbon Peak Areas)

m/z	Compound	Area Counts																								
		Samples from NAPL Investigation—August 2004																	Samples from RI/FS—May 2005							
		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	C_1-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	C_1-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	C_1-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	C_2-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

m/z	Compound	Area Counts																								
		Samples from NAPL Investigation—August 2004																	Samples from RI/FS—May 2005							
		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	C_5-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	C_1-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	C_2-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	ND	ND	ND	ND	ND	ND
TIC	Retene	8239	CO	15450	CO	CO		CO								16410				CO	CO	CO	CO	ND	ND	ND	CO
TIC	C30 hopane	1150 est	2110	2197	ND	ND														ND	ND	ND	ND	ND	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

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Figures

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Figure 1.1
Site Map

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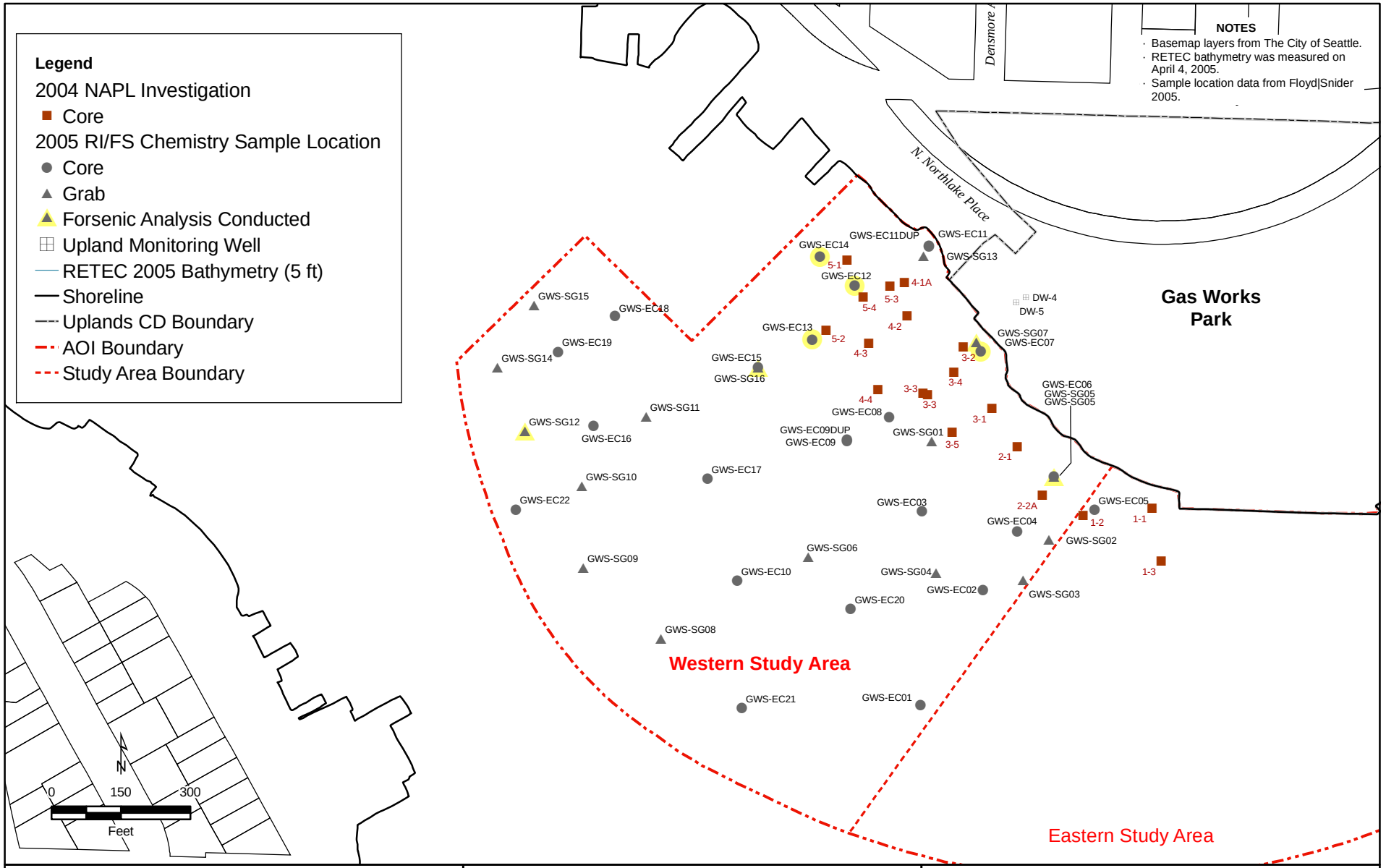

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Figure 2.1
Sediment and Upland Well Sampling Locations

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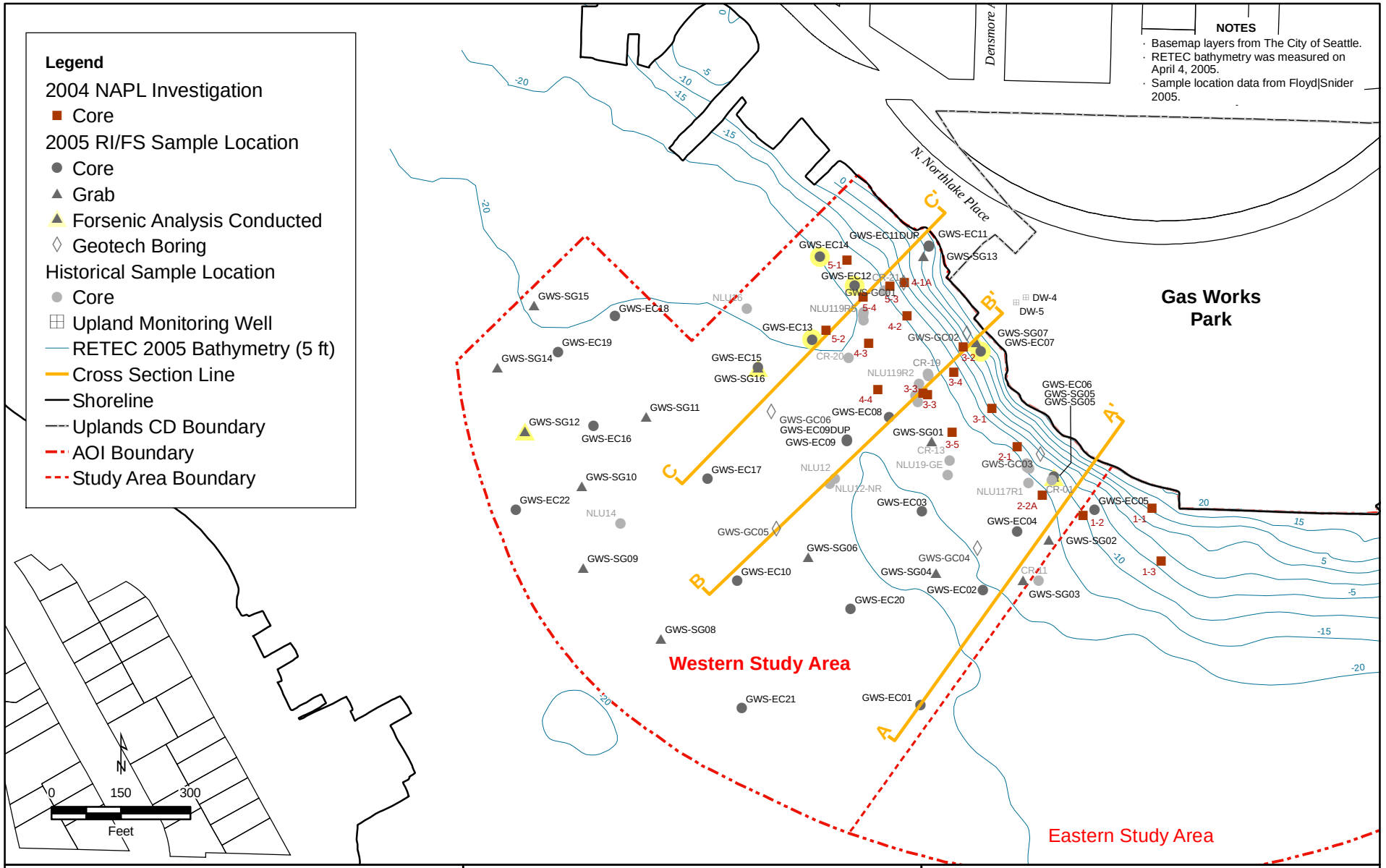

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Figure 4.1
Locations of Geologic Cross Sections

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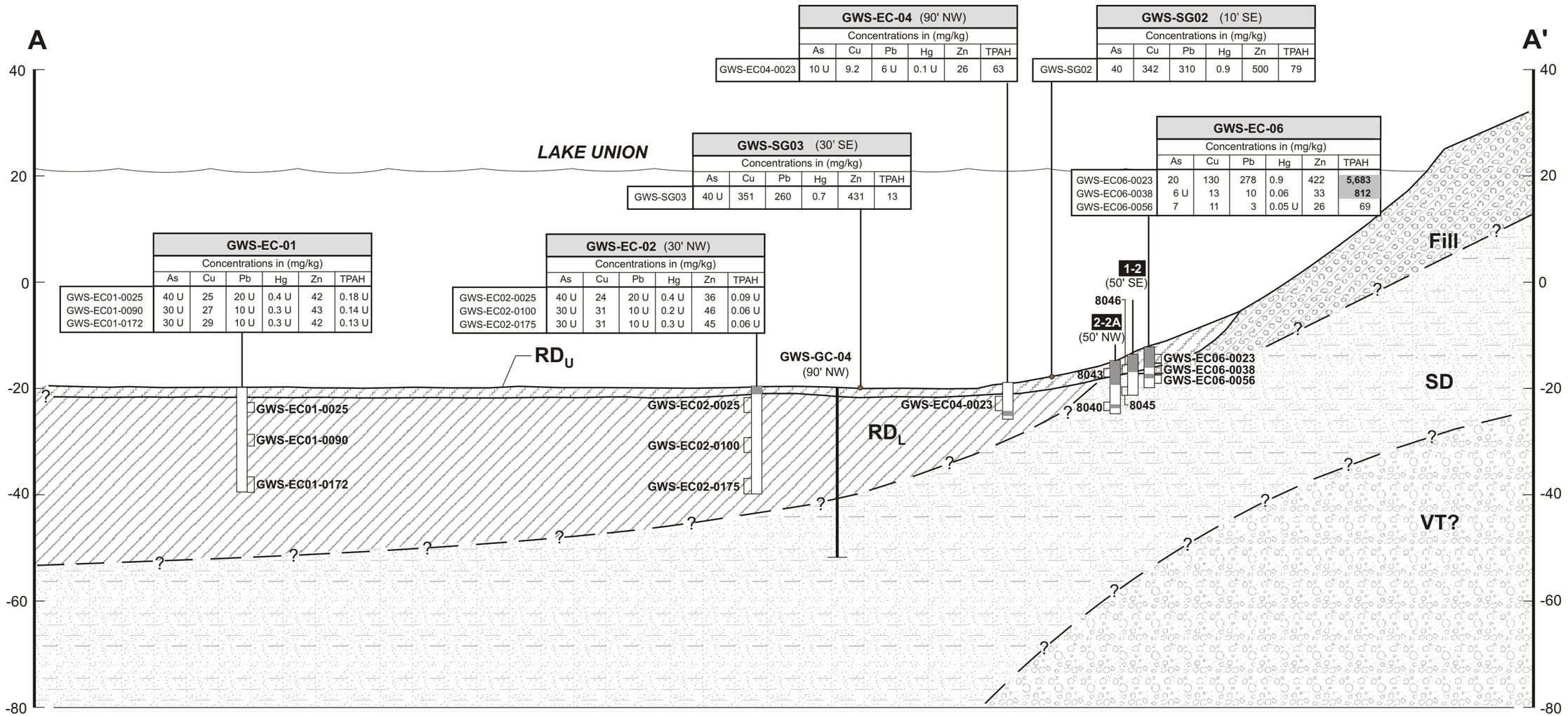

GWS-EC-04 (90' NW)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC04-0023	10 U	9.2	6 U	0.1 U	26	63

GWS-SG02 (10' SE)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-SG02	40	342	310	0.9	500	79

GWS-SG03 (30' SE)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-SG03	40 U	351	260	0.7	431	13

GWS-EC-06

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC06-0023	20	130	278	0.9	422	**5,683**
GWS-EC06-0038	6 U	13	10	0.06	33	**812**
GWS-EC06-0056	7	11	3	0.05 U	26	69

GWS-EC-01

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC01-0025	40 U	25	20 U	0.4 U	42	0.18 U
GWS-EC01-0090	30 U	27	10 U	0.3 U	43	0.14 U
GWS-EC01-0172	30 U	29	10 U	0.3 U	42	0.13 U

GWS-EC-02 (30' NW)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC02-0025	40 U	24	20 U	0.4 U	36	0.09 U
GWS-EC02-0100	30 U	31	10 U	0.2 U	46	0.06 U
GWS-EC02-0175	30 U	31	10 U	0.3 U	45	0.06 U

LEGEND

- DNAPL in Sediment
- 1,386 Concentration Exceeding TPAH SSQL of 170 ppm
- 1-2 2004 NAPL Investigation

Horizontal Scale in Feet
0 60 120
0 20 40
Vertical Scale in Feet
Vertical Exaggeration x 3

Notes:
- A subset of preliminary COPCs is shown.
- Concentrations have been rounded for clarity.
- Extent of VT estimated based on uplands data.

RD_U Upper Recent Deposits
Very soft, wet, brown to black sandy silt, and organic silt, wood chunks and debris grading to a very soft, wet, gray clay with silt

RD_L Lower Recent Deposits
Very soft, wet, olive brown to dark brown sandy organic silt with localized thin sand interbeds; med-high plasticity

GC Glaciolacustrine Clay
Very soft, wet, dark gray clay with sand and silty sand lenses

Fill Gas Works Fill
Loose, wet to dry, gray to black, poorly graded sand with clay, silt and gravel; abundant ash, cinders, wood; brick fragments; tar

SD Stratified Drift
Loose to very dense, moist to wet, brown to gray, fine to medium-grained sand with silt and gravel, interbedded with sandy silt

VT Vashon Till
Dense to very dense, wet to dry, gray to brown sandy clay with gravel to silty sandy gravel

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Figure 4.2
Geologic Cross Section A to A'

G:Project\Clients\Floyd Snider\Gasworks\Sections\SectionA-A"

GWS-SG07 (15' SE)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-SG07	30	248	189	0.5	435	119

GWS-EC07 (30' SE)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC07-0013	9	45	90	0.34	138	19 B
GWS-EC07-0034	10	123	260	1.9	332	**4,687**
GWS-EC07-0046	8 U	46	9	0.06 U	78	27
GWS-EC07-0056	5 U	16	3	0.04 U	54	0.67 B

GWS-EC09 (40' NW)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC09-0008	40 U	24	20 U	0.4 U	35	0.42 U
GWS-EC09-0092	40 U	29	10 U	0.3 U	42	0.08 U
GWS-EC09-0176	30 U	31	10 U	0.2 U	45	0.06 U

CR-19 (20' NW)

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
CR-19A	9.0	33	26	0.12	76	**2,305**
CR-19B	4.0	10	11	0.06	33	**1,416**
CR-19C	3.0 U	8.4	2	0.01	26	**171**

GWS-EC08

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC08-0006	40 U	33	20	0.4 U	67	**1,229**
GWS-EC08-0028	40 U	20	20 U	0.4 U	31	**600**
GWS-EC08-0048	40 U	25	20 U	0.4 U	41	**907**
GWS-EC08-0068	40 U	27	10 U	0.3 U	41	**1,602**
GWS-EC08-0100	30 U	28	10 U	0.3 U	44	**825**
GWS-EC08-0129	30 U	30	10 U	0.2 U	47	**218**

GWS-EC10 (10' NW)

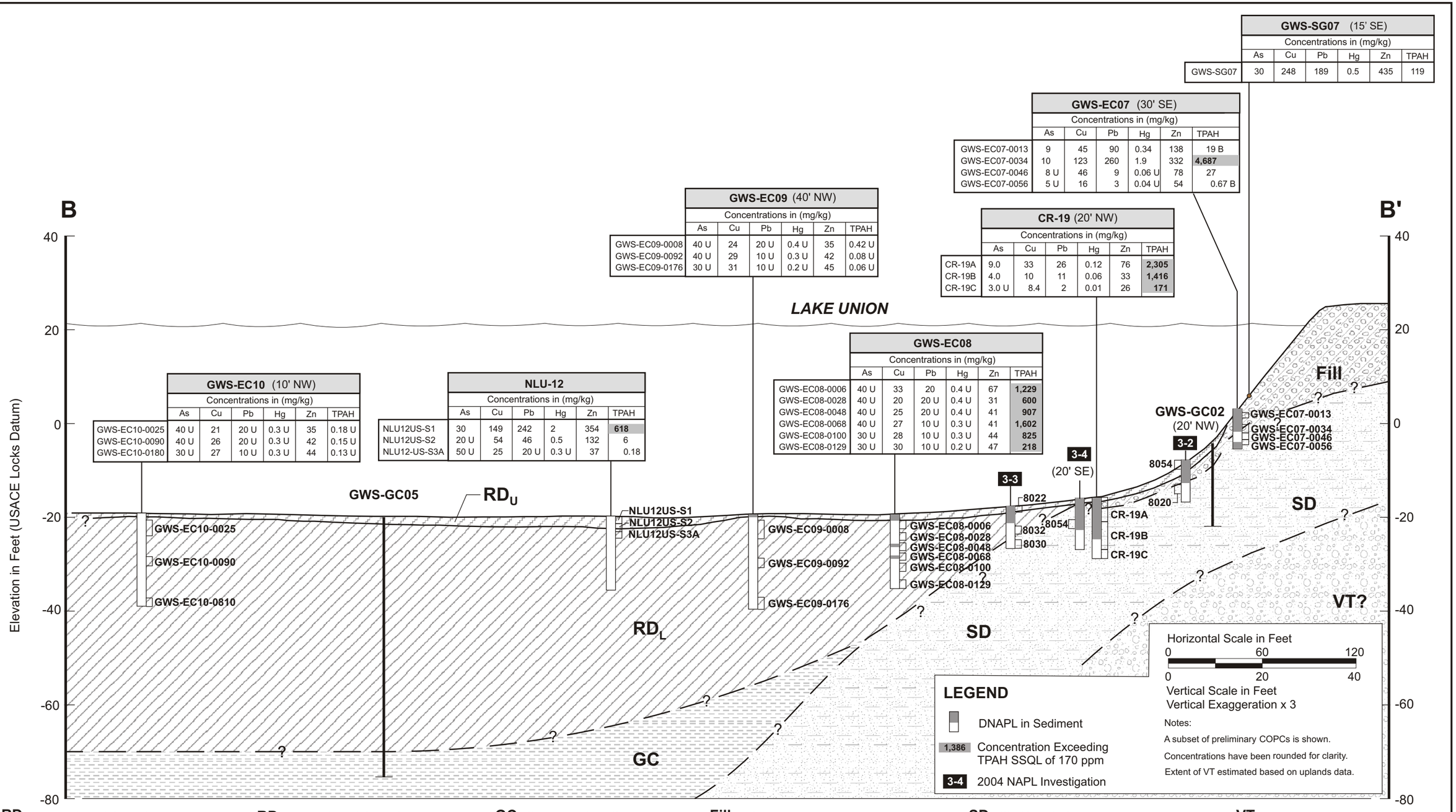
Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
GWS-EC10-0025	40 U	21	20 U	0.3 U	35	0.18 U
GWS-EC10-0090	40 U	26	20 U	0.3 U	42	0.15 U
GWS-EC10-0180	30 U	27	10 U	0.3 U	44	0.13 U

NLU-12

Concentrations in (mg/kg)

	As	Cu	Pb	Hg	Zn	TPAH
NLU12US-S1	30	149	242	2	354	**618**
NLU12US-S2	20 U	54	46	0.5	132	6
NLU12-US-S3A	50 U	25	20 U	0.3 U	37	0.18



RD_U Upper Recent Deposits
Very soft, wet, brown to black sandy silt, and organic silt, wood chunks and debris grading to a very soft, wet, gray clay with silt

RD_L Lower Recent Deposits
Very soft, wet, olive brown to dark brown sandy organic silt with localized thin sand interbeds; med-high plasticity

GC Glaciolacustrine Clay
Very soft, wet, dark gray clay with sand and silty sand lenses

Fill Gas Works Fill
Loose, wet to dry, gray to black, poorly graded sand with clay, silt and gravel; abundant ash, cinders, wood; brick fragments; tar

SD Stratified Drift
Loose to very dense, moist to wet, brown to gray, fine to medium-grained sand with silt and gravel, interbedded with sandy silt

VT Vashon Till
Dense to very dense, wet to dry, gray to brown sandy clay with gravel to silty sandy gravel

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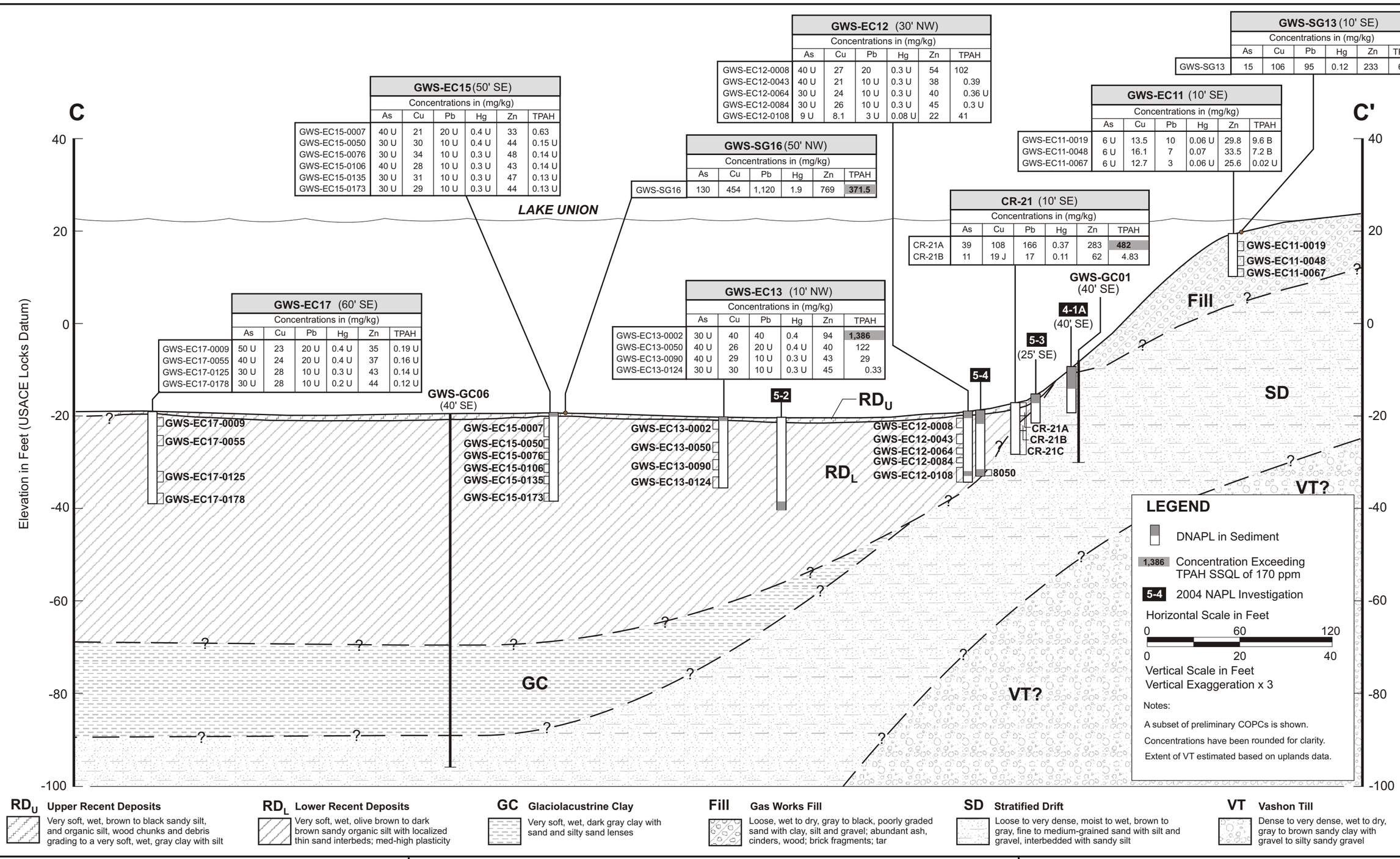
Figure 4.3
Geologic Cross Section B to B'

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



RDU Upper Recent Deposits
Very soft, wet, brown to black sandy silt, and organic silt, wood chunks and debris grading to a very soft, wet, gray clay with silt

RDL Lower Recent Deposits
Very soft, wet, olive brown to dark brown sandy organic silt with localized thin sand interbeds; med-high plasticity

GC Glaciolacustrine Clay
Very soft, wet, dark gray clay with sand and silty sand lenses

Fill Gas Works Fill
Loose, wet to dry, gray to black, poorly graded sand with clay, silt and gravel; abundant ash, cinders, wood; brick fragments; tar

SD Stratified Drift
Loose to very dense, moist to wet, brown to gray, fine to medium-grained sand with silt and gravel, interbedded with sandy silt

VT Vashon Till
Dense to very dense, wet to dry, gray to brown sandy clay with gravel to silty sandy gravel

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Figure 4.4
Geologic Cross Section C to C'

G:Project\Clients\Floyd 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

ZymaX FORENSICS

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

RECEIVED
SEP 16 2005
BY:

805.544.4696
www.ZymaXusa.com
71 Zaca Lane
San Luis Obispo CA 93401
fax 805.544.8226

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: Floyd/Snider	Phone:	Date: 6/29/05	Ice Present?
Client Contact: Jane Fisher / Allison Geiselbrecht		No. of Coolers: 1	Cooler Temps:
Client Project Name: Gas Works Sediment - Western Study Area Remedial Invest./ Feasibility Study			
Client Project #: 340542.002	Samplers:		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

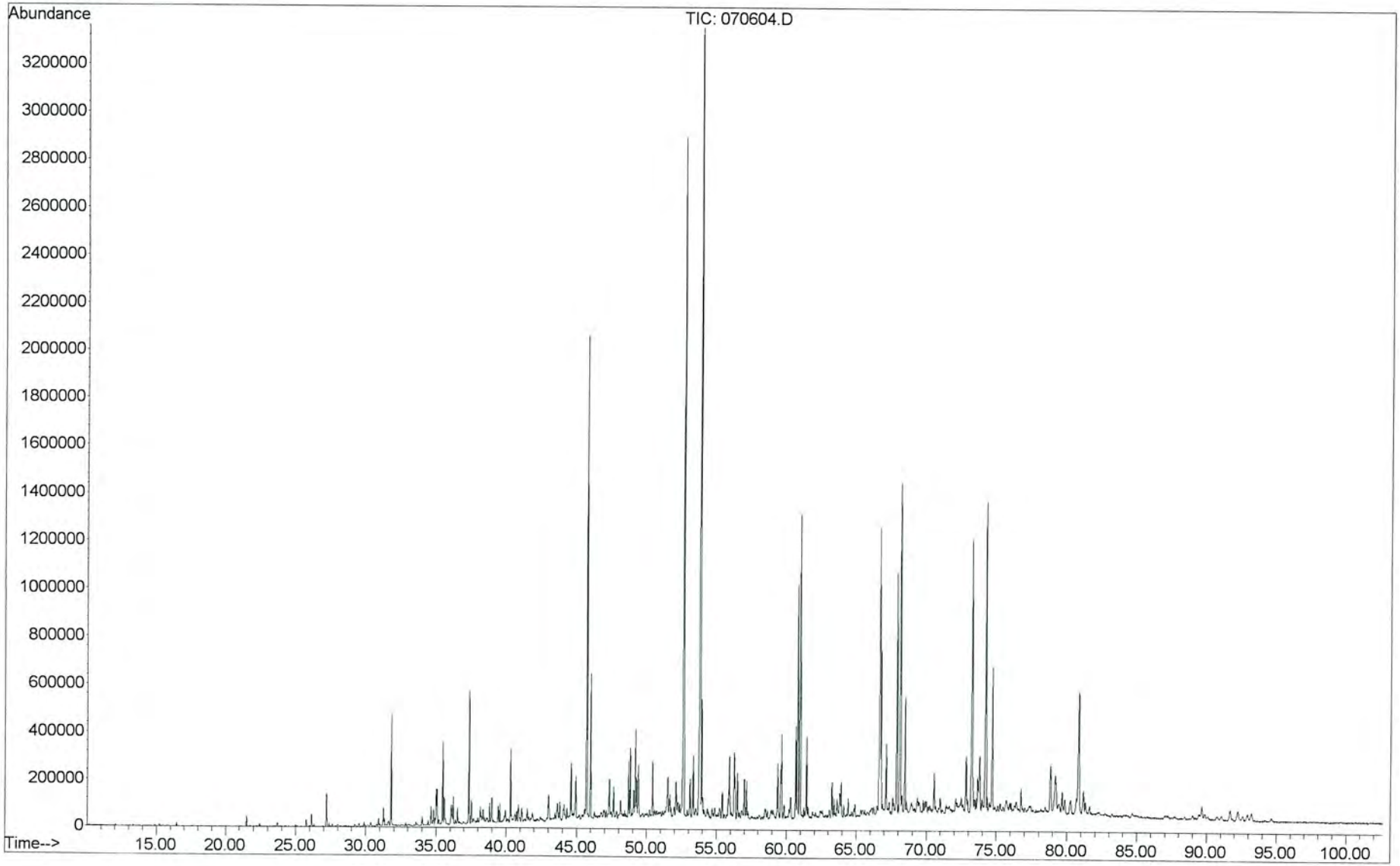
Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested	Notes/Comments
GWS-SG05	5/23/05	1435	Sed.	1		Samples being sent as requested by client.
GWS-SG07	5/23/05	1316	Sed.	1		
GWS-SG16	5/23/05	1510	Sed.	1		
GWS-EC07-0034	5/16/05	1007	Sed.	1		
GWS-EC12-0034 mw 6/30/05	5/17/05	0846	Sed	1		
GWS-EC14-0008	5/17/05	1335	Sed	1		
GWS-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)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: BOB CONGLETON	Printed Name:	Printed Name:	Printed Name:
	Company: ARI	Company: Zymax	Company:	Company:
	Date & Time: 6/29/05 1445	Date & Time: 6-30-05 1300	Date & Time:	Date & Time:

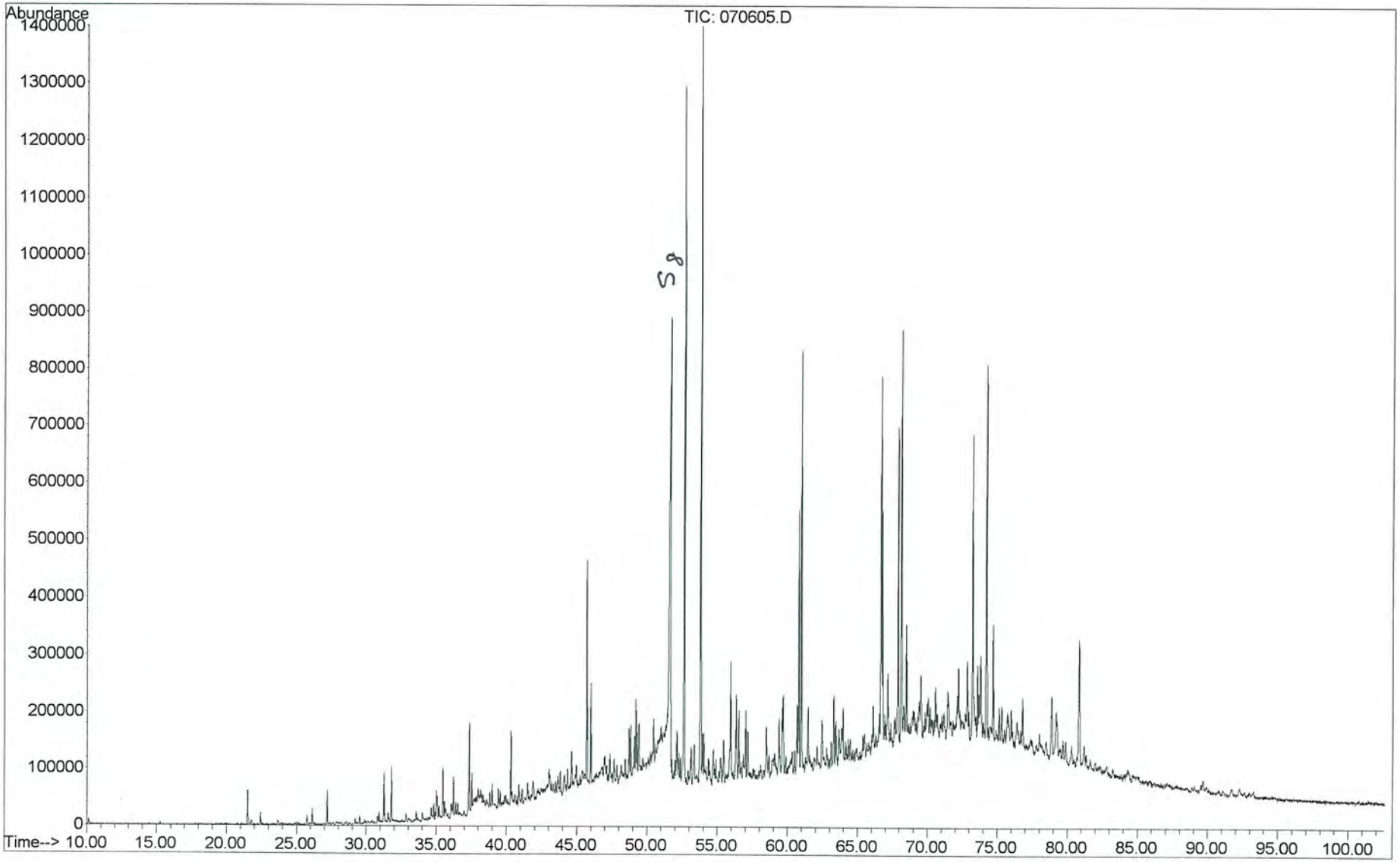
Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for 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-signed agreement between ARI and the Client.*

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.

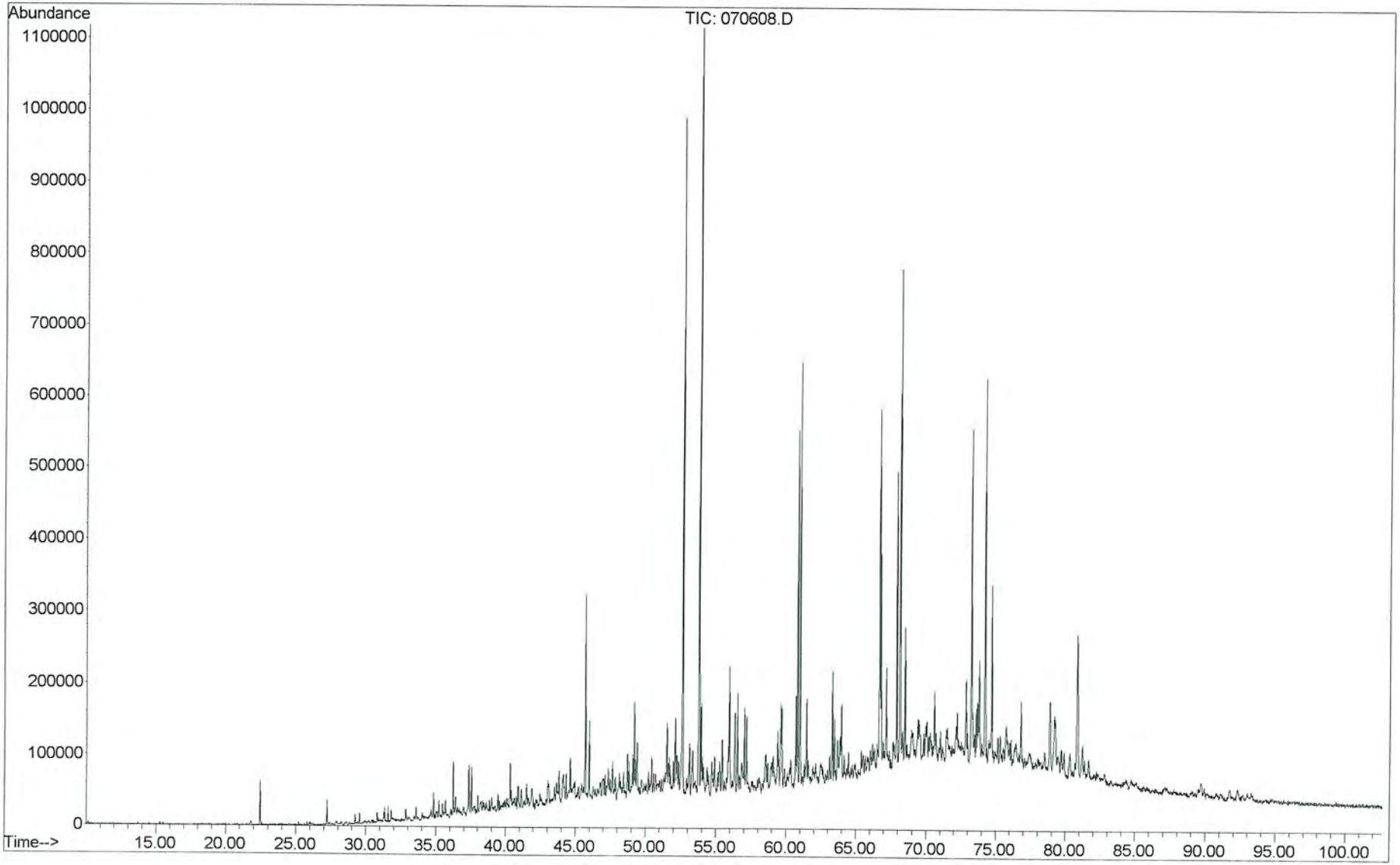
Sample Name: GWS-SG05 (39767-1) soil ext. (F1+F2)
Misc Info : Gas Works Feasibility Study, Floyd & Snider



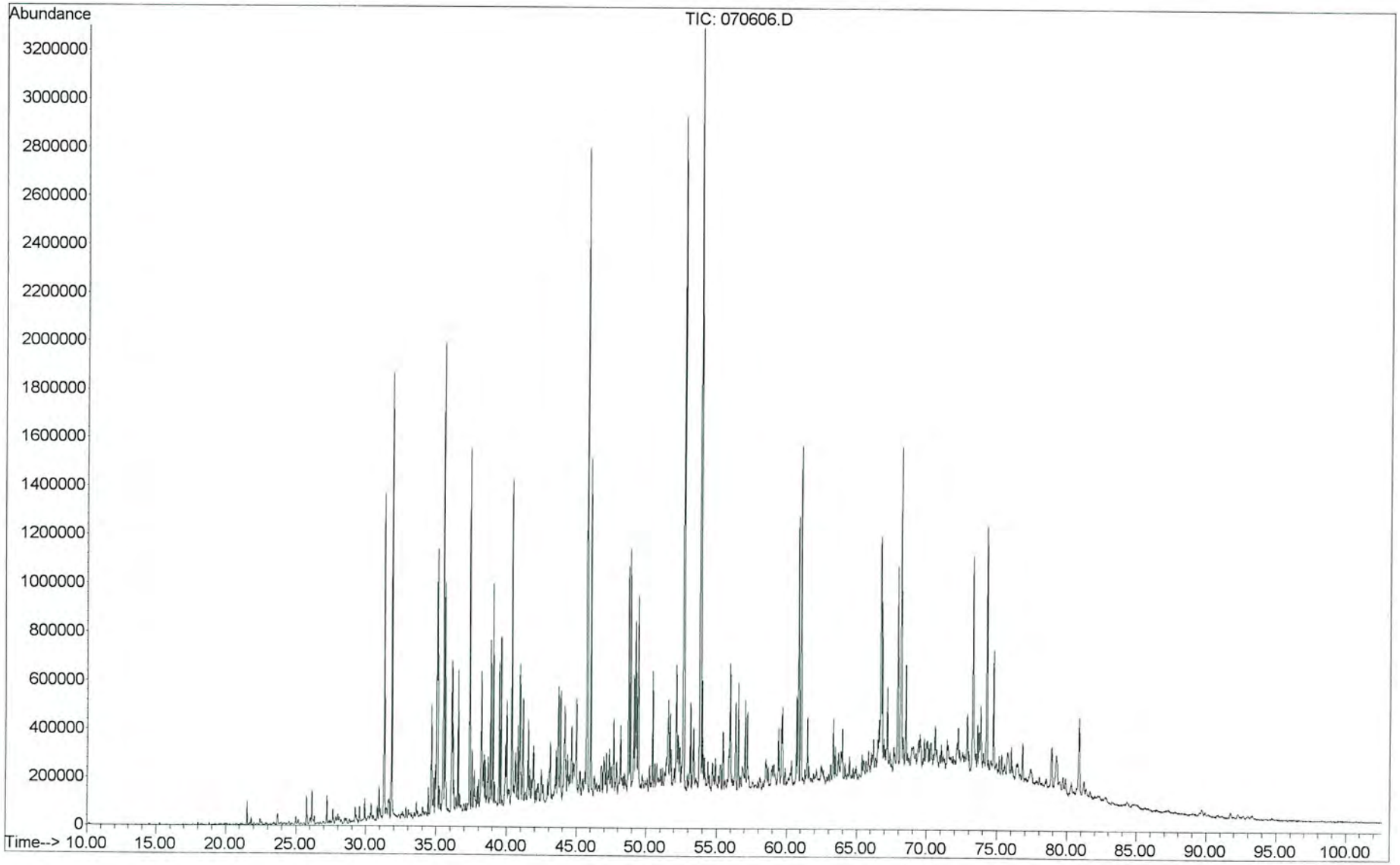
Sample Name: GWS-SG07 (39767-2) soil ext. (F1+F2)
Misc Info : Gas Works Feasibility Study, Floyd & Snider



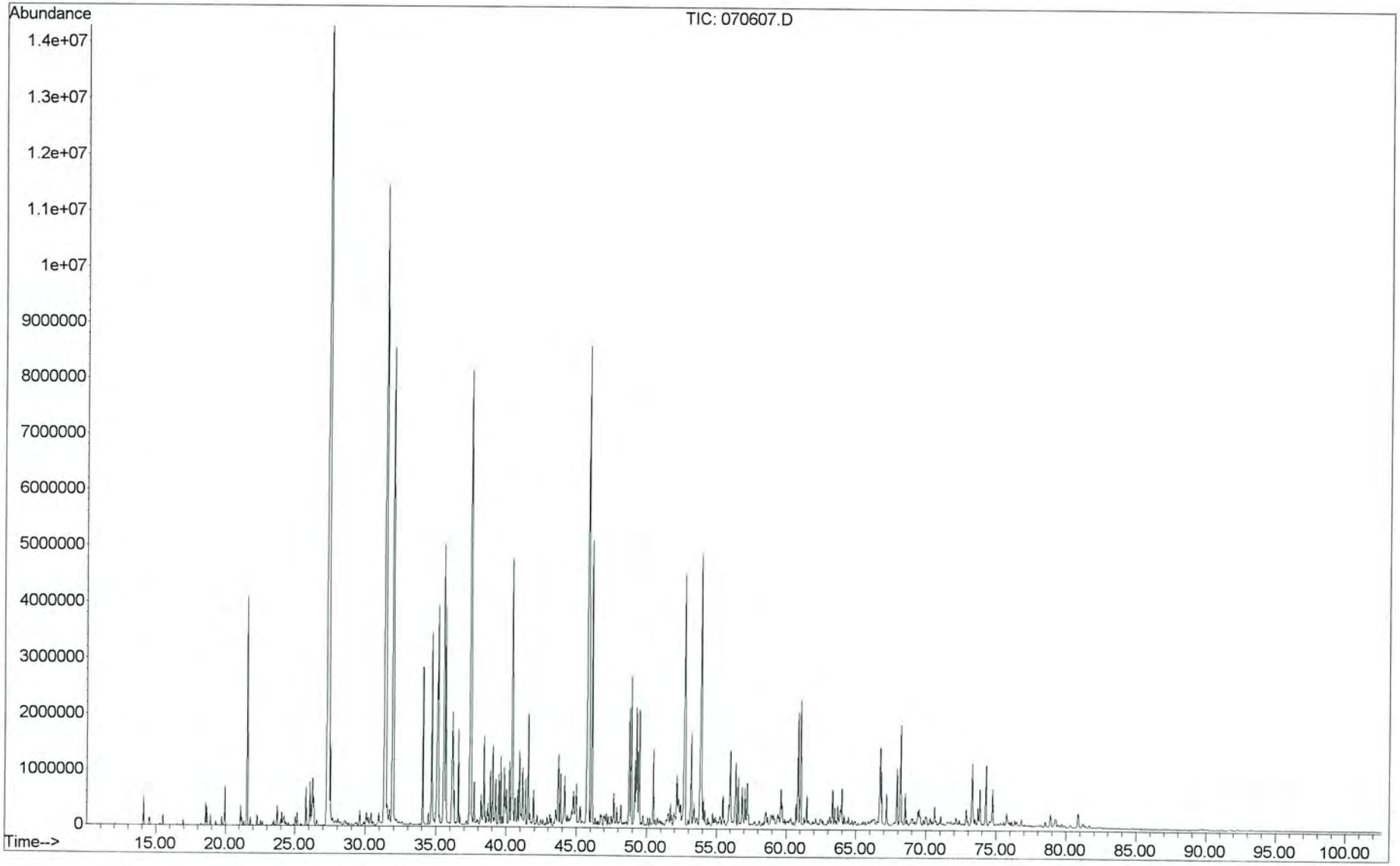
Sample Name: GWS-SG12 (39767-8) soil ext. (F1+F2)
Misc Info : Gas Works Feasibility Study, Floyd & Snider



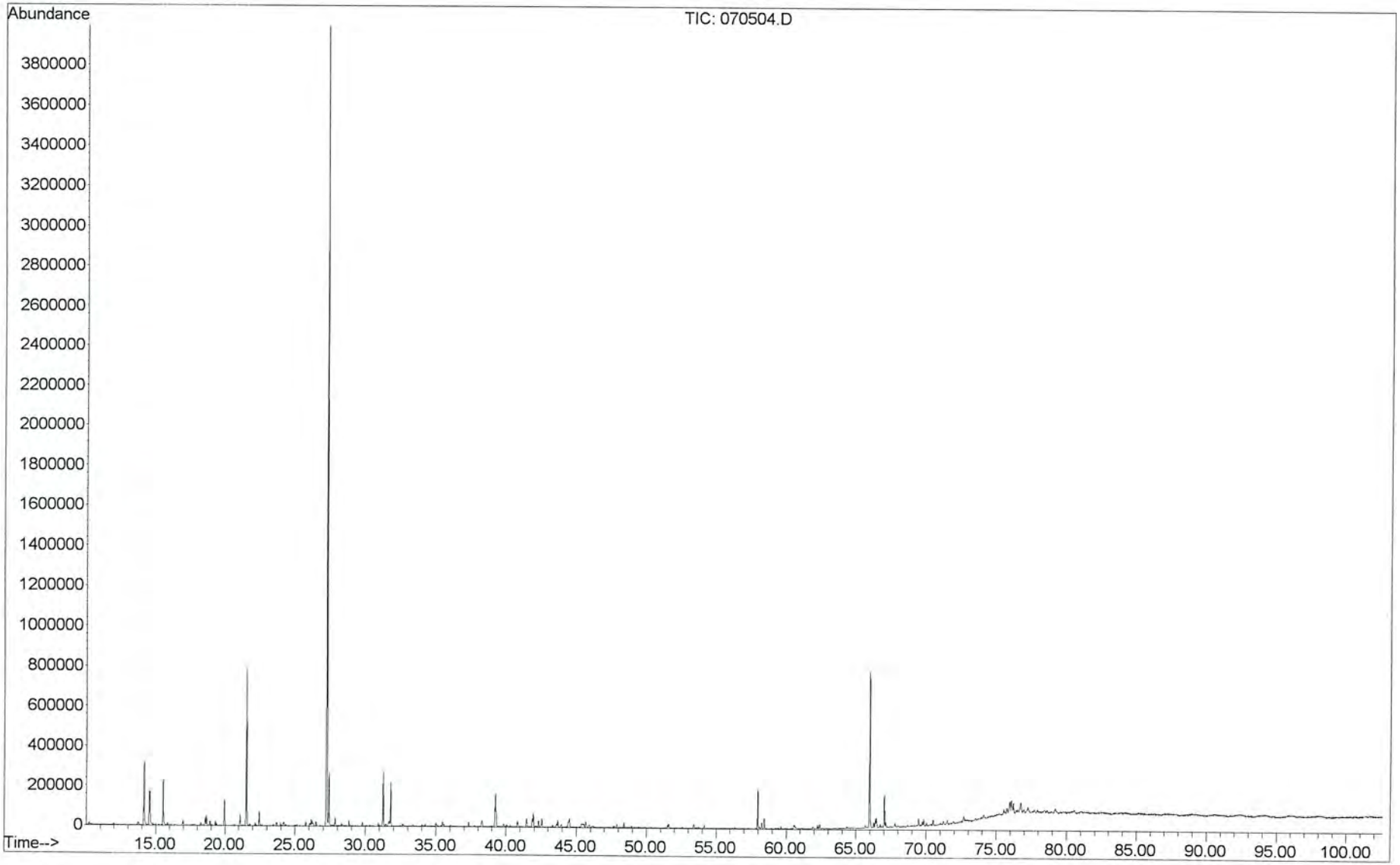
Sample Name: GWS-SG16 (39767-3) soil ext. (F1+F2)
Misc Info : Gas Works Feasibility Study, Floyd & Snider



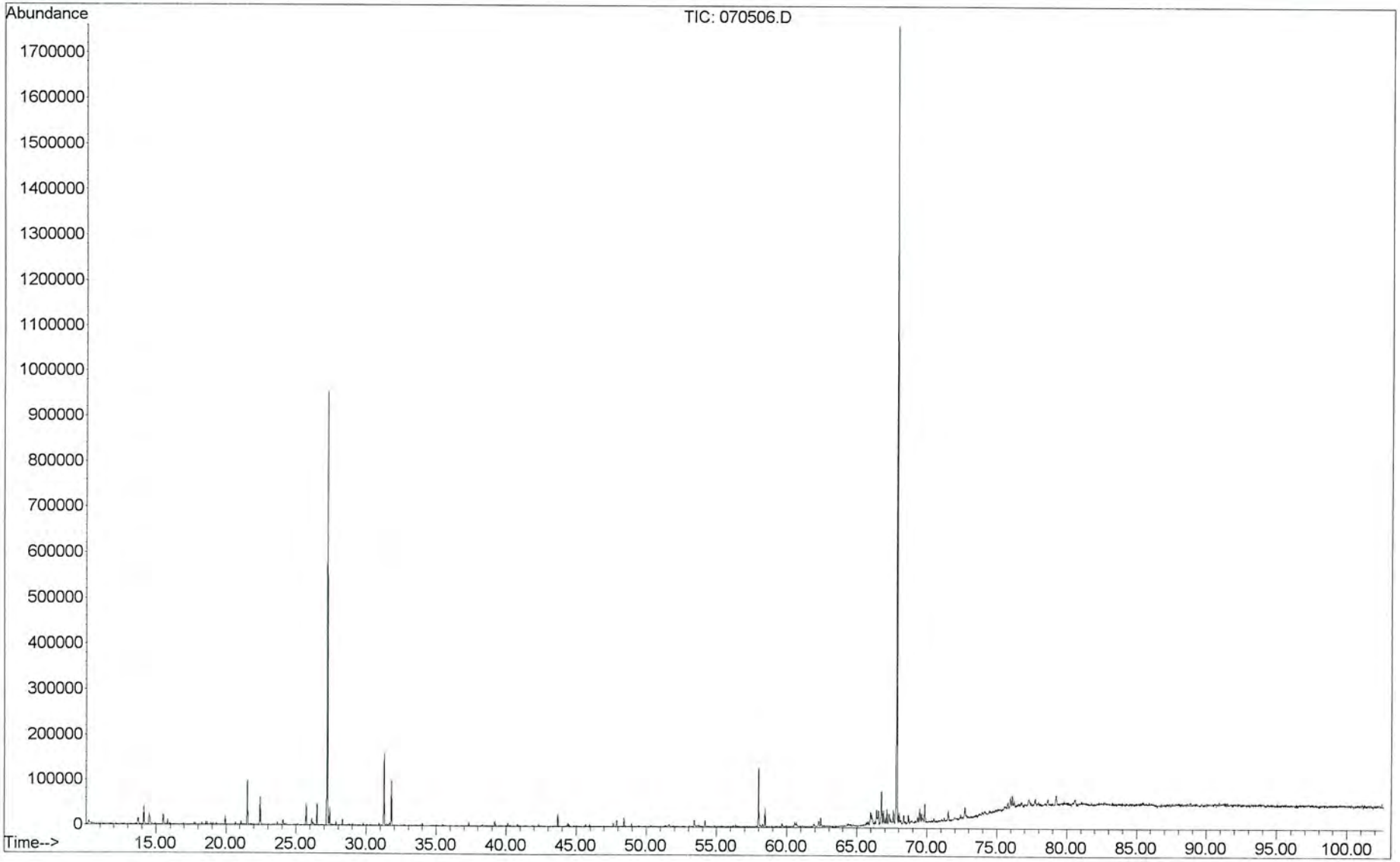
Sample Name: GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Misc Info : Gas Works Feasibility Study, Floyd & Snider



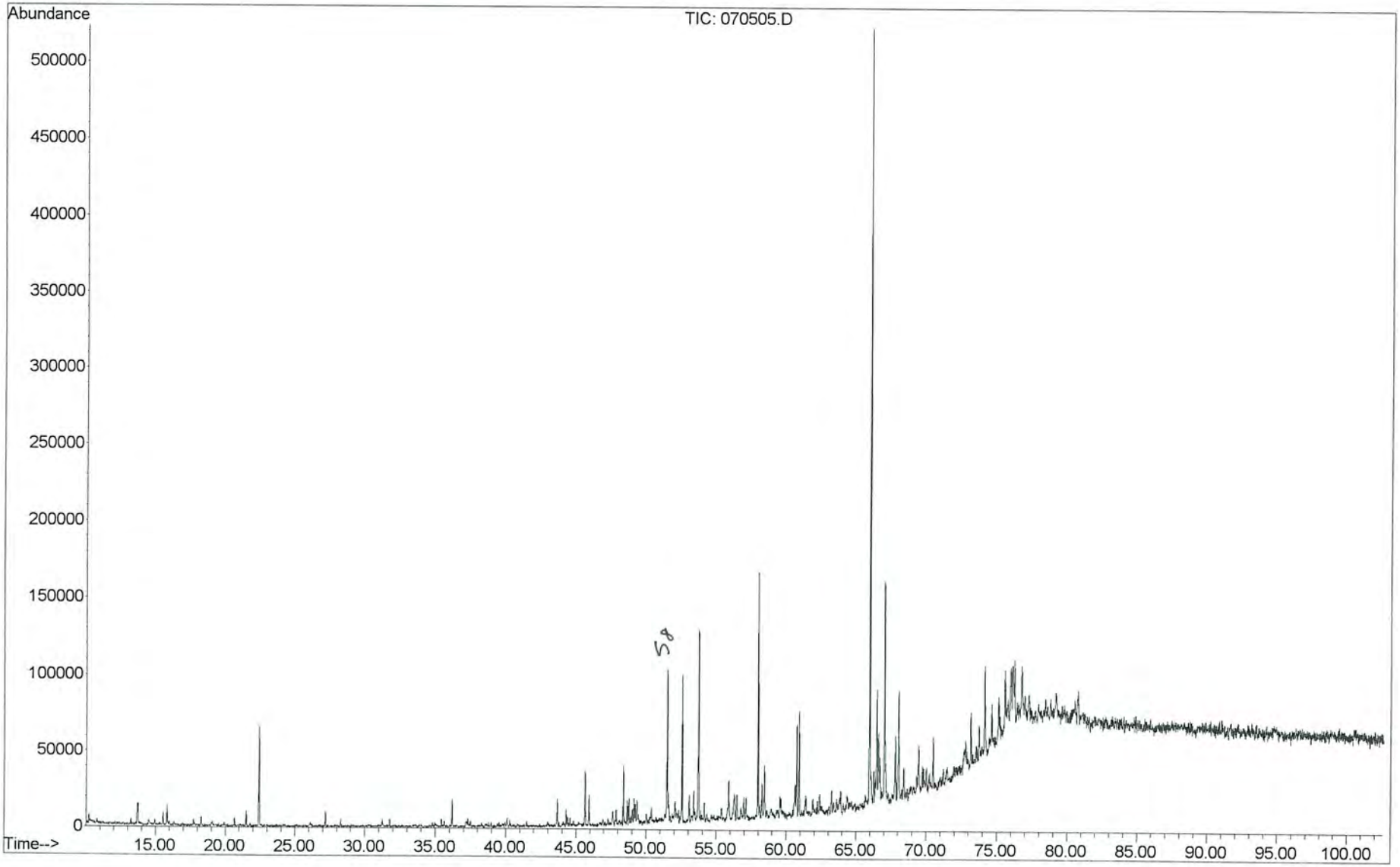
Sample Name: GWS-EC12-0008 (39767-5) soil extract
Misc Info : Gas Works Feasibility Study, Floyd & Snider,Inc.



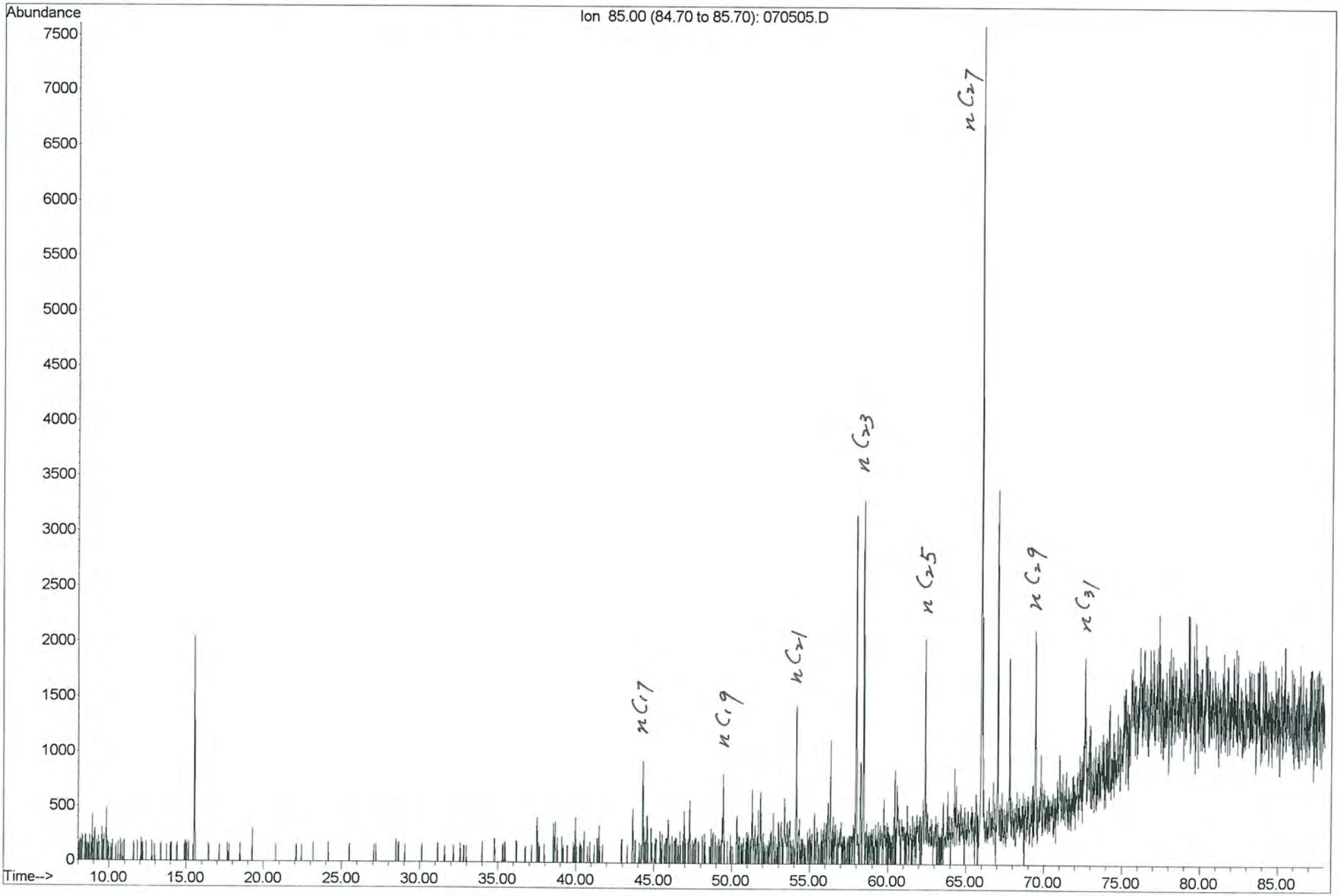
Sample Name: GWS-EC13-0090 (39767-7) soil extract
Misc Info : Gas Works Feasibility Study, Floyd & Snider



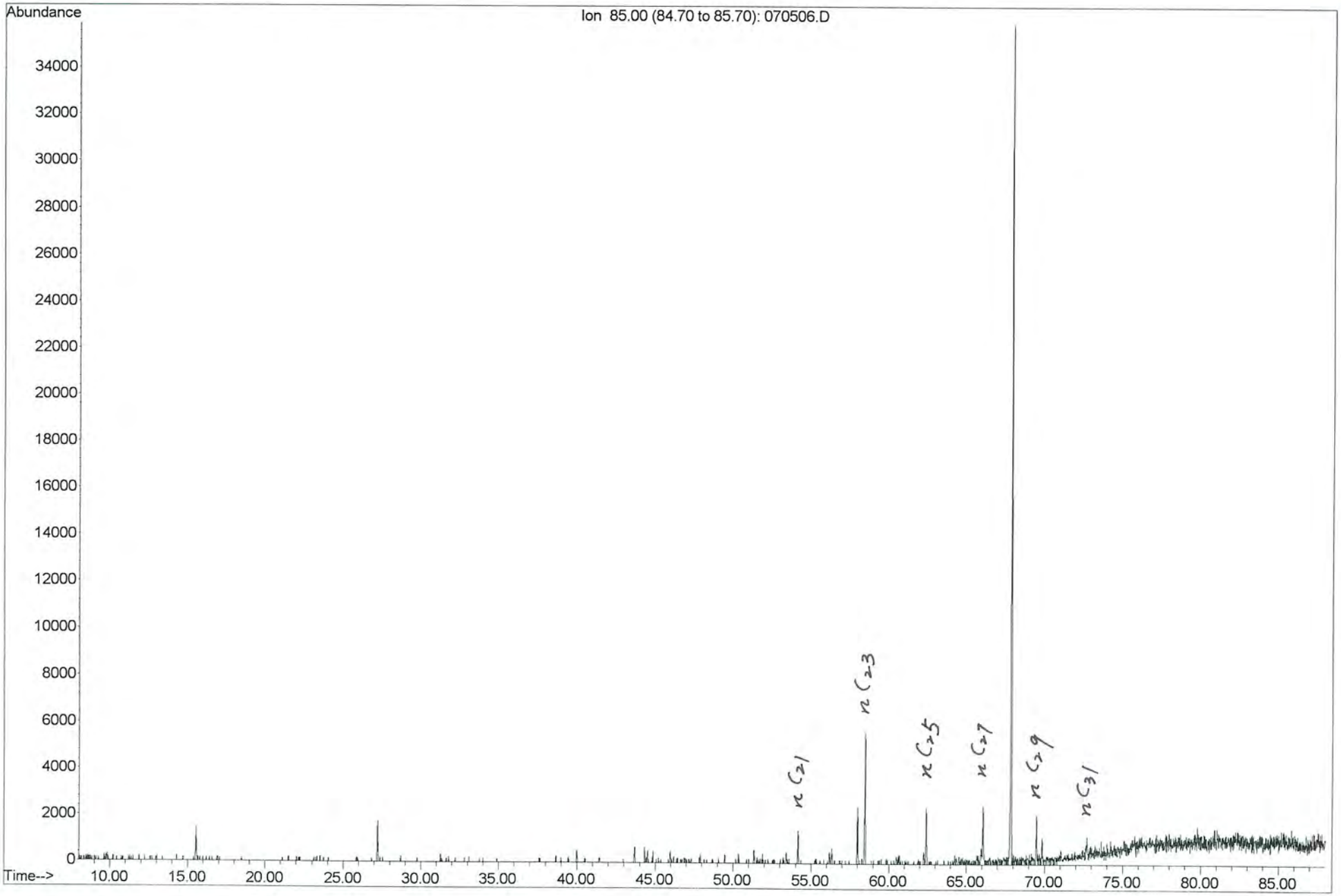
Sample Name: GWS-EC14-0008 (39767-6) soil extract
Misc Info : Gas Works Feasibility Study, Floyd & Snider



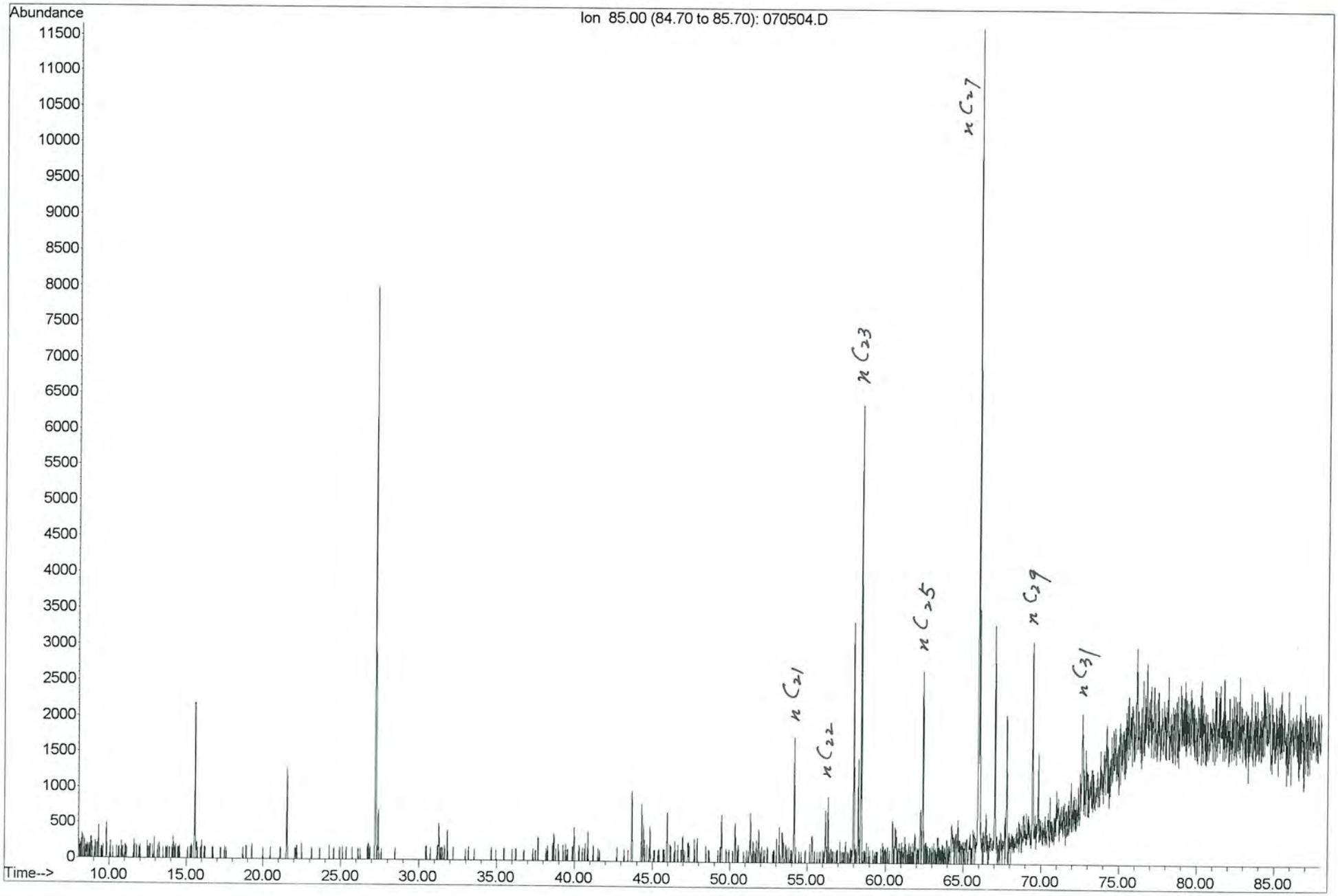
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



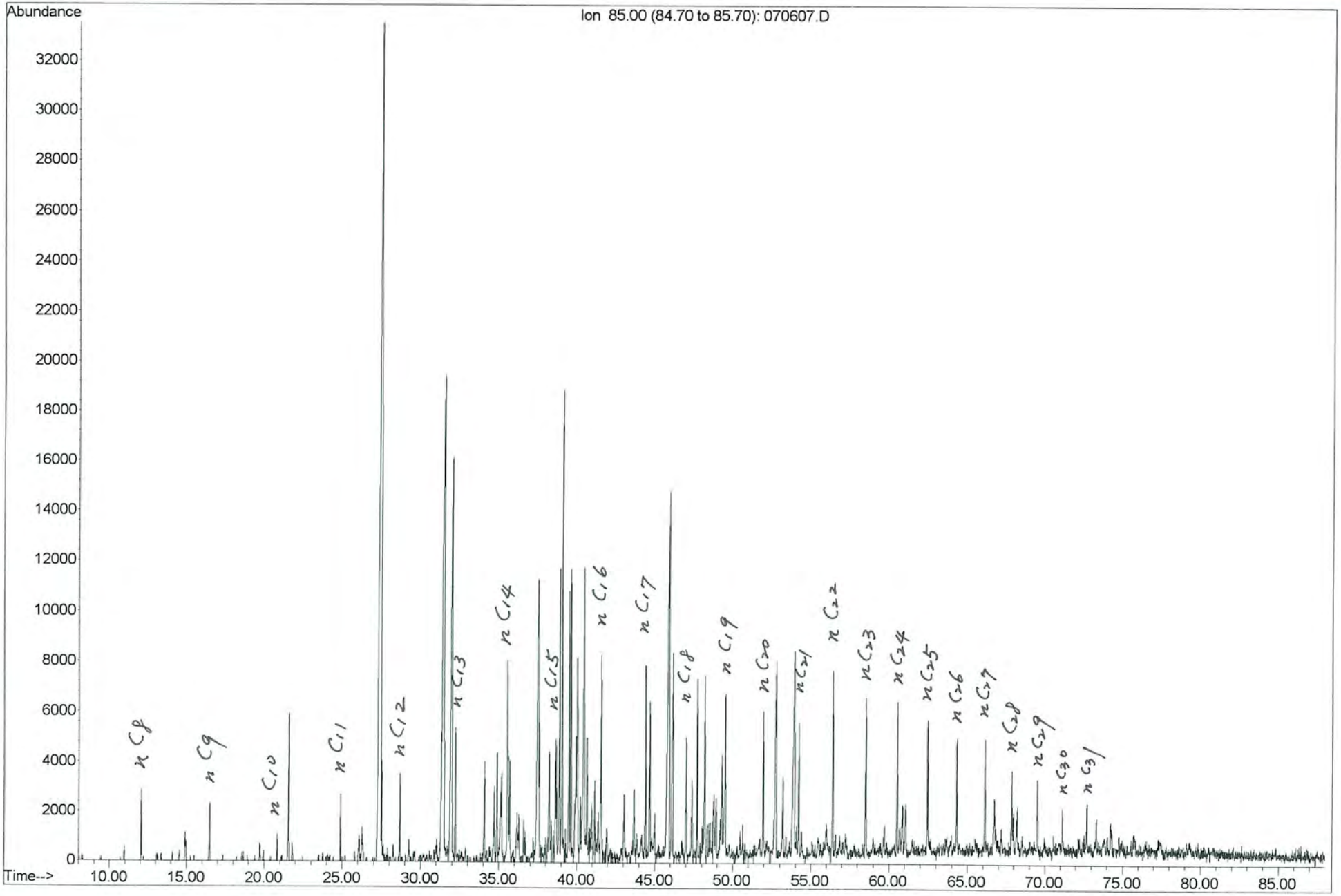
GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



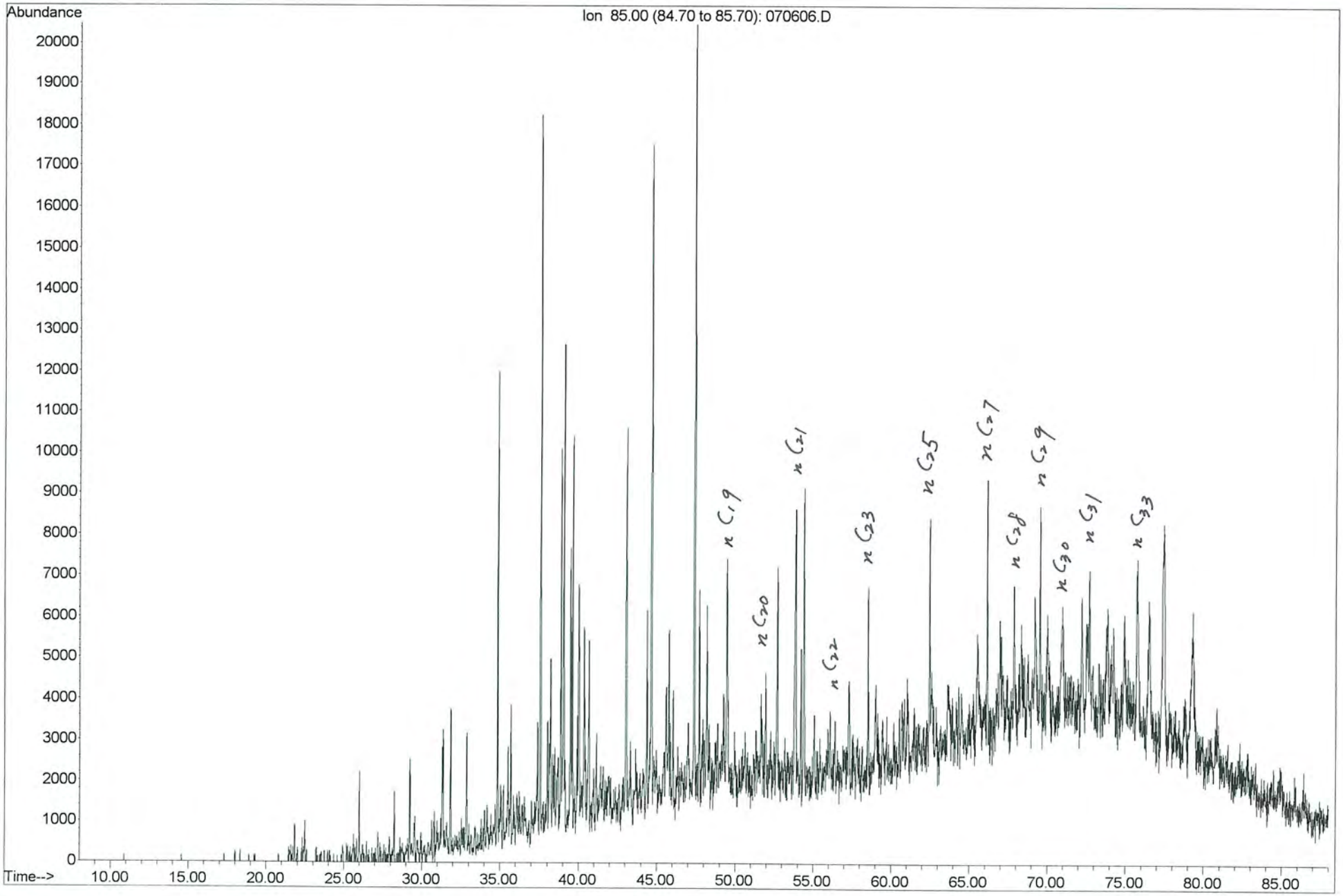
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



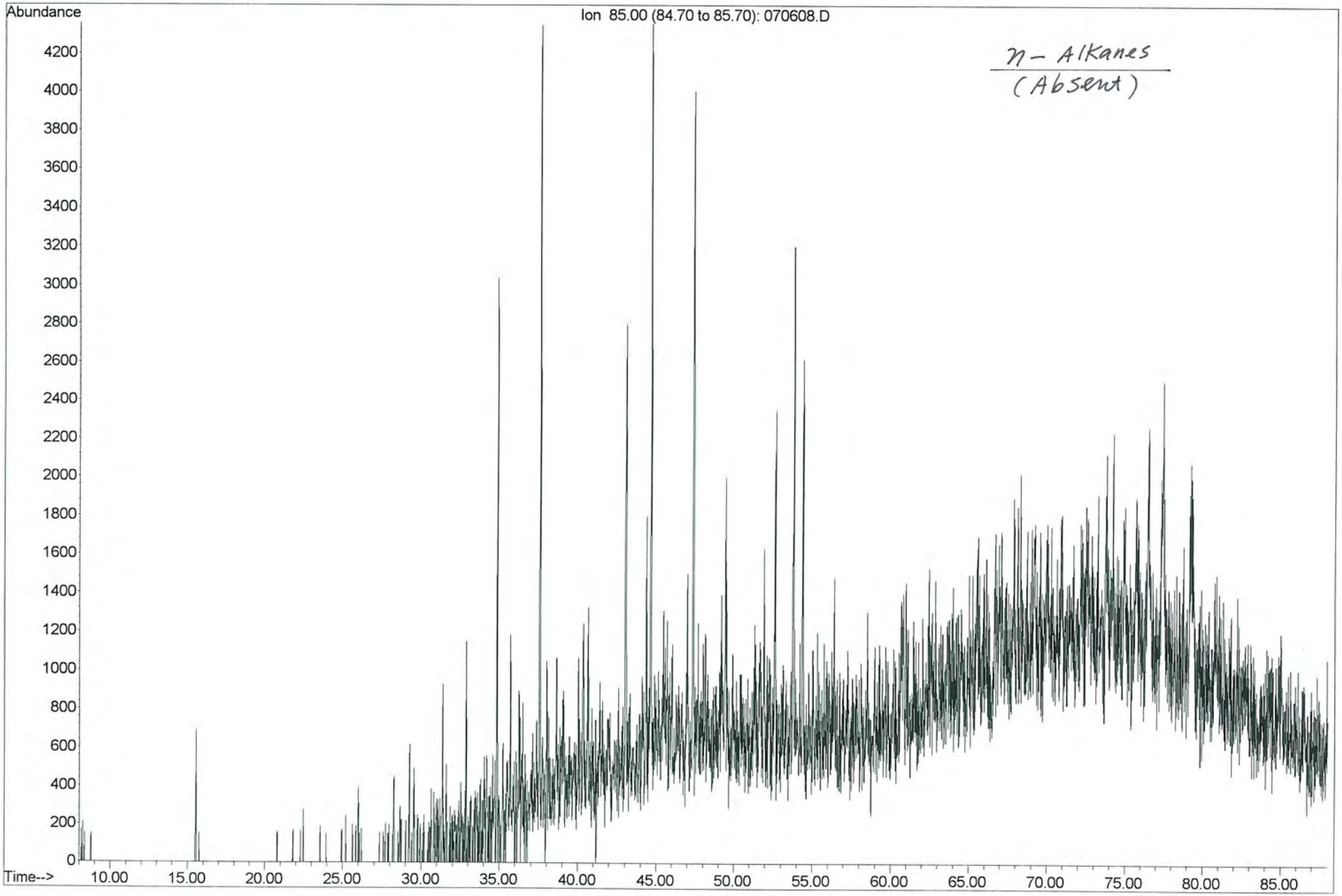
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



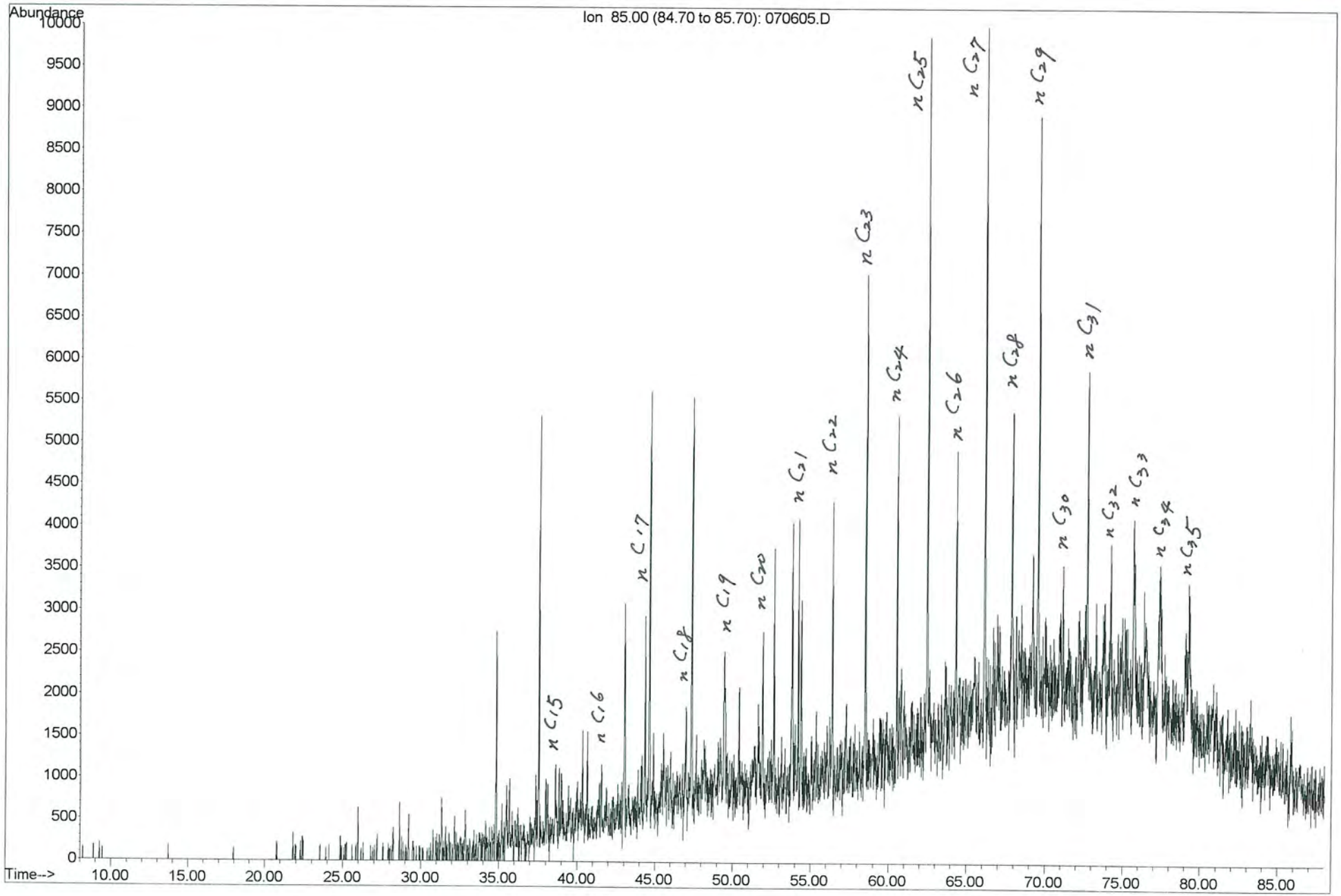
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



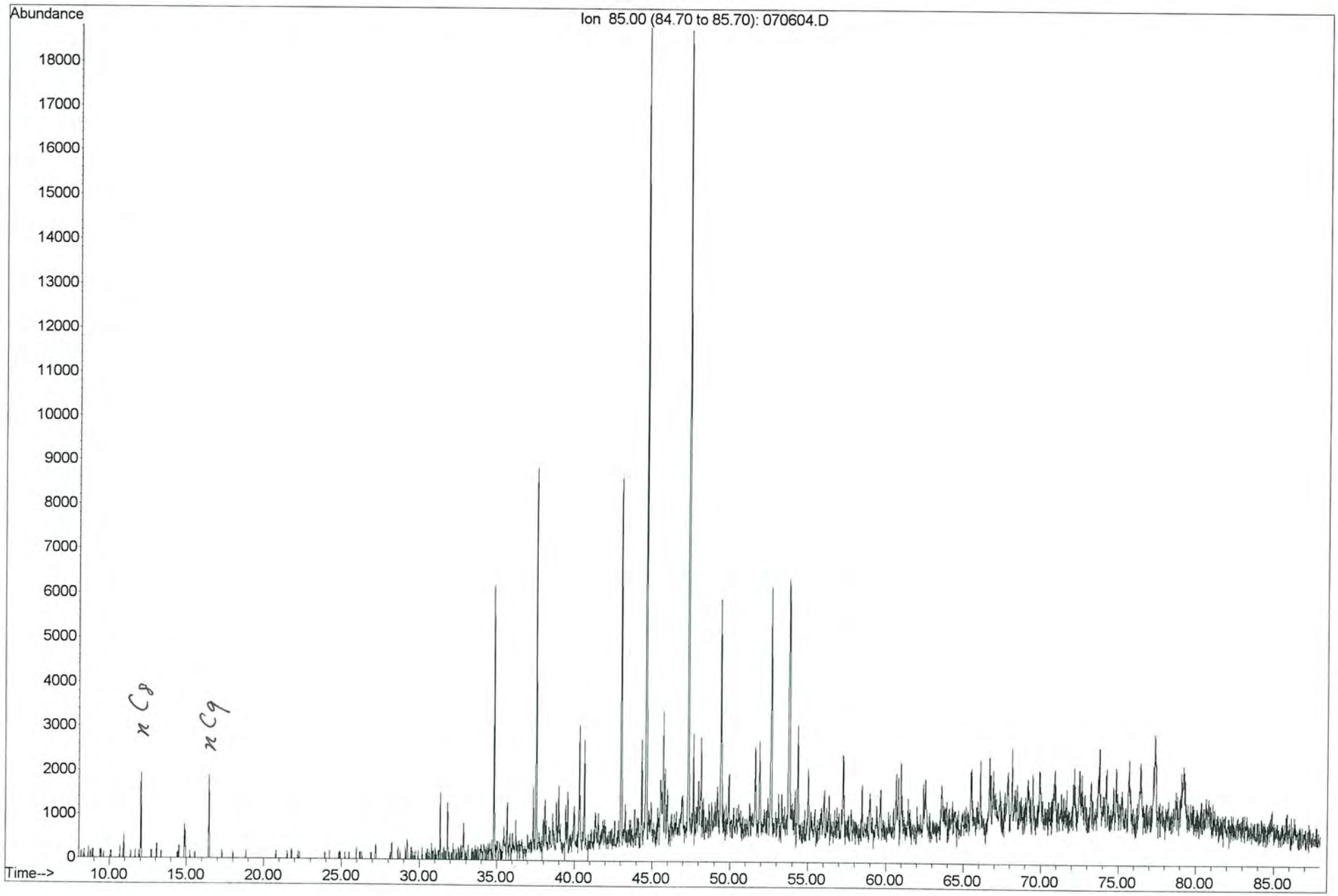
GWS-SG12 (39767-8) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



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



GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



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:	C_1-C_5 Benzothiophenes
DBT:	C_0-C_4 Dibenzothiophenes
NBT:	C_0-C_4 Naphthobenzothiophenes
MAS:	Monoaromatic Steranes
TAS:	Triaromatic Steranes

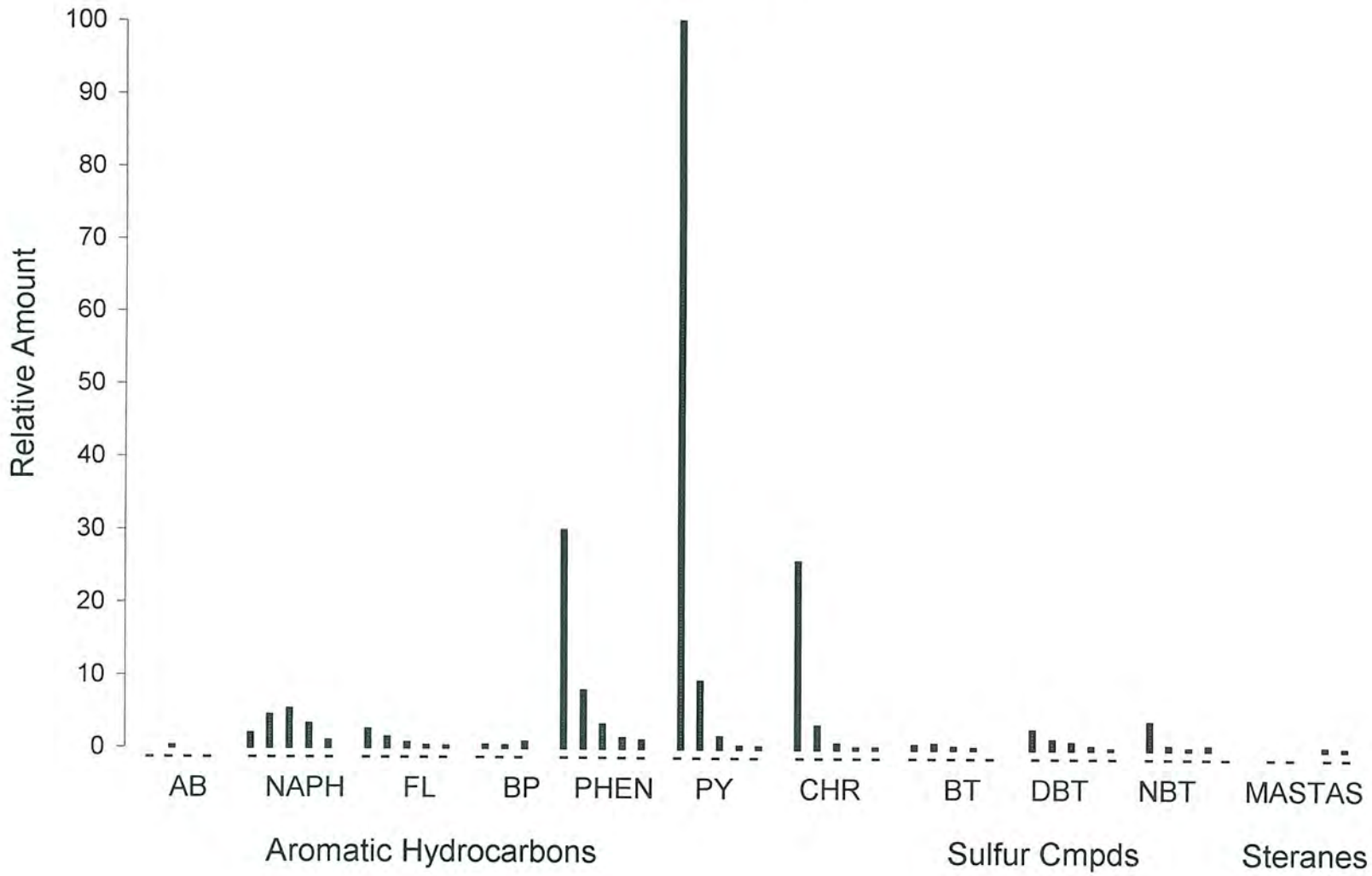
Table

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	128	C_0-naphthalene
6	142	C_1-naphthalenes
7	156	C_2-naphthalenes
8	170	C_3-naphthalenes
9	184	C_4-naphthalenes
10	166	C_0-fluorene
11	180	C_1-fluorenes
12	194	C_2-fluorenes
13	208	C_3-fluorenes
14	222	C_4-fluorenes
15	154	C_0-biphenyl
16	168	C_1-biphenyls + dibenzofuran
17	182	C_2-biphenyls + C_1-dibenzofuran
18	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	C_4-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
40	212	C_2-dibenzothiophenes
41	226	C_3-dibenzothiophenes
42	240	C_4-dibenzothiophenes
43	234	C_0-naphthobenzothiophene
44	248	C_1-naphthobenzothiophenes
45	262	C_2-naphthobenzothiophenes
46	276	C_3-naphthobenzothiophenes
47	290	C_4-naphthobenzothiophenes
48	253	Monoaromatic steranes
49	267	Monoaromatic steranes
50	239	Monoaromatic steranes
51	231	Triaromatic steranes
52	245	Triaromatic steranes

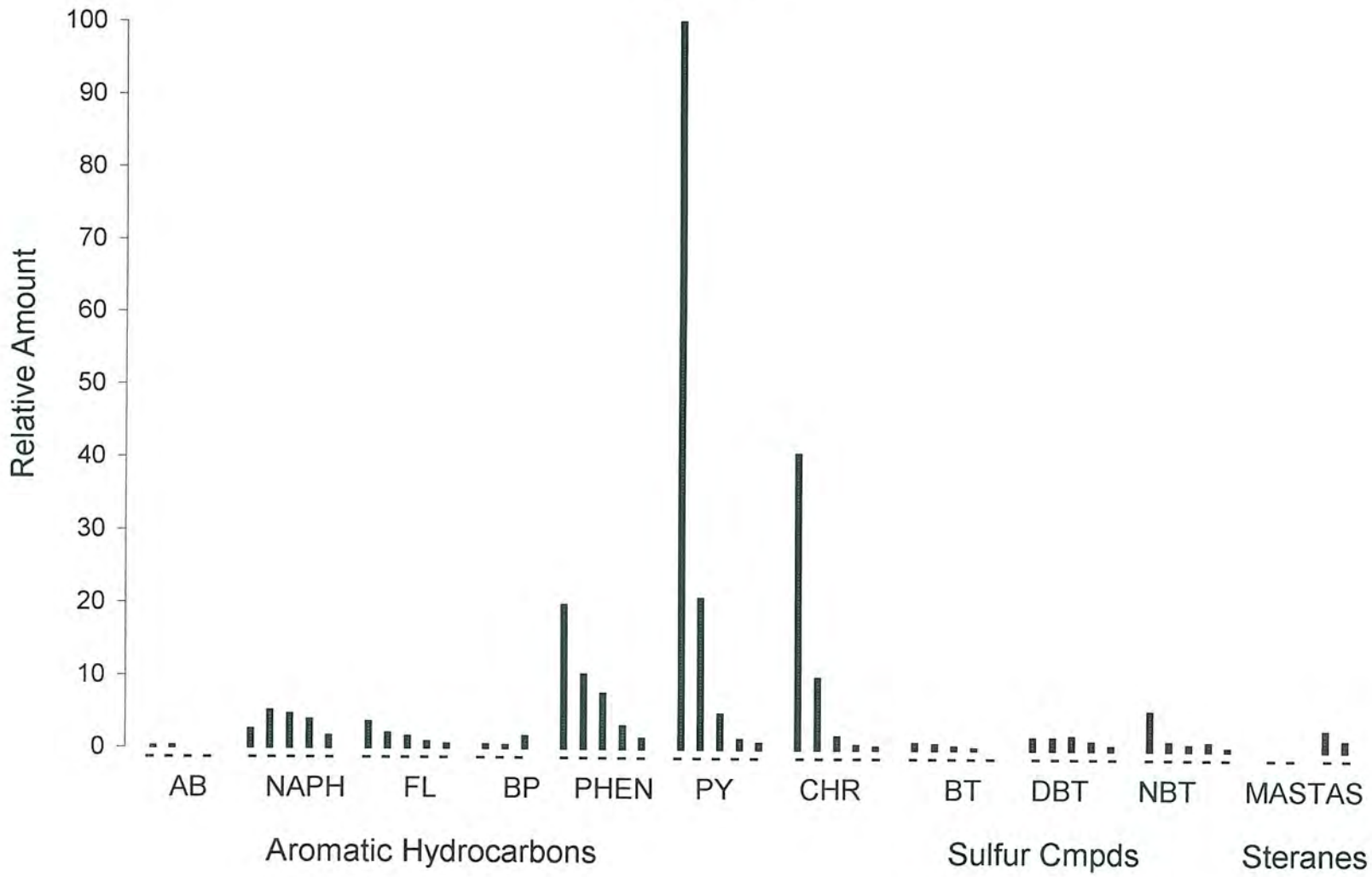
Aromatic Hydrocarbon Distribution

GWS-SG05



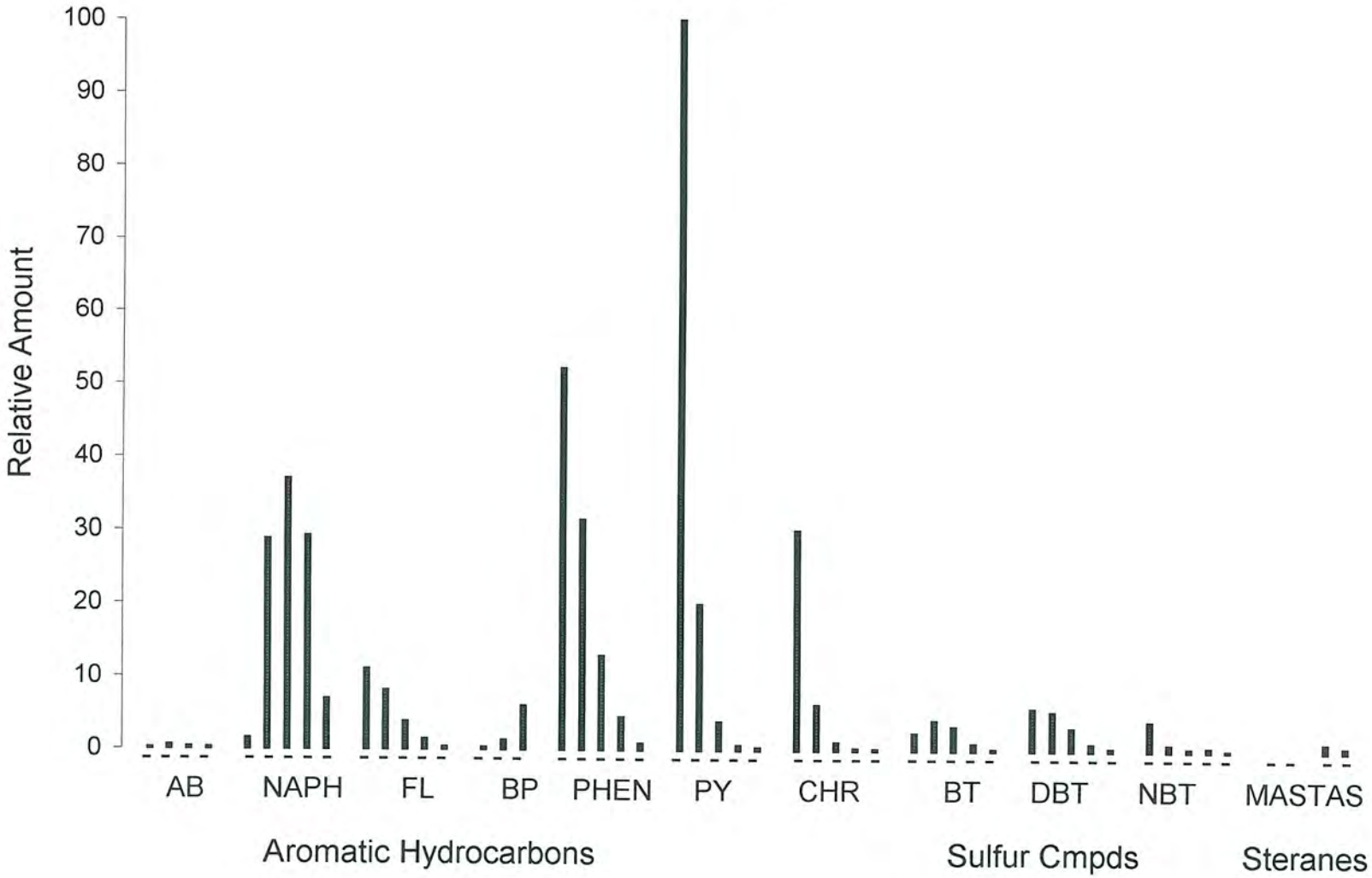
Aromatic Hydrocarbon Distribution

GWS-SG07



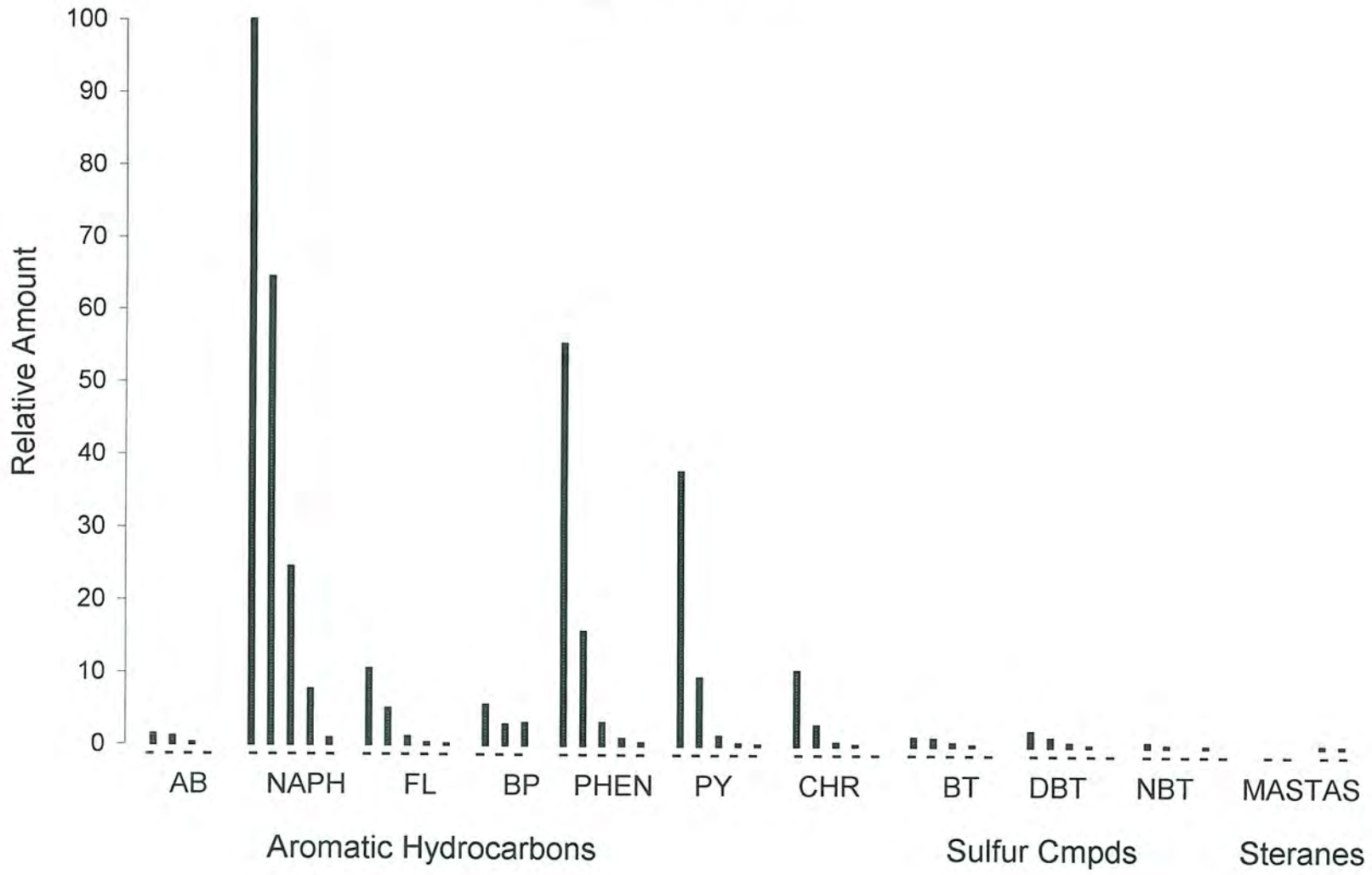
Aromatic Hydrocarbon Distribution

GWS-SG16



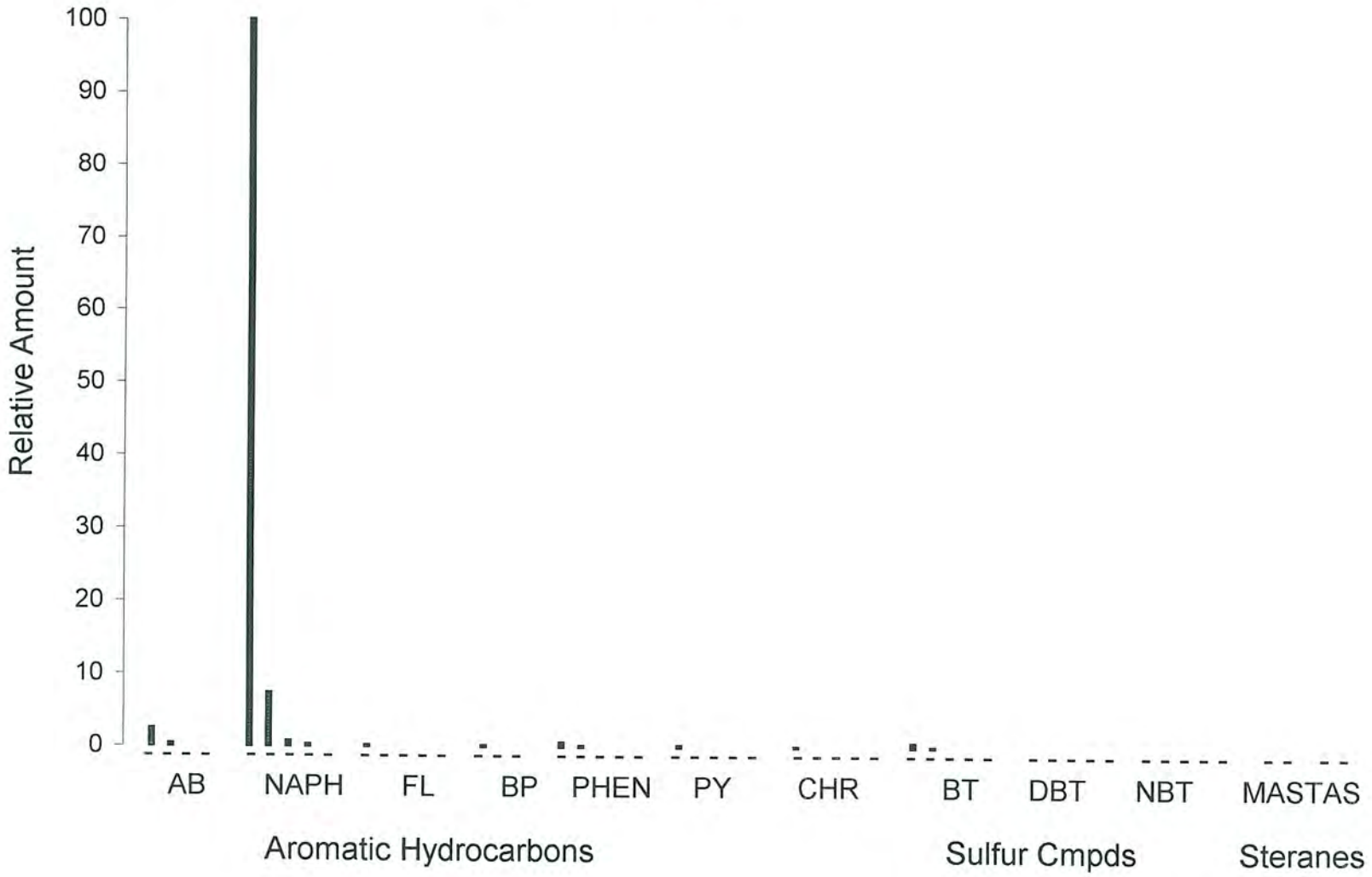
Aromatic Hydrocarbon Distribution

GWS-EC07-0034



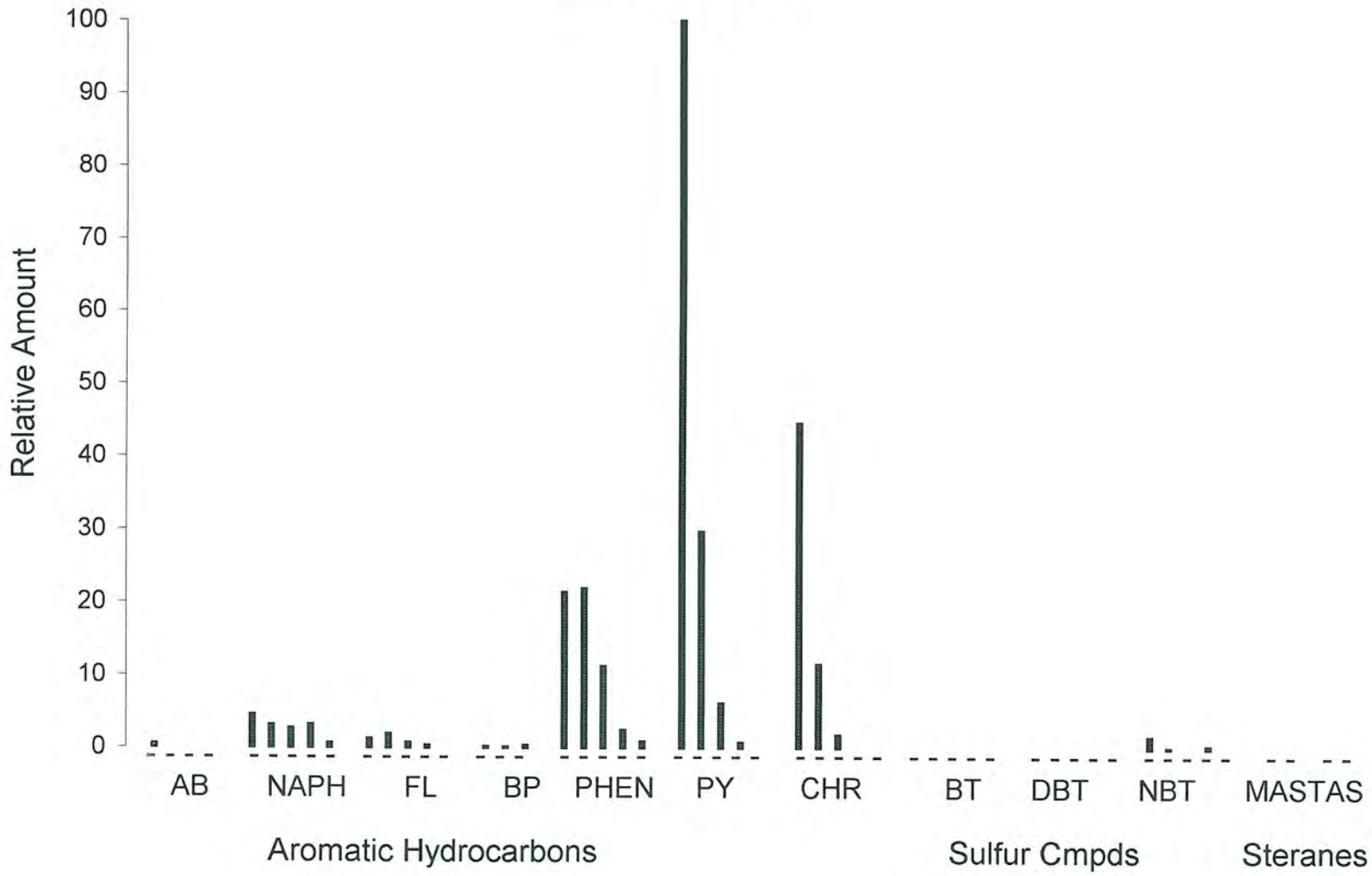
Aromatic Hydrocarbon Distribution

GWS-EC12-0008



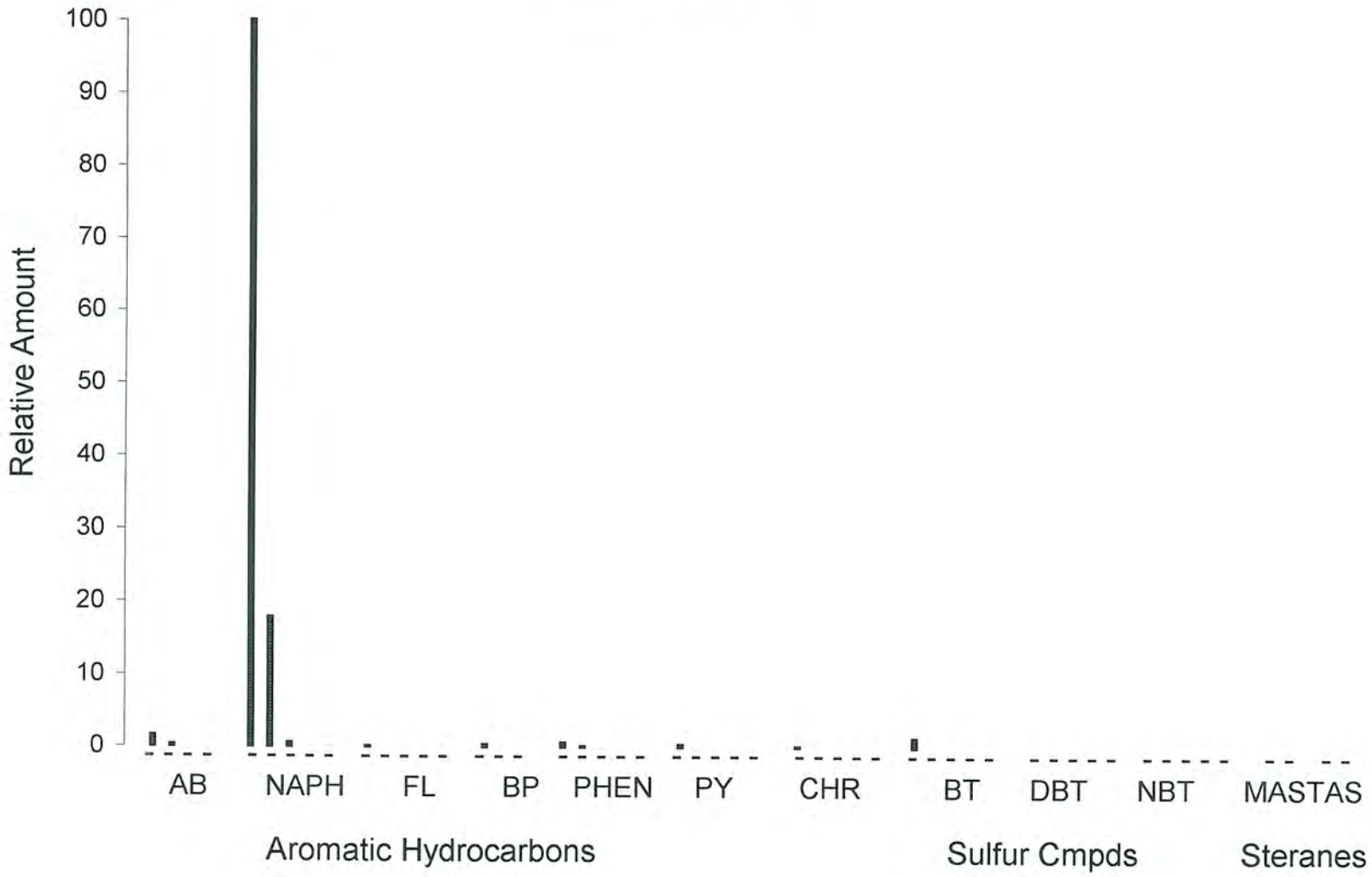
Aromatic Hydrocarbon Distribution

GWS-EC14-0008



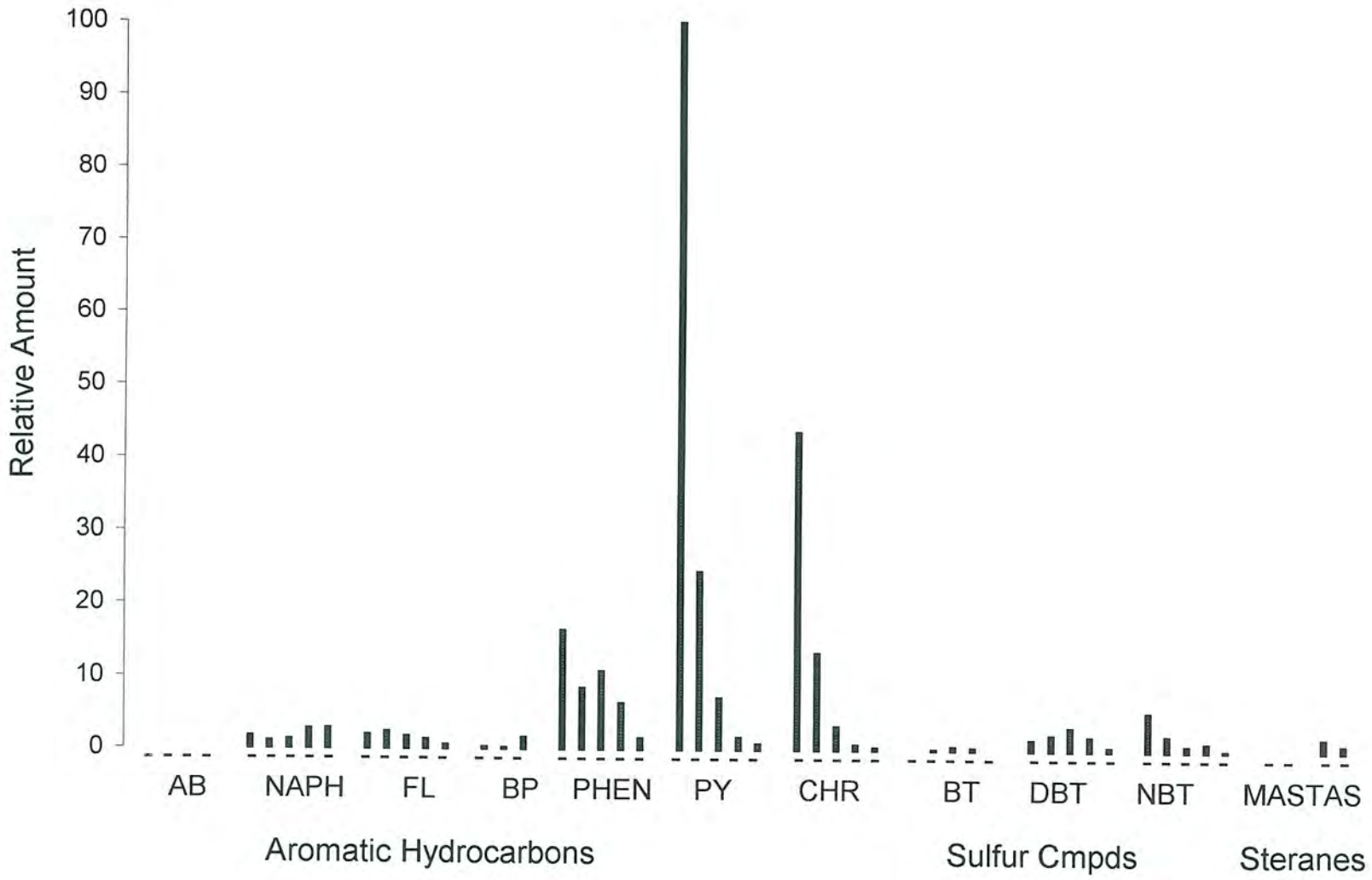
Aromatic Hydrocarbon Distribution

GWS-EC13-0090



Aromatic Hydrocarbon Distribution

GWS-SG12

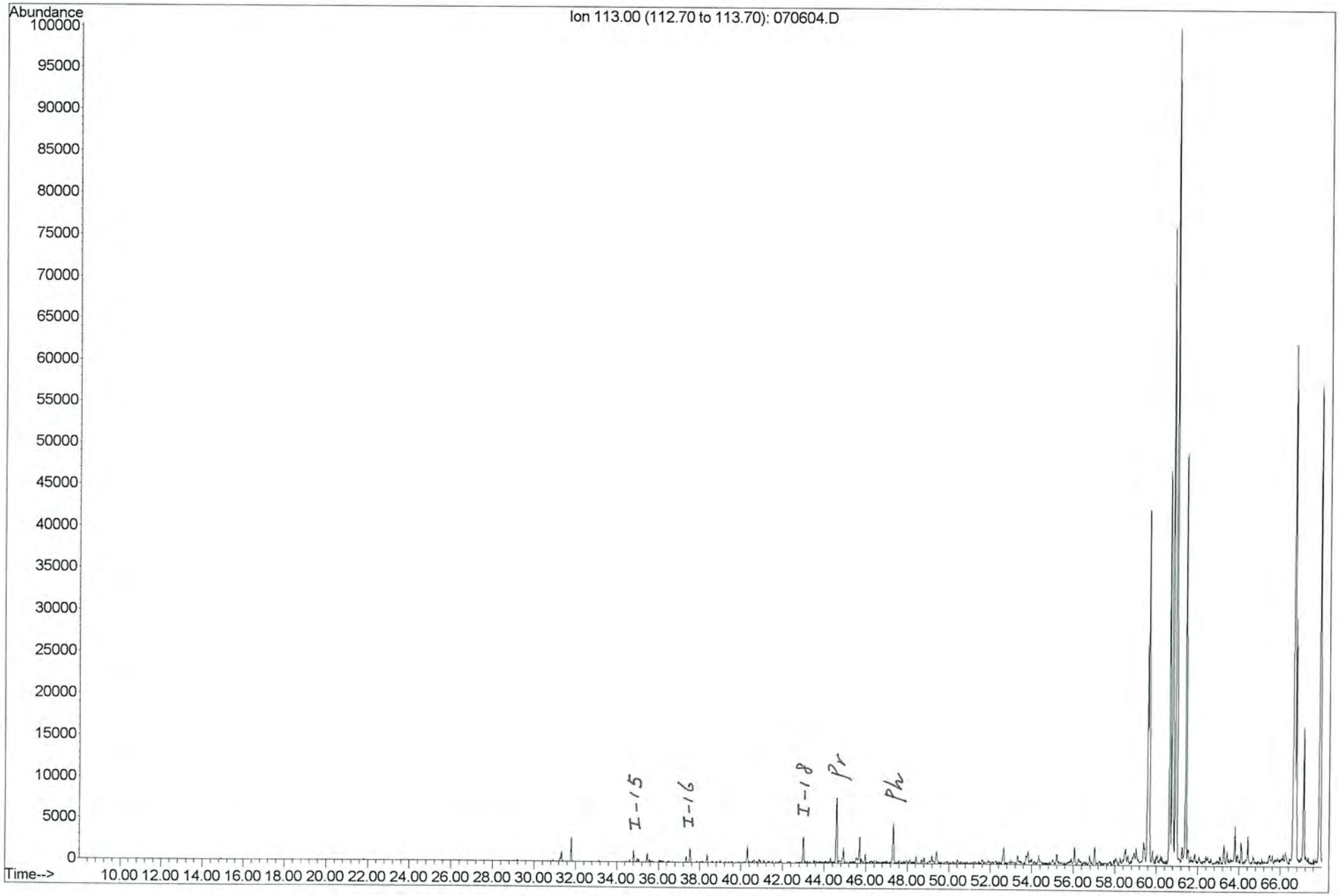


Table

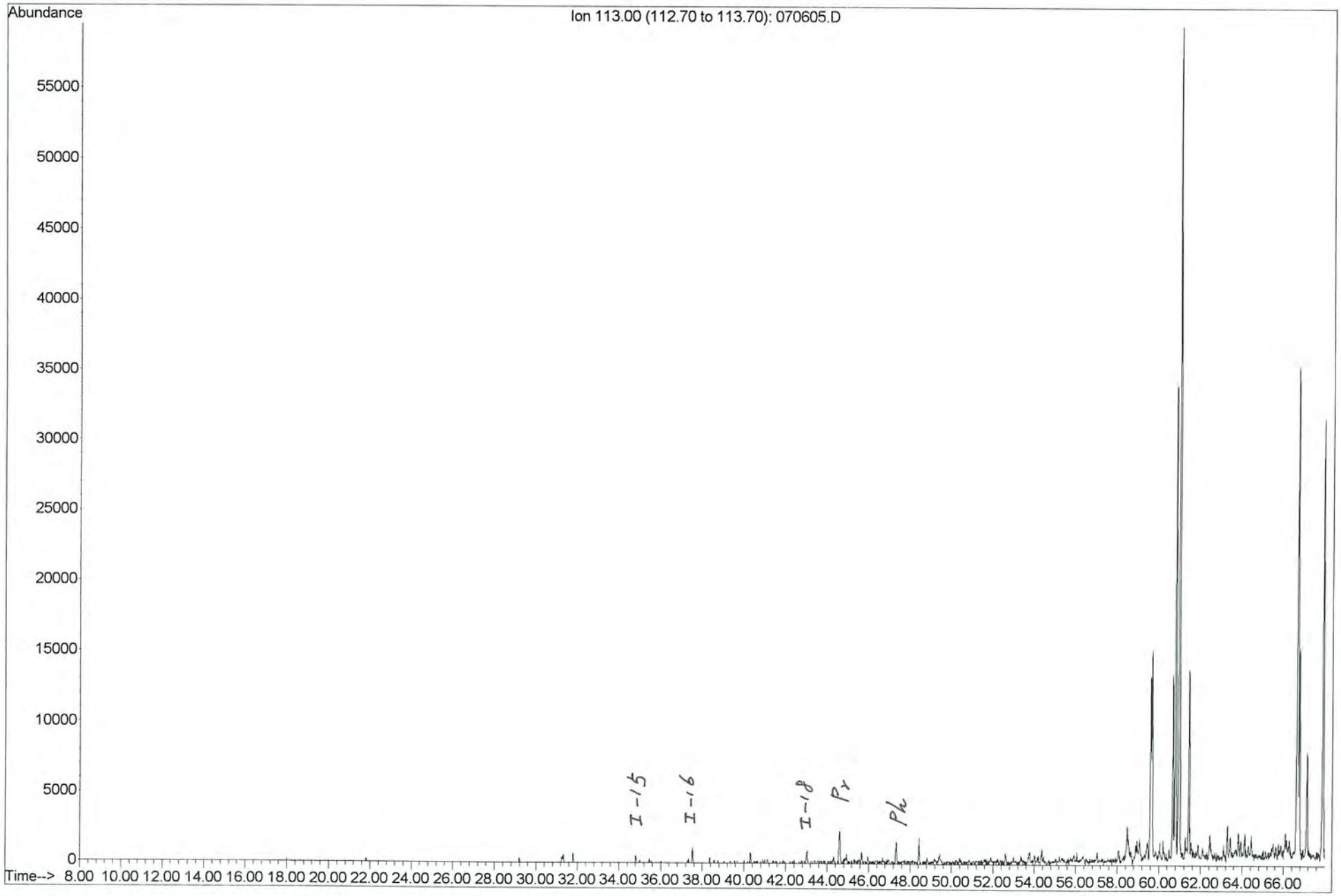
Key to Chromatogram Symbol Identification for m/z 85 and m/z 113 Paraffins and Isoparaffins

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 *n* indicates number of carbon atoms in the side chain)

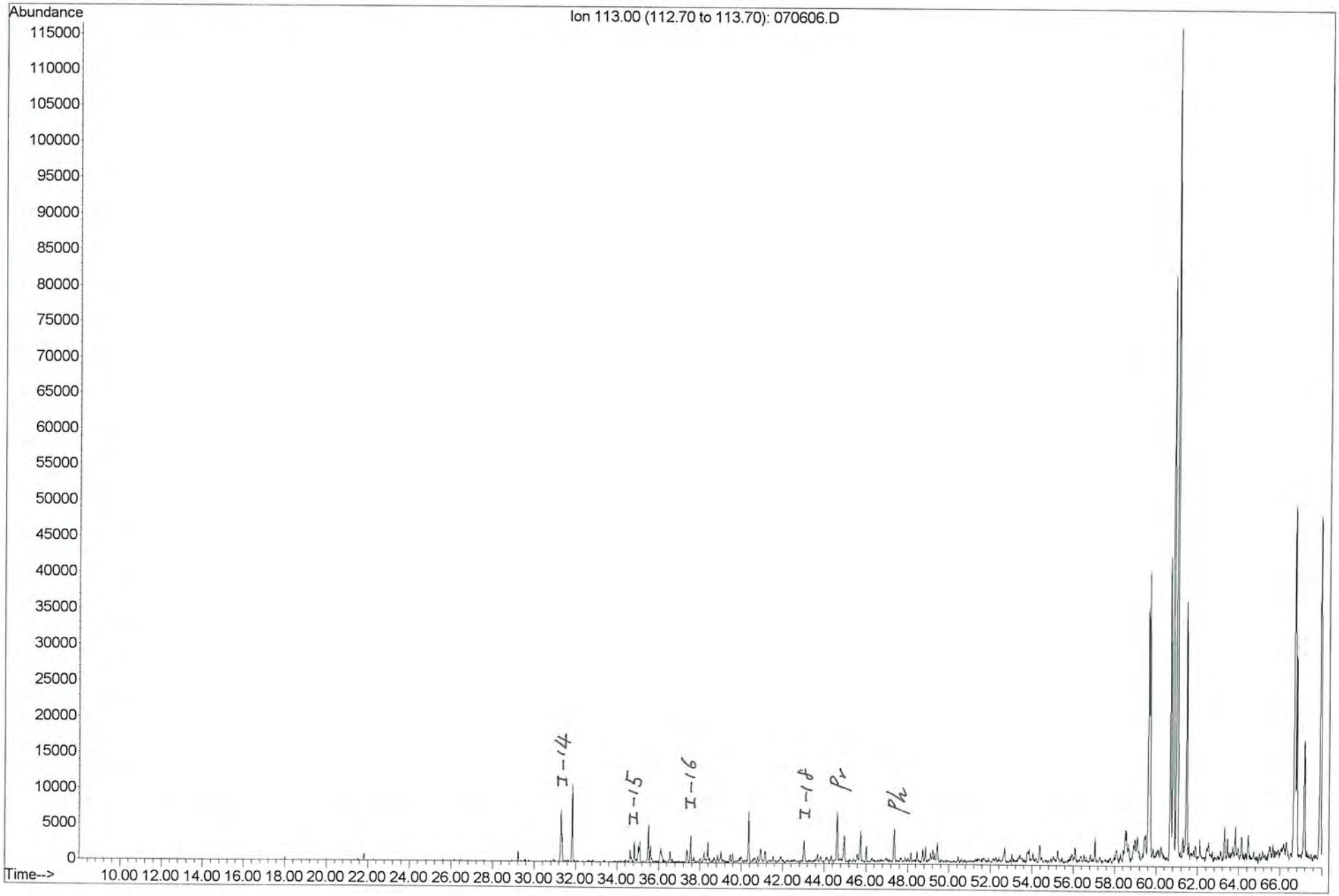
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



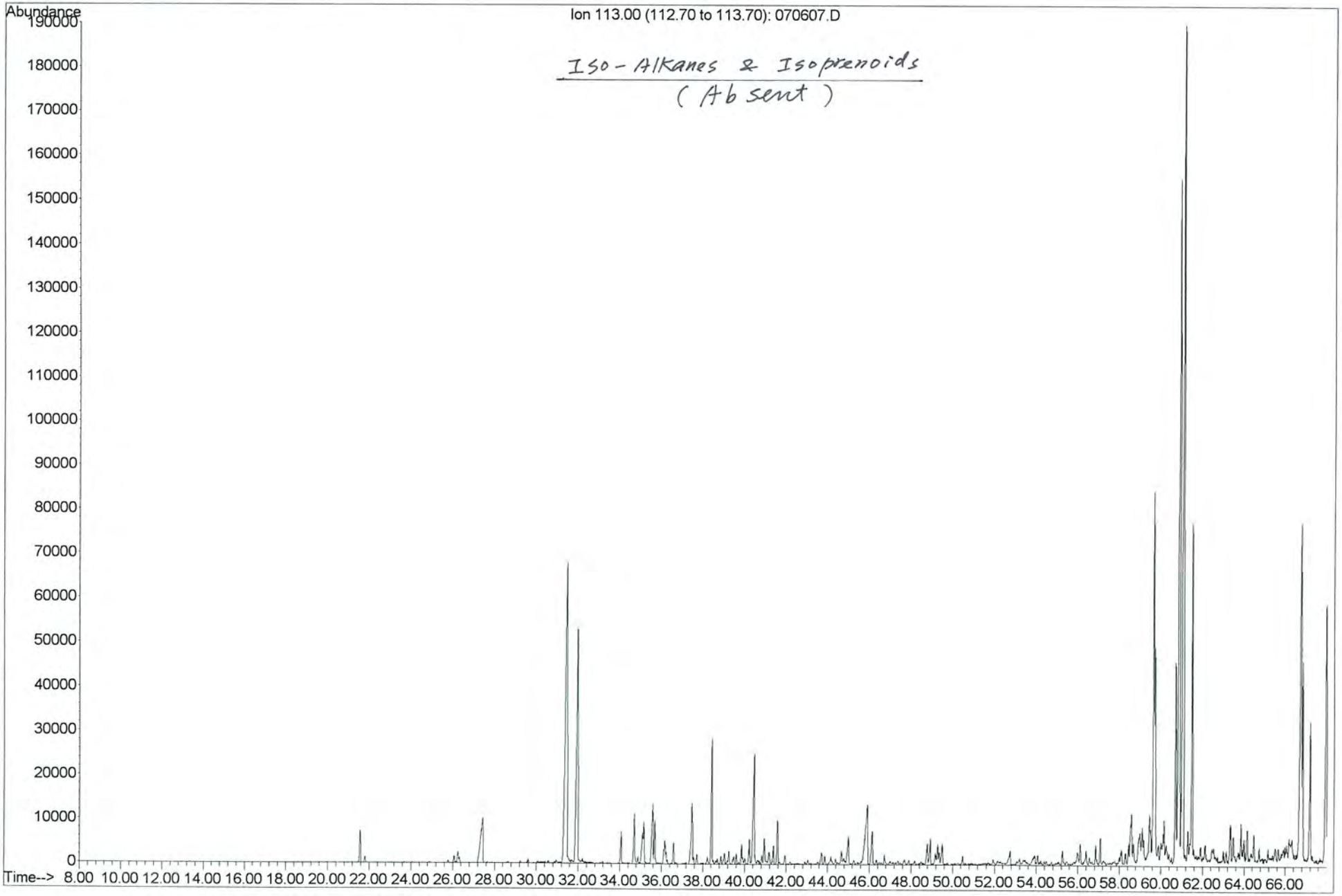
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



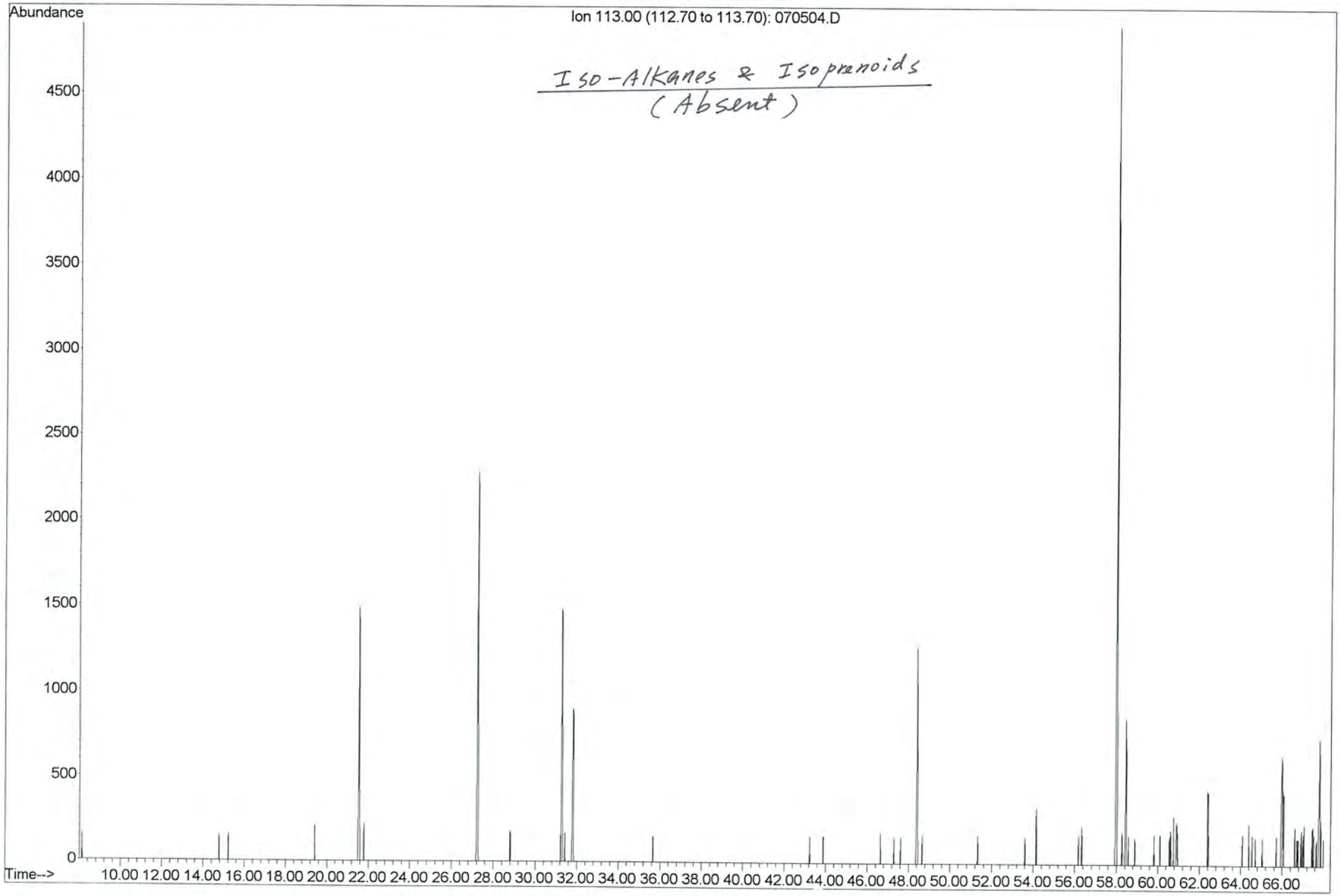
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



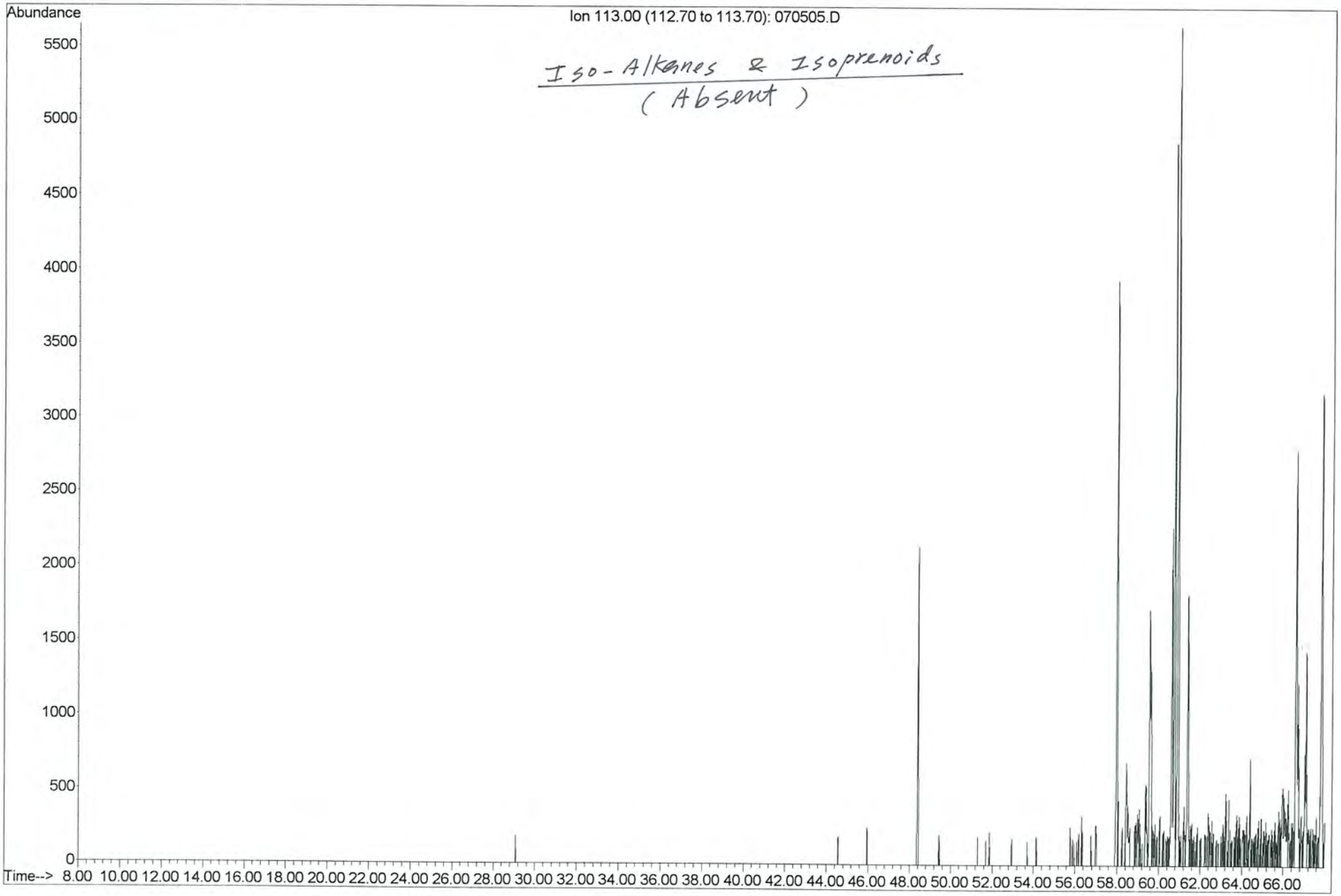
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



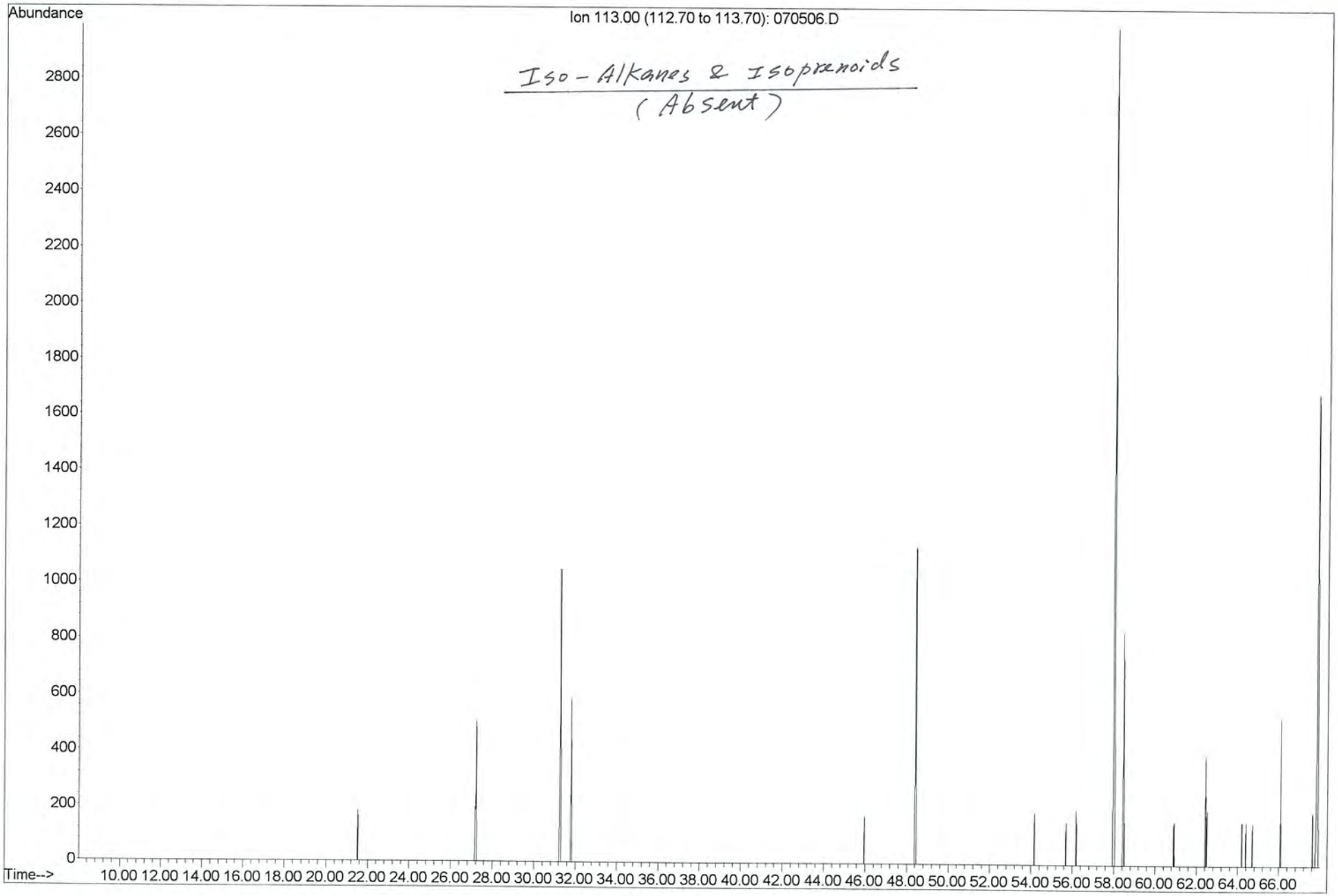
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



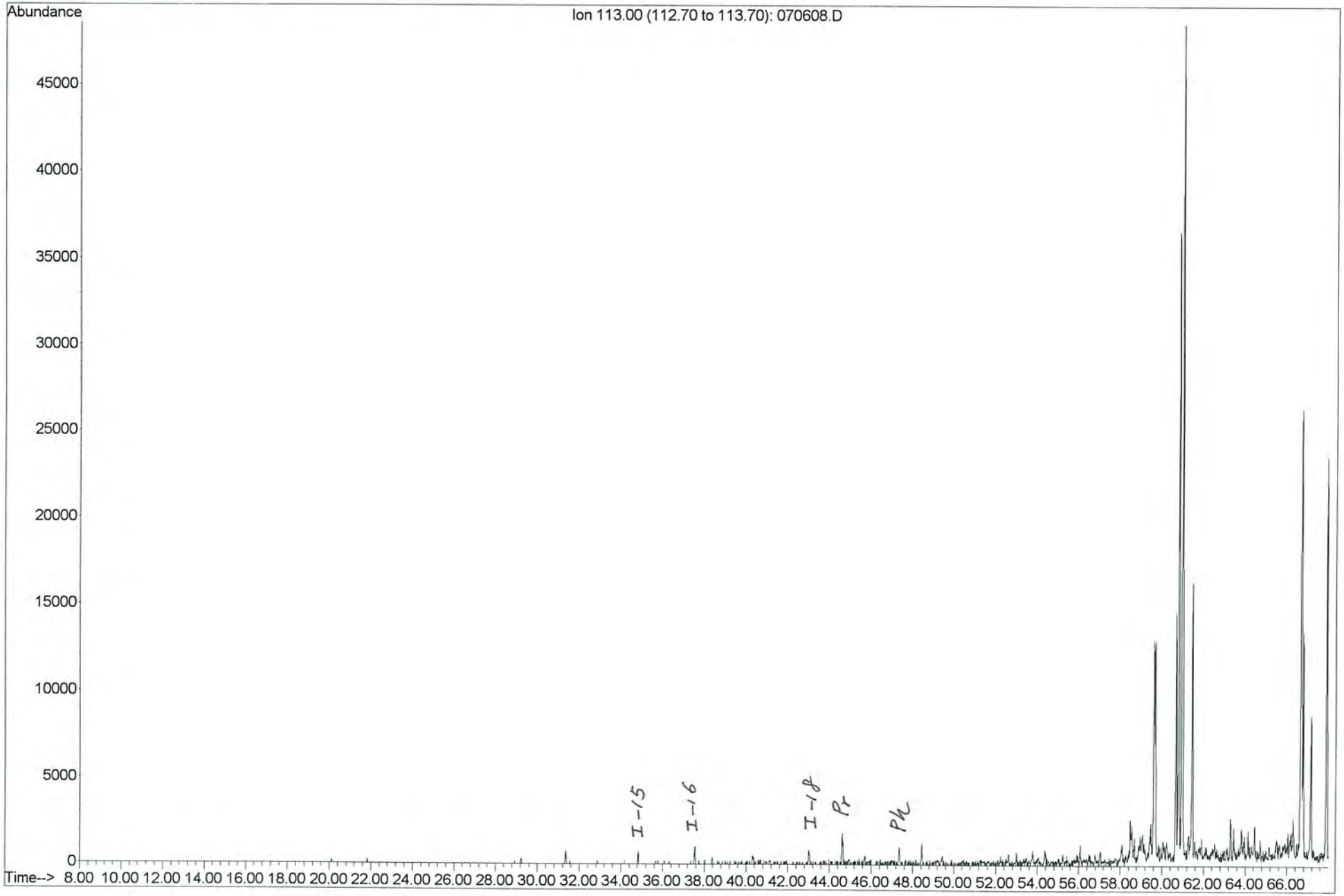
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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

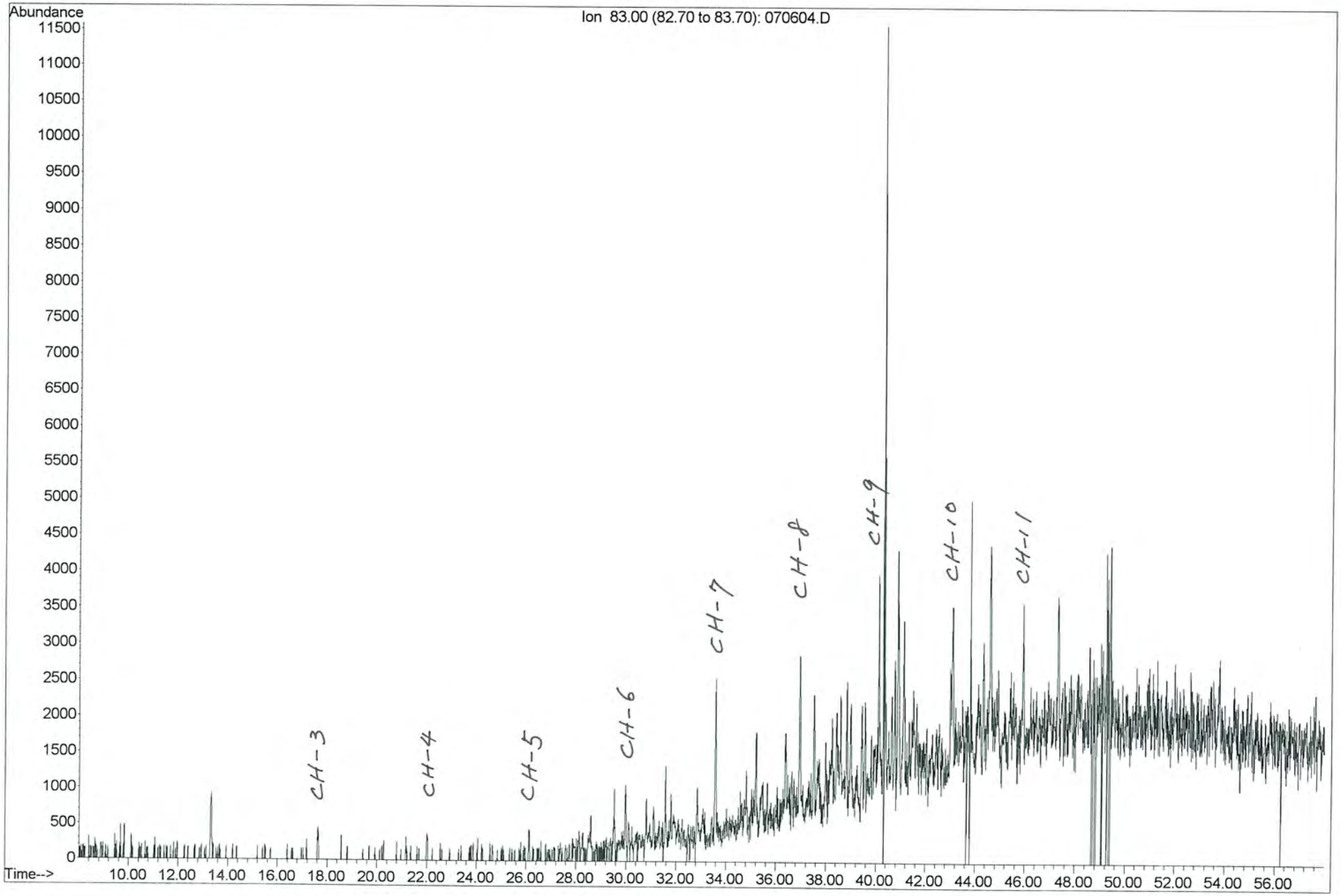


Table

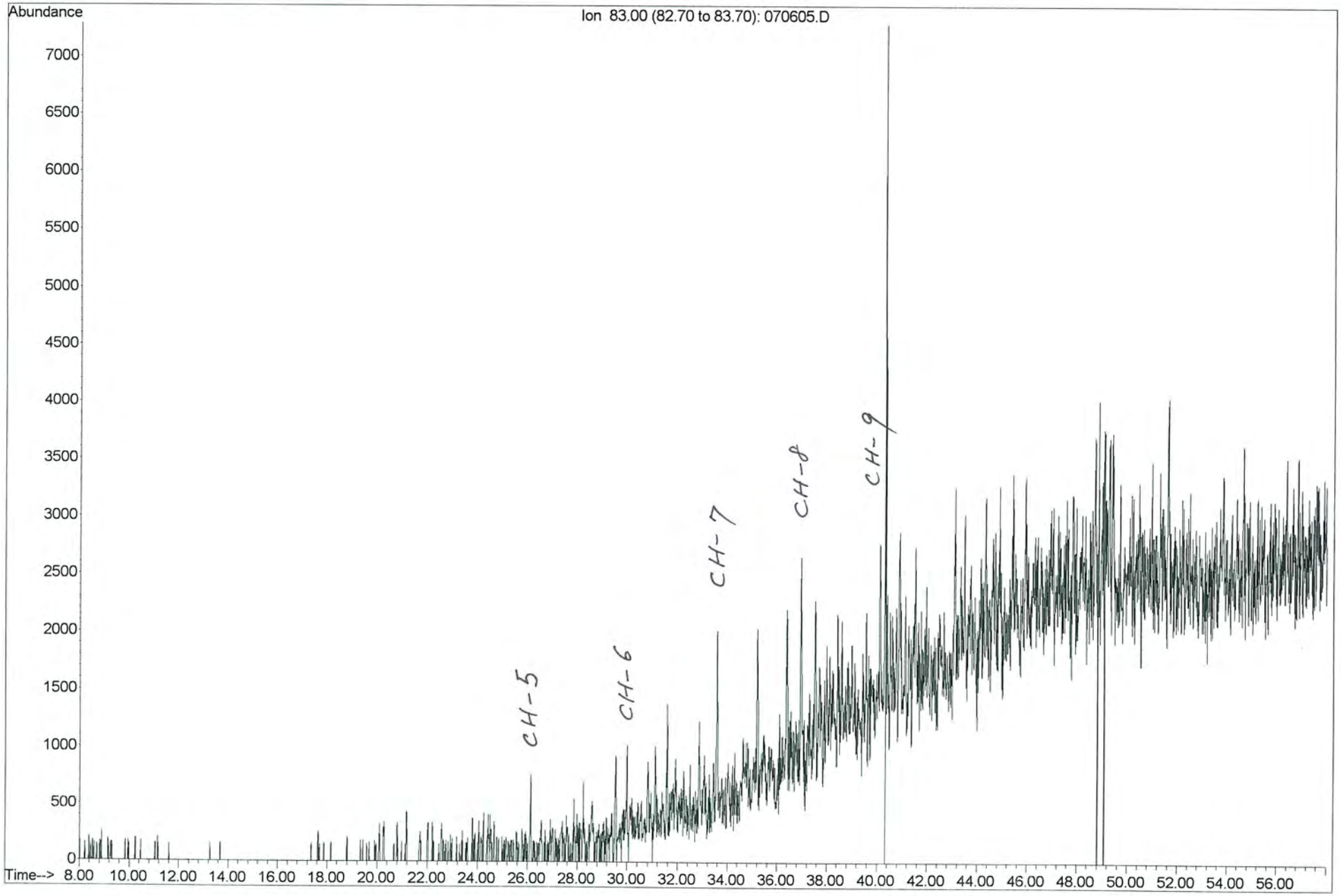
Key for Alkylcyclohexanes at m/z 83

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

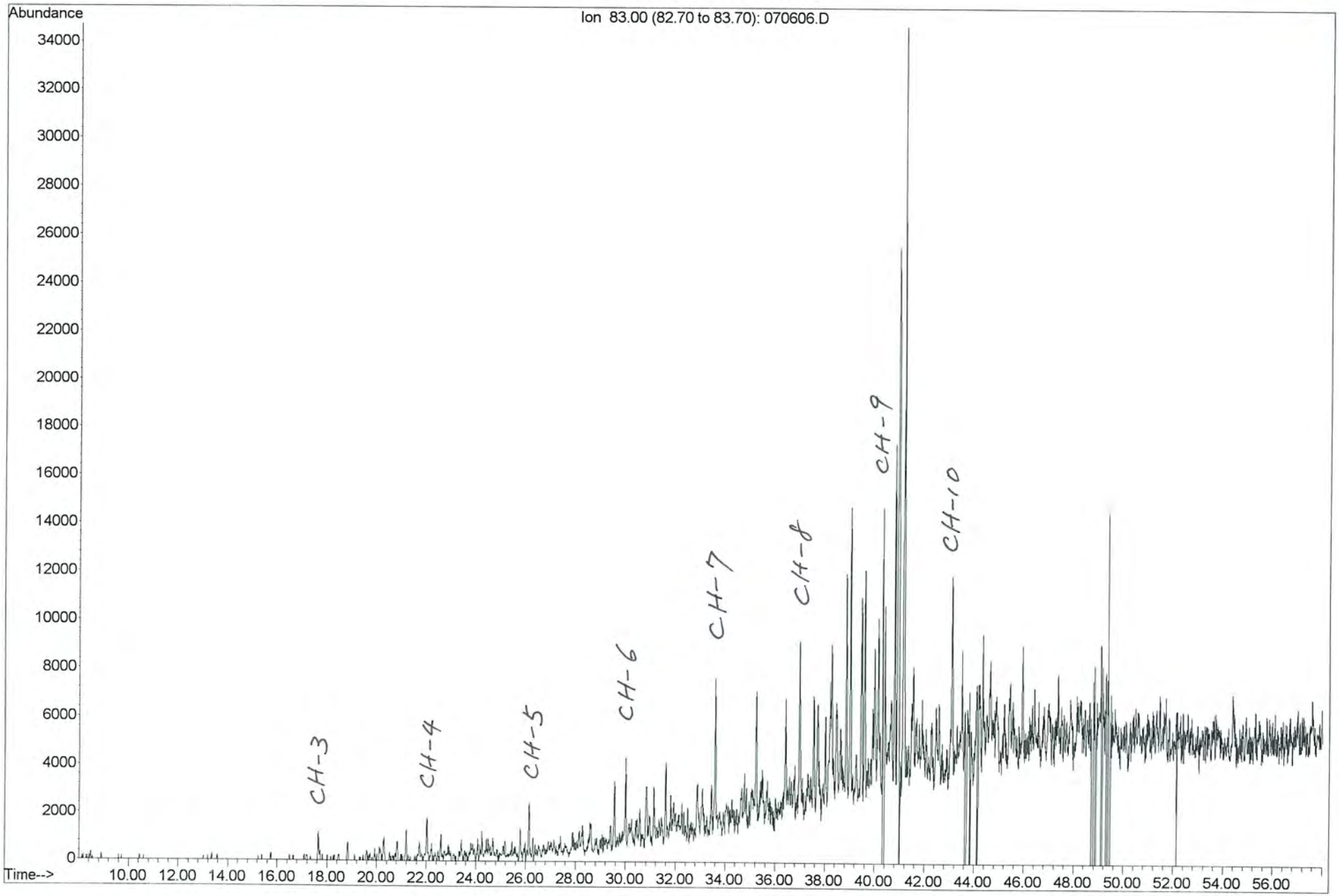
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



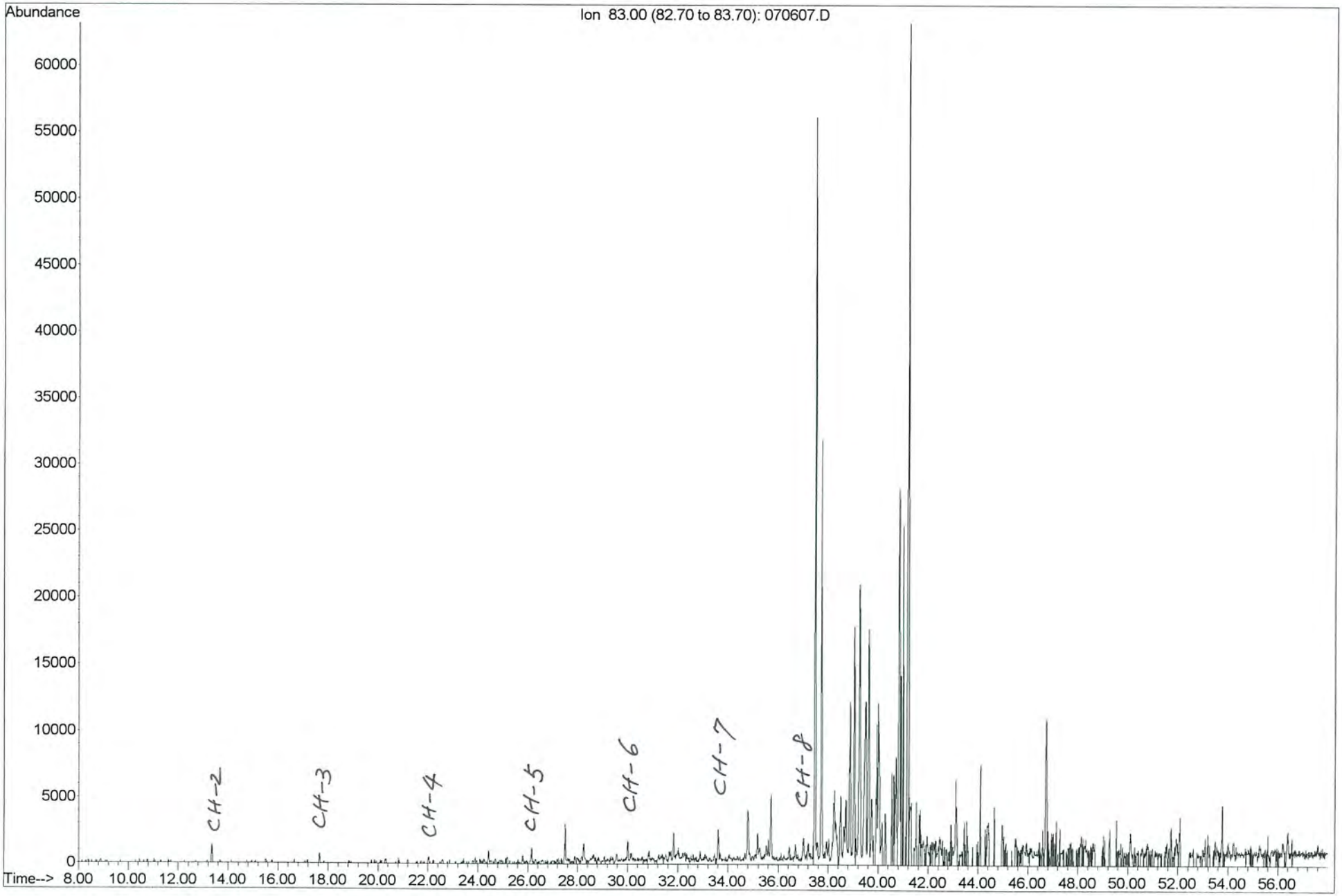
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



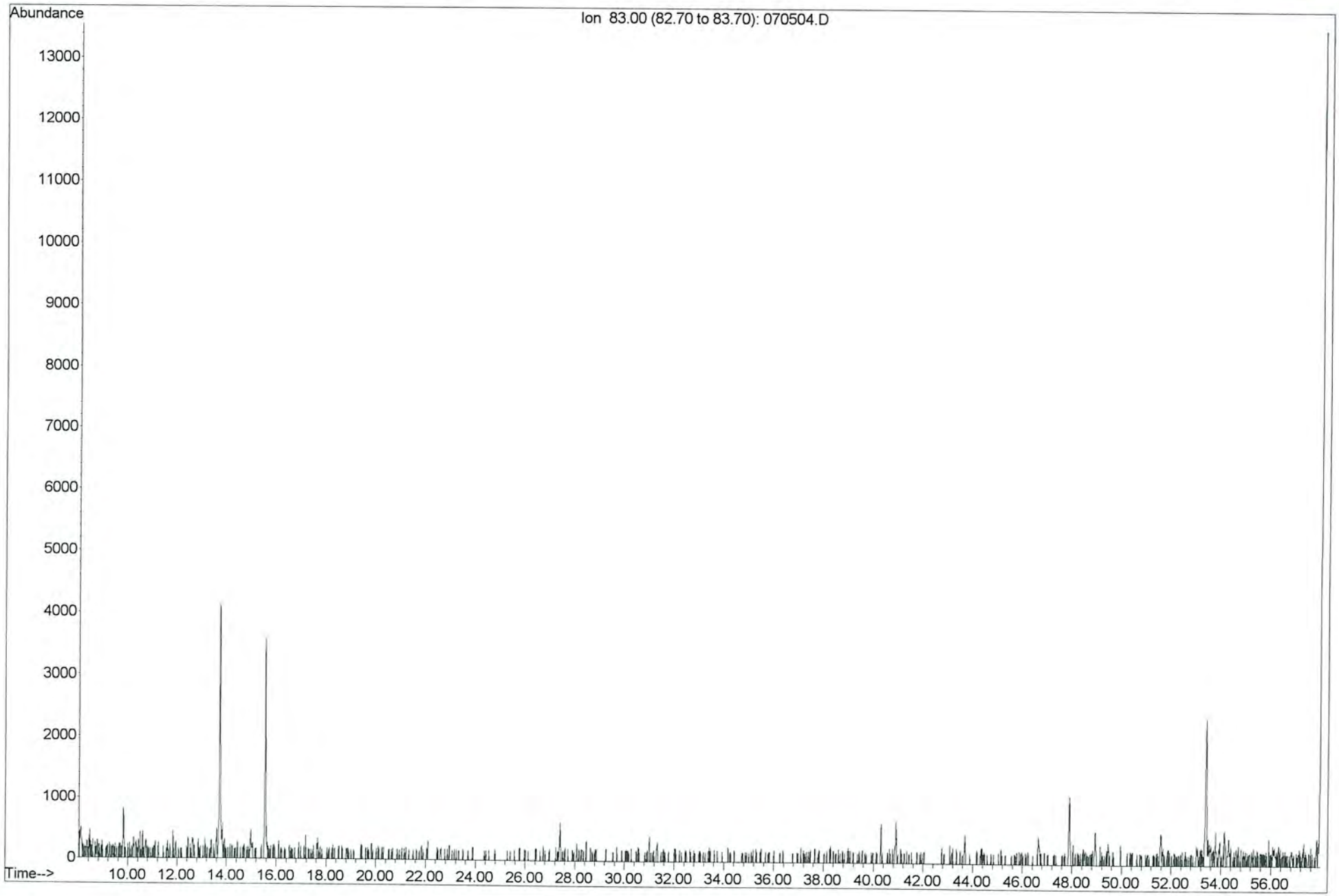
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



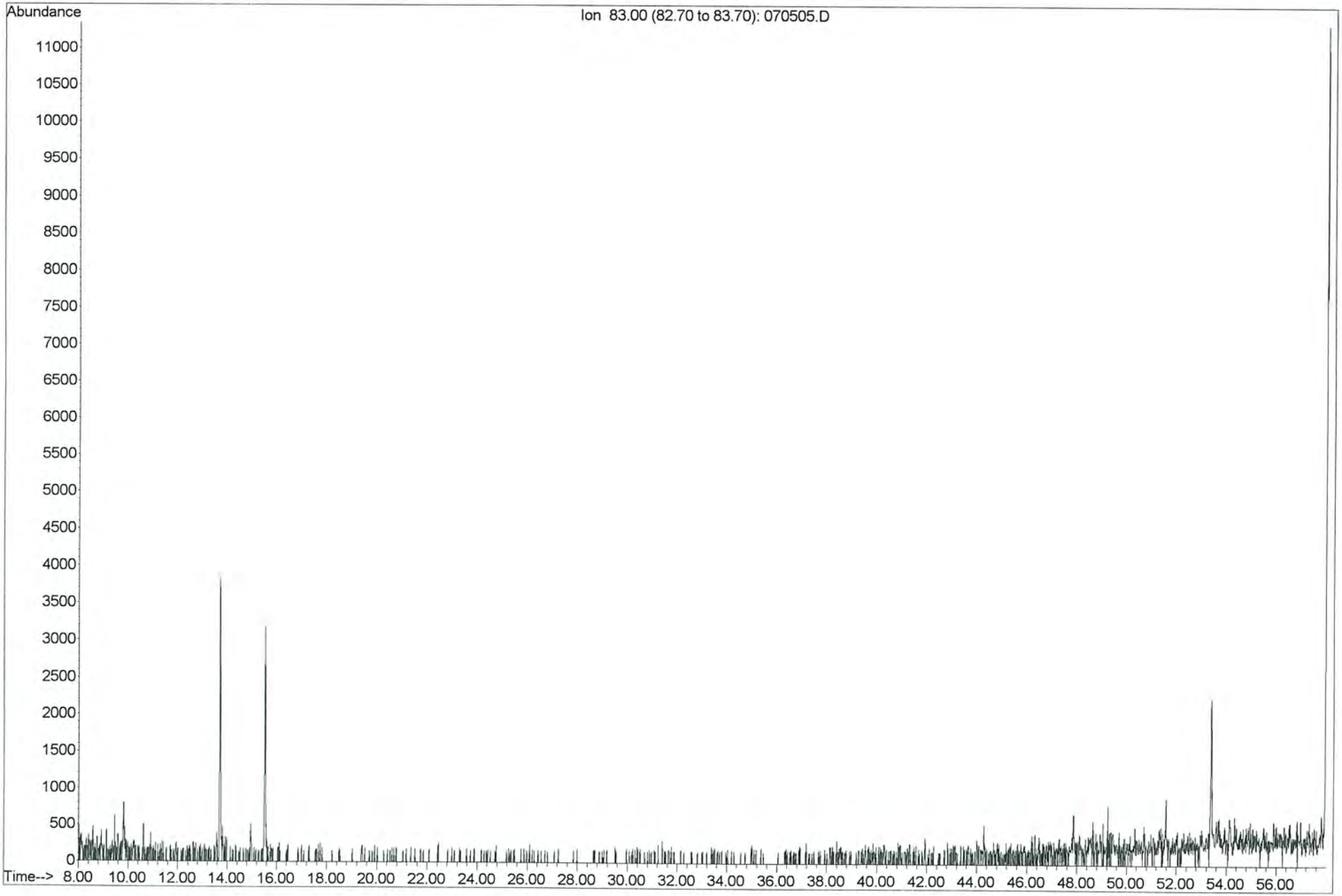
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



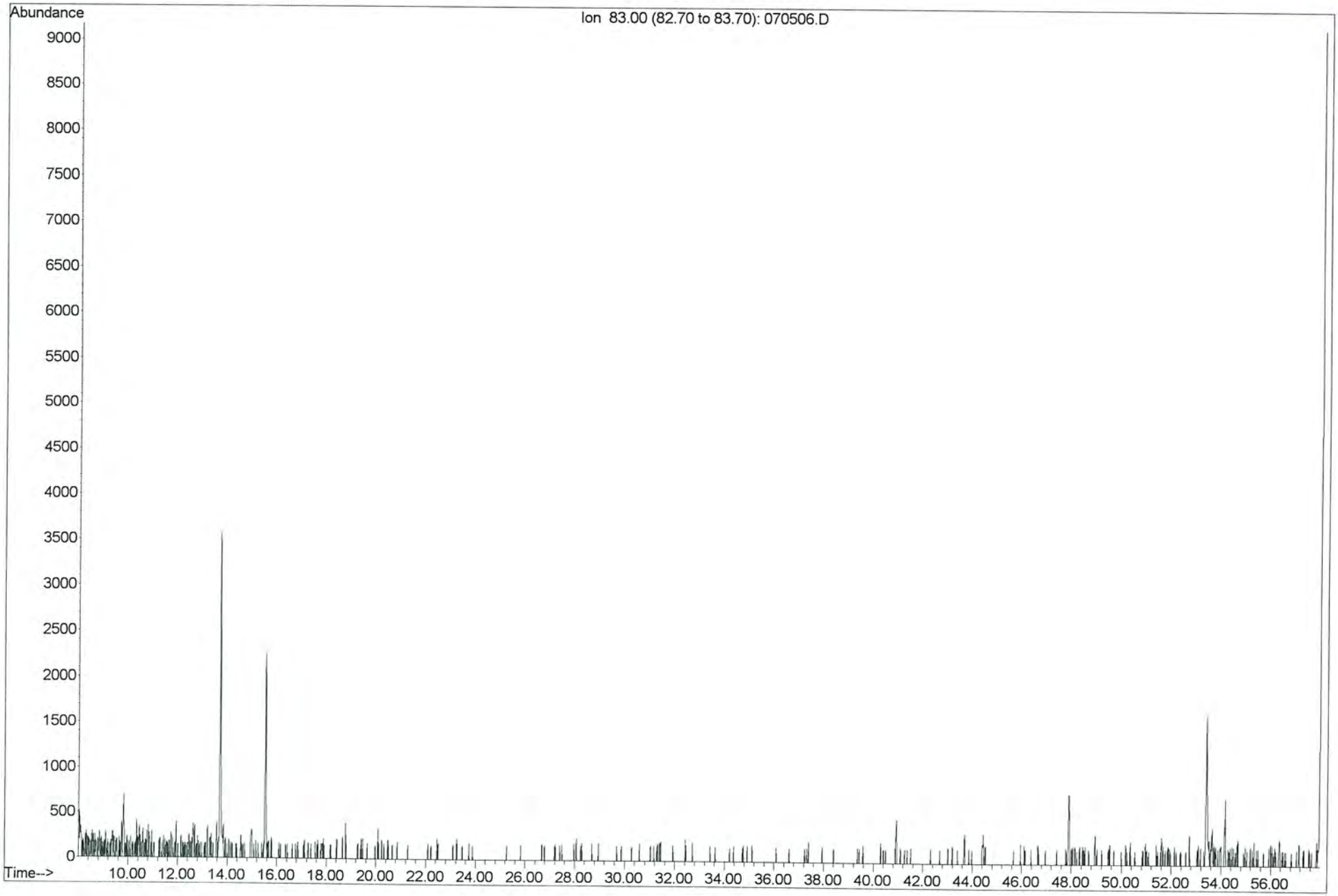
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



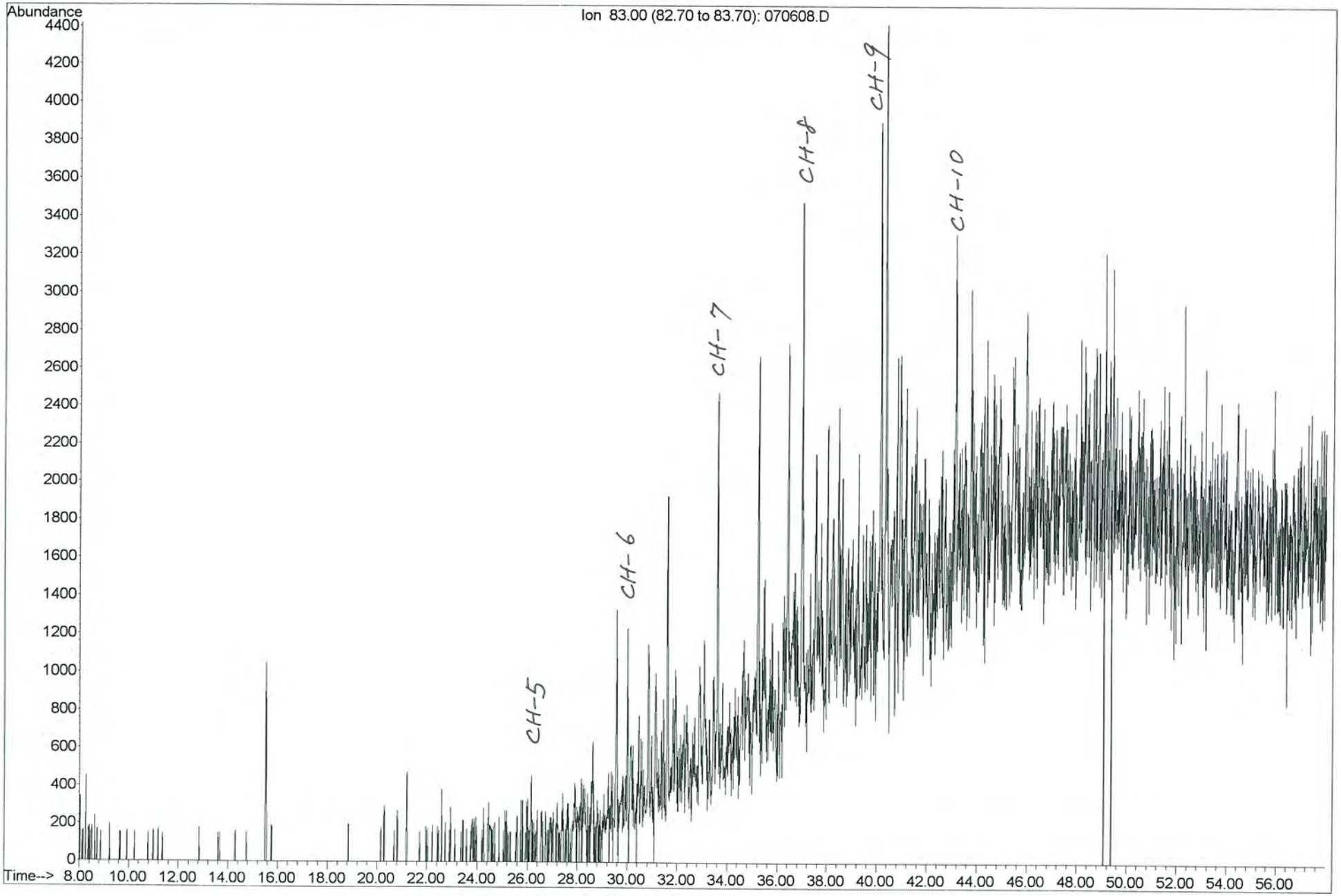
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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

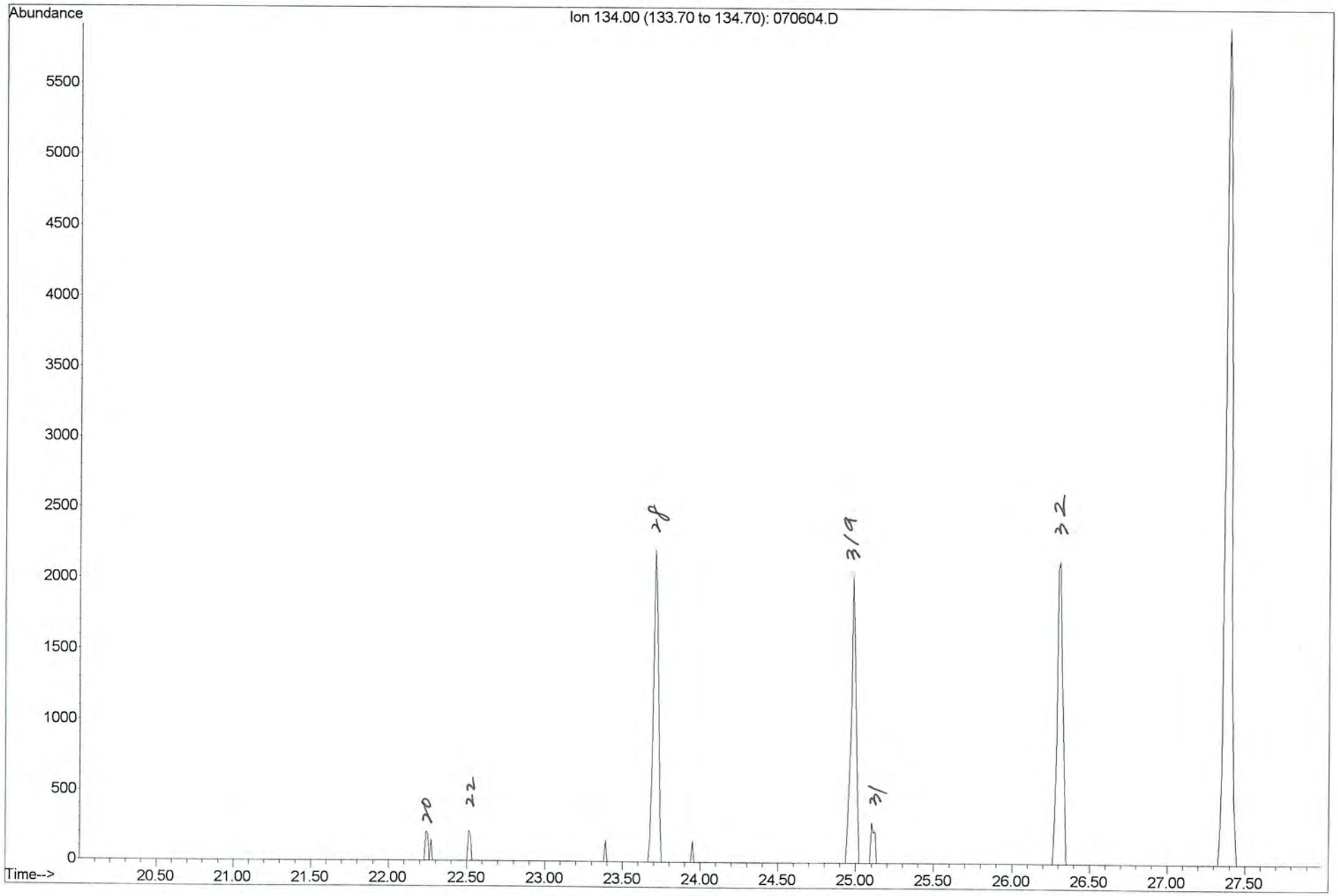


ZymaX FORENSICS

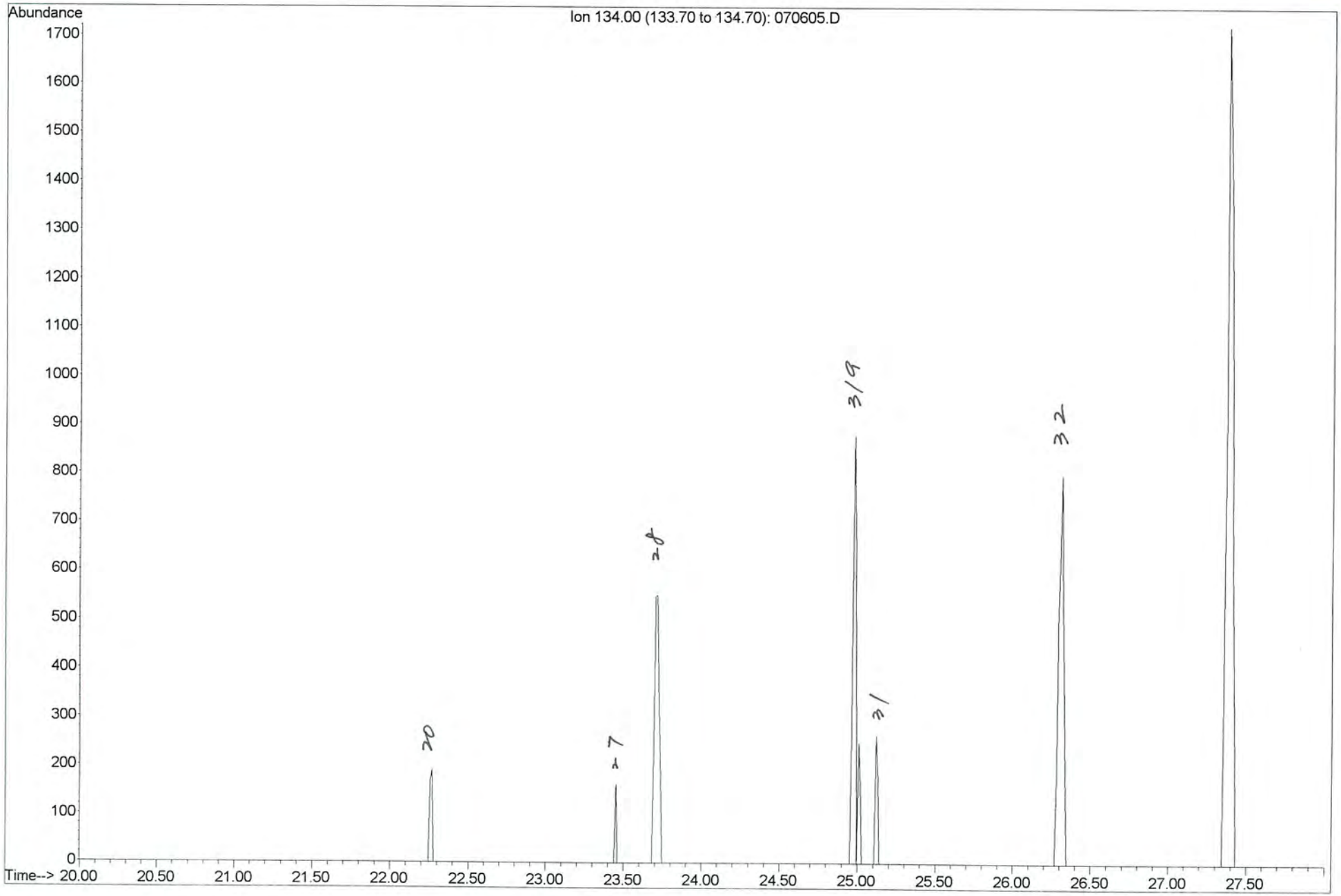
Key for C_4-Alkylbenzenes (m/z 134 mass chromatograms)

#	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

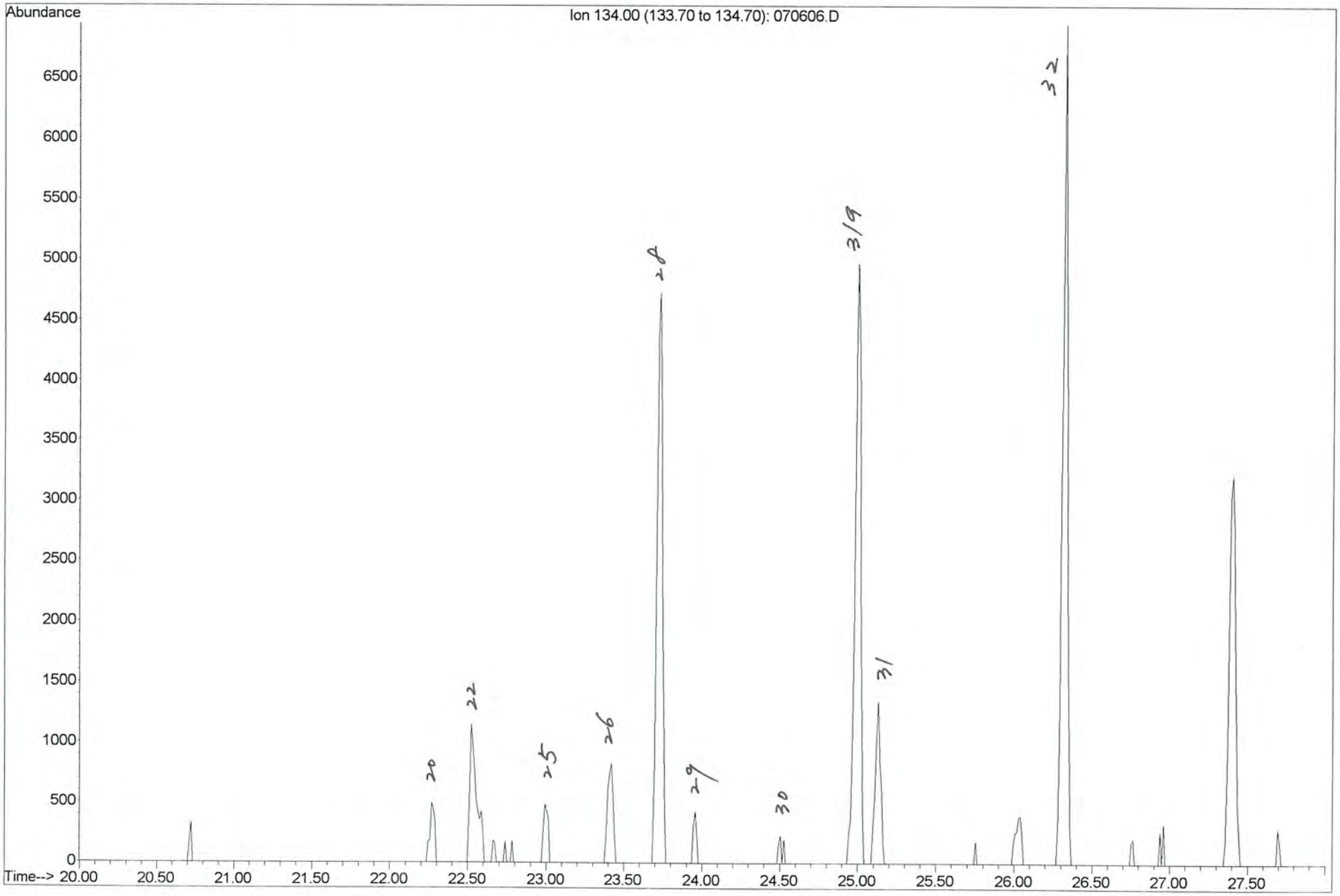
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



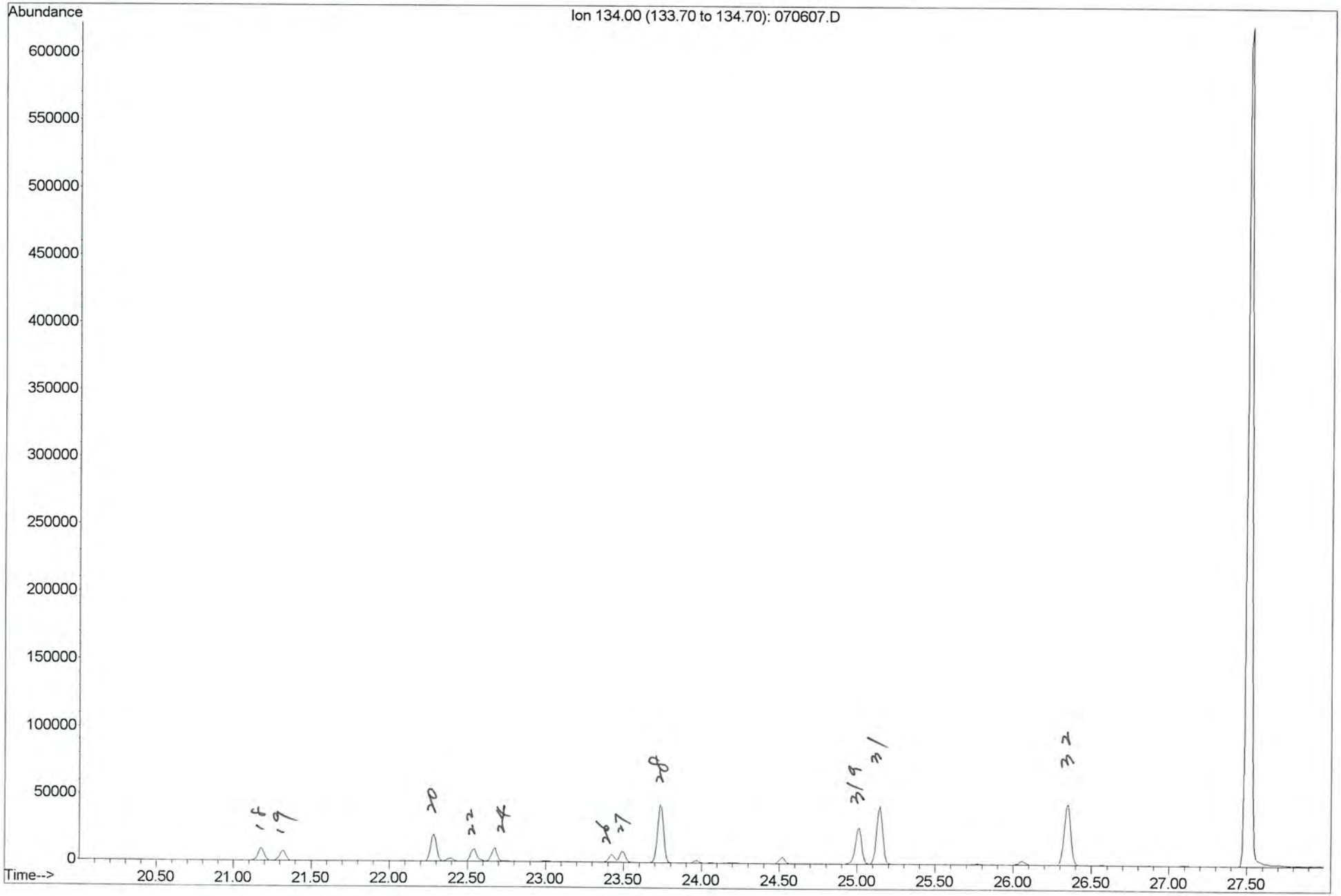
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



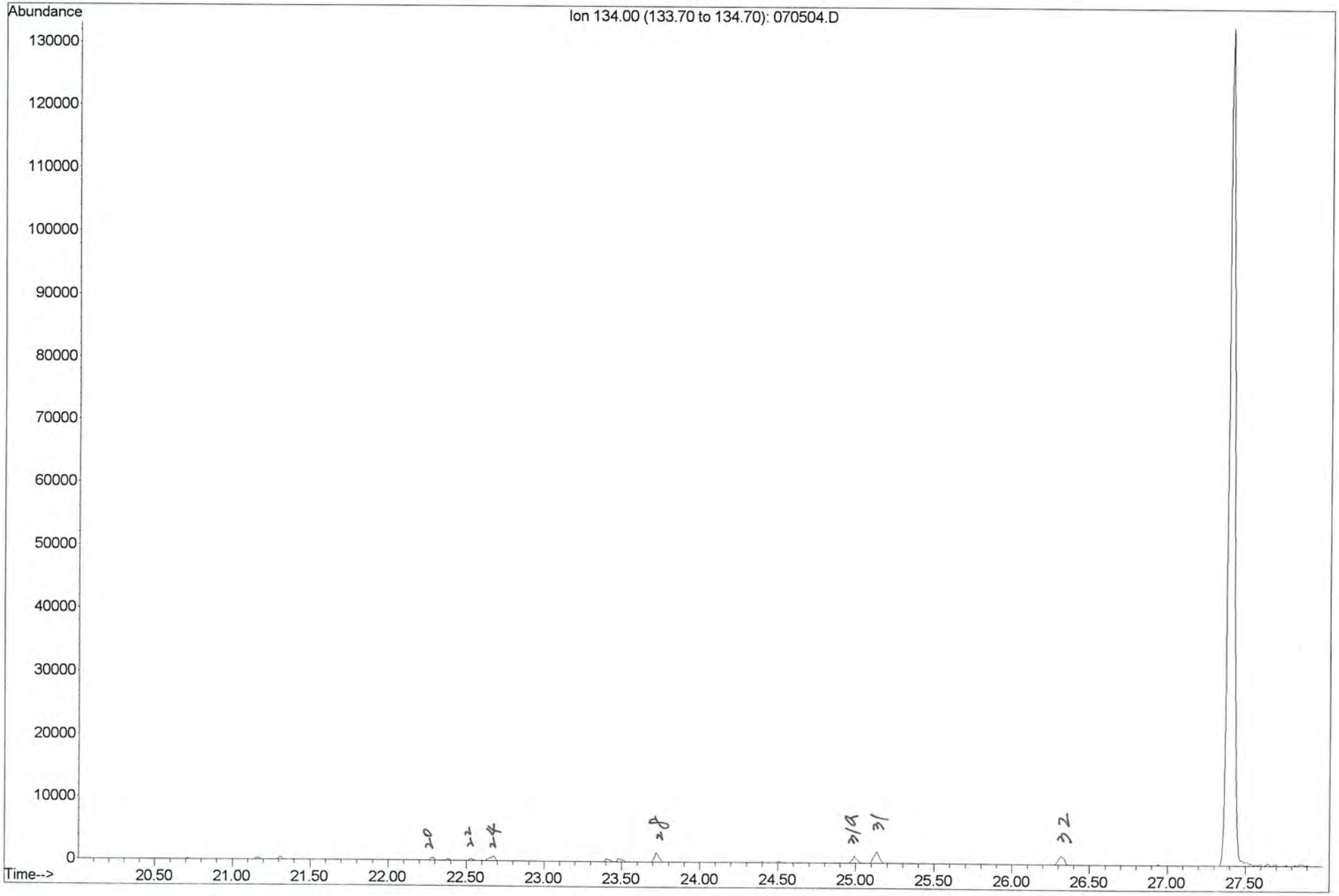
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



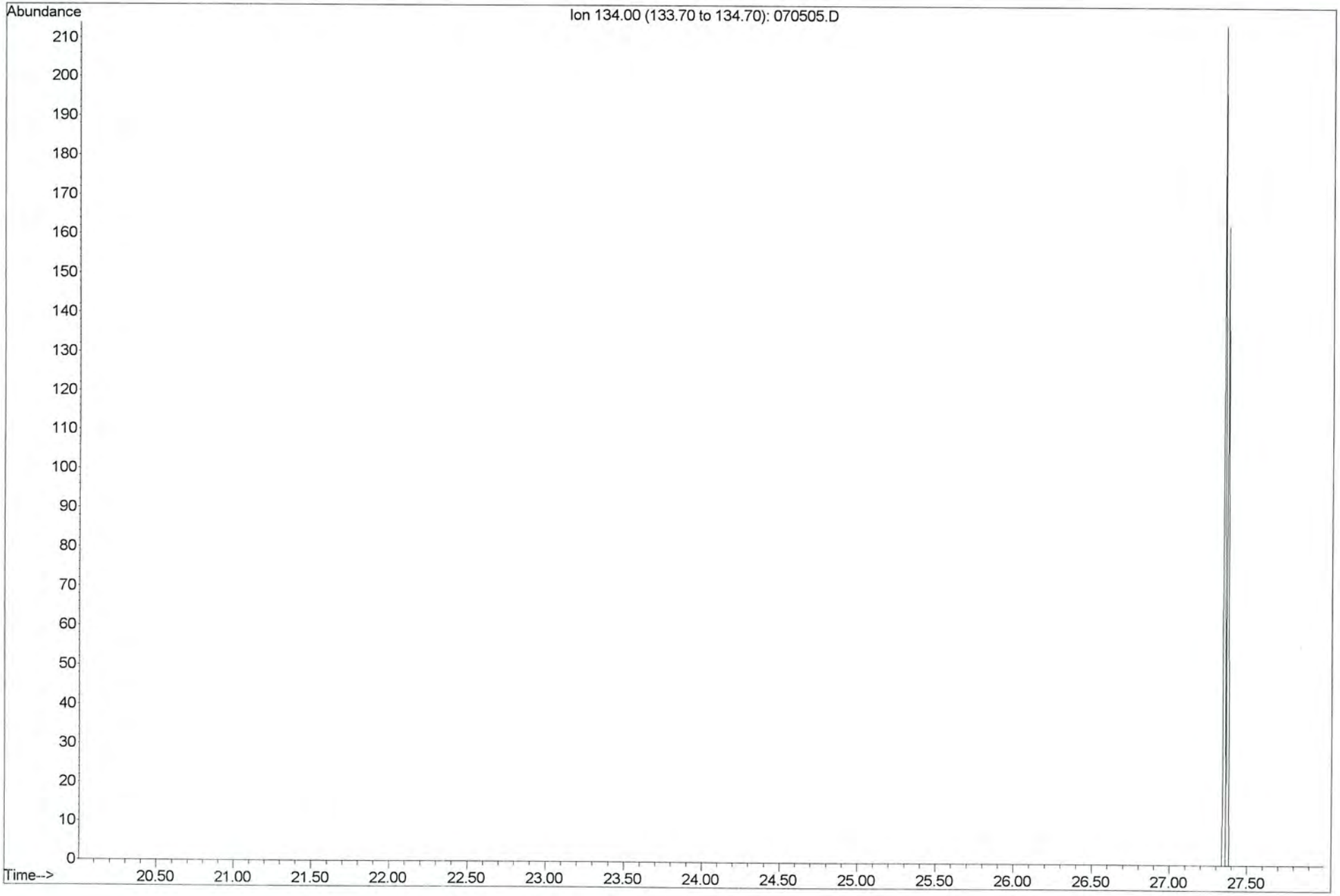
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



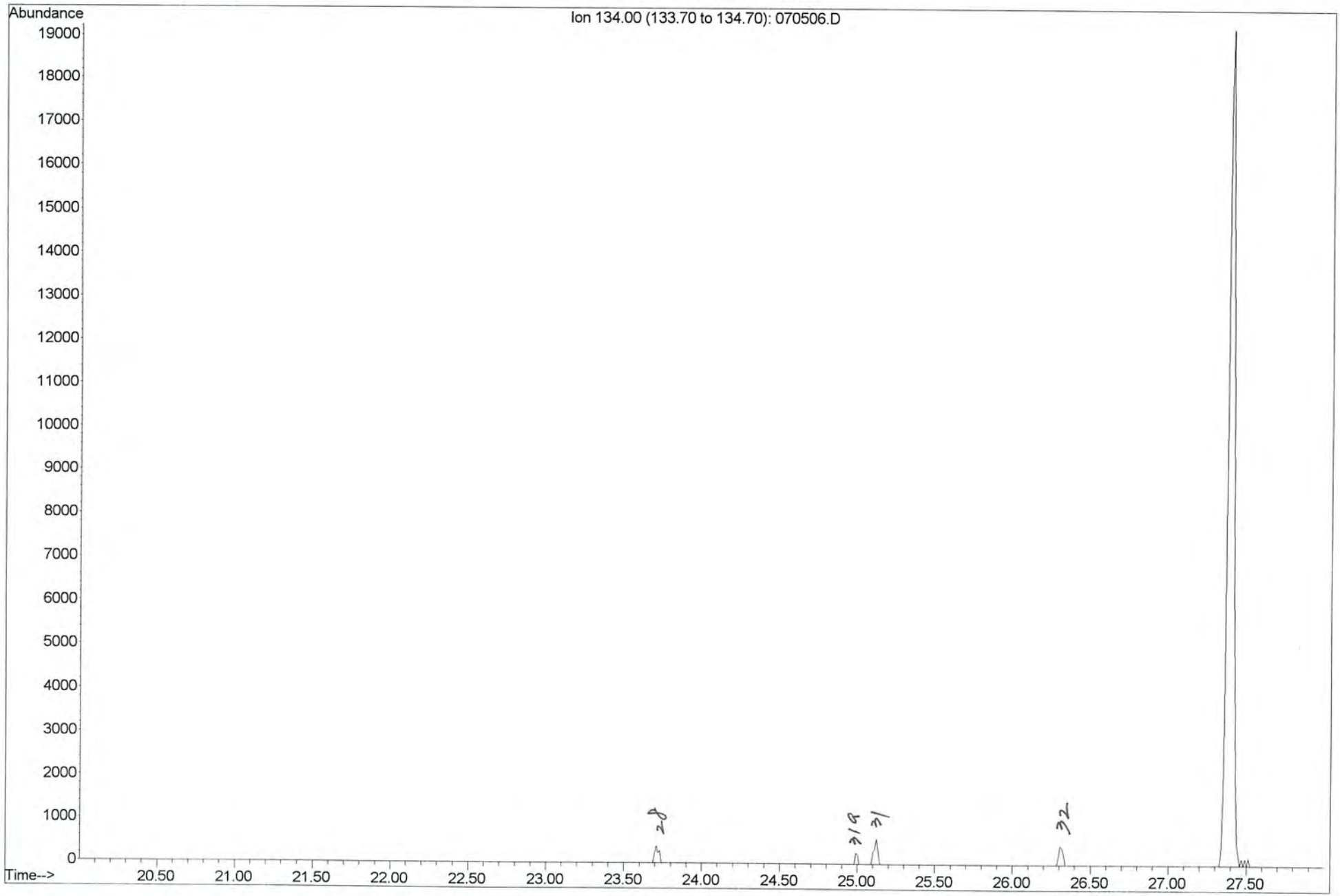
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider,Inc.



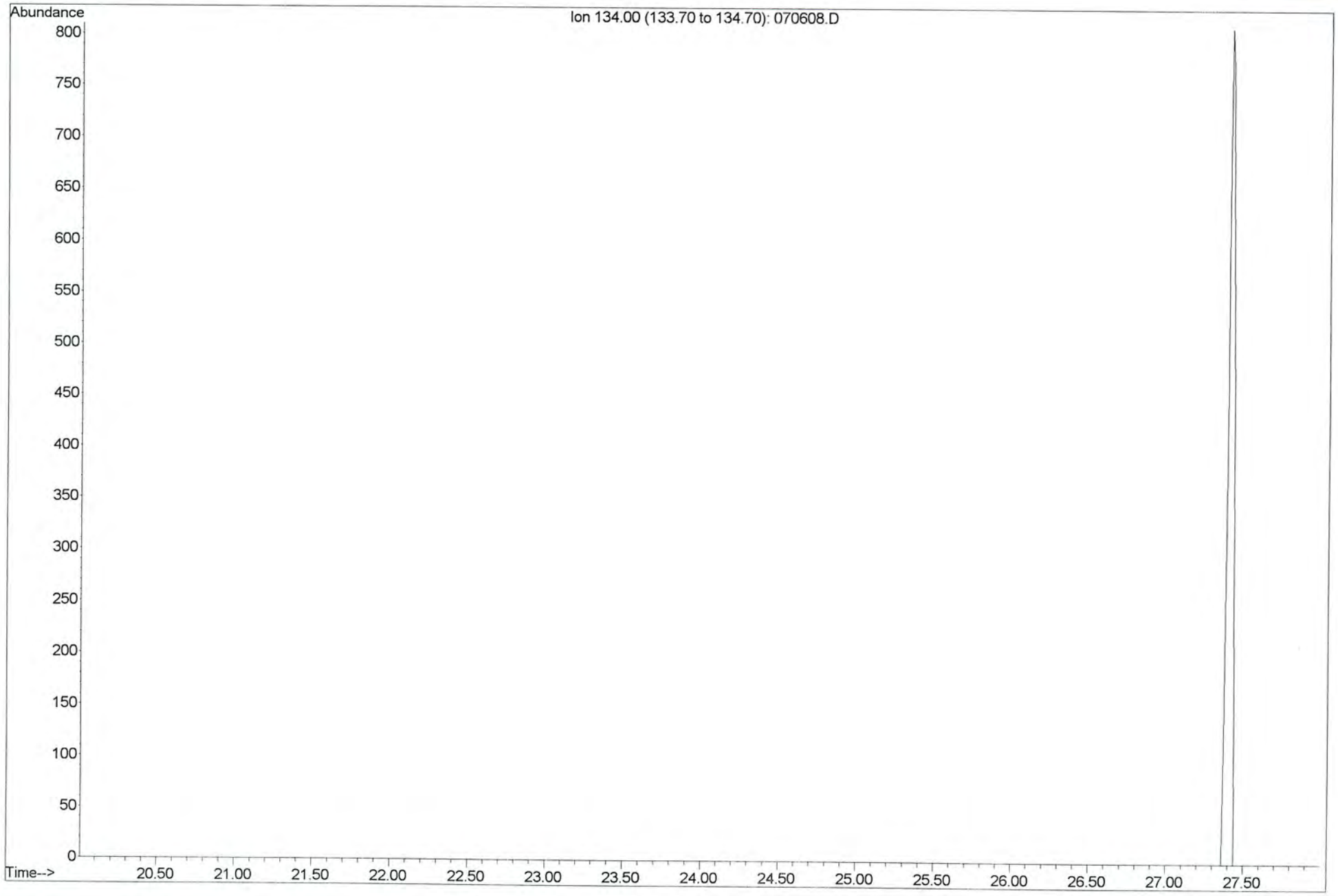
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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

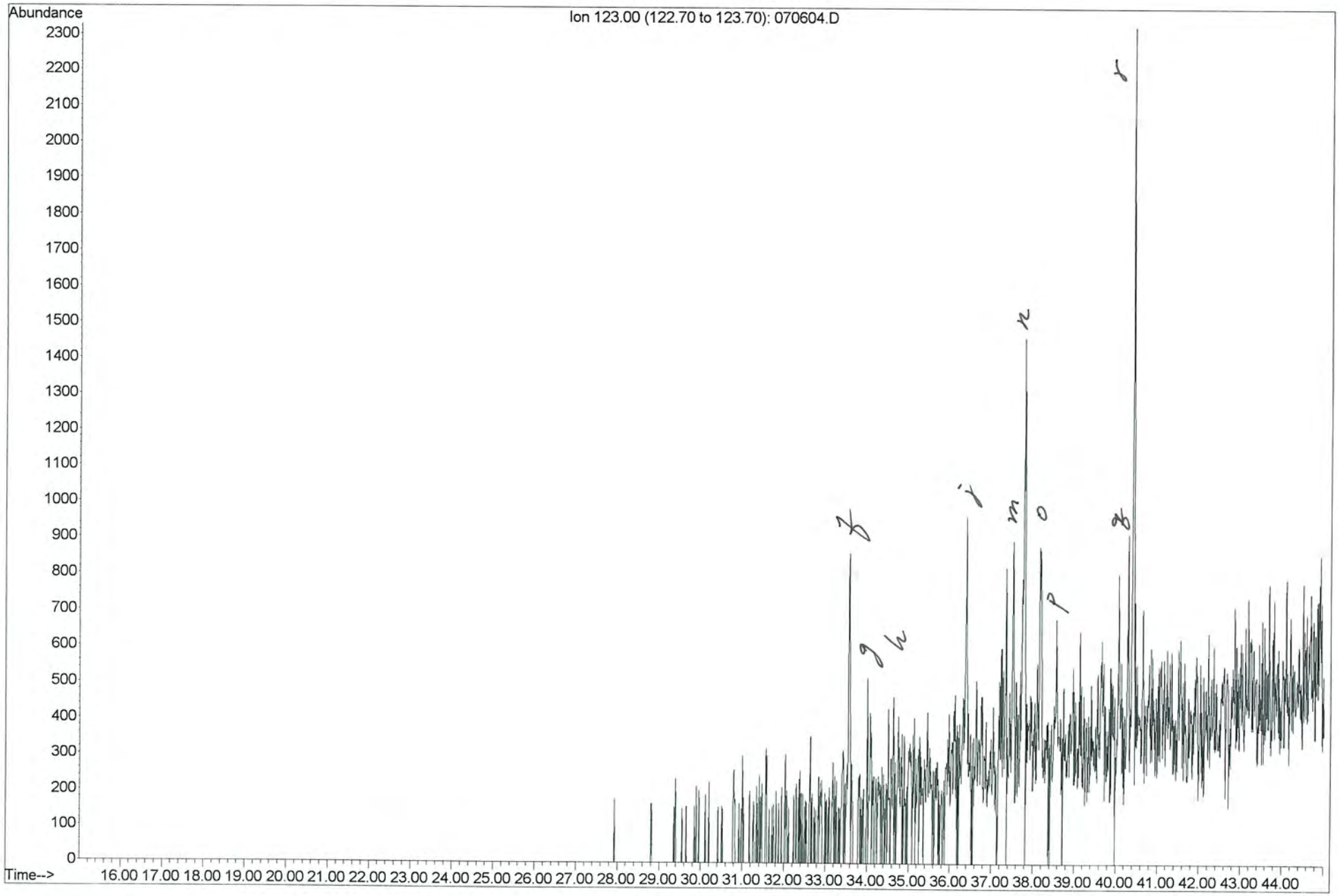


Table

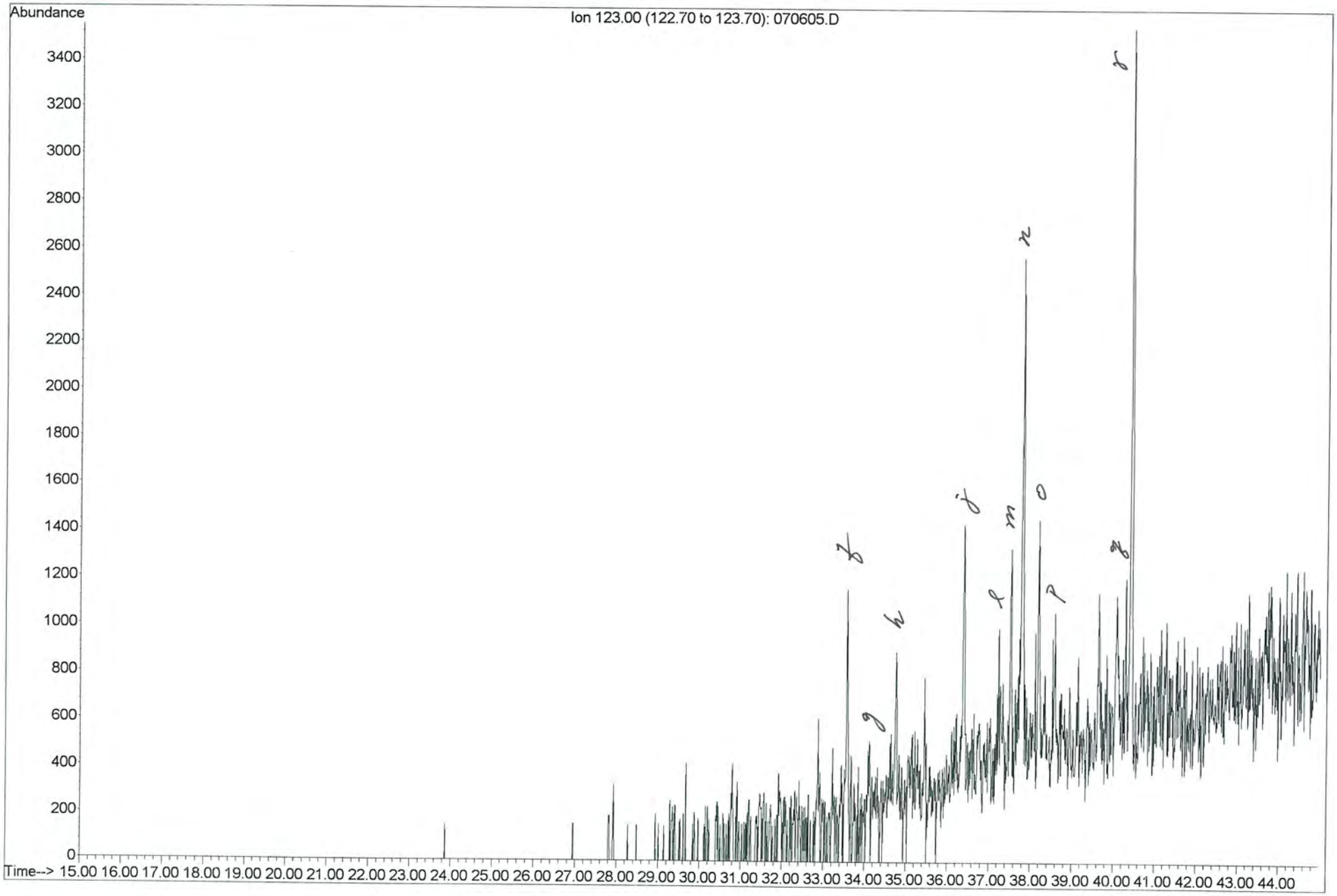
Key for identification of the Bicyclanes (m/z 123 mass chromatograms)

Peak No.	Identity	Formula	M.W.
a	2,2,3-Trimethylbicyloheptane	$C_{10}H_{18}$	138
b	C_{10} bicycloalkane	$C_{10}H_{18}$	138
c	3,3,7-Trimethylbicycloheptane	$C_{10}H_{18}$	138
d	C_{11} decalin	$C_{11}H_{20}$	152
f	Nordrimane	$C_{14}H_{26}$	194
g	Nordrimane	$C_{14}H_{26}$	194
h	Rearranged drimane	$C_{15}H_{28}$	208
j	Rearranged drimane	$C_{15}H_{28}$	208
k	Isomer of eudesmane	$C_{15}H_{28}$	208
l	4β(H) Eudesmane	$C_{15}H_{28}$	208
m	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
n	8β(H) Drimane	$C_{15}H_{28}$	208
o	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
p	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
q	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
r	8β(H) Homodrimane	$C_{16}H_{30}$	222

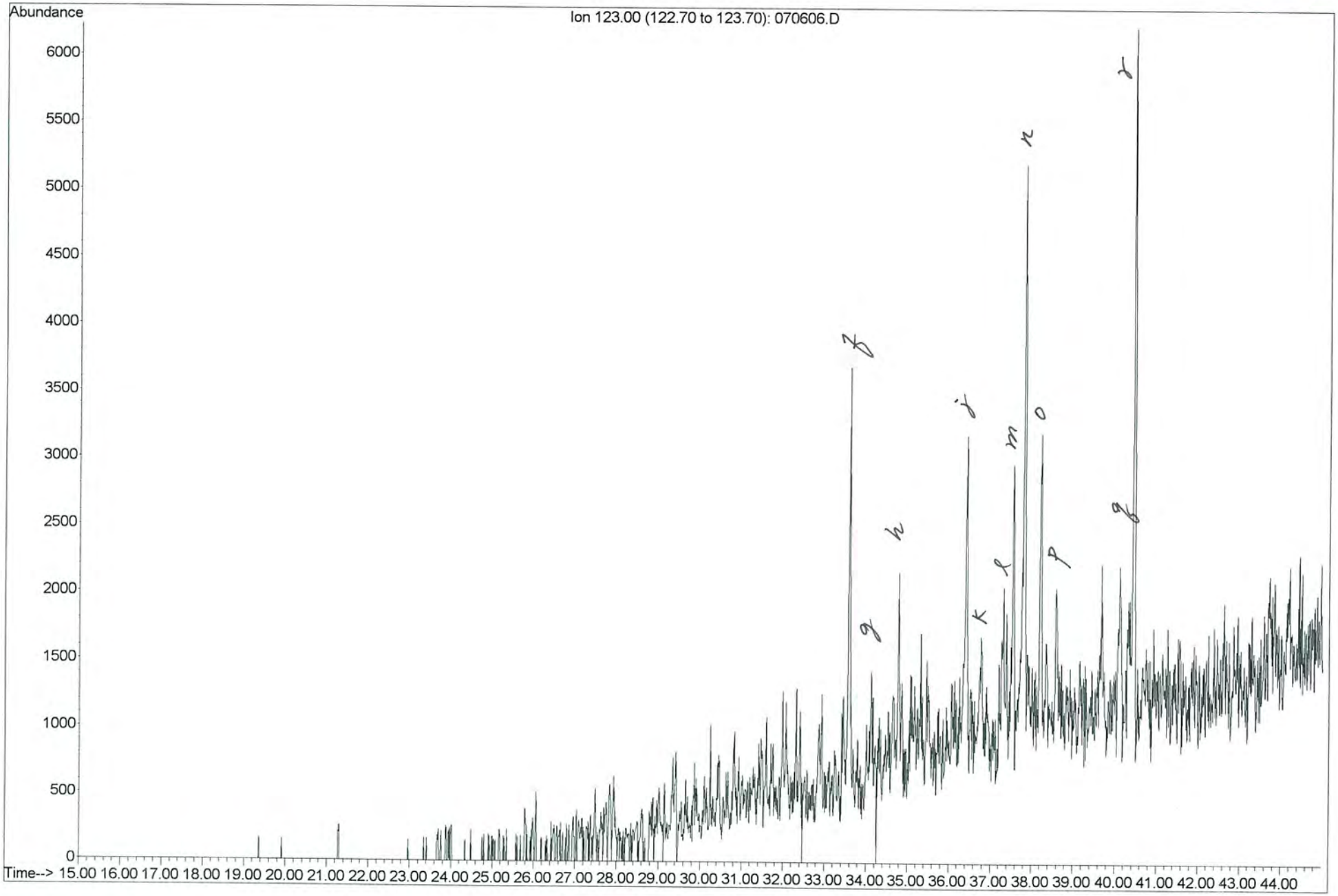
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



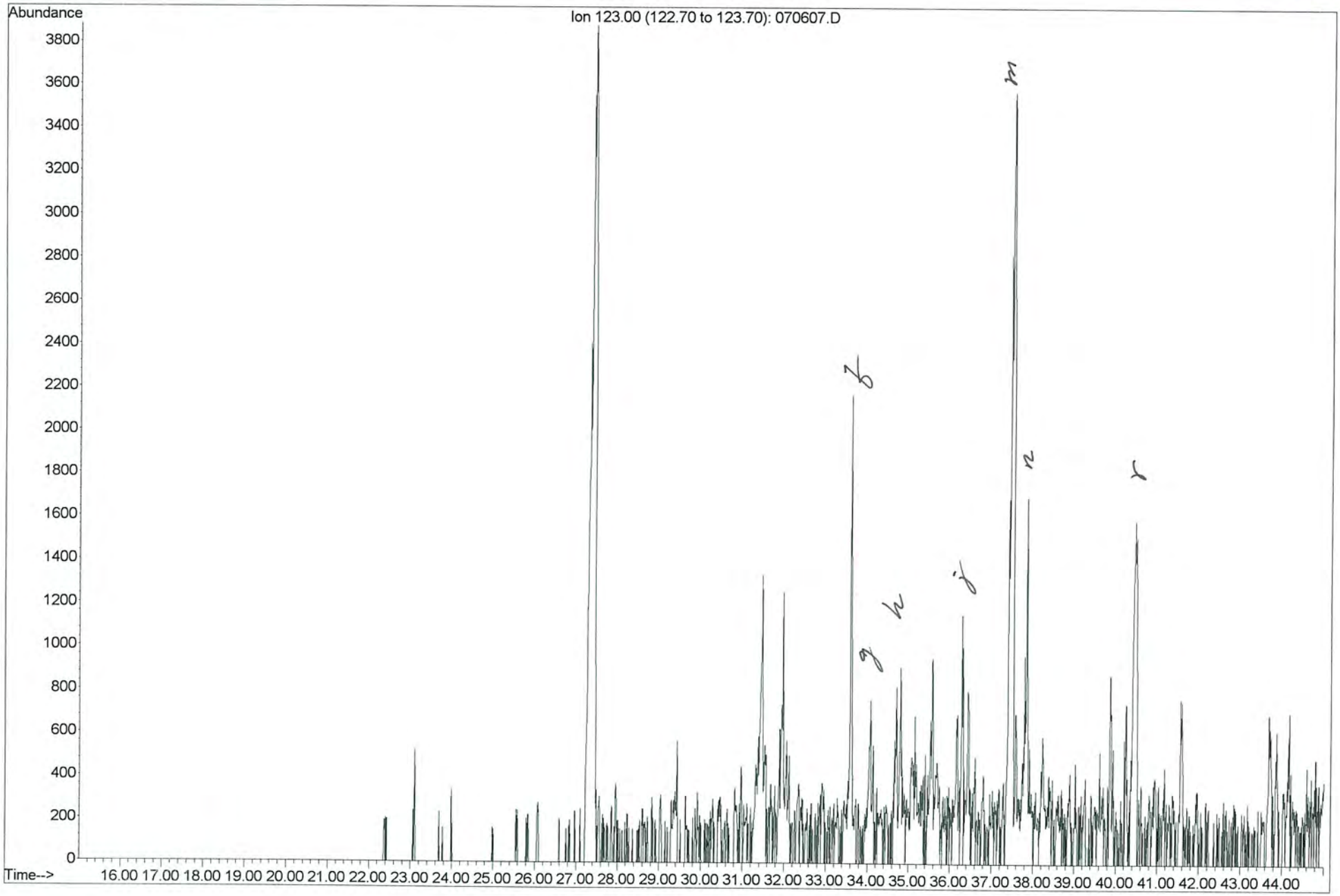
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



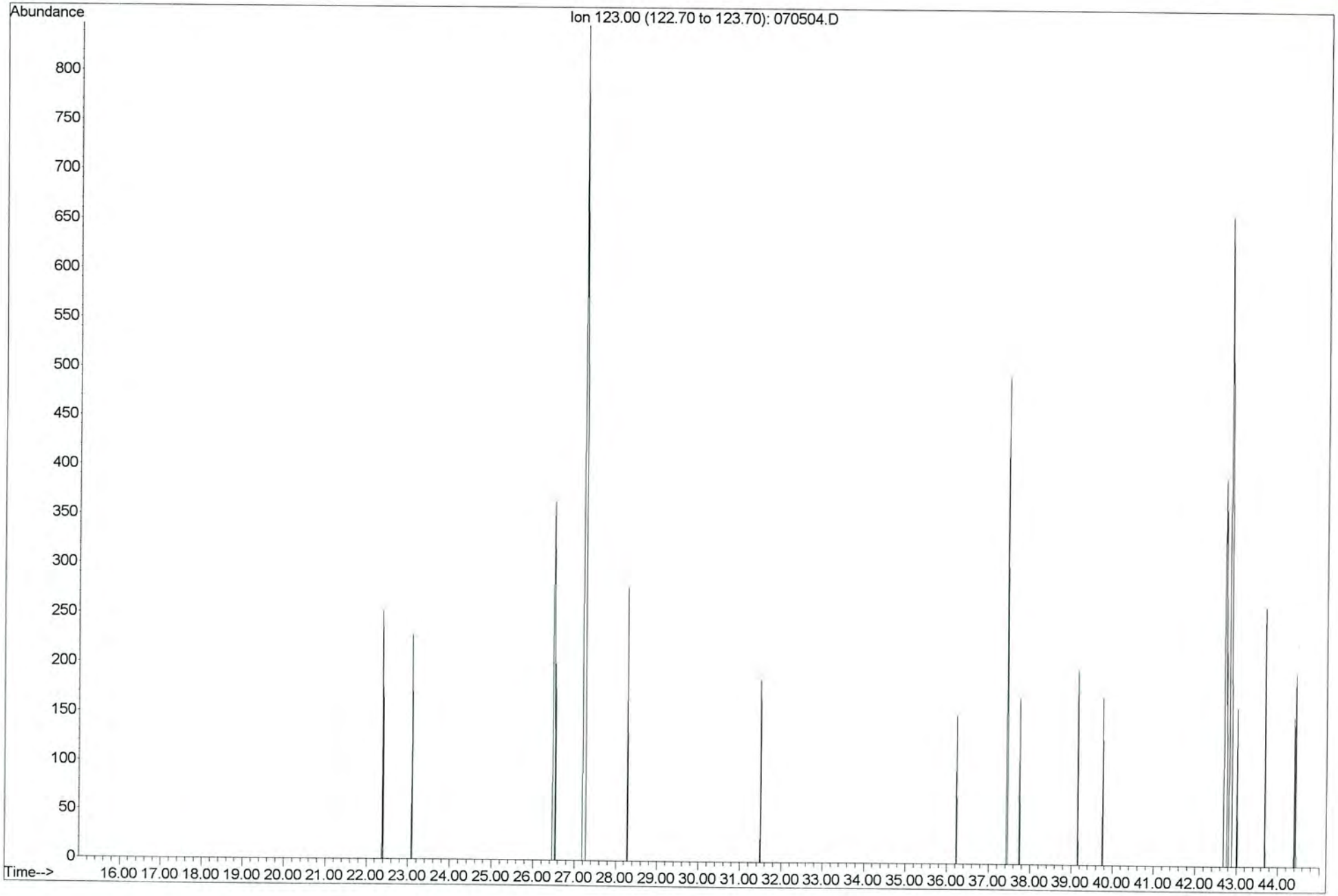
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



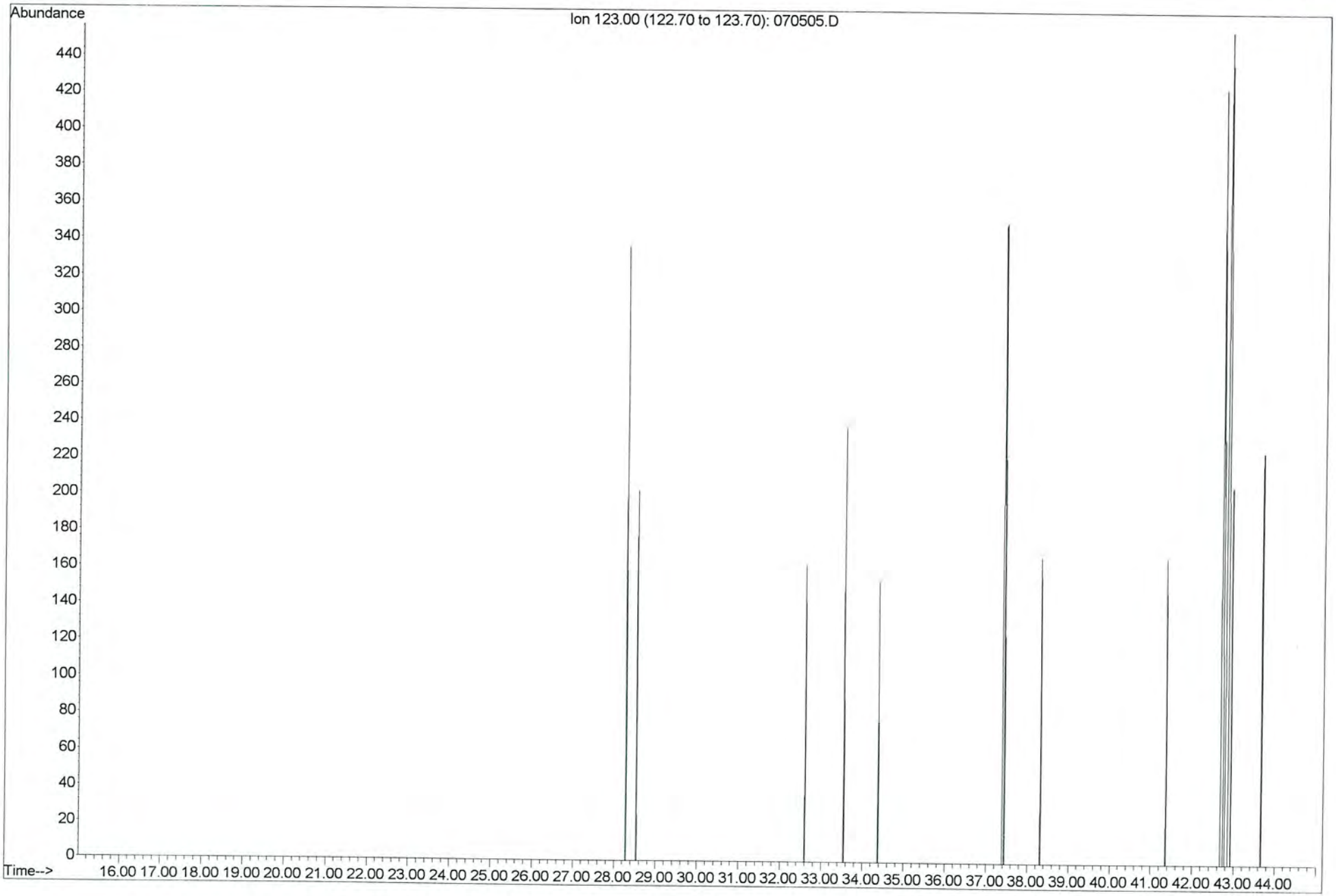
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



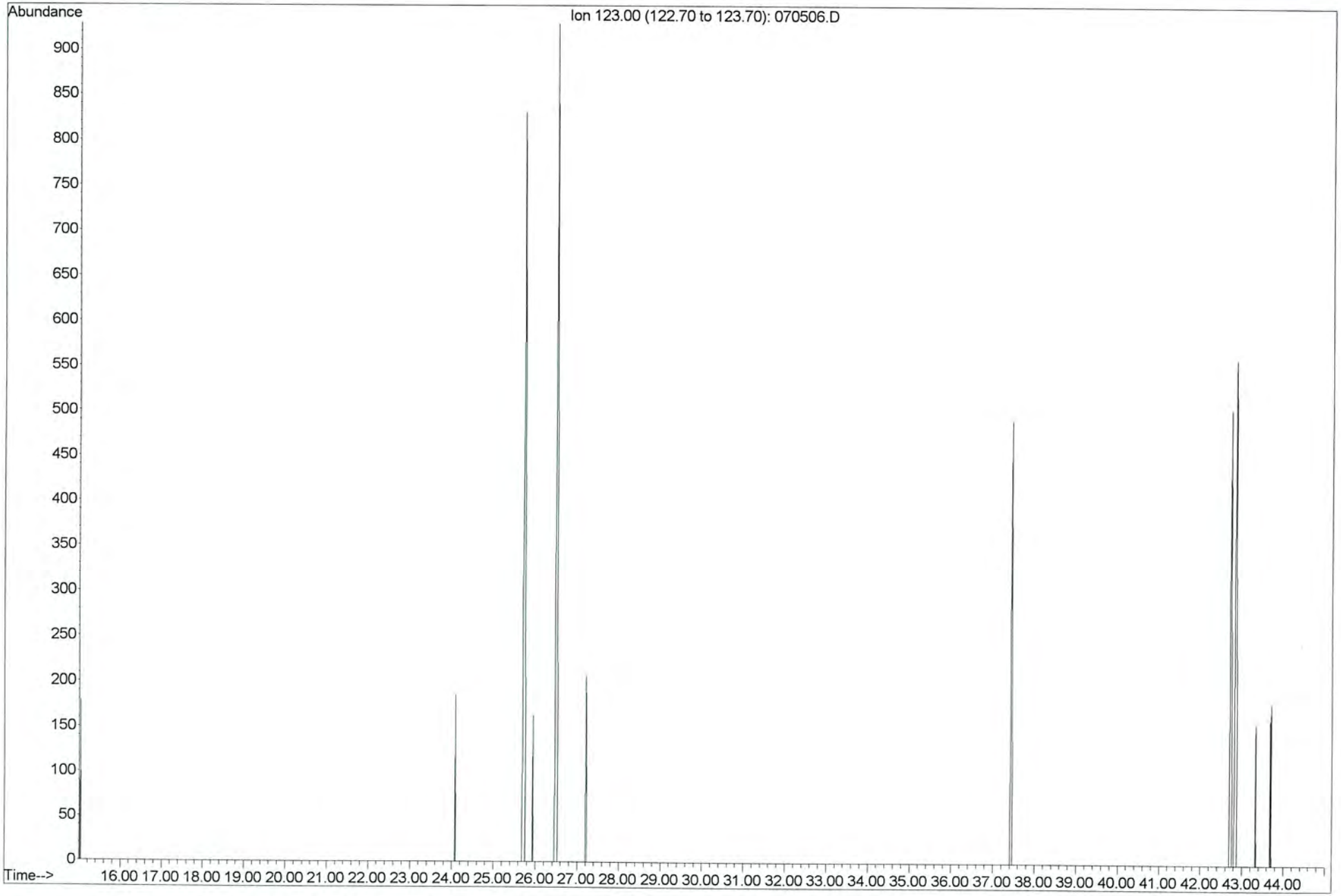
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



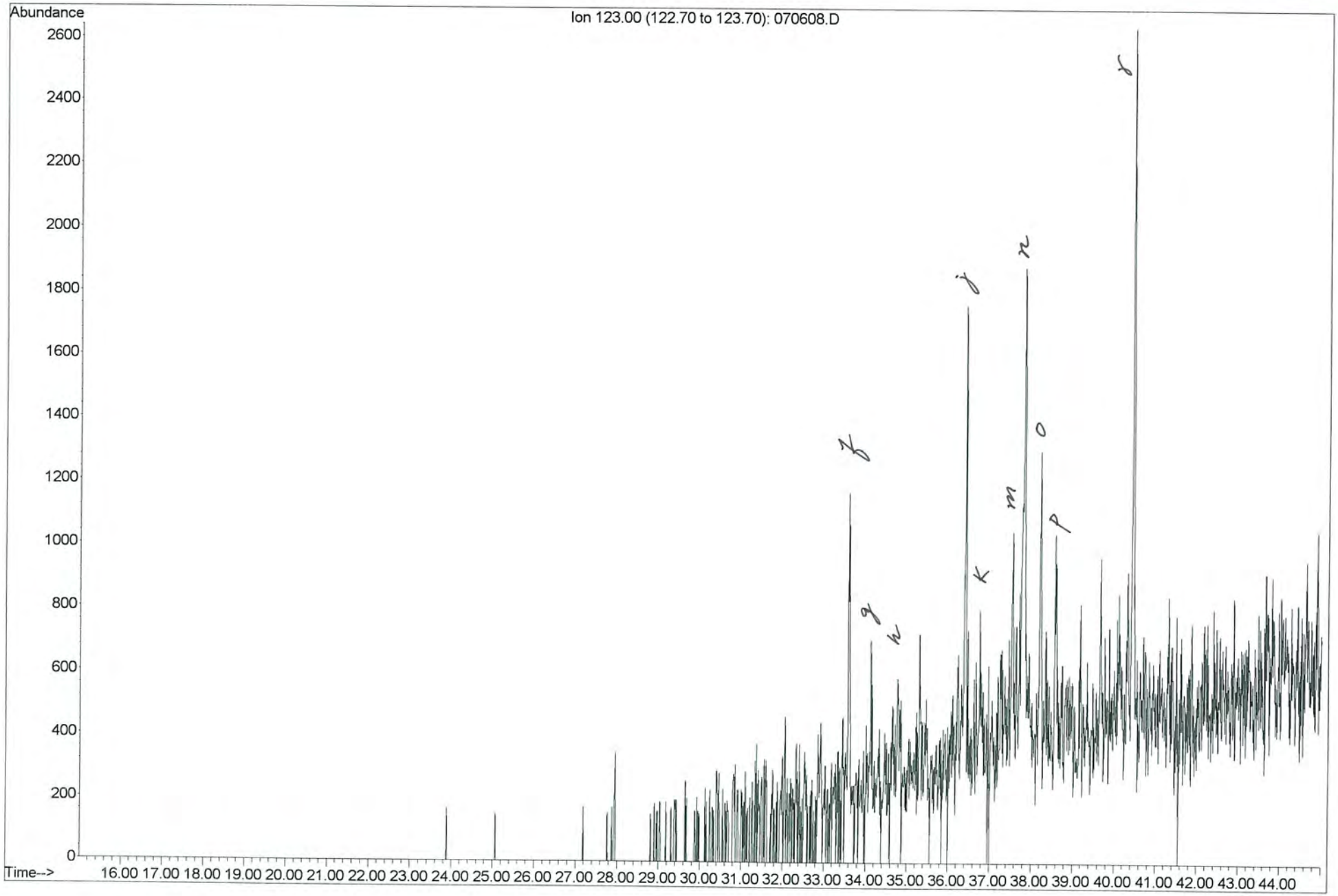
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider

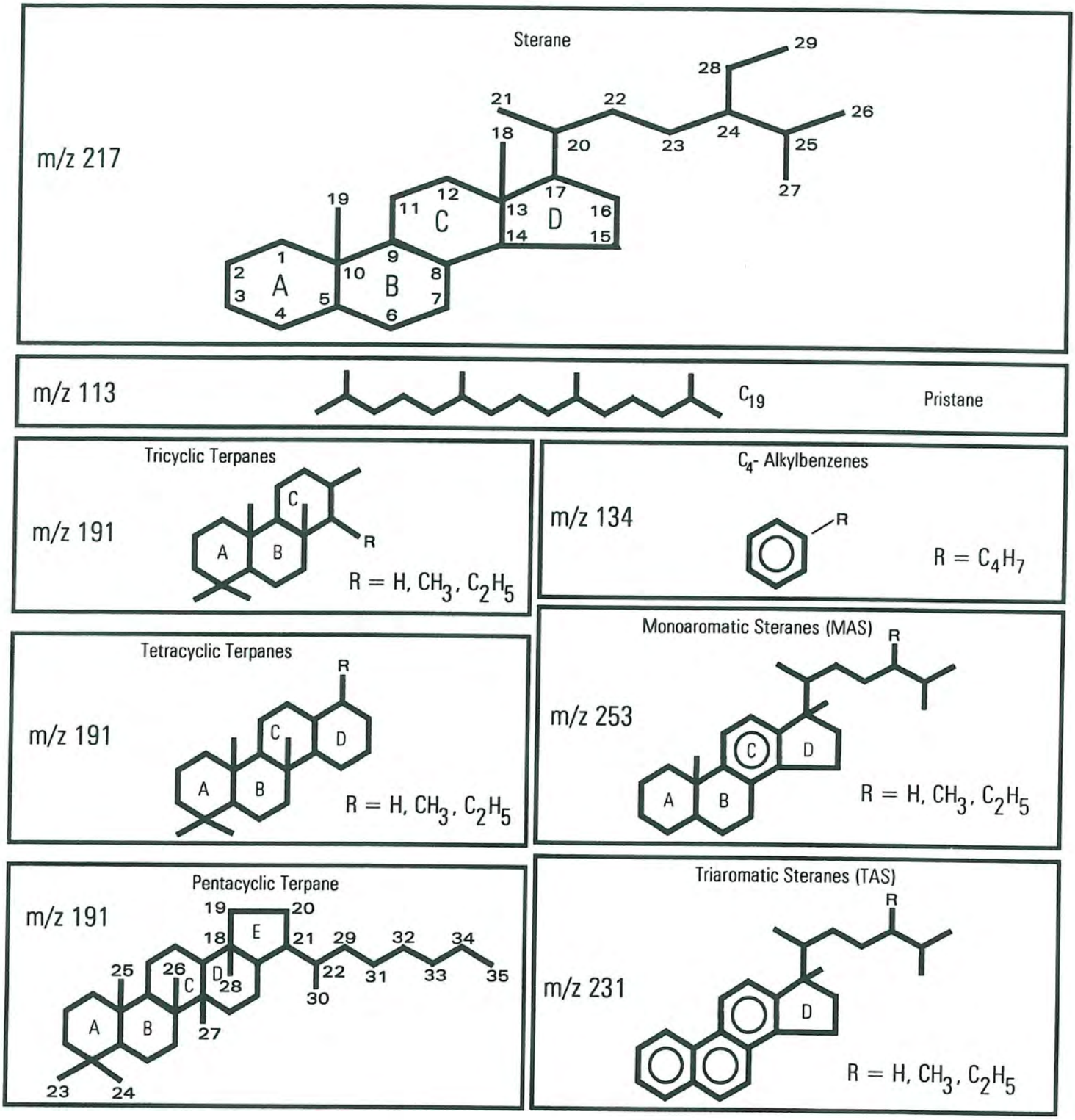


GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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





The compound structures of pristane, C_4-alkylbenzenes, sterane; terpanes; monoaromatic and triaromatic steranes

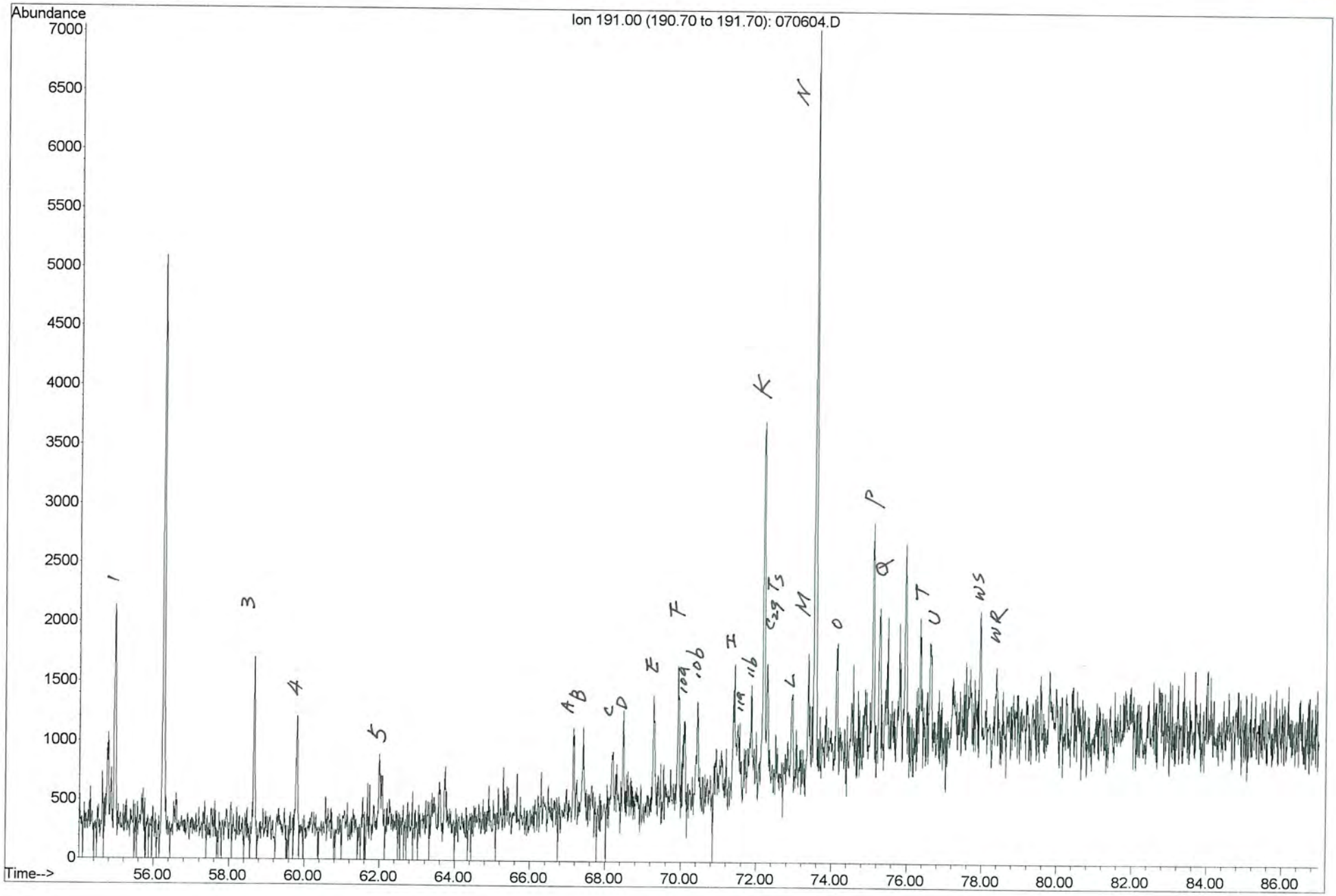
Table

ZymaX FORENSICS

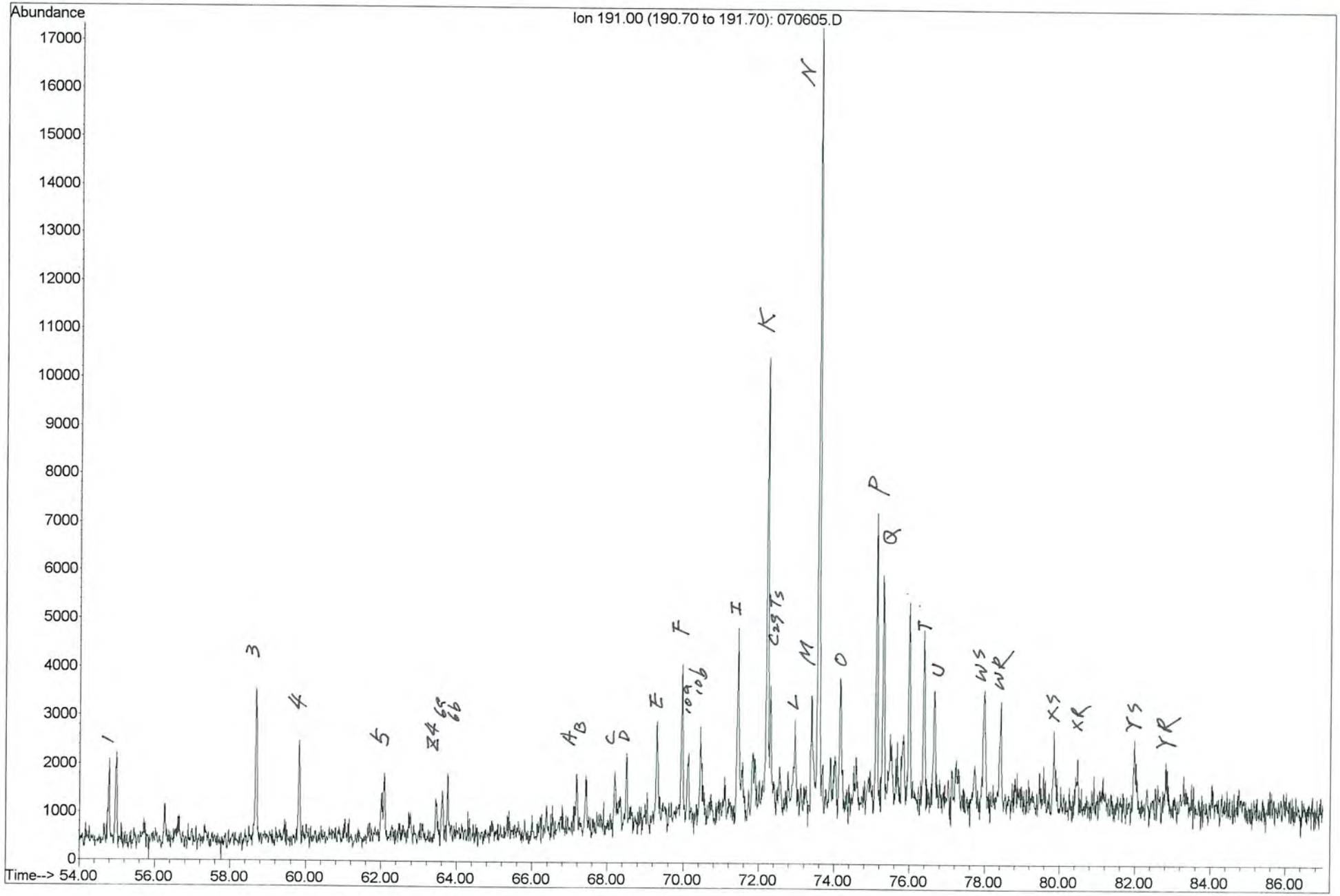
Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes Identification (m/z 191 mass chromatograms)

Code	Identity	Carbon #
0	C_{20}-Tricyclic Terpane	20
1	C_{21}-Tricyclic Terpane	21
2	C_{22}-Tricyclic Terpane	22
3	C_{23}-Tricyclic Terpane	23
4	C_{24}-Tricyclic Terpane	24
5	C_{25}-Tricyclic Terpane	25
Z4	C_{24}-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
B	C_{28}-Tricyclic Terpane #2	28
C	C_{29}-Tricyclic Terpane #1	29
D	C_{29}-Tricyclic Terpane #2	29
E	18α-22,29,30-Trisnorneohopane (Ts)	27
F	17α-22,29,30-Trisnorhopane (Tm)	27
G	17ß-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
I	17α-28,30-Bisnorhopane	28
11a	C_{31}-Tricyclic Terpane #1	31
J	17α-25-Norhopane	29
11b	C_{31}-Tricyclic Terpane #2	31
K	17α,21ß-30-Norhopane	29
C_{29}Ts	18α-30-Norneohopane	29
C_{30}*	17α-Diahopane	30
L	17ß-21α-30-Normoretane	29
Ma	18α-Oleanane	30
Mb	18ß-Oleanane	30
N	17α,21ß-Hopane	30
O	17ß,21α-Moretane	30
13a	C_{33}-Tricyclic Terpane #1	33
13b	C_{33}-Tricyclic Terpane #2	33
P	22S-17α,21ß-30-Homohopane	31
Q	22R-17α,21ß-30-Homohopane	31
R	Gammacerane	30
14a	C_{34}-Tricyclic Terpane #1	34
S	17ß,21α-Homomoretane	31
14b	C_{34}-Tricyclic Terpane #2	34
T	22S-17α,21ß-30-Bishomohopane	32
U	22R-17α,21ß-30-Bishomohopane	32
15a	C_{35}-Tricyclic Terpane #1	35
15b	C_{35}-Tricyclic Terpane #2	35
V	17ß,21α-C_{32}-Bishomomoretane	32
WS	22S-17α,21ß-30,31,32-Trishomohopane	33
WR	22R-17α,21ß-30,31,32-Trishomohopane	33
16a	C_{36}-Tricyclic Terpane #1	36
16b	C_{36}-Tricyclic Terpane #2	36
XS	22S-17α,21ß-30,31,32,33-Tetrahomohopane	34
XR	22R-17α,21ß-30,31,32,33-Tetrahomohopane	34
YS	22S-17α,21ß-30,31,32,33,34-Pentahomohopane	35
YR	22R-17α,21ß-30,31,32,33,34-Pentahomohopane	35

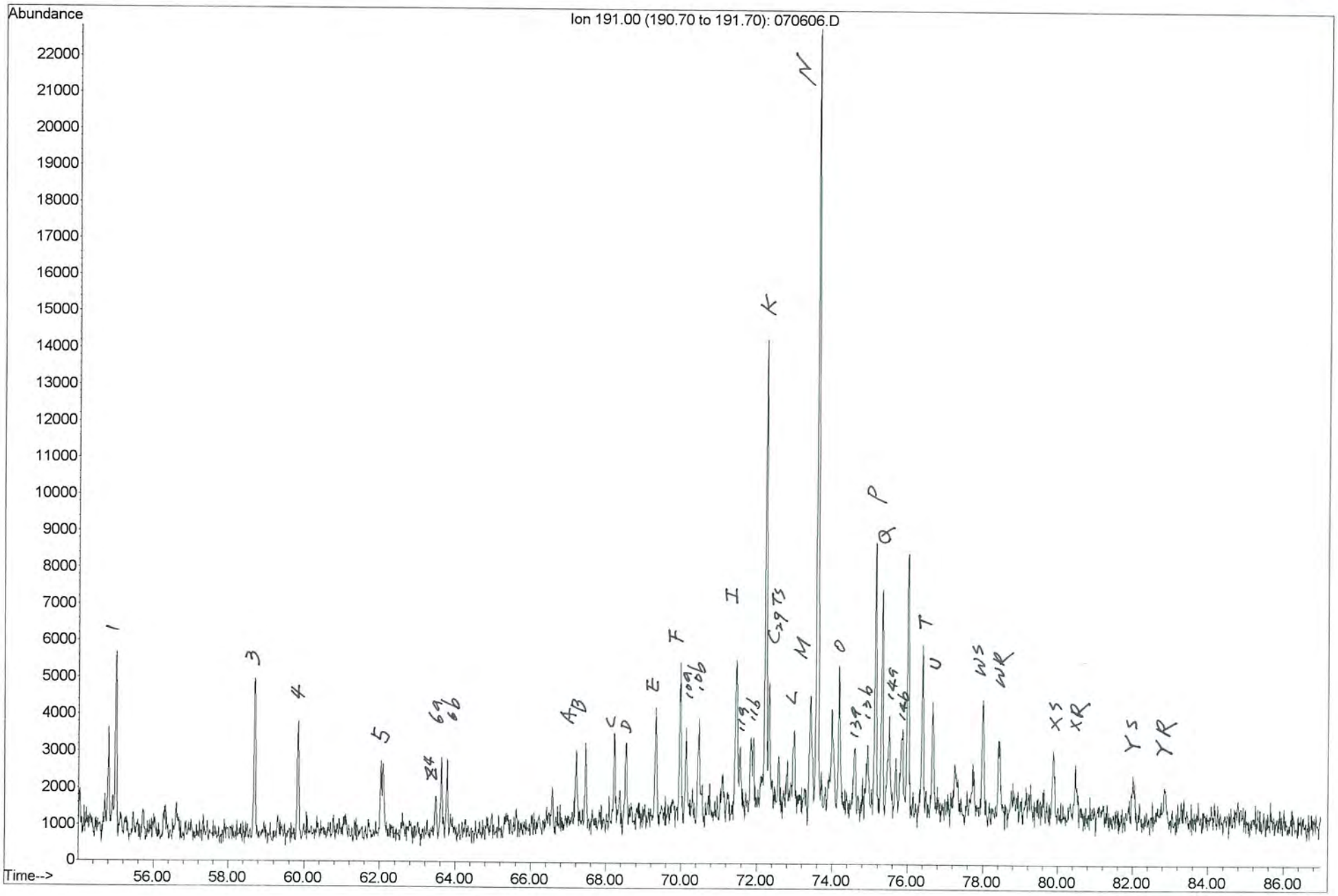
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



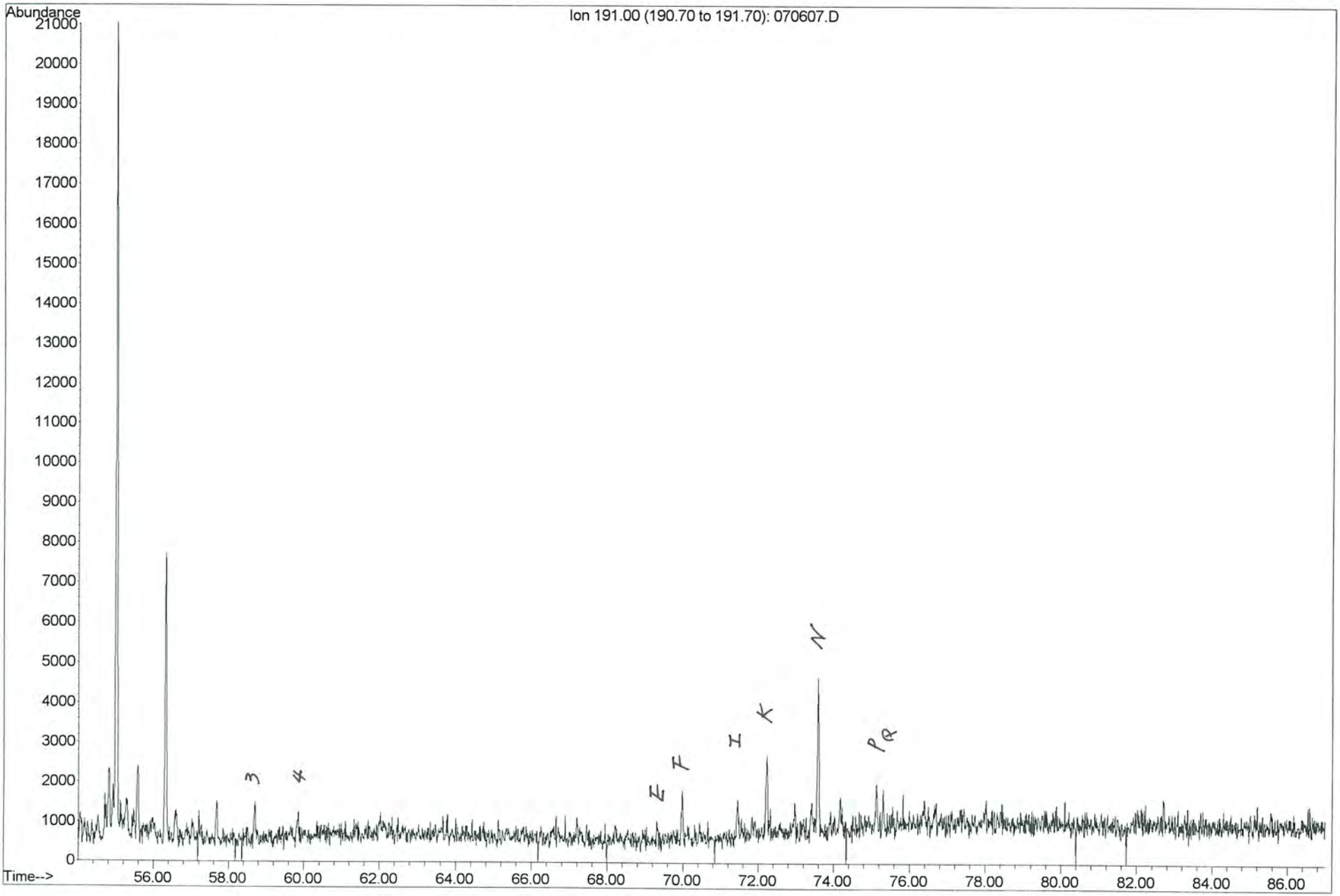
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



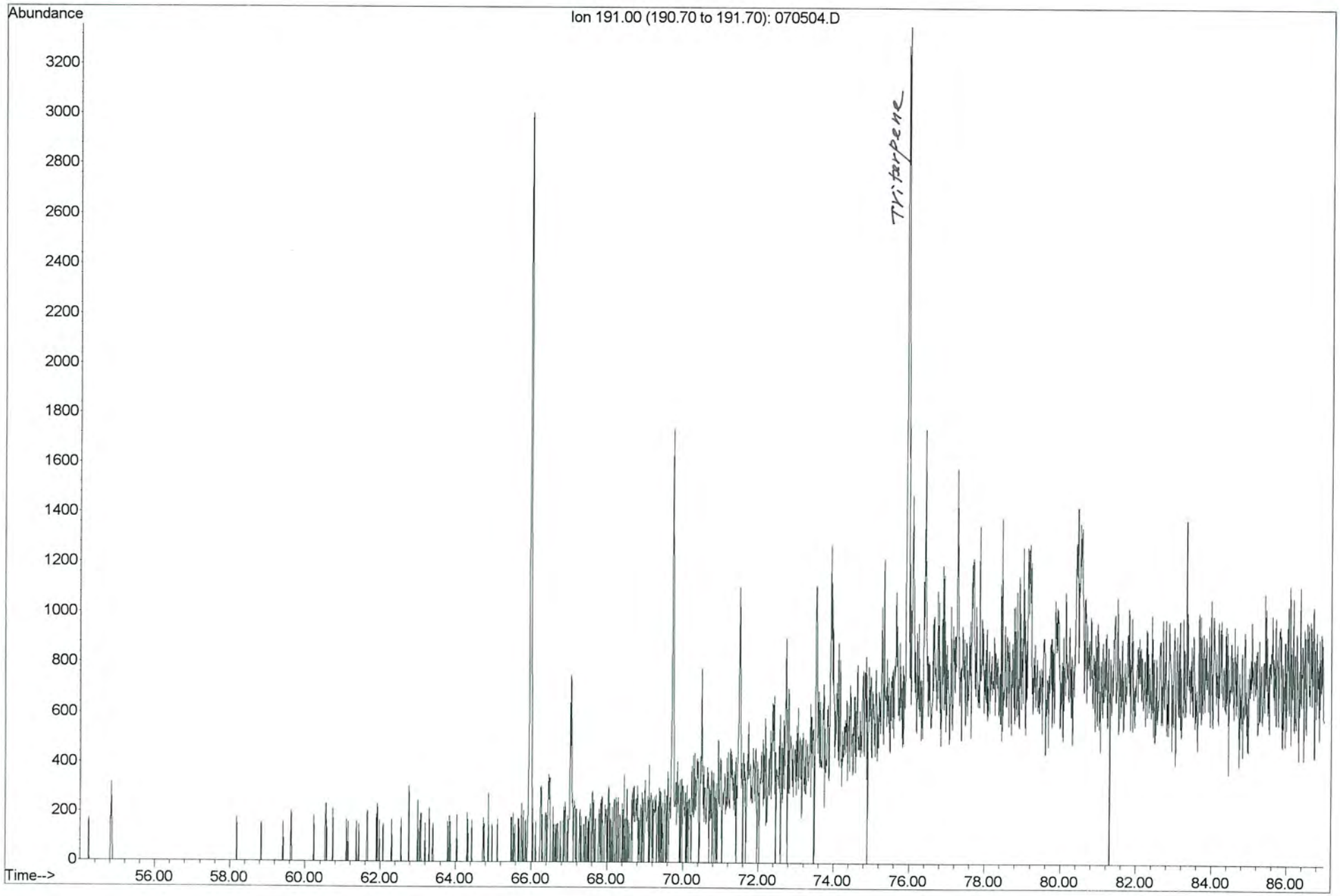
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



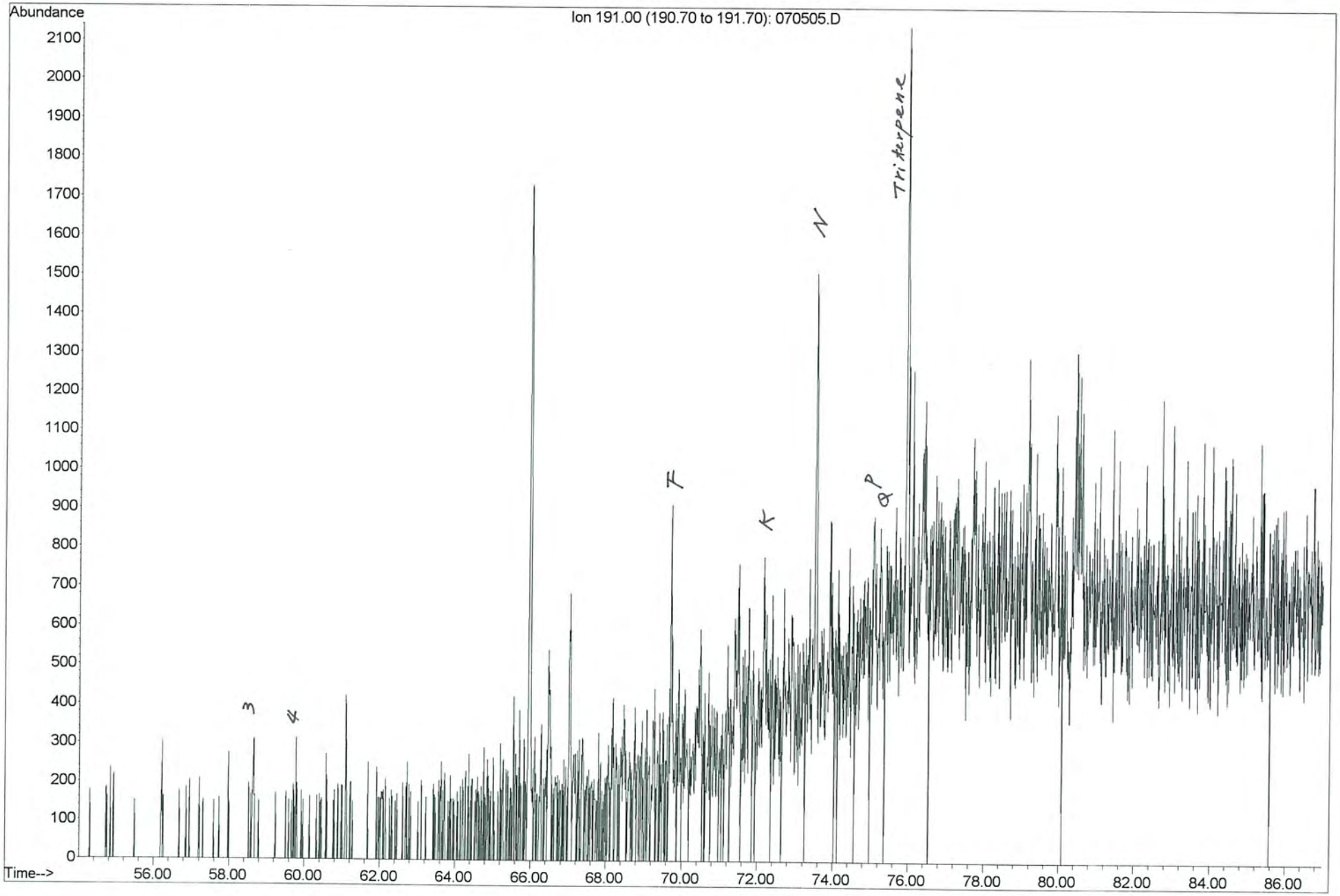
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



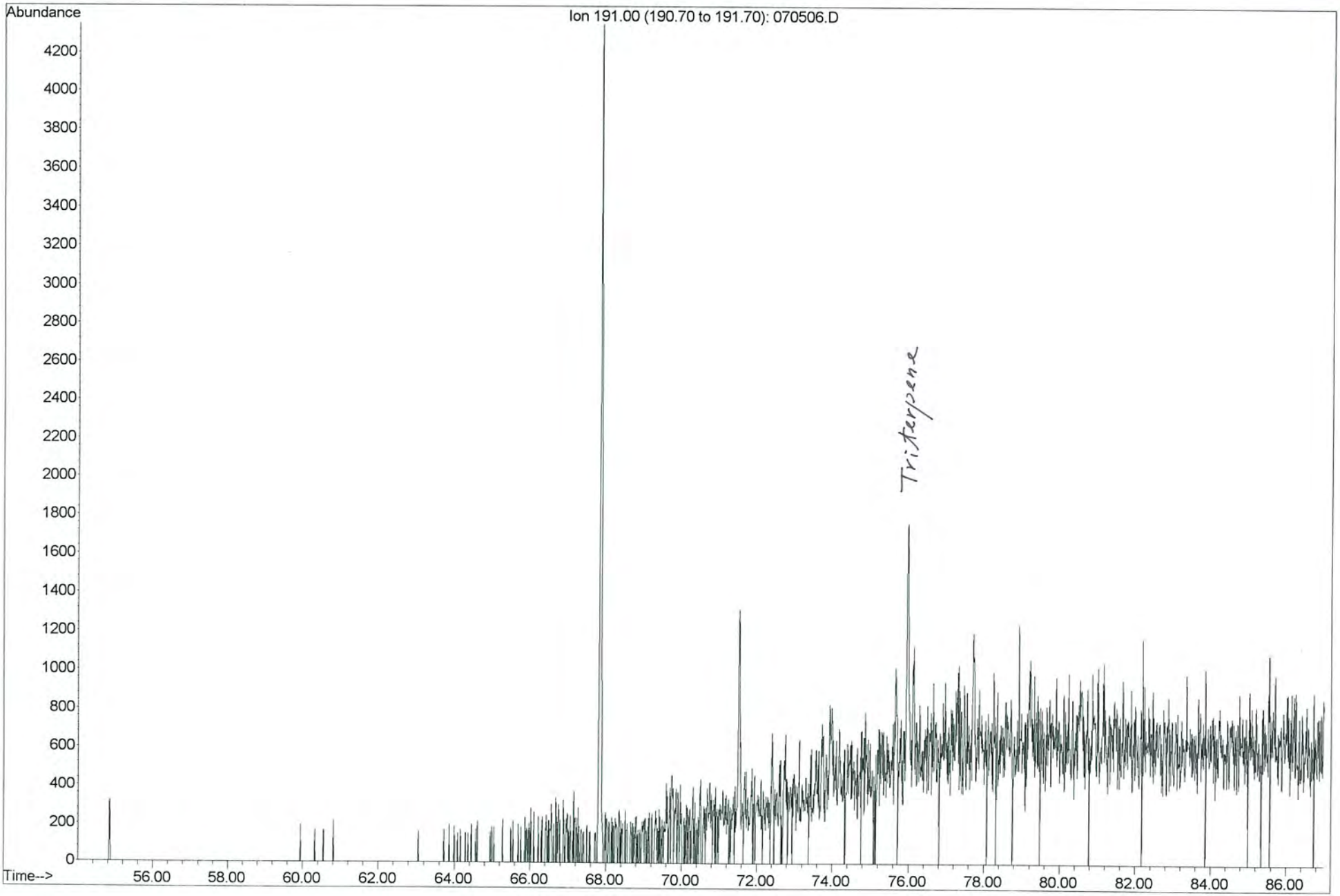
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



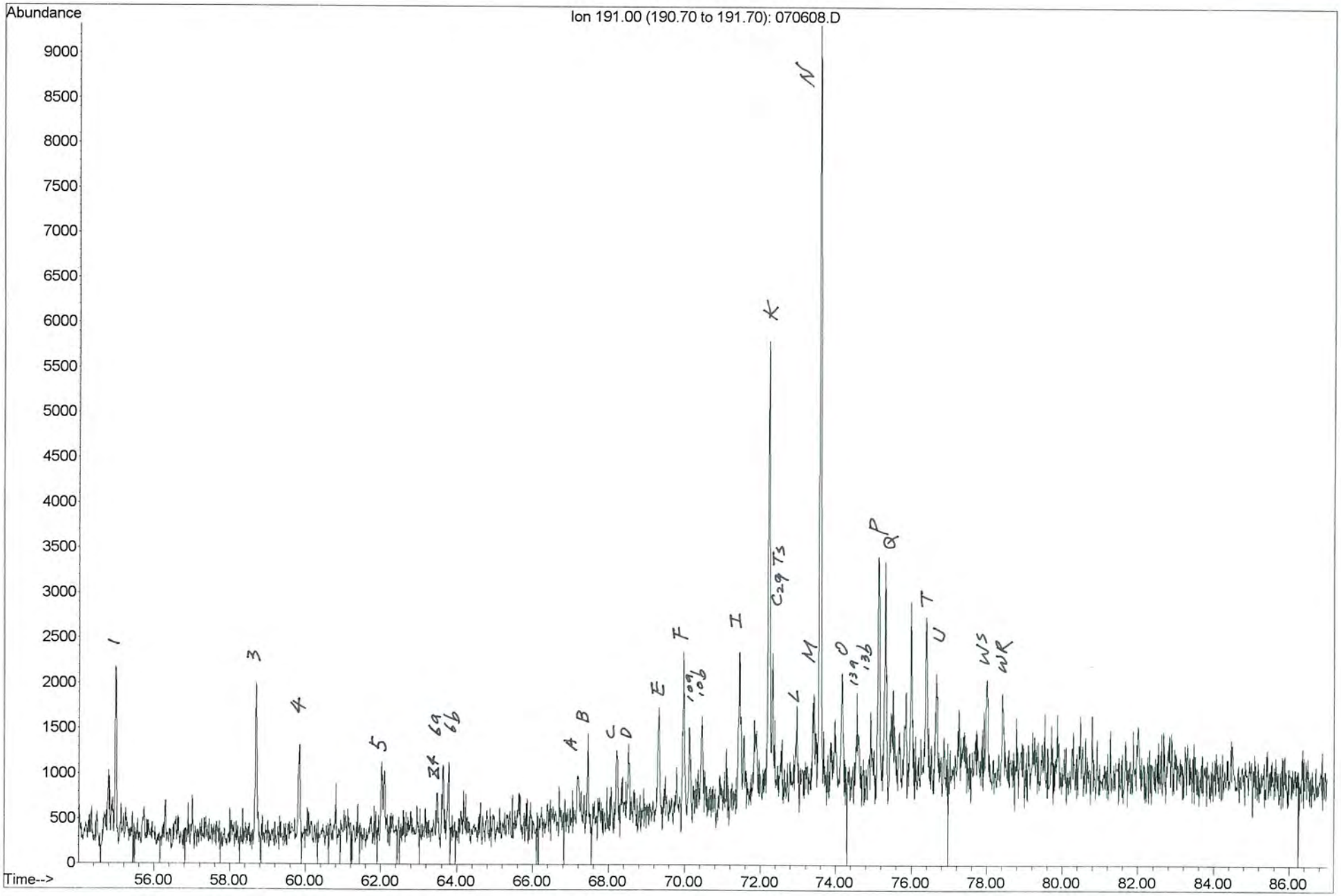
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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

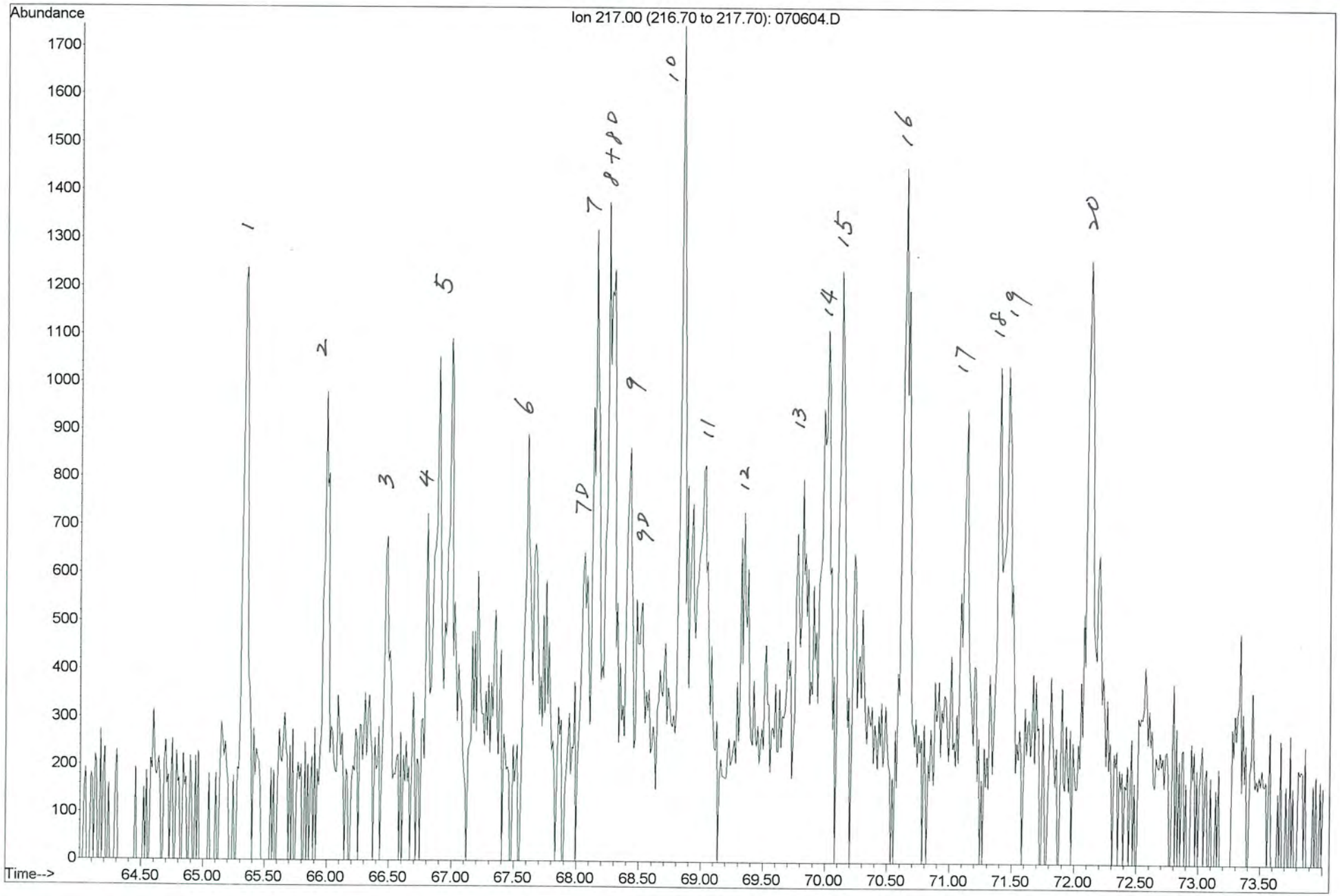


Table

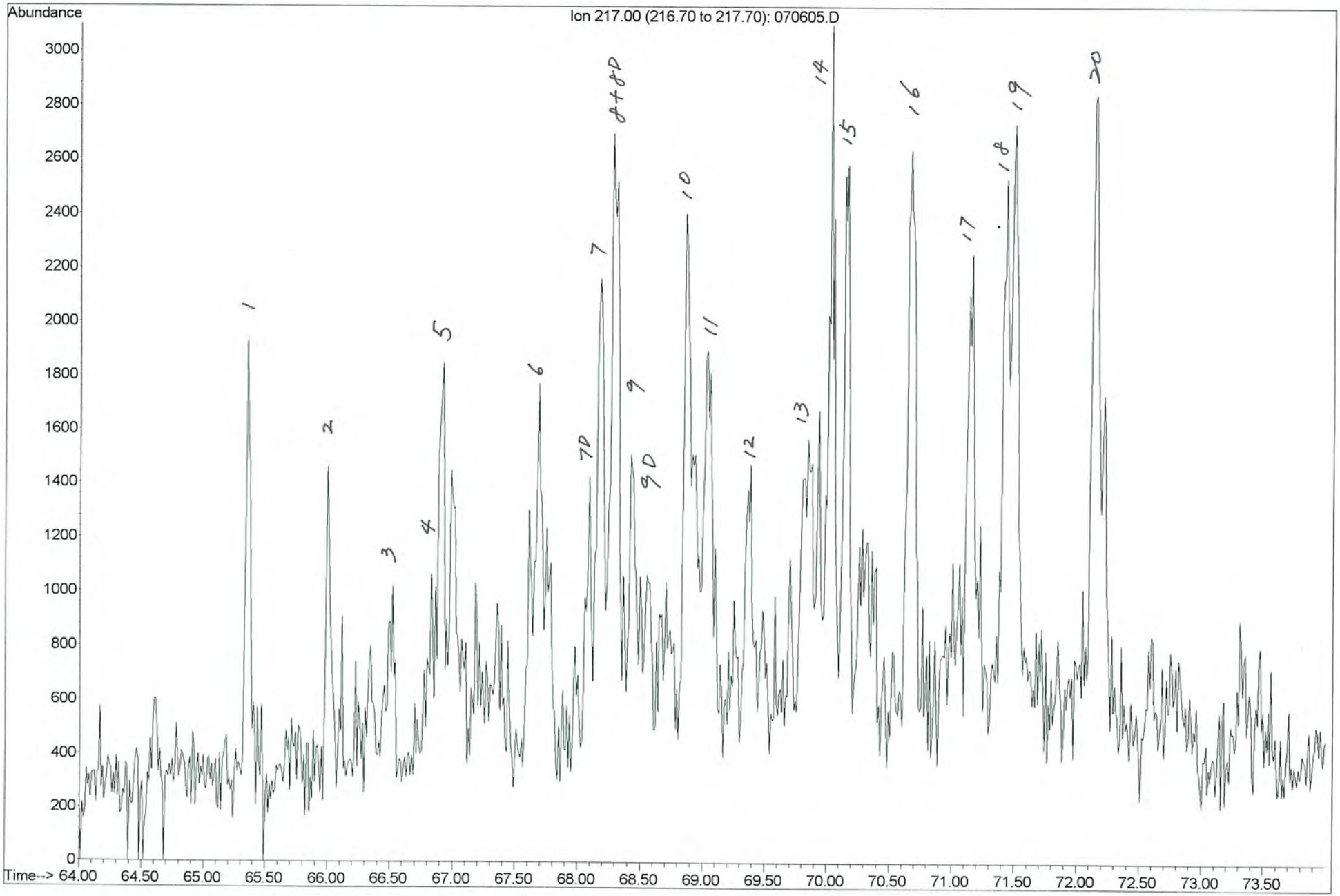
Key for Steranes Identification (m/z 217 Mass Chromatogram)

Code	Identity	Carbon #
1	13ß,17α-diacholestane (20S)	27
2	13ß,17α-diacholestane (20R)	27
3	13α,17ß-diacholestane (20S)	27
4	13α,17ß-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-13α,17ß-diacholestane (20S)	29
13	24-methyl-14α,17α-cholestane (20S)	28
14D	24-ethyl-13α,17ß-diacholestane (20R)	29
14	24-methyl-14ß,17ß-cholestane (20R)	28
15	24-methyl-14ß,17ß-cholestane (20S)	28
16	24-methyl-14α,17α-cholestane (20R)	28
17	24-ethyl-14α-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-14β,17β-cholestane(20S)	30
22B	24-n-propyl-14β,17β-cholestane (20S)	30
23A	4α-methyl-24-ethyl-14β,17β-cholestane(20R)	30
23B	24-n-propyl-14β,17β-cholestane (20R)	30
24A	4α-methyl-24-ethylcholestane(20R)	30
24B	24-n-propylcholestane (20R)	30

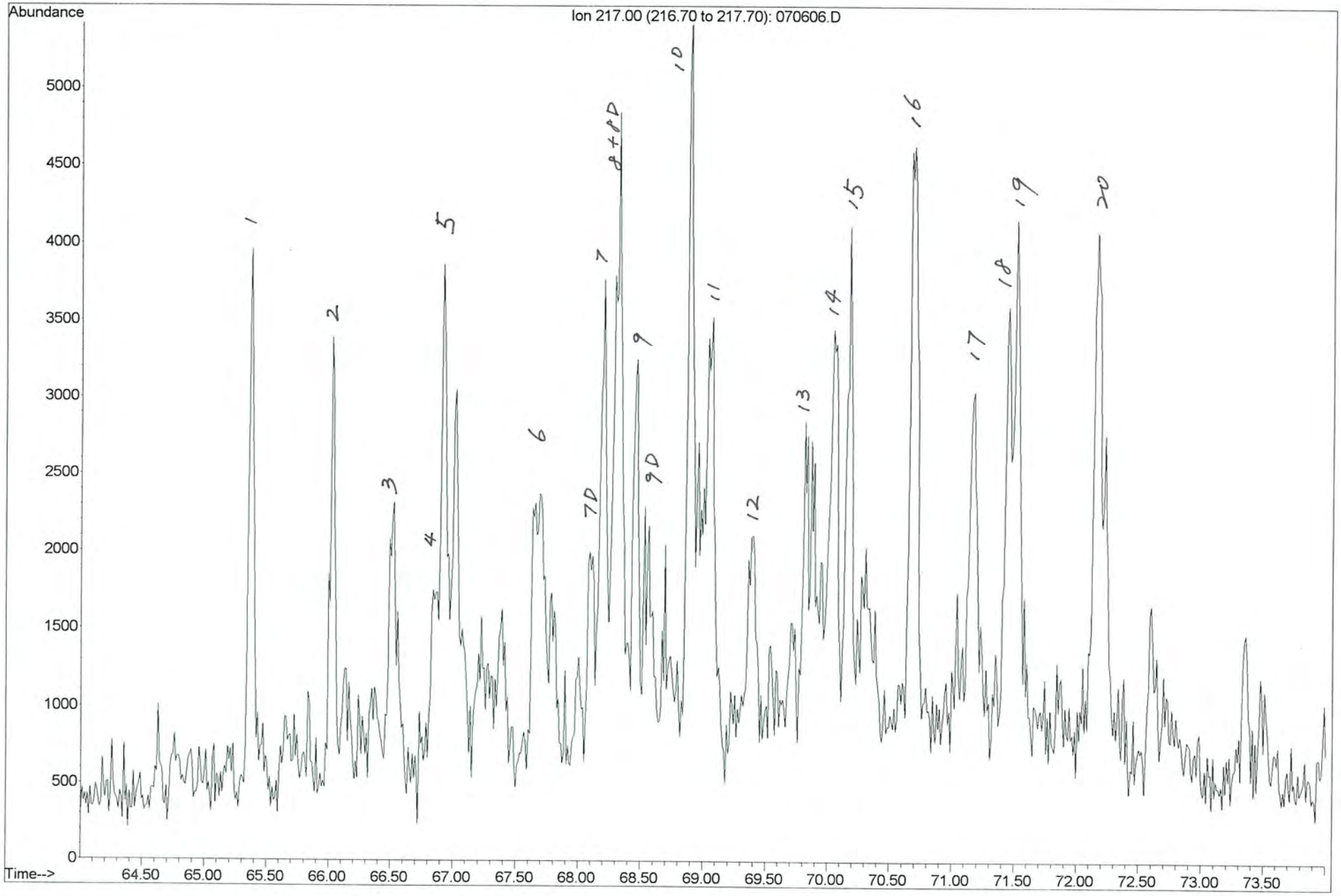
GWS-SG05 (39767-1) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



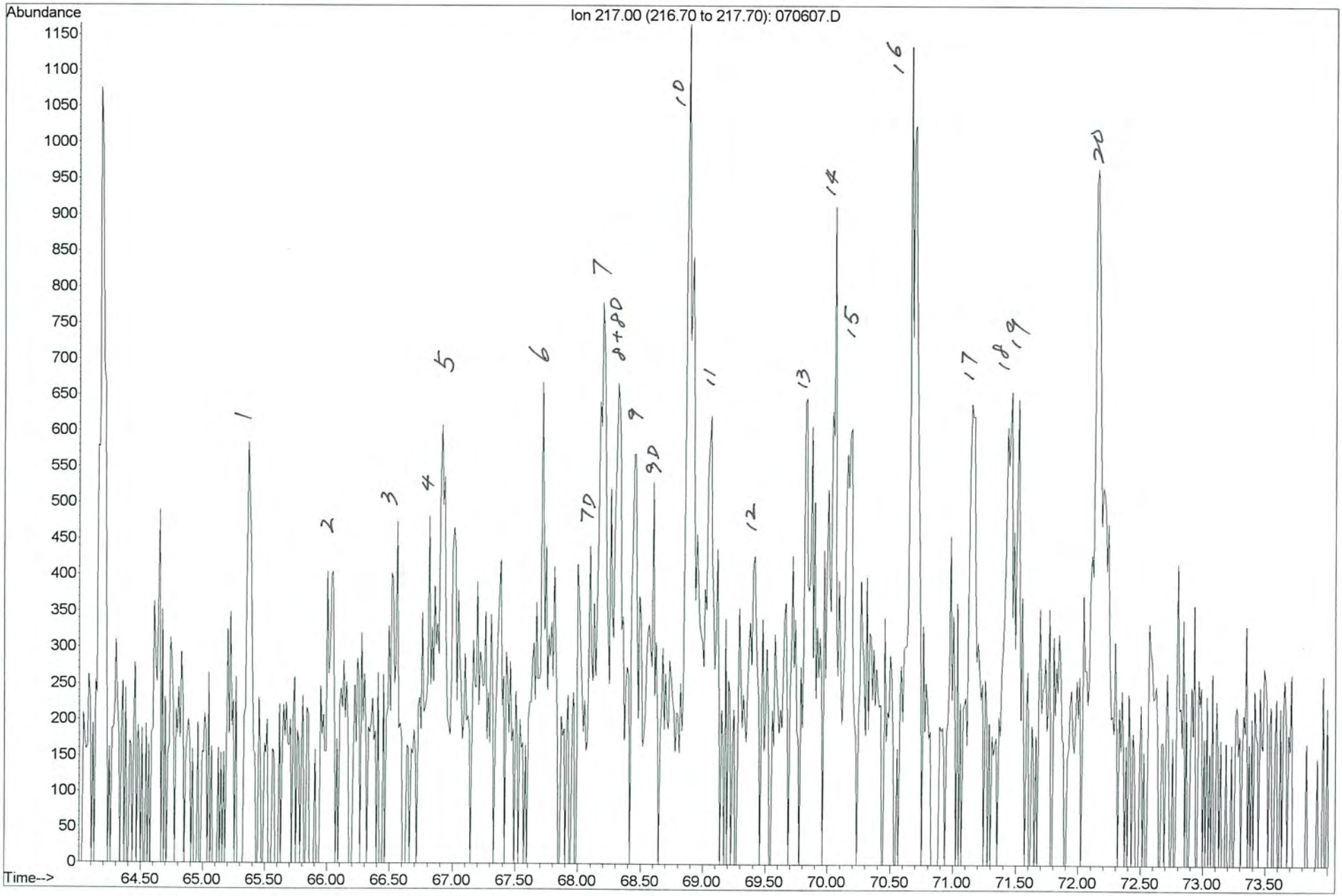
GWS-SG07 (39767-2) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



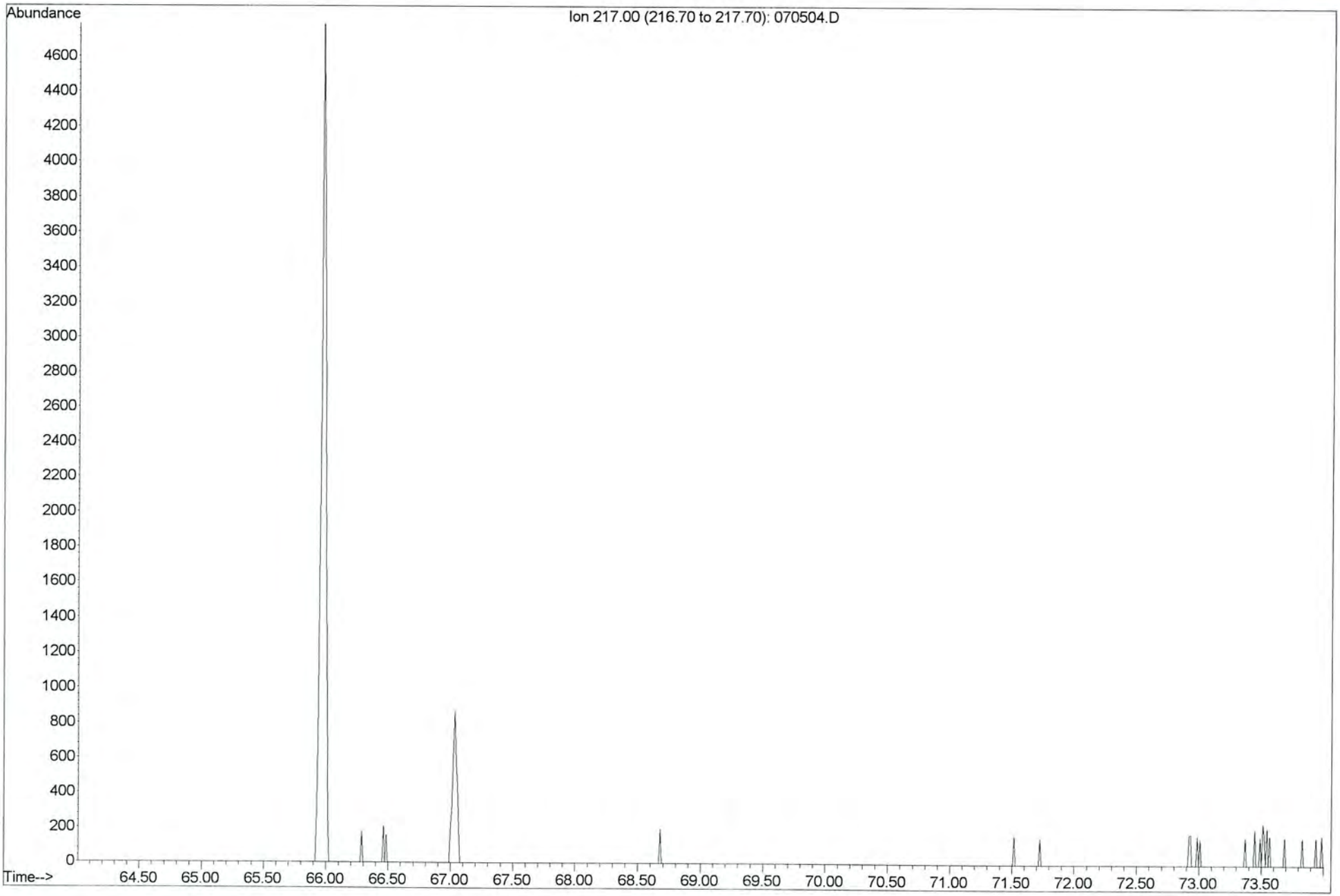
GWS-SG16 (39767-3) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



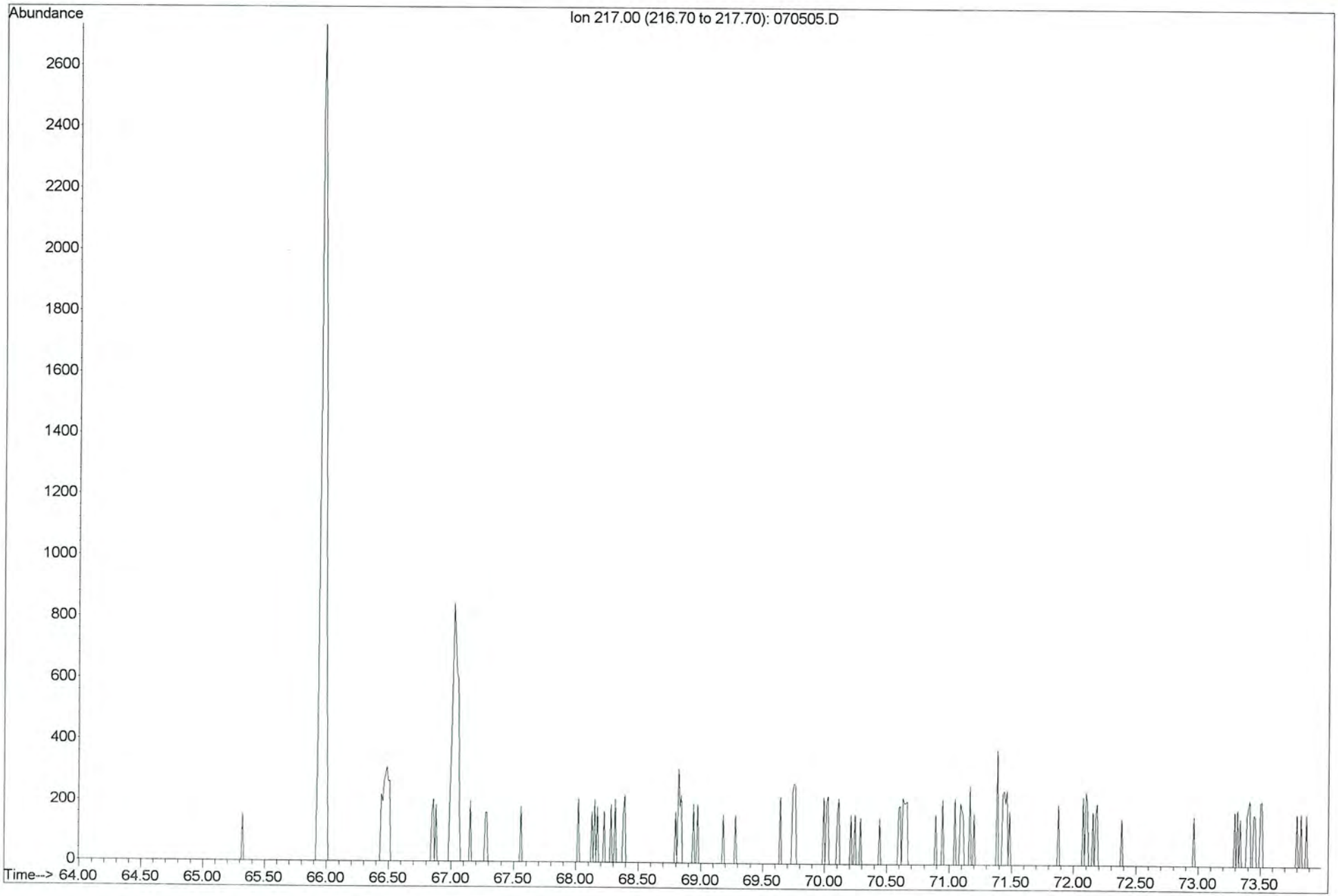
GWS-EC07-0034 (39767-4) soil ext. (F1+F2)
Gas Works Feasibility Study, Floyd & Snider



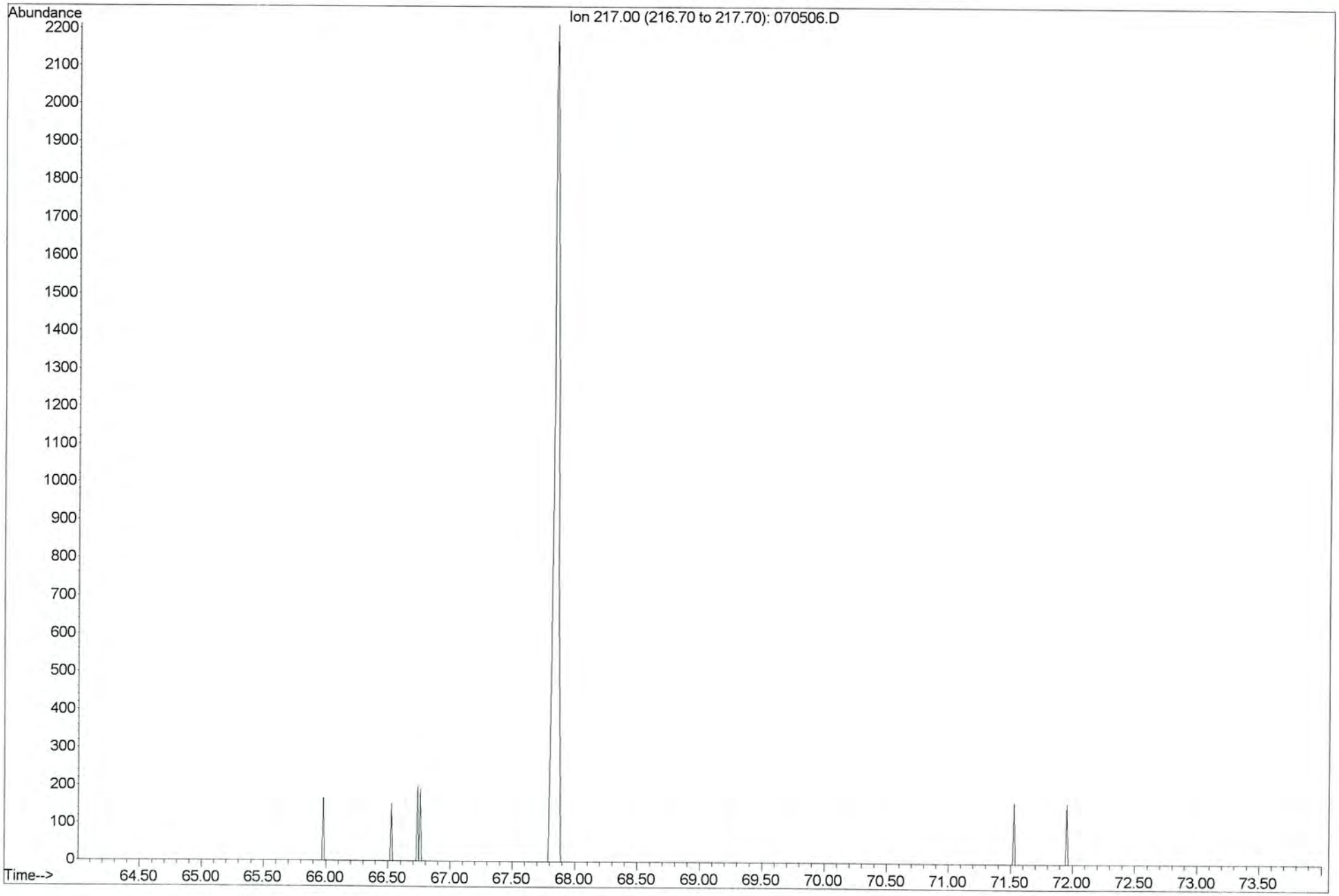
GWS-EC12-0008 (39767-5) soil extract
Gas Works Feasibility Study, Floyd & Snider, Inc.



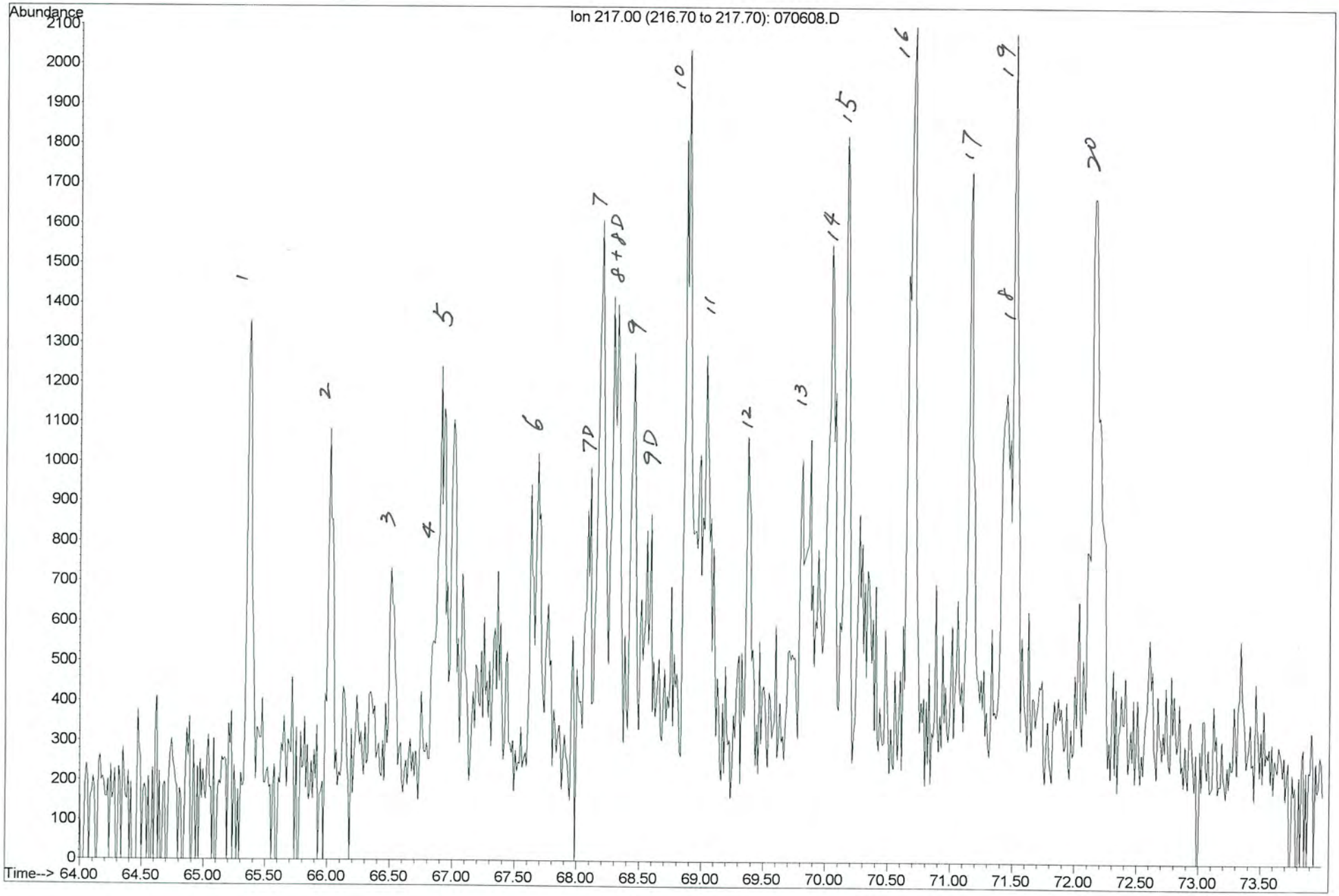
GWS-EC14-0008 (39767-6) soil extract
Gas Works Feasibility Study, Floyd & Snider



GWS-EC13-0090 (39767-7) soil extract
Gas Works Feasibility Study, Floyd & Snider



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



Floyd & Snider
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Seattle, WA 98104
(206) 292-2078

CHAIN OF CUSTODY

01/3

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 1

Analysis: SGC/MS full scan mod. EPA 8270 (HPAHs)

Recorded by: [initials]
Checked by: [initials]

	Sample	Sample Matrix	Date/Time	Analysis	Containers
36917-1	Floyd & Snider, Inc. 34011008001 COC Form Initials: JL Date: 8/10/04 Time: 1:23 — 10.2-10.7	S	Date: 8/10 Time: 1:23	⊗	Number of containers: 1; Number of Containers with Custody Seal Intact:
-2	Floyd & Snider, Inc. 34011008002 COC Form Initials: JL Date: 8/10/04 Time: 1:31 — 10.7-11.6	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:
-3	Floyd & Snider, Inc. 34011008003 COC Form Initials: JL Date: 8/10/04 Time: 1:35	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:
-4	Floyd & Snider, Inc. 34011008004 COC Form Initials: JL Date: 8/10/04 Time: 1:45	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:
-5	Floyd & Snider, Inc. 34011008005 COC Form Initials: JL Date: 8/10/04 Time: 1:52	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:
-6	Floyd & Snider, Inc. 34011008006 COC Form Initials: JL Date: 8/10/04 Time: 1:59	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:

Comments/Instructions

Hold for instructions
⊗ 8/23/04 per J. Lidfe / AS

Relinquished By	Transported By	Received By
Name: [signature] Date: 8/10/04 Time: 7:01 PM		Name: [signature] Date: 8/10/04 Time: 7:05 pm
Name: Date: Time:		Name: [signature] Date: 8/11/04 Time: 1200
Name: Date: Time:		Name: Date: Time:

Floyd & Snider
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Seattle, WA 98104
(206) 292-2078

CHAIN OF COUSTODY

P 2/3

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 2

Analysis: SVOCs; NWTPH-Dx; ...

Recorded by: ✓
Checked by: ✓

	Sample	Sample Matrix	Date/Time	Analysis	Number of containers	Number of Containers with Custody Seal Intact
36917-7	Floyd & Snider, Inc. 34011008007 COC Form Initials: JL Date: 8/10/04 Time: 2:59	S			2	
-8	Floyd & Snider, Inc. 34011008008 COC Form Initials: JL Date: 8/10/04 Time: 3:50	S			1	
-9	Floyd & Snider, Inc. 34011008009 COC Form Initials: JL Date: 8/10/04 Time: 3:57	S			1	
-10	Floyd & Snider, Inc. 34011008010 COC Form Initials: JL Date: 8/10/04 Time: 4:06	S			1	
-11	Floyd & Snider, Inc. 34011008011 COC Form Initials: JL Date: 8/10/04 Time: 4:55	S		⊗	2	
-12	Floyd & Snider, Inc. 34011008012 COC Form Initials: JL Date: 8/10/04 Time: 5:05	S			1	

Comments/Instructions

Hold for instructions
⊗ 8/23/04 per J. Lider/AJ

Relinquished By	Transported By	Received By
Name: [signature] Date: 8/10/04 Time: 7:01 pm		Name: [signature] Date: 8/11/04 Time: 7:03am
Name: Date: Time:		Name: [signature] Date: 8/11/04 Time: 1200
Name: Date: Time:		Name: Date: Time:

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CHAIN OF CUSTODY

P 3/3

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 3

Analysis: TPH-HCID / NWTPH-Dx (handwritten column headings, partly illegible)

Recorded by: JL
Checked by: [illegible]

Sample ID	Sample Matrix	Date / Time	Number of containers	Number of Containers with Custody Seal Intact
36917-13 Floyd & Snider, Inc. 34011008013 COC Form Initials: JL Date: 8/10/04 Time: 6:20		Date: Time:	1	
-14 Floyd & Snider, Inc. 34011008014 COC Form Initials: JL Date: 8/10/04 Time: 6:24		Date: Time:	1	
-15 Floyd & Snider, Inc. 34011008015 COC Form Initials: JL Date: 8/10/04 Time: 6:27		Date: Time:	1	
-16 Floyd & Snider, Inc. 34011008016 COC Form Initials: JL Date: 8/10/04 Time: 6:53		Date: Time:	1	
Place Sample ID Label Here or Write ID Number Here		Date: Time:		
Place Sample ID Label Here or Write ID Number Here		Date: Time:		

Comments/Instructions

Hold for instructions.

Relinquished By	Transported By	Received By
Name: [signature] Date: 8/10/04 Time: 7:01 pm		Name: [signature] Date: 8/10/04 Time: 7:03 pm
Name: Date: Time:		Name: [signature] Date: 8/11/04 Time: 1200
Name: Date: Time:		Name: Date: Time:

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Seattle, WA 98104
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CHAIN OF CUSTODY

Pg 1/4

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 4

Recorded by: ______

Checked by: ______

Lab ID	Sample	Sample Matrix	Date / Time	Analysis: GC/MS fuel scan	Analysis: EPA 8270	Number of containers	Number of Containers with Custody Seal Intact
36918-1	Floyd & Snider, Inc. 34011008017 COC Form Initials: JL Date: 8/11/04 Time: 10:59	S	Date: Time:	⊗		1	
-2	Floyd & Snider, Inc. 34011008018 COC Form Initials: JL Date: 8/11/04 Time: 11:07	S	Date: Time:			2	
-3	Floyd & Snider, Inc. 34011008019 COC Form Initials: JL Date: 8/11/04 Time: 11:03	S	Date: Time:			1	
-4	Floyd & Snider, Inc. 34011008020 COC Form Initials: JL Date: 8/11/04 Time: 11:34	S	Date: Time:	⊗		1	
-5	Floyd & Snider, Inc. 34011008021 COC Form Initials: JL Date: 8/11/04 Time: 12:50	S	Date: Time:			1	
-6	Floyd & Snider, Inc. 34011008022 COC Form Initials: JL Date: 8/11/04 Time: 12:52	S	Date: Time:	⊗		1	

Comments/Instructions

Hold for instructions
⊗ 8/23/04 per g. Leder / AJ

Relinquished By	Transported By	Received By
Name: [signature] Date: 8-11-04 Time: 1820		Name: [signature] Date: Time: 1822
Name: Date: Time:		Name: [signature] Date: 8/16/04 Time: 1230
Name: Date: Time:		Name: Date: Time:

Floyd & Snider
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Seattle, WA 98104
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CHAIN OF CUSTODY

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 5

Recorded by: _____

Checked by: _____

Sample Matrix	Analysis													
S	Date:													1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

36916-7
Floyd & Snider, Inc.
34011008023
COC Form
Initials: JL
Date: 8/11/04 Time: 12:54

Sample Matrix	Analysis													
S	Date:													1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

-8
Floyd & Snider, Inc.
34011008024
COC Form
Initials: JL
Date: 8/11/04 Time: 1:06

Sample Matrix	Analysis													
S	Date:													1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

-9
Floyd & Snider, Inc.
34011008025
COC Form
Initials: JL
Date: 8/11/04 Time: 2:10

Sample Matrix	Analysis													
S	Date:													1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

-10
Floyd & Snider, Inc.
34011008026
COC Form
Initials: JL
Date: 8/11/04 Time: ~~2:43~~ 2:43

Sample Matrix	Analysis													
S	Date:													1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

-11
Floyd & Snider, Inc.
34011008027
COC Form
Initials: JL
Date: 8/11/04 Time: 2:48

Sample Matrix	Analysis													
S	Date:	⊗												1 Number of containers
	Time:													Number of Containers with Custody Seal Intact

-12
Floyd & Snider, Inc.
34011008028
COC Form
Initials: JL
Date: 8/11/04 Time: 3:25

Comments/Instructions	Relinquished By	Transported By	Received By
Hold for instructions ⊗ 8/23/04 per J. Lider/AS	Name: Date: 8-11-04 Time: 1820		Name: Date: 8/11/04 Time: 1822
	Name: Date: Time:		Name: Date: 8/16/04 Time: 1230
	Name: Date: Time:		Name: Date: Time:

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Seattle, WA 98104
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CHAIN OF COUSTODY

P3/4

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 6

Recorded by: JD

Checked by: ______

	Sample	Sample Matrix	Date / Time	Analysis: [illegible]	Analysis: [illegible]	Number of containers	Number of Containers with Custody Seal Intact
36918-13	Floyd & Snider, Inc. 34011008029 COC Form Initials: JL Date: 8/11/04 Time: 3:30	S	Date: Time:			1	
-14	Floyd & Snider, Inc. 34011008030 COC Form Initials: JL Date: 8/11/04 Time: 4:30	S	Date: Time:	⊗		1	
-15	Floyd & Snider, Inc. 34011008031 COC Form Initials: JL Date: 8/11/04 Time: 4:40	S	Date: Time:			1	
-16	Floyd & Snider, Inc. 34011008032 COC Form Initials: JL Date: 8/11/04 Time: 4:48	S	Date: Time:	⊗		1	
-17	Floyd & Snider, Inc. 34011008033 COC Form Initials: JL Date: 8/11/04 Time: 4:53	S	Date: Time:			1	
-18	Floyd & Snider, Inc. 34011008034 COC Form Initials: JL Date: 8/11/04 Time: 5:56	S	Date: Time:			1	

Comments/Instructions

Hold for instructions
⊗ 8/23/04 per J. Lider / AJ

Relinquished By	Transported By	Received By
Name: [signature] Date: 8-11-04 Time: 1820		Name: [signature] Date: 8/11/04 Time: 1822
Name: Date: Time:		Name: [signature] Date: 8/16/04 Time: 1730
Name: Date: Time:		Name: Date: Time:

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Seattle, WA 98104
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CHAIN OF COUSTODY

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 7

Sample ID	Sample Matrix		Analysis		Containers
36918-19 Floyd & Snider, Inc. 34011008035 COC Form Initials: JL Date: 8/11/04 Time: 5:58	S	Date: Time:	(X)		Number of containers: 1; Number of Containers with Custody Seal Intact
-20 Floyd & Snider, Inc. 34011008036 COC Form Initials: JL Date: 8/11/04 Time: 6:02	S	Date: Time:			Number of containers: 1; 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
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

Recorded by:
Checked by:

Comments/Instructions

Hold for Instructions
(X) 8/23/04 per J. Lider / AJ

Relinquished By	Transported By	Received By
Name: [signature] Date: 8-11-04 Time: 1820		Name: [signature] Date: 8/11/04 Time: 1822
Name: Date: Time:		Name: [signature] Date: 8/16/04 Time: 1230
Name: Date: Time:		Name: Date: Time:

Pg 1/3

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

CHAIN OF CUSTODY

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 8

Recorded by: _____

Checked by: _____

Analysis

Sample Matrix

36919-1

Floyd & Snider, Inc.
34011008037
COC Form
Initials: JL
Date: 8/12/04 Time: 11:04

S

Date:
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

-2

Floyd & Snider, Inc.
34011008038
COC Form
Initials: JL
Date: 8/12/04 Time: 11:08

S

Date:
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

-3

Floyd & Snider, Inc.
34011008039
COC Form
Initials: JL
Date: 8/12/04 Time: 11:16

S

Date:
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

-4

Floyd & Snider, Inc.
34011008040
COC Form
Initials: JL
Date: 8/12/04 Time: 11:58

S

Date: 8
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

-5

Floyd & Snider, Inc.
34011008041
COC Form
Initials: JL
Date: 8/12/04 Time: 12:02

S

Date:
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

-6

Floyd & Snider, Inc.
34011008042
COC Form
Initials: JL
Date: 8/12/04 Time: 12:09

S

Date:
Time:

1 Number of containers

Number of Containers with Custody Seal Intact

Comments/Instructions	Relinquished By	Transported By	Received By
Hold for instructions @8/23/04 per J. Stolen 1:45	Name: JL Date: 8-12-04 Time: 1644		Name: [illegible] Date: 8/12/04 Time: 16:45
	Name: Date: Time:		Name: GBR Date: 8/16/04 Time: 1230
	Name: Date: Time:		Name: Date: Time:

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Seattle, WA 98104
(206) 292-2078

CHAIN OF CUSTODY

Pg 2/3

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 9

Recorded by: _____

Checked by: _____

	Sample Matrix	Analysis	
Floyd & Snider, Inc. 34011008043 COC Form Initials: JL Date: 8/12/04 Time: 12:13	S	Date: ⊗ Time:	Number of containers: 1 Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008044 COC Form Initials: JL Date: 8/12/04 Time: 2:02	S	Date: Time:	Number of containers: 1 Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008045 COC Form Initials: JL Date: 8/12/04 Time: 2:42	S	Date: Time:	Number of containers: 1 Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008046 COC Form Initials: JL Date: 8/12/04 Time: 2:45	S	Date: Time:	Number of containers: 1 Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008047 COC Form Initials: JL Date: 8/12/04 Time: 3:35	S	Date: Time:	Number of containers: 1 Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008048 COC Form Initials: JL Date: 8/12/04 Time: 3:45	S	Date: Time:	Number of containers: 1 Number of Containers with Custody Seal Intact

Comments/Instructions	Relinquished By	Transported By	Received By
Hold for instructions ⊗ 8/23/04 per Linda/AT	Name: JL Date: 8-12-04 Time: 1644		Name: J Satterberg Date: 8/12/04 Time: 1645
	Name: Date: Time:		Name: K Bell Date: 8/16/04 Time: 1250
	Name: Date: Time:		Name: Date: Time:

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

CHAIN OF CUSTODY

Pg 3/3

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 10

Analysis

Recorded by: ______

Checked by: ______

36919-13

Sample	Sample Matrix	Date/Time	Analysis	Containers
Floyd & Snider, Inc. 34011008049 COC Form Initials: JL Date: 8/12/04 Time: 4:24	S	Date: Time:		Number of containers: 1 Number of Containers with Custody Seal Intact
Place Sample ID Label Here or Write ID Number Here	S	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
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
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 instructions

Relinquished By	Transported By	Received By
Name: [signature] Date: 8-12-04 Time: 1244		Name: [signature] Date: 8/12/04 Time: 1645
Name: Date: Time:		Name: [signature] Date: 8/16/04 Time: 1220
Name: Date: Time:		Name: Date: Time:

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

CHAIN OF CUSTODY

1/2

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

Recorded by: JS

Checked by: _____

	Sample Matrix		Analysis: GC/MS full scan mod. EPA 8270/625	Number of containers	Number of Containers with Custody Seal Intact
Floyd & Snider, Inc. 34011008050 COC Form Initials: JL Date: 8/13/04 Time: 10:16	S	Date:	X	1	
		Time:			
Floyd & Snider, Inc. 34011008051 COC Form Initials: JL Date: 8/13/04 Time: 10:44	S	Date:		1	
		Time:			
Floyd & Snider, Inc. 34011008052 COC Form Initials: JS Date: 8/13/04 Time: 11:45	S	Date:		1	
		Time:			
Floyd & Snider, Inc. 34011008053 COC Form Initials: JS Date: 8/13/04 Time: 11:50	S	Date:		1	
		Time:			
Floyd & Snider, Inc. 34011008054 COC Form Initials: JS Date: 8/13/04 Time: 12:25	S	Date:	X	1	
		Time:			
Floyd & Snider, Inc. 34011008055 COC Form Initials: JS Date: 8/13/04 Time: 12:35	S	Date:		1	
		Time:			

Comments/Instructions	Relinquished By	Transported By	Received By
Hold for instructions	Name: Date: 8/13/04 Time: 1400		Name: Date: Time:
	Name: Date: Time:		Name: Date: Time:
	Name: Date: Time:		Name: Date: Time:

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

CHAIN OF CUSTODY

Pg 2/2

Floyd & Snider, Inc.
Job Number 34011008
COC Form # 12

Recorded by: JS

Checked by:

Sample ID	Sample Matrix	Date/Time	Analysis: PCB Fall Scan	Containers
36926-7 Floyd & Snider, Inc. 34011008056 COC Form Initials: JS Date: 8/13/04 Time: 1:42	S	Date: Time:	⊗	Number of containers: 1; Number of Containers with Custody Seal Intact:
-8 Floyd & Snider, Inc. 34011008057 COC Form Initials: JS Date: 8/13/04 Time: 1:44	S	Date: Time:		Number of containers: 1; Number of Containers with Custody Seal Intact:
-9 Floyd & Snider, Inc. 34011008058 COC Form Initials: JS Date: 8/13/04 Time: 1:47		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:
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 instructions
@ 9/23/04 per J. Lowe [illegible]

Relinquished By	Transported By	Received By
Name: [illegible] Date: 8/17/04 Time: 1400		Name: [illegible] Date: [illegible] Time: [illegible]
Name: Date: Time:		Name: [illegible] Date: [illegible] Time:
Name: Date: Time:		Name: Date: Time:

Zymax
71 Zaca Lane
San Luis Obispo CA 93401
vox 805.544.4696
fax 805.544.8226

CLIENT EDD ☐ LUFT EDF ☐ DW EDT ☐

CHAIN of CUSTODY

report to: Tom Colligan
company: Floyd|Snider
address: 83 S. King St Suite 614 Seattle, Wa 98104
vox: (206) 292-2078
fax: (206) 682-7867
proj: Gas Works Park
proj #: COS-NAPL T4
sampler: JESSI SATTERBERG

ZymaX use only	SAMPLE DESCRIPTION	Date Sampled	Time	Matrix	Preserve	GC/MS full scan	Mod. EPA 8270/625	Extraction	# of containers	Remarks
36921-1	DW-4-FP	8/11/04	8:50	Oil	N	⊗			1	
-2	DW-5-FP	8/11/04	9:20	Oil	N	⊗			1	
-3	3-1-G	8/11/04	2:10	S	N	⊗		⊗		

ANALYSIS REQUESTED

Turnaround Time: ASAP ☐ 48 hr ☐ 12 hr ☐ 72 hr ☐ 24 hr ☐ std ☐

Comments
Hold for instructions
⊗ 8/23/04 per John Lider/AJ.

Sample integrity upon receipt:
- Samples received intact ☐
- Samples received cold ☐
- Custody seals ☐
- Correct container types ☐

Bill 3rd party:
PO#: COS-NAPL T4
Quote yes no

Relinquished by:
Signature: Jessi Satterberg
Print: JESSI SATTERBERG
Company: Floyd|Snider
Date: 8:23 Time: 8/12/04

Received by:
Signature:
Print:
Company:
Date: Time:

Relinquished by:
Signature:
Print:
Company:
Date: Time:

Received by ZymaX envirotechnology, inc:
Signature: [signature]
Print: D Branham
Company: Zymax
Date: 8/16/04 Time: 1230

email: login@ZymaXusa.com

ZymaX — CHAIN of CUSTODY

71 Zaca Lane
San Luis Obispo CA 93401
vox 805.544.4696
fax 805.544.8226

CLIENT EDD ☐ LUFT EDF ☐ DW EDT ☐

report to	vox (206) 292-2078	fax
company Floyd | Snider	proj GWP	
address 83 S. King St. Suite 614 SEATTLE, WA 98104	proj # MS-NAPL T5	
	sampler JESSI SATTERBERG	

Turnaround Time
ASAP ☐ 48 hr ☐ 12 hr ☐ 72 hr ☐ 24 hr ☐ std ☐

ZymaX use only	SAMPLE DESCRIPTION	Date Sampled	Time	Matrix	Preserve	ANALYSIS REQUESTED: GC/MS Fullscan	# of containers	Remarks
36922-1	1-46	8/12/04	18:00	S	NA			
-2	1-46A	8/12/04	19:00	S	NA			
-3	1-16⊗	8/11/04	13:30	S	NA	⊗		

Comments
⊗ 8/23/04 per J. Linder/MS

Relinquished by:
Signature _____
Print _____
Company _____
Date 8/16/04 Time _____

Received by:
Signature _____
Print _____
Company _____
Date _____ Time _____

Sample integrity upon receipt:
Samples received intact ☐
Samples received cold ☐
Custody seals ☐
Correct container types ☐

Bill 3rd party:

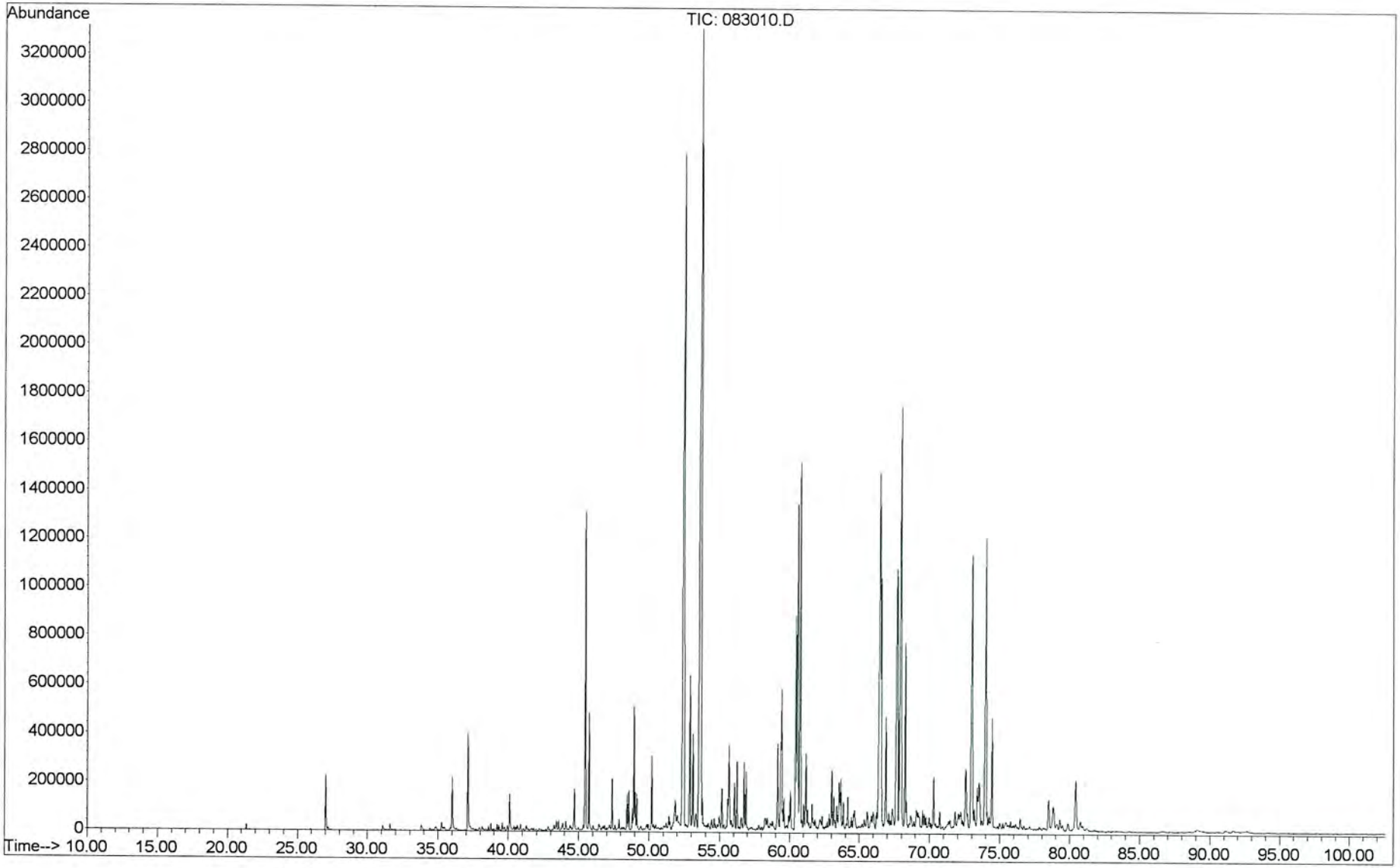
PO#: _____
Quote yes no

Relinquished by:
Signature _____
Print _____
Company _____
Date _____ Time _____

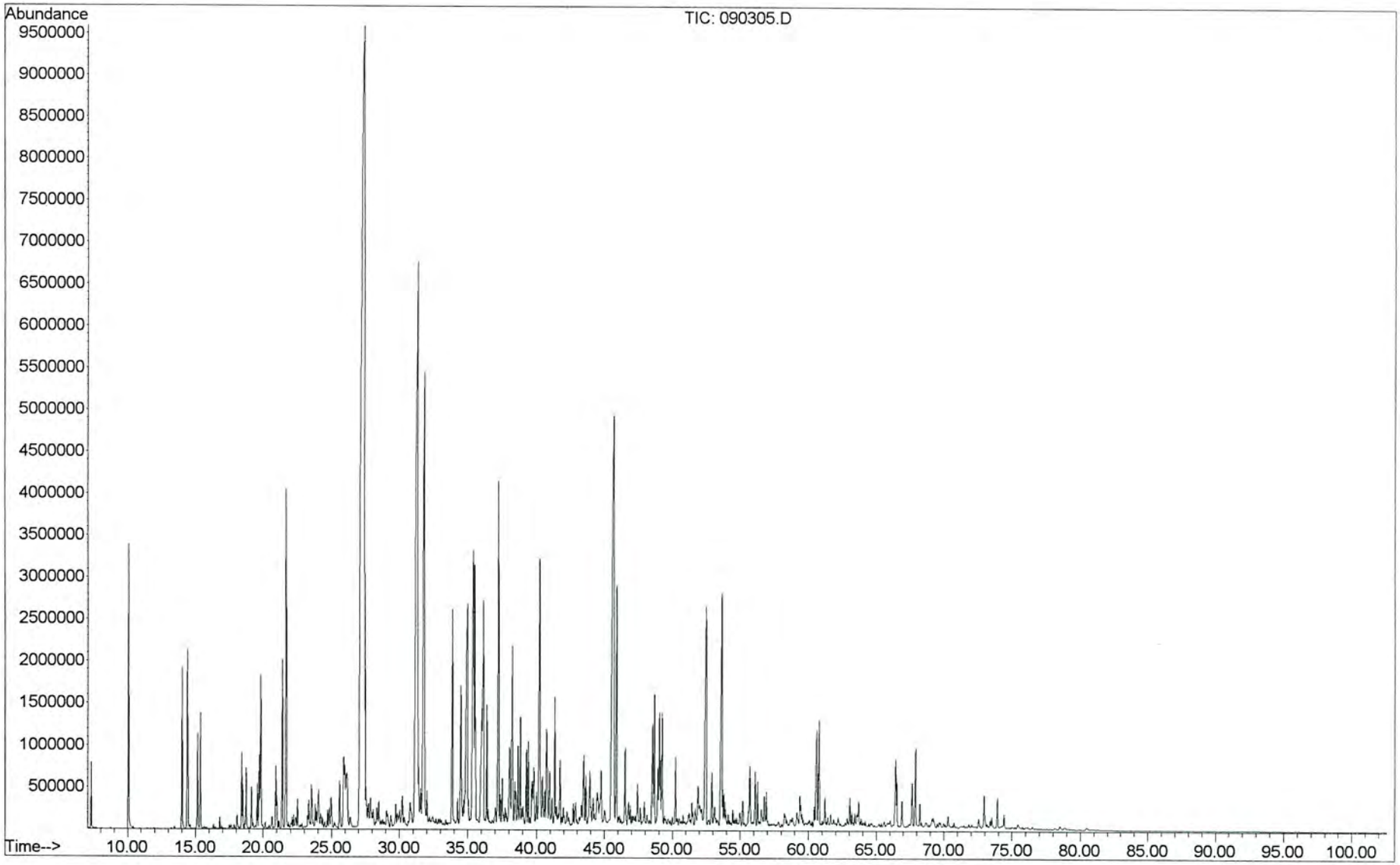
Received by ZymaX envirotechnology, inc:
Signature _____
Print Amy Branham
Company ZymaX
Date 8/16/04 Time 1230

email: login@ZymaXusa.com

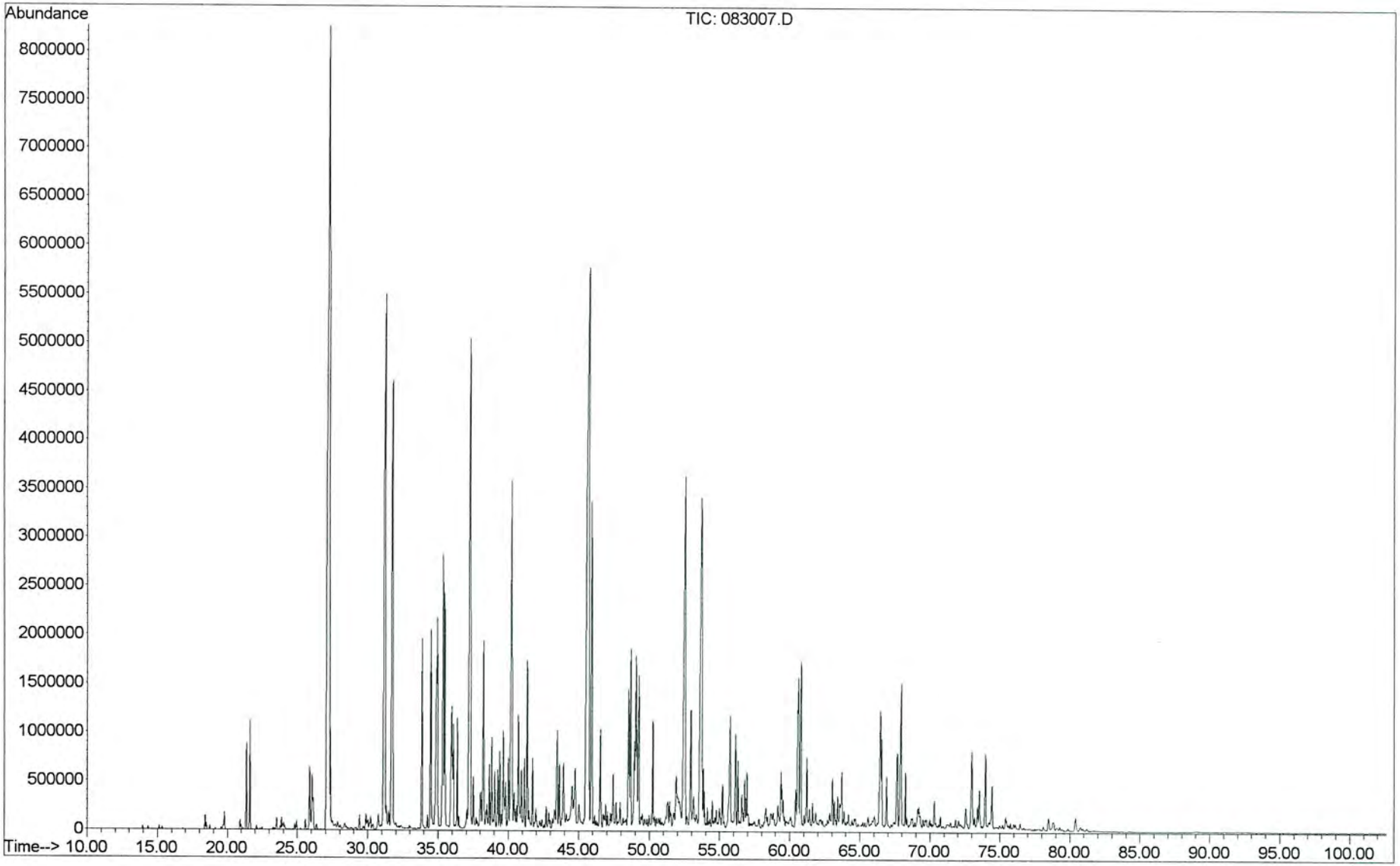
Sample Name: 1-1G (36922-3) soil extract (1:12)
Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml



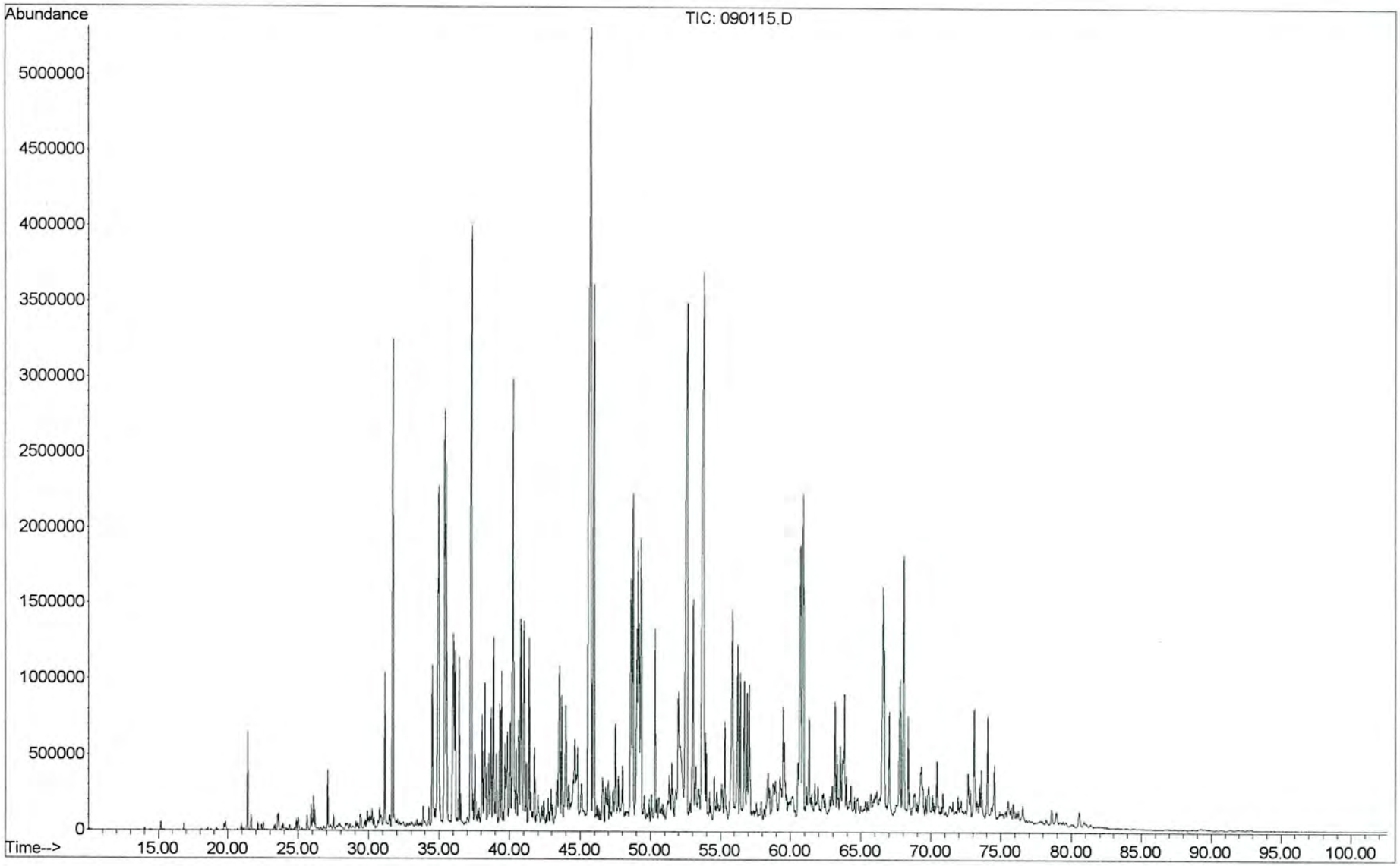
Sample Name: DW-4-FP (36921-1) Product x50
Misc Info : Gas Works Park, Floyd



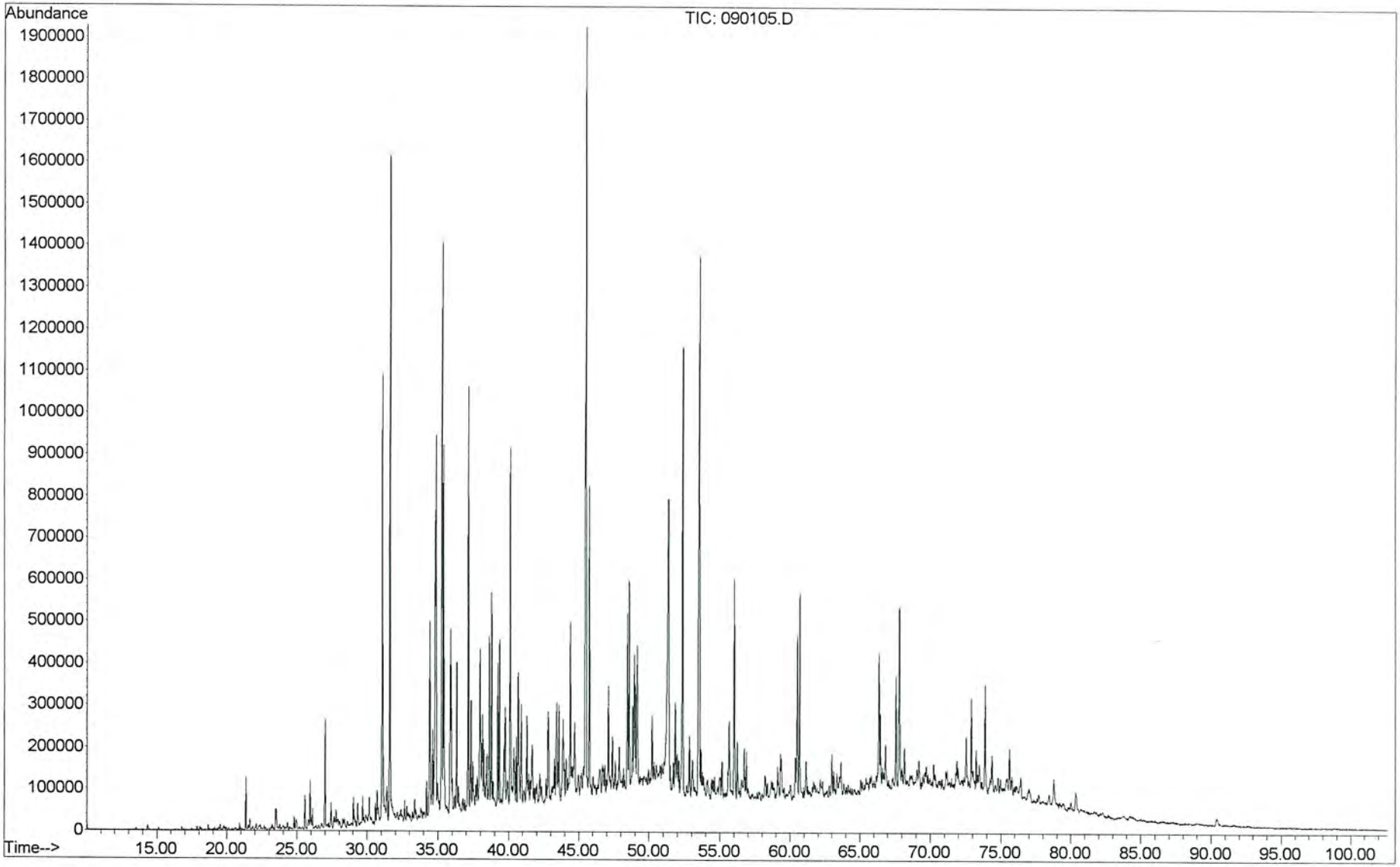
Sample Name: 34011008040 (36919-4) soil extract (1:2)
Misc Info : MGP, Floyd Snider, QB SS5318



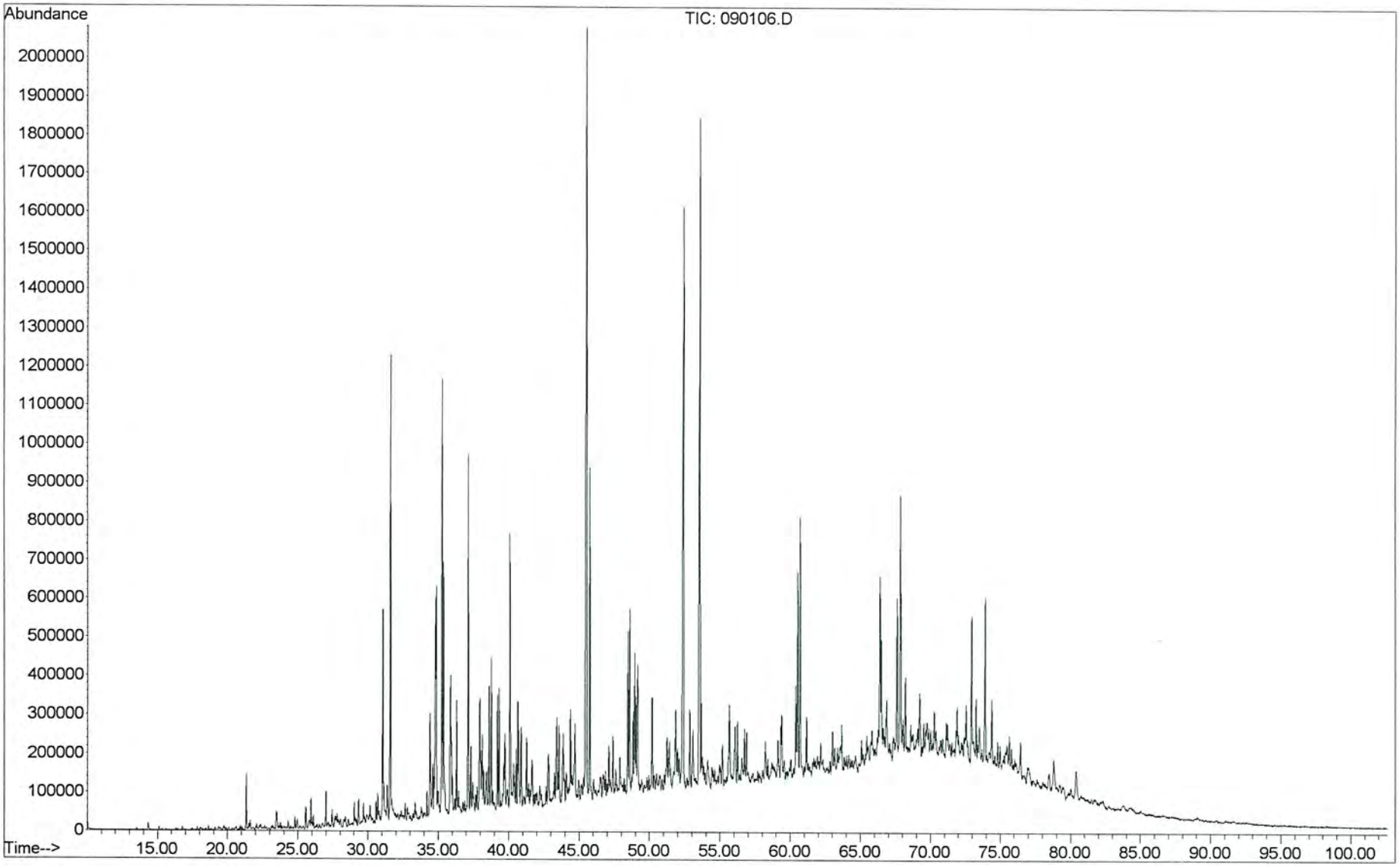
Sample Name: 34011008035 (36918-19) soil ext (4:6)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



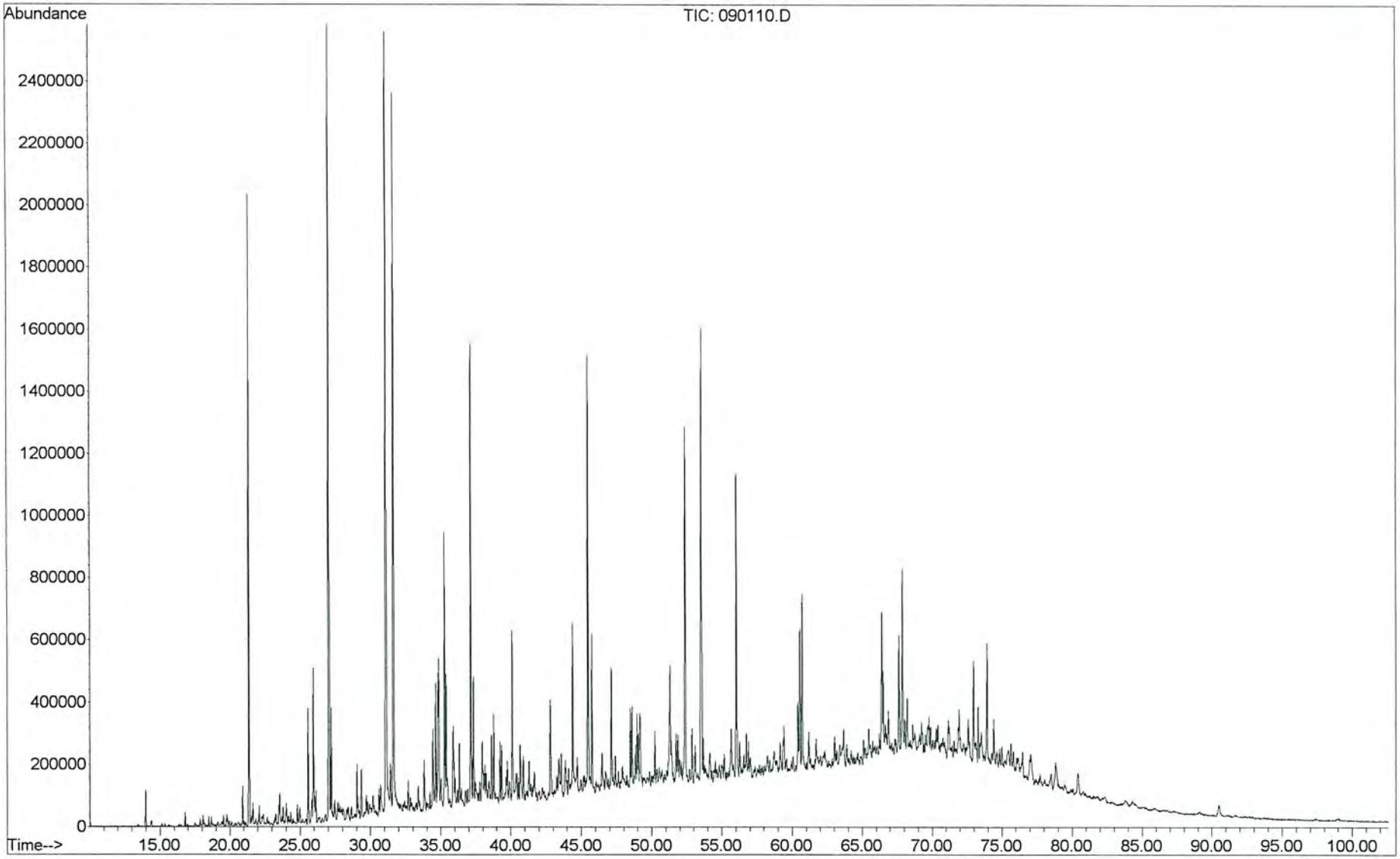
Sample Name: 34011008001 (36917-1) soil extract (1:2)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



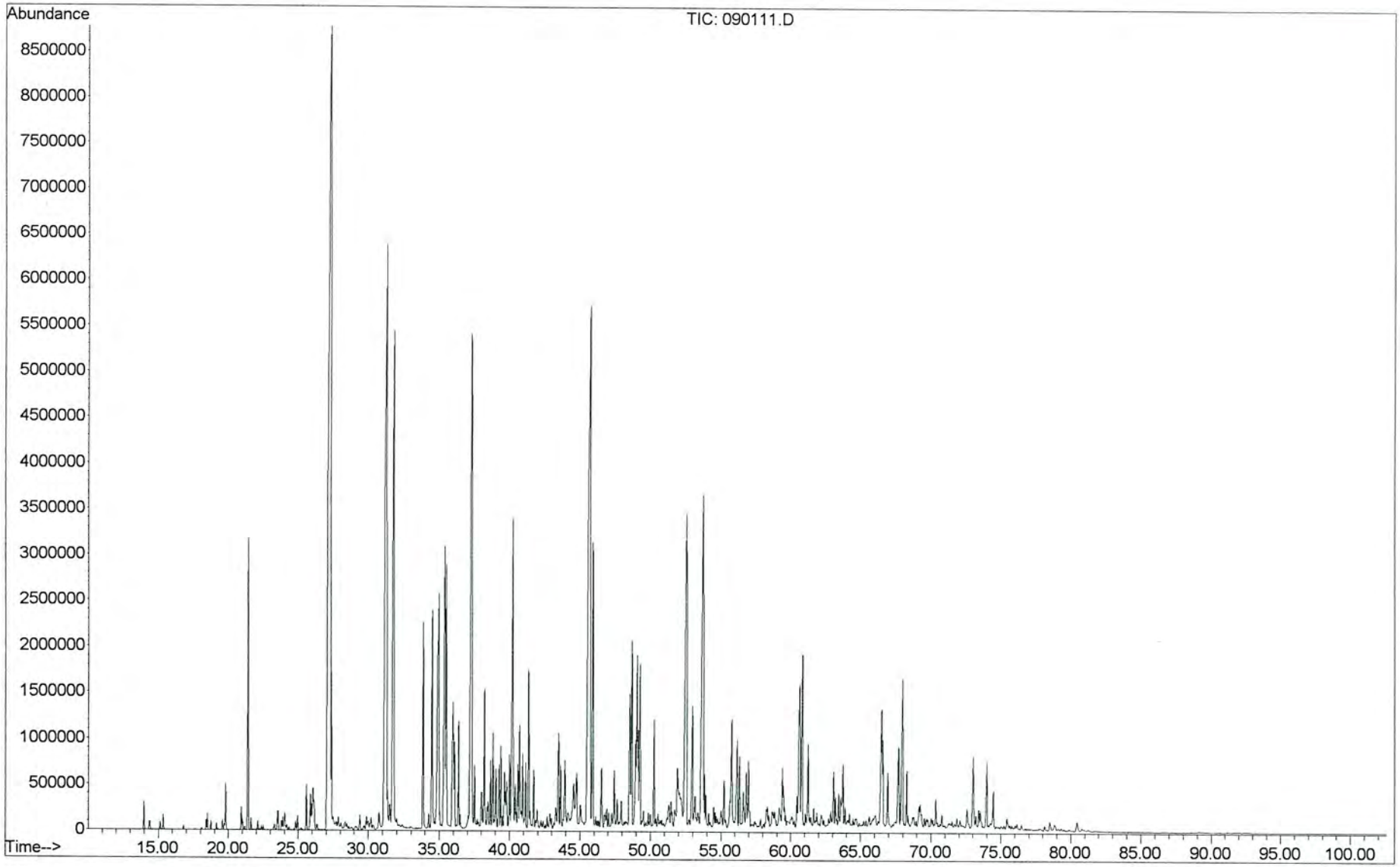
Sample Name: 34011008011 (36917-11) soil extract (1:2)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



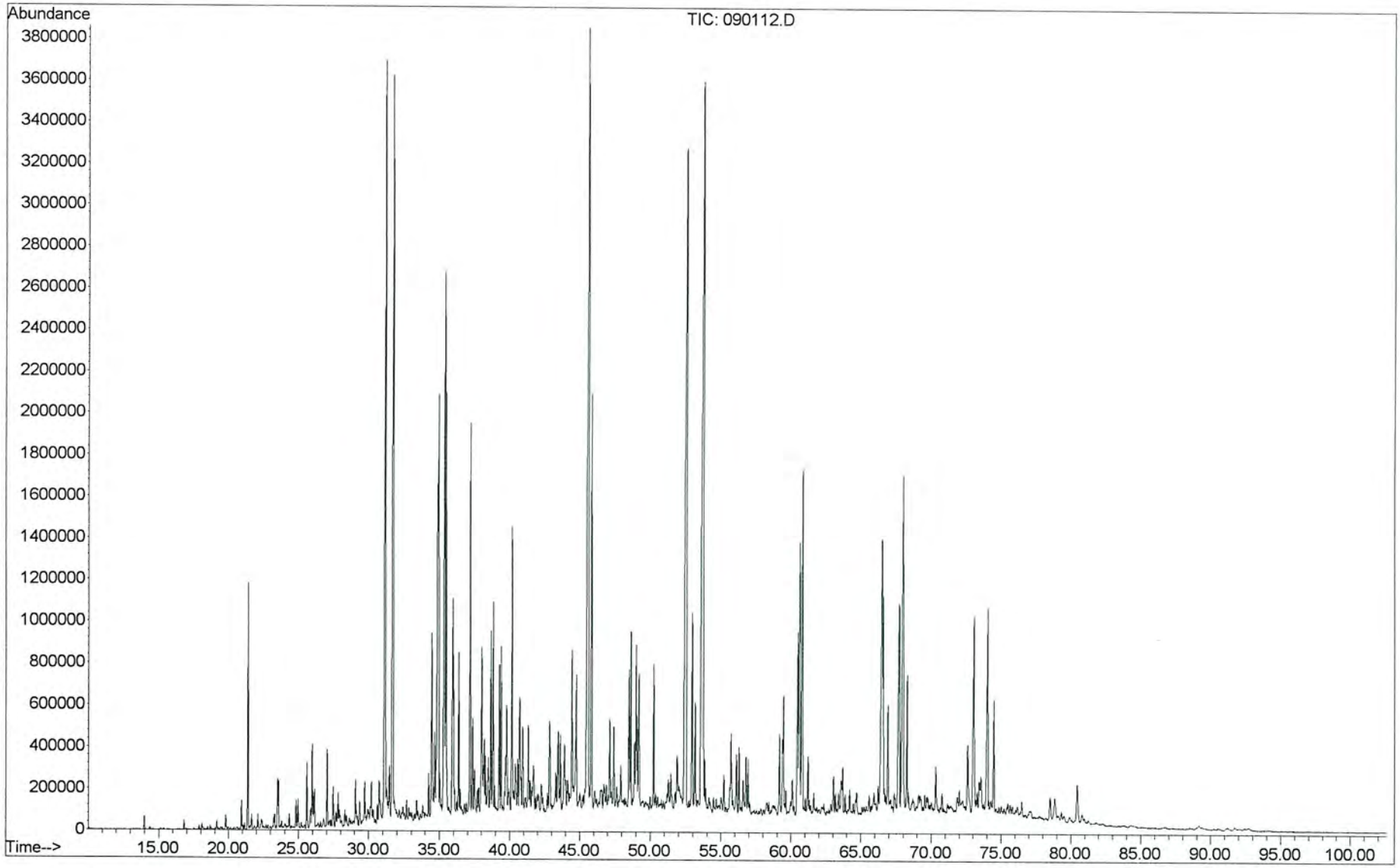
Sample Name: 34011008017 (36918-1) soil extract (3:7)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=1ml



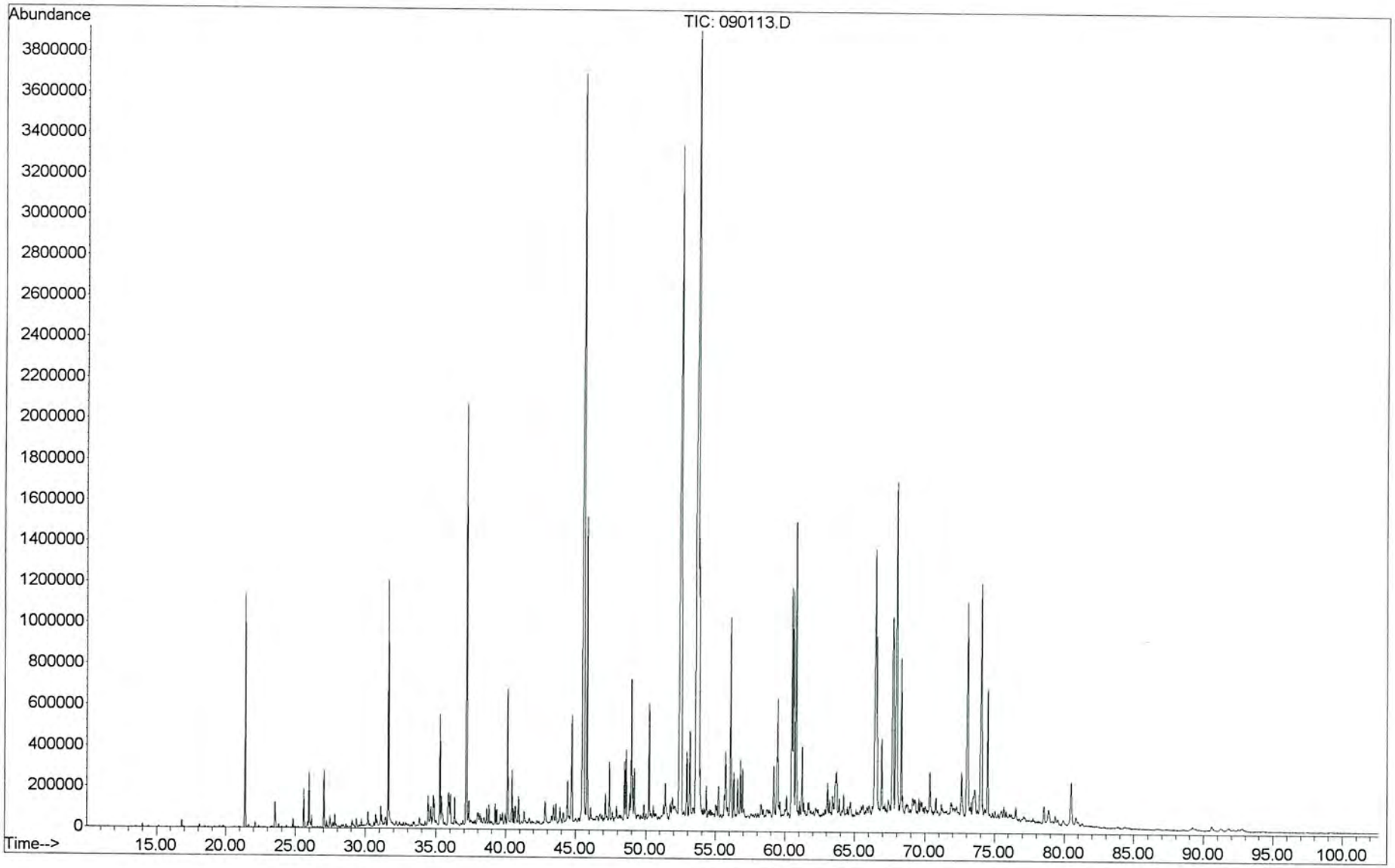
Sample Name: 34011008020 (36918-4) soil extract (1:1.2)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



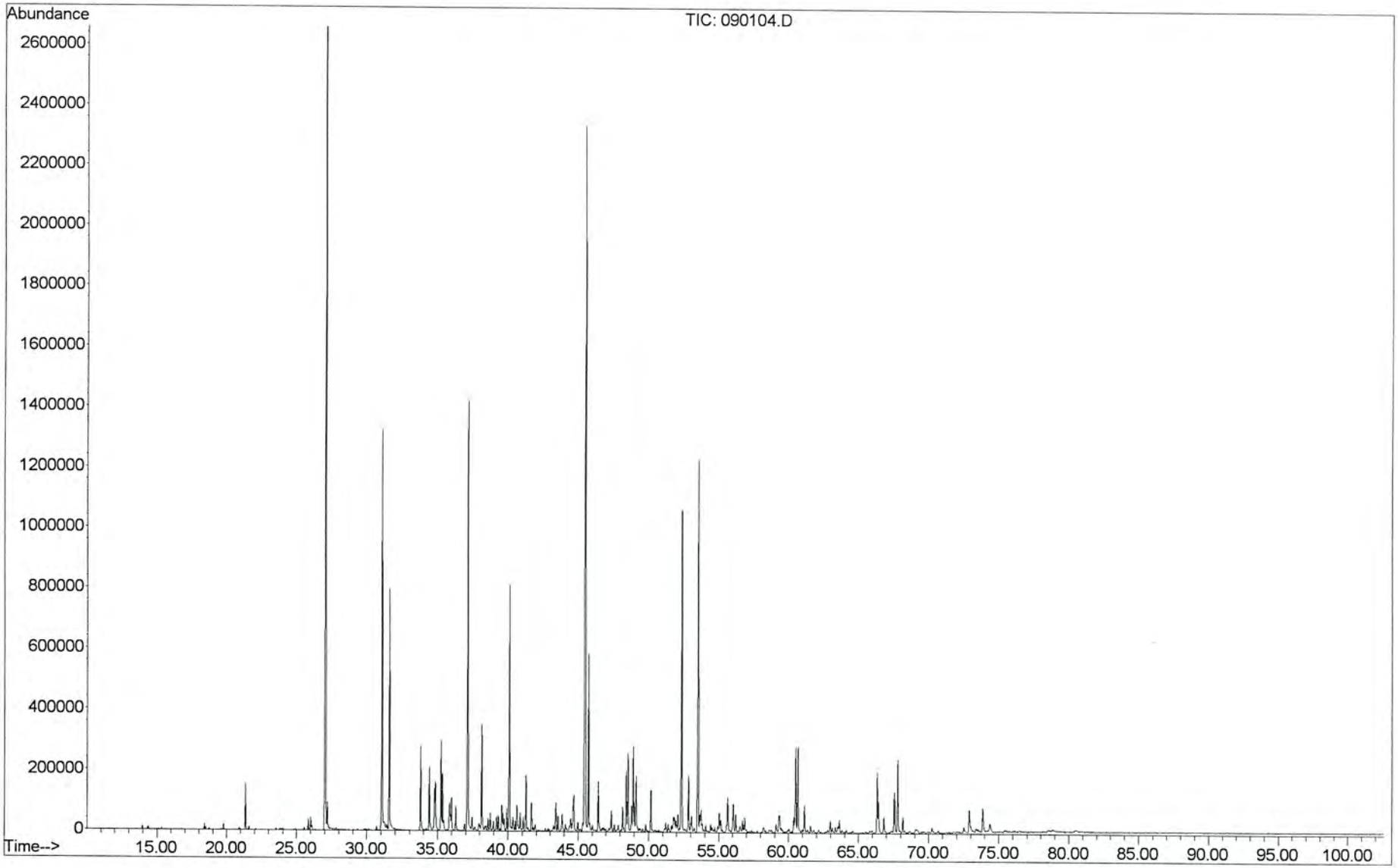
Sample Name: 34011008022 (36918-6) soil extract (3:8)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



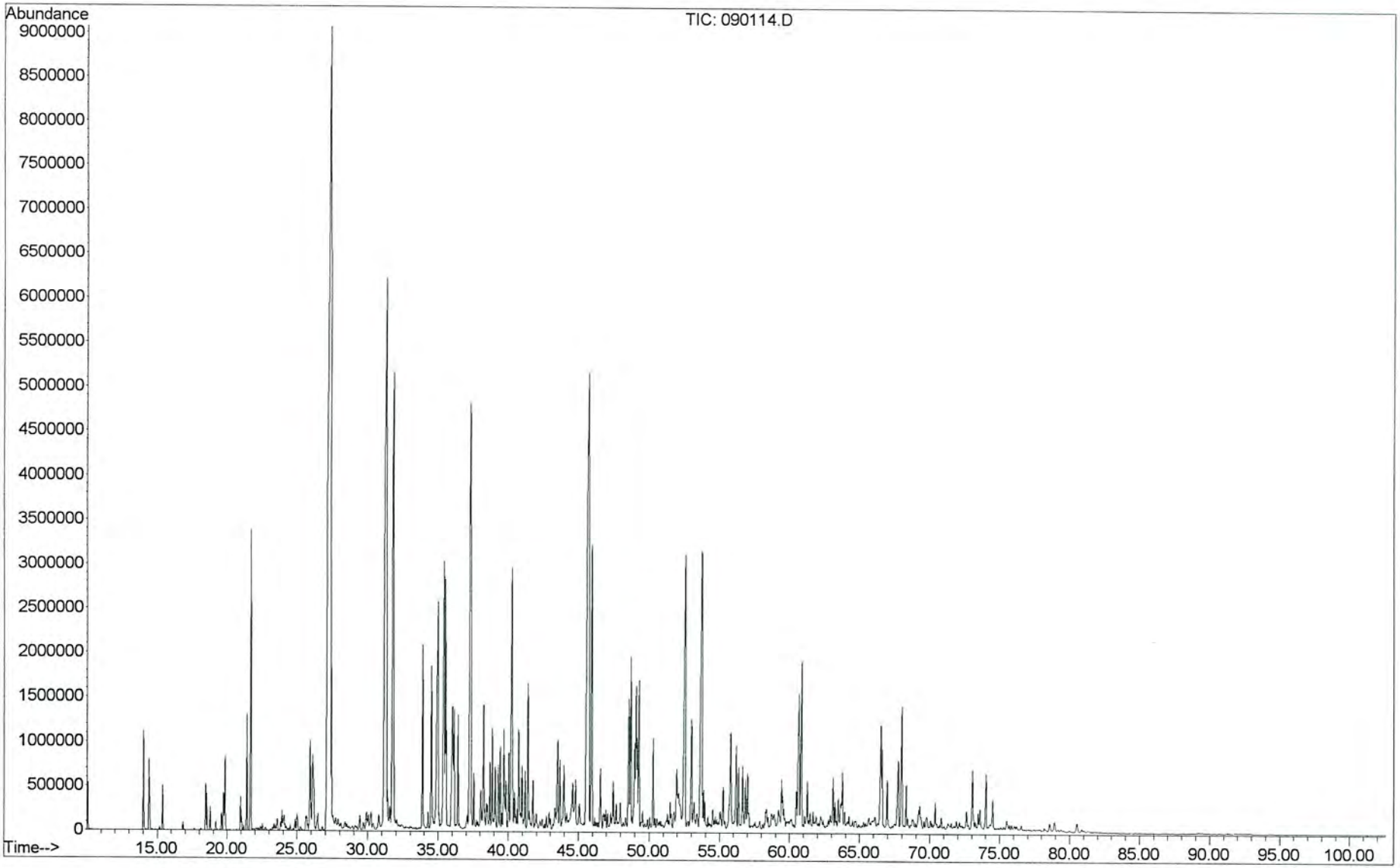
Sample Name: 34011008028 (36918-12) soil extract (1:1))
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=2ml



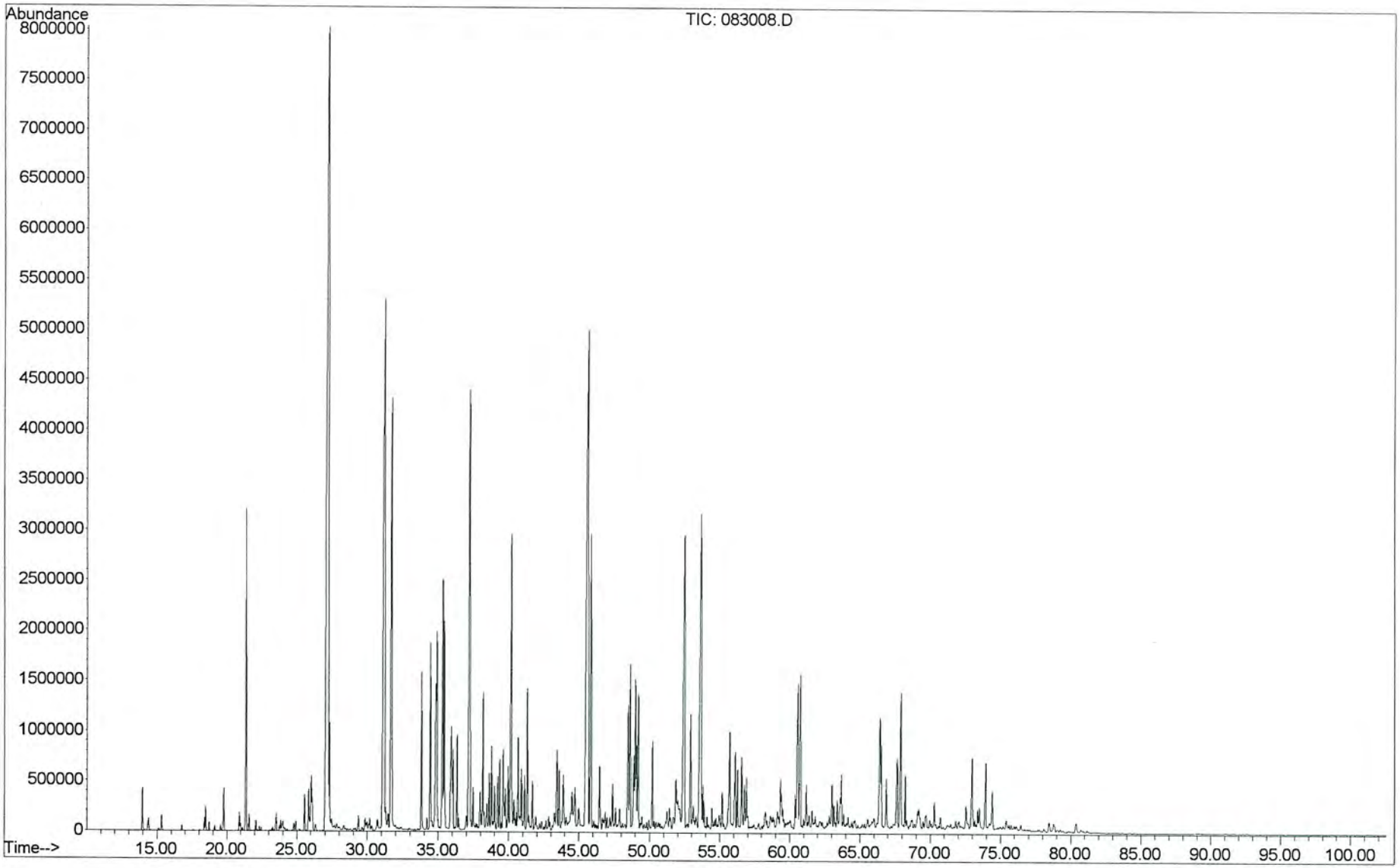
Sample Name: 34011008030 (36918-14) soil extract
Misc Info : MGP, Floyd Snider, QB SS5305



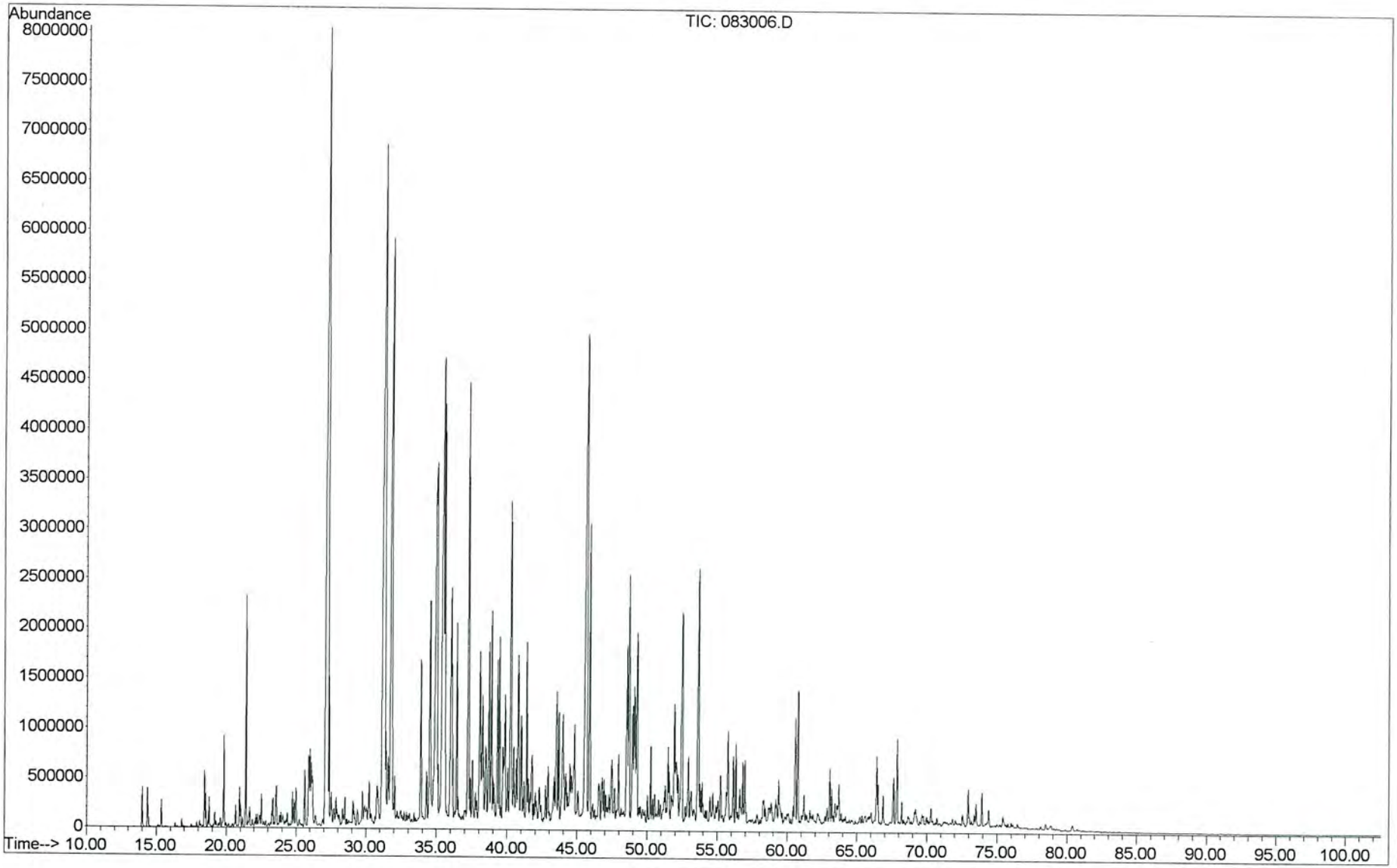
Sample Name: 34011008032 (36918-16) soil ext (3.5:6.5)
Misc Info : MGP, Floyd Snider, QB SS5305, Vf=4ml



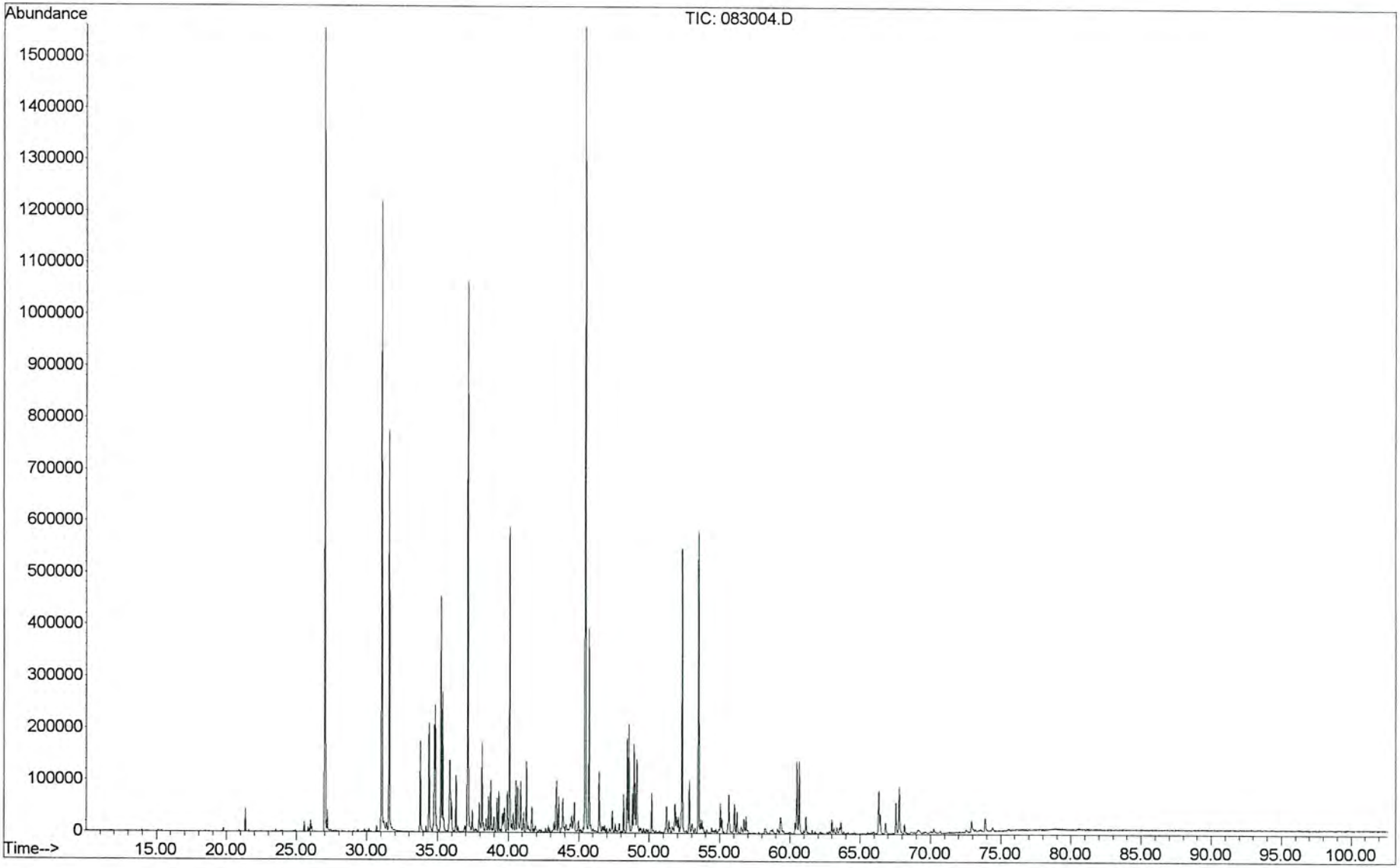
Sample Name: 34011008043 (36919-7) soil extract (1:2)
Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml



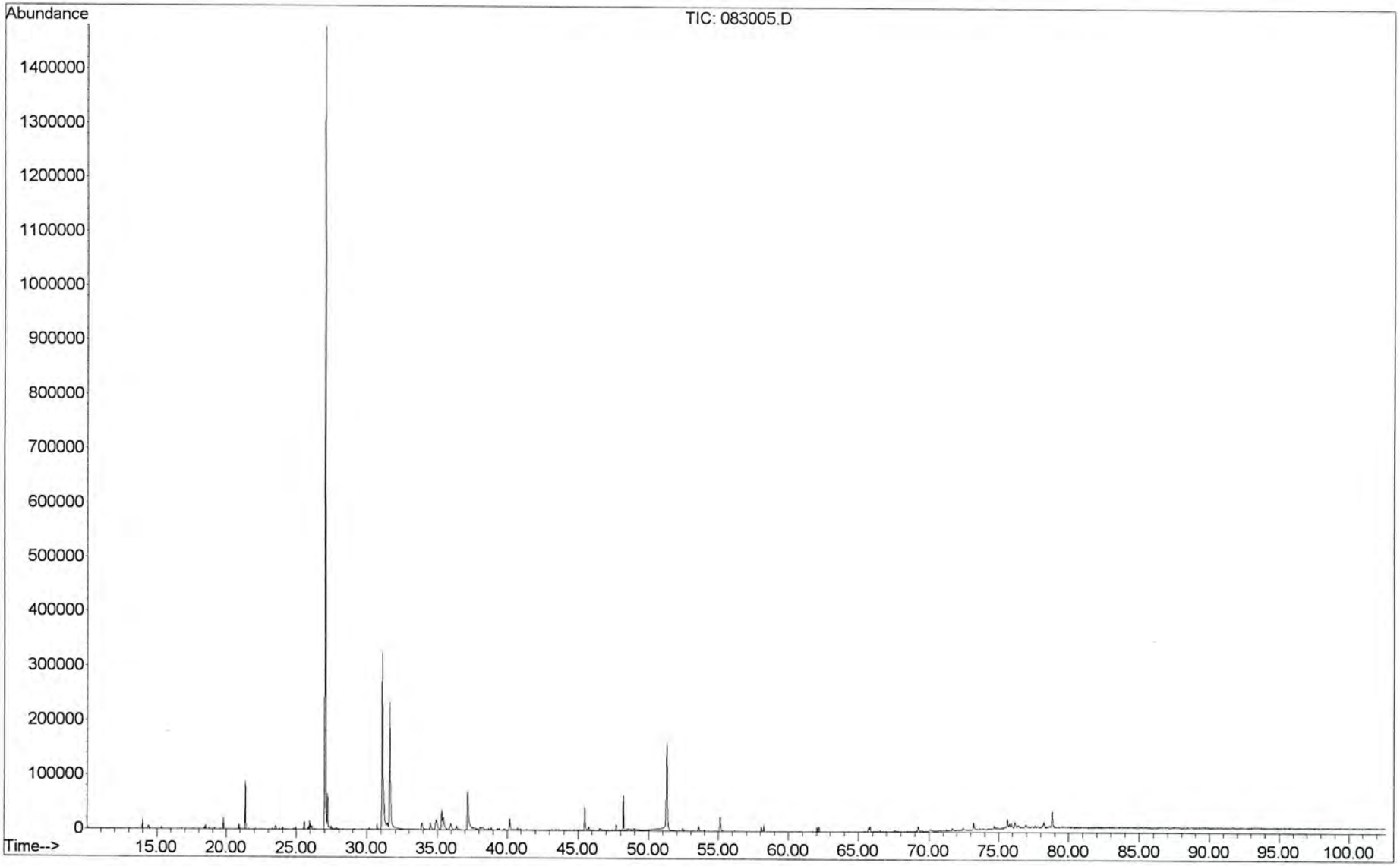
Sample Name: 34011008050 (36920-1) soil extract (1:7)
Misc Info : MGP, Floyd Snider, QB SS5318, Vf=3ml



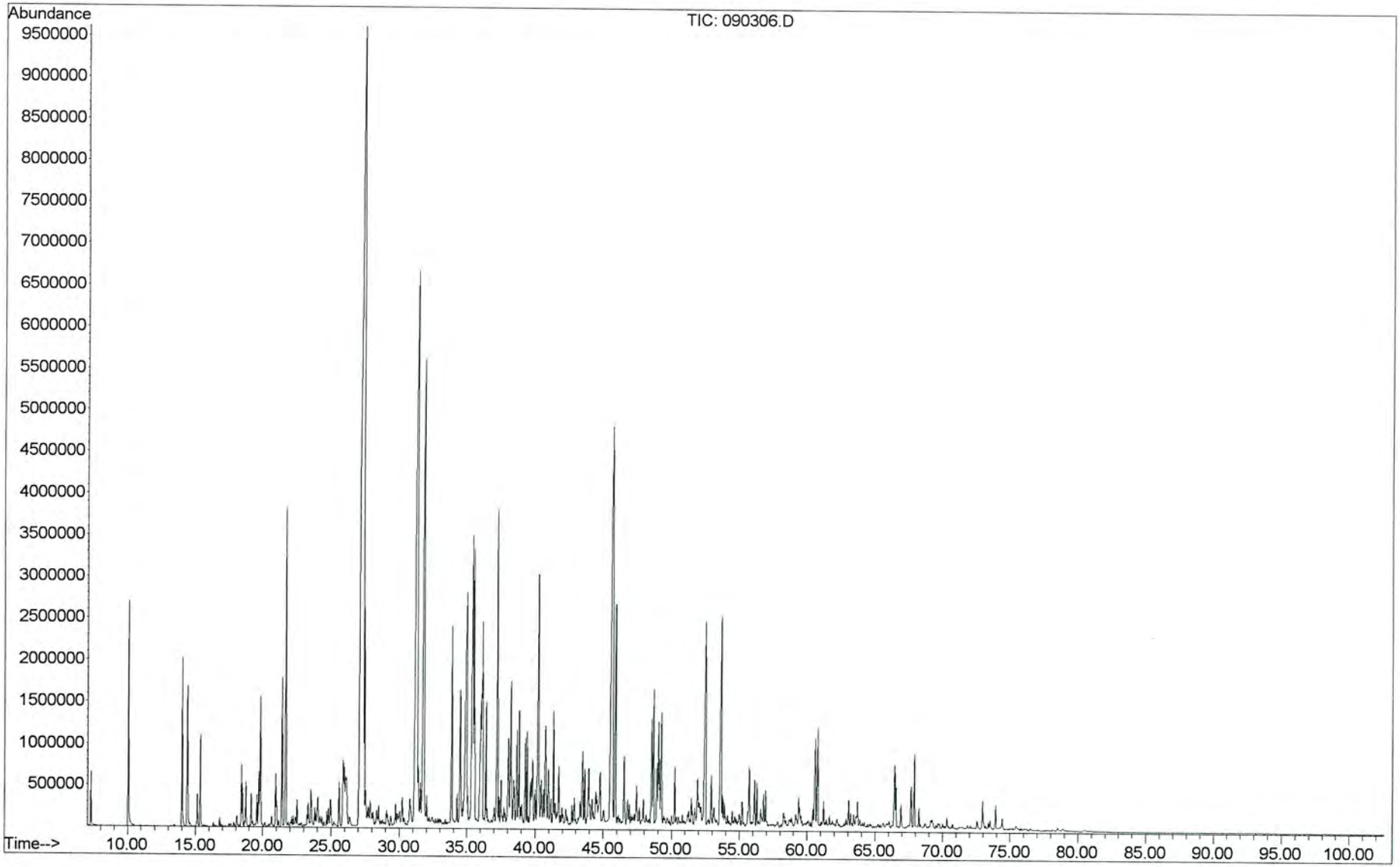
Sample Name: 34011008054 (36920-5) soil extract
Misc Info : MGP, Floyd Snider, QB SS5318



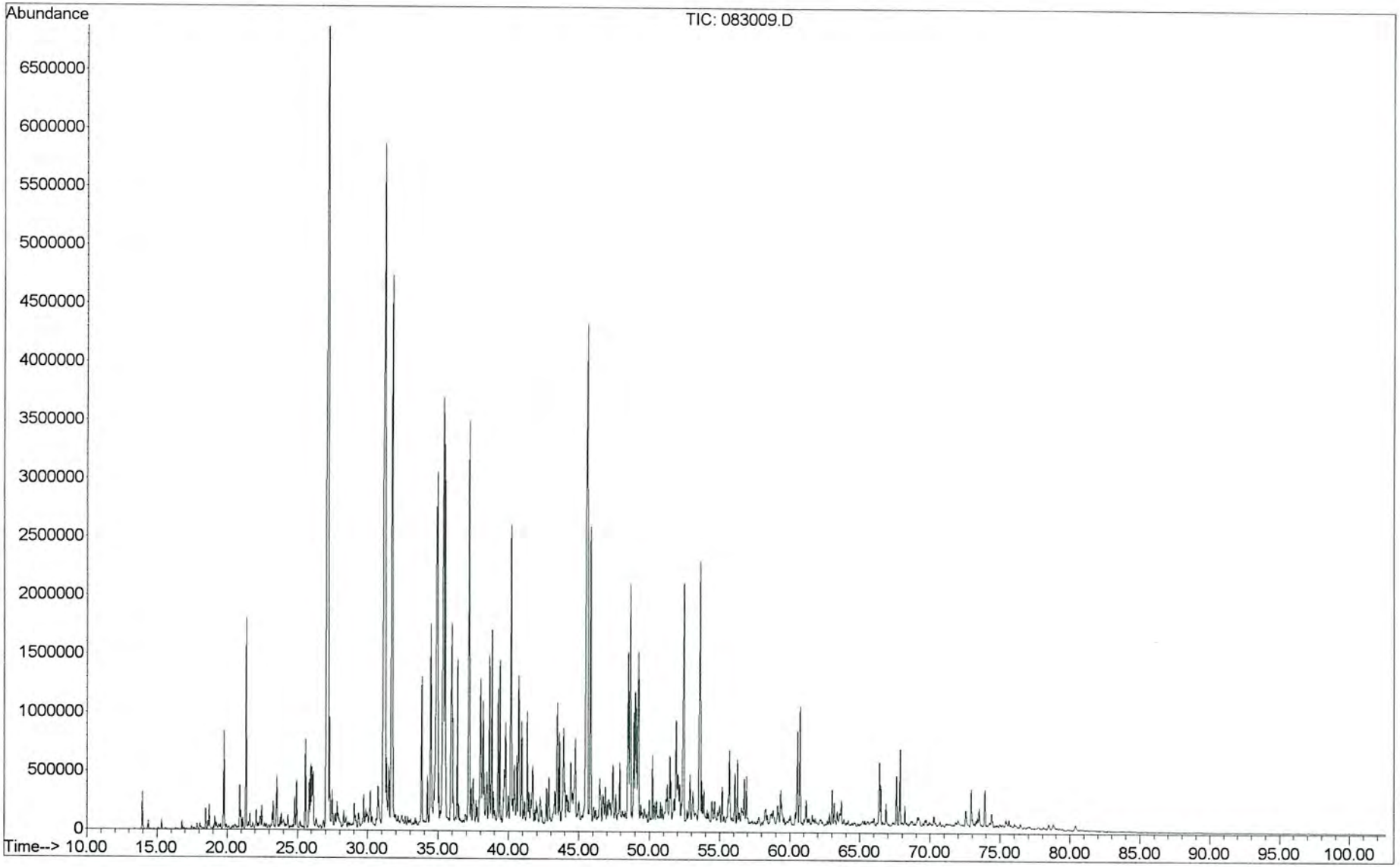
Sample Name: 34011008056 (36920-7) soil extract
Misc Info : MGP, Floyd Snider, QB SS5318



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=2ml

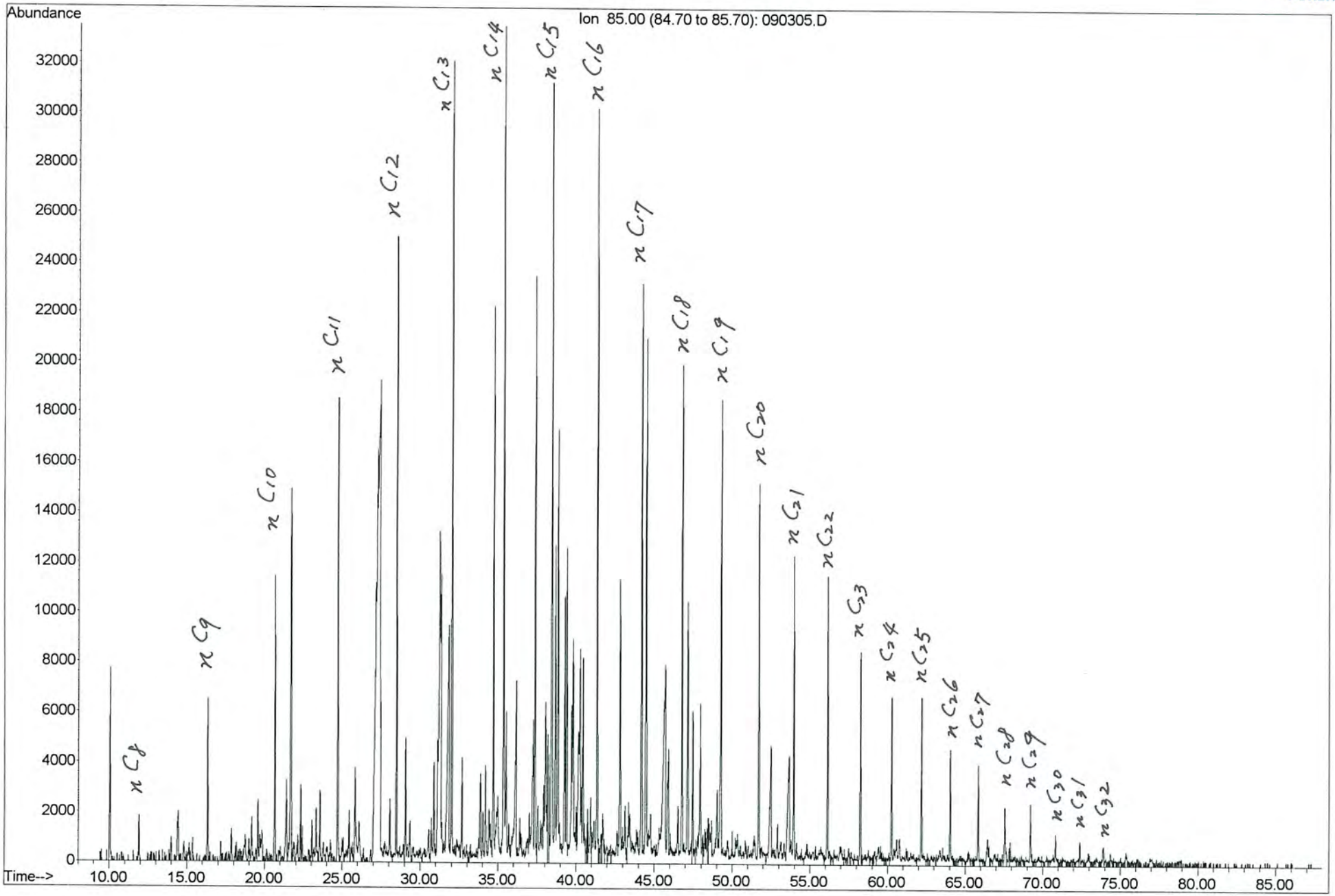


Table

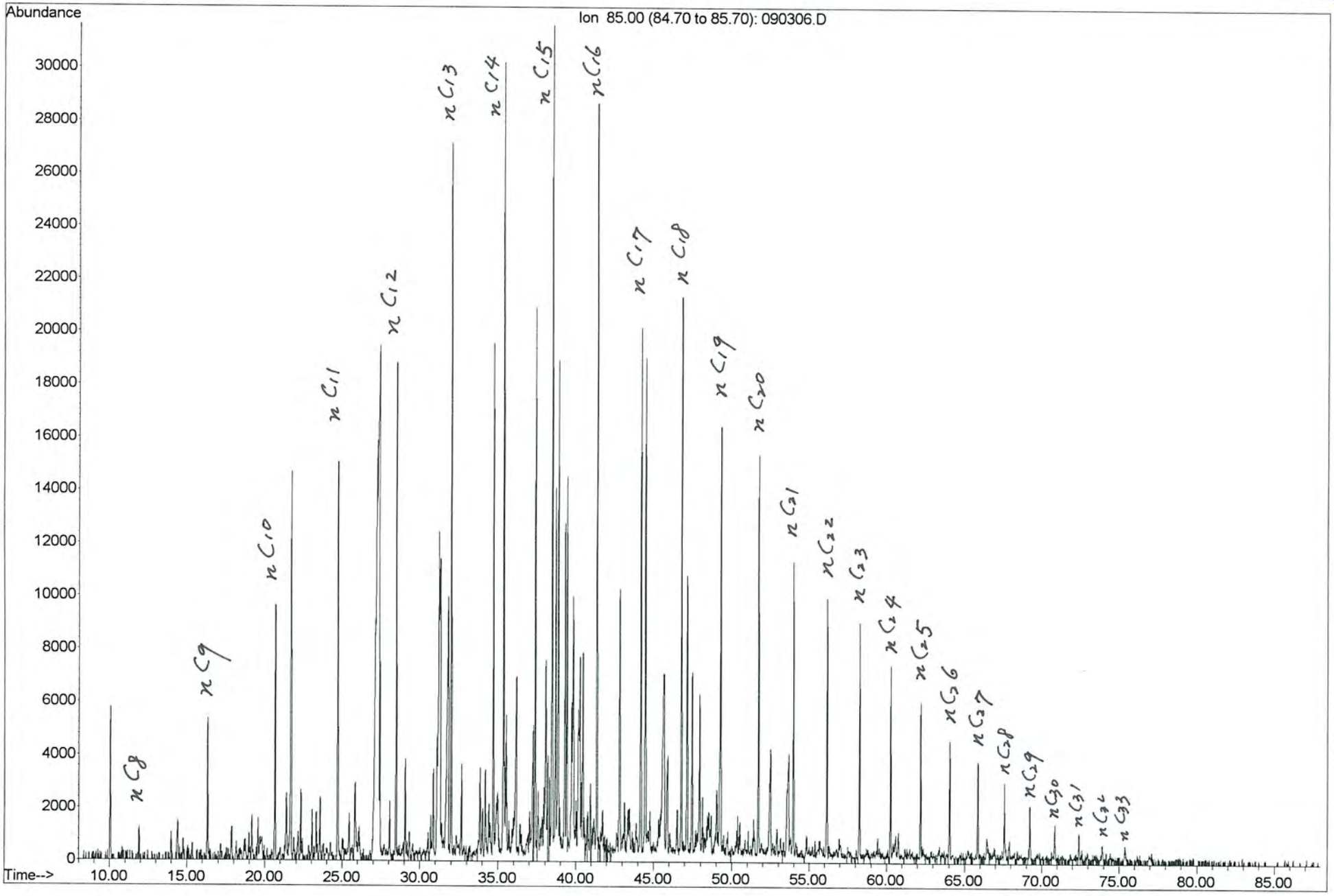
Key to Chromatogram Symbol Identification for m/z 85 and m/z 113 Paraffins and Isoparaffins

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 *n* indicates number of carbon atoms in the side chain)

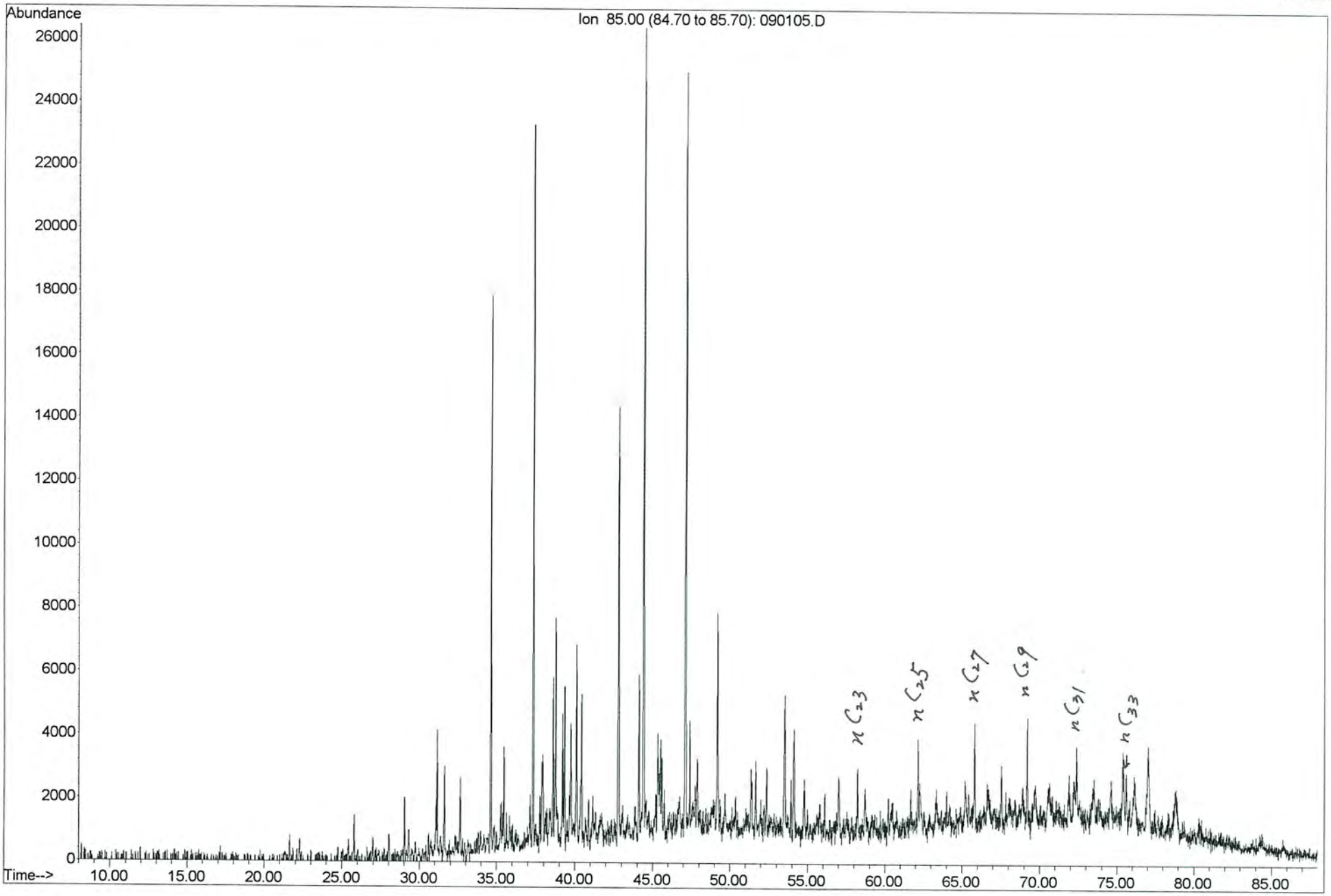
DW-4-FP (36921-1) Product x50
Gas Works Park, Floyd



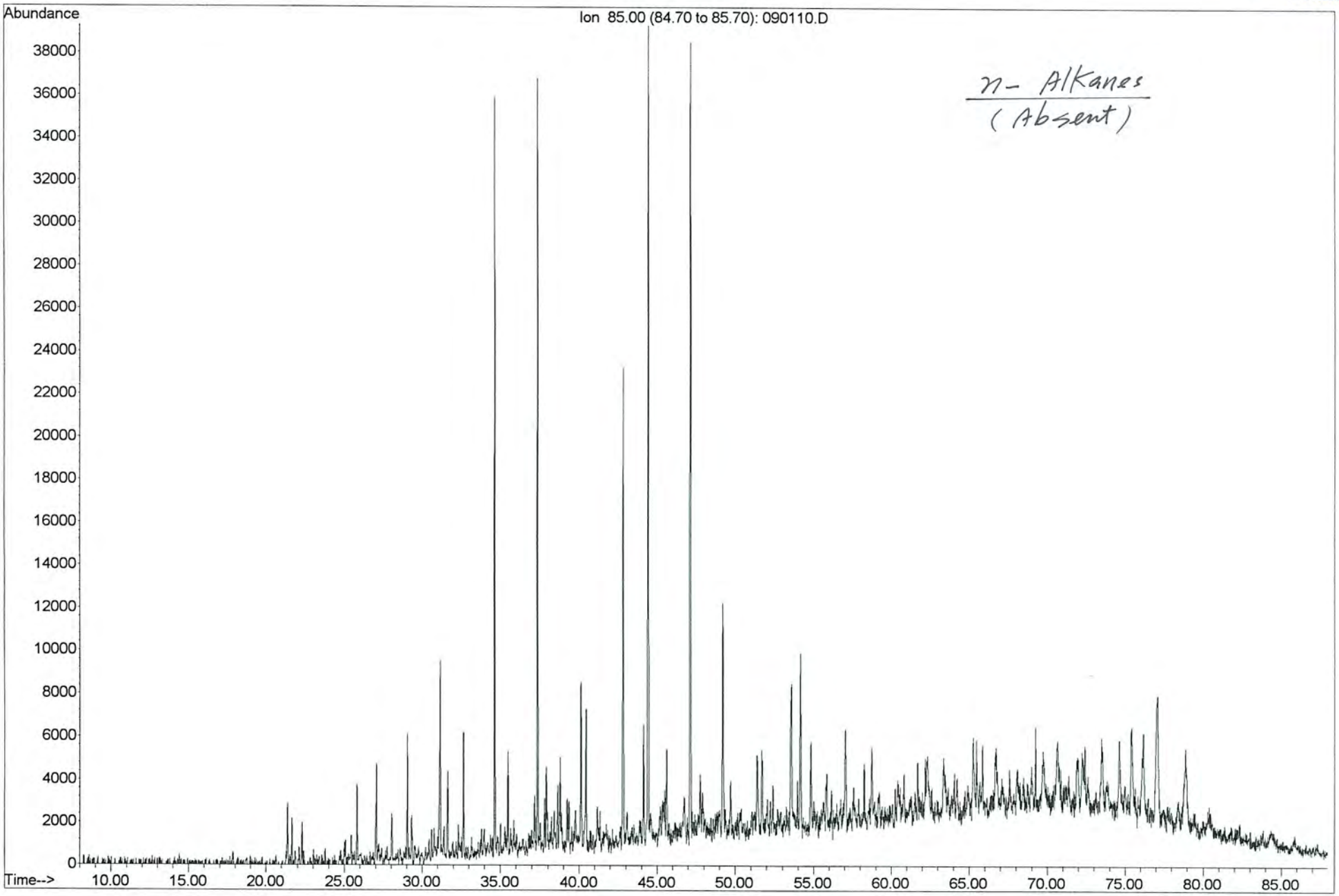
DW-5-FP (36921-2) Product x50
Gas Works Park, Floyd



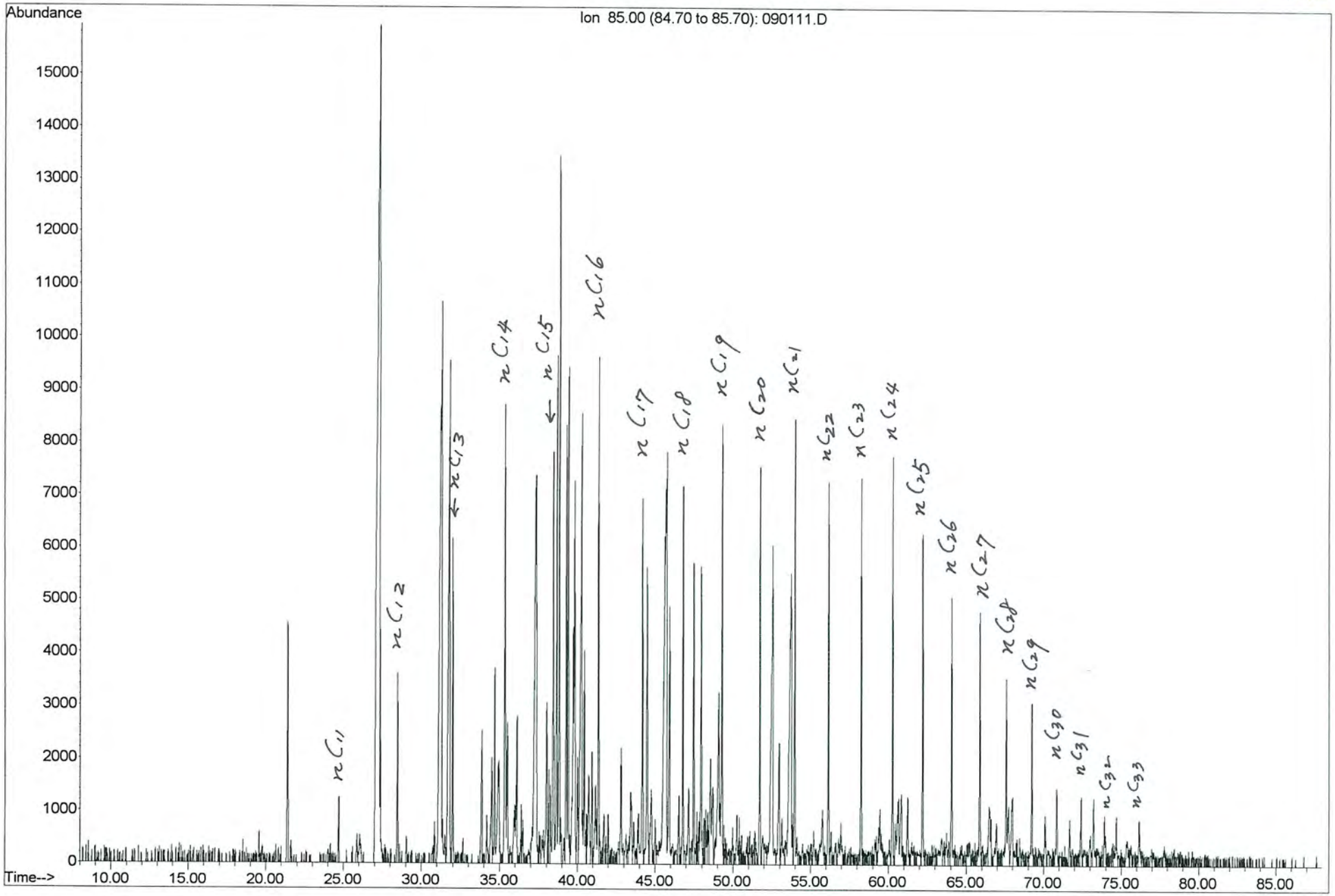
34011008001 (36917-1) soil extract (1:2)
MGP, Floyd Snider, QB SS5305, Vf=1ml



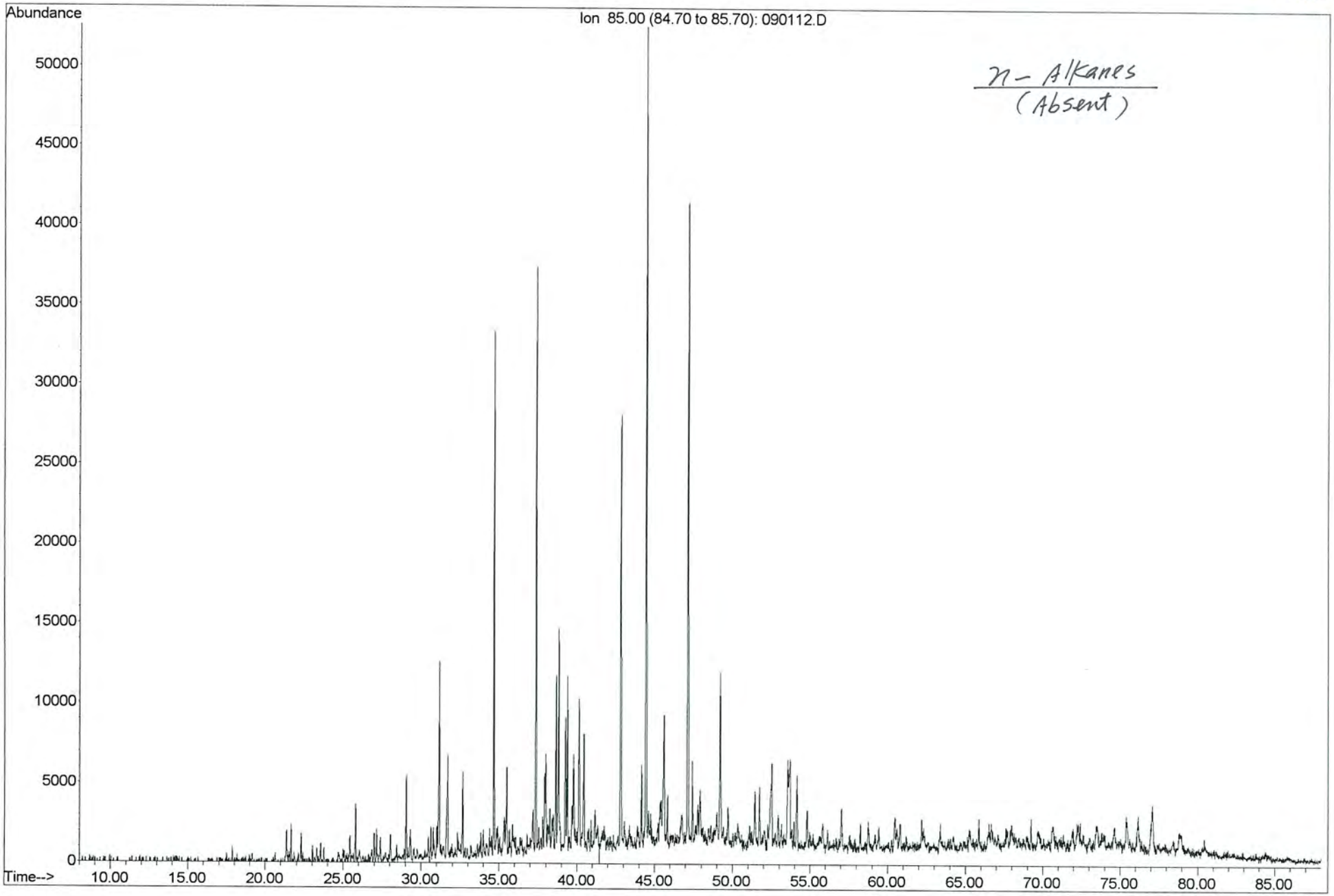
34011008017 (36918-1) soil extract (3:7)
MGP, Floyd Snider, QB SS5305, Vf=1ml



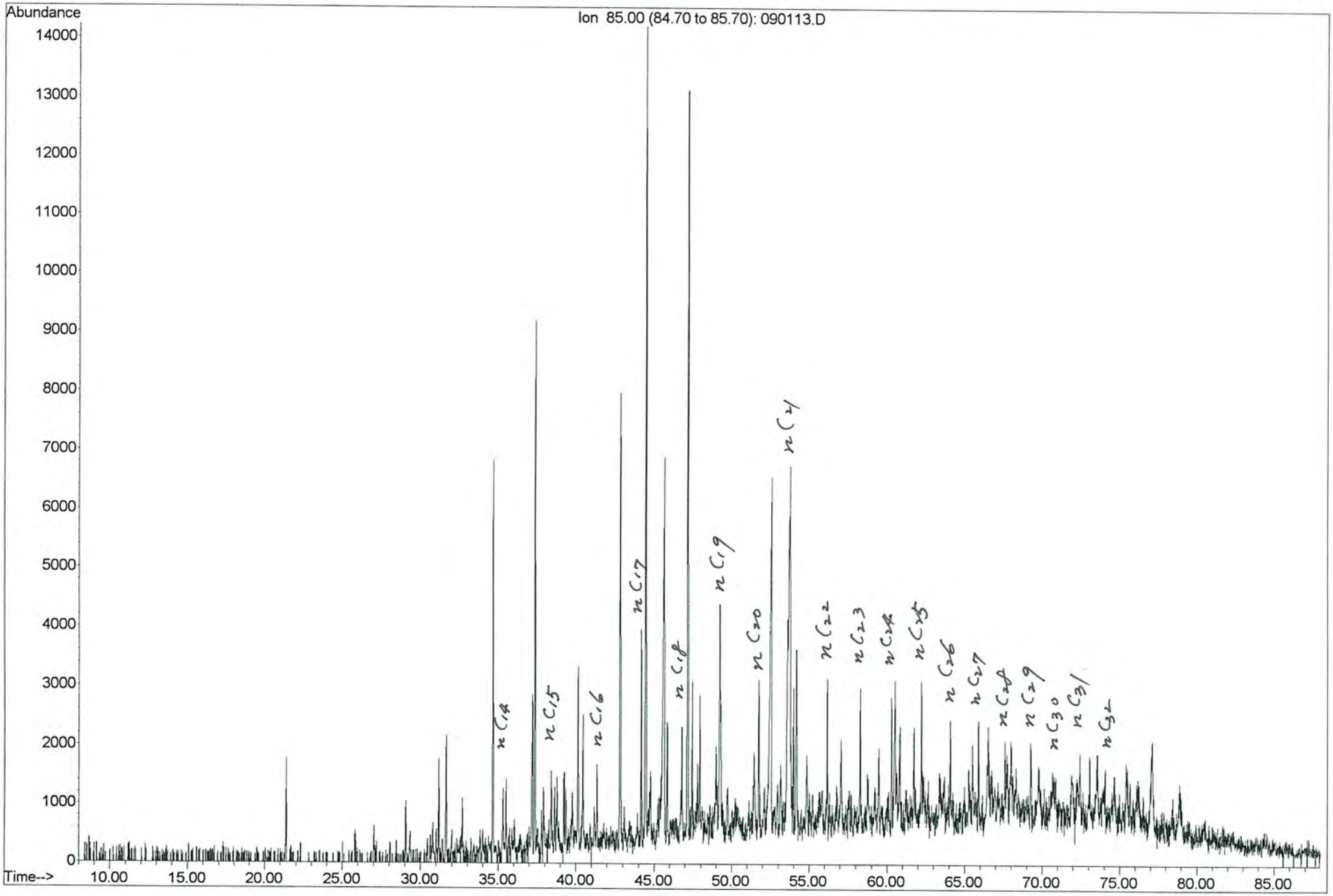
34011008020 (36918-4) soil extract (1:1.2)
MGP, Floyd Snider, QB SS5305, Vf=2ml



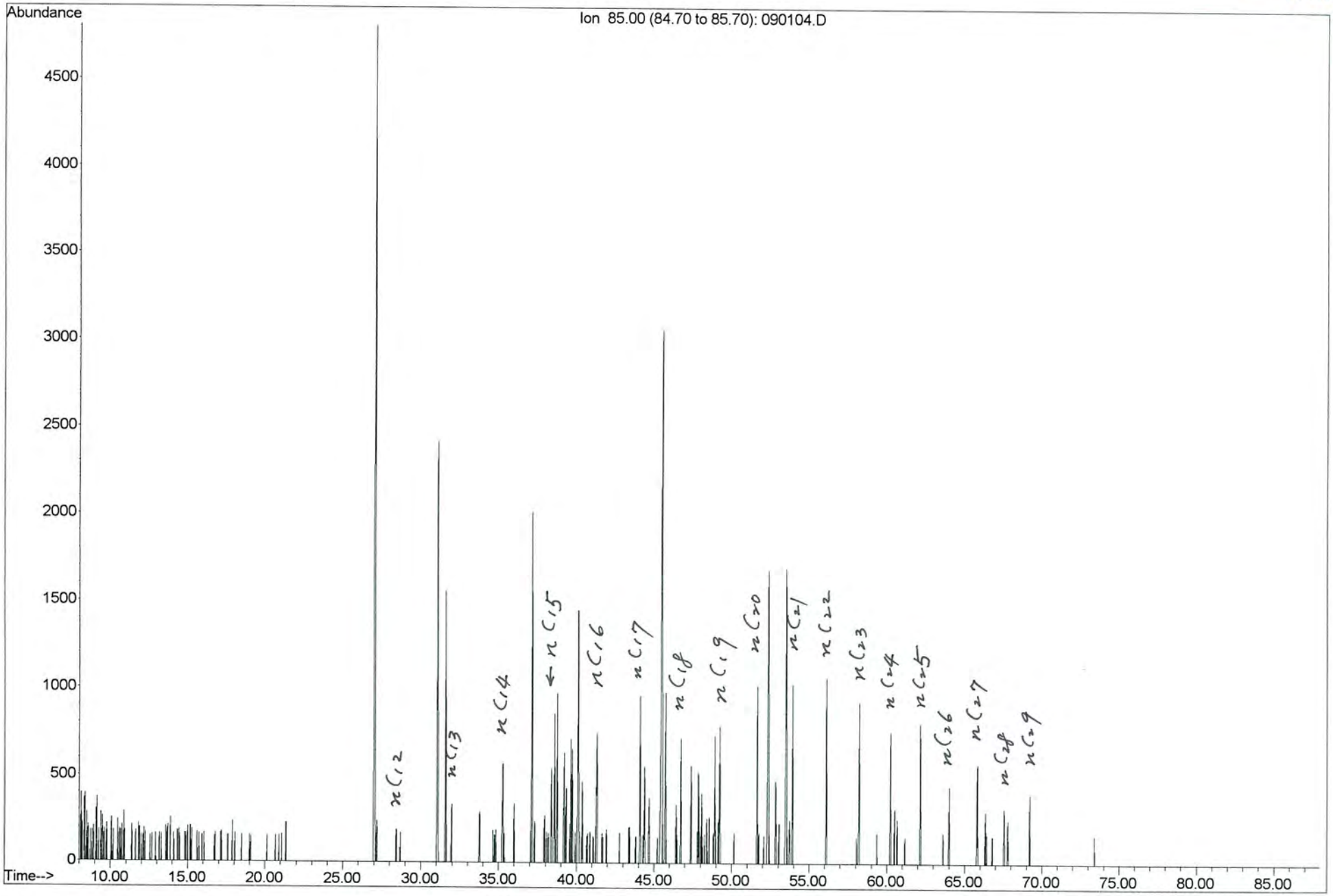
34011008022 (36918-6) soil extract (3:8)
MGP, Floyd Snider, QB SS5305, Vf=2ml



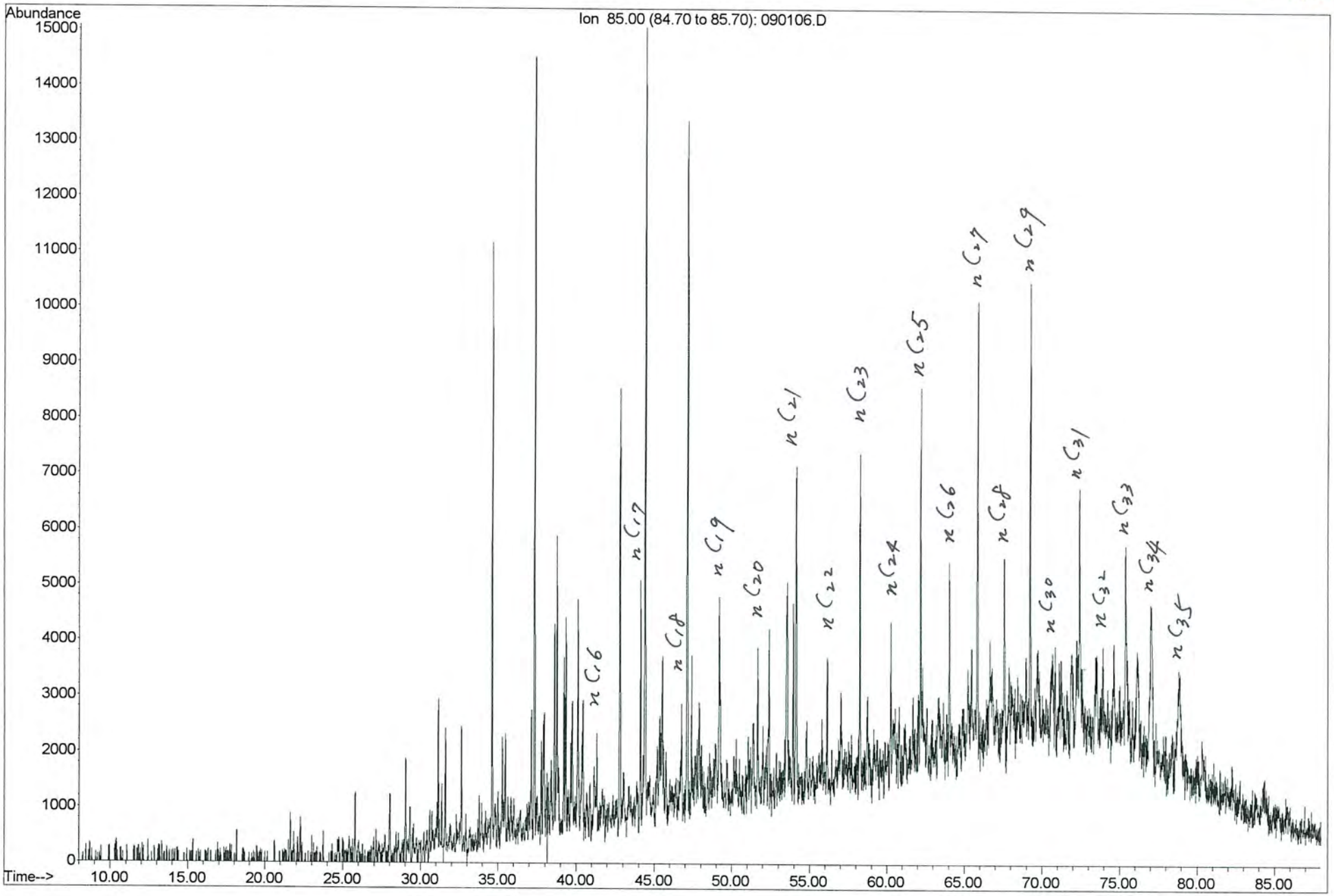
34011008028 (36918-12) soil extract (1:1))
MGP, Floyd Snider, QB SS5305, Vf=2ml



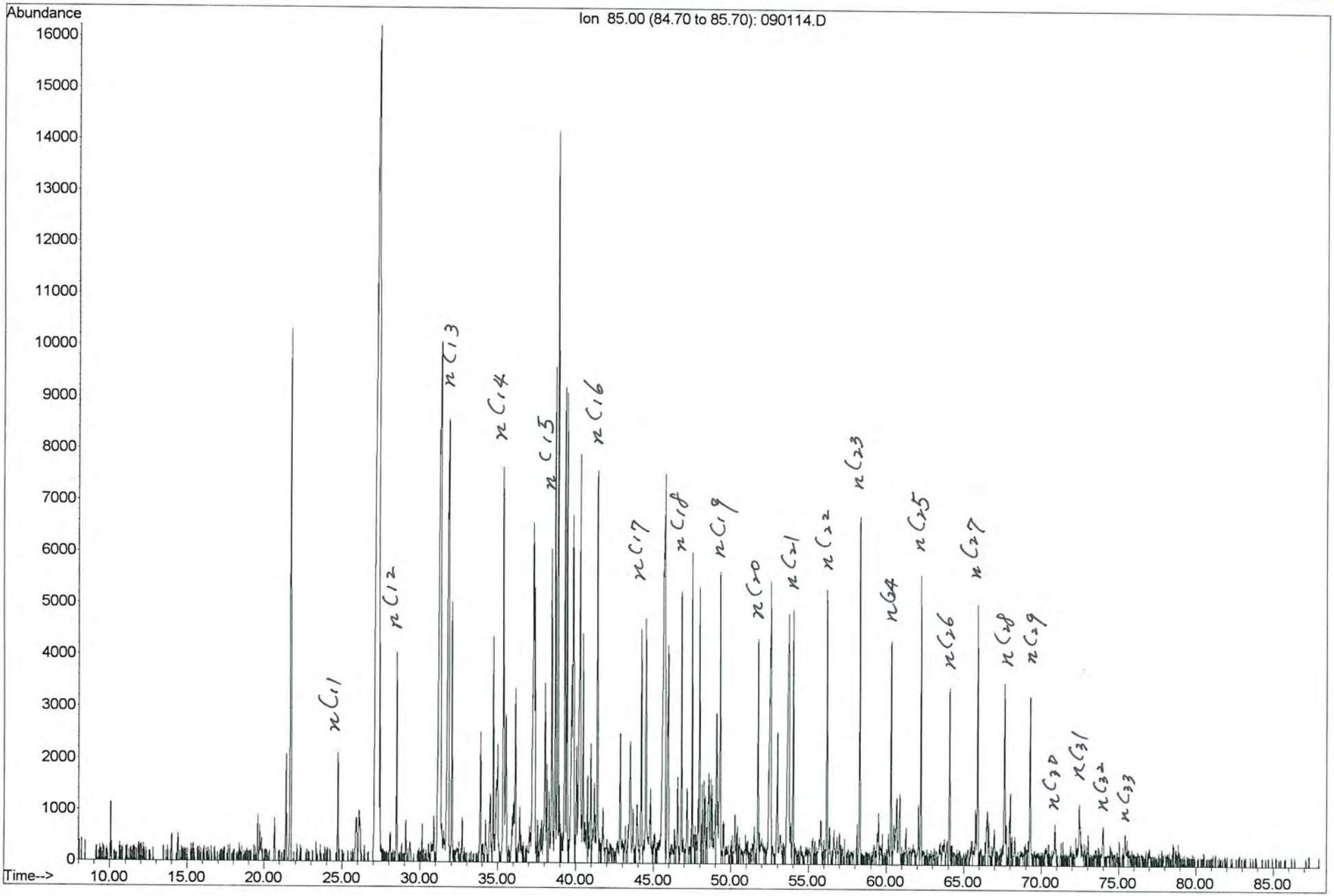
34011008030 (36918-14) soil extract
MGP, Floyd Snider, QB SS5305



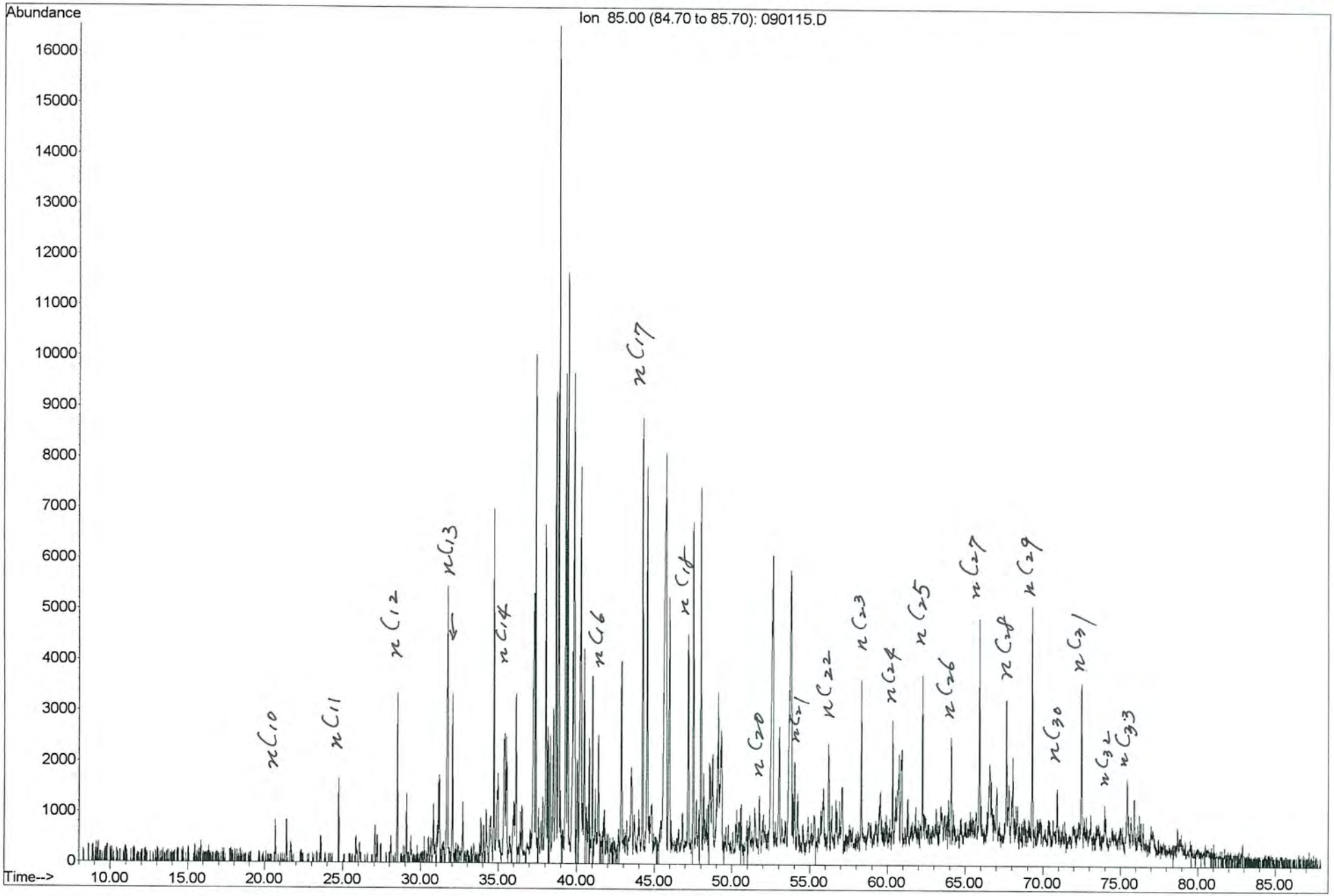
34011008011 (36917-11) soil extract (1:2)
MGP, Floyd Snider, QB SS5305, Vf=1ml



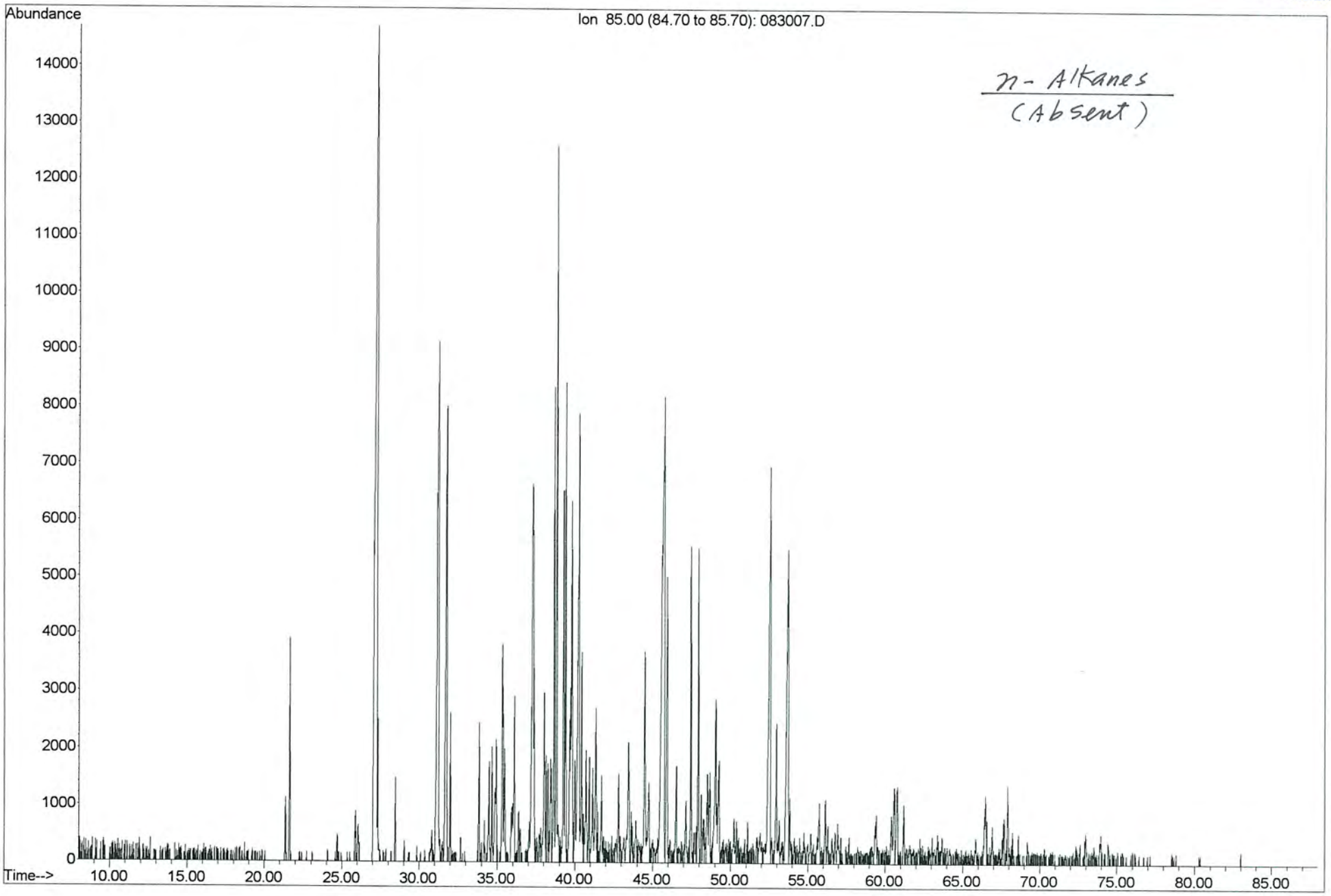
34011008032 (36918-16) soil ext (3.5:6.5)
MGP, Floyd Snider, QB SS5305, Vf=4ml



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



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



n-Alkanes
(Absent)

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