9

IGT Project Number: 49010-01

COMPARATIVE ANALYSIS OF EIGHT SOIL SAMPLES FROM THE SWL&P FORMER MGP SITE, SUPERIOR, WISCONSIN

Prepared by

GAS TECHNOLOGY INSTITUTE
1700 South Mount Prospect Road
Des Plaines, Illinois 60018

for

SUPERIOR WATER, LIGHT & POWER
2915 Hill Avenue
P.O. Box 519
Superior, Wisconsin 54880

February, 2003

gti SM

EXECUTIVE SUMMARY

The Gas Technology Institute has conducted a comparative study of soil samples collected from the Superior Water, Light and Power Company (SWL&P) former manufactured gas plant site in Superior, Wisconsin. Samples were tested and evaluated against known standards for the presence of pyrogenic substances (tars), petrogenic substances (crude oil derivatives) and other organic compounds. This study has defined potential sources for the contamination at the site through chemical fingerprinting.

Using GC/FID fingerprinting techniques, results concluded that six of the eight soils from the SWL&P Site contained both petrogenic and pyrogenic substances. Samples T10-1, T10-2, T10-3, B-11-12-13, B-12-11-12 and B-13-12-13 demonstrated PAH patterns and diagnostic ratios which indicated MGP-type tar, probably from a carbureted water gas (CWG) process. The samples also contained a petrogenic fraction, characterized by an unresolved complex mixture in the C10 to C40 range. This is characteristic of #5 and #6 fuel oils. Samples T10-1, T10-2, T10-3, B-11-12-13, B-12-11-12 and B-13-12-13 are highly similar to each other.

Chemical fingerprints of samples B-23-6-8 and B-23-10-12 showed only the presence of a gasoline-range material. No pyrogenic substances were detected in these two samples. The lack of tri- and tetra-alkyl benzenes indicates that the gasoline-range material is not gasoline. The gasoline-range material consists almost exclusively of benzene and toluene, with lesser amounts of xylenes, ethylbenzene and a very small quantity of styrene. This material is similar to a blended volatile petroleum solvent

INTRODUCTION

Superior Water, Light and Power Company (SWL&P) has contracted the Gas Technology Institute (GTI) to determine whether organic residues found in soil samples from their Superior, Wisconsin former manufactured gas plant (MGP) site are chemically similar or dissimilar to petrogenic, pyrogenic or other organic materials specifically associated with MGP operations. GTI has performed a series of highly definitive, defendable tests designed to determine the generic source of the organic material, to determine the chemical similarity or dissimilarity between all samples, and to determine the exact composition of the samples.

Recent trends in environmental investigation, particularly of sites containing former MGP materials, have increasingly employed the use of environmental forensic techniques to identify specific wastes. Environmental forensic methodologies have been especially effective in discerning MGP-type tars from other tars and waste mixtures. Former MGP wastes possess distinct "chemical fingerprints", based upon the gas production process used and other factors. This is also true of other tar wastes, such as asphalt/roofing tar, creosotes or other types. Chemical fingerprinting is also able to identify compounds associated with the tars, either from distinctly separate sources or purposely co-mingled with the tar. Therefore, analysis and comparison of specific fingerprints with known standards may elucidate the sources of the contamination.

Chemical fingerprinting has also been applied to site investigations, in order to determine the extent of organic residues that may be attributable to specific sources. The chemical fingerprints of site samples can be compared to each other and to off-site sample fingerprints, to determine if off-site impacts are caused by on-site sources. As such, environmental forensic methods have been increasing applied to a variety of site investigation efforts.

Hydrocarbons, such as those found on former MGP sites, can be divided into three classes: petrogenic substances, pyrogenic substances, and diagenetic substances. Petrogenic substances can be defined as substances originating from petroleum, including crude oil, fuels, lubricants and derivatives of those materials. Aliphatic and aromatic hydrocarbons constitute the vast majority of compounds in petrogenic substances. Two features most clearly represent fresh

crude oil: 1) a regular series of normal alkanes peaks (the "picket fence") on the chromatogram, and, 2) the "hump" in the baseline of the chromatogram (unresolved complex mixture.) The fraction of crude oil contained in the sample (i.e., gasoline, diesel fuel, kerosene, etc.) can be determined by examination of the elution time of the cluster of peaks and the presence of particular compounds.

Pyrogenic substances can be defined as those organic substances originating from oxygen-depleted high temperature processes, including: incomplete combustion, pyrolysis, cracking and destructive distillation. Pyrogenic materials consist primarily of aromatic hydrocarbons. By definition, tar is a pyrogenic material. MGP-type tars, because of the conditions under which they were formed, are distinct. The resulting chromatograms possess a particular pattern. However, examination of the ratios of particular polynuclear aromatic hydrocarbons (PAHs) and alkylated PAHs can be used as indicator of the source of the material. Typically, the ratios of fluoranthene to pyrene and dibenzofuran to fluorine are most often examined. Comparison of these ratios can discern MGP tars from non-MGP tars as well as within the grouping of MGP tars (for instance, carburetted water gas tar from oil gas or coal carbonization tar). Identification of the tars may also be based upon the relative abundance of certain PAHs, such as naphthalene and anthracene.

Diagenetic substances include PAHs from natural sources. These sources include plants and buried organic material, including municipal waste.

METHODOLOGY

GTI has completed chemical forensic analysis of eight soil samples from a former MGP site in Superior, Wisconsin. These samples include Sample T10-1, Sample T10-2, Sample T10-3, Sample B-11-12-13, Sample B-12-11-12, Sample B-13-12-13, Samples B-23-6-8 and Sample B-23-10-12. Analyses of these samples have included identification and/or quantification of: 1) monocyclic hydrocarbons (MAHs), 2) polycyclic aromatic hydrocarbons (PAHs), and, 3) aliphatic hydrocarbons and polar hydrocarbons. Analyses and hydrocarbon fingerprinting were performed using gas chromatography with flame ionization detection (GC/FID) and gas chromatography with mass spectrometry (GC/MS). The soil samples were prepared by solvent extraction (EPA 3570) using dichloromethane (DCM). The extracts were spiked with internal standards and analyzed by GC/FID (EPA 8100 mod.) and GC/MS (EPA 8270 mod.).

The GC/FID method of analysis is routinely used to identify specific compounds present in a sample, which can then be compared with a "standard" sample of known origin or composition. The GC/FID analysis does not quantify the compounds found in the mixture. Results obtained from a single GC/FID scan show the FID detector response versus residence time of each compound in the chromatographic column. The pattern of peaks versus residence time that is generated in the GC/FID scan is sometimes referred to as the "fingerprint" of the sample. In this way, an investigator may "fingerprint" the sample by comparing scan features of the test sample with scan features of a control sample. For instance, particular relative ratios of one compound to another, the relatively high concentration of a compound or the absence of particular compounds may be indicative of a carburetted water gas tar, a high temperature coal tar or a mixture of alternate origin. Generally, several identified reference samples are used when conducting the GC/FID analysis, so that the test sample may be compared with accuracy.

In order to quantify the compounds or classes of compounds contained in the sample mixture, the sample is then subjected to a second set of analyses through GC/MS. In GC/MS, chromatograms are produced which show peaks that are similar to the chromatograms obtained in GC/FID analysis, but additional compound-specific information is obtained as well. When performed in a controlled and reproducible manner, the GC/MS method produces multiple "fingerprints" of a

sample when specific fragment ions are isolated. Analysis of the specific ions can be highly useful in sample identification. Additionally, compounds of certain target classes, such as biomarker compounds, can be selectively measured.

Results of these analyses are included in this report, with expanded analytical data detailed in Appendices A-E.

INTERPRETATION

Based upon review of the data, the following interpretation of data is presented.

Sample T10-1 This sample contained pyrogenic and petrogenic substances (see definitions above). The pattern of PAHs, especially the ratios of fluoranthene to pyrene and dibenzofuran to fluorene indicate that this sample contains MGP tar, probably from a carburetted water gas (CWG) process. The presence of MAHs and the high concentration of naphthalene relative to other PAHs indicate that this material is relatively unweathered. The amounts of MAHs relative to PAHs are higher than is usually seen in MGP tars, suggesting a mixture of materials.

The petroleum is indicated by an unresolved complex mixture (UCM or "hump") which eluted from approximately decane (C10 – 9 minutes) to beyond tetracontane (C40 – 45 minutes). Examples of common petroleum products with these features include wide spectrum distillates such as the types of gas oils used in typical CWG processes, as well as residual oils such as #5 and #6 oils. These types of materials are sometimes seen at MGP sites, but may be indicative of other sources.

Sample T10-2 This sample also contained pyrogenic and petrogenic substances. The patterns and ratios of PAHs indicate that this sample contains MGP tar, probably CWG. The reduced amounts of MAHs and naphthalene relative to other PAHs indicate that this material has been subject to mild weathering.

The petroleum is indicated by a UCM similar in range and shape to that seen on sample T10-1.

Sample T10-3 This sample also contained pyrogenic and petrogenic substances. The patterns and ratios of PAHs indicate that this sample contains MGP tar, probably CWG tar. The presence of MAHs and the high concentration of naphthalene relative to other PAHs indicate that this material is relatively unweathered. However, the amounts of MAHs relative to PAHs are much higher than is usually seen in MGP tars, suggesting mixed products.

The petroleum is indicated by a UCM similar in range and shape to that seen on sample T10-1.

Sample B-11-12-13 This sample also contained pyrogenic and petrogenic substances. The patterns and ratios of PAHs indicate that this sample contains MGP tar, probably CWG. The reduced amounts of naphthalene relative to other PAHs indicate that this material has been subject to mild weathering. However, the amounts of MAHs relative to PAHs are much higher than is usually seen in MGP tars, suggesting mixed products.

The petroleum is indicated by a UCM similar in range and shape to that seen on sample T10-1.

Sample B-12-11-12 This sample also contained pyrogenic and petrogenic substances. The patterns and ratios of PAHs indicate that this sample contains MGP tar, probably CWG. The reduced amounts of naphthalene relative to other PAHs indicate that this material has been subject to mild weathering. However, the amounts of MAHs relative to PAHs are much higher than is usually seen in MGP tars, suggesting mixed products.

The petroleum is indicated by a UCM similar in range and shape to that seen on sample T10-1.

Sample B-13-12-13 This sample also contained pyrogenic and petrogenic substances. The patterns and ratios of PAHs indicate that this sample contains MGP tar, probably CWG. The reduced amounts of naphthalene relative to other PAHs indicate that this material has been subject to mild weathering. However, the amounts of MAHs, especially toluene, relative to PAHs are higher than is usually seen in MGP tars, suggesting mixed products.

The petroleum is indicated by a UCM similar in range and shape to that seen on sample T10-1.

Sample B-23-6-8 This sample contained a gasoline-range product. However, the lack of tri- and tetra-alkyl benzenes indicates that it is not gasoline. Based on this composition, the material can be described as a volatile petroleum solvent.

Sample B-23-10-1 This sample also contained a gasoline-range product similar to that found in sample B-23-6-8.

DISCUSSION

Recent work by GTI, collaborative laboratories (META Environmental, Inc.) and EPRI (1) has shown that pyrogenic materials from different sources have characteristic compound ratios. For example, the ratios of fluoranthene to pyrene in wastes from former MGP plants operating the relatively low temperature CWG process range from about 0.6 to 0.8 typically. This is in contrast to coke oven tars and other pyrogenic materials generated at relatively high temperatures where the fluoranthene to pyrene ratios range from about 1.0 to about 1.4. Similarly, CWG wastes are low in oxygen containing compounds. Thus, the ratio of dibenzofuran (an oxygen-containing compound) to fluorine in CWG wastes ranges from about 0.1 to 0.4 while the same ratio in coal tars ranges from about 0.4 to 0.8. Other compound ratios and chemical indicators have been identified. These ratios are relatively stable in the environment over time and during the various refining processes that produce coal tar-based products. The source ratios for samples T10-1, T10-2, T10-3, B-11-12-13, B-12-12, and B-13-12-13 ranged from 0.74 to 0.81 for fluoranthene/pyrene and 0.05 to 0.11 for dibenzofuran/fluorene indicating low temperature gas plant wastes probably from a CWG plant.

Total PAH concentration is also indicative of chemical source. Contamination by PAHs can be found at both high and low concentrations throughout urban America. Recent work by GTI, collaborative laboratories and EPRI (2) has shown that *high* concentrations of PAHs in soil are not "background", but generally originated from one or more concentrated sources, such as coal tar, creosote, or other coal tar products. A survey of PAHs in surface soil samples from randomly-selected, visually un-impacted sites in small to large cities and towns indicated that "background levels" of total PAHs are generally *less than* 50 mg/kg. Thus, samples with greater than 50 to 100 mg/kg total PAHs are most likely to be impacted by one or more concentrated PAH sources, such as coal tar, coal tar products, or some petroleum products. The concentrations of total PAHs in samples T10-1, T10-2, T10-3, B-11-12-13, B-12-11-12, and B-13-12-13 were all well above 100 mg/kg. These results combined with the fingerprints indicate that these samples contained MGP wastes.

Because of the relatively high concentrations of mono-aromatic hydrocarbons (MAHs) in the samples from the site, the nature and concentrations of volatile compounds was examined in detail. In GTI's experience, as well as in other referenced literature (1, 3), the levels of benzene, toluene, and xylenes (BTX) in pyrogenic sources, including gas plant and coke oven residues are *less than* those of naphthalene and other PAHs. Furthermore, BTX are never found as sole constituents in samples from these sites, except in *some* groundwater samples in their dissolved state. However, over the past century, BTX have been isolated from crude oil and coal tar by several processes, primarily distillation, which requires specialized process engineering for this purpose. BTX are also produced during petroleum refining and can be found in a number of petroleum products and are principal constituents of gasoline. When isolated from coal tar, BTX are called light oil.

The data were examined for indications that *gasoline* was present. However gasoline was not indicated based on the relative amounts of aromatic and aliphatic compounds in the gasoline range. Specifically, gasolines contain about 40 to 60 percent aromatic compounds with the remaining hydrocarbons being straight, branched, and naphthenic (4). These relative abundances are clearly visible in a GC/FID fingerprint or GC/MS ion chromatogram of the types included in this report. However, very little saturated hydrocarbon content was present in any of the samples. Further, the saturated hydrocarbons that were present could be attributed to the middle distillate petrogenic material that was present in significant amounts in samples T10-1, T10-2, T10-3, B-11-12-13, B-12-11-12, and B-13-12-13.

Chemical fingerprints of samples B-23-6-8 and B-23-10-12 showed the presence of a gasoline-range product, although the lack of tri- and tetra-alkyl benzenes indicates that it is *not* gasoline. The product consists almost exclusively of benzene and toluene, with lesser amounts of xylenes, ethylbenzene and a very small quantity of styrene. The lack of saturated hydrocarbons in the gasoline range suggests some type of light oil distillate, because light oils are low in saturated components. However, other products, such as some aromatic solvents consist of nearly all BTX. For example, a sample of Gumout Choke and Carburetor Cleaner consisted of nearly all ethylbenzene and xylenes (5). The fact that there are non-detect quantities of other compounds typically associated with MGP-type waste may indicate that this is a custom-blended petroleum

solvent, perhaps used for stripping or cleaning and not directly associated with MGP operations. However, a good match to a commercial solvent could not be found among the reference chromatograms available to GTI, but may exist for one of the many products sold. It is not likely that the material is a gas pipeline condensate, due to its highly pure nature.

Finally, some data has been reported that suggests that when gasoline in soil is severely degraded, the relative amount of aromatic hydrocarbons can increase to over 90 % (4). Presumably, this occurs because the saturated hydrocarbons degrade preferentially over aromatic hydrocarbons. However, the naphthalene concentrations indicate that weathering *has not been* severe for most of the site samples. Therefore, co-mingling of MGP wastes with severely weathered gasoline could be a possible explanation, but this could not be confirmed with the available data.

Because gasoline was not indicated in these initial analyses, supplemental analyses for total paraffins, isoparaffins, aromatics, naphthenics, and olefins (PIANO) would not provide additional discriminating information and was not conducted.

REFERENCES

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

2. "Polycyclic Aromatic Hydrocarbons (PAHs) In Surface Soil," EPRI Report in print, December, 2000.

3. "Chemical and Physical Characteristics of Tar Samples from Selected Manufactured Gas Plant (MGP) Sites," EPRI Report TR-102184, May, 1993.

4. "Patterns of Chemical Changes during Environmental Alteration of Hydrocarbon Fuels," Kaplan, I.R., Galperin, Y., Alimi, H., Lee, R., and Lu, S., *Groundwater Monitoring Review*, Fall, 1996.

5. GC/MS Guide to Ignitable Liquids. CRC Press, Boca Raton, Florida, 1998.

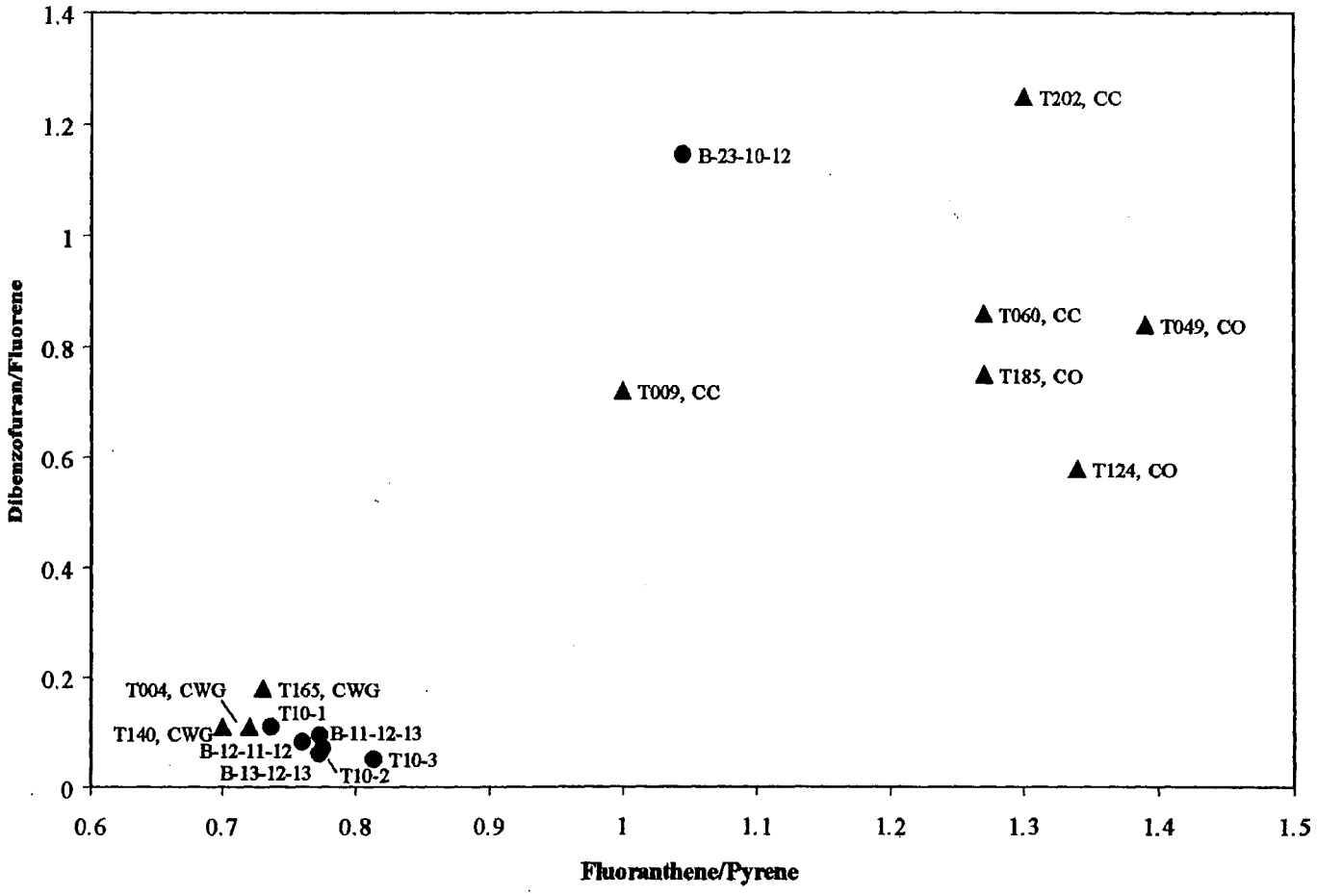
Table 1
Source and Weathering Ratios

Sample	Fl/Py	D/F	C17/Pris	C18/Phy	Pris/Phy	C3D/C3PA	C2D/C2PA
T10-1	0.74	0.11	1.27	1.12	1.30	0.62	0.21
T10-2	0.77	0.07	1.49	1.66	1.57	0.67	0.25
T10-3	0.81	0.05	1.14	0.86	1.11	0.35	0.21
B-11-12-13	0.77	0.09	2.21	0.25	0.20	0.62	0.23
B-12-11-12	0.76	0.08	0.85	0.70	1.46	0.61	0.22
B-13-12-13	0.77	0.06	2.81	2.70	1.44	0.63	0.23
B-23-6-8	ND	ND	ND	ND	ND	ND	ND
B-23-10-12	1.05	1.15	ND	ND	ND	ND	ND

Ratios:

Fl/Py	fluoranthene/pyrene
D/F	dibenzofuran/fluorene
C17/Pris	septadecane/pristane
C18/Phy	octadecane/phytane
Pris/Phy	pristane/phytane
C3D/C3PA	trialkyldibenzothiophenes/trialkylphenanthrenes/anthracenes
C2D/C2PA	dialkyldibenzothiophenes/dialkylphenanthrenes/anthracenes

Figure 1
Selected Source Ratios



TXXX	Tar Sample from META's in house source library
CC	Coal Carbonization Tar
CO	Coke Oven Tar
CWG	Carburetted Water Gas Tar
●	Site Sample

Appendix A

Chains of Custody

META ENVIRONMENTAL SAMPLE RECEIPT

Lab ID	Field ID	Matrix	Analysis			Date Sampled	Date Received	Client/ Project	Container/ Storage
GT020924-01	T10-1	Soil				9/18/2002	9/24/2002		4oz. Jar
GT020924-02	T10-2	Soil				9/18/2002	9/24/2002		4oz. Jar
GT020924-03a,b	B-11-12-13	Soil				9/19/2002	9/24/2002		4oz. Jar
GT020924-04a,b	B-12-11-12	Soil				9/19/2002	9/24/2002		4oz. Jar
GT020924-05a,b	B13-12-13	Soil				9/19/2002	9/24/2002		4oz. Jar
GT020924-06a,b	B23-6-8	Soil				9/19/2002	9/24/2002		4oz. Jar
GT020924-07a,b	B-23-10-12	Soil				9/19/2002	9/24/2002		4oz. Jar

Dwm 9/24/02

Chain of Custody Record

GTI

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
ENSR	Bill Gregg	9/18/02	150716
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
4500 Park Glen Road, Suite 210	952-924-0117		
City / State / Zip Code	**Site Contact**	**Lab Contact**	
St. Louis Park / MN / 55416		Diane Saber	
Project Name and Location (State)	**Carrier/Waybill Number**		
Superior MGP, Wisconsin			
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: PLANO	Paraffin	Fingerprint	Special Instructions/ Conditions of Receipt
T10-1	9/18/02	1130				X	1						X	X		broken jar / GT020924-01
T10-2	↓	1230				↓	↓						↓	↓		↓ -02
T10-3	↓	1530				↓	↓						↓	↓		
~~B-8-6-8~~		~~1745~~														
B-11-12-13	9/19/02	800				X	2						X	X		-03a,b
B-12-11-12	↓	850				↓	↓						↓	↓		-04a,b
B-13-12-13	↓	945				↓	↓						↓	↓		-05a,b
B-23-6-8	↓	1615				↓	↓						↓	↓		-06a,b
B-23-10-12	↓	1620				↓	↓						↓	↓		↓ -07a,b

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time
1. Relinquished By: Chris Bochow / ENSR	9/19/02	1730
1. Received By: John Connor	9/19/02	
2. Relinquished By: John Connor / GTI	9/23/02	
2. Received By: Dusty Pechacek	9/24/02	9:30 am
3. Relinquished By:		
3. Received By: rec'd @ 6.5°C		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

META ENVIRONMENTAL SAMPLE RECEIPT

Lab ID	Field ID	Matrix	Analysis			Date Sampled	Date Received	Client/ Project	Container/ Storage
GT021121-01	ENSRSWLP MGP T10-3	Soil	3540	4007	4008	9/18/2002	11/21/2002	G13010-60	4oz. Jar

11/21/02

NO.

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	NO. OF CONTAINERS	DESIRED ANALYSIS						REMARKS
80014-19			Fingerprinting						Rush
SAMPLERS: *(Signature)*									Superior G13010
SAMPLE NO.	DATE	TIME	SAMPLE LOCATION						
	9/18/02	15:30	ENSR SWLP MGP T10-3	1		X		GT00	1121-01		From previous sample Sol

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Mary Barry	11/20/02 0800				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time		
		Diana Berhane	11/21/02 9:15am		

REMARKS:

rec'd @ 4.5°C

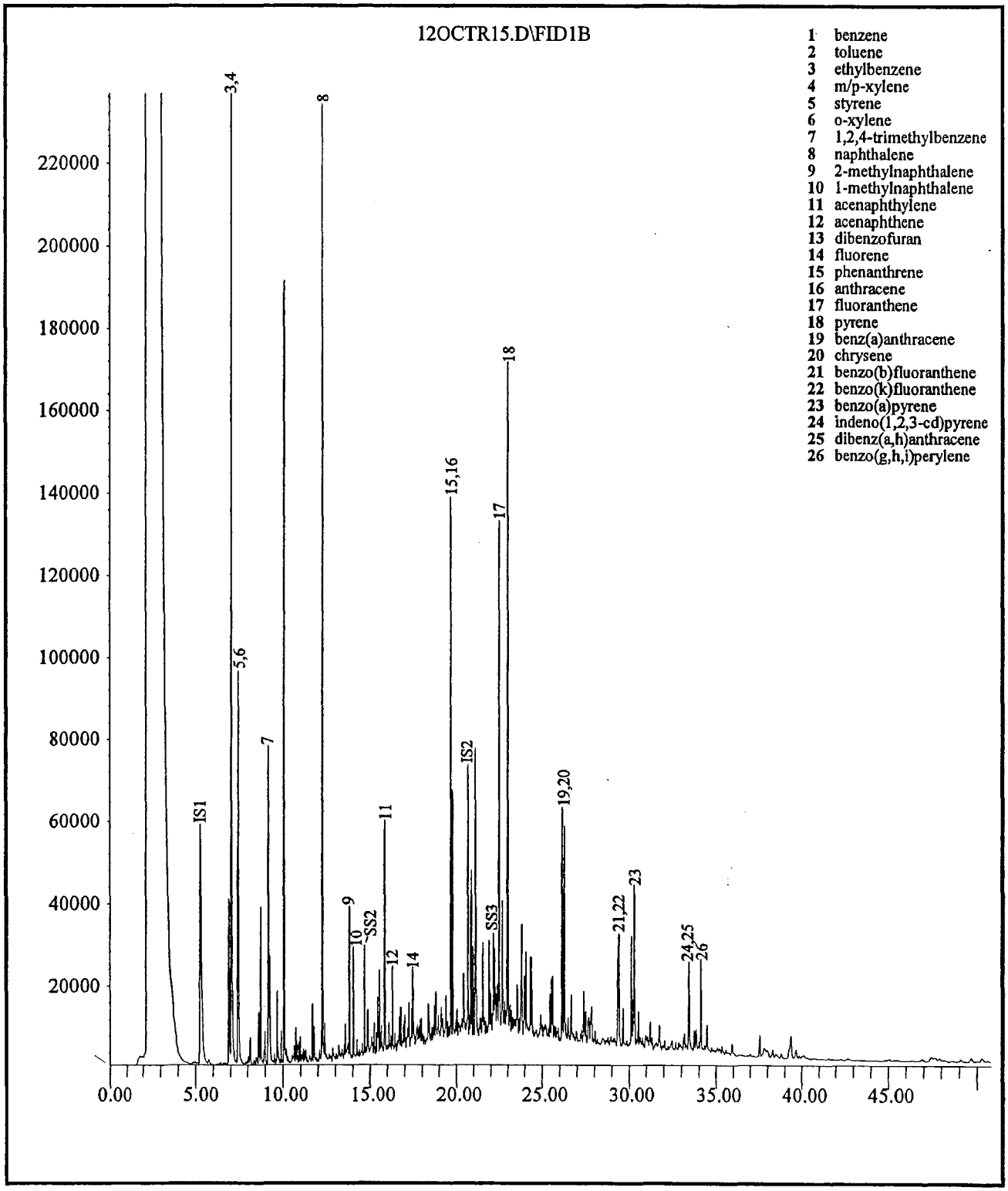
IGT

INSTITUTE OF GAS TECHNOLOGY
1700 S. Mount Prospect Rd.
Des Plaines, IL 60018-1804

Appendix B

GC/FID Fingerprints

GC/FID Fingerprint

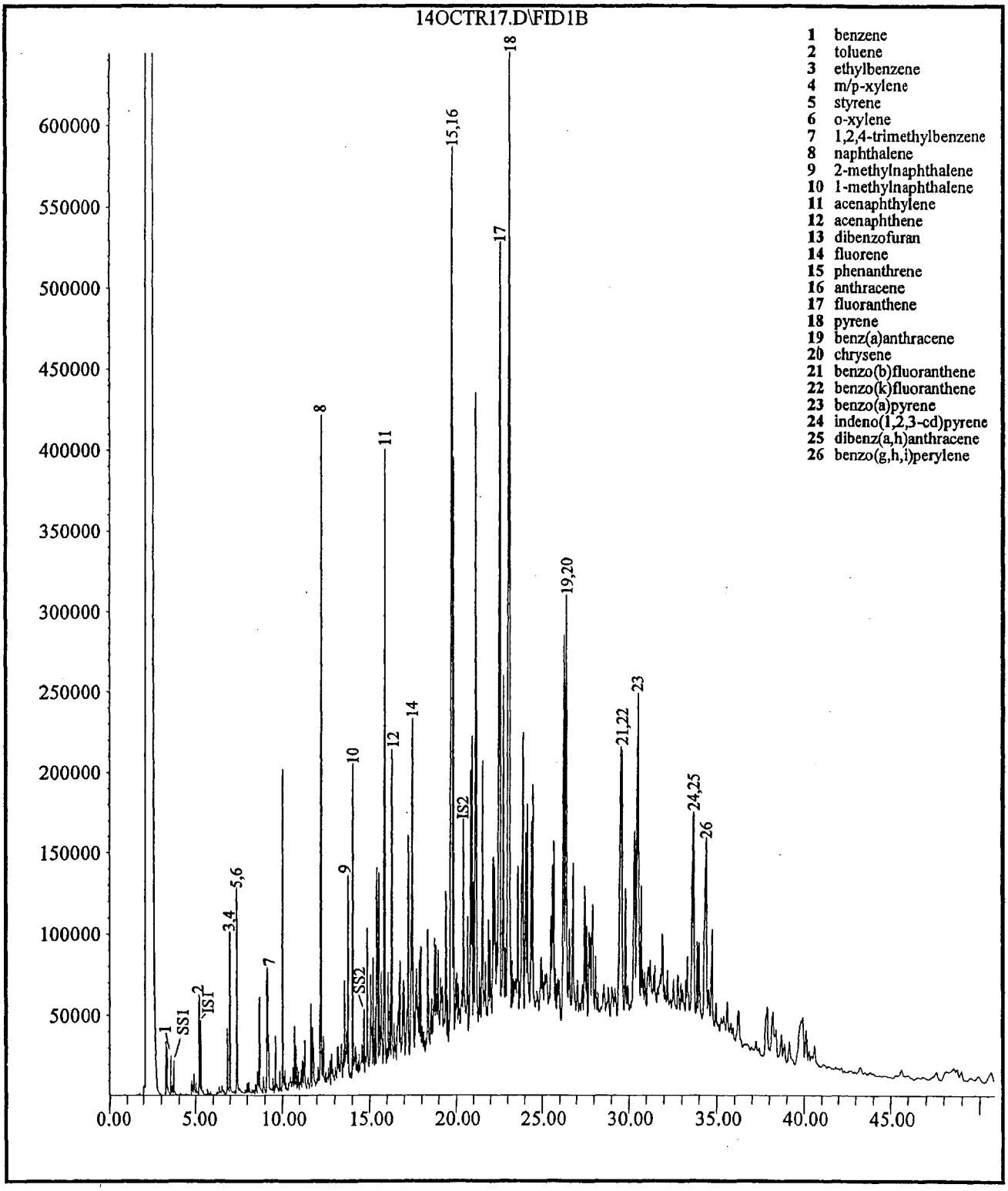


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane

Field ID:	**T10-1**
Laboratory ID:	GT020924-01
Method:	MET4007D

META

GC/FID Fingerprint

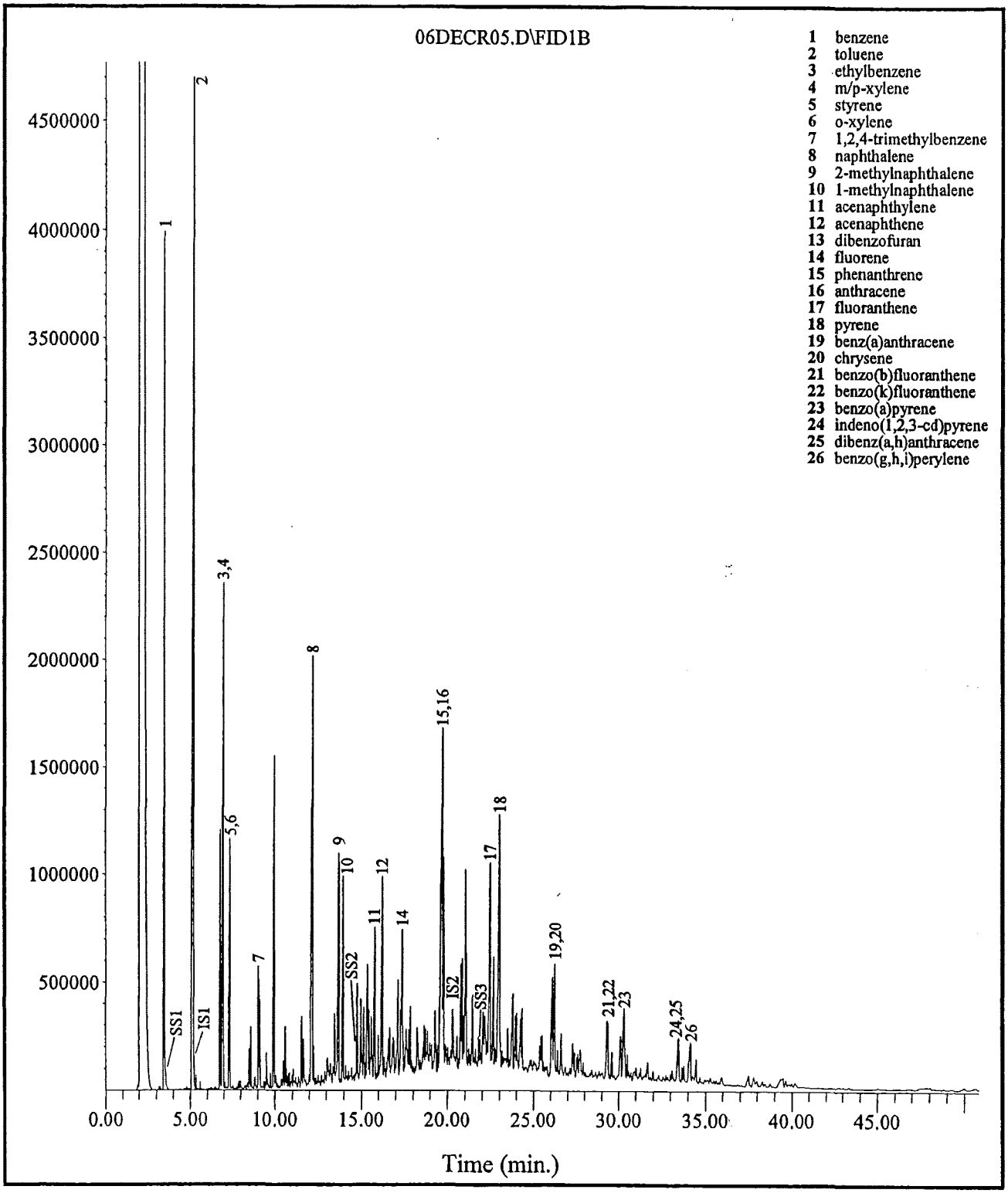


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane

Field ID:	**T10-2**
Laboratory ID:	GT020924-02
Method:	MET4007D

META

GC/FID Fingerprint

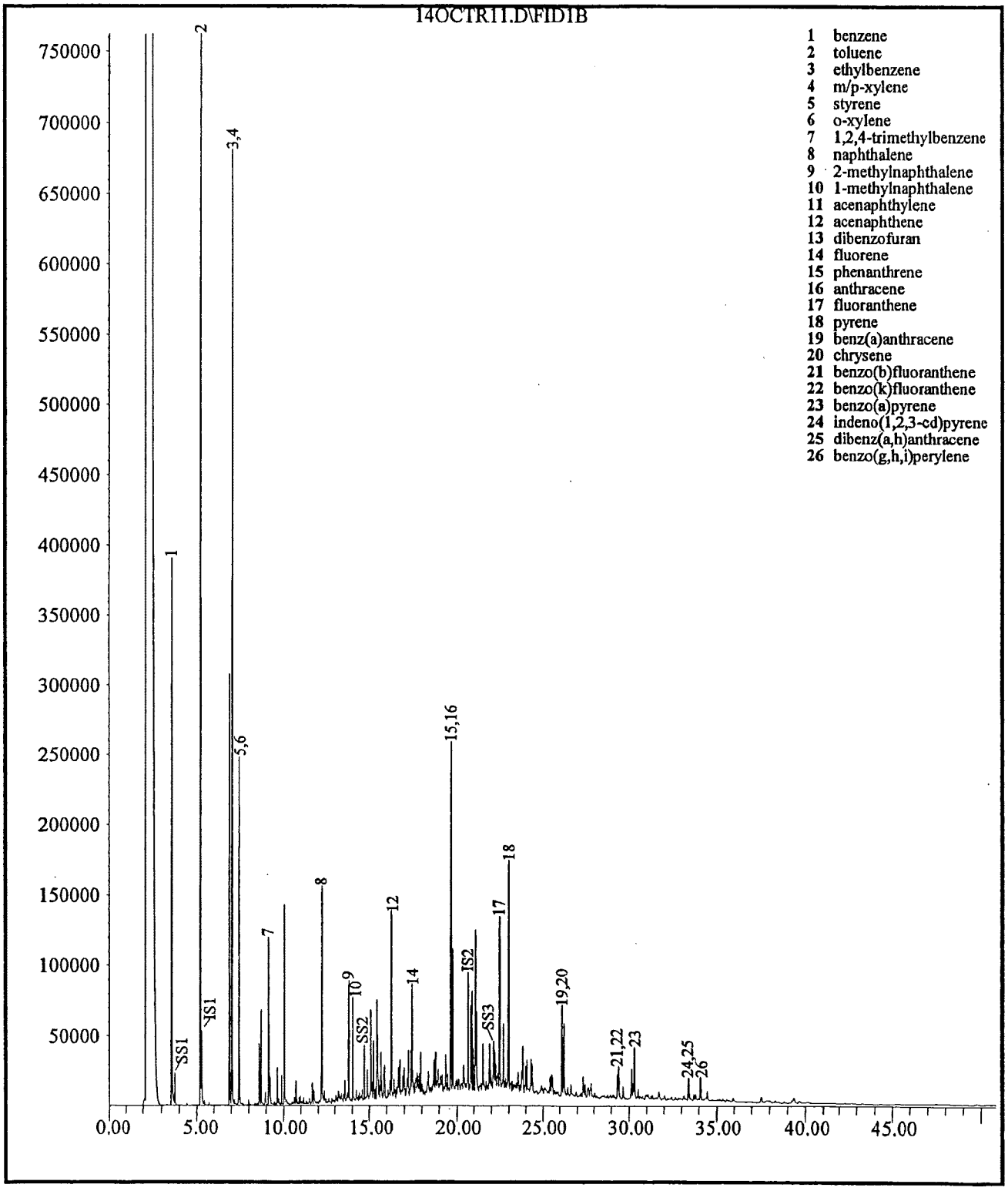


IS1 – 2,4-difluorotoluene
IS2 – o-terphenyl
SS1 – fluorobenzene
SS2 – 2-fluorobiphenyl
SS3 – 5α-androstane
SS4 – benzo(a)pyrene-d12

Field ID:	**T10-3**
Laboratory ID:	GT021121-01
Method:	MET4007

META

GC/FID Fingerprint

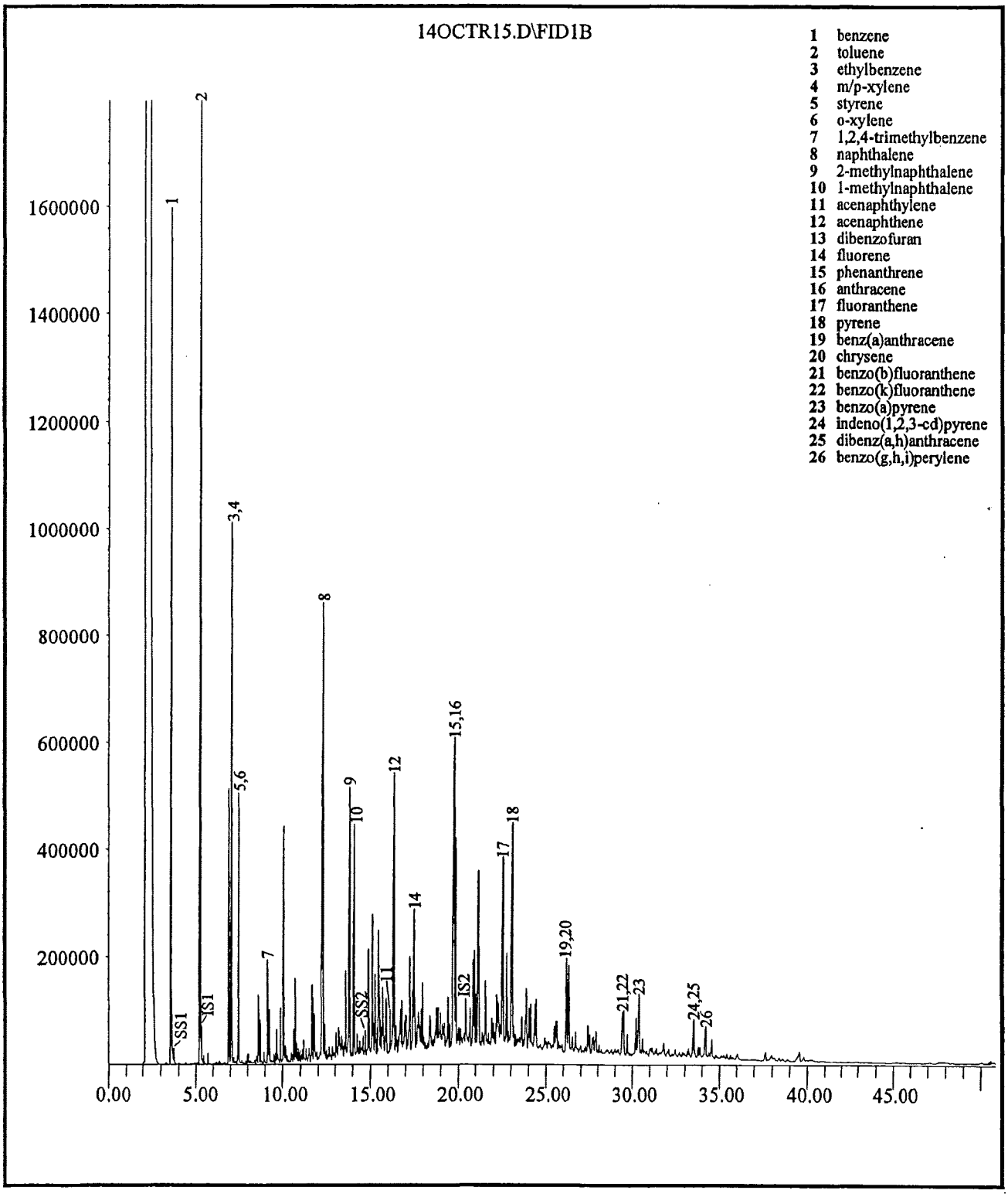


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane

Field ID:	**B-11-12-13**
Laboratory ID:	GT020924-03
Method:	MET4007D

META

GC/FID Fingerprint

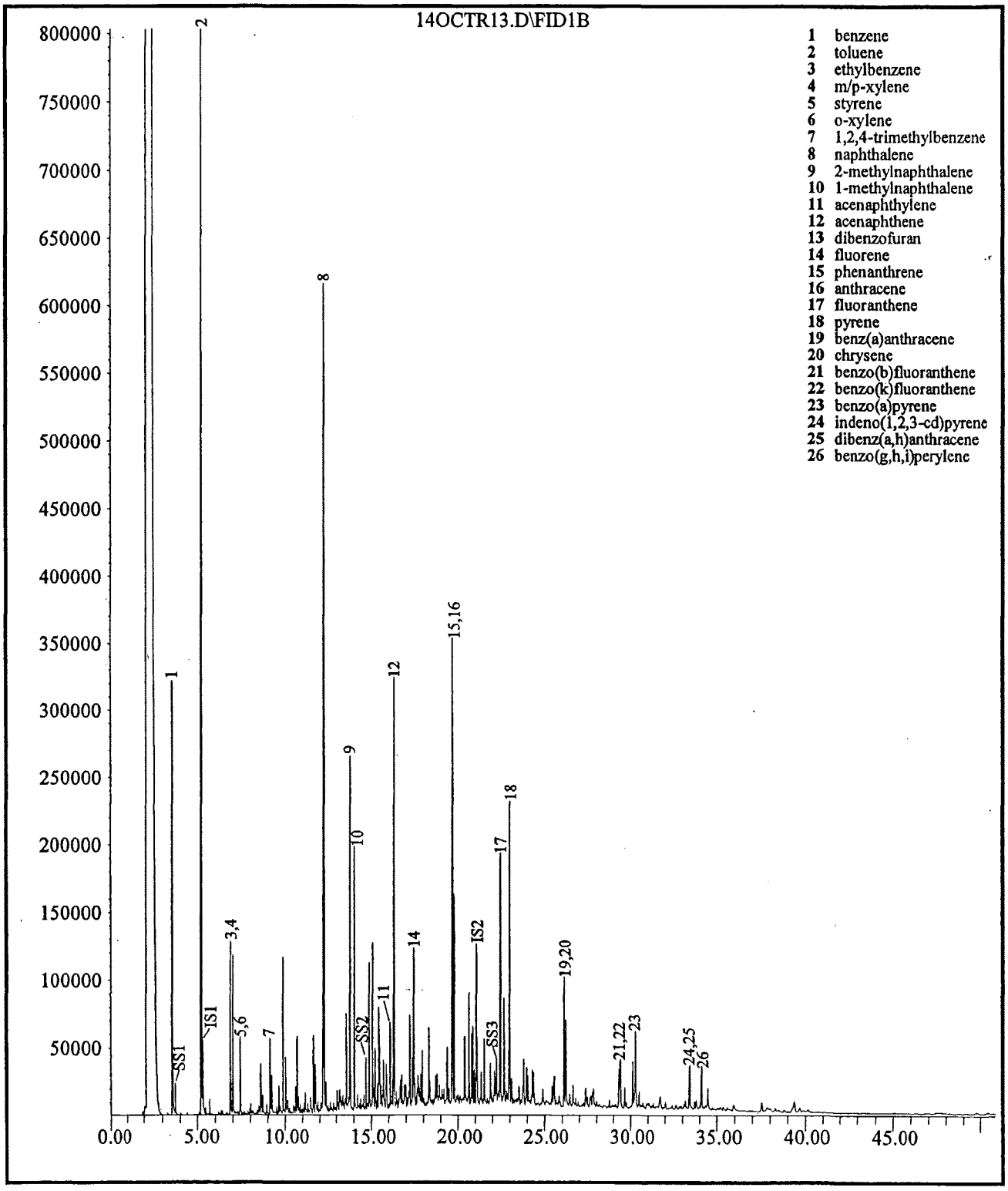


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane

Field ID:	**B-12-11-12**
Laboratory ID:	GT020924-04
Method:	MET4007D

META

GC/FID Fingerprint

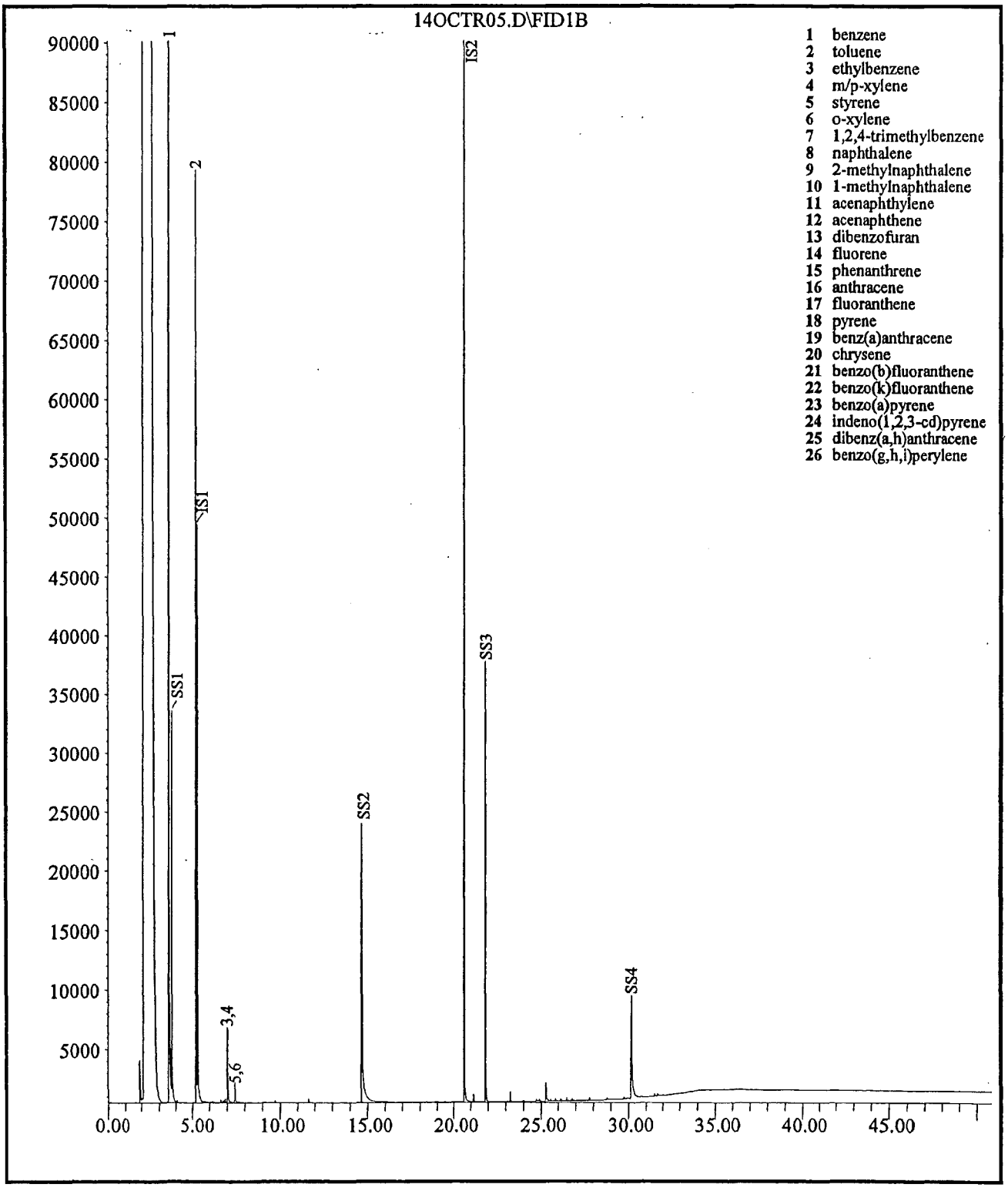


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane

Field ID:	**B13-12-13**
Laboratory ID:	GT020924-05
Method:	MET4007D

META

GC/FID Fingerprint

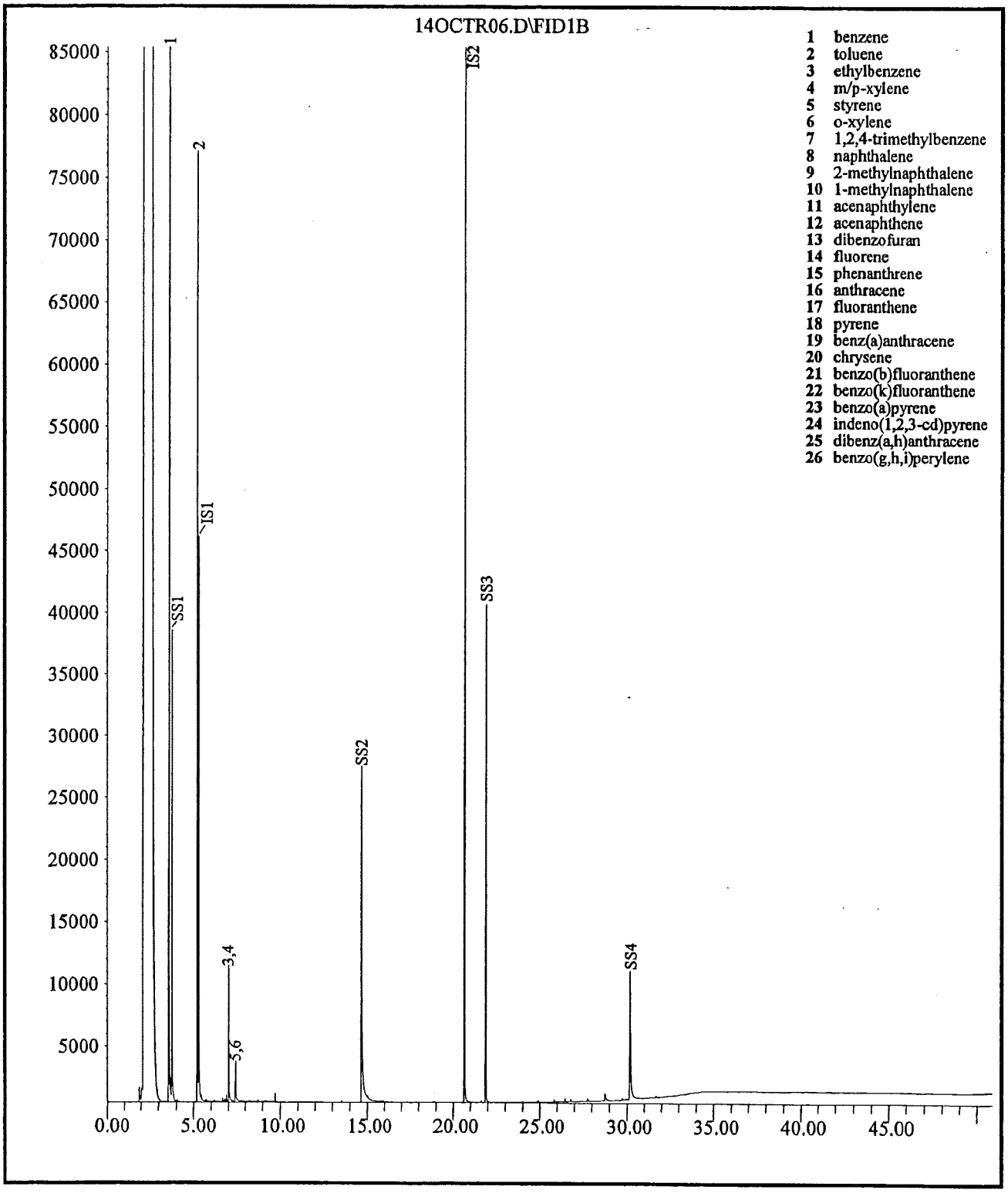


IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane
SS4 – benzo(a)pyrene-d12

Field ID:	**B23-6-8**
Laboratory ID:	GT020924-06
Method:	MET4007D

META

GC/FID Fingerprint



IS1 - 2,4-difluorotoluene
IS2 - o-terphenyl
SS1 - fluorobenzene
SS2 - 2-fluorobiphenyl
SS3 - 5α-androstane
SS4 – benzo(a)pyrene-d12

Field ID:	**B-23-10-12**
Laboratory ID:	GT020924-07
Method:	MET4007D

META

Appendix C

Chemical Concentrations

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-1

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
Lab ID:	GT020924-01 1:10	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	14OCT18.D	Matrix:	Soil
		Preservation:	None
Date Sampled:	9/18/2002	Decanted:	No
Date Received:	9/24/2002	Sample Size:	2.212 g
Date Prepared:	10/11/2002	%Solid:	74%
Date Cleanup:		Extract Volume:	2 mL
Date Analyzed:	15 Oct 2002 7:15 am	Prep DF:	10
Instrument:	GC/MS Ins	Analysis DF:	1
Operator:	ECC	Injection Volume:	0.001 mL
		Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	32.4		1.22	0.61	
Toluene	217	B	1.22	0.61	
Ethylbenzene	82.5		1.22	0.61	
m/p-Xylenes	422		1.22	0.61	
Styrene	105		1.22	0.61	
o-Xylene	135		1.22	0.61	
1,2,4-Trimethylbenzene	110		1.22	0.61	
Naphthalene	339		1.22	0.61	
2-Methylnaphthalene	56.4		1.22	0.61	
1-Methylnaphthalene	37.7		1.22	0.61	
Acenaphthylene	61.9		1.22	0.61	
Acenaphthene	30.2		1.22	0.61	
Dibenzofuran	3.84		1.22	0.61	
Fluorene	35.0		1.22	0.61	
Phenanthrene	209		1.22	0.61	
Anthracene	68.9		1.22	0.61	
Fluoranthene	131		1.22	0.61	
Pyrene	178		1.22	0.61	
Benz[a]anthracene	41.6		1.22	0.61	
Chrysene	46.1		1.22	0.61	
Benzo[b]fluoranthene	22.7		1.22	0.61	
Benzo[k]fluoranthene	22.7		1.22	0.61	
Benzo(e)pyrene	23.5		1.22	0.61	
Benzo[a]pyrene	26.5		1.22	0.61	
Perylene	3.89		1.22	0.61	
Indeno[1,2,3-cd]pyrene	16.9		1.22	0.61	
Dibenz[a,h]anthracene	4.73		1.22	0.61	
Benzo[g,h,i]perylene	38.7		1.22	0.61	
ALKYLATED PAHs:					
C0 - Benzene	32.4		1.22	0.61	
C1 - Benzene	260		1.22	0.61	
C2 - Benzene	769		1.22	0.61	
C3 - Benzene	236		1.22	0.61	
C4 - Benzene	67.1		1.22	0.61	
C5 - Benzene	12.7		1.22	0.61	
C0 - Naphthalene	339		1.22	0.61	
C1 - Naphthalene	53.9		1.22	0.61	
C2 - Naphthalene	32.2		1.22	0.61	
C3- Naphthalene	19.4		1.22	0.61	
C4- Naphthalene	12.7		1.22	0.61	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-1

Client:	GTI	Preparation Method:	EPA 3570		
Project:	Superior	Cleanup Method(s):			
		Analysis Method:	GC/MS (EPA 8270 Mod.)		
Lab ID:	GT020924-01 1:10	Matrix:	Soil		
File ID:	14OCT18.D	Preservation:	None		
		Decanted:	No		
		Sample Size:	2.212	g	
Date Sampled:	9/18/2002	%Solid:	74%		
Date Received:	9/24/2002	Extract Volume:	2	mL	
Date Prepared:	10/11/2002	Prep DF:	10		
Date Cleanup:		Analysis DF:	1		
Date Analyzed:	15 Oct 2002 7:15 am	Injection Volume:	0.001	mL	
Instrument:	GC/MS Ins				
Operator:	ECC	Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	35.0		1.22	0.61	
C1 - Fluorene	34.5		1.22	0.61	
C2 - Fluorene	12.8		1.22	0.61	
C3 - Fluorene	6.48		1.22	0.61	
C0 - Phenanthrene/Anthracene	290		1.22	0.61	
C1 - Phenanthrene/Anthracene	120		1.22	0.61	
C2 - Phenanthrene/Anthracene	44.2		1.22	0.61	
C3 - Phenanthrene/Anthracene	8.30		1.22	0.61	
C4 - Phenanthrene/Anthracene	3.29		1.22	0.61	
C0 - Dibenzothiophene	49.3		1.22	0.61	
C1 - Dibenzothiophene	16.3		1.22	0.61	
C2 - Dibenzothiophene	9.49		1.22	0.61	
C3 - Dibenzothiophene	5.16		1.22	0.61	
C0 - Fluoranthene/Pyrene	346		1.22	0.61	
C1 - Fluoranthene/Pyrene	68.0		1.22	0.61	
C2 - Fluoranthene/Pyrene	14.7		1.22	0.61	
C3 - Fluoranthene/Pyrene	4.20		1.22	0.61	
C0 - Benz(a)anthracene/Chrysene	98.0		1.22	0.61	
C1 - Benz(a)anthracene/Chrysene	20.3		1.22	0.61	
C2 - Benz(a)anthracene/Chrysene	5.30		1.22	0.61	
C3 - Benz(a)anthracene/Chrysene	1.32		1.22	0.61	
C4 - Benz(a)anthracene/Chrysene	0.89	J	1.22	0.61	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	57%	50%	150%
2-Fluorobiphenyl	83%	50%	120%
5a-Androstane	71%	50%	120%
Benzo(a)pyrene-d12	59%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-2

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
Lab ID:	GT020924-02 1:10	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	14OCT19.D	Matrix:	Soil
		Preservation:	None
Date Sampled:	9/18/2002	Decanted:	No
Date Received:	9/24/2002	Sample Size:	2.183 g
Date Prepared:	10/11/2002	%Solid:	37%
Date Cleanup:		Extract Volume:	2 mL
Date Analyzed:	15 Oct 2002 8:26 am	Prep DF:	10
Instrument:	GC/MS Ins	Analysis DF:	1
Operator:	ECC	Injection Volume:	0.001 mL
		Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	42.3		2.51	1.26	
Toluene	116	B	2.51	1.26	
Ethylbenzene	78.8		2.51	1.26	
m/p-Xylenes	185		2.51	1.26	
Styrene	241		2.51	1.26	
o-Xylene	156		2.51	1.26	
1,2,4-Trimethylbenzene	138		2.51	1.26	
Naphthalene	1,260		2.51	1.26	
2-Methylnaphthalene	360		2.51	1.26	
1-Methylnaphthalene	554		2.51	1.26	
Acenaphthylene	1,160		2.51	1.26	
Acenaphthene	590		2.51	1.26	
Dibenzofuran	56.2		2.51	1.26	
Fluorene	793		2.51	1.26	
Phenanthrene	2,670		2.51	1.26	
Anthracene	803		2.51	1.26	
Fluoranthene	1,410		2.51	1.26	
Pyrene	1,820		2.51	1.26	
Benz[a]anthracene	533		2.51	1.26	
Chrysene	518		2.51	1.26	
Benzo[b]fluoranthene	305		2.51	1.26	
Benzo[k]fluoranthene	453		2.51	1.26	
Benzo(e)pyrene	447		2.51	1.26	
Benzo[a]pyrene	637		2.51	1.26	
Perylene	112		2.51	1.26	
Indeno[1,2,3-cd]pyrene	511		2.51	1.26	
Dibenz[a,h]anthracene	147		2.51	1.26	
Benzo[g,h,i]perylene	951		2.51	1.26	
ALKYLATED PAHs:					
C0 - Benzene	42.3		2.51	1.26	
C1 - Benzene	140		2.51	1.26	
C2 - Benzene	505		2.51	1.26	
C3 - Benzene	430		2.51	1.26	
C4 - Benzene	244		2.51	1.26	
C5 - Benzene	82.9		2.51	1.26	
C0 - Naphthalene	1,260		2.51	1.26	
C1 - Naphthalene	520		2.51	1.26	
C2 - Naphthalene	611		2.51	1.26	
C3- Naphthalene	229		2.51	1.26	
C4- Naphthalene	107		2.51	1.26	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-2

Client:	GTI	Preparation Method:	EPA 3570		
Project:	Superior	Cleanup Method(s):			
		Analysis Method:	GC/MS (EPA 8270 Mod.)		
Lab ID:	GT020924-02 1:10	Matrix:	Soil		
File ID:	14OCT19.D	Preservation:	None		
		Decanted:	No		
		Sample Size:	2.183	g	
Date Sampled:	9/18/2002	%Solid:	37%		
Date Received:	9/24/2002	Extract Volume:	2	mL	
Date Prepared:	10/11/2002	Prep DF:	10		
Date Cleanup:		Analysis DF:	1		
Date Analyzed:	15 Oct 2002 8:26 am	Injection Volume:	0.001	mL	
Instrument:	GC/MS Ins				
Operator:	ECC	Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	793		2.51	1.26	
C1 - Fluorene	412		2.51	1.26	
C2 - Fluorene	126		2.51	1.26	
C3 - Fluorene	54.1		2.51	1.26	
C0 - Phenanthrene/Anthracene	3,650		2.51	1.26	
C1 - Phenanthrene/Anthracene	1,110		2.51	1.26	
C2 - Phenanthrene/Anthracene	367		2.51	1.26	
C3 - Phenanthrene/Anthracene	72.6		2.51	1.26	
C4 - Phenanthrene/Anthracene	29.5		2.51	1.26	
C0 - Dibenzothiophene	215		2.51	1.26	
C1 - Dibenzothiophene	146		2.51	1.26	
C2 - Dibenzothiophene	90.7		2.51	1.26	
C3 - Dibenzothiophene	49.0		2.51	1.26	
C0 - Fluoranthene/Pyrene	3,820		2.51	1.26	
C1 - Fluoranthene/Pyrene	791		2.51	1.26	
C2 - Fluoranthene/Pyrene	188		2.51	1.26	
C3 - Fluoranthene/Pyrene	49.7		2.51	1.26	
C0 - Benz(a)anthracene/Chrysene	1,150		2.51	1.26	
C1 - Benz(a)anthracene/Chrysene	265		2.51	1.26	
C2 - Benz(a)anthracene/Chrysene	89.9		2.51	1.26	
C3 - Benz(a)anthracene/Chrysene	23.1		2.51	1.26	
C4 - Benz(a)anthracene/Chrysene	8.78		2.51	1.26	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	63%	50%	150%
2-Fluorobiphenyl	92%	50%	120%
5a-Androstane	65%	50%	120%
Benzo(a)pyrene-d12	84%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-3

Client:	GTI	Preparation Method:	EPA 3540	
Project:	Superior	Cleanup Method(s):		
Lab ID:	GT021121-01 1/10	Analysis Method:	GC/MS (EPA 8270 Mod.)	
File ID:	15DEC10.D	Matrix:	Soil	
		Preservation:	None	
Date Sampled:	9/18/2002	Decanted:	No	
Date Received:	11/21/2002	Sample Size:	10.369	g
Date Prepared:	11/21/2002	%Solid:	58%	
Date Cleanup:		Extract Volume:	10	mL
Date Analyzed:	16 Dec 2002 12:10 am	Prep DF:	10	
Instrument:	GC4-MS_59	Analysis DF:	1	
Operator:	DRC	Injection Volume:	0.001	mL
		Batch QC:	IS021121-SB	

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	5,610	D	1.66	0.83	
Toluene	8,840	D	1.66	0.83	
Ethylbenzene	1,290		1.66	0.83	
m/p-Xylenes	4,180	D	1.66	0.83	
Styrene	721		1.66	0.83	
o-Xylene	943		1.66	0.83	
1,2,4-Trimethylbenzene	473		1.66	0.83	
Naphthalene	4,070	D	1.66	0.83	
2-Methylnaphthalene	1,400		1.66	0.83	
1-Methylnaphthalene	1,050		1.66	0.83	
Acenaphthylene	806		1.66	0.83	
Acenaphthene	1,200		1.66	0.83	
Dibenzofuran	41.6		1.66	0.83	
Fluorene	815		1.66	0.83	
Phenanthrene	4,150	D	1.66	0.83	
Anthracene	961		1.66	0.83	
Fluoranthene	1,050		1.66	0.83	
Pyrene	1,290		1.66	0.83	
Benz[a]anthracene	691		1.66	0.83	
Chrysene	833		1.66	0.83	
Benzo[b]fluoranthene	537		1.66	0.83	
Benzo[k]fluoranthene	460		1.66	0.83	
Benzo(e)pyrene	562		1.66	0.83	
Benzo[a]pyrene	870		1.66	0.83	
Perylene	182		1.66	0.83	
Indeno[1,2,3-cd]pyrene	419		1.66	0.83	
Dibenz[a,h]anthracene	127		1.66	0.83	
Benzo[g,h,i]perylene	575		1.66	0.83	
ALKYLATED PAHs:					
C0 - Benzene	5,610	D	1.66	0.83	
C1 - Benzene	9,590	D	1.66	0.83	
C2 - Benzene	7,710	D	1.66	0.83	
C3 - Benzene	1,430		1.66	0.83	
C4 - Benzene	548		1.66	0.83	
C5 - Benzene	256		1.66	0.83	
C0 - Naphthalene	4,070	D	1.66	0.83	
C1 - Naphthalene	2,260		1.66	0.83	
C2 - Naphthalene	2,920		1.66	0.83	
C3- Naphthalene	1,120		1.66	0.83	
C4- Naphthalene	241		1.66	0.83	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: T10-3

Client:	GTI	Preparation Method:	EPA 3540	
Project:	Superior	Cleanup Method(s):		
		Analysis Method:	GC/MS (EPA 8270 Mod.)	
Lab ID:	GT021121-01 1/10	Matrix:	Soil	
File ID:	15DEC10.D	Preservation:	None	
		Decanted:	No	
		Sample Size:	10.369	g
Date Sampled:	9/18/2002	%Solid:	58%	
Date Received:	11/21/2002	Extract Volume:	10	mL
Date Prepared:	11/21/2002	Prep DF:	10	
Date Cleanup:		Analysis DF:	1	
Date Analyzed:	16 Dec 2002 12:10 am	Injection Volume:	0.001	mL
Instrument:	GC4-MS_59			
Operator:	DRC	Batch QC:	IS021121-SB	

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	815		1.66	0.83	
C1 - Fluorene	684		1.66	0.83	
C2 - Fluorene	169		1.66	0.83	
C3 - Fluorene	90.9		1.66	0.83	
C0 - Phenanthrene/Anthracene	5,820	D	1.66	0.83	
C1 - Phenanthrene/Anthracene	473		1.66	0.83	
C2 - Phenanthrene/Anthracene	374		1.66	0.83	
C3 - Phenanthrene/Anthracene	95.0		1.66	0.83	
C4 - Phenanthrene/Anthracene	27.2		1.66	0.83	
C0 - Dibenzothiophene	246		1.66	0.83	
C1 - Dibenzothiophene	139		1.66	0.83	
C2 - Dibenzothiophene	79.6		1.66	0.83	
C3 - Dibenzothiophene	33.2		1.66	0.83	
C0 - Fluoranthene/Pyrene	3,100		1.66	0.83	
C1 - Fluoranthene/Pyrene	1,320		1.66	0.83	
C2 - Fluoranthene/Pyrene	369		1.66	0.83	
C3 - Fluoranthene/Pyrene	152		1.66	0.83	
C0 - Benz(a)anthracene/Chrysene	1,540		1.66	0.83	
C1 - Benz(a)anthracene/Chrysene	669		1.66	0.83	
C2 - Benz(a)anthracene/Chrysene	278		1.66	0.83	
C3 - Benz(a)anthracene/Chrysene	78.6		1.66	0.83	
C4 - Benz(a)anthracene/Chrysene	28.2		1.66	0.83	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	63%	50%	150%
2-Fluorobiphenyl	138%	50%	120%
5a-Androstane	148%	50%	120%
Benzo(a)pyrene-d12	62%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B11-12-13

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
		Analysis Method:	GC/MS (EPA 8270 Mod.)
Lab ID:	GT020924-03	Matrix:	Soil
File ID:	14OCT33.D	Preservation:	None
		Decanted:	No
		Sample Size:	1.547 g
Date Sampled:	9/19/2002	%Solid:	77%
Date Received:	9/24/2002	Extract Volume:	2 mL
Date Prepared:	10/11/2002	Prep DF:	1
Date Cleanup:		Analysis DF:	1
Date Analyzed:	16 Oct 2002 1:06 am	Injection Volume:	0.001 mL
Instrument:	GC/MS Ins		
Operator:	ECC	Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	568	D	0.17	0.08	
Toluene	1,380	D	0.17	0.08	
Ethylbenzene	531	D	0.17	0.08	
m/p-Xylenes	1,370	D	0.17	0.08	
Styrene	24.1		0.17	0.08	
o-Xylene	386	D	0.17	0.08	
1,2,4-Trimethylbenzene	219	D	0.17	0.08	
Naphthalene	303	D	0.17	0.08	
2-Methylnaphthalene	157		0.17	0.08	
1-Methylnaphthalene	127		0.17	0.08	
Acenaphthylene	27.2		0.17	0.08	
Acenaphthene	282	D	0.17	0.08	
Dibenzofuran	14.4		0.17	0.08	
Fluorene	152		0.17	0.08	
Phenanthrene	520	D	0.17	0.08	
Anthracene	118		0.17	0.08	
Fluoranthene	112		0.17	0.08	
Pyrene	145		0.17	0.08	
Benz[a]anthracene	42.7		0.17	0.08	
Chrysene	46.5		0.17	0.08	
Benzo[b]fluoranthene	17.6		0.17	0.08	
Benzo[k]fluoranthene	29.8		0.17	0.08	
Benzo(e)pyrene	27.9		0.17	0.08	
Benzo[a]pyrene	41.4		0.17	0.08	
Perylene	6.63		0.17	0.08	
Indeno[1,2,3-cd]pyrene	24.2		0.17	0.08	
Dibenz[a,h]anthracene	7.85		0.17	0.08	
Benzo[g,h,i]perylene	44.7		0.17	0.08	
ALKYLATED PAHs:					
C0 - Benzene	568	D	0.17	0.08	
C1 - Benzene	1,650	D	0.17	0.08	
C2 - Benzene	2,710	D	0.17	0.08	
C3 - Benzene	566	D	0.17	0.08	
C4 - Benzene	51.7		0.17	0.08	
C5 - Benzene	20.7		0.17	0.08	
C0 - Naphthalene	303	D	0.17	0.08	
C1 - Naphthalene	163		0.17	0.08	
C2 - Naphthalene	207		0.17	0.08	
C3- Naphthalene	67.6		0.17	0.08	
C4- Naphthalene	25.1		0.17	0.08	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B11-12-13

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
Lab ID:	GT020924-03	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	14OCT33.D	Matrix:	Soil
		Preservation:	None
		Decanted:	No
Date Sampled:	9/19/2002	Sample Size:	1.547 g
Date Received:	9/24/2002	%Solid:	77%
Date Prepared:	10/11/2002	Extract Volume:	2 mL
Date Cleanup:		Prep DF:	1
Date Analyzed:	16 Oct 2002 1:06 am	Analysis DF:	1
Instrument:	GC/MS Ins	Injection Volume:	0.001 mL
Operator:	ECC	Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	152		0.17	0.08	
C1 - Fluorene	95.5		0.17	0.08	
C2 - Fluorene	27.6		0.17	0.08	
C3 - Fluorene	8.22		0.17	0.08	
C0 - Phenanthrene/Anthracene	679	D	0.17	0.08	
C1 - Phenanthrene/Anthracene	191		0.17	0.08	
C2 - Phenanthrene/Anthracene	67.2		0.17	0.08	
C3 - Phenanthrene/Anthracene	13.0		0.17	0.08	
C4 - Phenanthrene/Anthracene	5.18		0.17	0.08	
C0 - Dibenzothiophene	34.6		0.17	0.08	
C1 - Dibenzothiophene	26.8		0.17	0.08	
C2 - Dibenzothiophene	15.4		0.17	0.08	
C3 - Dibenzothiophene	8.06		0.17	0.08	
C0 - Fluoranthene/Pyrene	314		0.17	0.08	
C1 - Fluoranthene/Pyrene	91.4		0.17	0.08	
C2 - Fluoranthene/Pyrene	23.6		0.17	0.08	
C3 - Fluoranthene/Pyrene	6.78		0.17	0.08	
C0 - Benz(a)anthracene/Chrysene	99.3		0.17	0.08	
C1 - Benz(a)anthracene/Chrysene	31.5		0.17	0.08	
C2 - Benz(a)anthracene/Chrysene	11.8		0.17	0.08	
C3 - Benz(a)anthracene/Chrysene	2.82		0.17	0.08	
C4 - Benz(a)anthracene/Chrysene	0.72		0.17	0.08	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	75%	50%	150%
2-Fluorobiphenyl	102%	50%	120%
5a-Androstane	72%	50%	120%
Benzo(a)pyrene-d12	120%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B12-11-12

Client:	GTI	Preparation Method:	EPA 3570	
Project:	Superior	Cleanup Method(s):		
		Analysis Method:	GC/MS (EPA 8270 Mod.)	
Lab ID:	GT020924-04 1:10	Matrix:	Soil	
File ID:	14OCT21.D	Preservation:	None	
		Decanted:	No	
		Sample Size:	1.26	g
Date Sampled:	9/19/2002	%Solid:	76%	
Date Received:	9/24/2002	Extract Volume:	2	mL
Date Prepared:	10/11/2002	Prep DF:	10	
Date Cleanup:		Analysis DF:	1	
Date Analyzed:	15 Oct 2002 10:49 am	Injection Volume:	0.001	mL
Instrument:	GC/MS Ins			
Operator:	ECC	Batch QC:	GT021011-SB	

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	3,050	E	2.08	1.04	
Toluene	4,330	E	2.08	1.04	
Ethylbenzene	1,250		2.08	1.04	
m/p-Xylenes	2,600	E	2.08	1.04	
Styrene	85.8		2.08	1.04	
o-Xylene	916		2.08	1.04	
1,2,4-Trimethylbenzene	401		2.08	1.04	
Naphthalene	3,230	E	2.08	1.04	
2-Methylnaphthalene	2,070		2.08	1.04	
1-Methylnaphthalene	1,410		2.08	1.04	
Acenaphthylene	157		2.08	1.04	
Acenaphthene	2,260	E	2.08	1.04	
Dibenzofuran	80.9		2.08	1.04	
Fluorene	982		2.08	1.04	
Phenanthrene	2,480	E	2.08	1.04	
Anthracene	862		2.08	1.04	
Fluoranthene	695		2.08	1.04	
Pyrene	915		2.08	1.04	
Benz[a]anthracene	223		2.08	1.04	
Chrysene	220		2.08	1.04	
Benzo[b]fluoranthene	132		2.08	1.04	
Benzo[k]fluoranthene	126		2.08	1.04	
Benzo(e)pyrene	137		2.08	1.04	
Benzo[a]pyrene	214		2.08	1.04	
Perylene	31.4		2.08	1.04	
Indeno[1,2,3-cd]pyrene	126		2.08	1.04	
Dibenz[a,h]anthracene	35.9		2.08	1.04	
Benzo[g,h,i]perylene	240		2.08	1.04	
ALKYLATED PAHs:					
C0 - Benzene	3,050	E	2.08	1.04	
C1 - Benzene	5,190		2.08	1.04	
C2 - Benzene	5,670		2.08	1.04	
C3 - Benzene	1,260		2.08	1.04	
C4 - Benzene	807		2.08	1.04	
C5 - Benzene	159		2.08	1.04	
C0 - Naphthalene	3,230	E	2.08	1.04	
C1 - Naphthalene	1,990		2.08	1.04	
C2 - Naphthalene	1,210		2.08	1.04	
C3- Naphthalene	334		2.08	1.04	
C4- Naphthalene	112		2.08	1.04	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B12-11-12

Client:	GTI	Preparation Method:	EPA 3570	
Project:	Superior	Cleanup Method(s):		
		Analysis Method:	GC/MS (EPA 8270 Mod.)	
Lab ID:	GT020924-04 1:10	Matrix:	Soil	
File ID:	14OCT21.D	Preservation:	None	
		Decanted:	No	
		Sample Size:	1.26	g
Date Sampled:	9/19/2002	%Solid:	76%	
Date Received:	9/24/2002	Extract Volume:	2	mL
Date Prepared:	10/11/2002	Prep DF:	10	
Date Cleanup:		Analysis DF:	1	
Date Analyzed:	15 Oct 2002 10:49 am	Injection Volume:	0.001	mL
Instrument:	GC/MS Ins			
Operator:	ECC	Batch QC:	GT021011-SB	

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	982		2.08	1.04	
C1 - Fluorene	524		2.08	1.04	
C2 - Fluorene	112		2.08	1.04	
C3 - Fluorene	30.1		2.08	1.04	
C0 - Phenanthrene/Anthracene	3,460	E	2.08	1.04	
C1 - Phenanthrene/Anthracene	911		2.08	1.04	
C2 - Phenanthrene/Anthracene	267		2.08	1.04	
C3 - Phenanthrene/Anthracene	47.3		2.08	1.04	
C4 - Phenanthrene/Anthracene	14.3		2.08	1.04	
C0 - Dibenzothiophene	200		2.08	1.04	
C1 - Dibenzothiophene	122		2.08	1.04	
C2 - Dibenzothiophene	58.2		2.08	1.04	
C3 - Dibenzothiophene	29.0		2.08	1.04	
C0 - Fluoranthene/Pyrene	1,950		2.08	1.04	
C1 - Fluoranthene/Pyrene	427		2.08	1.04	
C2 - Fluoranthene/Pyrene	96.9		2.08	1.04	
C3 - Fluoranthene/Pyrene	27.3		2.08	1.04	
C0 - Benz(a)anthracene/Chrysene	497		2.08	1.04	
C1 - Benz(a)anthracene/Chrysene	128		2.08	1.04	
C2 - Benz(a)anthracene/Chrysene	45.0		2.08	1.04	
C3 - Benz(a)anthracene/Chrysene	15.2		2.08	1.04	
C4 - Benz(a)anthracene/Chrysene	4.55		2.08	1.04	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	96%	50%	150%
2-Fluorobiphenyl	115%	50%	120%
5a-Androstane	73%	50%	120%
Benzo(a)pyrene-d12	85%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B13-12-13

Client:	GTI	Preparation Method:	EPA 3570		
Project:	Superior	Cleanup Method(s):			
Lab ID:	GT020924-05 1:10	Analysis Method:	GC/MS (EPA 8270 Mod.)		
File ID:	14OCT22.D	Matrix:	Soil		
		Preservation:	None		
Date Sampled:	9/19/2002	Decanted:	No		
Date Received:	9/24/2002	Sample Size:	1.433	g	
Date Prepared:	10/11/2002	%Solid:	79%		
Date Cleanup:		Extract Volume:	2	mL	
Date Analyzed:	15 Oct 2002 12:01 pm	Prep DF:	10		
Instrument:	GC/MS Ins	Analysis DF:	1		
Operator:	ECC	Injection Volume:	0.001	mL	
		Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	377		1.77	0.88	
Toluene	1,250	B	1.77	0.88	
Ethylbenzene	175		1.77	0.88	
m/p-Xylenes	159		1.77	0.88	
Styrene	5.02		1.77	0.88	
o-Xylene	67.3		1.77	0.88	
1,2,4-Trimethylbenzene	65.6		1.77	0.88	
Naphthalene	1,580		1.77	0.88	
2-Methylnaphthalene	581		1.77	0.88	
1-Methylnaphthalene	364		1.77	0.88	
Acenaphthylene	38.3		1.77	0.88	
Acenaphthene	830		1.77	0.88	
Dibenzofuran	15.5		1.77	0.88	
Fluorene	254		1.77	0.88	
Phenanthrene	899		1.77	0.88	
Anthracene	244		1.77	0.88	
Fluoranthene	254		1.77	0.88	
Pyrene	329		1.77	0.88	
Benz[a]anthracene	62.4		1.77	0.88	
Chrysene	62.4		1.77	0.88	
Benzo[b]fluoranthene	37.5		1.77	0.88	
Benzo[k]fluoranthene	35.3		1.77	0.88	
Benzo(e)pyrene	39.4		1.77	0.88	
Benzo[a]pyrene	58.4		1.77	0.88	
Perylene	8.51		1.77	0.88	
Indeno[1,2,3-cd]pyrene	31.4		1.77	0.88	
Dibenz[a,h]anthracene	7.67		1.77	0.88	
Benzo[g,h,i]perylene	64.9		1.77	0.88	
ALKYLATED PAHs:					
C0 - Benzene	377		1.77	0.88	
C1 - Benzene	1,500	B	1.77	0.88	
C2 - Benzene	494		1.77	0.88	
C3 - Benzene	237		1.77	0.88	
C4 - Benzene	221		1.77	0.88	
C5 - Benzene	41.5		1.77	0.88	
C0 - Naphthalene	1,580		1.77	0.88	
C1 - Naphthalene	542		1.77	0.88	
C2 - Naphthalene	234		1.77	0.88	
C3- Naphthalene	58.9		1.77	0.88	
C4- Naphthalene	19.2		1.77	0.88	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B13-12-13

		Preparation Method:	EPA 3570		
		Cleanup Method(s):			
Client:	GTI	Analysis Method:	GC/MS (EPA 8270 Mod.)		
Project:	Superior	Matrix:	Soil		
		Preservation:	None		
Lab ID:	GT020924-05 1:10	Decanted:	No		
File ID:	14OCT22.D				
		Sample Size:	1.433	g	
Date Sampled:	9/19/2002	%Solid:	79%		
Date Received:	9/24/2002	Extract Volume:	2	mL	
Date Prepared:	10/11/2002	Prep DF:	10		
Date Cleanup:		Analysis DF:	1		
Date Analyzed:	15 Oct 2002 12:01 pm	Injection Volume:	0.001	mL	
Instrument:	GC/MS Ins				
Operator:	ECC	Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	254		1.77	0.88	
C1 - Fluorene	89.3		1.77	0.88	
C2 - Fluorene	23.3		1.77	0.88	
C3 - Fluorene	6.58		1.77	0.88	
C0 - Phenanthrene/Anthracene	1,170		1.77	0.88	
C1 - Phenanthrene/Anthracene	193		1.77	0.88	
C2 - Phenanthrene/Anthracene	47.0		1.77	0.88	
C3 - Phenanthrene/Anthracene	8.41		1.77	0.88	
C4 - Phenanthrene/Anthracene	2.66		1.77	0.88	
C0 - Dibenzothiophene	83.8		1.77	0.88	
C1 - Dibenzothiophene	24.0		1.77	0.88	
C2 - Dibenzothiophene	10.7		1.77	0.88	
C3 - Dibenzothiophene	5.28		1.77	0.88	
C0 - Fluoranthene/Pyrene	682		1.77	0.88	
C1 - Fluoranthene/Pyrene	99.3		1.77	0.88	
C2 - Fluoranthene/Pyrene	17.4		1.77	0.88	
C3 - Fluoranthene/Pyrene	3.73		1.77	0.88	
C0 - Benz(a)anthracene/Chrysene	140		1.77	0.88	
C1 - Benz(a)anthracene/Chrysene	24.6		1.77	0.88	
C2 - Benz(a)anthracene/Chrysene	7.95		1.77	0.88	
C3 - Benz(a)anthracene/Chrysene	2.39		1.77	0.88	
C4 - Benz(a)anthracene/Chrysene	1.63	J	1.77	0.88	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	70%	50%	150%
2-Fluorobiphenyl	93%	50%	120%
5a-Androstane	70%	50%	120%
Benzo(a)pyrene-d12	76%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B23-6-8

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
Lab ID:	GT020924-06	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	14OCT23.D	Matrix:	Soil
		Preservation:	None
Date Sampled:	9/18/2002	Decanted:	No
Date Received:	9/24/2002	Sample Size:	2.057 g
Date Prepared:	10/11/2002	%Solid:	73%
Date Cleanup:		Extract Volume:	1.5 mL
Date Analyzed:	15 Oct 2002 1:13 pm	Prep DF:	1
Instrument:	GC/MS Ins	Analysis DF:	1
Operator:	ECC	Injection Volume:	0.001 mL
		Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	138	E	0.10	0.05	
Toluene	53.1	B	0.10	0.05	
Ethylbenzene	0.28		0.10	0.05	
m/p-Xylenes	5.71		0.10	0.05	
Styrene	0.72		0.10	0.05	
o-Xylene	1.22		0.10	0.05	
1,2,4-Trimethylbenzene	0.15		0.10	0.05	
Naphthalene	0.18		0.10	0.05	
2-Methylnaphthalene	0.06	J	0.10	0.05	
1-Methylnaphthalene		U	0.10	0.05	
Acenaphthylene		U	0.10	0.05	
Acenaphthene	0.10	J	0.10	0.05	
Dibenzofuran		U	0.10	0.05	
Fluorene		U	0.10	0.05	
Phenanthrene	0.10		0.10	0.05	
Anthracene		U	0.10	0.05	
Fluoranthene		U	0.10	0.05	
Pyrene		U	0.10	0.05	
Benz[a]anthracene		U	0.10	0.05	
Chrysene		U	0.10	0.05	
Benzo[b]fluoranthene		U	0.10	0.05	
Benzo[k]fluoranthene		U	0.10	0.05	
Benzo(e)pyrene		U	0.10	0.05	
Benzo[a]pyrene		U	0.10	0.05	
Perylene		U	0.10	0.05	
Indeno[1,2,3-cd]pyrene		U	0.10	0.05	
Dibenz[a,h]anthracene		U	0.10	0.05	
Benzo[g,h,i]perylene		U	0.10	0.05	
ALKYLATED PAHs:					
C0 - Benzene	138	E	0.10	0.05	
C1 - Benzene	63.7	B	0.10	0.05	
C2 - Benzene	8.87		0.10	0.05	
C3 - Benzene	0.36		0.10	0.05	
C4 - Benzene		U	0.10	0.05	
C5 - Benzene		U	0.10	0.05	
C0 - Naphthalene	0.18		0.10	0.05	
C1 - Naphthalene	0.06	J	0.10	0.05	
C2 - Naphthalene		U	0.10	0.05	
C3- Naphthalene		U	0.10	0.05	
C4- Naphthalene		U	0.10	0.05	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B23-6-8

Client:	GTI	Preparation Method:	EPA 3570
Project:	Superior	Cleanup Method(s):	
		Analysis Method:	GC/MS (EPA 8270 Mod.)
Lab ID:	GT020924-06	Matrix:	Soil
File ID:	14OCT23.D	Preservation:	None
		Decanted:	No
Date Sampled:	9/18/2002	Sample Size:	2.057 g
Date Received:	9/24/2002	%Solid:	73%
Date Prepared:	10/11/2002	Extract Volume:	1.5 mL
Date Cleanup:		Prep DF:	1
Date Analyzed:	15 Oct 2002 1:13 pm	Analysis DF:	1
Instrument:	GC/MS Ins	Injection Volume:	0.001 mL
Operator:	ECC	Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene		U	0.10	0.05	
C1 - Fluorene		U	0.10	0.05	
C2 - Fluorene		U	0.10	0.05	
C3 - Fluorene		U	0.10	0.05	
C0 - Phenanthrene/Anthracene	0.14		0.10	0.05	
C1 - Phenanthrene/Anthracene		U	0.10	0.05	
C2 - Phenanthrene/Anthracene		U	0.10	0.05	
C3 - Phenanthrene/Anthracene		U	0.10	0.05	
C4 - Phenanthrene/Anthracene		U	0.10	0.05	
C0 - Dibenzothiophene		U	0.10	0.05	
C1 - Dibenzothiophene		U	0.10	0.05	
C2 - Dibenzothiophene		U	0.10	0.05	
C3 - Dibenzothiophene		U	0.10	0.05	
C0 - Fluoranthene/Pyrene		U	0.10	0.05	
C1 - Fluoranthene/Pyrene		U	0.10	0.05	
C2 - Fluoranthene/Pyrene		U	0.10	0.05	
C3 - Fluoranthene/Pyrene		U	0.10	0.05	
C0 - Benz(a)anthracene/Chrysene		U	0.10	0.05	
C1 - Benz(a)anthracene/Chrysene		U	0.10	0.05	
C2 - Benz(a)anthracene/Chrysene		U	0.10	0.05	
C3 - Benz(a)anthracene/Chrysene		U	0.10	0.05	
C4 - Benz(a)anthracene/Chrysene		U	0.10	0.05	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	74%	50%	150%
2-Fluorobiphenyl	82%	50%	120%
5a-Androstane	63%	50%	120%
Benzo(a)pyrene-d12	91%	50%	120%
FRACTIONATION SURROGATE COMPOUNDS:			
2,5-Dibromotoluene	Not Spiked	50%	150%
2-Bromonaphthalene	0%	50%	150%
1-Chlorooctadecane	Not Spiked	50%	150%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B23-10-12

Client:	GTI	Preparation Method:	EP A 3570
Project:	Superior	Cleanup Method(s):	
		Analysis Method:	GC/MS (EPA 8270 Mod.)
Lab ID:	GT020924-07	Matrix:	Soil
File ID:	14OCT26.D	Preservation:	None
		Decanted:	No
		Sample Size:	2.018 g
Date Sampled:	9/19/2002	%Solid:	77%
Date Received:	9/24/2002	Extract Volume:	1.3 mL
Date Prepared:	10/11/2002	Prep DF:	1
Date Cleanup:		Analysis DF:	1
Date Analyzed:	15 Oct 2002 3:57 pm	Injection Volume:	0.001 mL
Instrument:	GC/MS Ins		
Operator:	ECC	Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	49.7		0.08	0.04	
Toluene	49.1	B	0.08	0.04	
Ethylbenzene	0.60		0.08	0.04	
m/p-Xylenes	9.68		0.08	0.04	
Styrene	2.70		0.08	0.04	
o-Xylene	2.23		0.08	0.04	
1,2,4-Trimethylbenzene	0.50		0.08	0.04	
Naphthalene	0.37		0.08	0.04	
2-Methylnaphthalene	0.37		0.08	0.04	
1-Methylnaphthalene	0.35		0.08	0.04	
Acenaphthylene	0.35		0.08	0.04	
Acenaphthene	0.42		0.08	0.04	
Dibenzofuran	0.39		0.08	0.04	
Fluorene	0.34		0.08	0.04	
Phenanthrene	0.32		0.08	0.04	
Anthracene	0.35		0.08	0.04	
Fluoranthene	0.23		0.08	0.04	
Pyrene	0.22		0.08	0.04	
Benz[a]anthracene	0.09		0.08	0.04	
Chrysene	0.16		0.08	0.04	
Benzo[b]fluoranthene	0.12		0.08	0.04	
Benzo[k]fluoranthene	0.20		0.08	0.04	
Benzo(e)pyrene		U	0.08	0.04	
Benzo[a]pyrene	0.20		0.08	0.04	
Perylene		U	0.08	0.04	
Indeno[1,2,3-cd]pyrene	0.11		0.08	0.04	
Dibenz[a,h]anthracene	0.06	J	0.08	0.04	
Benzo[g,h,i]perylene	0.20		0.08	0.04	
ALKYLATED PAHs:					
C0 - Benzene	49.7		0.08	0.04	
C1 - Benzene	58.9	B	0.08	0.04	
C2 - Benzene	15.7		0.08	0.04	
C3 - Benzene	1.29		0.08	0.04	
C4 - Benzene	0.44		0.08	0.04	
C5 - Benzene		U	0.08	0.04	
C0 - Naphthalene	0.37		0.08	0.04	
C1 - Naphthalene	0.43		0.08	0.04	
C2 - Naphthalene		U	0.08	0.04	
C3- Naphthalene		U	0.08	0.04	
C4- Naphthalene		U	0.08	0.04	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: B23-10-12

Client:	GTI	Preparation Method:	EP A 3570		
Project:	Superior	Cleanup Method(s):			
Lab ID:	GT020924-07	Analysis Method:	GC/MS (EPA 8270 Mod.)		
File ID:	14OCT26.D	Matrix:	Soil		
		Preservation:	None		
Date Sampled:	9/19/2002	Decanted:	No		
Date Received:	9/24/2002	Sample Size:	2.018	g	
Date Prepared:	10/11/2002	%Solid:	77%		
Date Cleanup:		Extract Volume:	1.3	mL	
Date Analyzed:	15 Oct 2002 3:57 pm	Prep DF:	1		
Instrument:	GC/MS Ins	Analysis DF:	1		
Operator:	ECC	Injection Volume:	0.001	mL	
		Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene	0.34		0.08	0.04	
C1 - Fluorene		U	0.08	0.04	
C2 - Fluorene		U	0.08	0.04	
C3 - Fluorene		U	0.08	0.04	
C0 - Phenanthrene/Anthracene	0.66		0.08	0.04	
C1 - Phenanthrene/Anthracene		U	0.08	0.04	
C2 - Phenanthrene/Anthracene		U	0.08	0.04	
C3 - Phenanthrene/Anthracene		U	0.08	0.04	
C4 - Phenanthrene/Anthracene		U	0.08	0.04	
C0 - Dibenzothiophene		U	0.08	0.04	
C1 - Dibenzothiophene		U	0.08	0.04	
C2 - Dibenzothiophene		U	0.08	0.04	
C3 - Dibenzothiophene		U	0.08	0.04	
C0 - Fluoranthene/Pyrene	0.47		0.08	0.04	
C1 - Fluoranthene/Pyrene		U	0.08	0.04	
C2 - Fluoranthene/Pyrene		U	0.08	0.04	
C3 - Fluoranthene/Pyrene		U	0.08	0.04	
C0 - Benz(a)anthracene/Chrysene	0.26		0.08	0.04	
C1 - Benz(a)anthracene/Chrysene		U	0.08	0.04	
C2 - Benz(a)anthracene/Chrysene		U	0.08	0.04	
C3 - Benz(a)anthracene/Chrysene		U	0.08	0.04	
C4 - Benz(a)anthracene/Chrysene		U	0.08	0.04	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	87%	50%	150%
2-Fluorobiphenyl	89%	50%	120%
5a-Androstane	67%	50%	120%
Benzo(a)pyrene-d12	91%	50%	120%

FRACTIONATION SURROGATE COMPOUNDS:			
2,5-Dibromotoluene	Not Spiked	50%	150%
2-Bromonaphthalene	1%	50%	150%
1-Chlorooctadecane	Not Spiked	50%	150%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	Various	Preparation Method:	EPA 3570		
Project:	Various	Cleanup Method(s):			
Lab ID:	GT021011-SB	Analysis Method:	GC/MS (EPA 8270 Mod.)		
File ID:	16OCT11.D	Matrix:	Soil		
		Preservation:	None		
Date Sampled:		Decanted:	No		
Date Received:		Sample Size:	2	g	
Date Prepared:	10/11/2002	%Solid:	100%		
Date Cleanup:		Extract Volume:	1.1	mL	
Date Analyzed:	16 Oct 2002 9:39 pm	Prep DF:	1		
Instrument:	GC/MS Ins	Analysis DF:	1		
Operator:	ECC	Injection Volume:	0.001	mL	
		Batch QC:	GT021011-SB		

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene		U	0.06	0.03	
Toluene	0.04	J	0.06	0.03	
Ethylbenzene		U	0.06	0.03	
m/p-Xylenes		U	0.06	0.03	
Styrene		U	0.06	0.03	
o-Xylene		U	0.06	0.03	
1,2,4-Trimethylbenzene		U	0.06	0.03	
Naphthalene		U	0.06	0.03	
2-Methylnaphthalene		U	0.06	0.03	
1-Methylnaphthalene		U	0.06	0.03	
Acenaphthylene		U	0.06	0.03	
Acenaphthene		U	0.06	0.03	
Dibenzofuran		U	0.06	0.03	
Fluorene		U	0.06	0.03	
Phenanthrene		U	0.06	0.03	
Anthracene		U	0.06	0.03	
Fluoranthene		U	0.06	0.03	
Pyrene		U	0.06	0.03	
Benz[a]anthracene		U	0.06	0.03	
Chrysene		U	0.06	0.03	
Benzo[b]fluoranthene		U	0.06	0.03	
Benzo[k]fluoranthene		U	0.06	0.03	
Benzo(e)pyrene		U	0.06	0.03	
Benzo[a]pyrene		U	0.06	0.03	
Perylene		U	0.06	0.03	
Indeno[1,2,3-cd]pyrene		U	0.06	0.03	
Dibenz[a,h]anthracene		U	0.06	0.03	
Benzo[g,h,i]perylene		U	0.06	0.03	
ALKYLATED PAHs:					
C0 - Benzene		U	0.06	0.03	
C1 - Benzene	0.05	J	0.06	0.03	
C2 - Benzene		U	0.06	0.03	
C3 - Benzene		U	0.06	0.03	
C4 - Benzene		U	0.06	0.03	
C5 - Benzene		U	0.06	0.03	
C0 - Naphthalene		U	0.06	0.03	
C1 - Naphthalene		U	0.06	0.03	
C2 - Naphthalene		U	0.06	0.03	
C3 - Naphthalene		U	0.06	0.03	
C4 - Naphthalene		U	0.06	0.03	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	Various	Preparation Method:	EPA 3570
Project:	Various	Cleanup Method(s):	
Lab ID:	GT021011-SB	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	16OCT11.D	Matrix:	Soil
		Preservation:	None
Date Sampled:		Decanted:	No
Date Received:		Sample Size:	2 g
Date Prepared:	10/11/2002	%Solid:	100%
Date Cleanup:		Extract Volume:	1.1 mL
Date Analyzed:	16 Oct 2002 9:39 pm	Prep DF:	1
Instrument:	GC/MS Ins	Analysis DF:	1
Operator:	ECC	Injection Volume:	0.001 mL
		Batch QC:	GT021011-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene		U	0.06	0.03	
C1 - Fluorene		U	0.06	0.03	
C2 - Fluorene		U	0.06	0.03	
C3 - Fluorene		U	0.06	0.03	
C0 - Phenanthrene/Anthracene		U	0.06	0.03	
C1 - Phenanthrene/Anthracene		U	0.06	0.03	
C2 - Phenanthrene/Anthracene		U	0.06	0.03	
C3 - Phenanthrene/Anthracene		U	0.06	0.03	
C4 - Phenanthrene/Anthracene		U	0.06	0.03	
C0 - Dibenzothiophene		U	0.06	0.03	
C1 - Dibenzothiophene		U	0.06	0.03	
C2 - Dibenzothiophene		U	0.06	0.03	
C3 - Dibenzothiophene		U	0.06	0.03	
C0 - Fluoranthene/Pyrene		U	0.06	0.03	
C1 - Fluoranthene/Pyrene		U	0.06	0.03	
C2 - Fluoranthene/Pyrene		U	0.06	0.03	
C3 - Fluoranthene/Pyrene		U	0.06	0.03	
C0 - Benz(a)anthracene/Chrysene		U	0.06	0.03	
C1 - Benz(a)anthracene/Chrysene		U	0.06	0.03	
C2 - Benz(a)anthracene/Chrysene		U	0.06	0.03	
C3 - Benz(a)anthracene/Chrysene		U	0.06	0.03	
C4 - Benz(a)anthracene/Chrysene		U	0.06	0.03	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	67%	50%	150%
2-Fluorobiphenyl	80%	50%	120%
5a-Androstane	68%	50%	120%
Benzo(a)pyrene-d12	109%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **Soil Blank Spike**

Client:	Various	Preparation Method:	EPA 3570	
Project:	Various	Cleanup Method(s):		
Lab ID:	GT021011-SBS	Analysis Method:	GC/MS (EPA 8270 Mod.)	
File ID:	14OCT17.D	Matrix:	Soil	
		Preservation:	None	
Date Sampled:		Decanted:	No	
Date Received:		Sample Size:	2	g
Date Prepared:	10/11/2002	%Solid:	100%	
Date Cleanup:		Extract Volume:	1.3	mL
Date Analyzed:	15 Oct 2002 6:05 am	Prep DF:	1	
Instrument:	GC/MS Ins	Analysis DF:	1	
Operator:	ECC	Injection Volume:	0.001	mL
		Batch QC:	GT021011-SB	

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	14.8		0.07	0.03	72.1%
Toluene	16.7		0.07	0.03	72.5%
Ethylbenzene	18.3		0.07	0.03	68.5%
m/p-Xylenes	16.8		0.07	0.03	67.1%
Styrene	20.0		0.07	0.03	65.4%
o-Xylene	17.5		0.07	0.03	67.8%
1,2,4-Trimethylbenzene	22.1		0.07	0.03	68.2%
Naphthalene	22.4		0.07	0.03	69.2%
2-Methylnaphthalene	25.7		0.07	0.03	71.8%
1-Methylnaphthalene	24.7		0.07	0.03	72.7%
Acenaphthylene	24.8		0.07	0.03	73.6%
Acenaphthene	27.2		0.07	0.03	72.7%
Dibenzofuran	24.7		0.07	0.03	71.8%
Fluorene	23.1		0.07	0.03	71.5%
Phenanthrene	21.5		0.07	0.03	68.1%
Anthracene	20.5		0.07	0.03	62.9%
Fluoranthene	14.6		0.07	0.03	61.0%
Pyrene	14.1		0.07	0.03	57.2%
Benz[a]anthracene	9.47		0.07	0.03	44.3%
Chrysene	10.6		0.07	0.03	49.4%
Benzo[b]fluoranthene	10.3		0.07	0.03	40.1%
Benzo[k]fluoranthene	12.5		0.07	0.03	52.8%
Benzo[a]pyrene	10.3		0.07	0.03	46.6%
Indeno[1,2,3-cd]pyrene	15.5		0.07	0.03	61.4%
Dibenz[a,h]anthracene	12.1		0.07	0.03	51.7%
Benzo[g,h,i]perylene	18.8		0.07	0.03	74.3%

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	73%	50%	150%
2-Fluorobiphenyl	82%	50%	120%
5a-Androstane	67%	50%	120%
Benzo(a)pyrene-d12	87%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	GTI	Preparation Method:	EPA 3540
Project:	Superior	Cleanup Method(s):	
Lab ID:	IS021121-SB	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	15DEC05.D	Matrix:	Soil
		Preservation:	None
		Decanted:	No
Date Sampled:		Sample Size:	10 g
Date Received:		%Solid:	100%
Date Prepared:	11/21/2002	Extract Volume:	2 mL
Date Cleanup:		Prep DF:	1
Date Analyzed:	15 Dec 2002 6:27 pm	Analysis DF:	1
Instrument:	GC4-MS_59	Injection Volume:	0.001 mL
Operator:	DRC	Batch QC:	IS021121-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene		U	0.02	0.01	
Toluene	0.02	J	0.02	0.01	
Ethylbenzene		U	0.02	0.01	
m/p-Xylenes		U	0.02	0.01	
Styrene		U	0.02	0.01	
o-Xylene		U	0.02	0.01	
1,2,4-Trimethylbenzene		U	0.02	0.01	
Naphthalene		U	0.02	0.01	
2-Methylnaphthalene		U	0.02	0.01	
1-Methylnaphthalene		U	0.02	0.01	
Acenaphthylene		U	0.02	0.01	
Acenaphthene		U	0.02	0.01	
Dibenzofuran		U	0.02	0.01	
Fluorene		U	0.02	0.01	
Phenanthrene		U	0.02	0.01	
Anthracene		U	0.02	0.01	
Fluoranthene		U	0.02	0.01	
Pyrene		U	0.02	0.01	
Benz[a]anthracene		U	0.02	0.01	
Chrysene		U	0.02	0.01	
Benzo[b]fluoranthene		U	0.02	0.01	
Benzo[k]fluoranthene		U	0.02	0.01	
Benzo(e)pyrene		U	0.02	0.01	
Benzo[a]pyrene		U	0.02	0.01	
Perylene		U	0.02	0.01	
Indeno[1,2,3-cd]pyrene		U	0.02	0.01	
Dibenz[a,h]anthracene		U	0.02	0.01	
Benzo[g,h,i]perylene		U	0.02	0.01	
ALKYLATED PAHs:					
C0 - Benzene		U	0.02	0.01	
C1 - Benzene	0.02	J	0.02	0.01	
C2 - Benzene		U	0.02	0.01	
C3 - Benzene		U	0.02	0.01	
C4 - Benzene		U	0.02	0.01	
C5 - Benzene		U	0.02	0.01	
C0 - Naphthalene		U	0.02	0.01	
C1 - Naphthalene		U	0.02	0.01	
C2 - Naphthalene		U	0.02	0.01	
C3- Naphthalene		U	0.02	0.01	
C4- Naphthalene		U	0.02	0.01	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	GTI	Preparation Method:	EPA 3540
Project:	Superior	Cleanup Method(s):	
Lab ID:	IS021121-SB	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	15DEC05.D	Matrix:	Soil
		Preservation:	None
Date Sampled:		Decanted:	No
Date Received:		Sample Size:	10 g
Date Prepared:	11/21/2002	%Solid:	100%
Date Cleanup:		Extract Volume:	2 mL
Date Analyzed:	15 Dec 2002 6:27 pm	Prep DF:	1
Instrument:	GC4-MS_59	Analysis DF:	1
Operator:	DRC	Injection Volume:	0.001 mL
		Batch QC:	IS021121-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
C0 - Fluorene		U	0.02	0.01	
C1 - Fluorene		U	0.02	0.01	
C2 - Fluorene		U	0.02	0.01	
C3 - Fluorene		U	0.02	0.01	
C0 - Phenanthrene/Anthracene		U	0.02	0.01	
C1 - Phenanthrene/Anthracene		U	0.02	0.01	
C2 - Phenanthrene/Anthracene		U	0.02	0.01	
C3 - Phenanthrene/Anthracene		U	0.02	0.01	
C4 - Phenanthrene/Anthracene		U	0.02	0.01	
C0 - Dibenzothiophene		U	0.02	0.01	
C1 - Dibenzothiophene		U	0.02	0.01	
C2 - Dibenzothiophene		U	0.02	0.01	
C3 - Dibenzothiophene		U	0.02	0.01	
C0 - Fluoranthene/Pyrene		U	0.02	0.01	
C1 - Fluoranthene/Pyrene		U	0.02	0.01	
C2 - Fluoranthene/Pyrene		U	0.02	0.01	
C3 - Fluoranthene/Pyrene		U	0.02	0.01	
C0 - Benz(a)anthracene/Chrysene		U	0.02	0.01	
C1 - Benz(a)anthracene/Chrysene		U	0.02	0.01	
C2 - Benz(a)anthracene/Chrysene		U	0.02	0.01	
C3 - Benz(a)anthracene/Chrysene		U	0.02	0.01	
C4 - Benz(a)anthracene/Chrysene		U	0.02	0.01	

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	75%	50%	150%
2-Fluorobiphenyl	119%	50%	120%
5a-Androstane	109%	50%	120%
Benzo(a)pyrene-d12	55%	50%	120%

Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **Blank Spike**

Client:	GTI	Preparation Method:	EPA 3540
Project:	Superior	Cleanup Method(s):	
Lab ID:	IS021121-SBS	Analysis Method:	GC/MS (EPA 8270 Mod.)
File ID:	15DEC06.D	Matrix:	Soil
		Preservation:	None
		Decanted:	No
Date Sampled:		Sample Size:	10 g
Date Received:		%Solid:	100%
Date Prepared:	11/21/2002	Extract Volume:	2 mL
Date Cleanup:		Prep DF:	1
Date Analyzed:	15 Dec 2002 7:36 pm	Analysis DF:	1
Instrument:	GC4-MS_59	Injection Volume:	0.001 mL
Operator:	DRC	Batch QC:	IS021121-SB

Analyte:	Concentration mg/kg	Q	RL mg/kg	EDL mg/kg	Comments
PAH COMPOUNDS:					
Benzene	3.49		0.02	0.01	69.8%
Toluene	5.40		0.02	0.01	108.0%
Ethylbenzene	5.77		0.02	0.01	115.4%
m/p-Xylenes	5.84		0.02	0.01	116.8%
Styrene	5.77		0.02	0.01	115.4%
o-Xylene	5.75		0.02	0.01	115.0%
1,2,4-Trimethylbenzene	5.50		0.02	0.01	110.0%
Naphthalene	5.65		0.02	0.01	113.0%
2-Methylnaphthalene	5.75		0.02	0.01	115.0%
1-Methylnaphthalene	5.44		0.02	0.01	108.8%
Acenaphthylene	5.59		0.02	0.01	111.8%
Acenaphthene	5.35		0.02	0.01	107.0%
Dibenzofuran	5.24		0.02	0.01	104.8%
Fluorene	5.37		0.02	0.01	107.4%
Phenanthrene	5.24		0.02	0.01	104.8%
Anthracene	4.87		0.02	0.01	97.4%
Fluoranthene	5.23		0.02	0.01	104.6%
Pyrene	5.26		0.02	0.01	105.2%
Benz[a]anthracene	5.75		0.02	0.01	115.0%
Chrysene	5.31		0.02	0.01	106.2%
Benzo[b]fluoranthene	6.22		0.02	0.01	124.4%
Benzo[k]fluoranthene	5.16		0.02	0.01	103.2%
Benzo(e)pyrene	5.64		0.02	0.01	112.8%
Benzo[a]pyrene	5.64		0.02	0.01	112.8%
Perylene	5.64		0.02	0.01	112.8%
Indeno[1,2,3-cd]pyrene	6.14		0.02	0.01	122.8%
Dibenz[a,h]anthracene	6.25		0.02	0.01	125.0%
Benzo[g,h,i]perylene	5.70		0.02	0.01	114.0%

EXTRACTION SURROGATE COMPOUNDS:	%R	Min	Max
Fluorobenzene	77%	50%	150%
2-Fluorobiphenyl	119%	50%	120%
5a-Androstane	108%	50%	120%
Benzo(a)pyrene-d12	56%	50%	120%

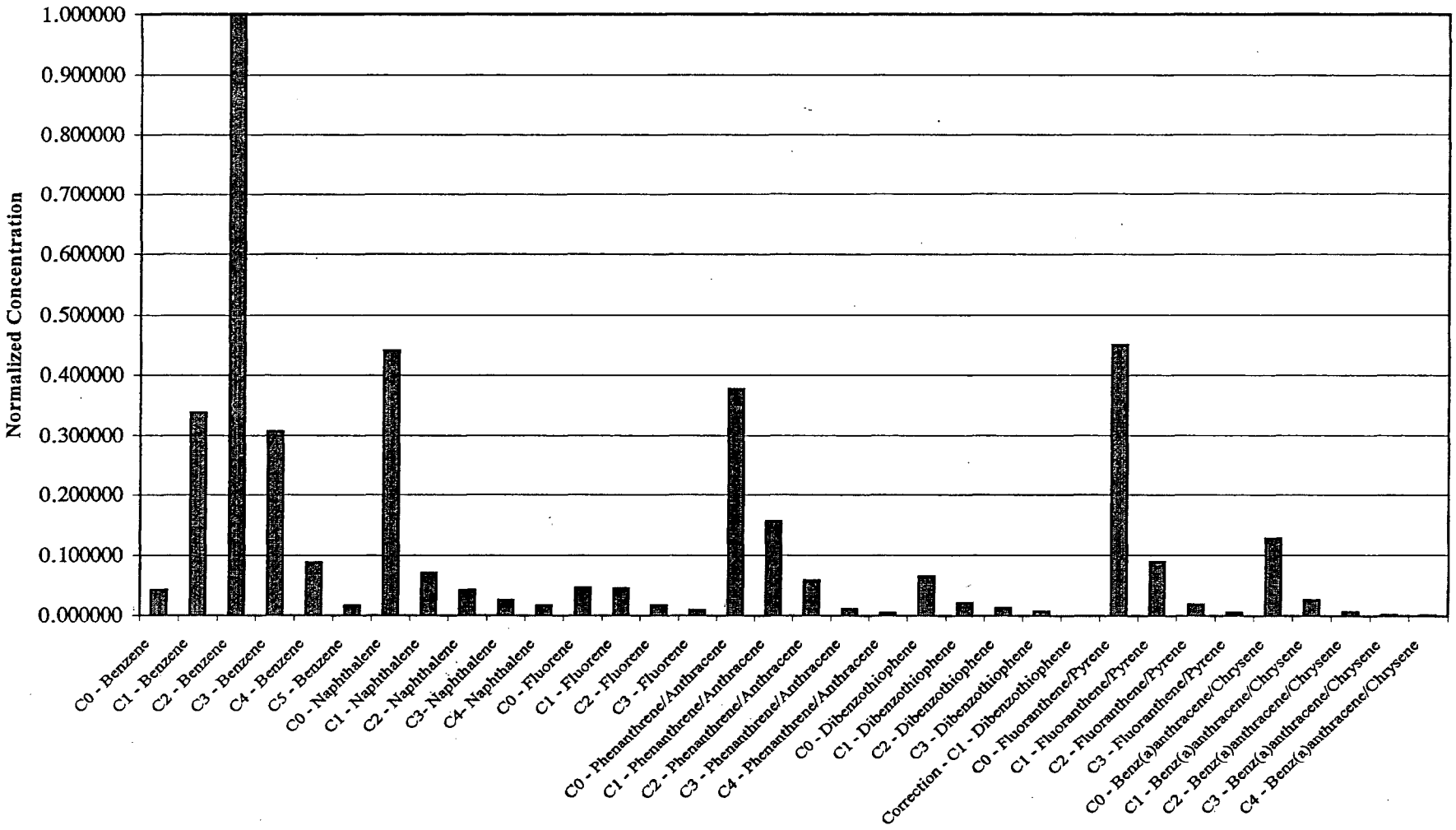
Qualifiers:

B	Analyte detected in the blank
D	Analyte reported from a diluted extract
U	Undetected above the detection limit
J	Estimated value detected between the reporting and detection limits
E	Estimated value detected above calibration range
RL	Reporting limit is the sample equivalent of the lowest linear calibration concentration
EDL	Estimated detection limit is 50% of the RL

Appendix D

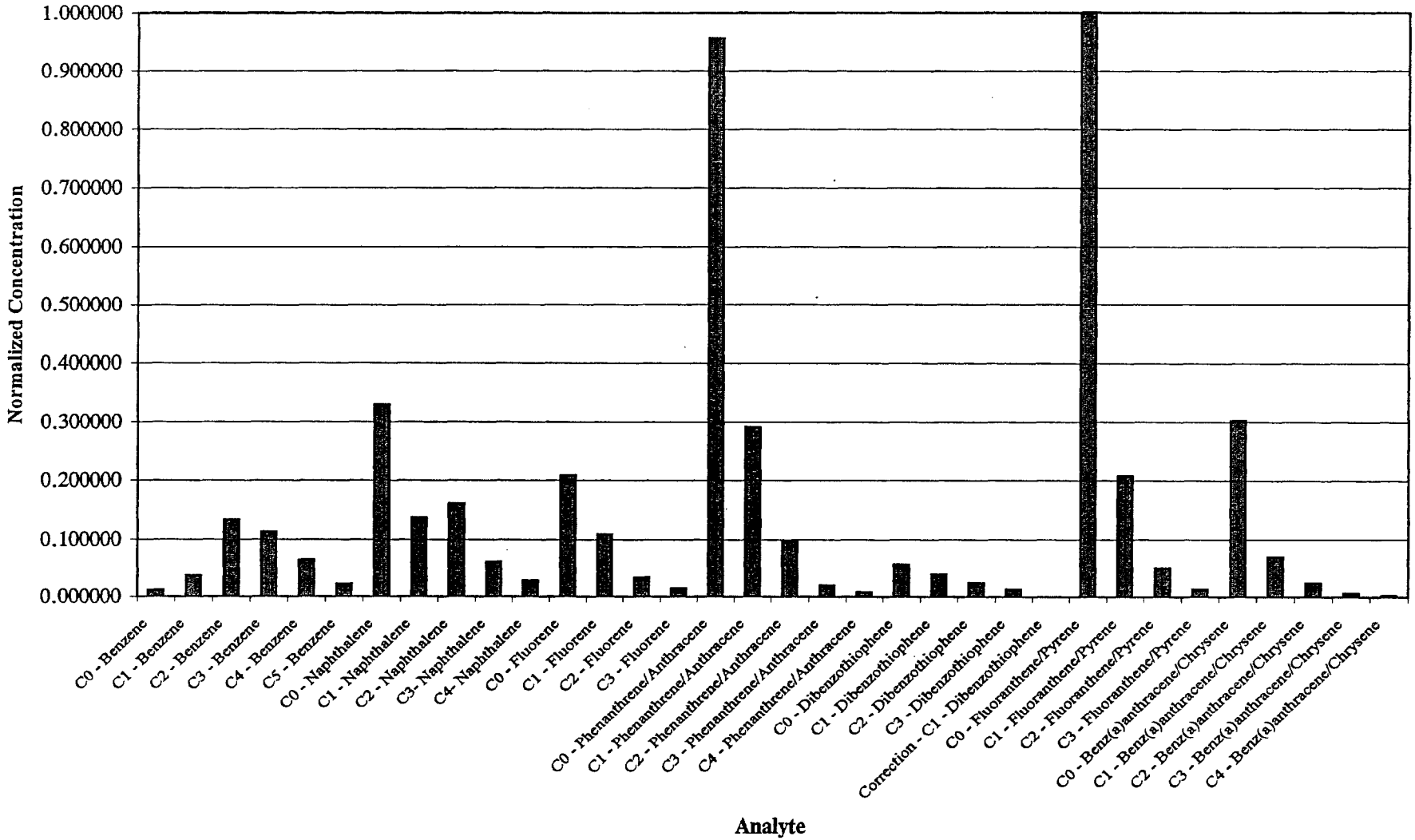
Extended PAH Profiles – Bar Graphs

T10-1


Normalized Concentration
1.000000
0.900000
0.800000
0.700000
0.600000
0.500000
0.400000
0.300000
0.200000
0.100000
0.000000
C0 - Benzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
C0 - Naphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
C0 - Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
C0 - Phenanthrene/Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
C0 - Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
Correction - C1 - Dibenzothiophene
C0 - Fluoranthene/Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
C0 - Benz(a)anthracene/Chrysene
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Analyte

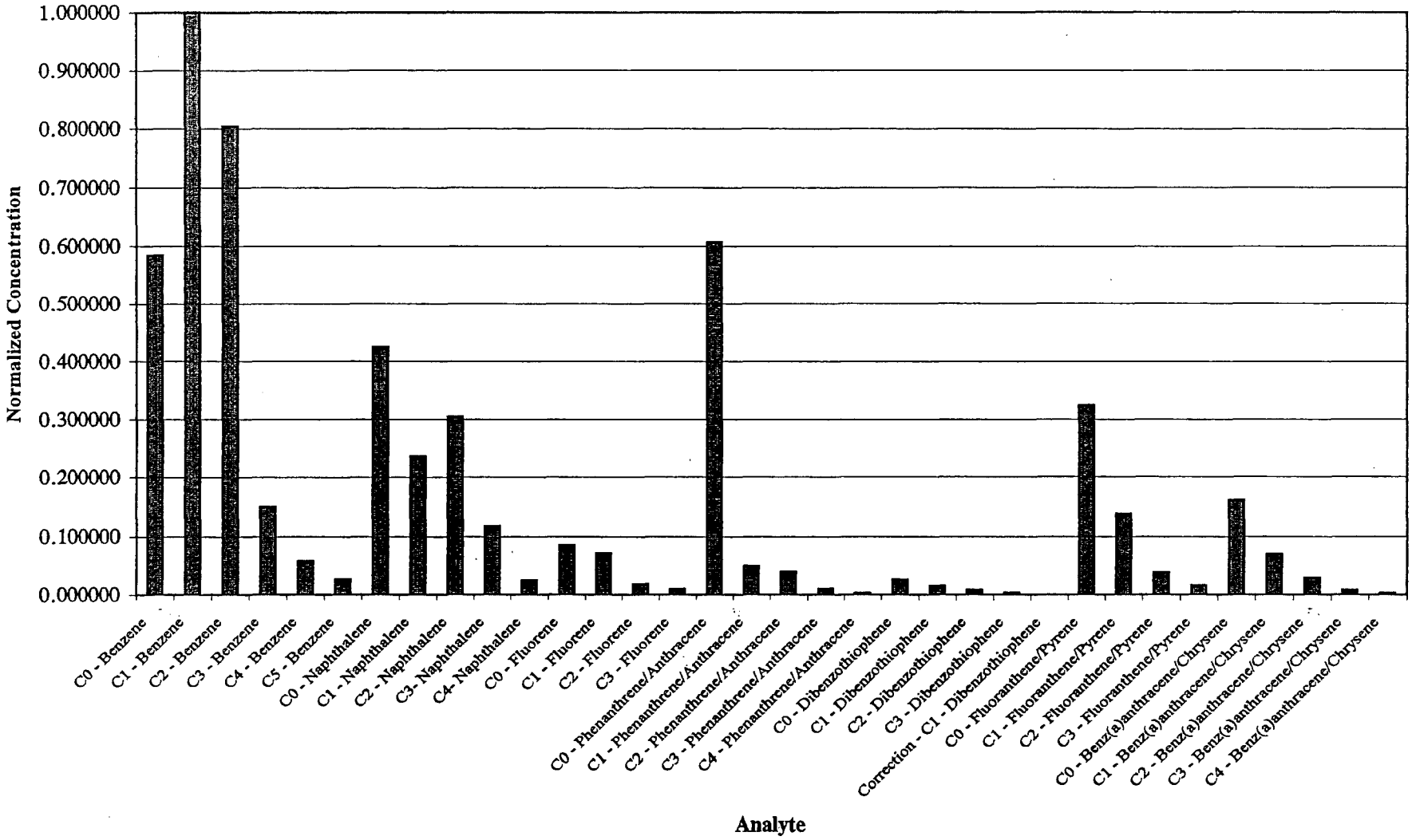
META

T10-2


Normalized Concentration
1.000000
0.900000
0.800000
0.700000
0.600000
0.500000
0.400000
0.300000
0.200000
0.100000
0.000000
C0 - Benzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
C0 - Naphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
C0 - Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
C0 - Phenanthrene/Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
C0 - Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
Correction - C1 - Dibenzothiophene
C0 - Fluoranthene/Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
C0 - Benz(a)anthracene/Chrysene
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Analyte

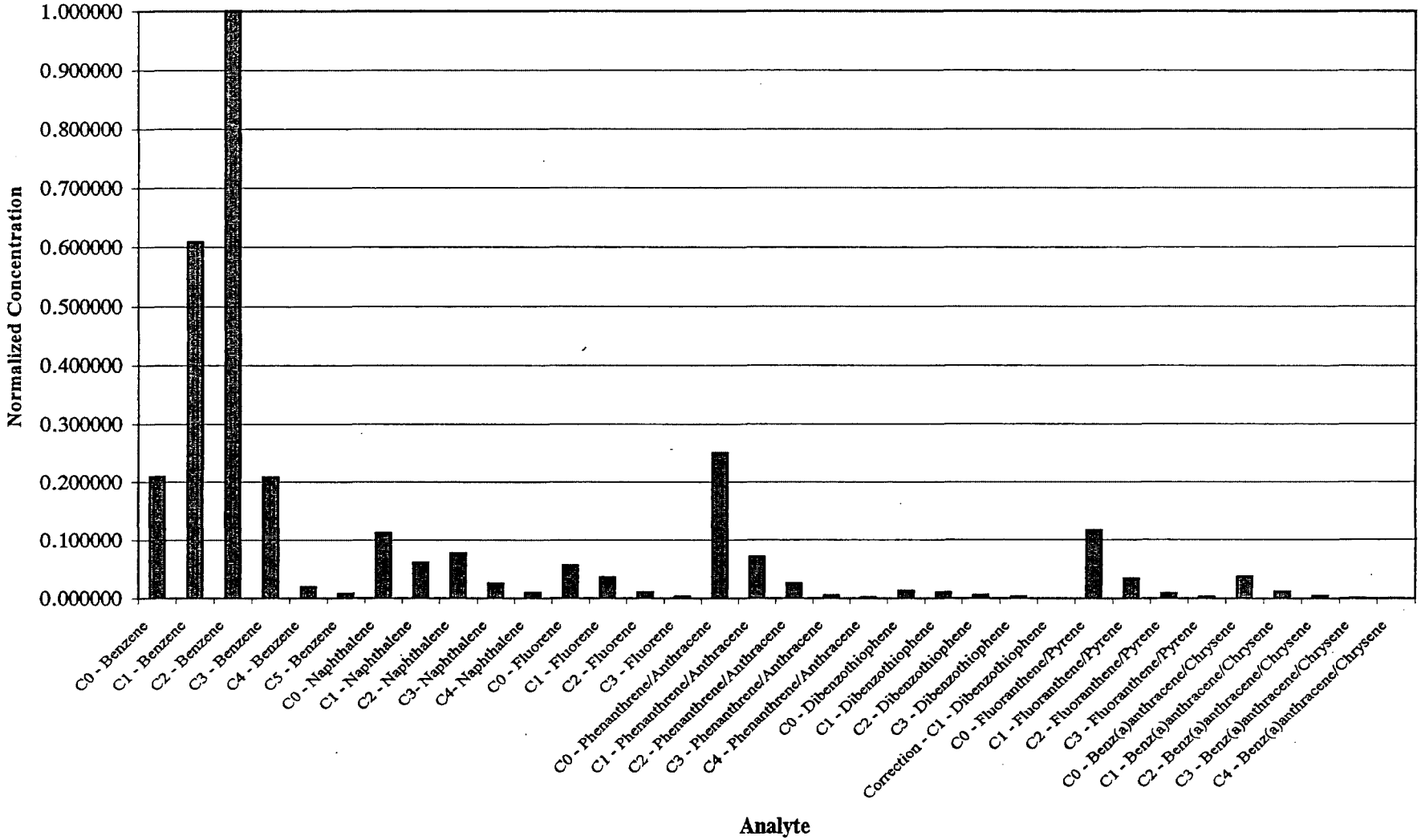
META

T10-3


Normalized Concentration
1.000000
0.900000
0.800000
0.700000
0.600000
0.500000
0.400000
0.300000
0.200000
0.100000
0.000000
C0 - Benzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
C0 - Naphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
C0 - Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
C0 - Phenanthrene/Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
C0 - Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
Correction - C1 - Dibenzothiophene
C0 - Fluoranthene/Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
C0 - Benz(a)anthracene/Chrysene
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Analyte

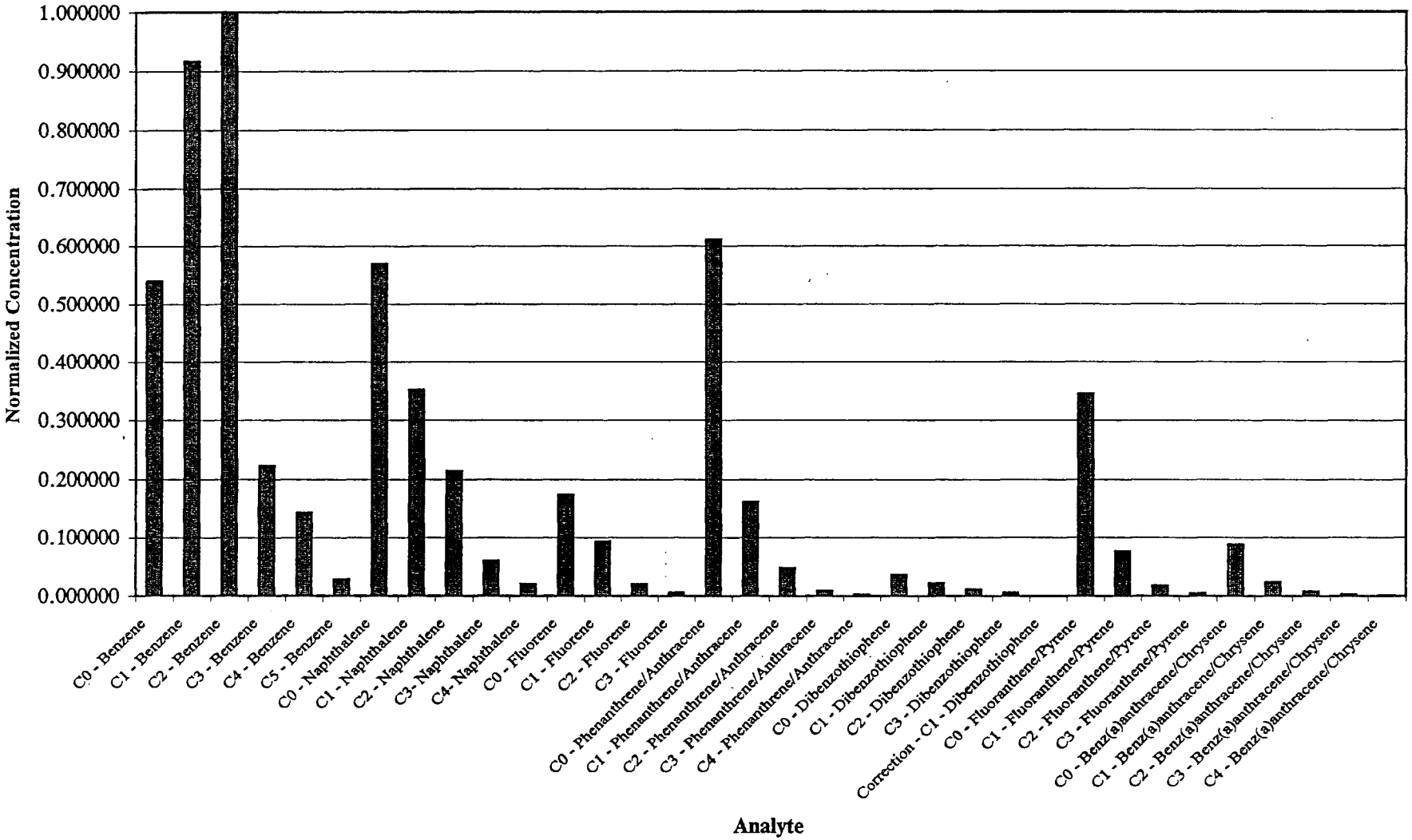
META

B-11-12-13



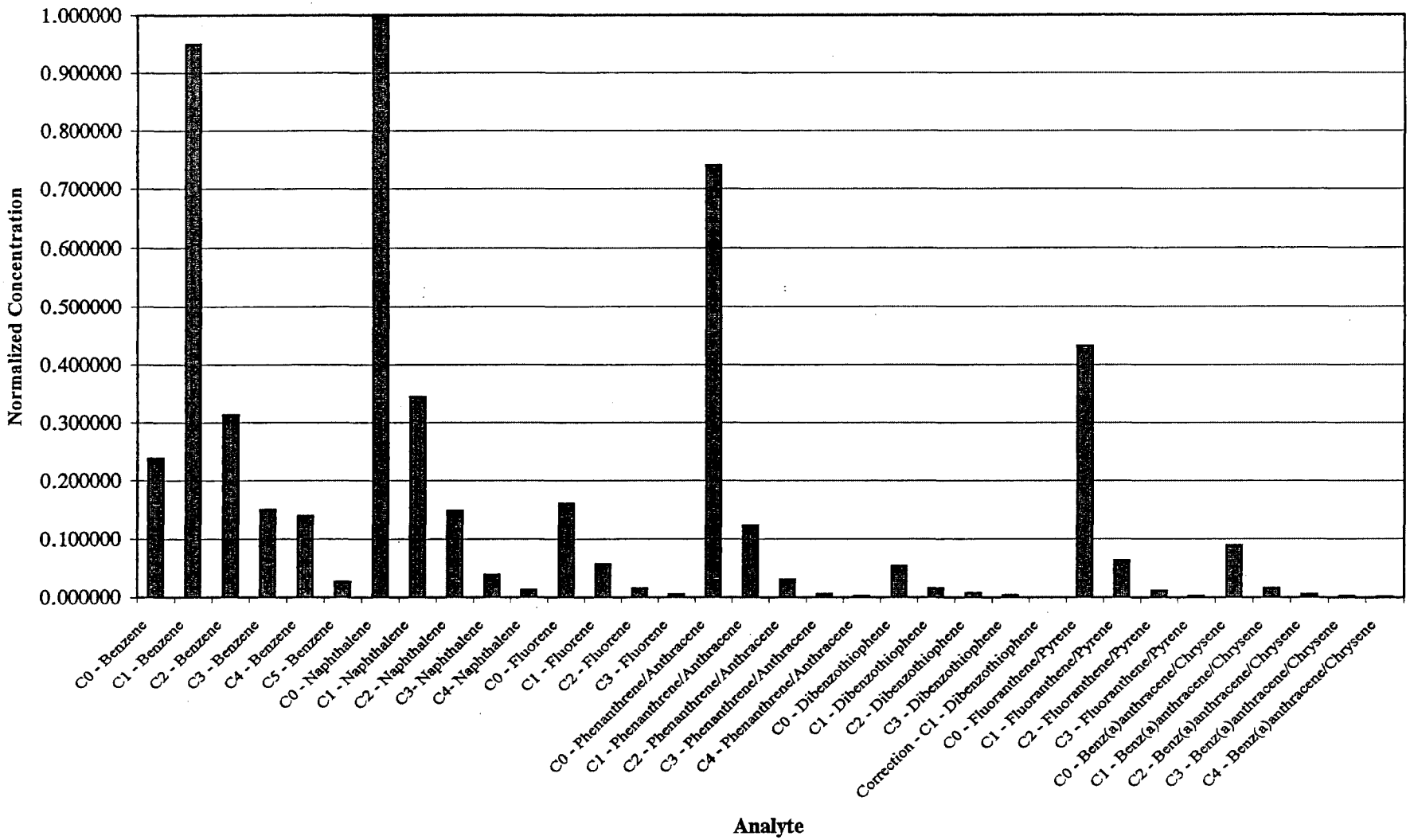
META

B-12-11-12



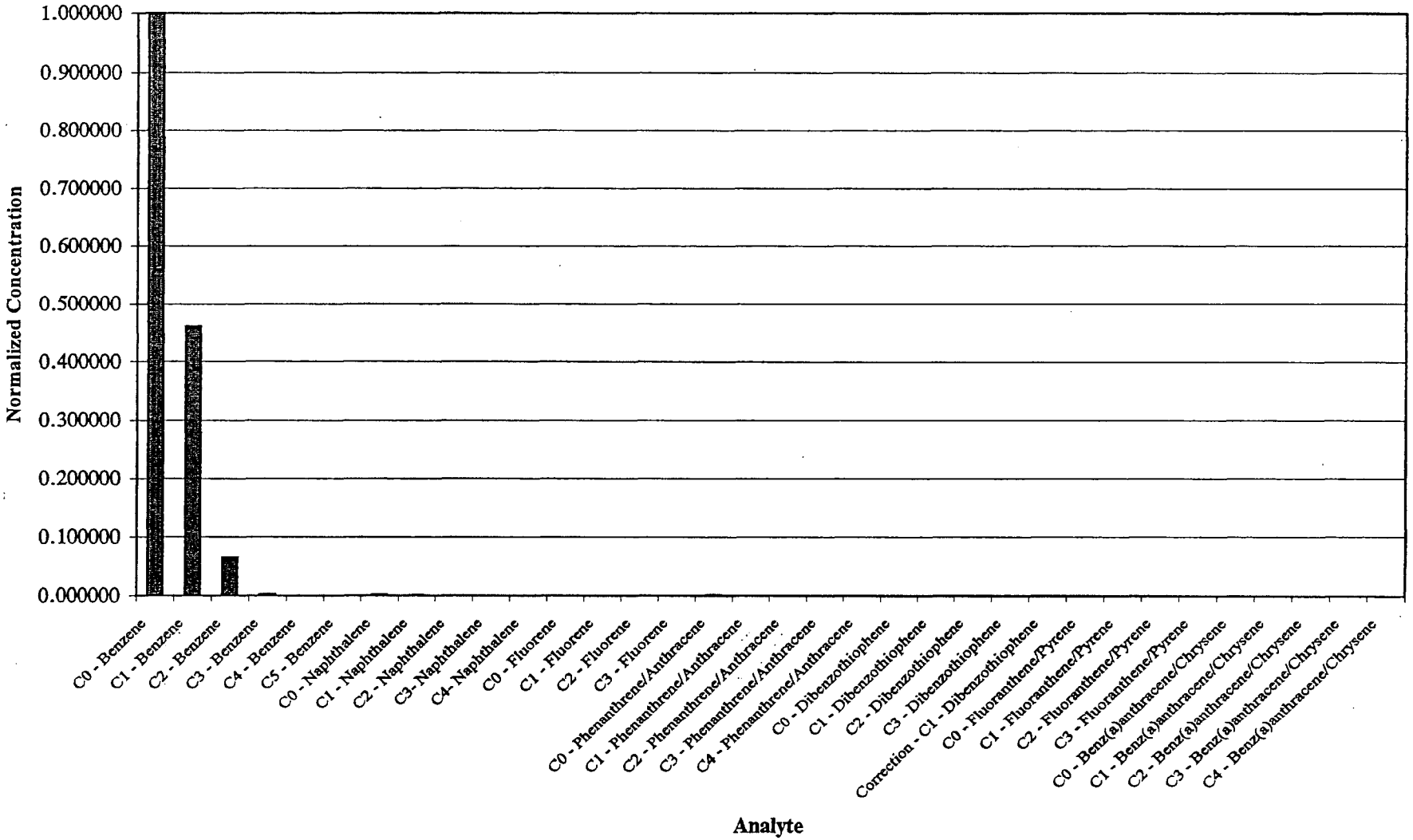
META

B-13-12-13



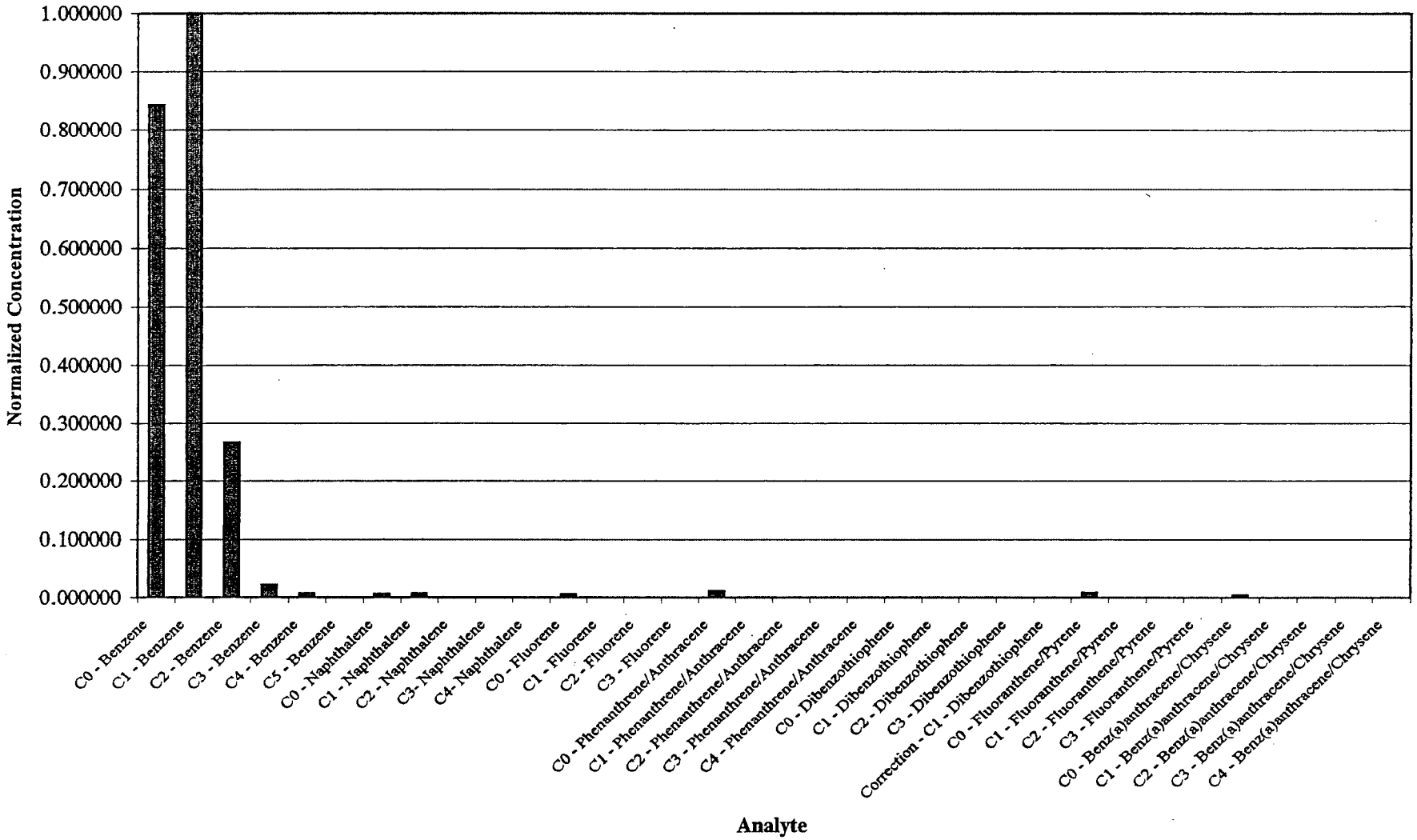
META

B-23-6-8


1.000000
0.900000
0.800000
0.700000
0.600000
0.500000
0.400000
0.300000
0.200000
0.100000
0.000000
Normalized Concentration
C0 - Benzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
C0 - Naphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
C0 - Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
C0 - Phenanthrene/Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
C0 - Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
Correction - C1 - Dibenzothiophene
C0 - Fluoranthene/Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
C0 - Benz(a)anthracene/Chrysene
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Analyte

META

B-23-10-12



META

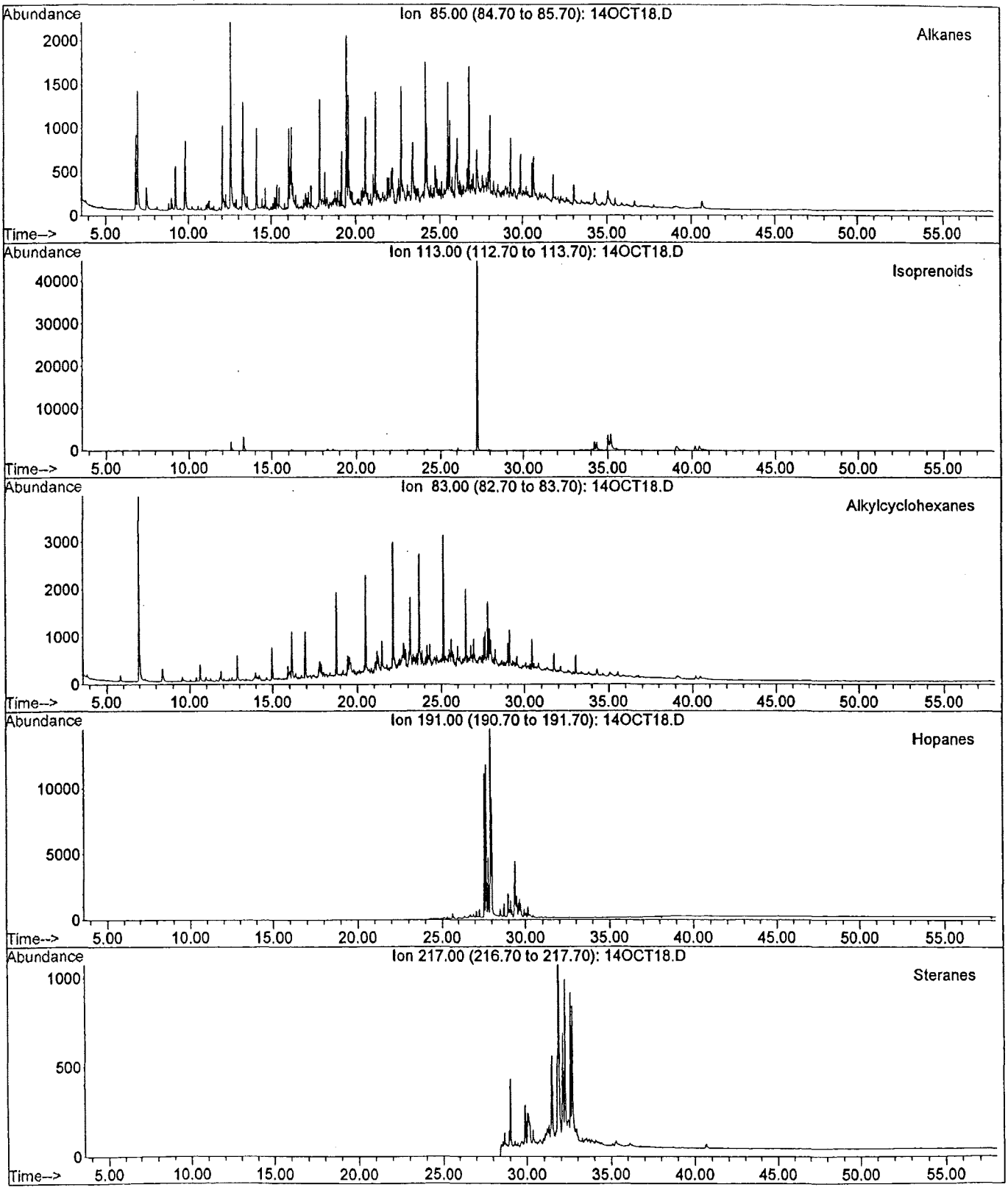
Appendix E

Extracted Ion Current Profiles (EICs)

Primary Ions for Target Compounds and Compound Groups

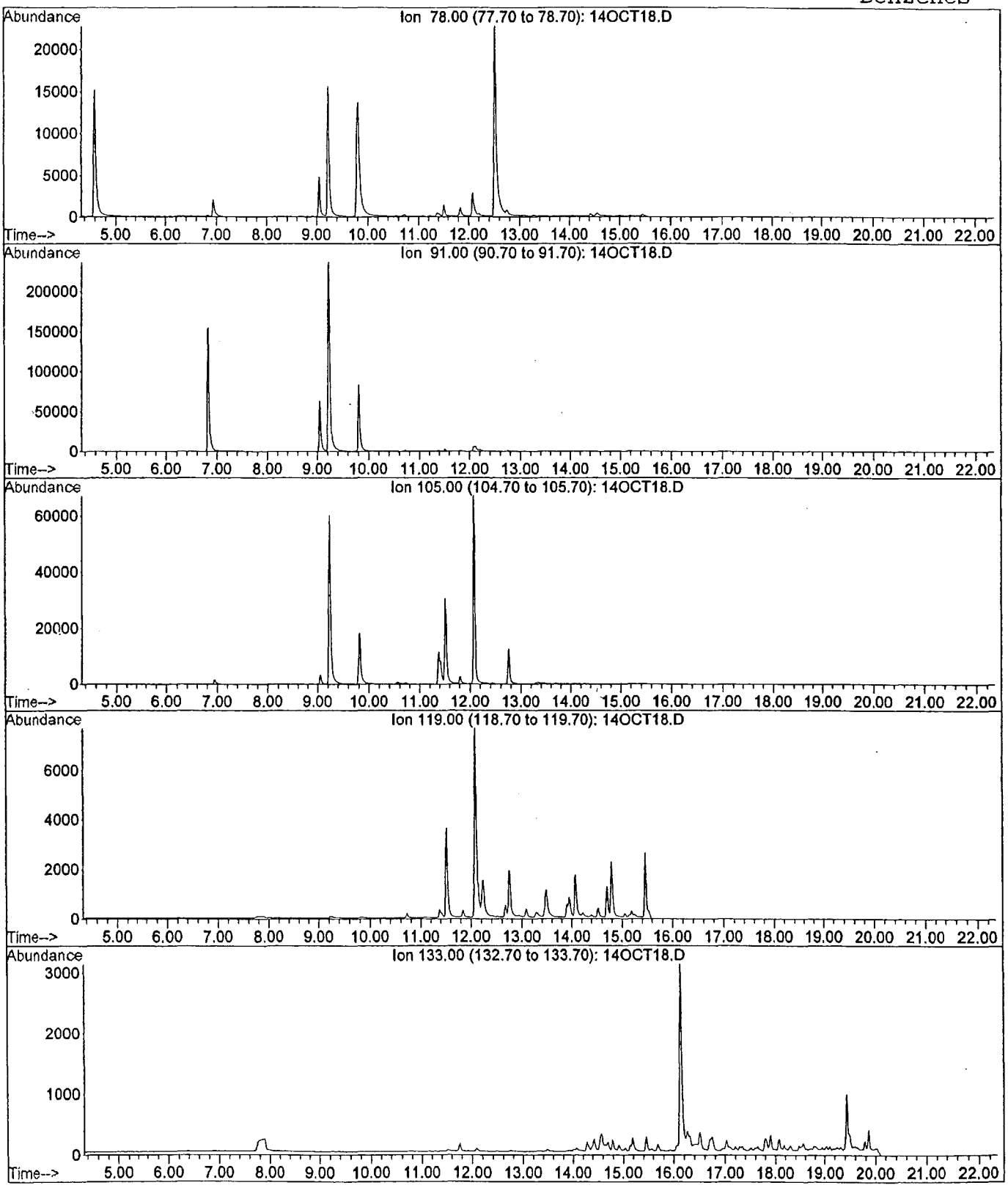
Target Compound or Group	Abbreviation	Ion
Alkylated cyclohexanes		83
Normal alkanes, pristane, phytane		85
Isoprenoid hydrocarbons, pristane, phytane		113
Olefins		115
Hopanes		191
Steranes		217
Benzene	B	78
Monoalkylbenzenes	C1B	91
Dialkylbenzenes	C2B	91
Trialkylbenzenes	C3B	105
Tetraalkylbenzenes	C4B	119
Pentaalkylbenzenes	C5B	133
Naphthalene	N	128
Monoalkylnaphthalenes	C1N	142
Dialkylnaphthalenes	C2N	156
Trialkylnaphthalenes	C3N	170
Tetraalkylnaphthalenes	C4N	184
Fluorene	F	166
Monoalkylfluorenes	C1F	180
Dialkylfluorenes	C2F	194
Trialkylfluorenes	C3F	208
Phenanthrene, anthracene	PA	178
Monoalkylphenanthrenes and anthracenes	C1PA	192
Dialkylphenanthrenes and anthracenes	C2PA	206
Trialkylphenanthrenes and anthracenes	C3PA	220
Tetraalkylphenanthrenes and anthracenes	C4PA	234
Dibenzothiophene	D	184
Monoalkyldibenzothiophenes	C1D	198
Dialkyldibenzothiophenes	C2D	212
Trialkyldibenzothiophenes	C3D	226
Fluoranthene, pyrene	FP	202
Monoalkylfluoranthenes and pyrenes	C1FP	216
Dialkylfluoranthenes and pyrenes	C2FP	230
Trialkyfluoranthenes and pyrenes	C3FP	244
Benz(a)anthracene, chrysene	BC	228
Monoalkylbenz(a)anthracenes and chrysenes	C1BC	242
Dialkylbenz(a)anthracenes and chrysenes	C2BC	256
Trialkylbenz(a)anthracenes and chrysenes	C3BC	270
Tetraalkylbenz(a)anthrancenes and chrysenes	C4BC	284

Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



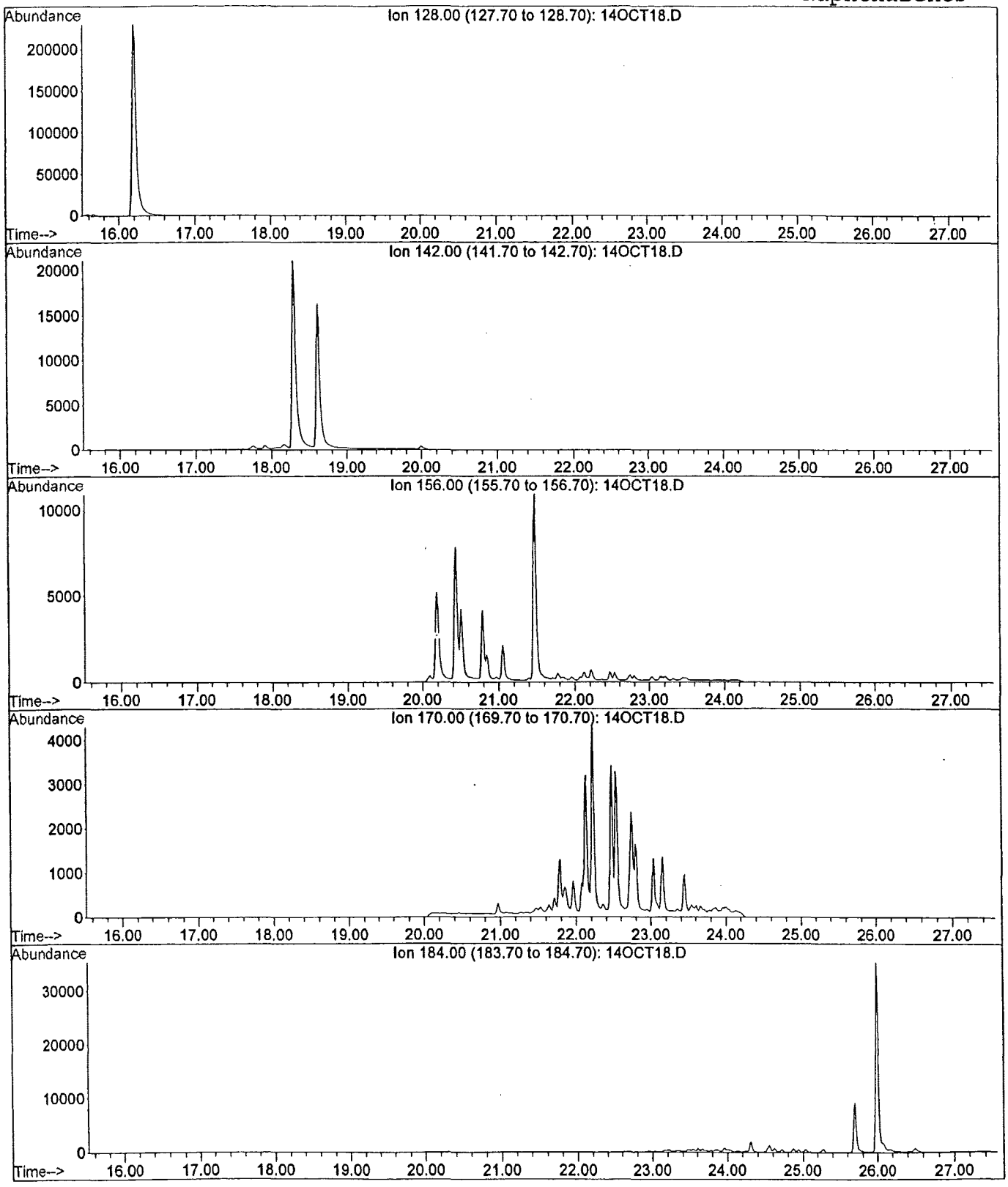
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



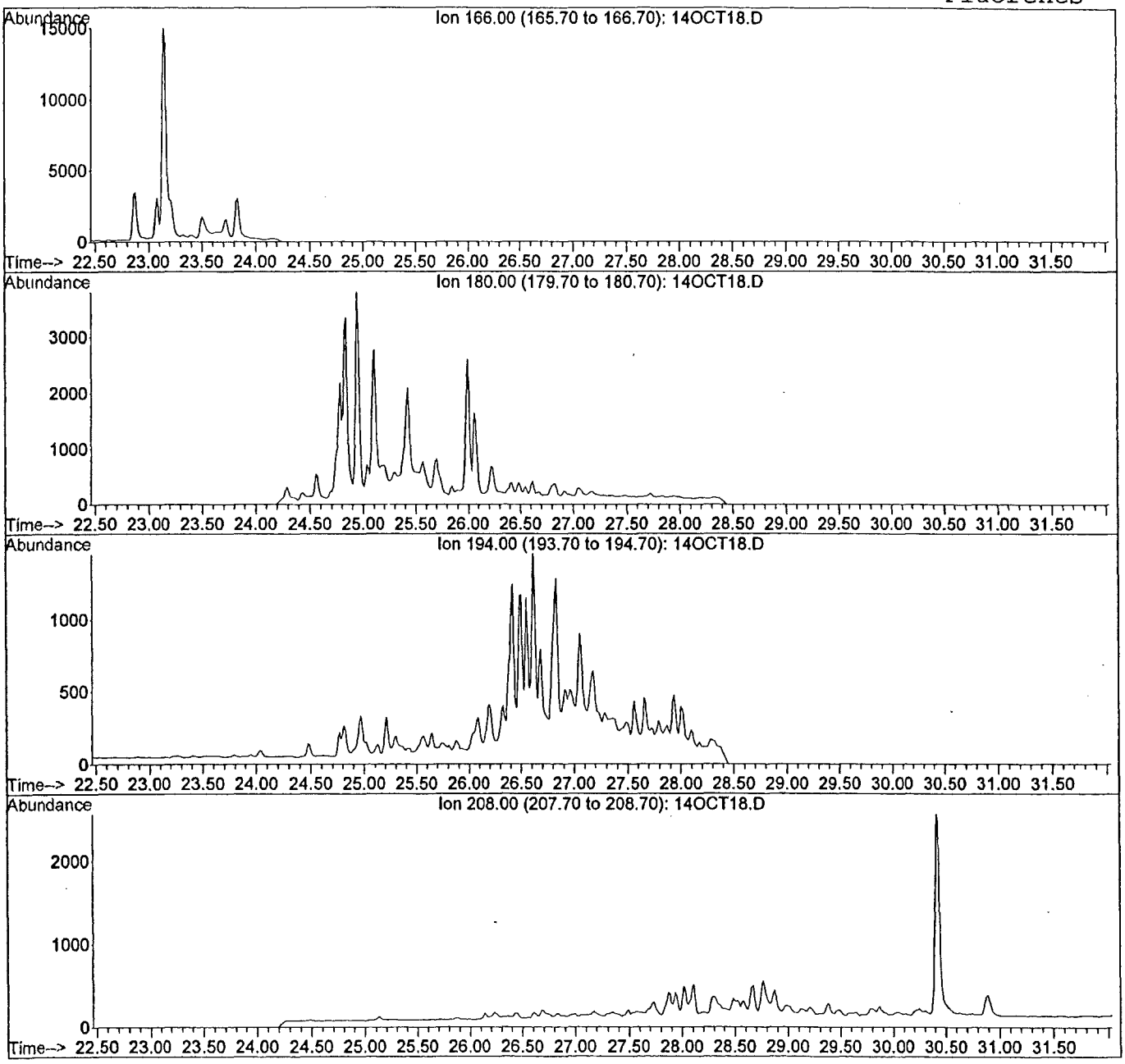
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



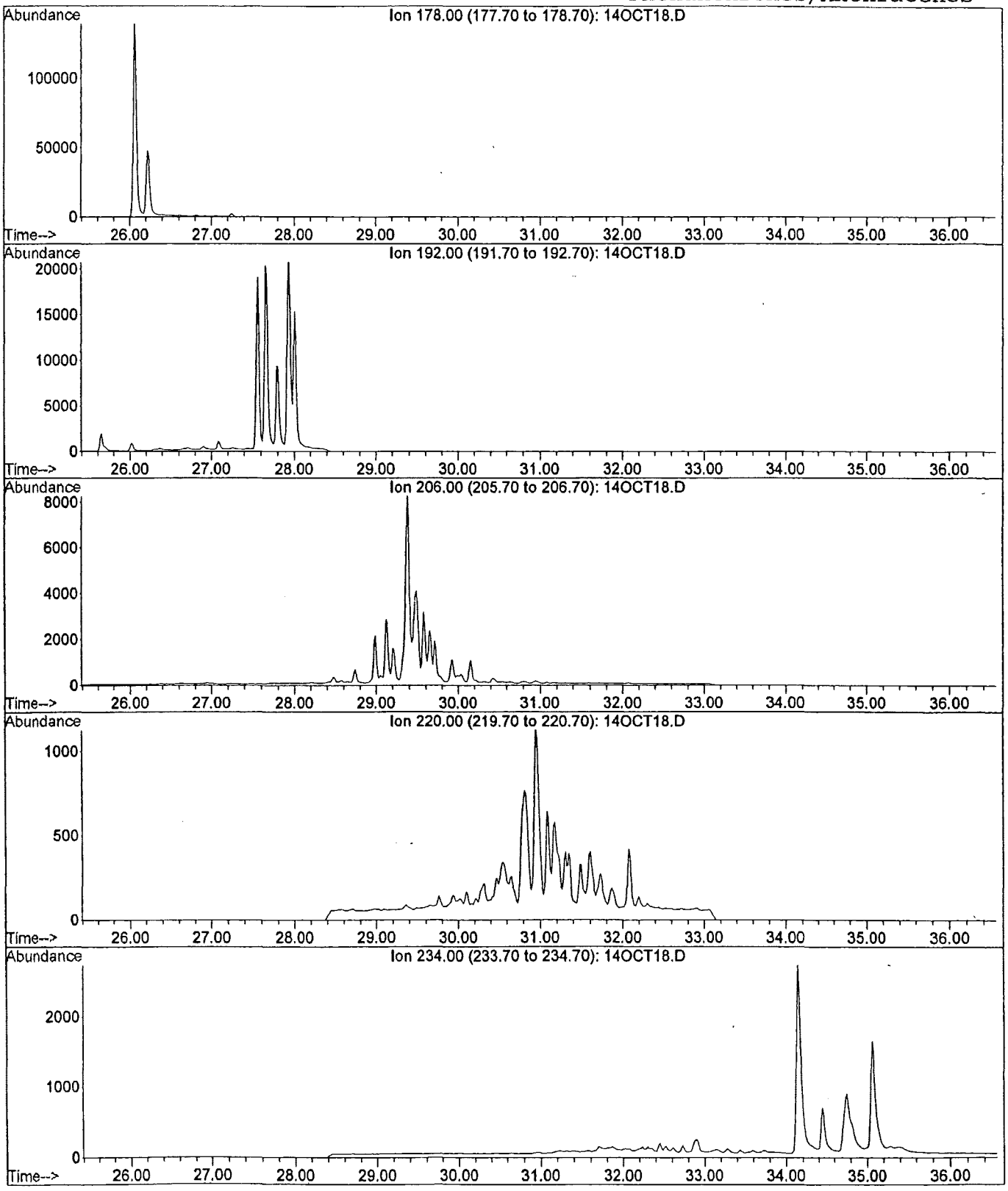
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



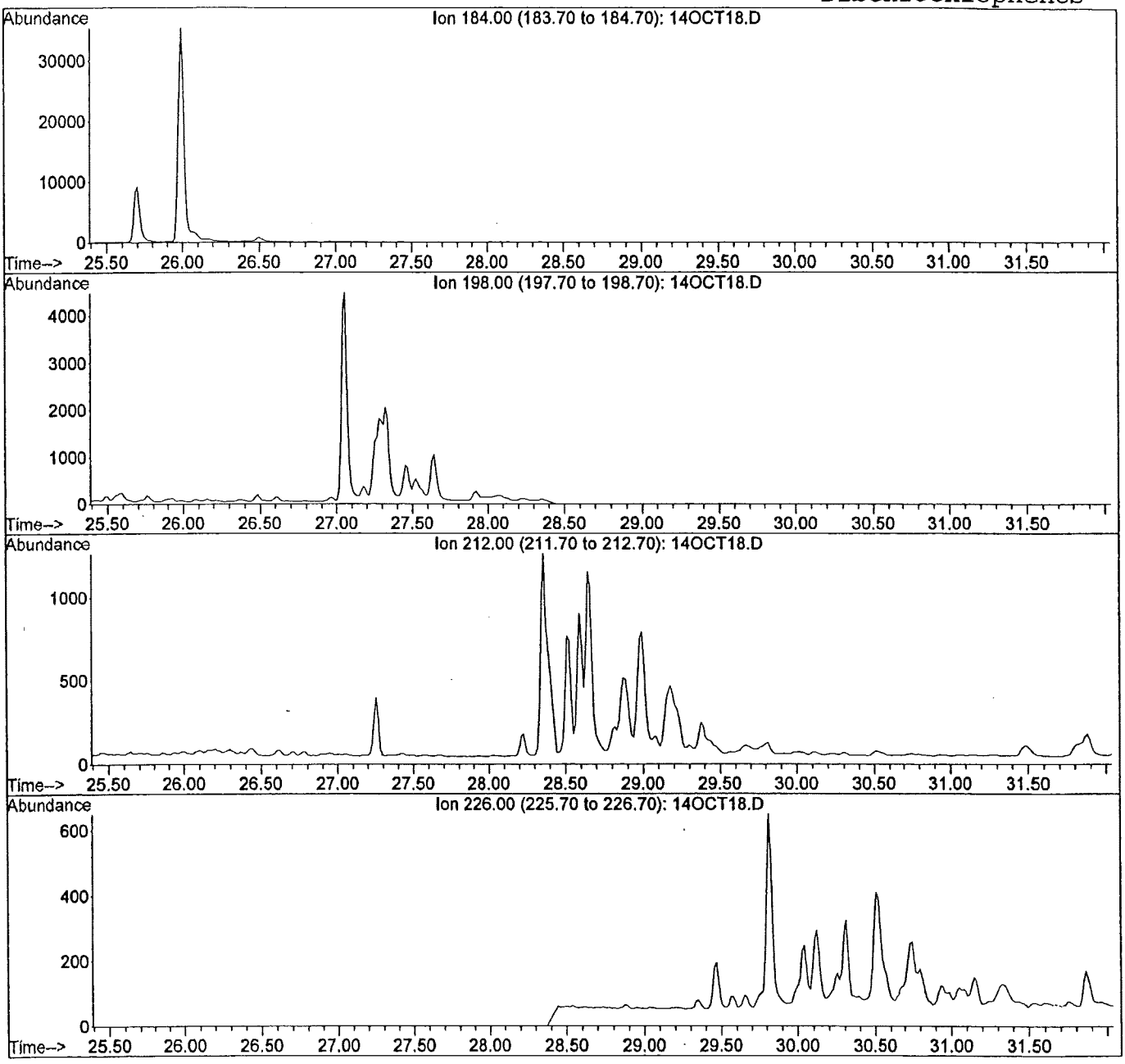
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



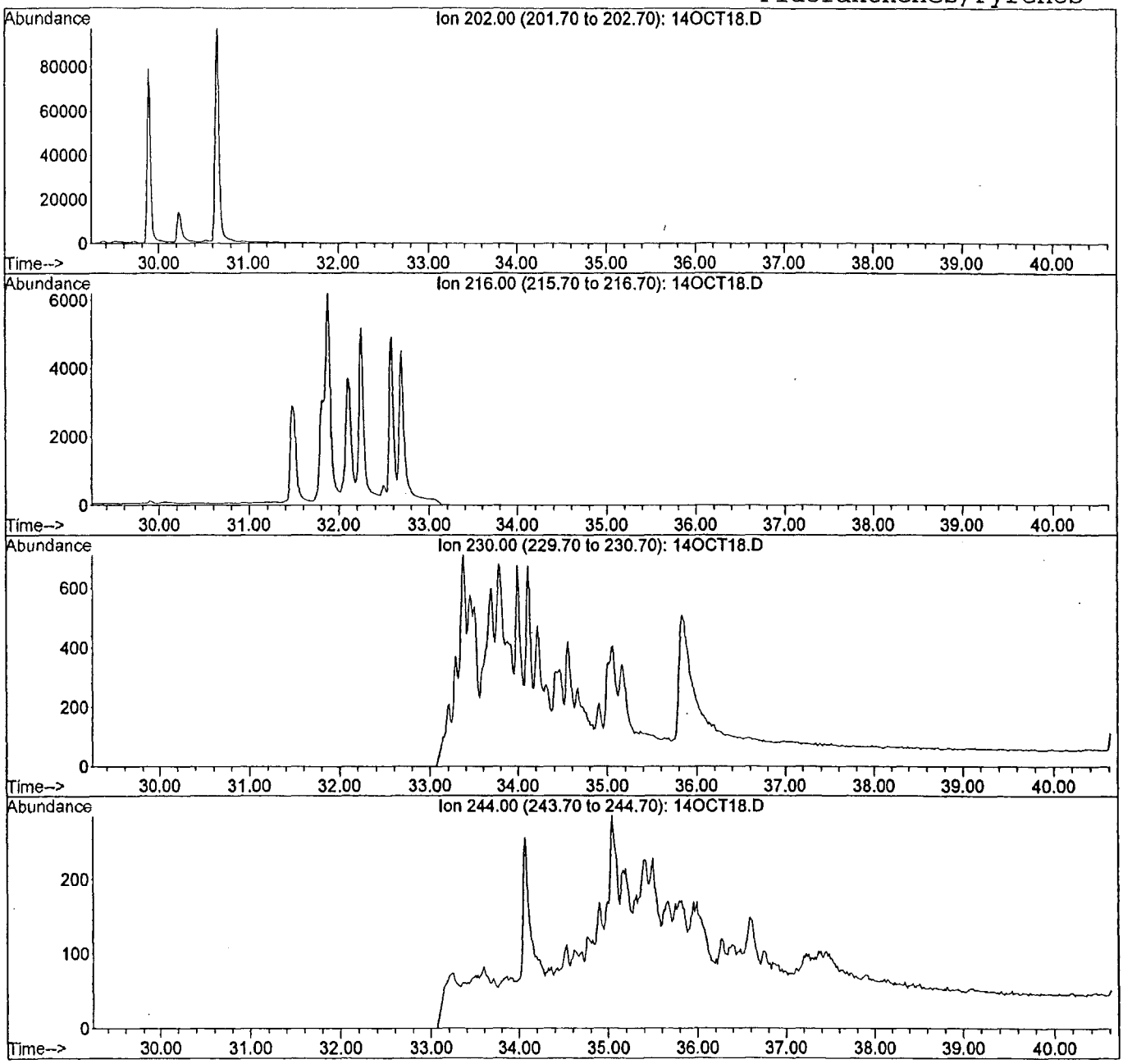
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



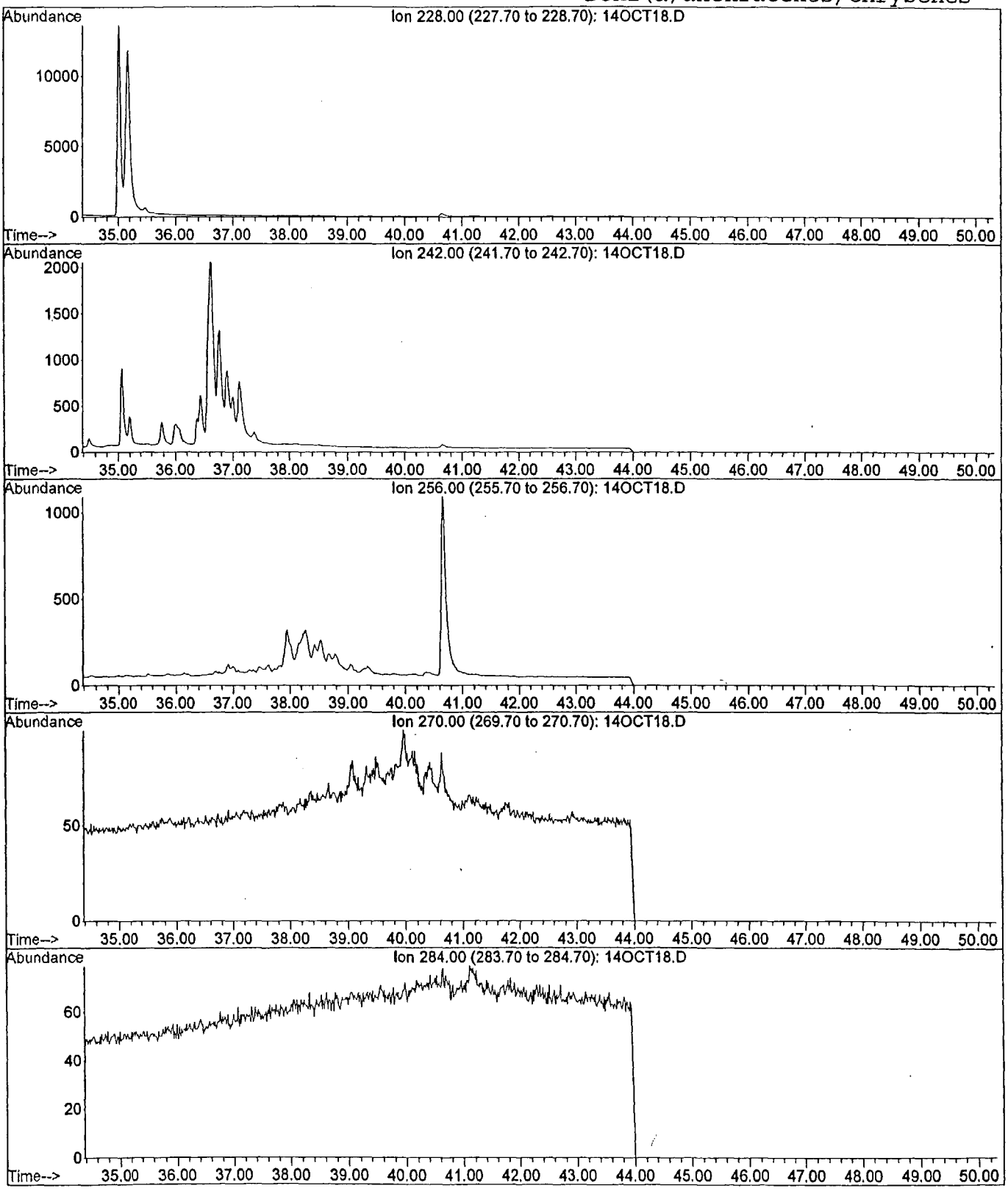
Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

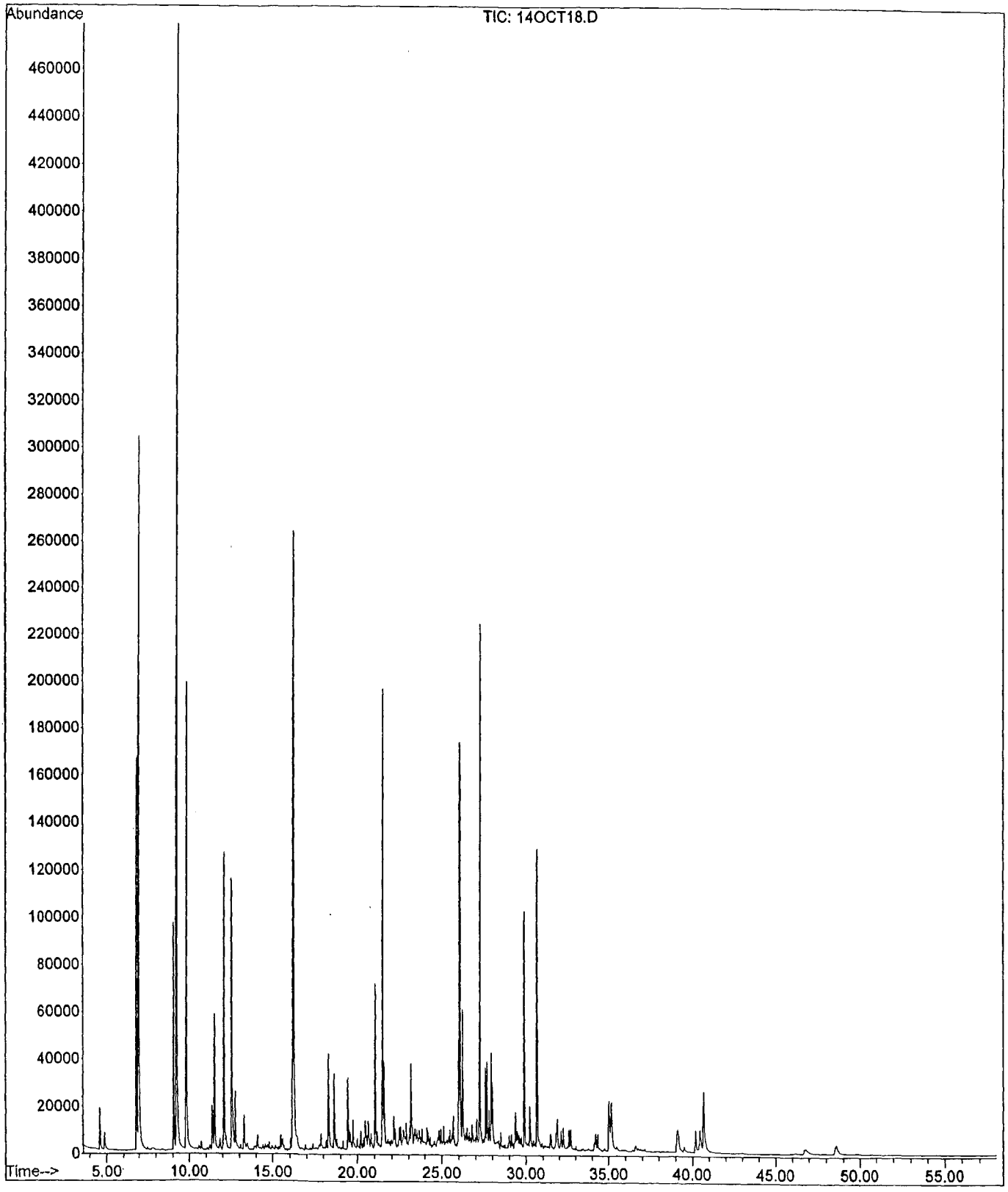


Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

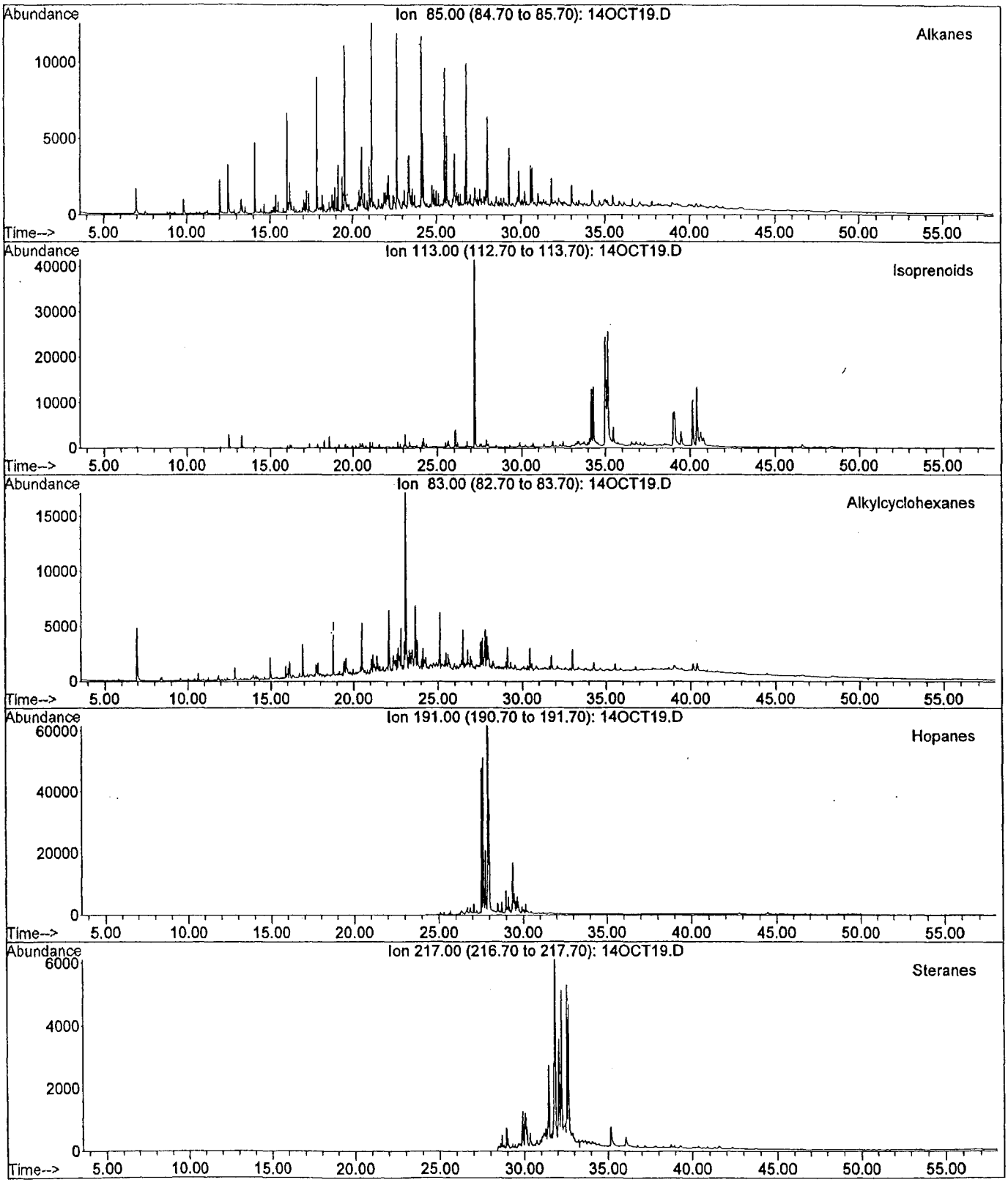
Benz(a)anthracenes/Chrysenes



Field ID: T10-1
Lab ID: GT020924-01 1:10
File: G:\1\DATA\021014\14OCT18.D
Acquired: 15 Oct 2002 7:15 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

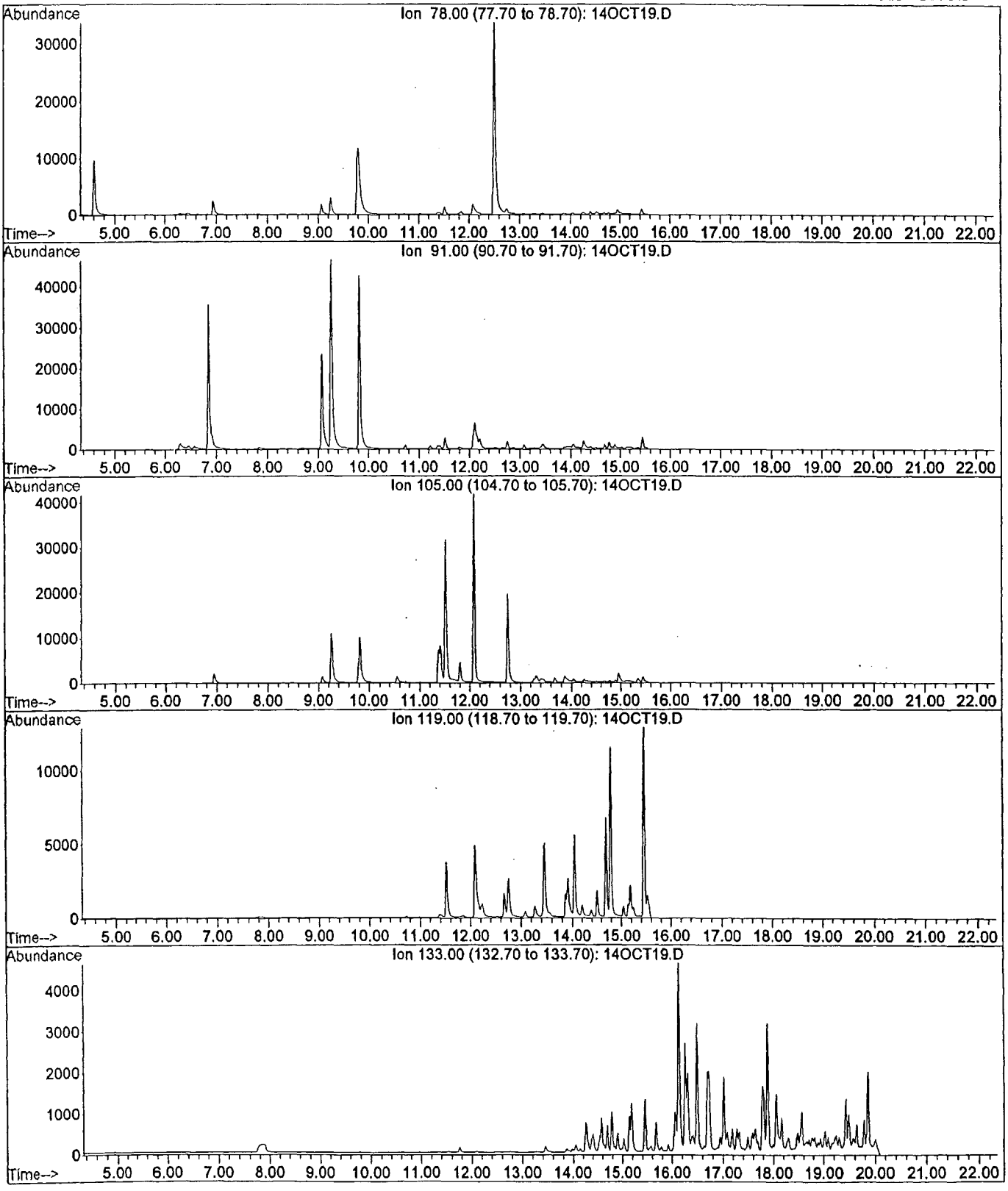


Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



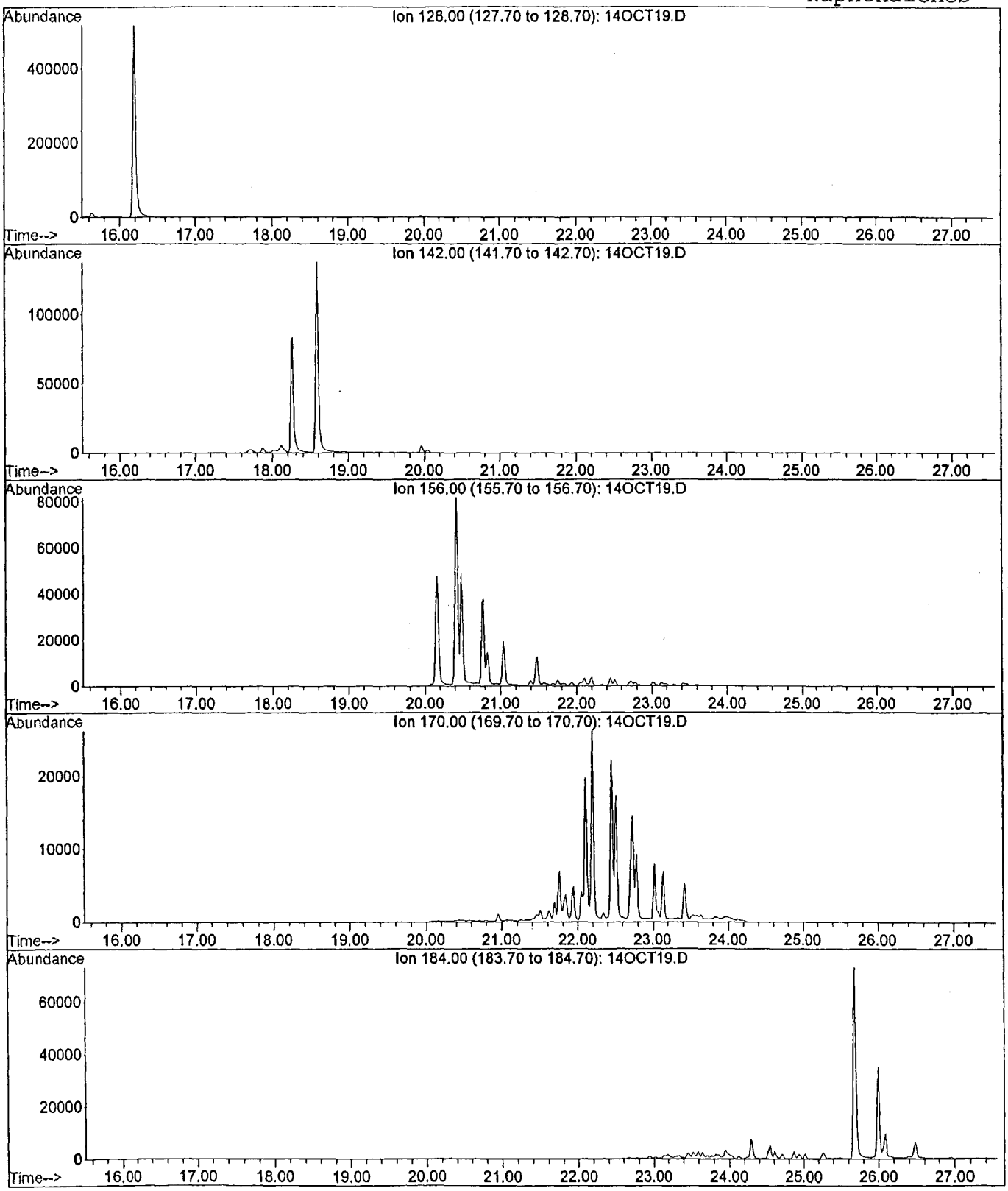
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



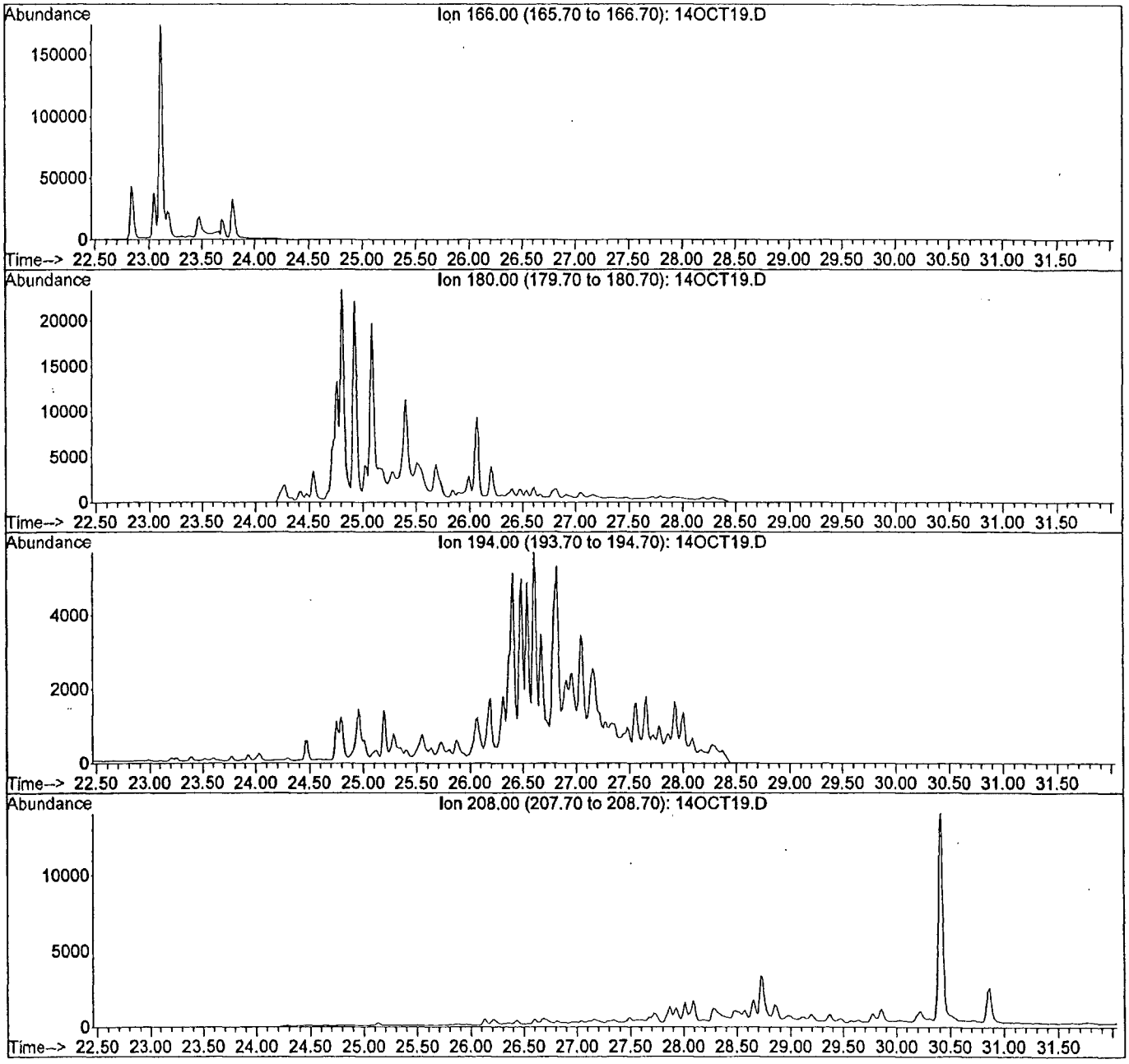
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



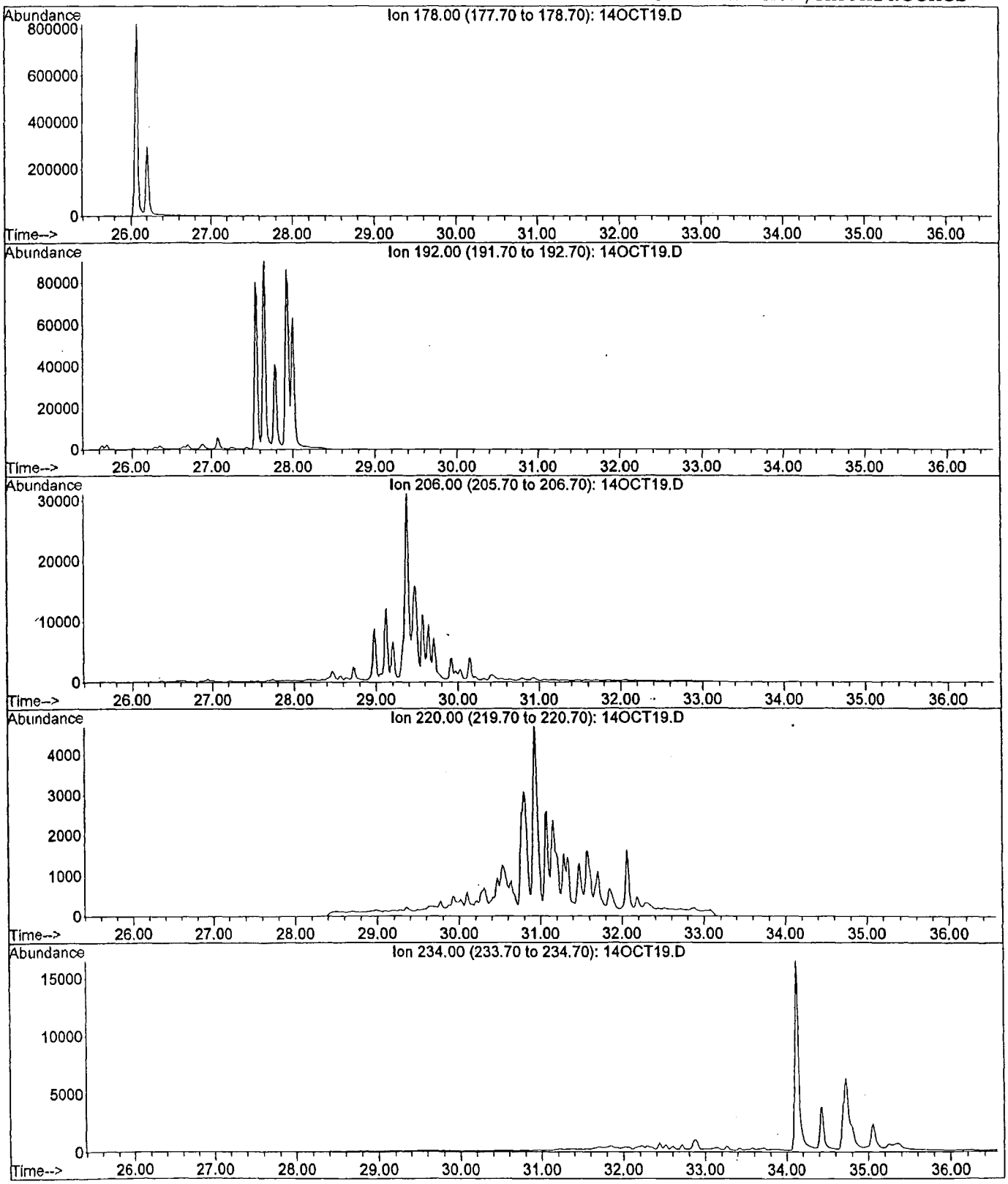
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



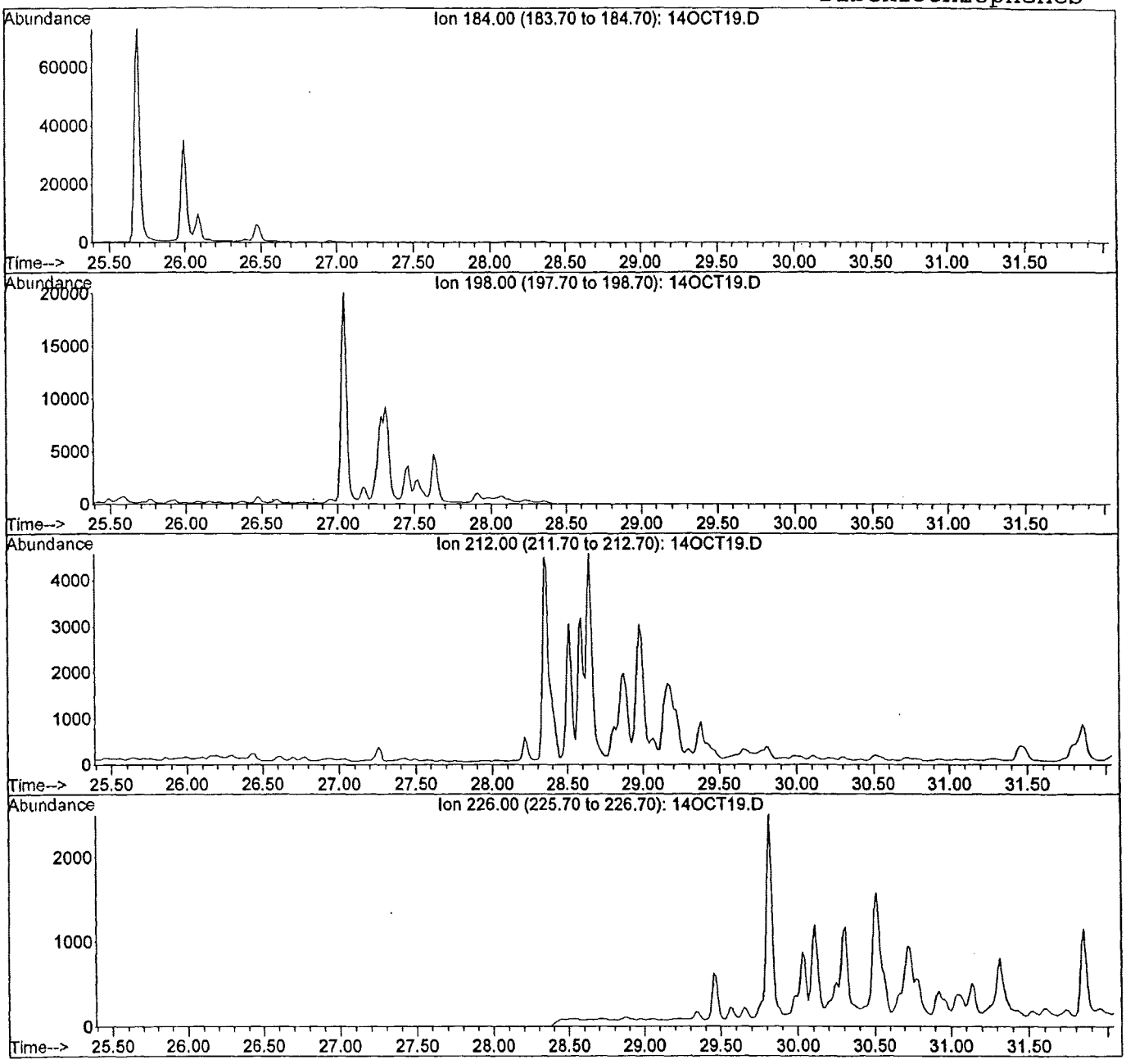
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



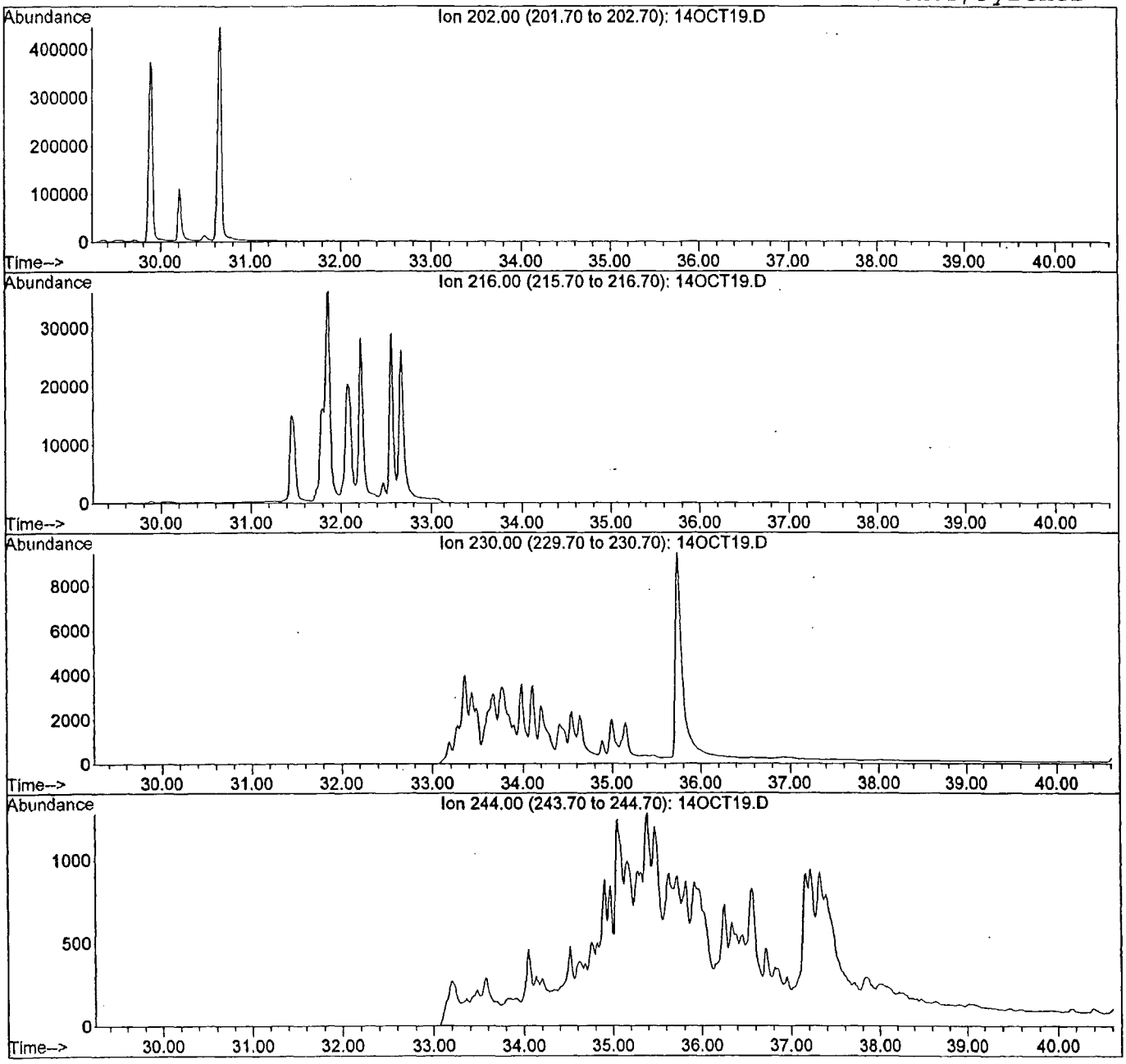
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



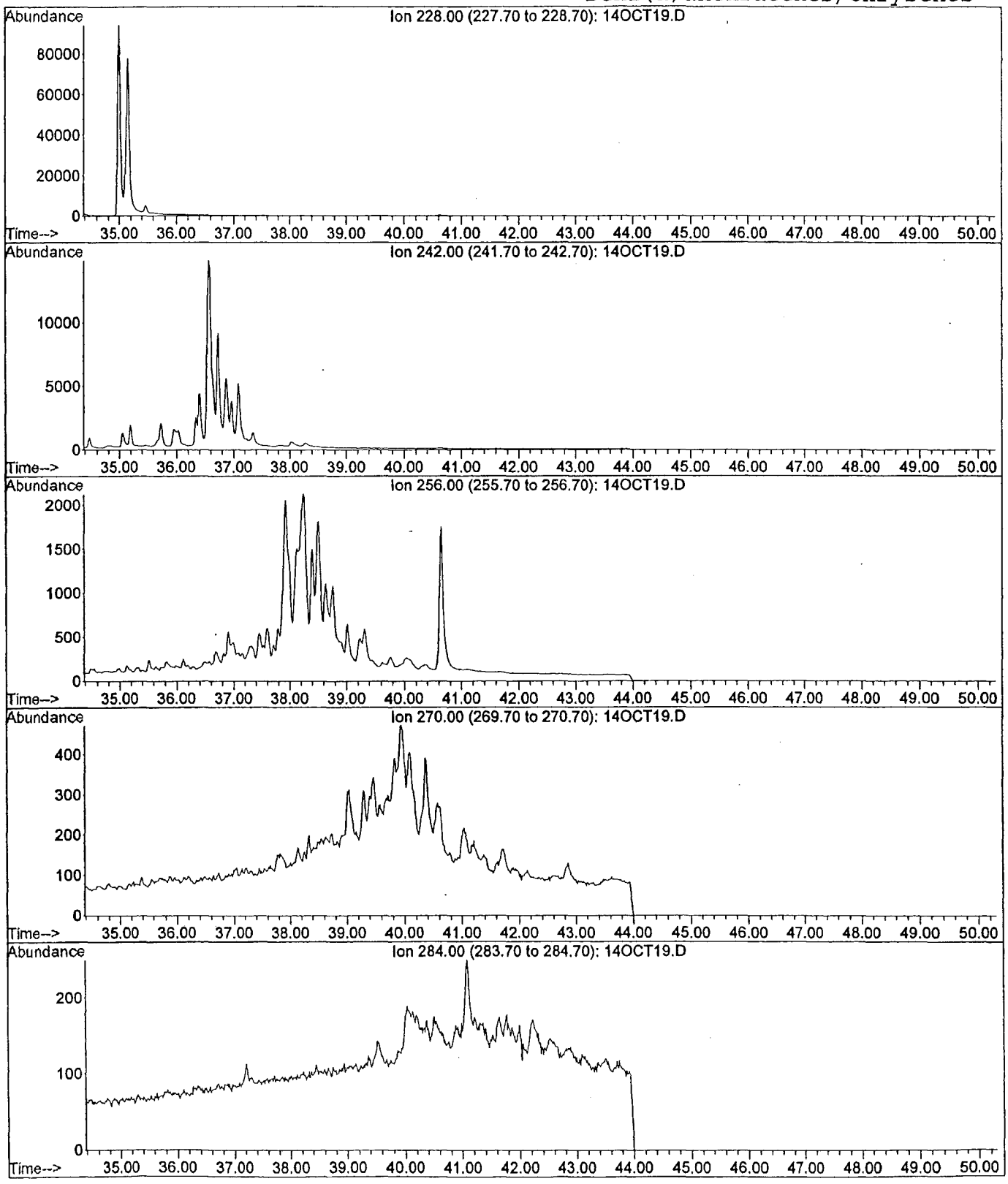
Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

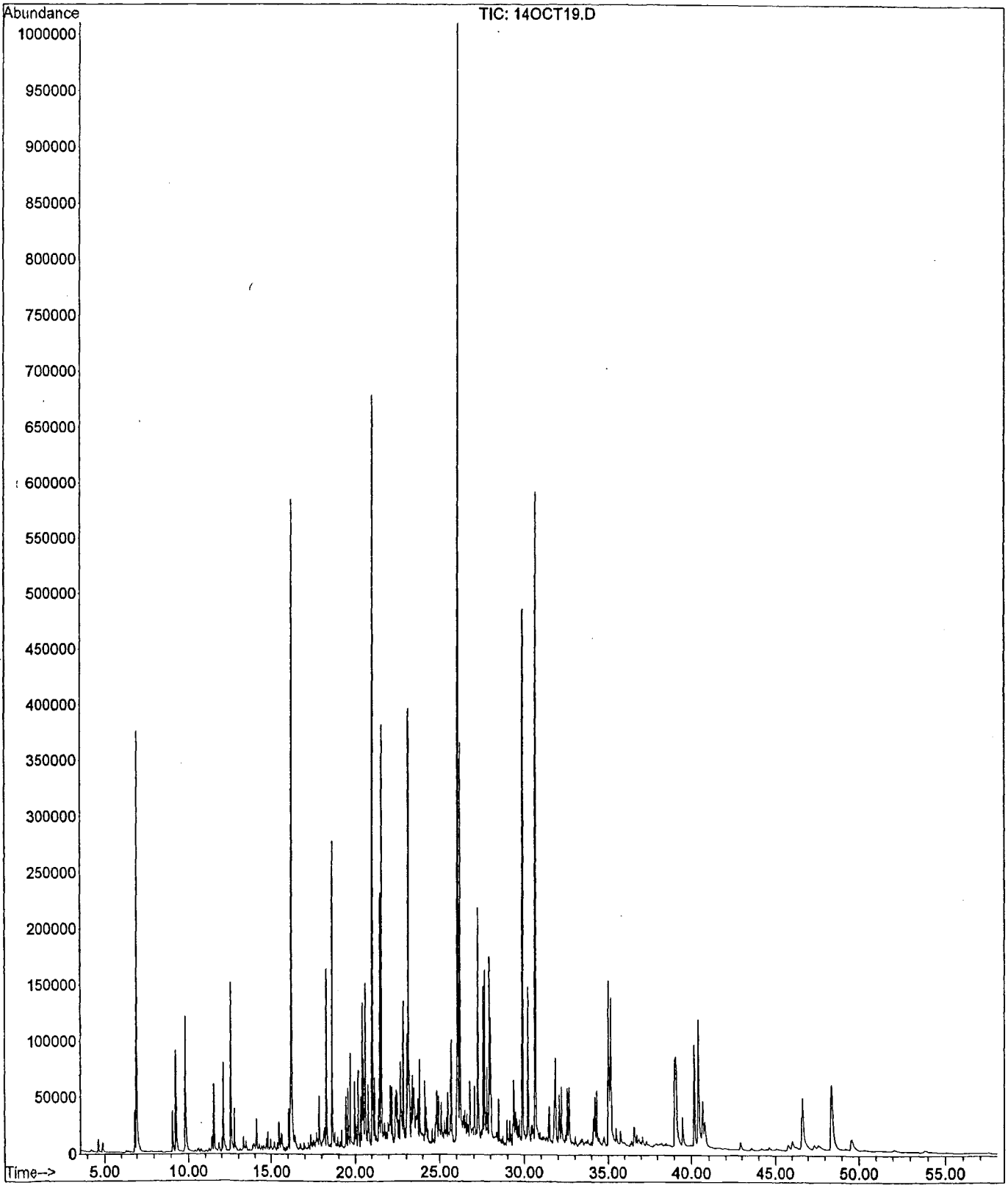


Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

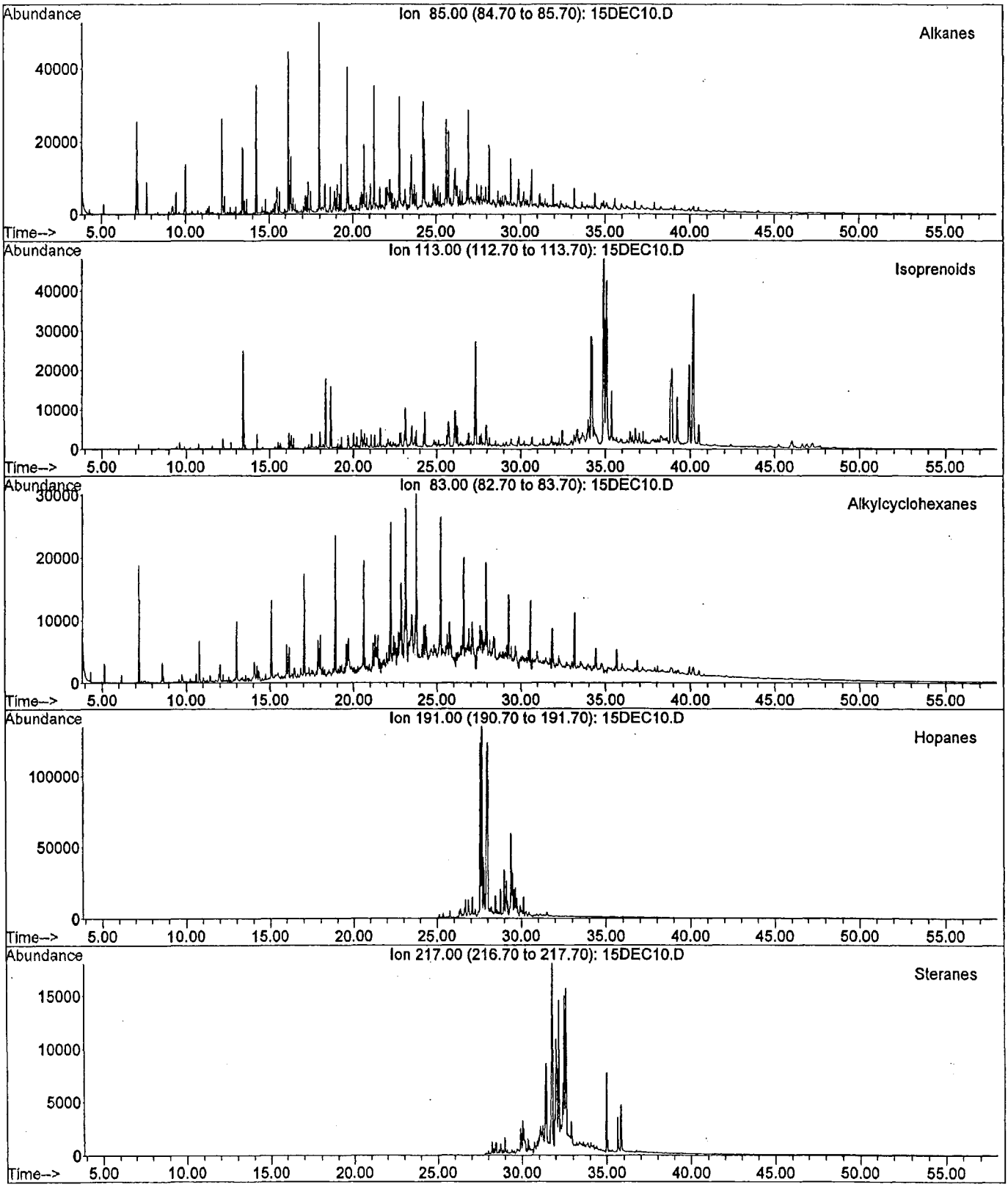
Benz(a)anthracenes/Chrysenes



Field ID: T10-2
Lab ID: GT020924-02 1:10
File: G:\1\DATA\021014\14OCT19.D
Acquired: 15 Oct 2002 8:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

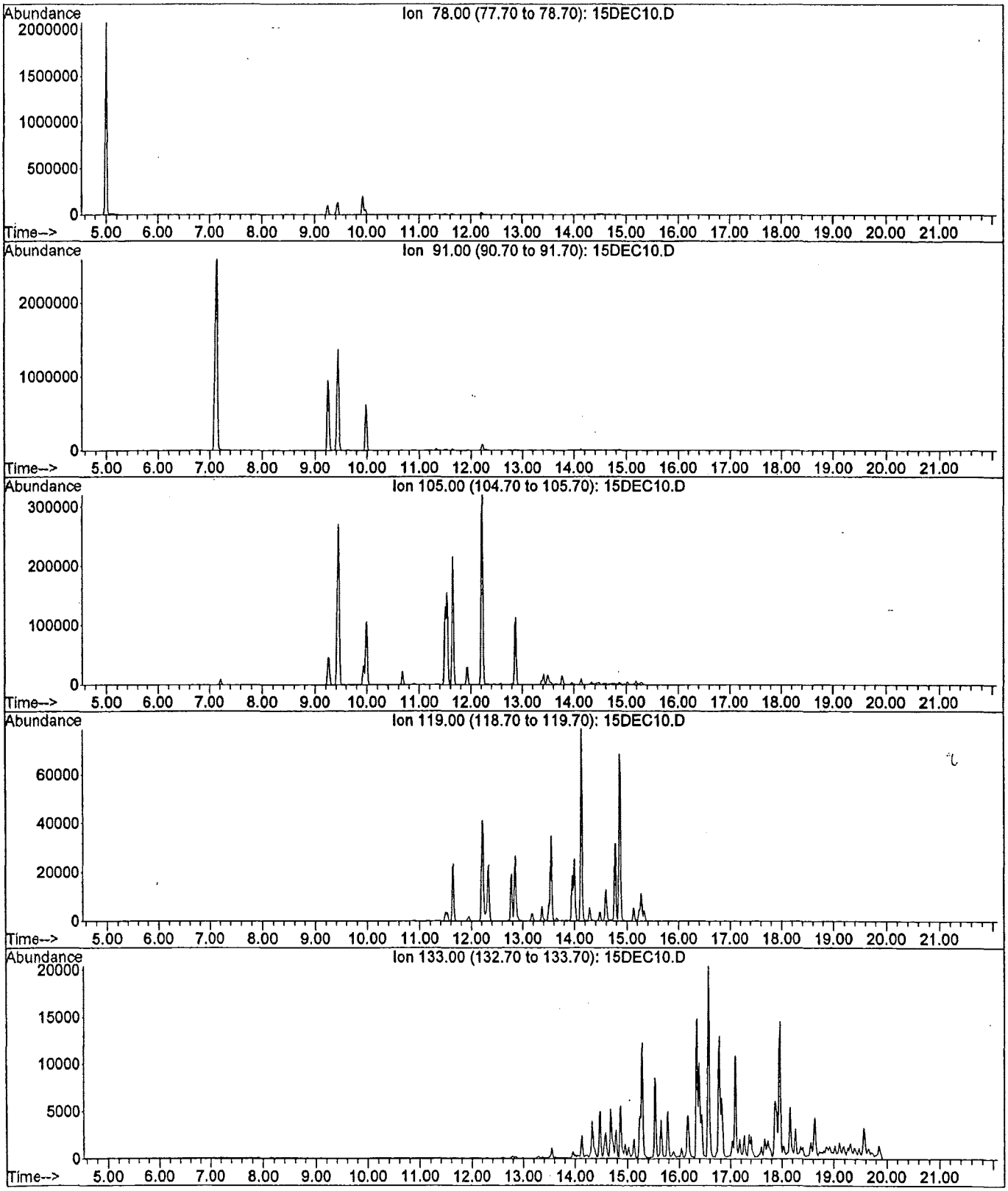


Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC



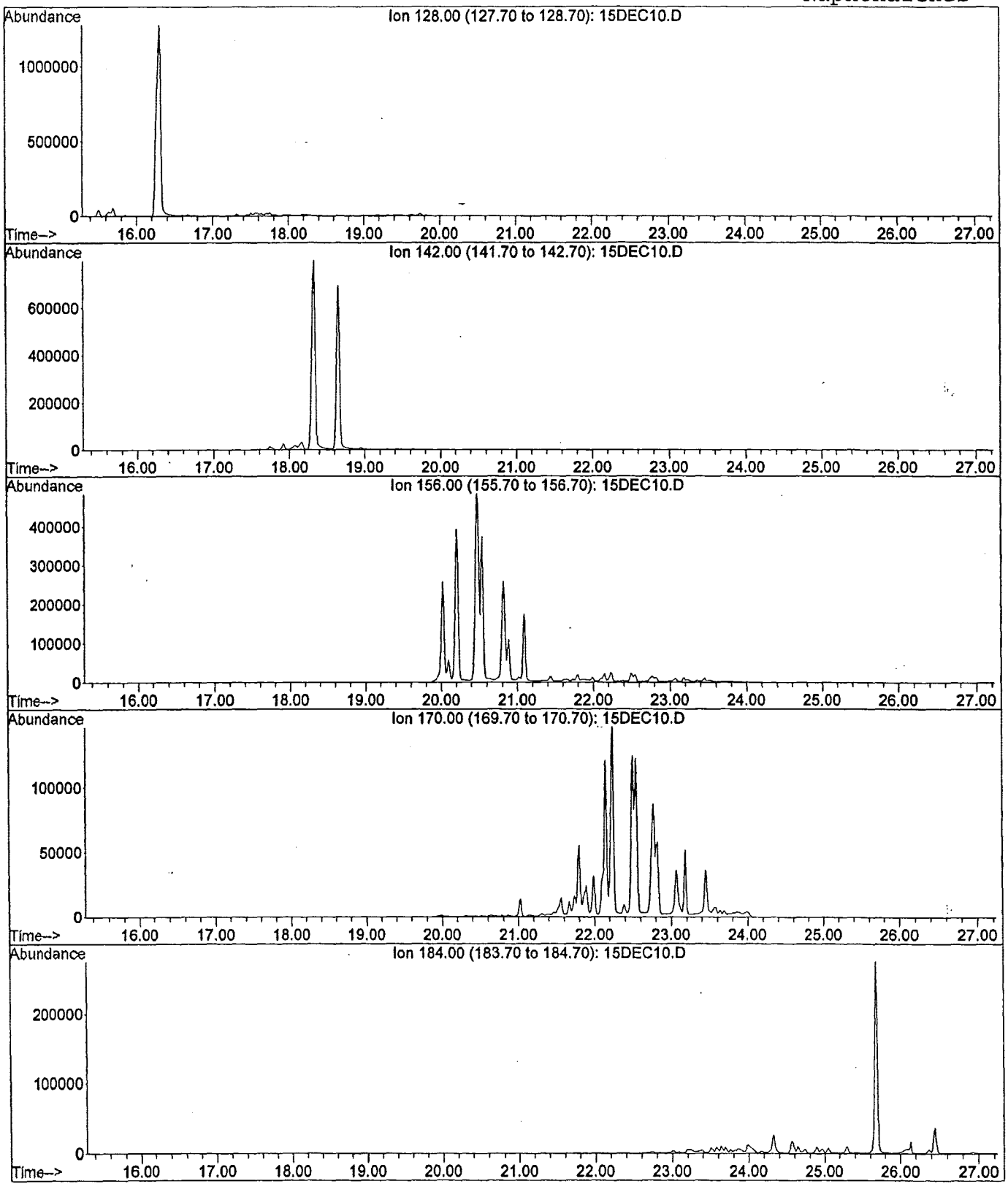
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Benzenes



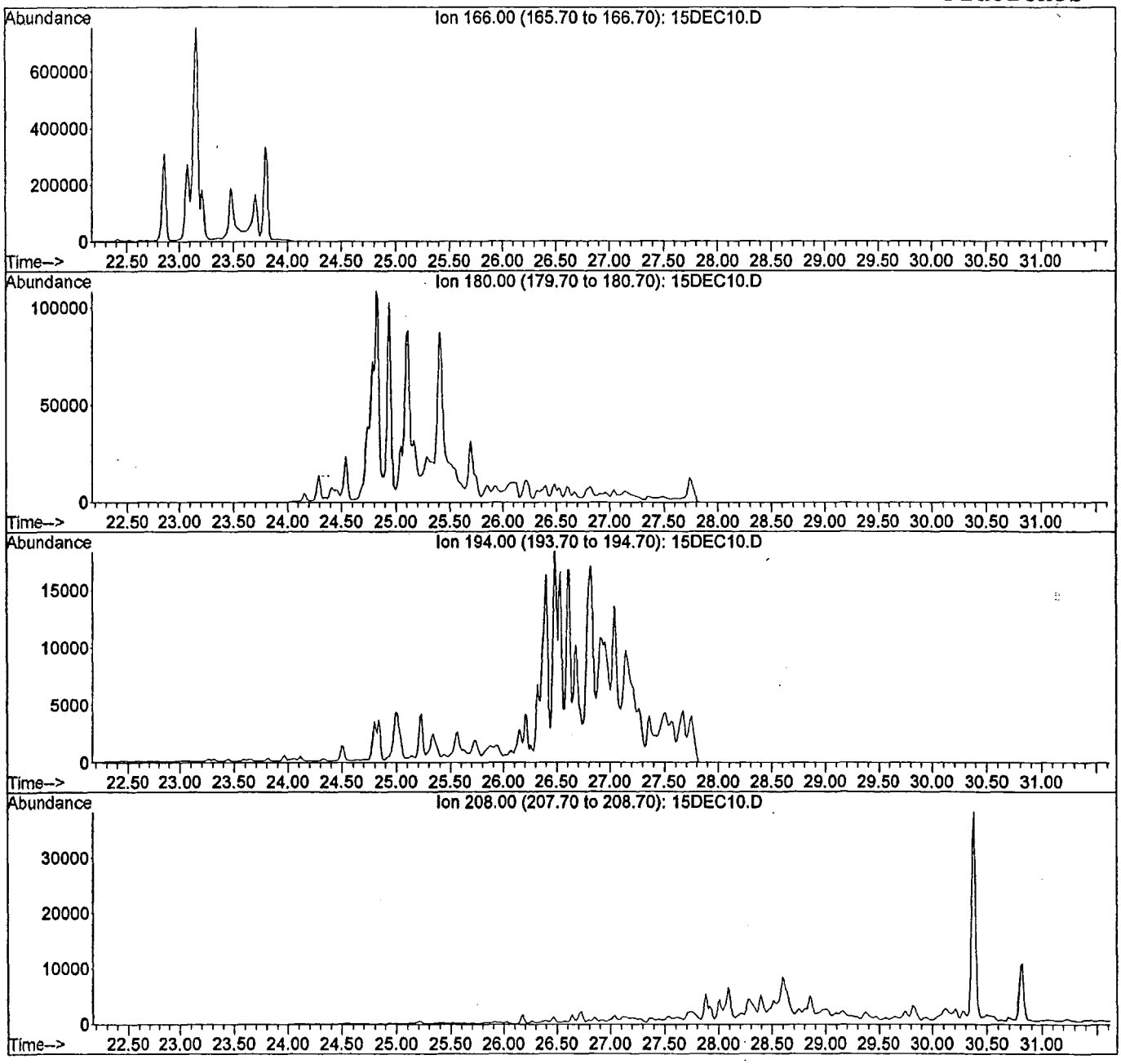
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Naphthalenes



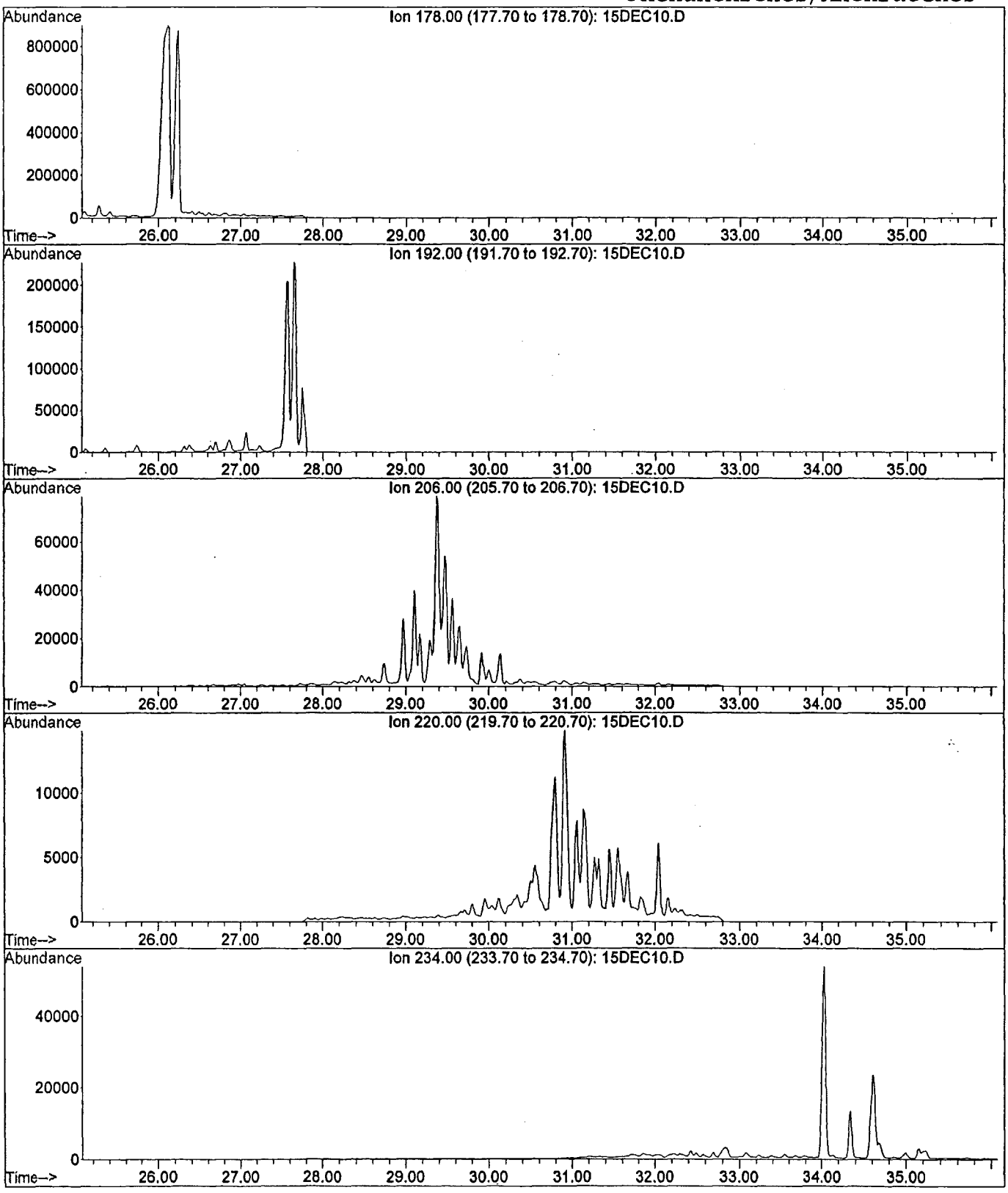
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Fluorenes



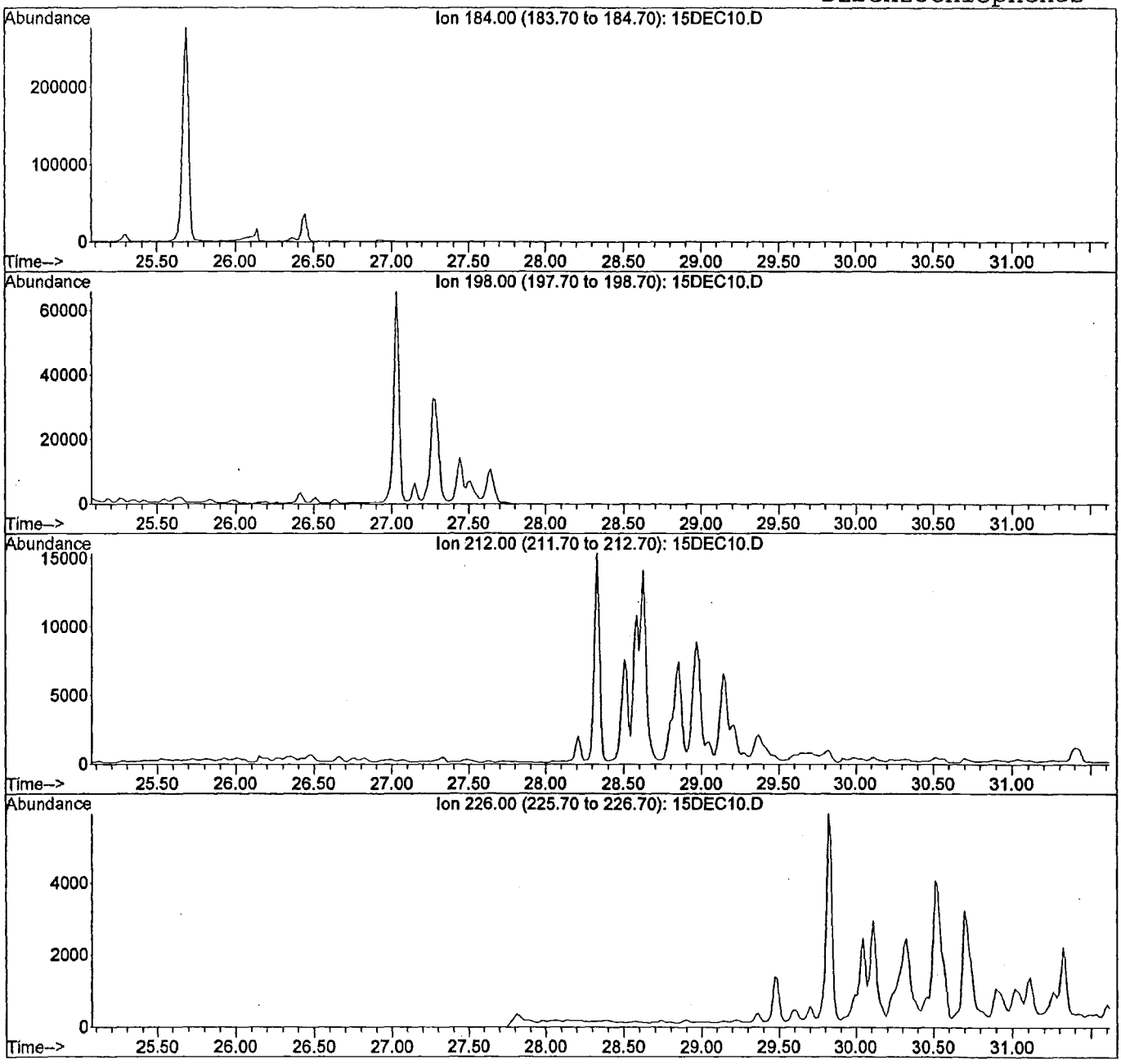
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Phenanthrenes/Anthracenes



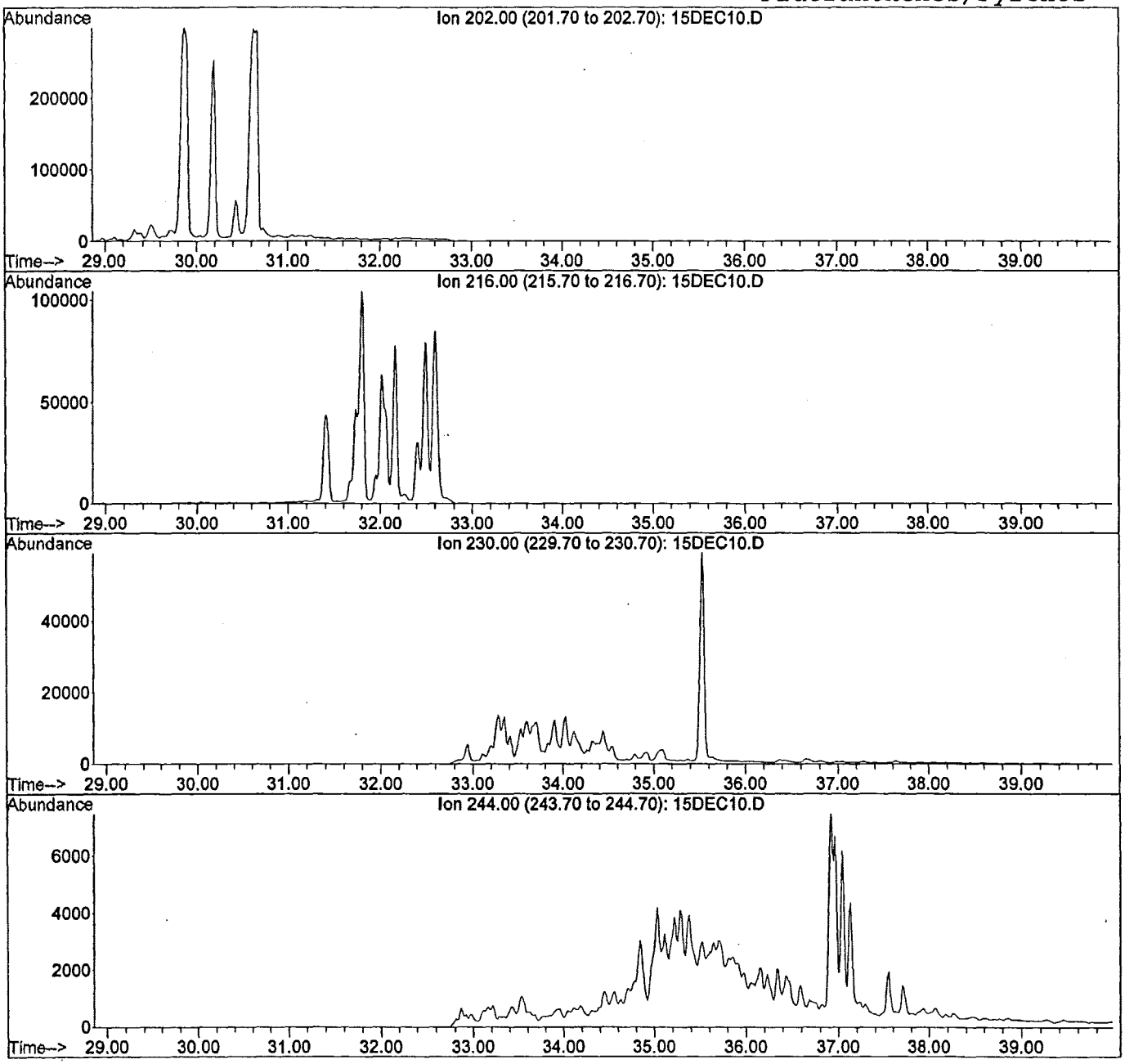
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Dibenzothiophenes



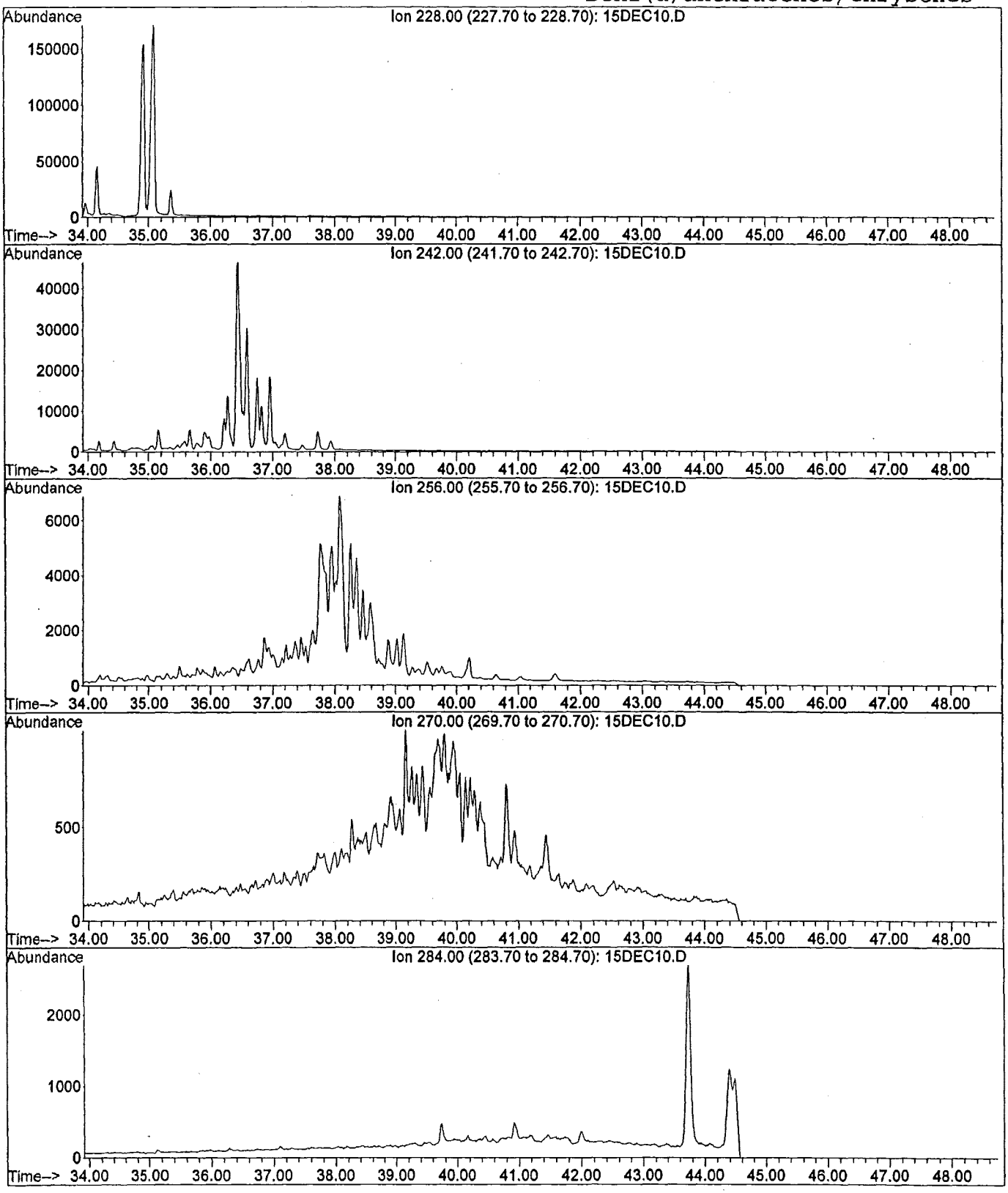
Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Fluoranthenes/Pyrenes

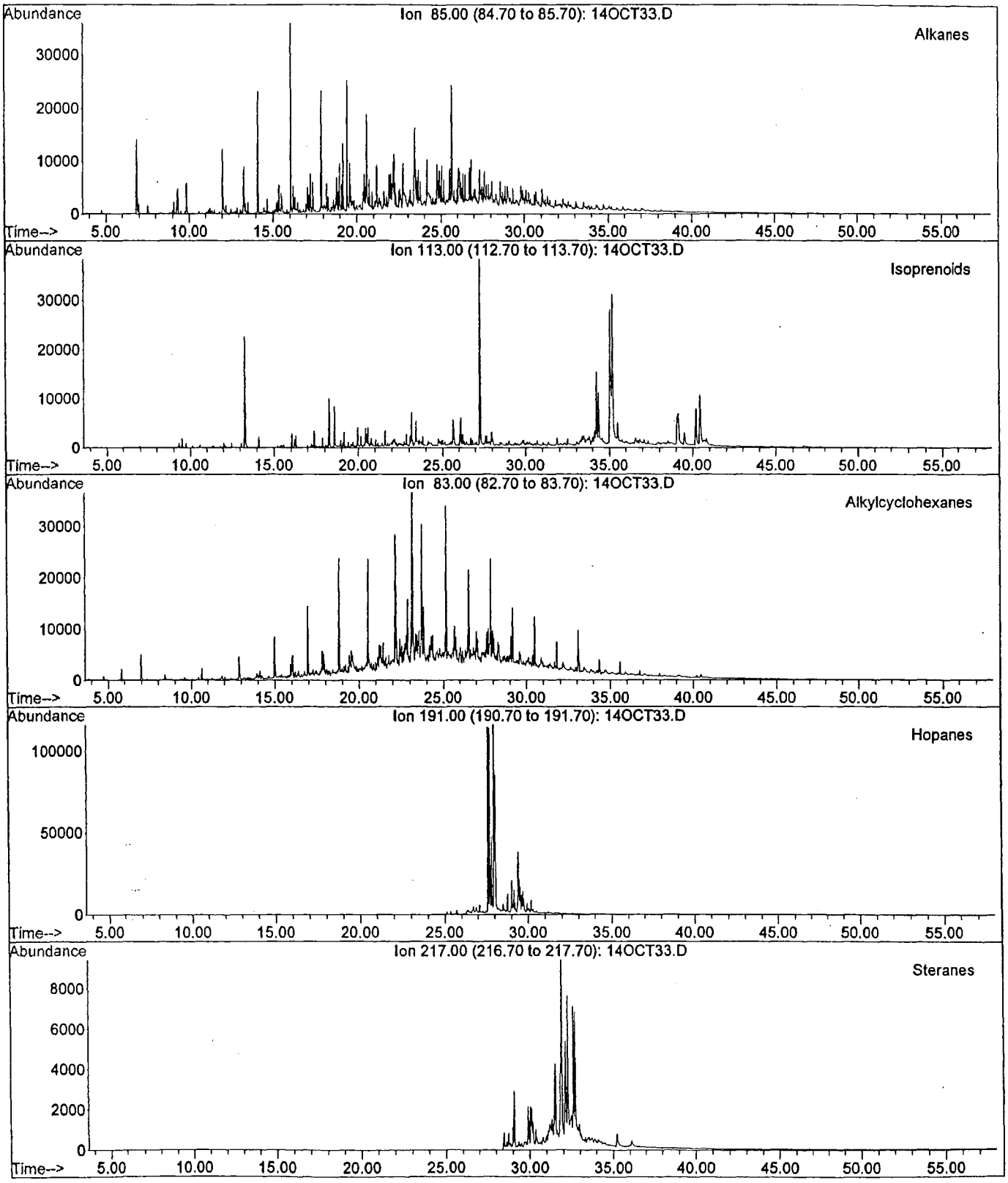


Field ID: T10-3
Lab ID: GT021121-01 1/10
File: I:\4\DATA\021215\15DEC10.D
Acquired: 16 Dec 2002 12:10 am using AcqMethod MET4008
Instrument: GC4-MS_59 Operator: DRC

Benz(a)anthracenes/Chrysenes

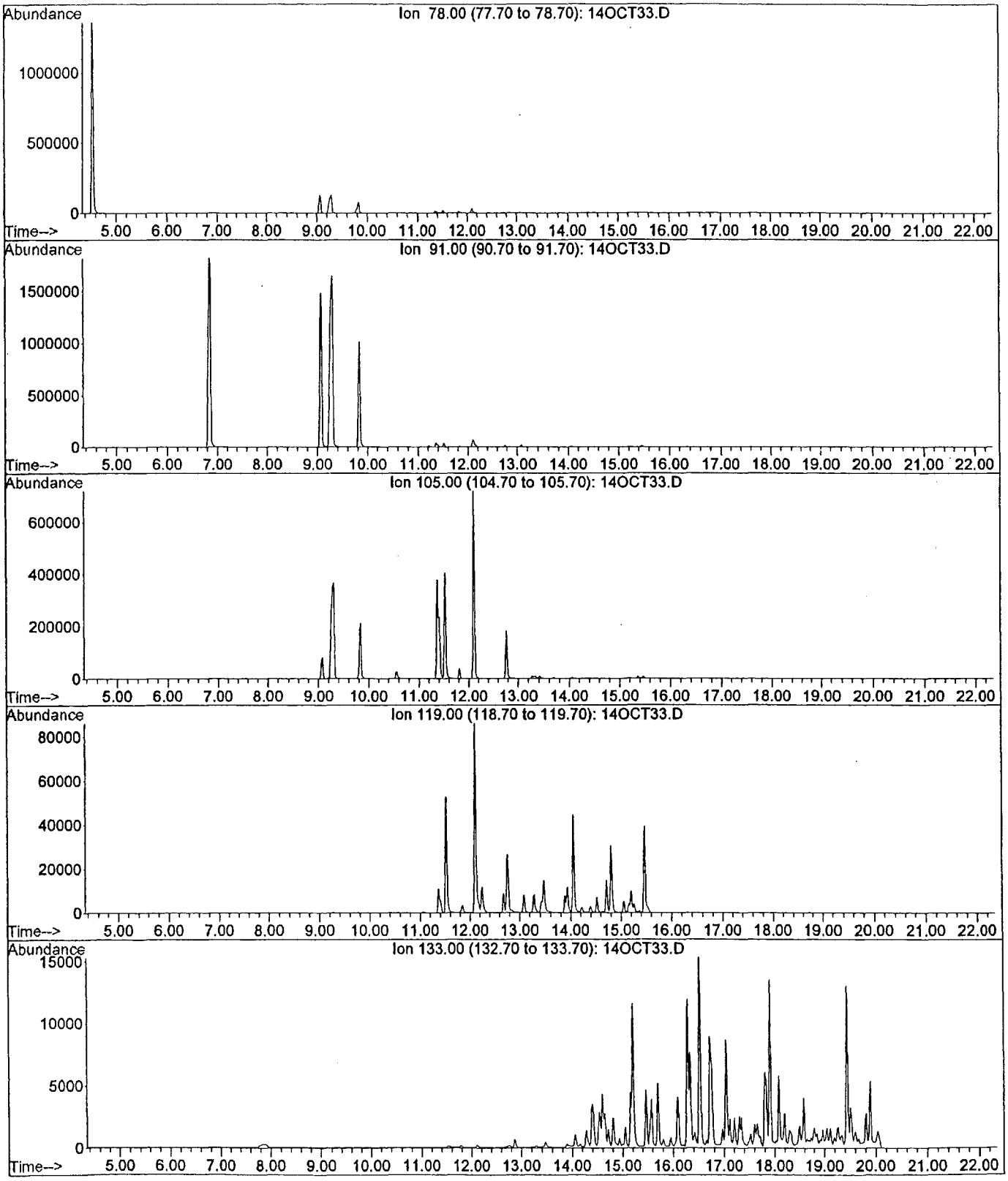


Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



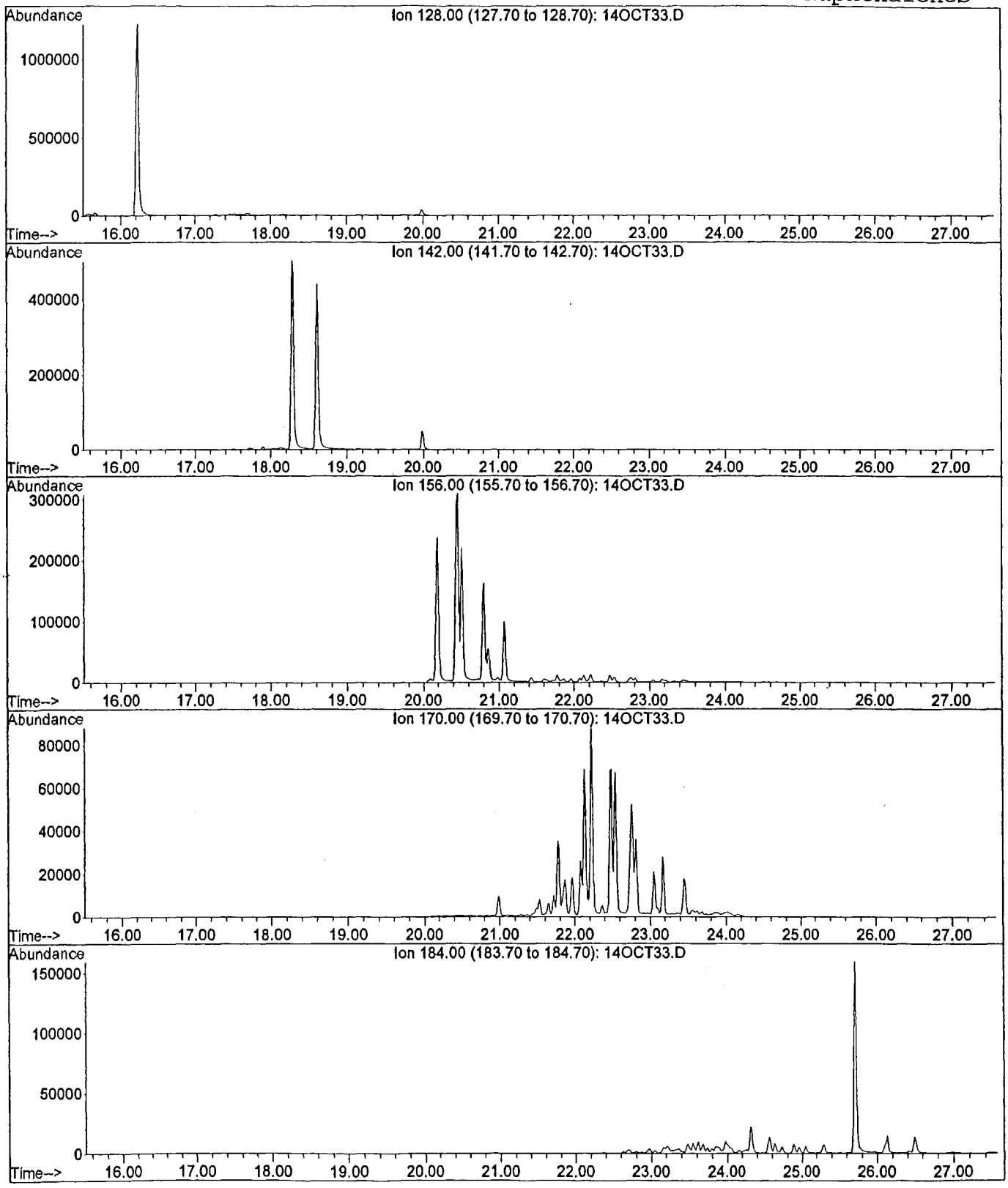
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



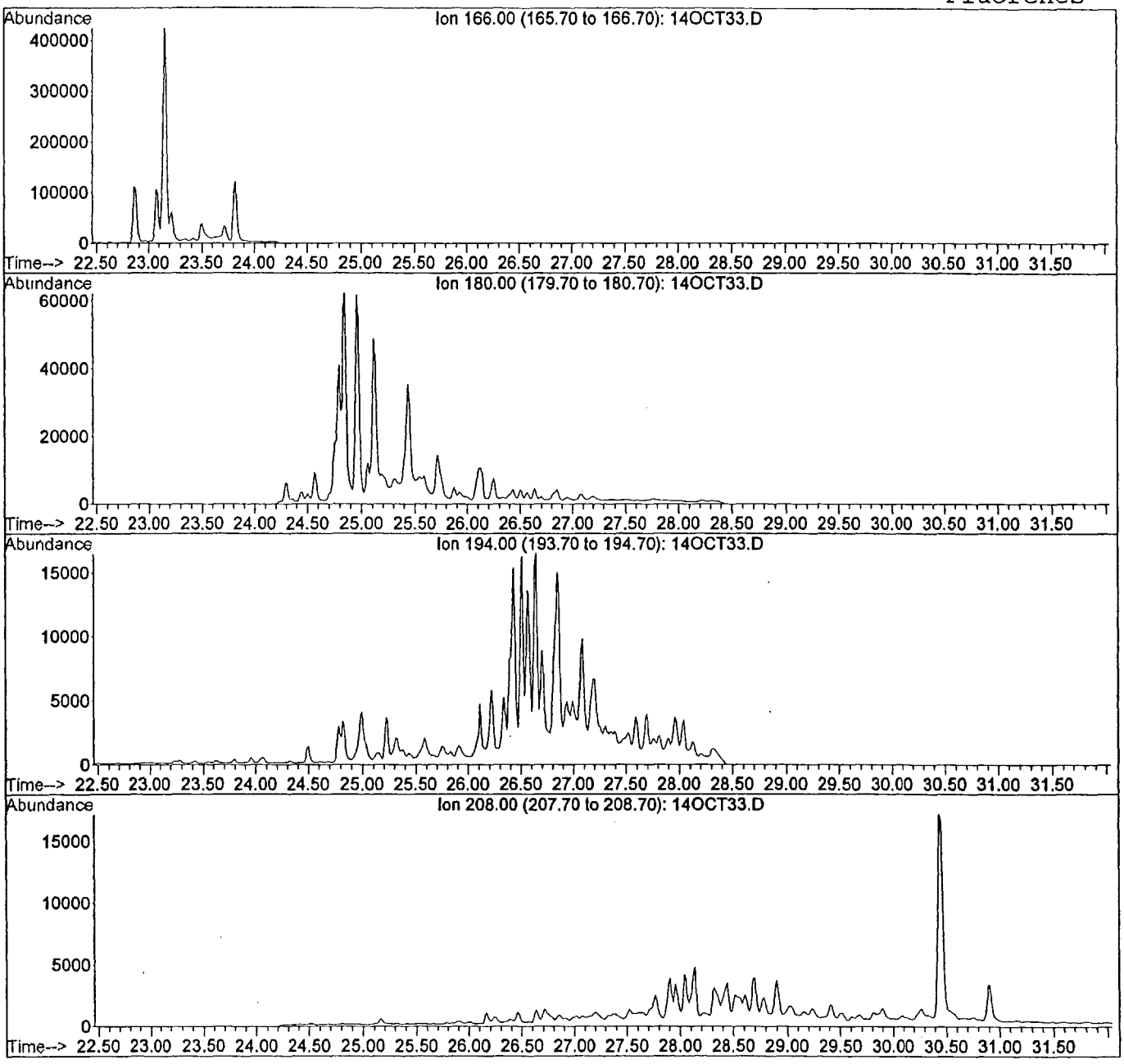
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



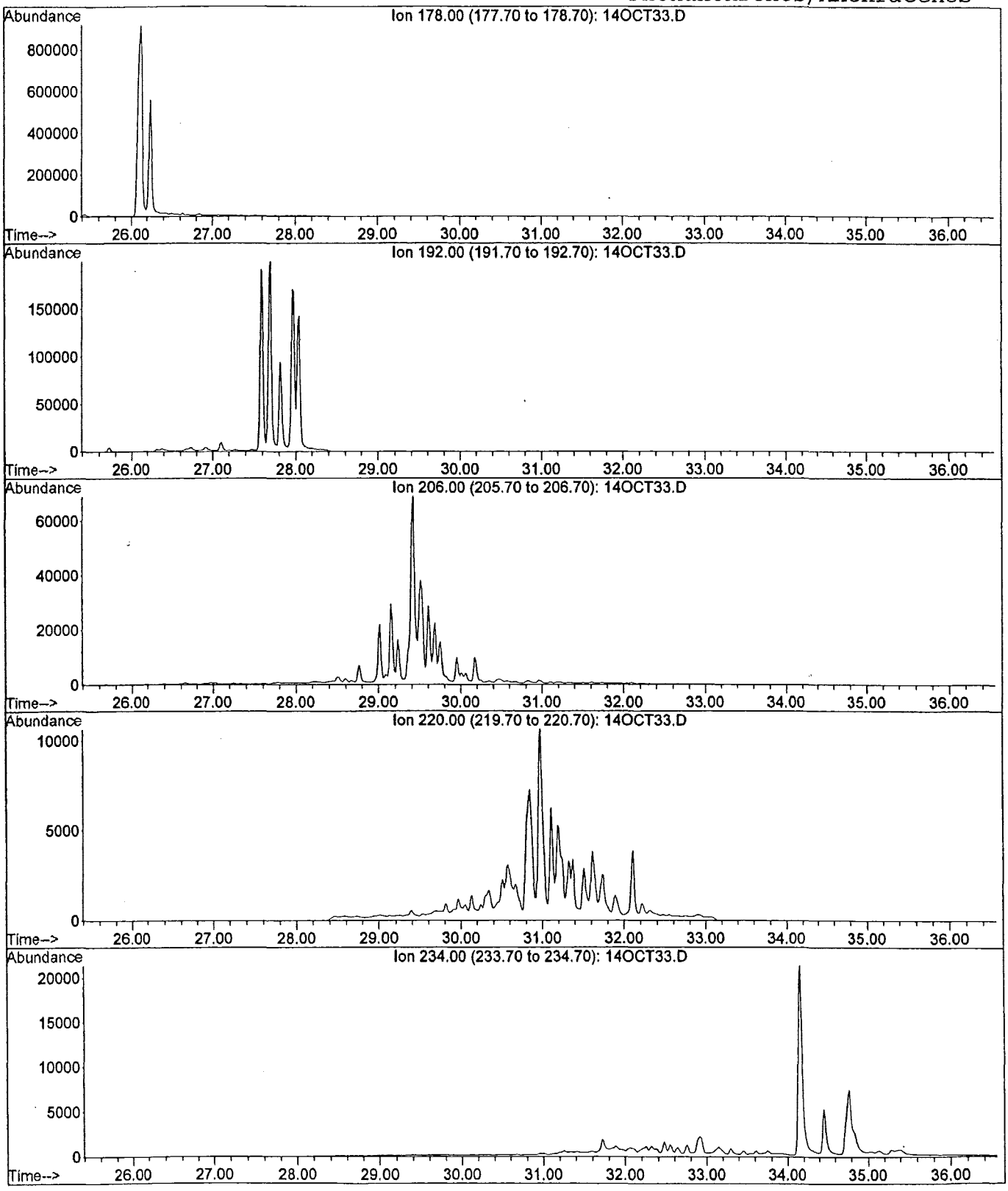
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



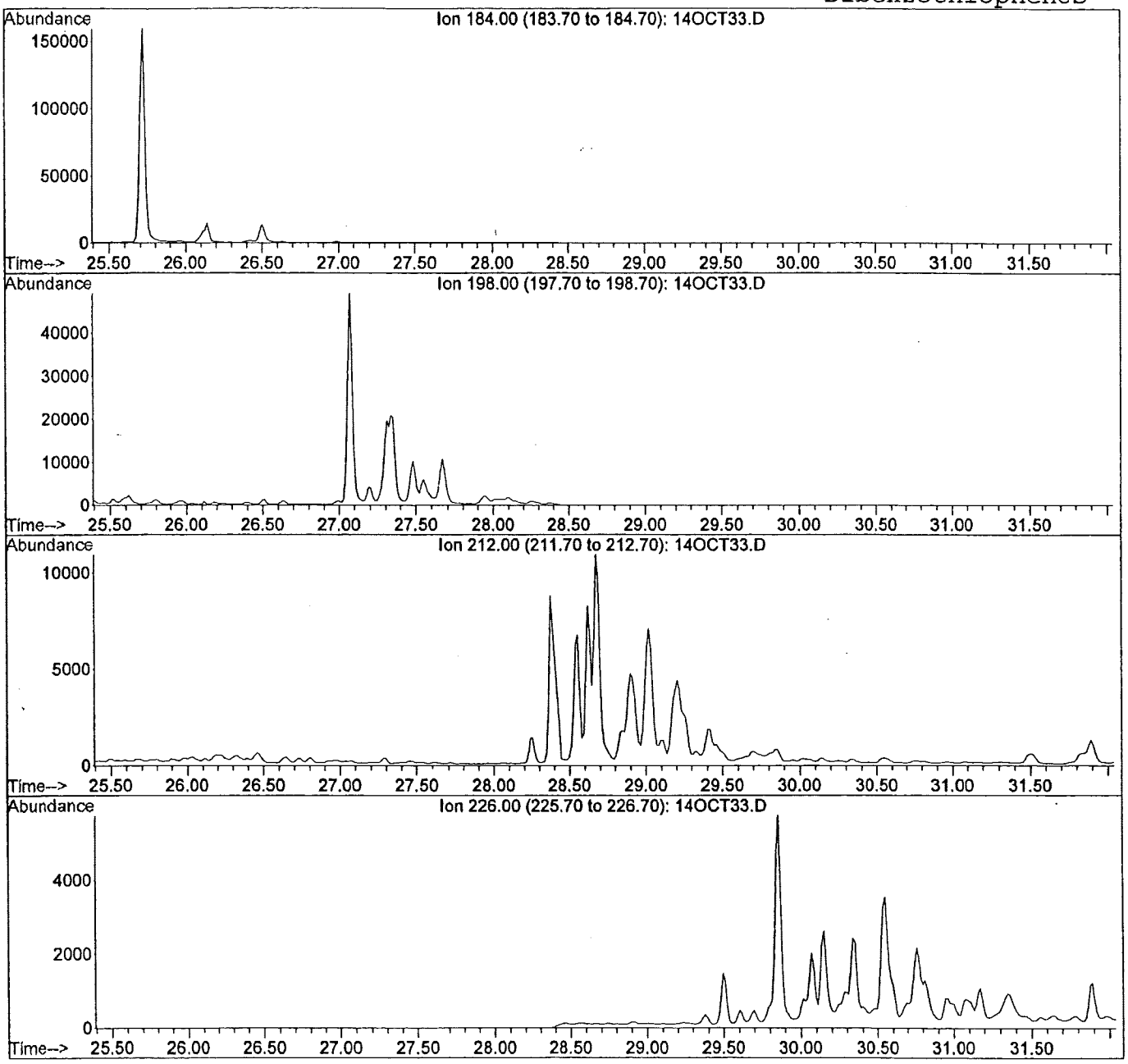
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



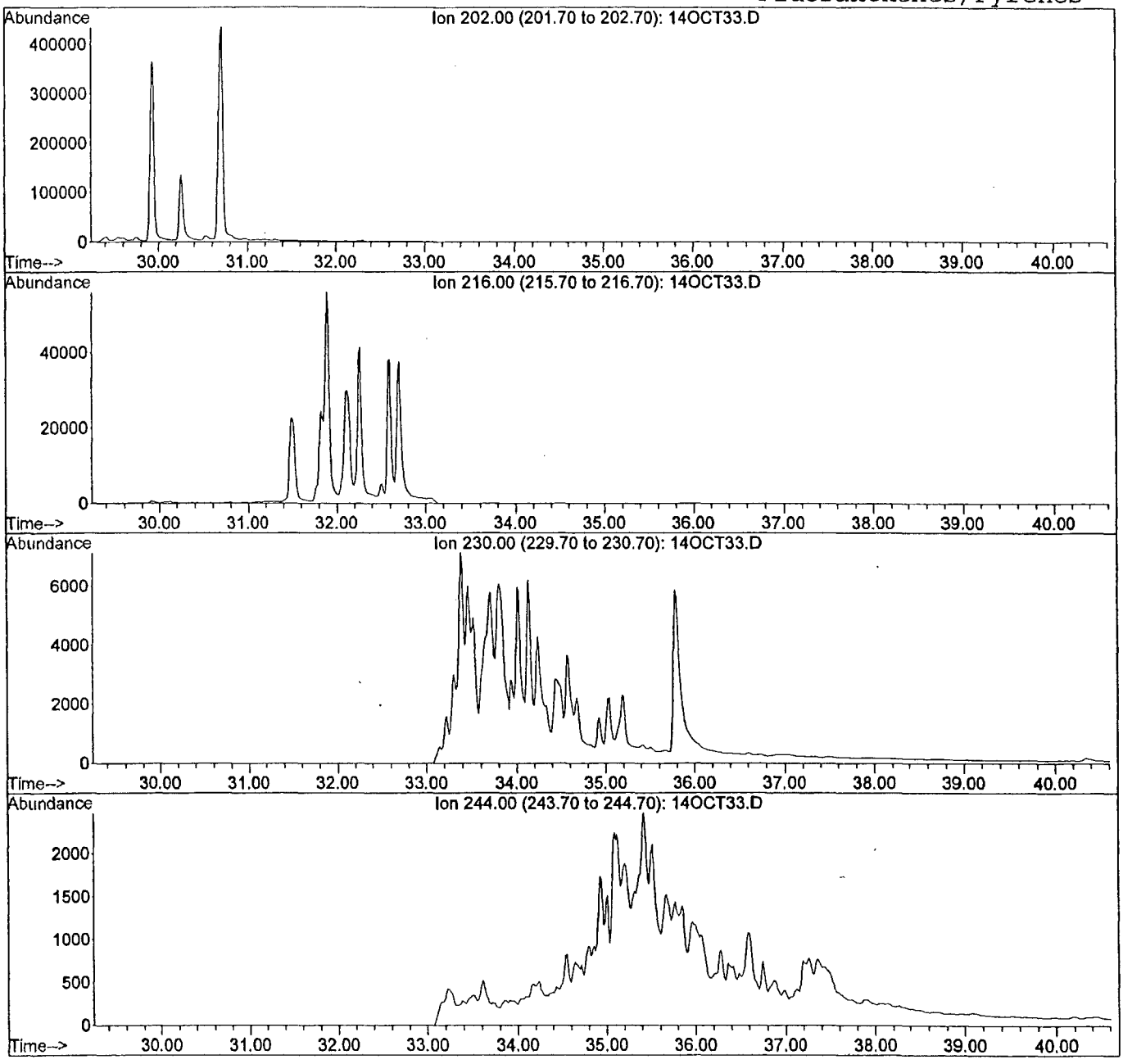
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



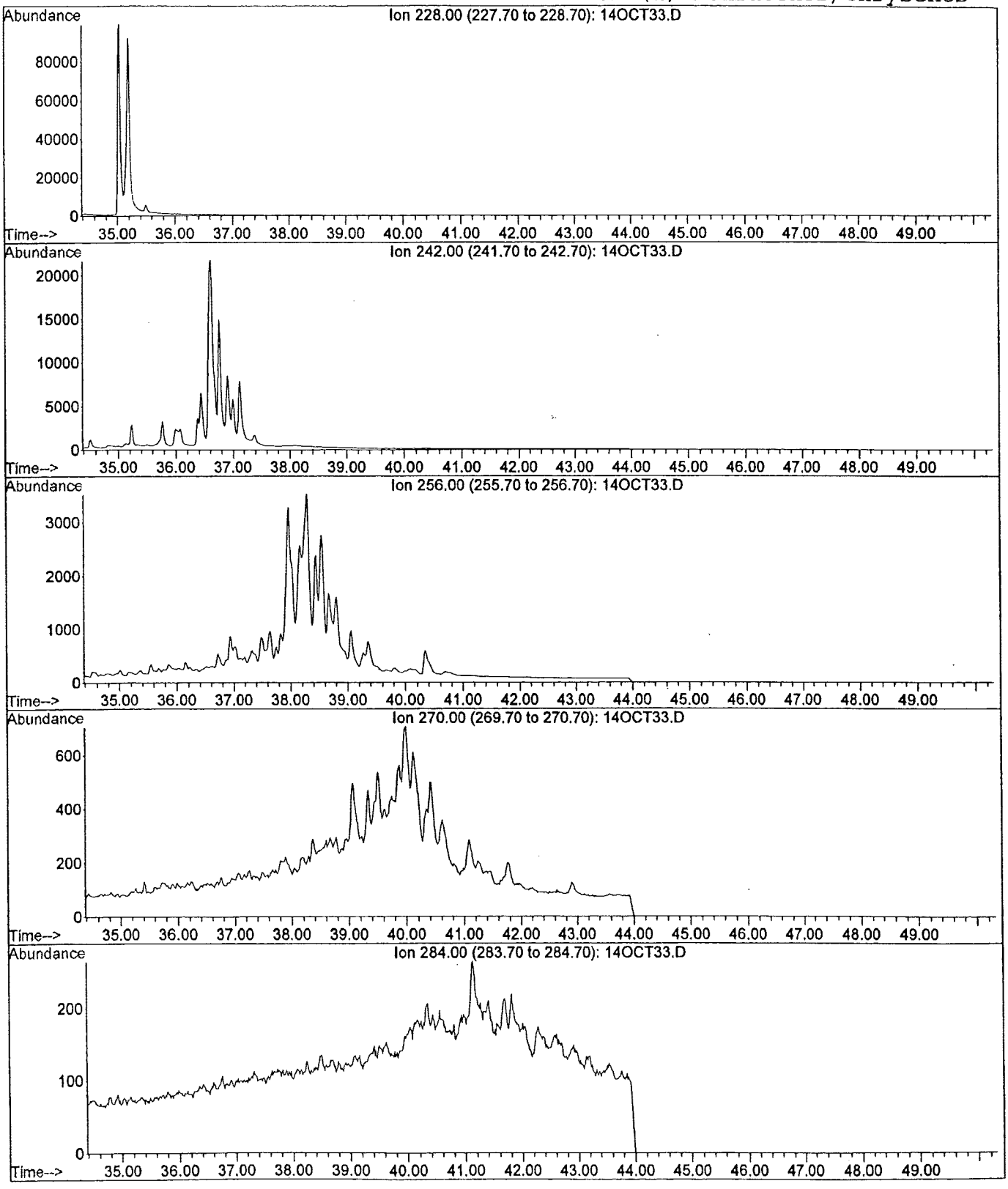
Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

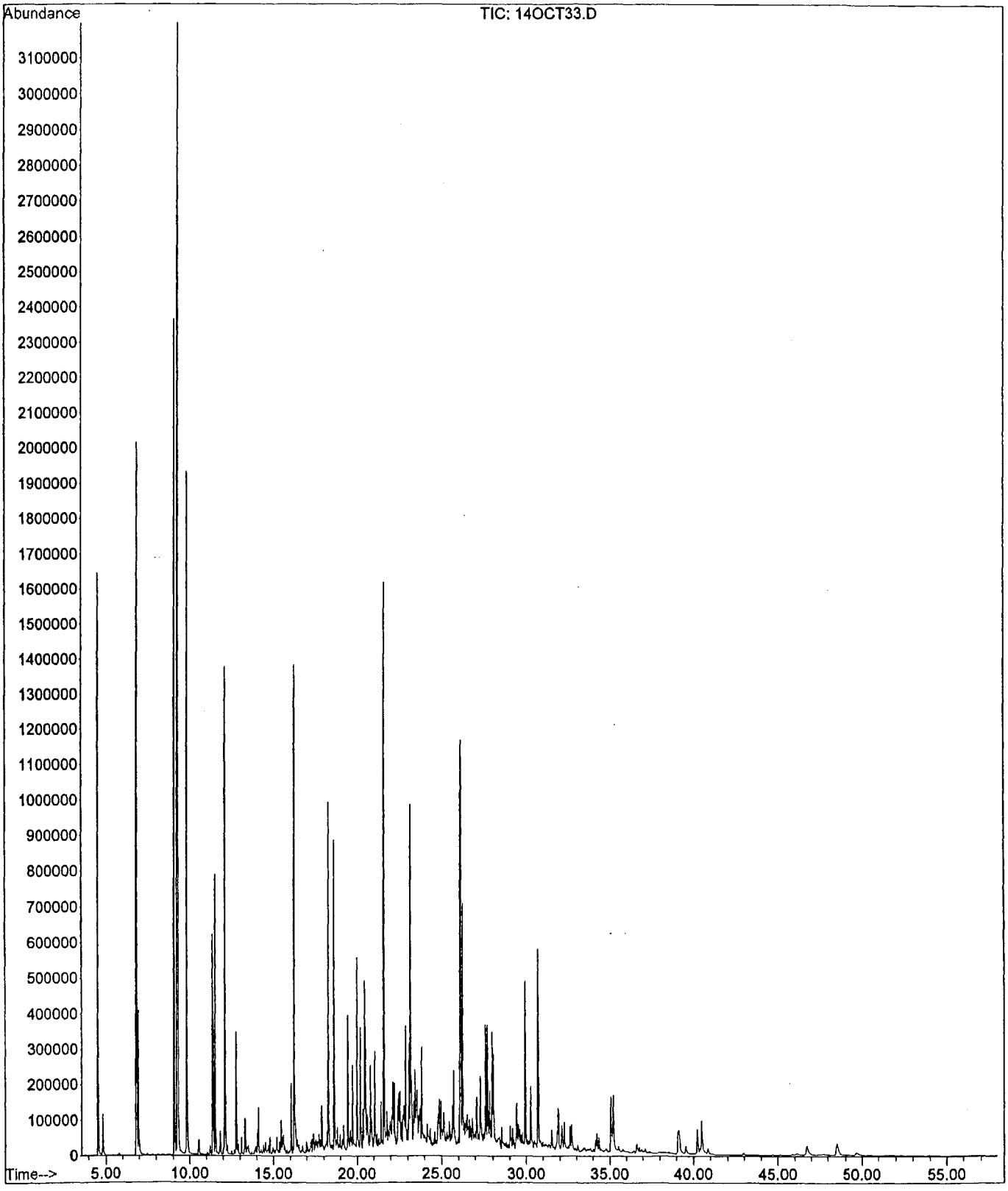


Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

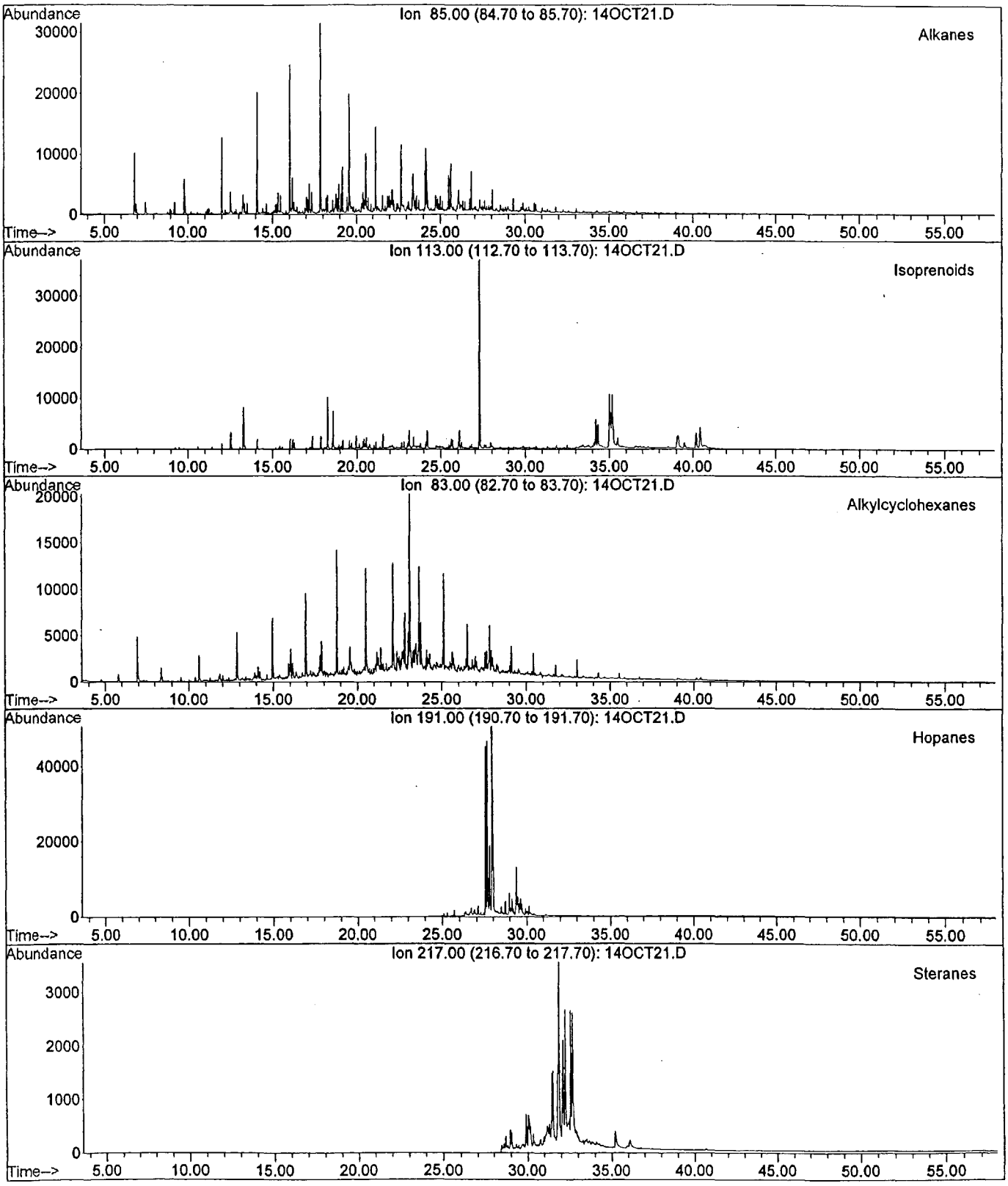
Benz(a)anthracenes/Chrysenes



Field ID: B11-12-13
Lab ID: GT020924-03
File: G:\1\DATA\021014\14OCT33.D
Acquired: 16 Oct 2002 1:06 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

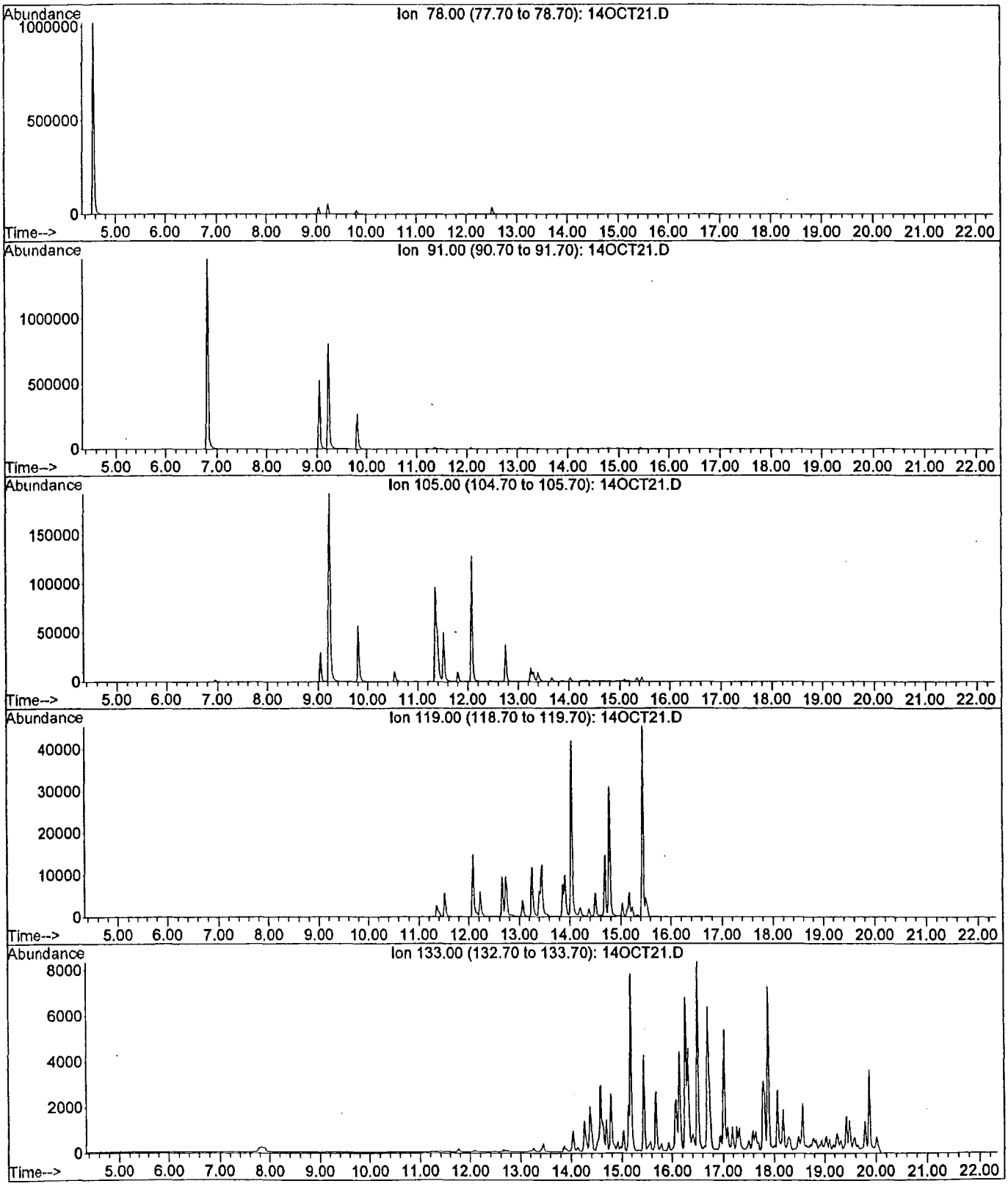


Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



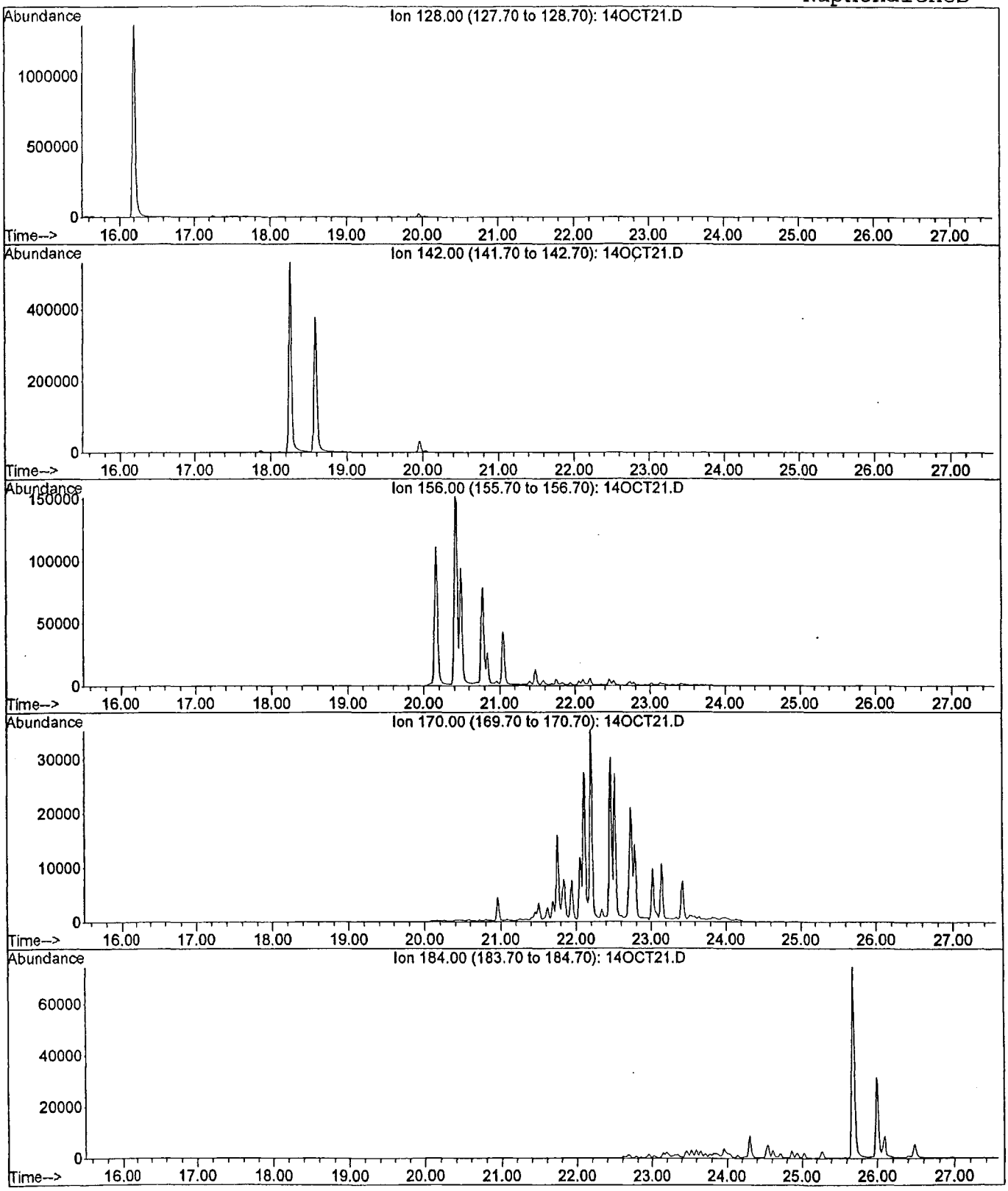
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



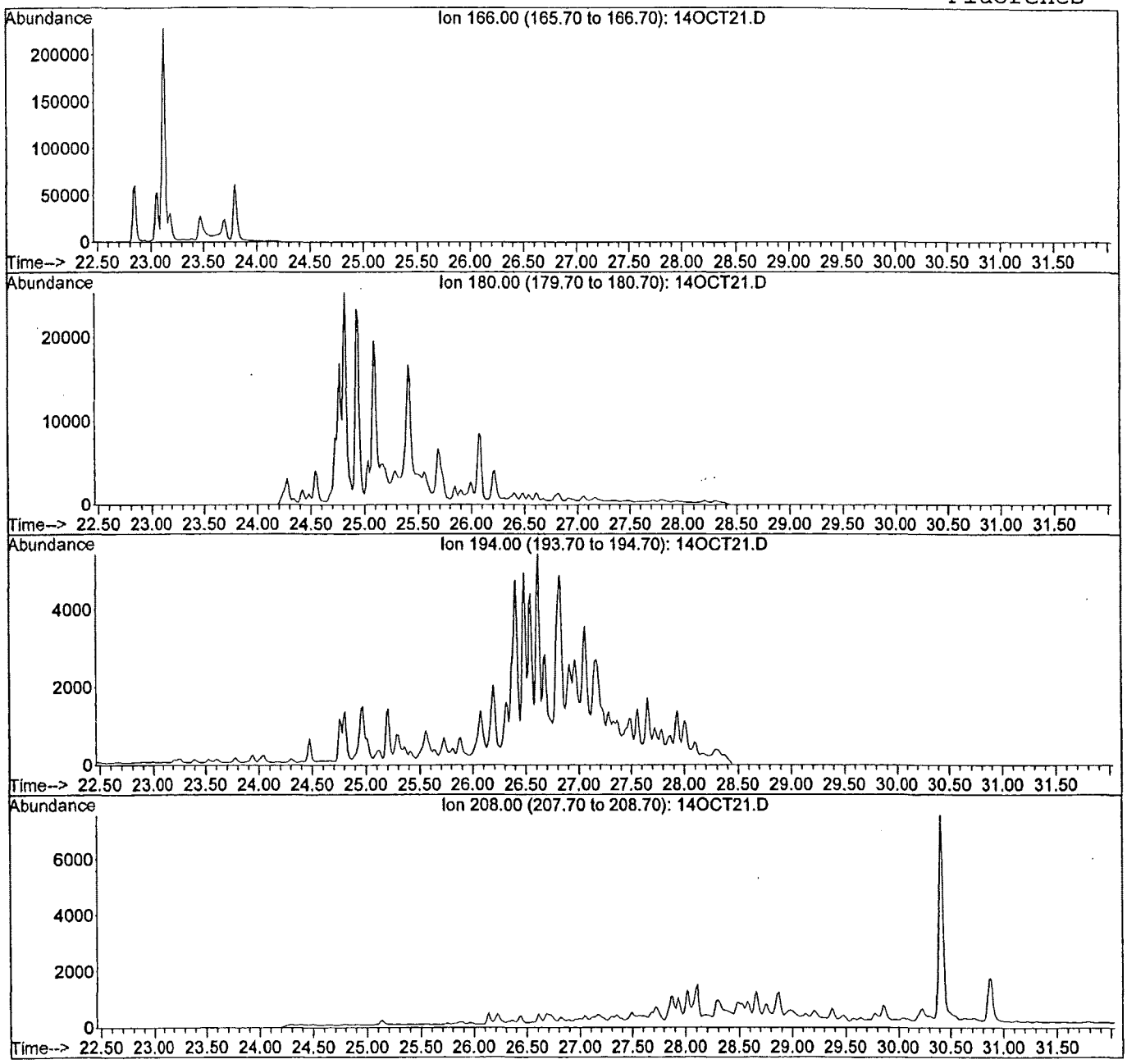
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



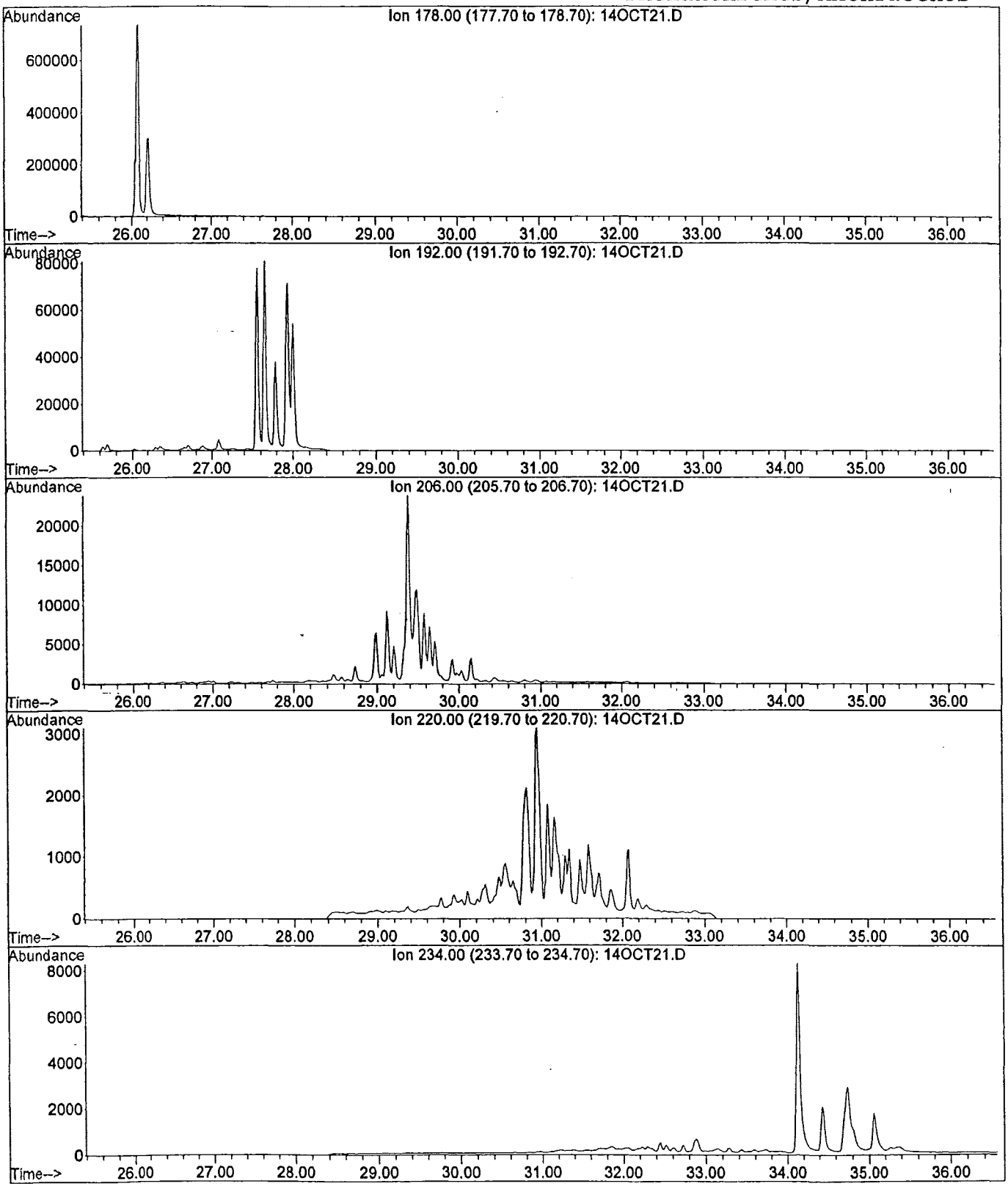
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



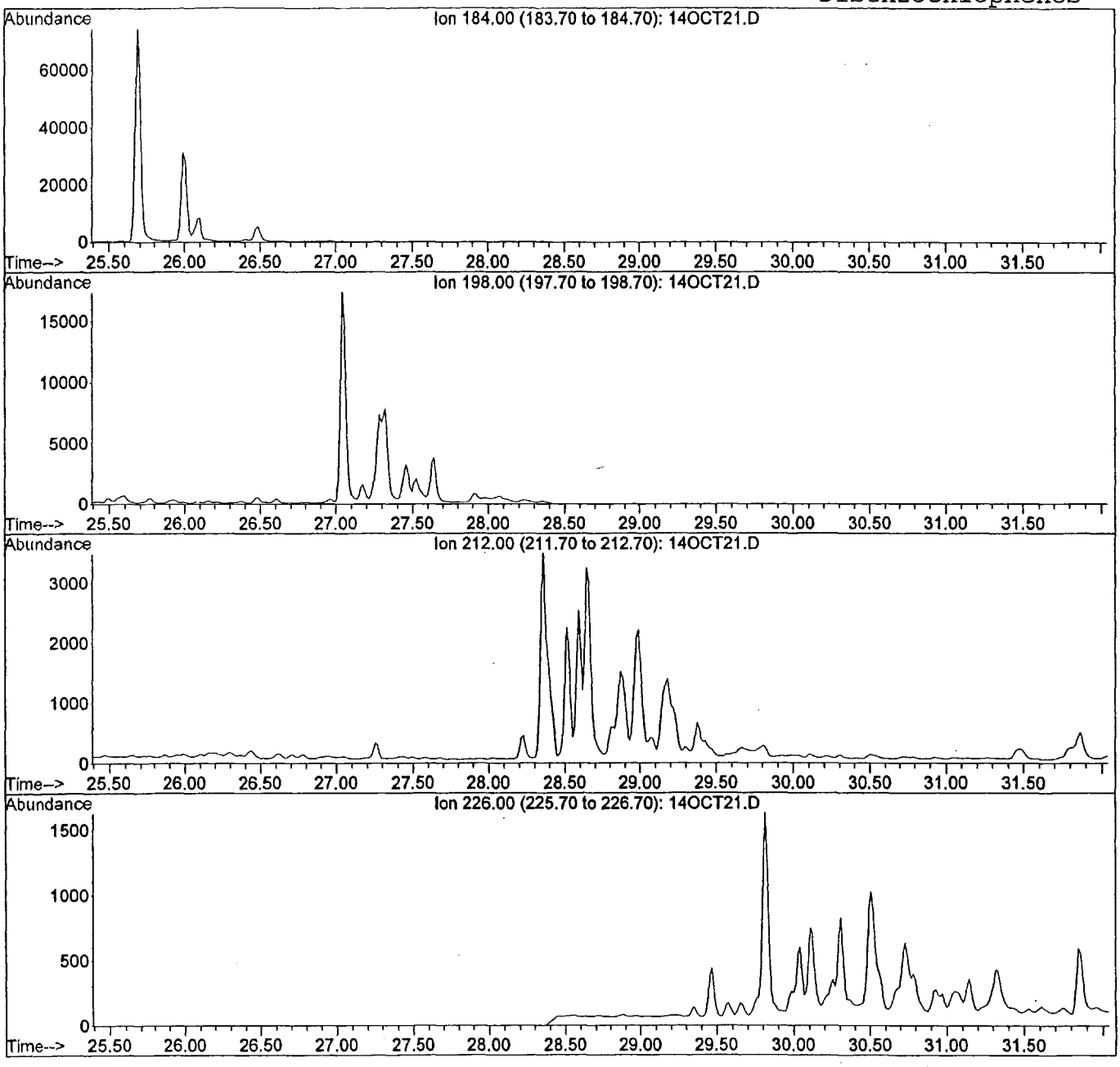
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



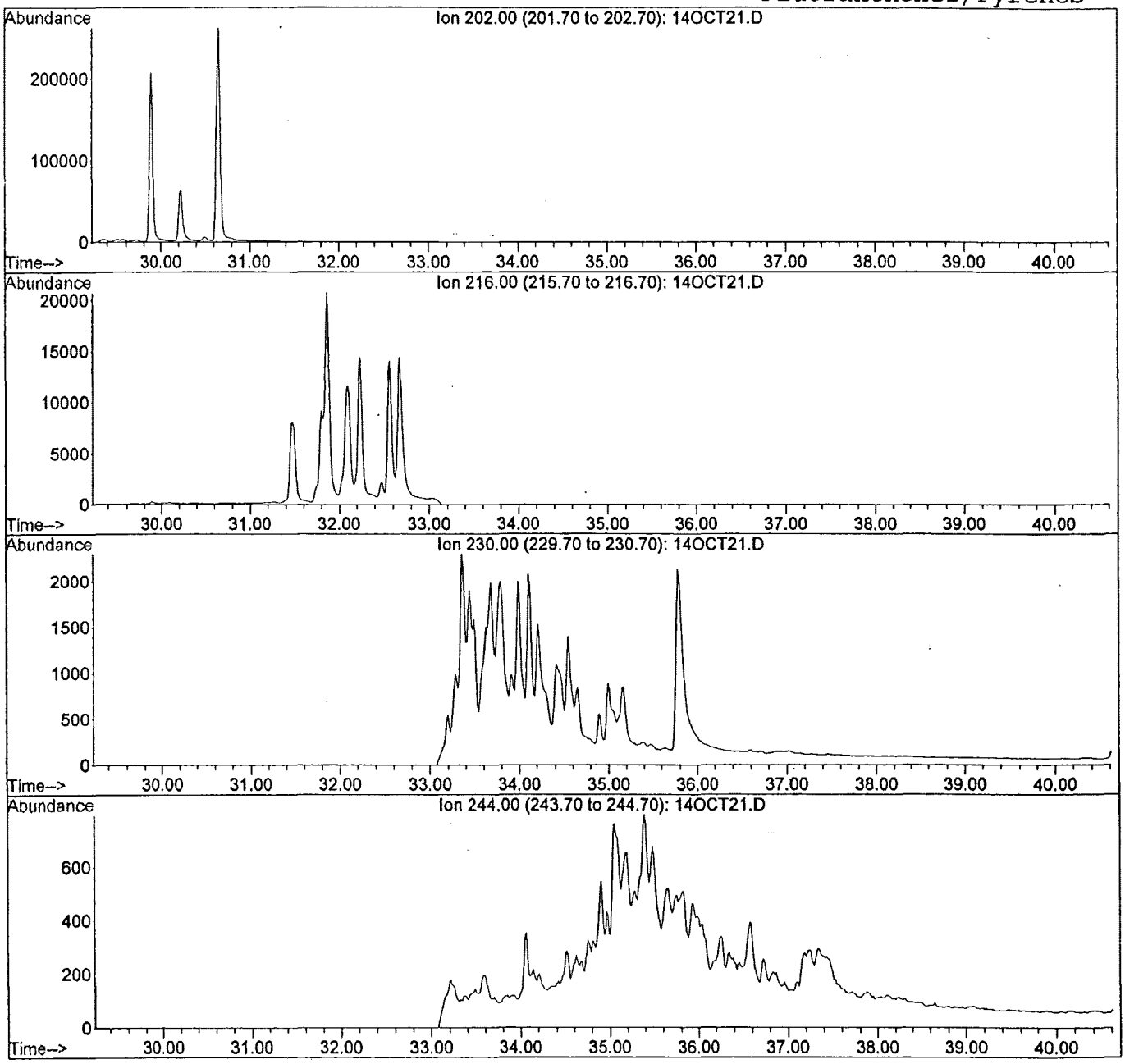
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



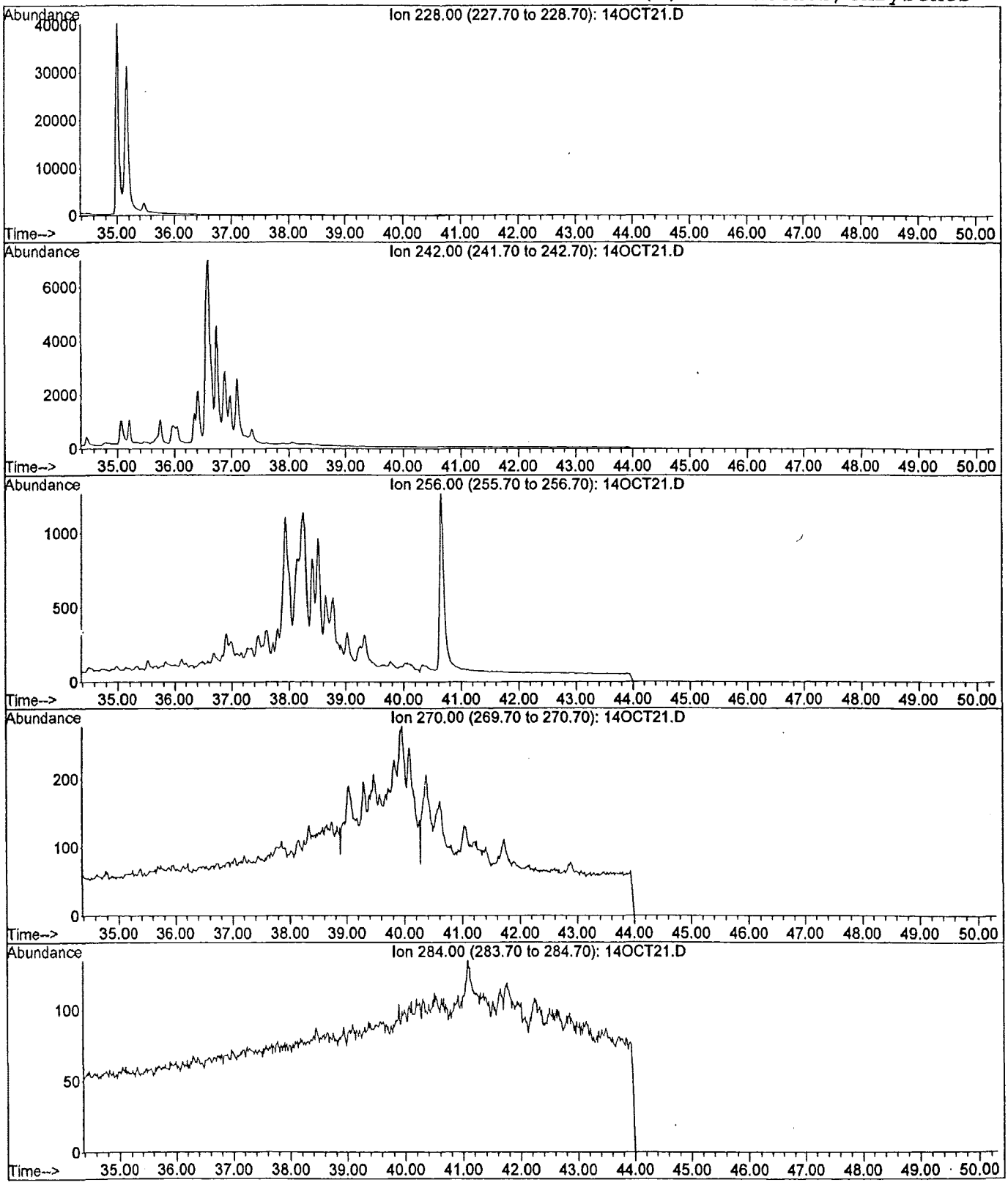
Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

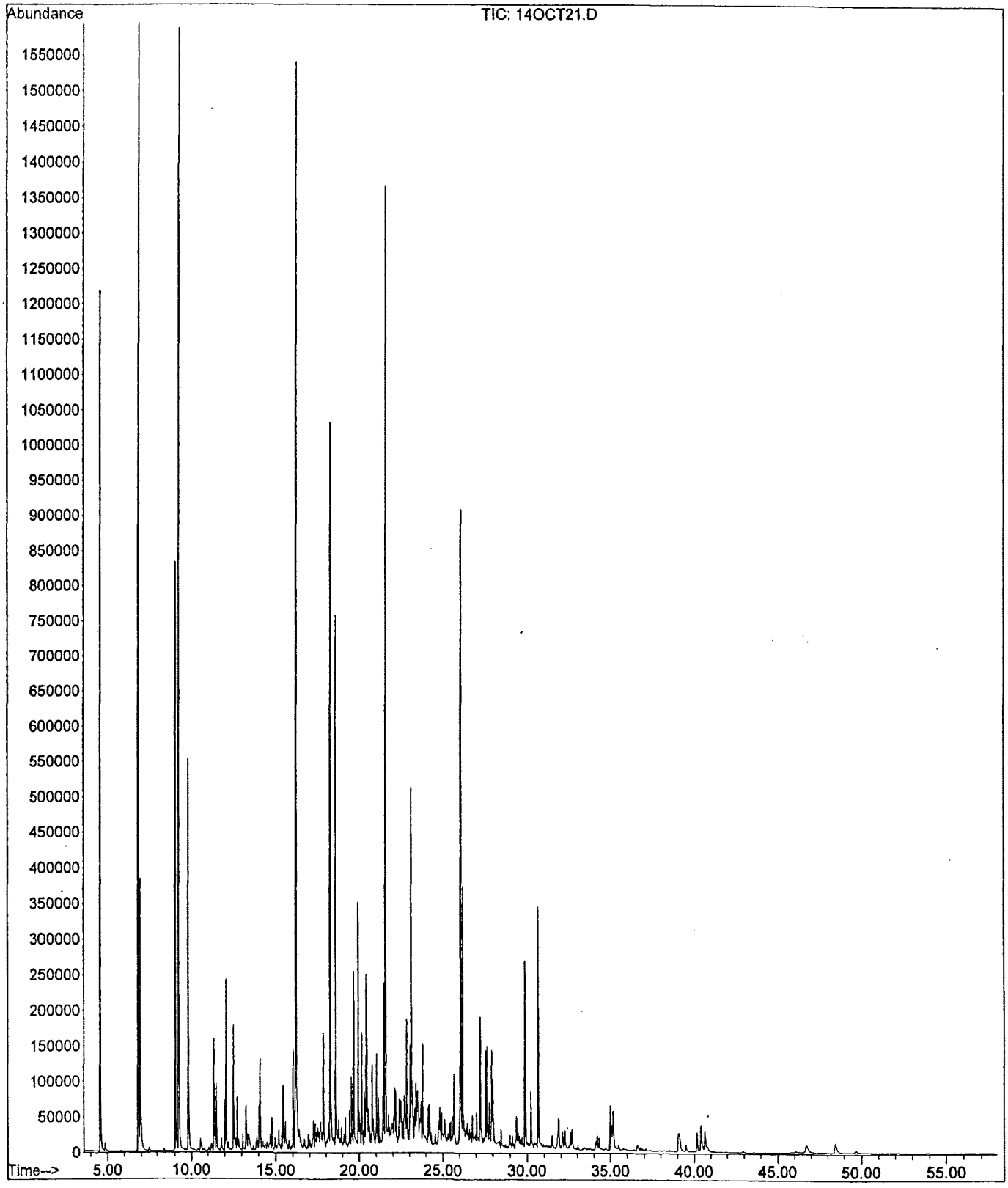


Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

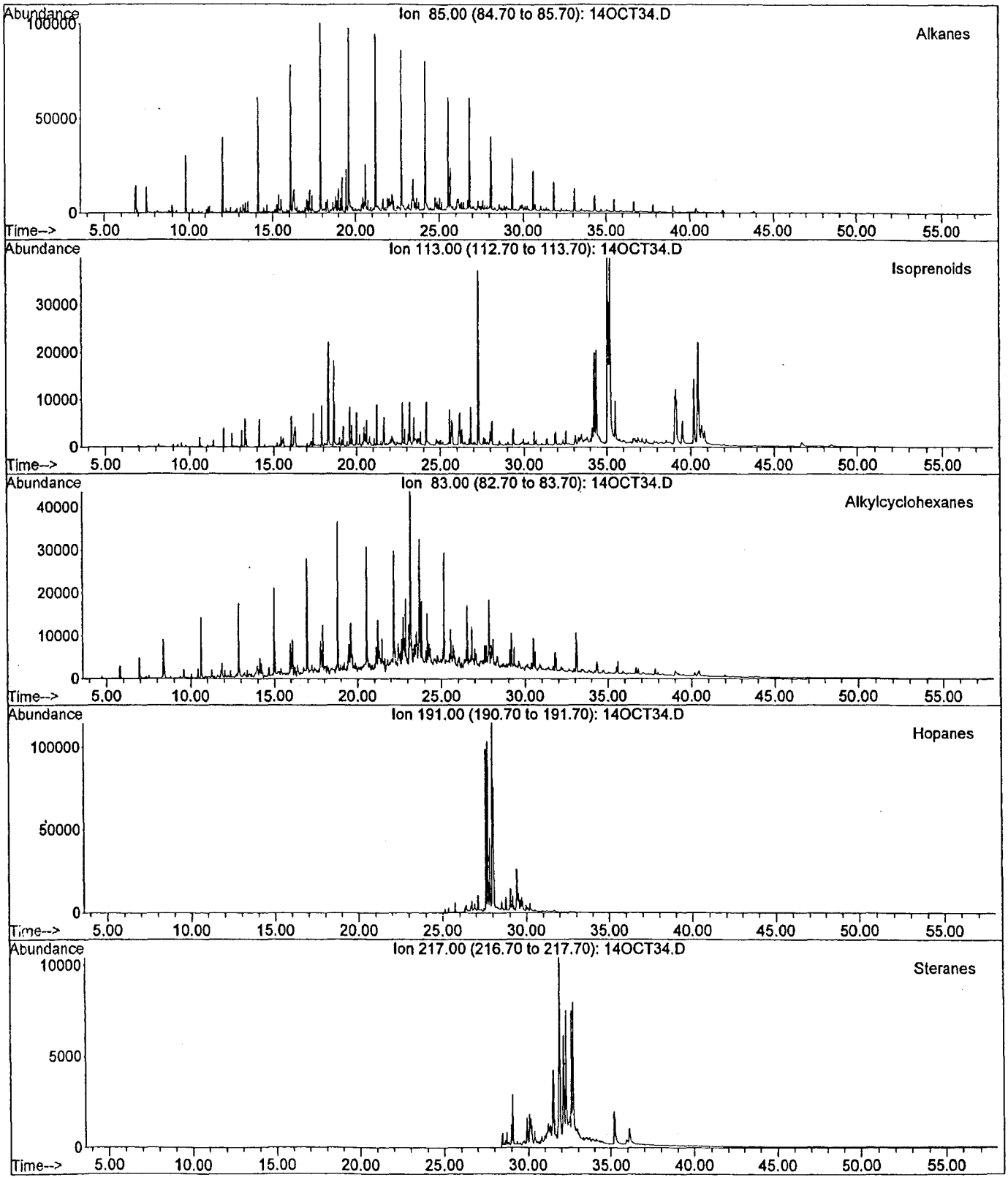
Benz(a)anthracenes/Chrysenes



Field ID: B12-11-12
Lab ID: GT020924-04 1:10
File: G:\1\DATA\021014\14OCT21.D
Acquired: 15 Oct 2002 10:49 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

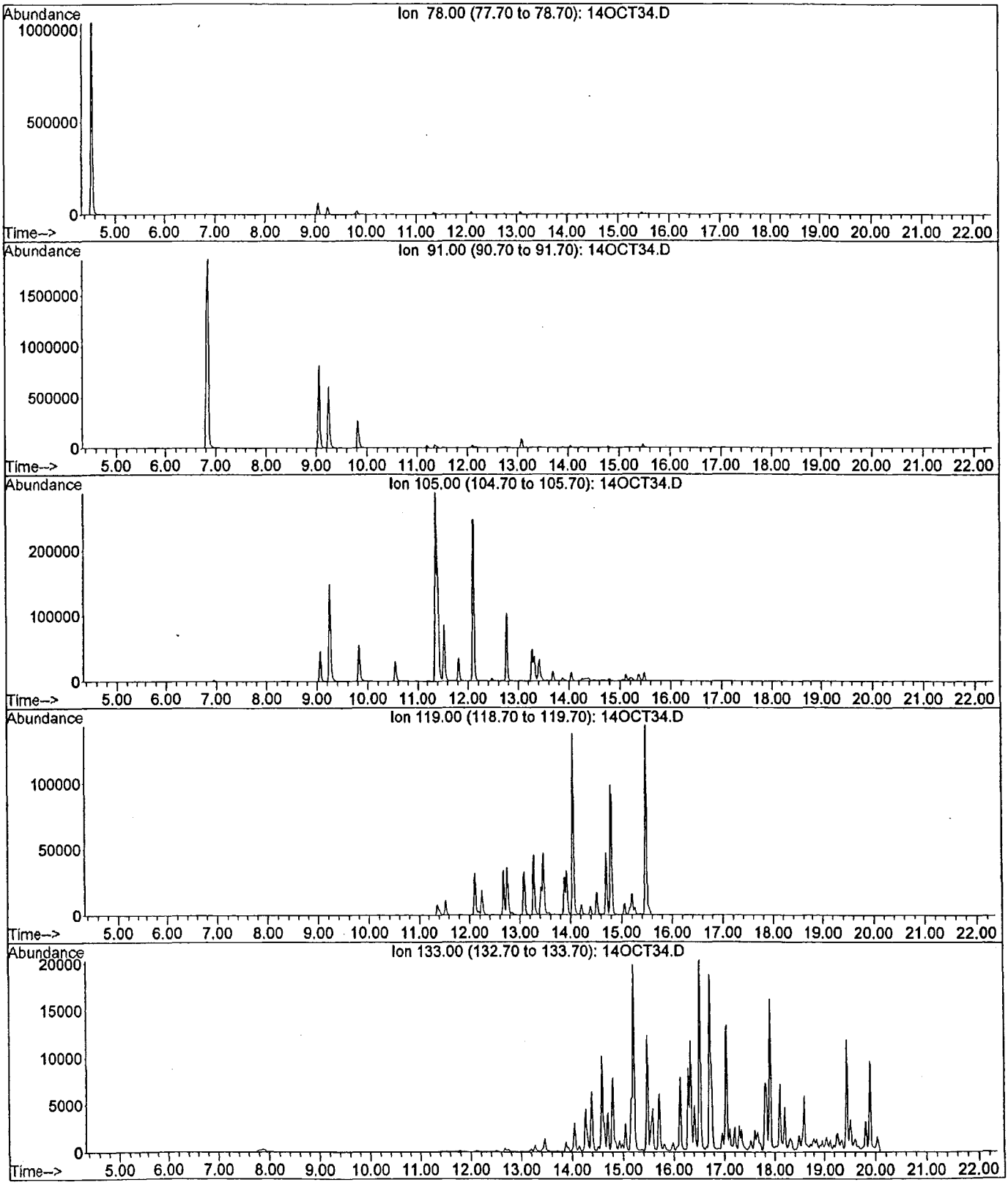


Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



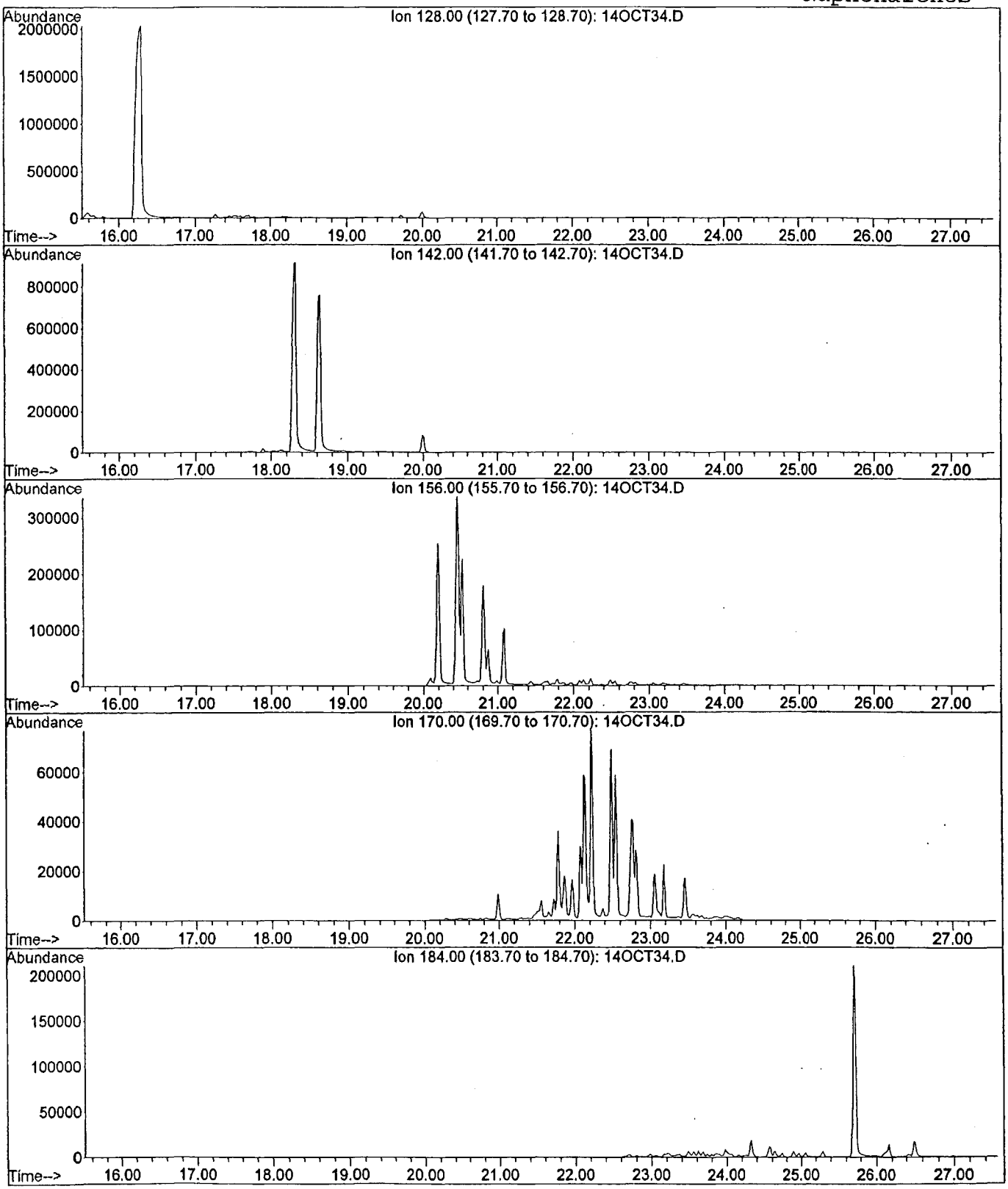
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



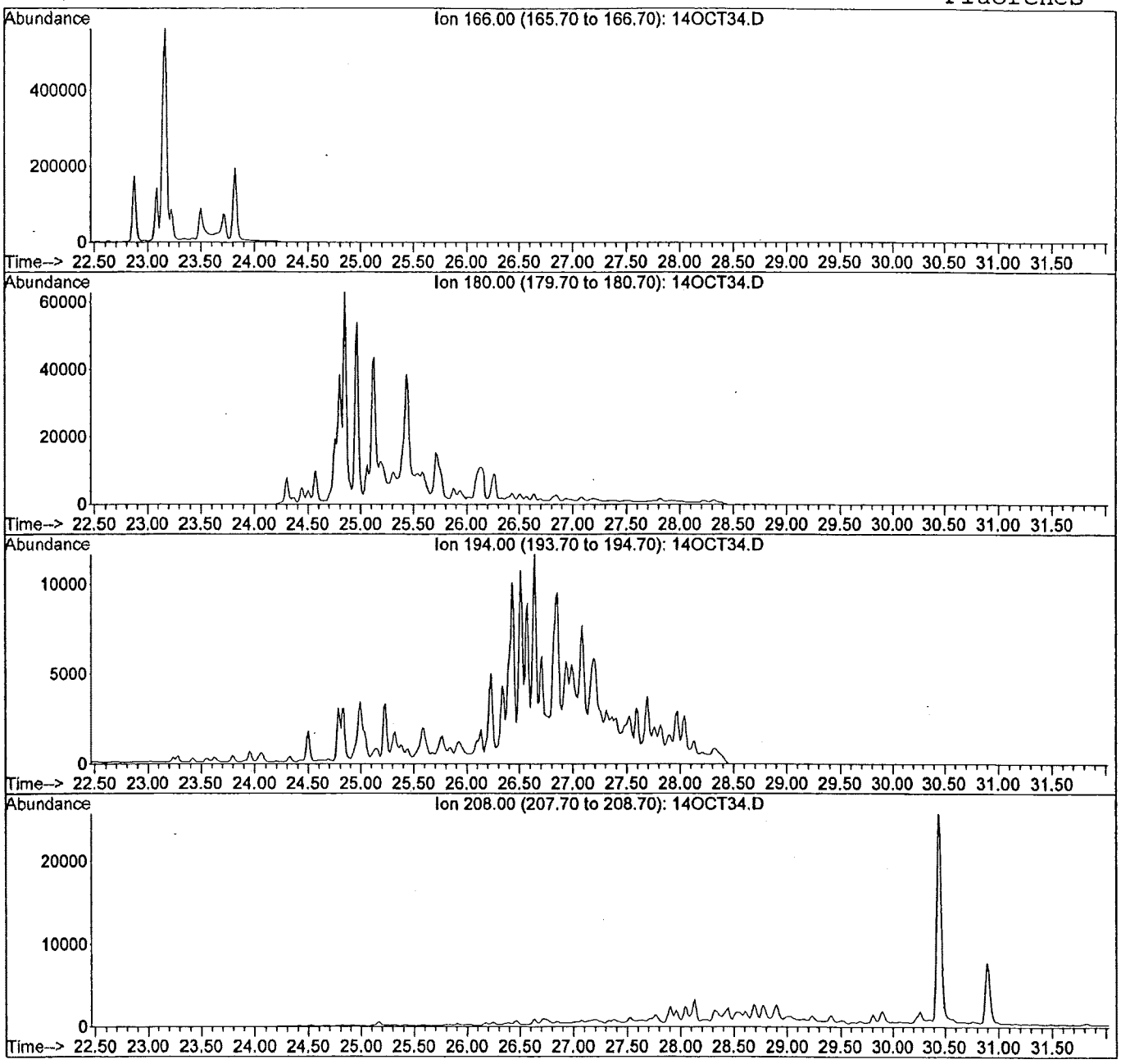
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



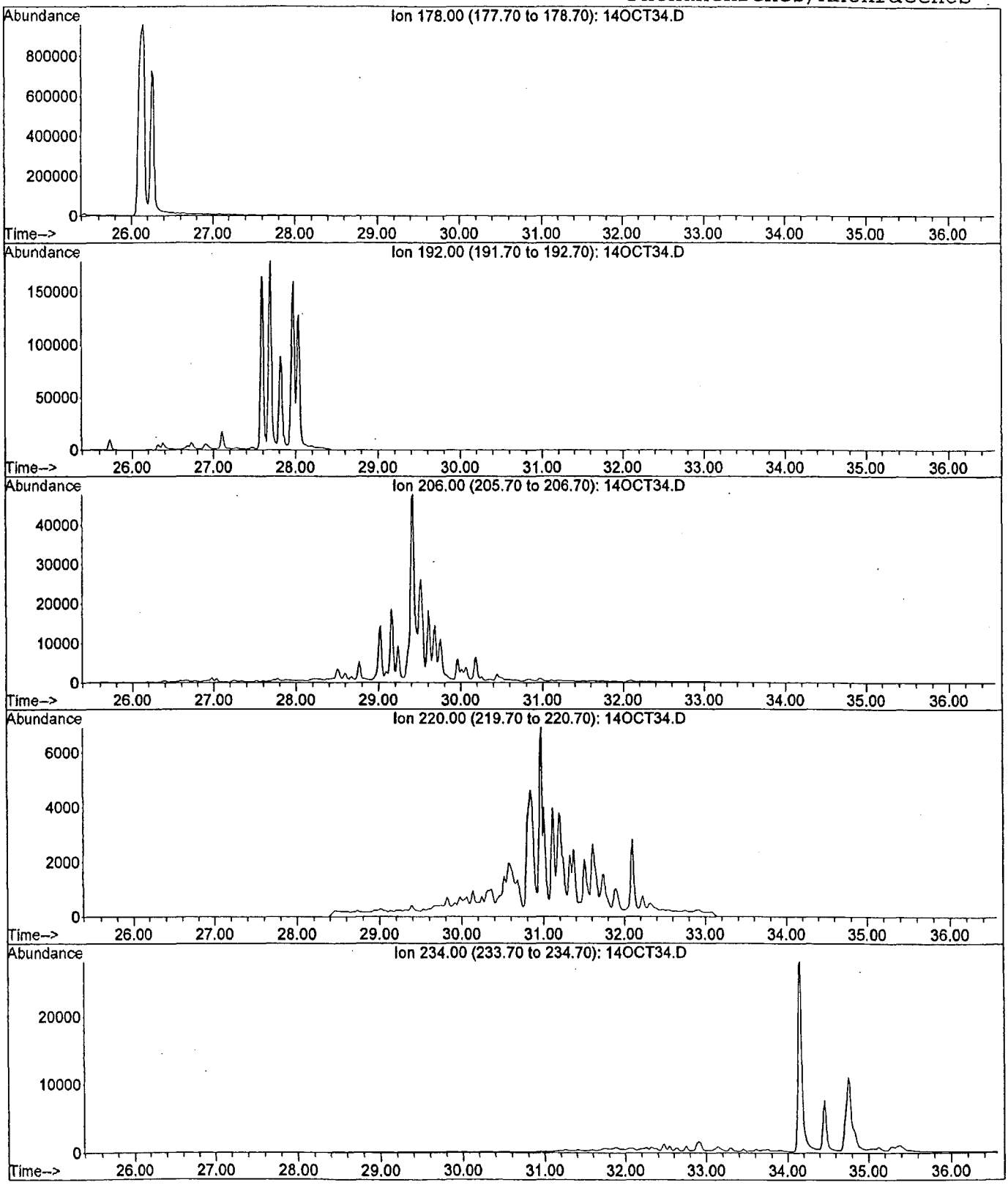
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



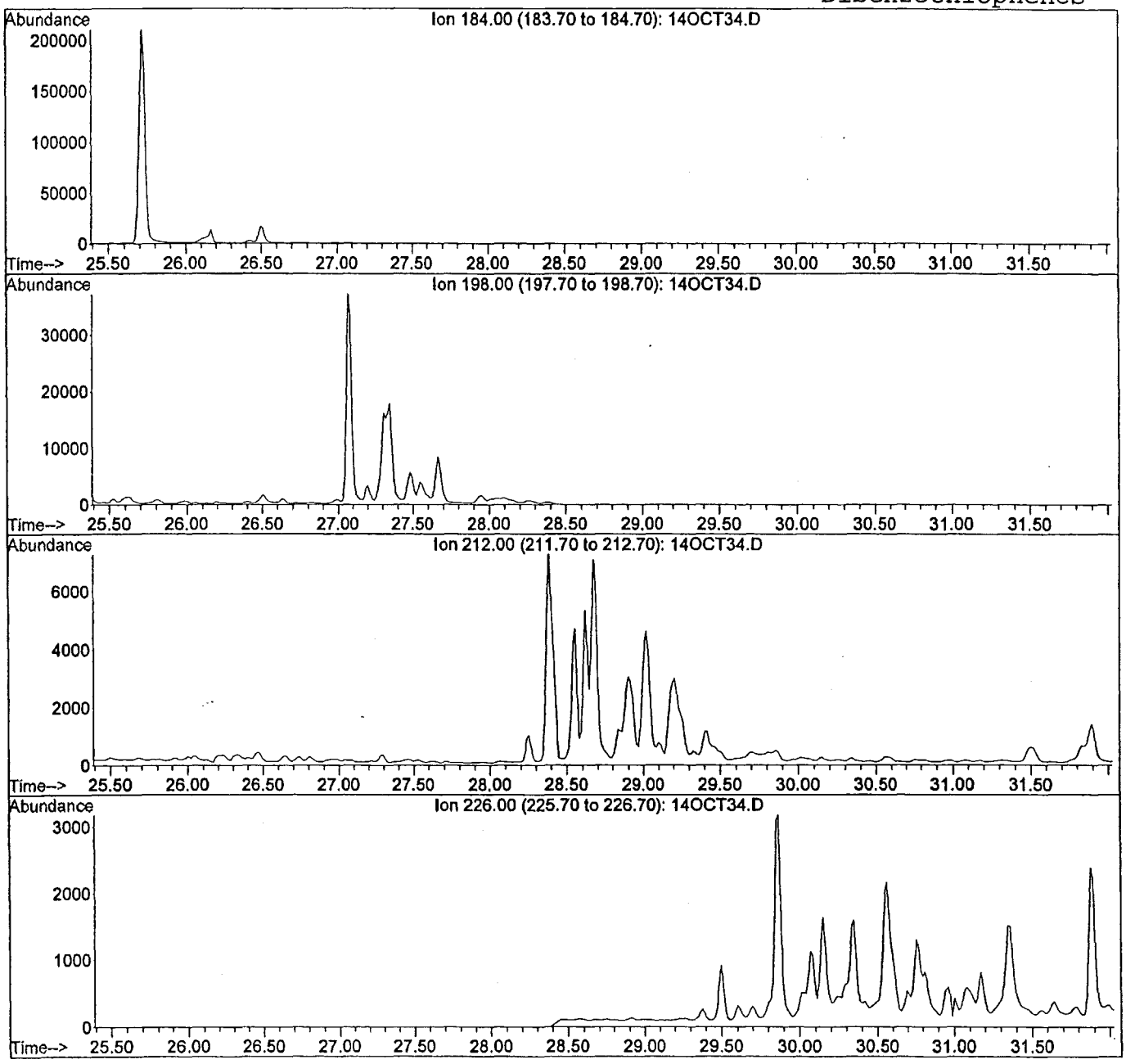
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



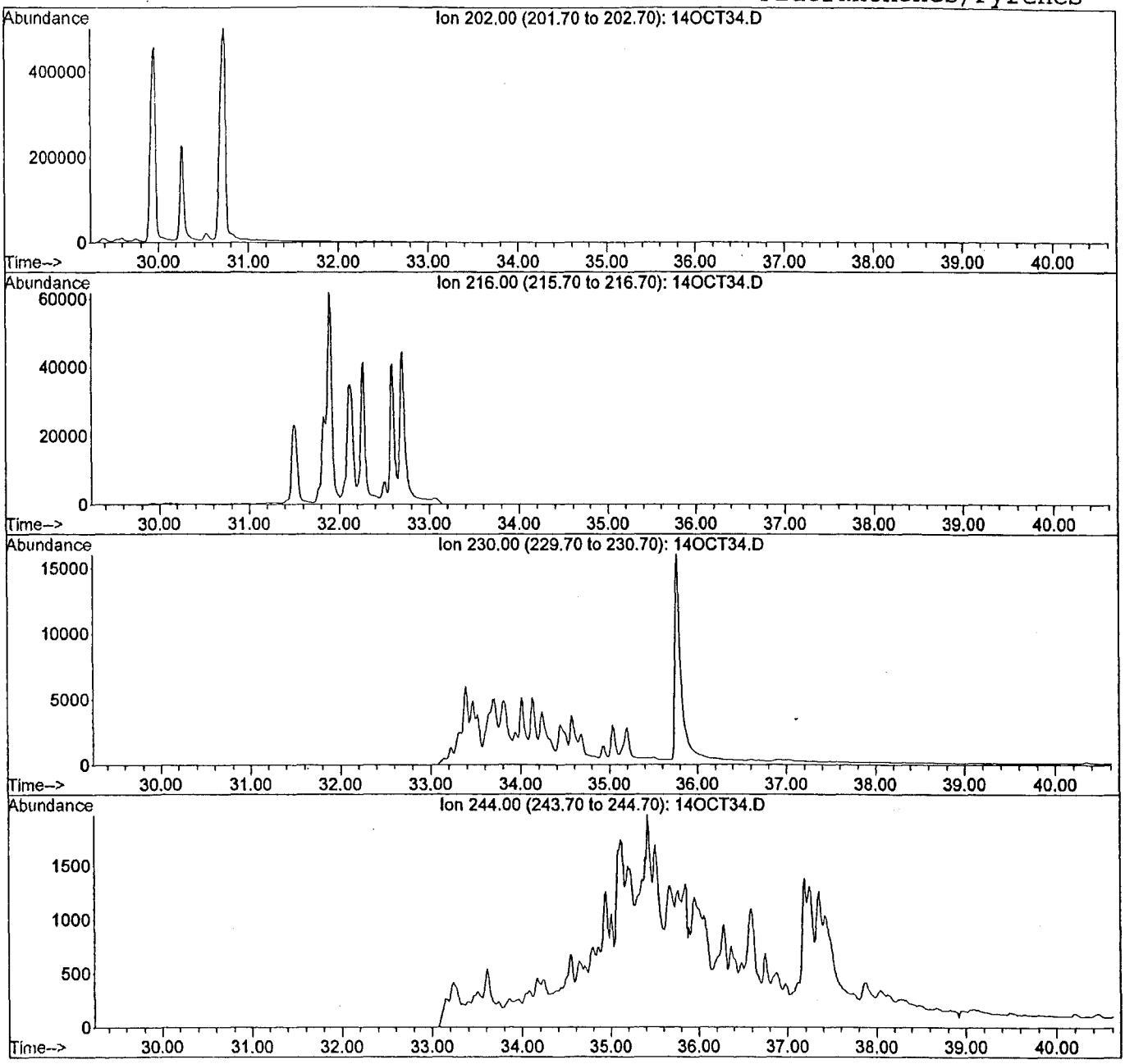
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



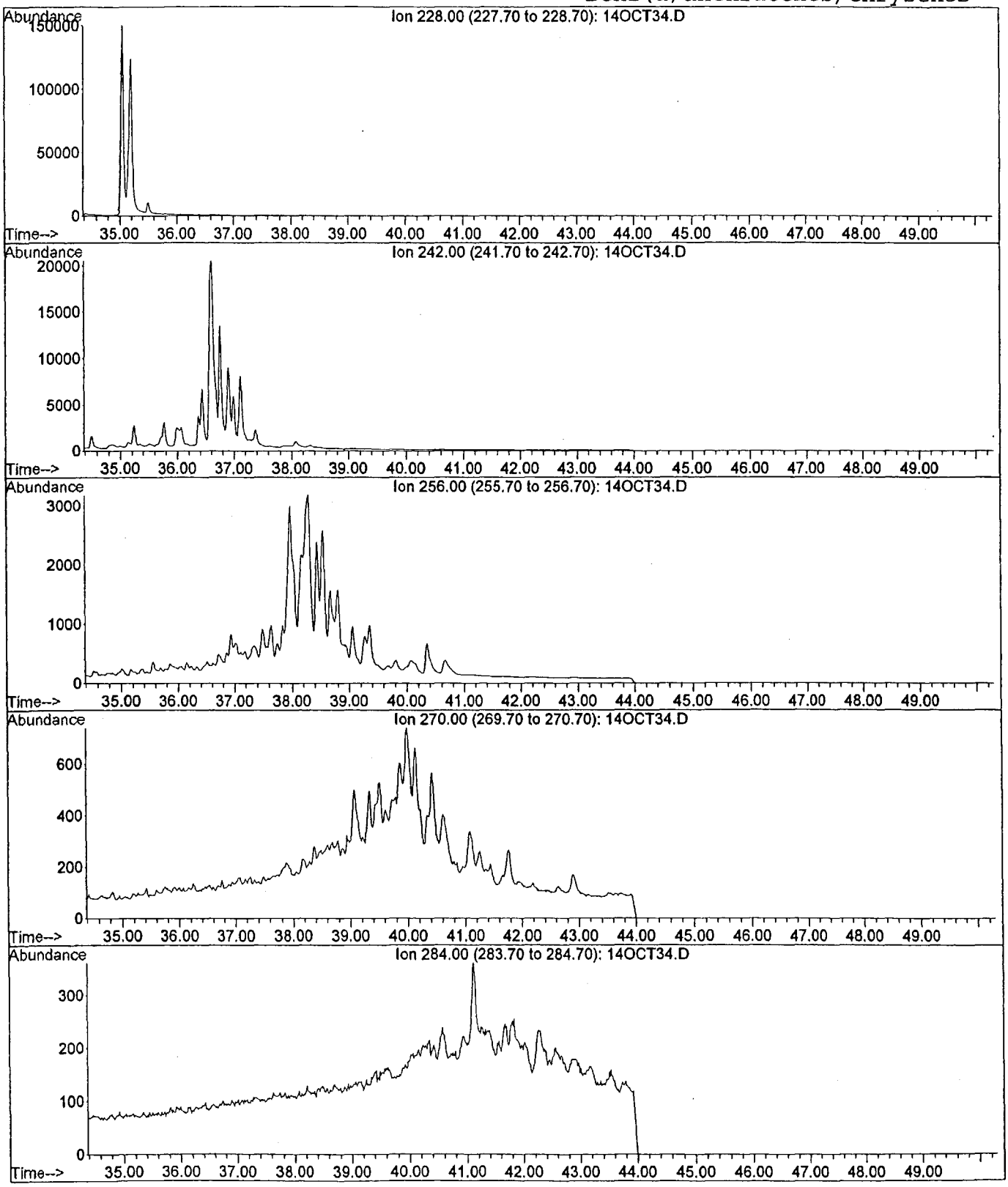
Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

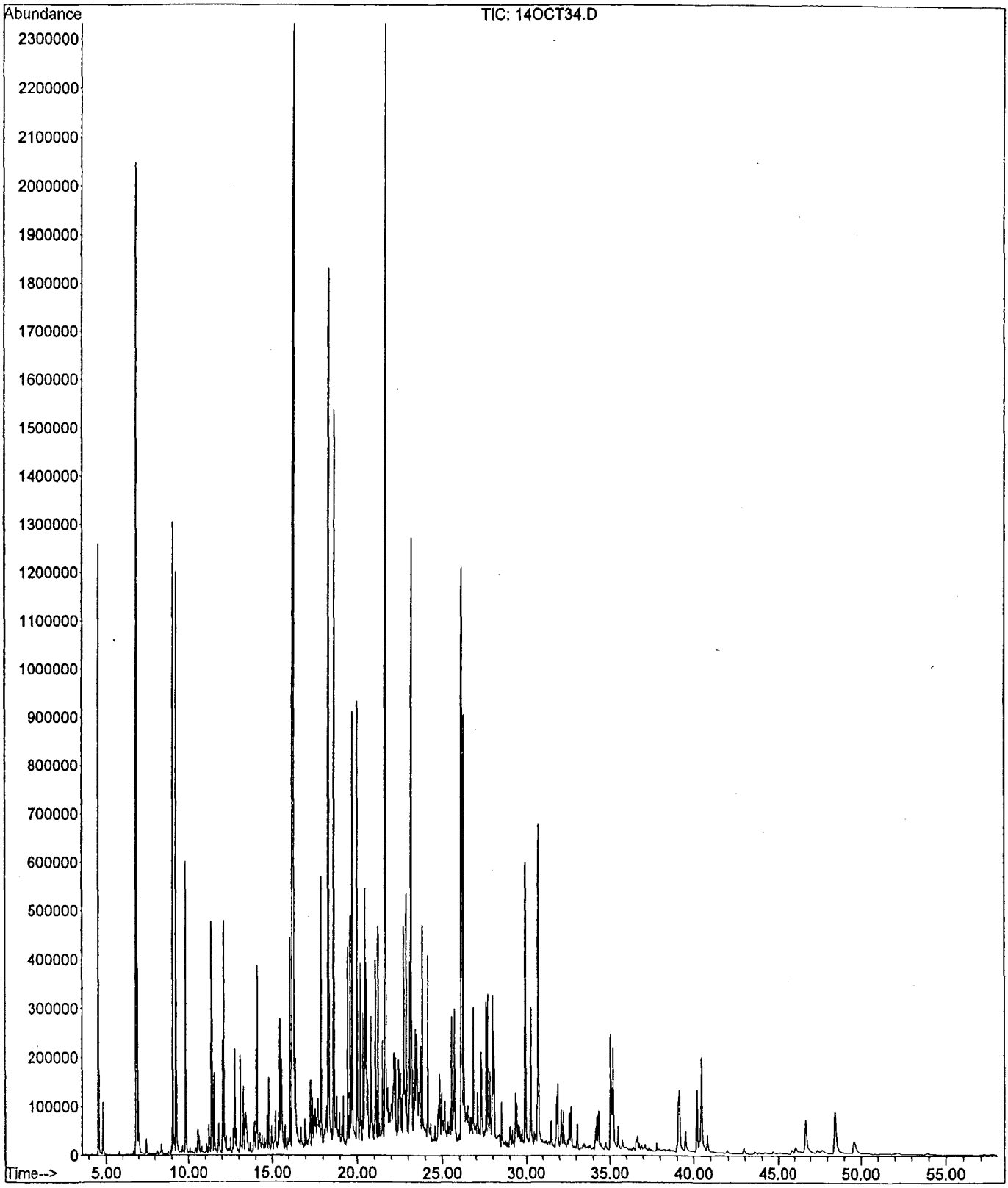


Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

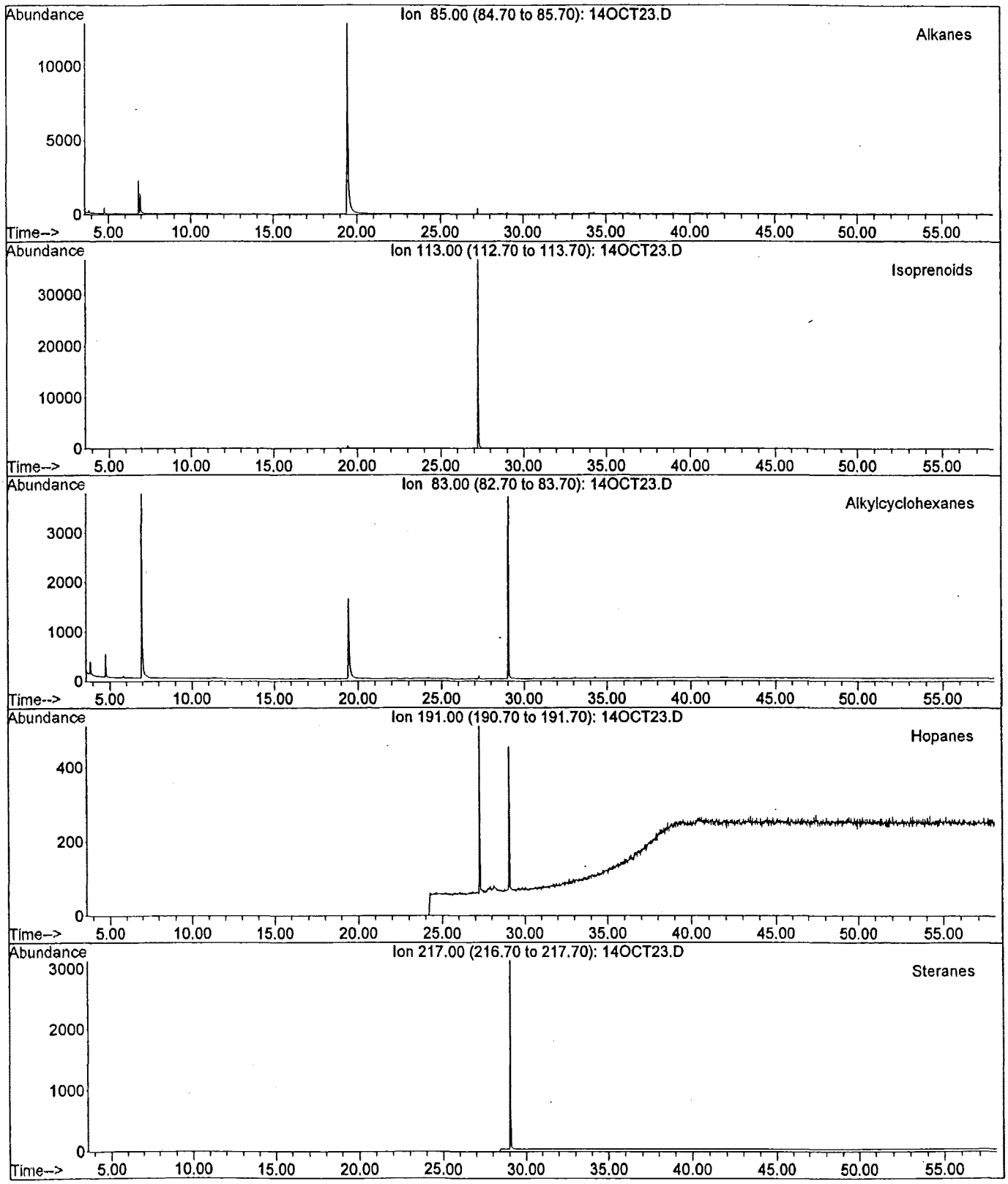
Benz(a)anthracenes/Chrysenes



Field ID: B13-12-13
Lab ID: GT020924-05
File: G:\1\DATA\021014\14OCT34.D
Acquired: 16 Oct 2002 2:26 am using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

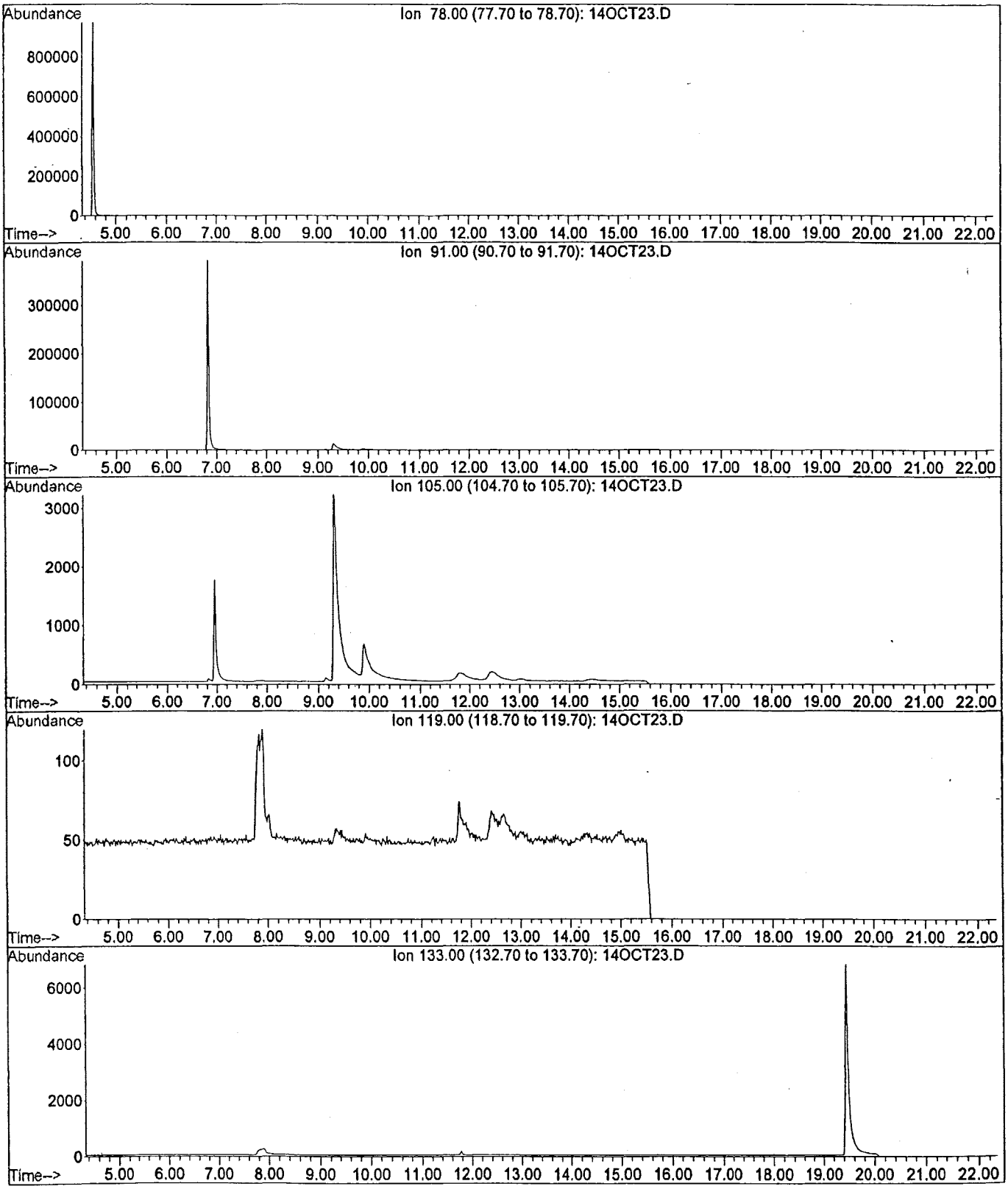


Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



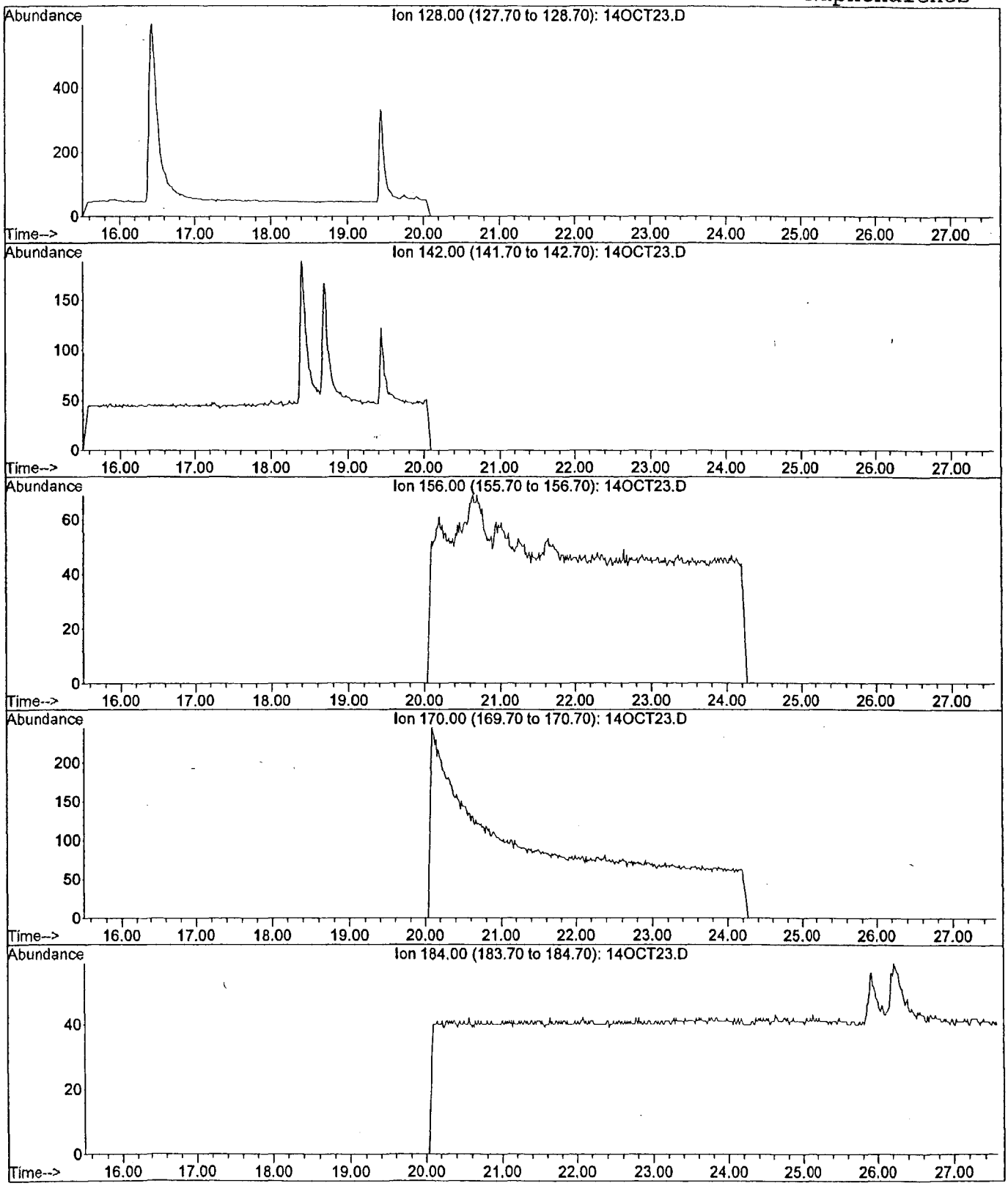
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



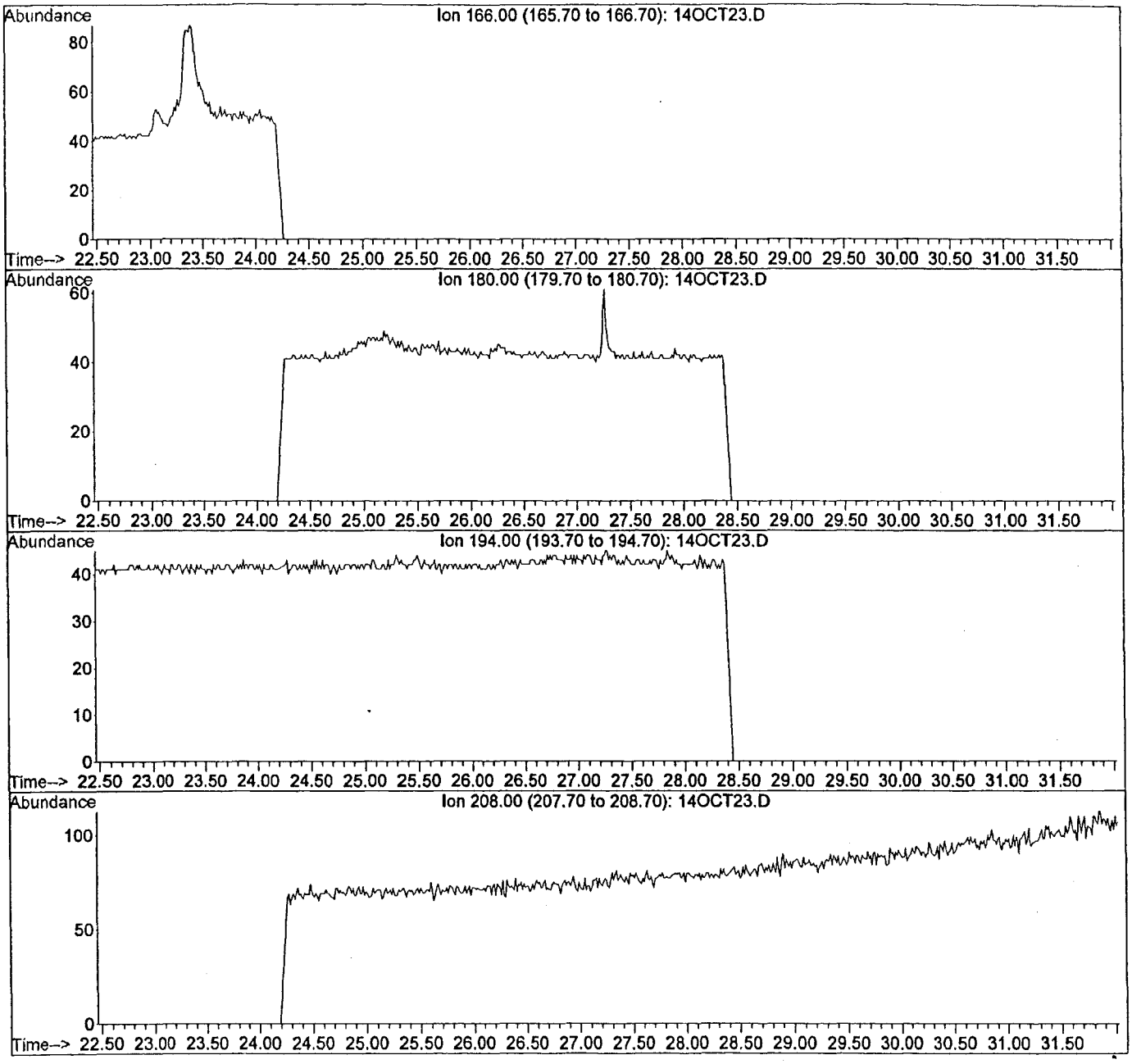
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



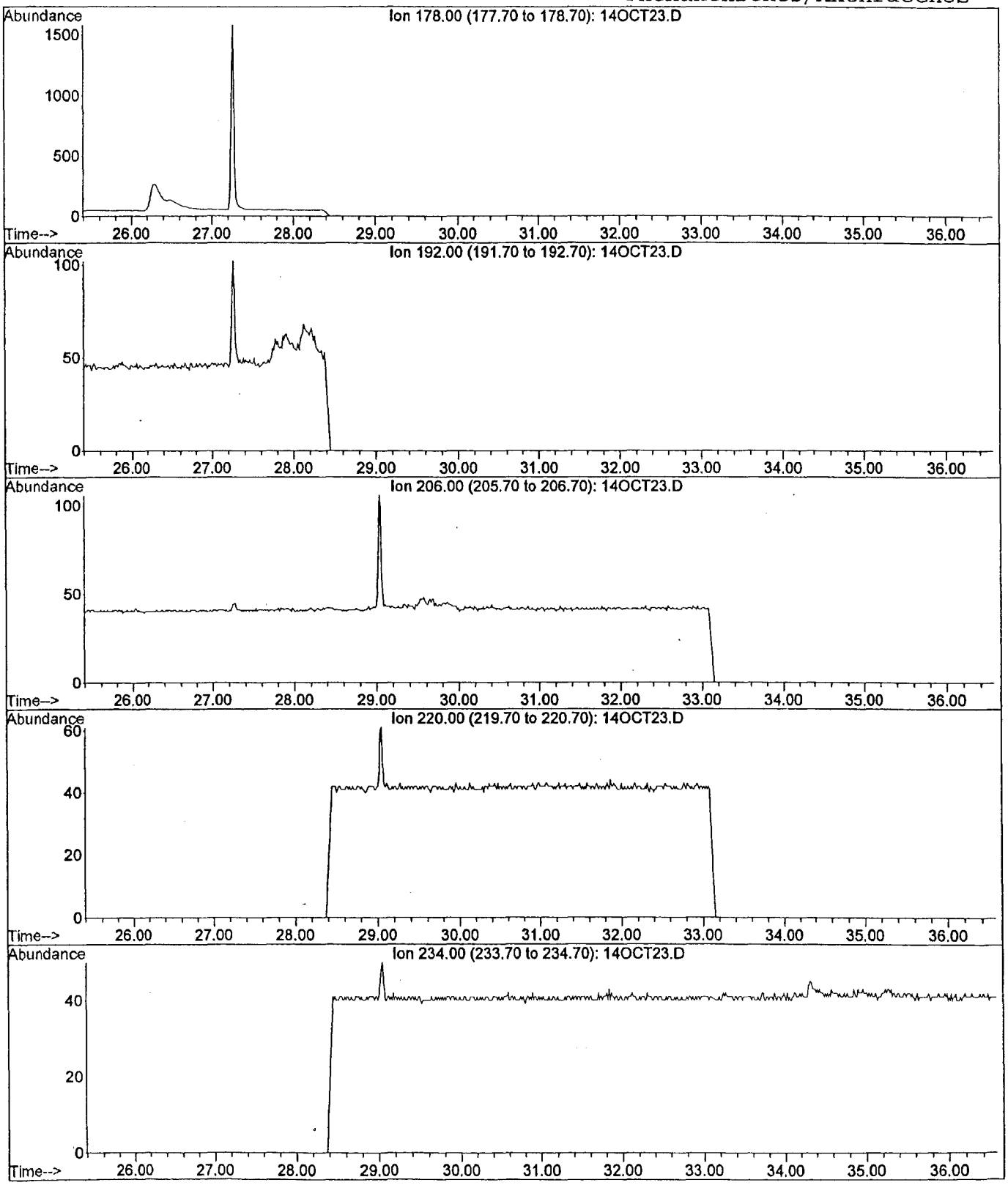
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



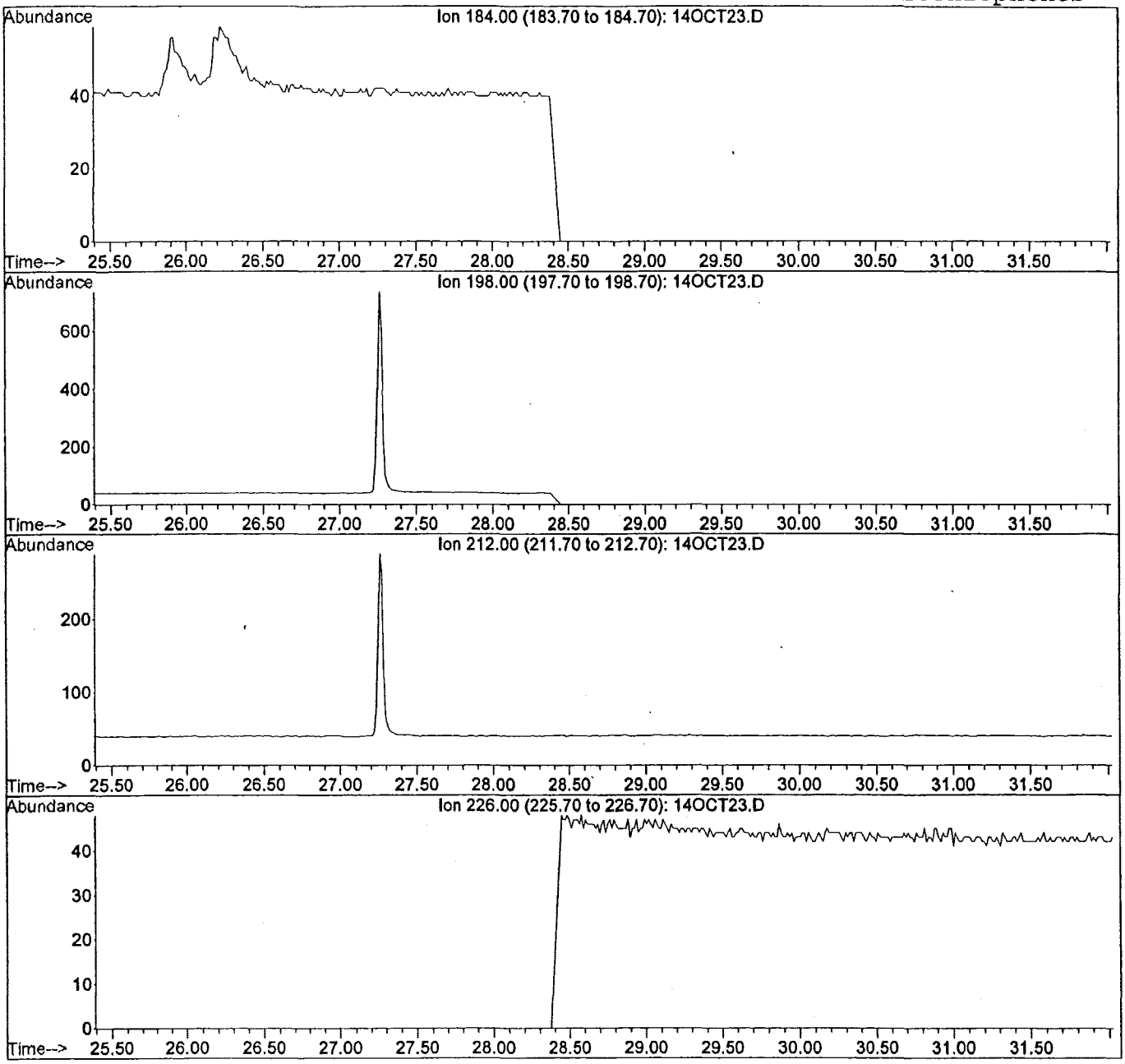
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



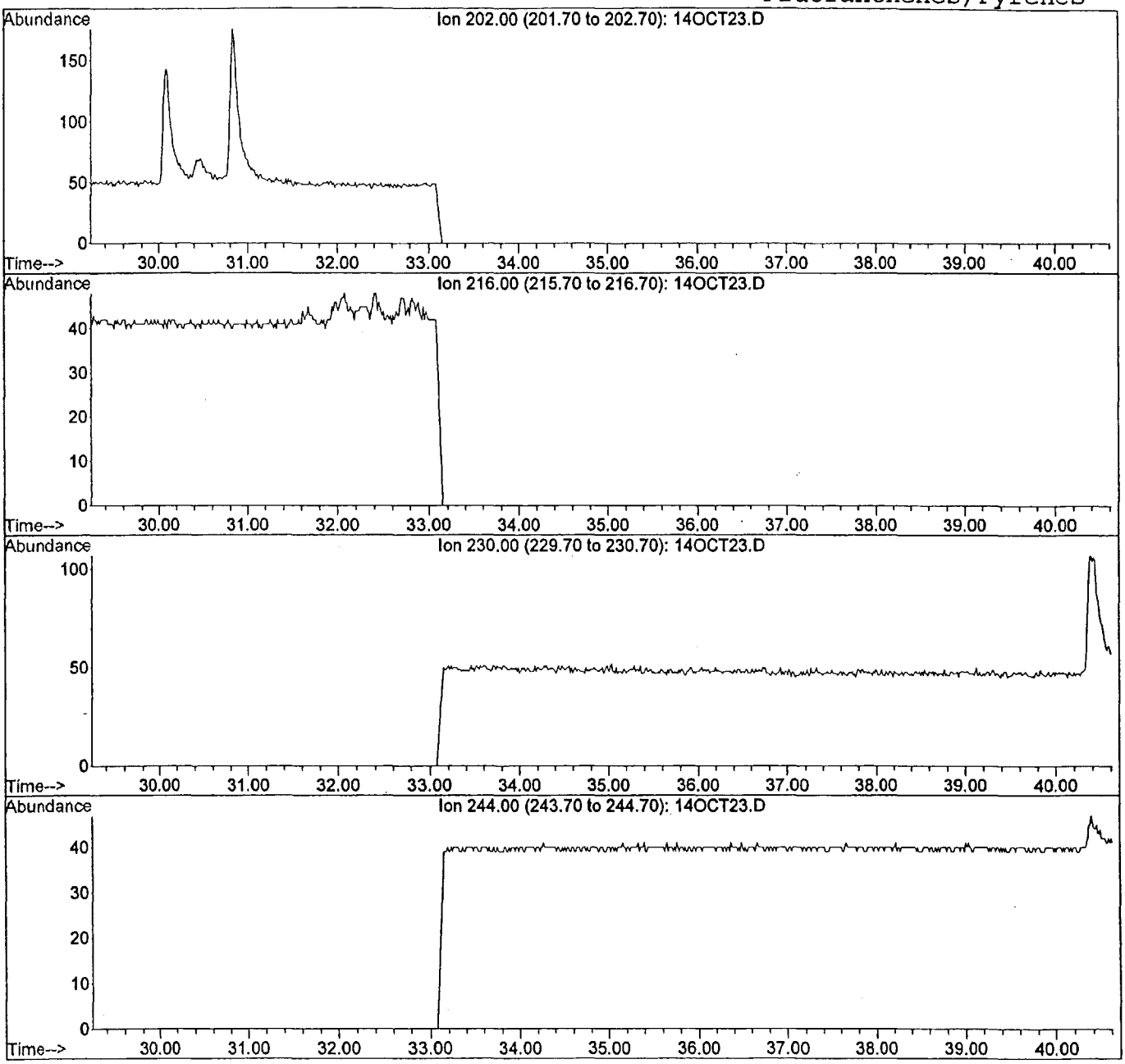
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



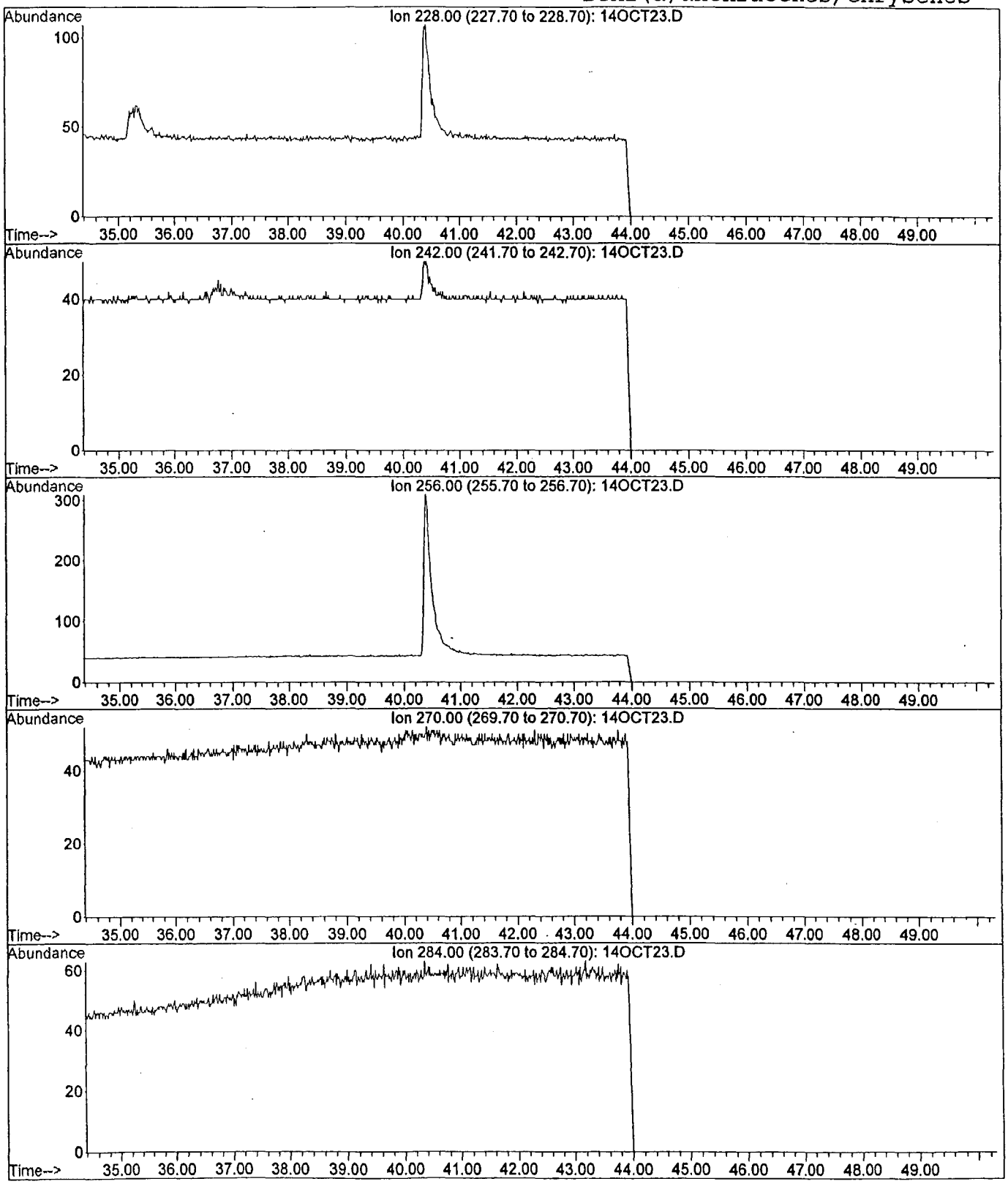
Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes

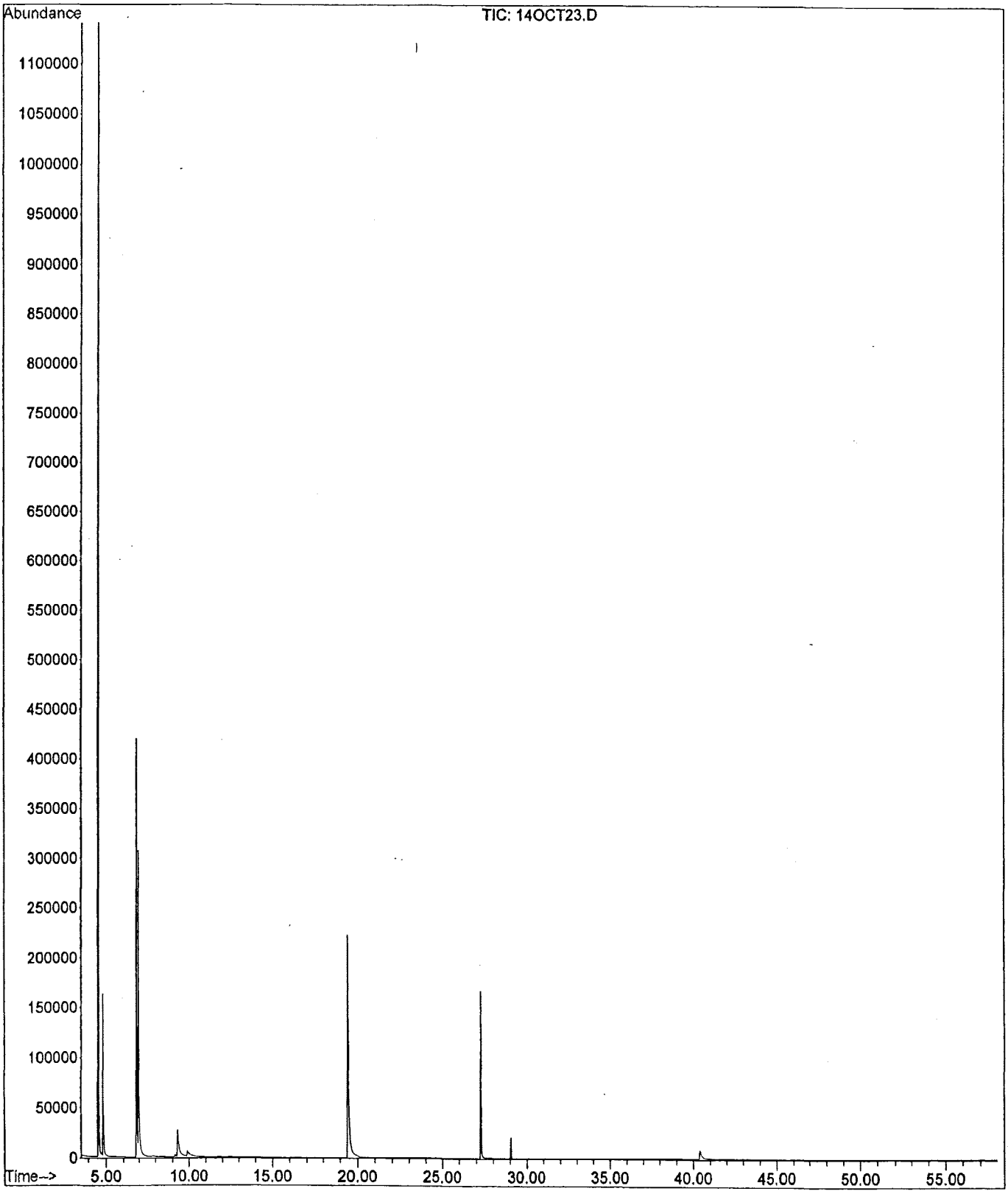


Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

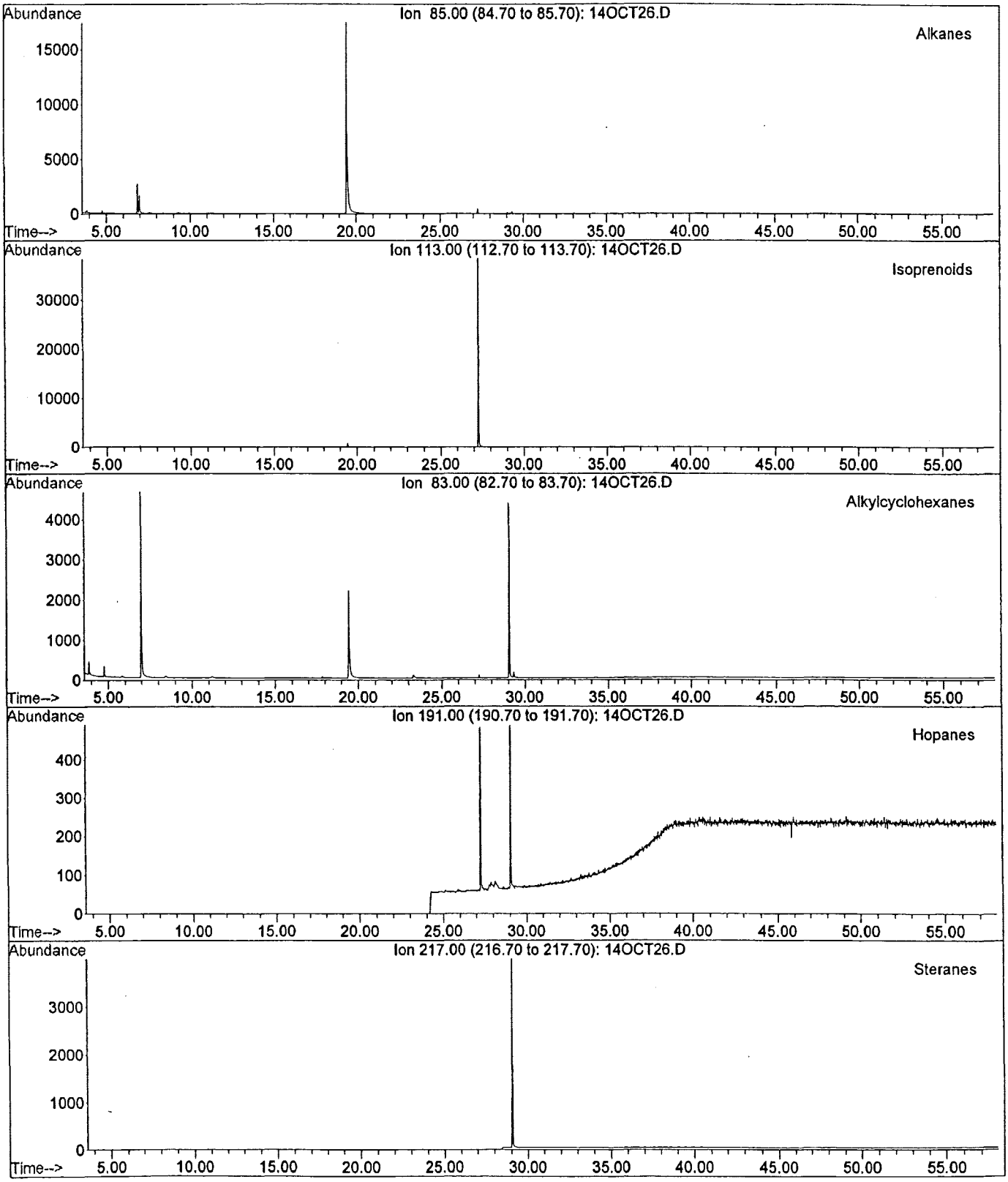
Benz(a)anthracenes/Chrysenes



Field ID: B23-6-8
Lab ID: GT020924-06
File: G:\1\DATA\021014\14OCT23.D
Acquired: 15 Oct 2002 1:13 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

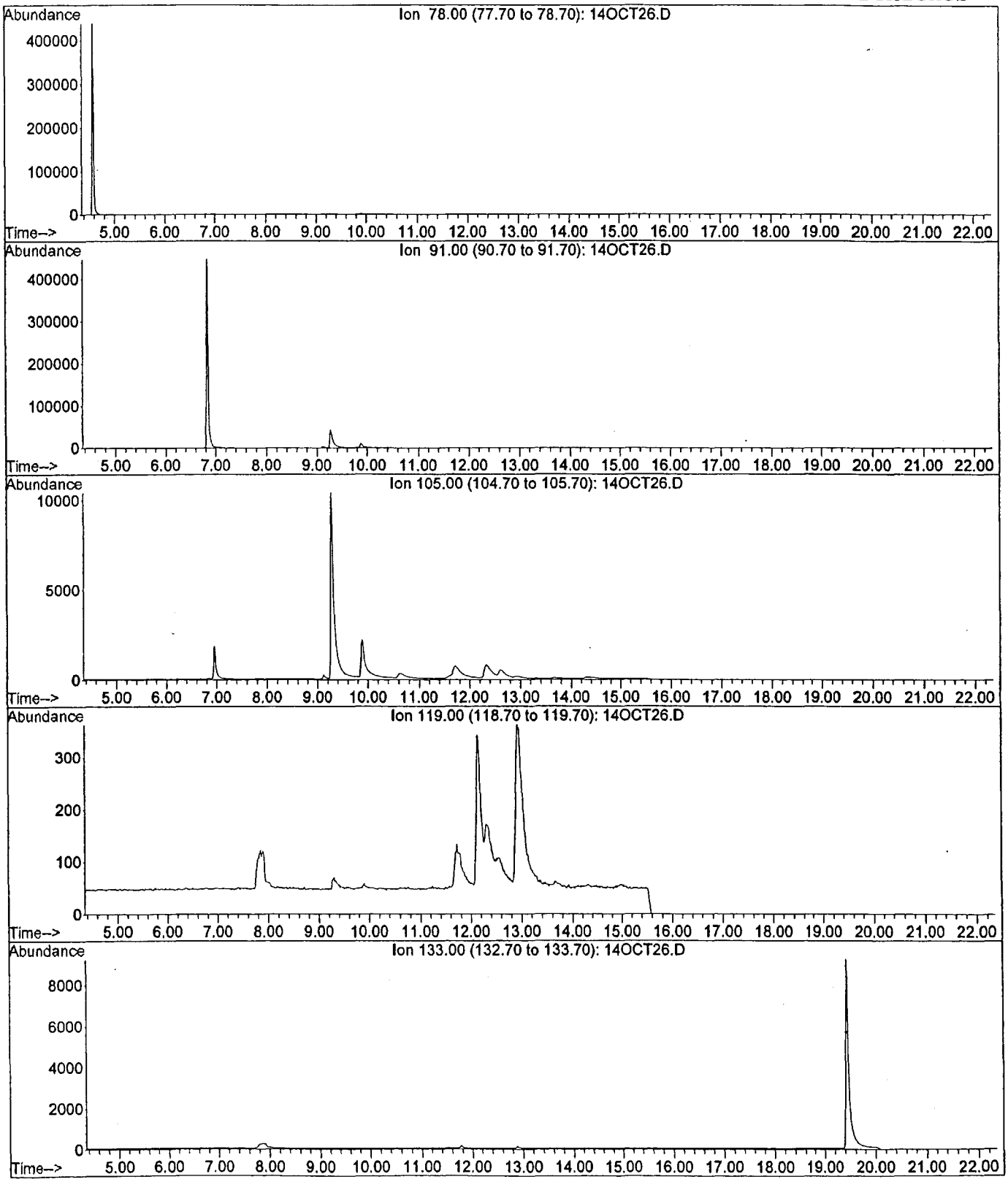


Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC



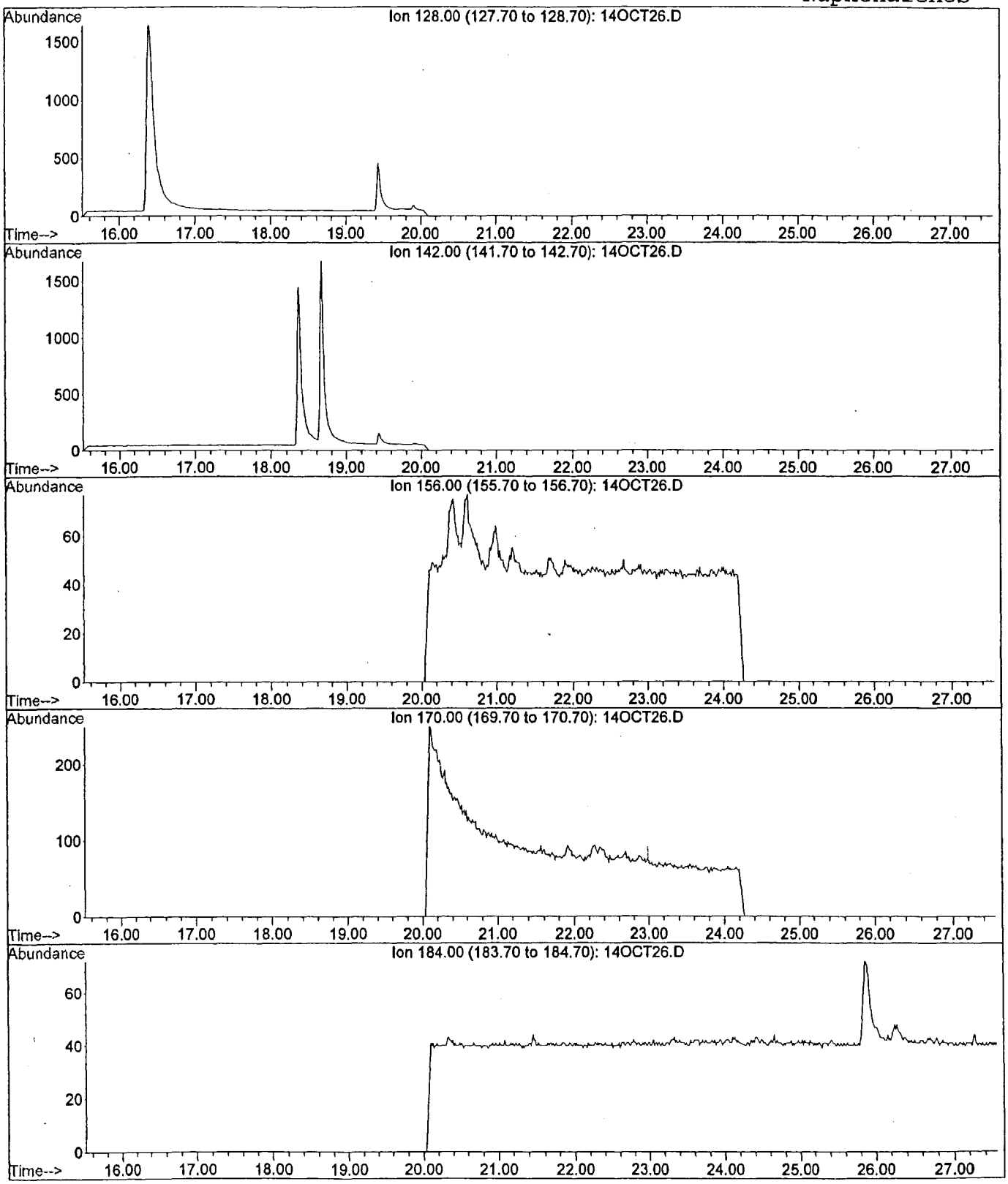
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benzenes



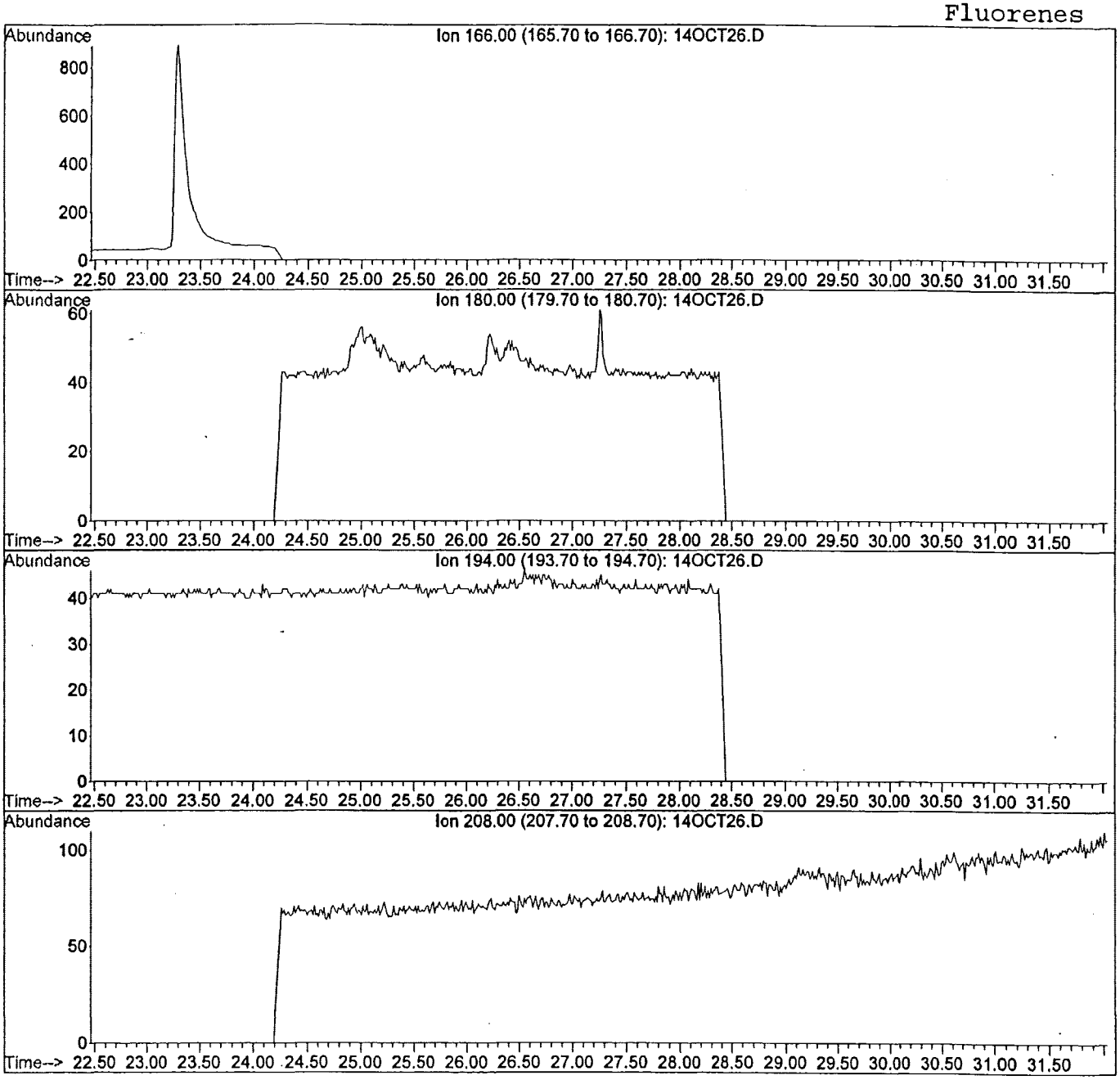
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Naphthalenes



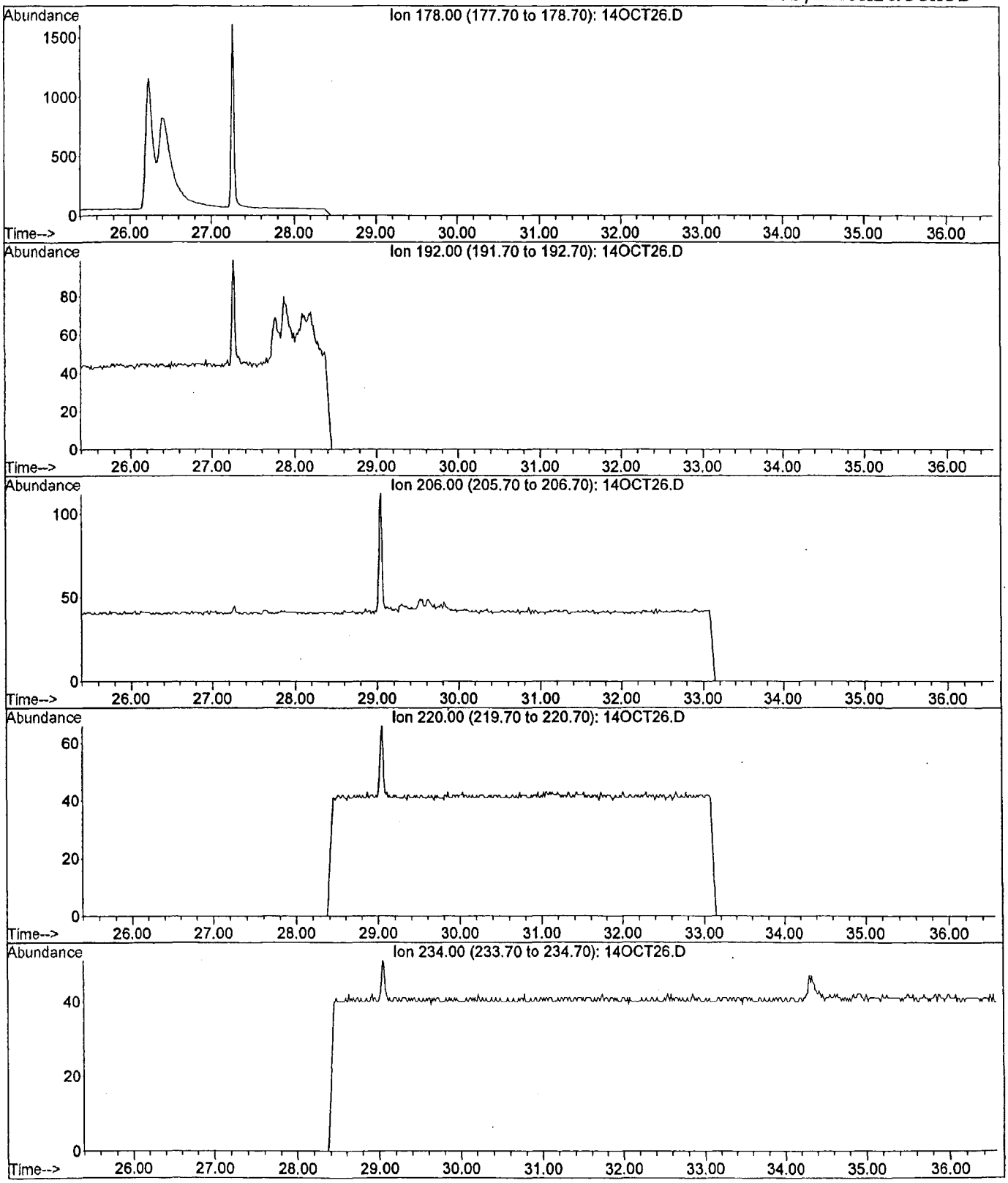
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluorenes



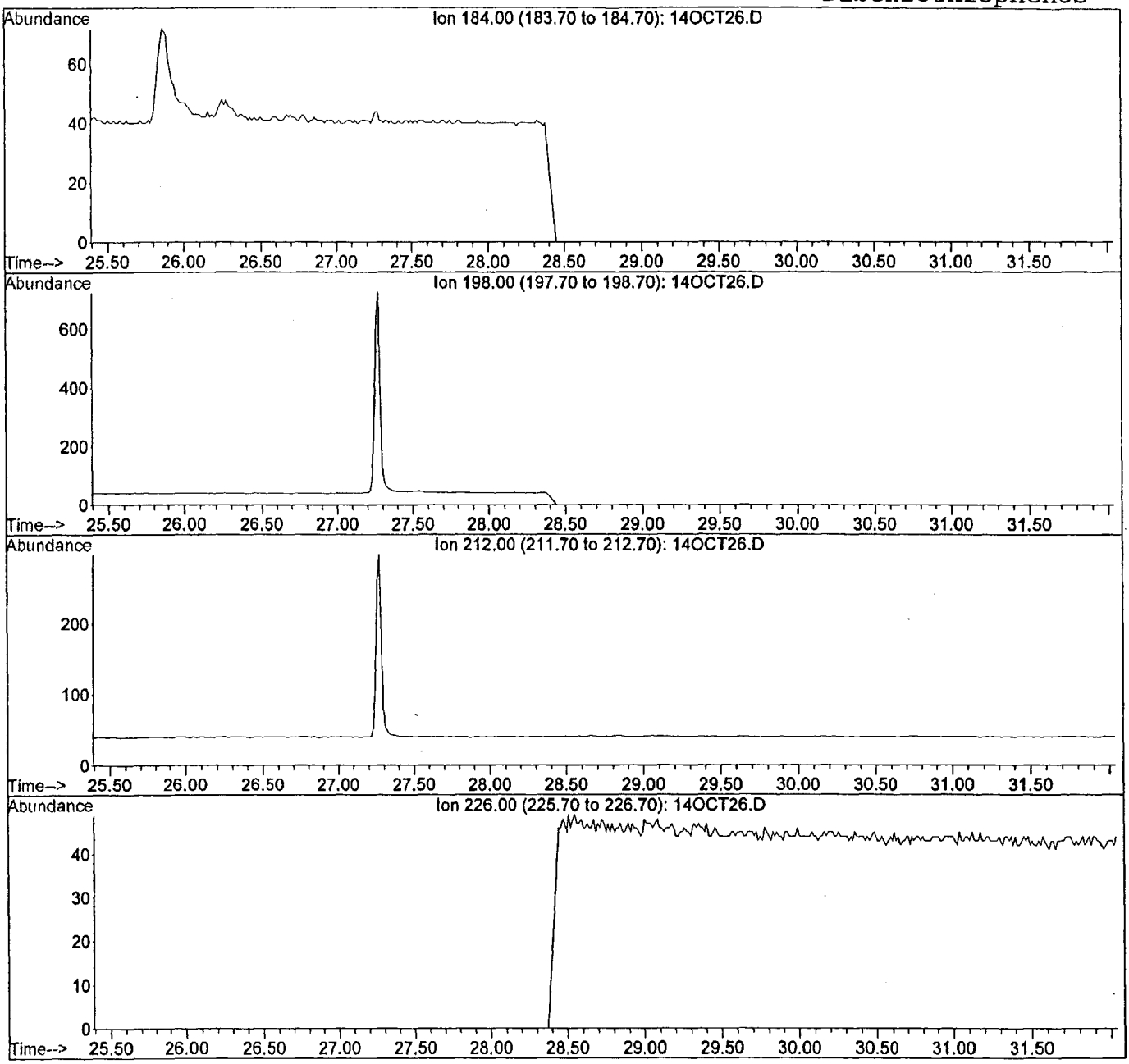
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Phenanthrenes/Anthracenes



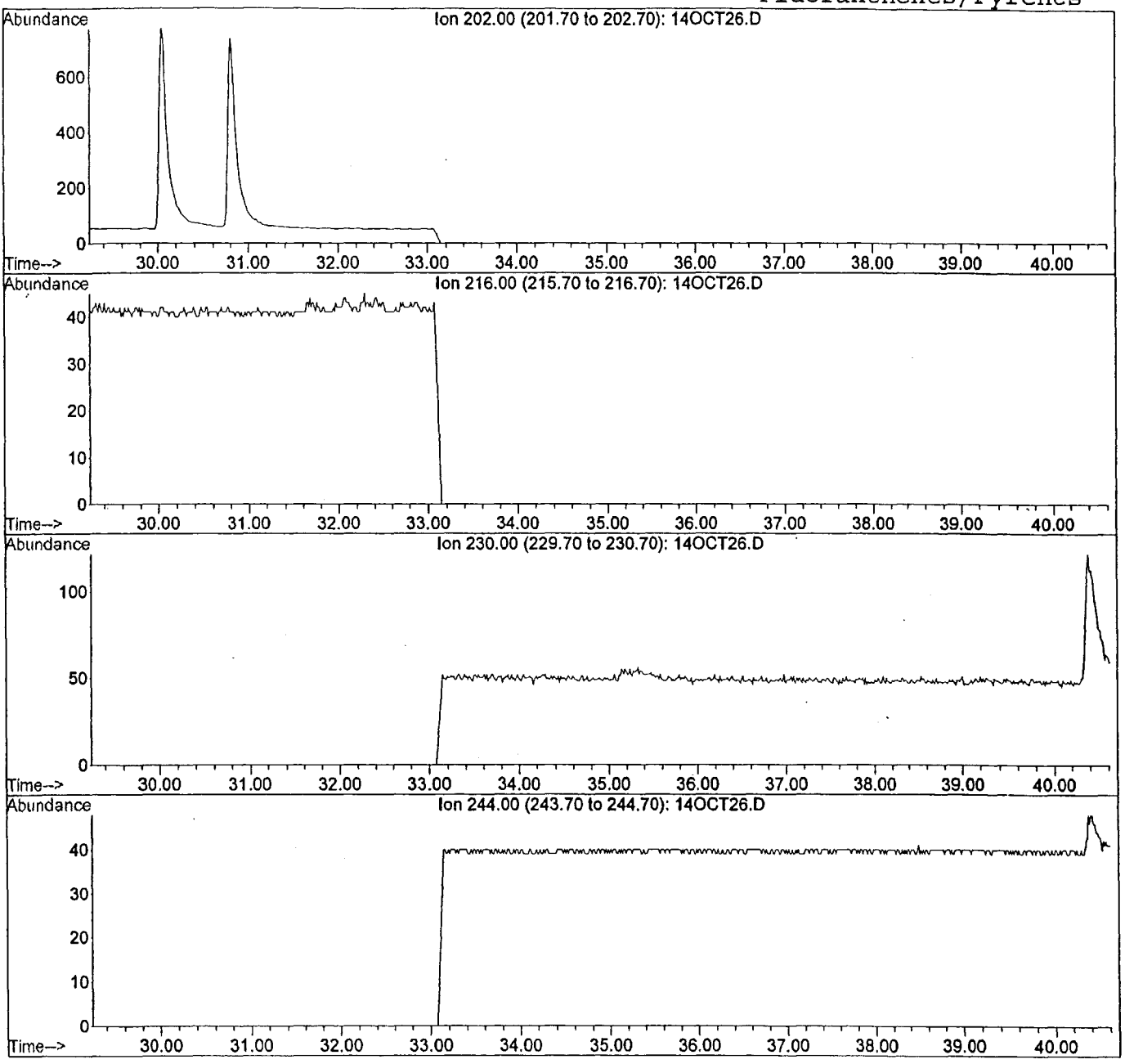
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Dibenzothiophenes



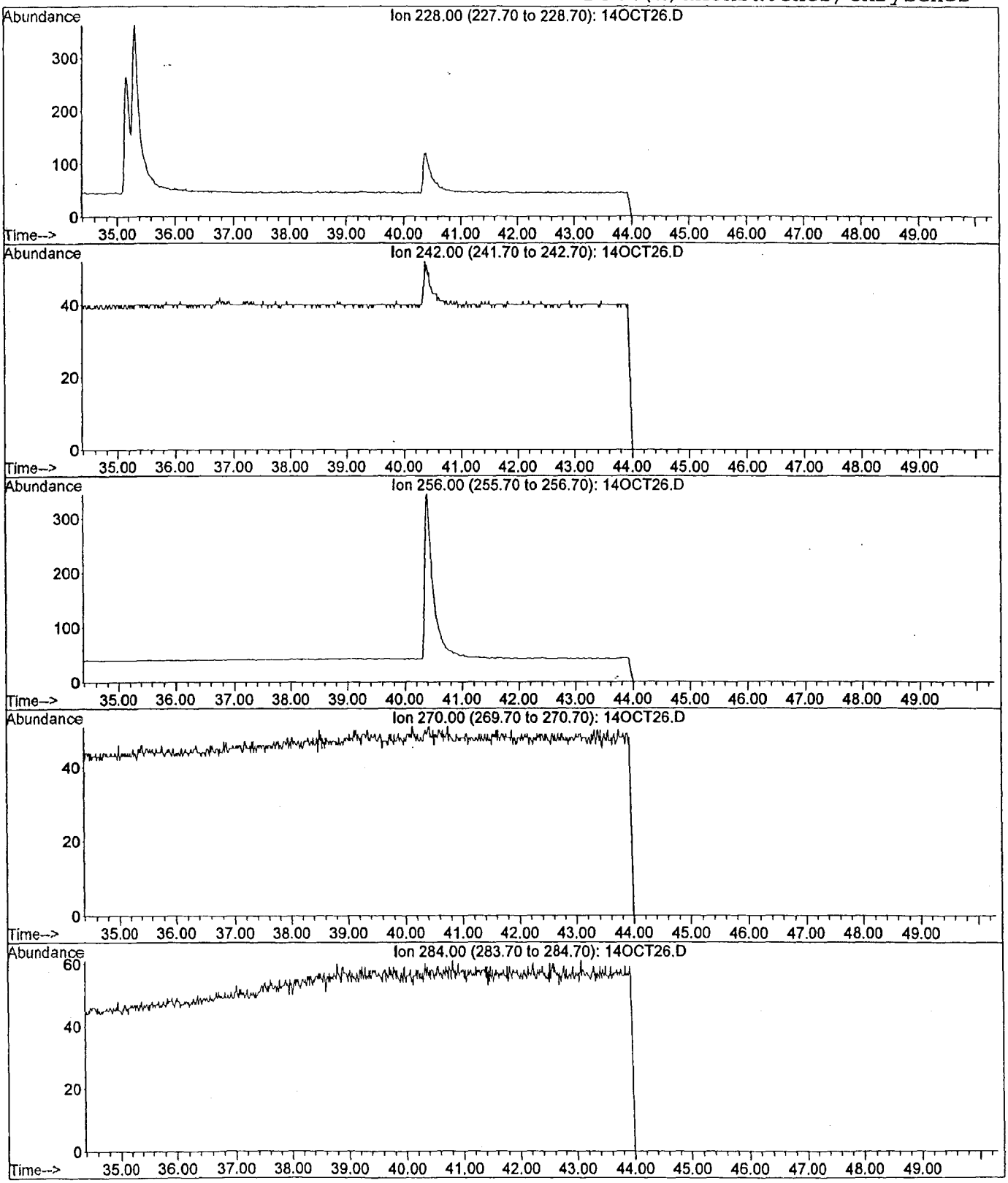
Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Fluoranthenes/Pyrenes



Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC

Benz(a)anthracenes/Chrysenes



Field ID: B23-10-12
Lab ID: GT020924-07
File: G:\1\DATA\021014\14OCT26.D
Acquired: 15 Oct 2002 3:57 pm using AcqMethod SIM4008Z
Instrument: GC/MS Ins Operator: ECC