Geochemical analysis of cuttings from the following North Slope oil/gas exploratory wells:

Sohio Alaska Petroleum Co. Nechelik No. 1 (8,520'-8,790'),
U. S. Navy (Husky Oil NPR) Atigaru Point No. 1 (7,190'-8,600'),
U. S. Navy (Husky Oil NPR) East Teshekpuk No. 1 (7,090'- 8,850'),
U. S. Navy (Husky Oil NPR) South Harrison Bay No. 1 (5,700'-9,200'), and
U. S. Navy (Husky Oil NPR) West Fish Creek No. 1 (7,290'-9,500').

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Alaska Geologic Materials Center Data Report No. 280

LGC

GEOCHEMISTRY

Geochemical Analysis of Cuttings Samples from Nechelik-1, Atigaru Point-1, East Teshekpuk-1, South Harrison Bay-1 and West Fish Creek-1, Alaska

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Date: 14-Nov-97

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Summary

This report details geochemical analytical data for cutting samples from Nechelik-1, Atigaru Point-1, East Teshekpuk-1, South Harrison Bay-1 and West Fish Creek-1, Alaska.

Source potential (pyrolysis P1P2 and Total Organic Carbon) has been determined on mudstone and limestone samples from the five wells. Thermal maturity by vitrinite reflectance has been determined on limited samples from each of the wells.

A number of the richer samples from each of the five wells have been solvent extracted to attempt to characterise the hydrocarbon extracts by total soluble extract (TSE) GC, high resolution GC-MS and stable carbon isotope analysis of the kerogen and total soluble fractions.

Additionally, two oil shows in sandstones at 5700ft and 5800ft from South Harrison Bay-1 have been extracted, and the soluble hydrocarbons characterised by total soluble extract (TSE) GC, high resolution GC-MS and TSE stable carbon isotopes. The hydrocarbon recoveries for the two oil shows were very low, consequently the TSE GC chromatograms are poor. The chromatograms display an unresolved 'hump' that is probably column bleed rather than a characteristic of the sample.

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Nechelik-1 Data

TABLE 1

LITHOLOGY AND STRATIGRAPHY

COUNTRY: **Alaska**
WELL: **Nechelik-1**

DEPTH ft	DEPTHRANGE ft	FORMATION	AGE	LITHOLOGY	PICKED LITHOLOGY	SAMPLE TYPE
8520				MDST-dk gy shale 40%:MDST-dk gy calcareous 40%:SST-lt bn 25%	Mudstone	CUT
8610				MDST-dk gy shale 20%:MDST-dk gy calcareous 50%:SST-lt bn 30%	Mudstone	CUT
8700				LST-lt gy 70%:MDST-m gy calcareous 30%	Limestone	CUT
8790				LST-lt gy mddy 70%:MDST-m gy calcareous 30%	Limestone	CUT

TABLE 2

OPTICAL SOURCE ROCK MATURITY INDICATORS

COUNTRY Alaska
WELL: Nechelik-1

DEPTH (ft)	FORMATION	VITRINITE (%Ro)	NO. of READINGS	CONFIDENCE	COMMENTS
8610		0.49	20	D	L-MOD;IPAR 90% VPAR+WPAR 10%;BS MOD+STR BW MOD/RI;AMORPH L.O. MOD/RI SP Y/O+L

Confidence A=Excellent B=Good C=Average D=Poor E=Unreliable

Vitrinite Reflectance Thermal Maturity Plot

Well Name : Nechelik-1

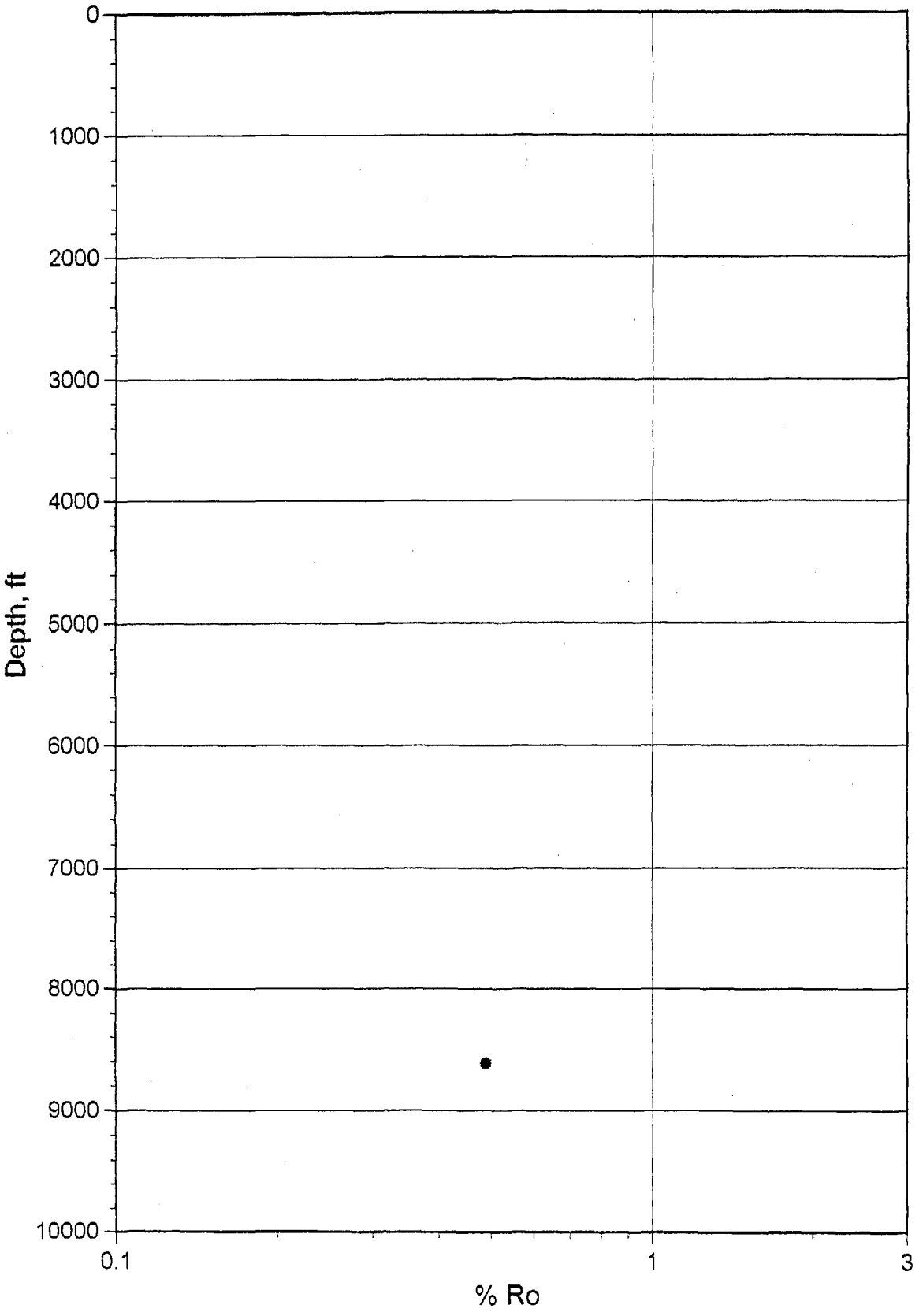


Figure 1

TABLE 3

SOURCE ROCK QUALITY INDICATORS

COUNTRY: Alaska
WELL: Nechelik-1

DEPTH (ft)	DEPTHRANGE (ft)	FORMATION	PICKED LITHOLOGY	P1 (kg/t)	P1 (mg/gC)	P2 (kg/t)	TOC (%)	TMAX deg C	HI	GOGI	CARBT (%)	S (%)
8520			Mudstone	1.16	36.4	11.12	3.17	441	350		10.49	1.61
8610			Mudstone	1.09	46.0	10.47	2.37	442	441		25.86	1.67
8700			Limestone	1.00	61.7	6.42	1.62	438	395		69.72	0.96
8790			Limestone	1.55	58.3	11.65	2.66	438	438		52.88	0.89

Sediment/Extract Analysis

Well name : Nechelik-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8520
Sample name :

Extraction

TSE %wt : 0.349

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.57
H2 : 0.55
H3 : 0.87
H4 : 0
H5 : 100:66:44:28:17:8
H6 : 0.51
H7 : 0.61
H8 :
H9 :
H10 :
H11 : 9.20
H12 : 3.24
H13 : 0.00
H14 : 6.77
H15 : 0.00
H16 : 0.00
H17 : 31.91
H18 : 0.00

S1 : 0.51
S2 : 0.44
S3 : 35:28:35
S4 : 32:24:42
S5 : 30.35
S6 :
S7 : 50.02
S8 : 23.44
S9 :
S10 :

M2 : 0.57
M3 : 0.57
M4 : 65.16
M5 :
A1 : 0.79
A2 : 0.78
A3 : 0.32
A4 : 0.17
A5 : 0.34
A6 : 0.66
MDR : 1.26
MBP : 5.57

Light Hydrocarbons

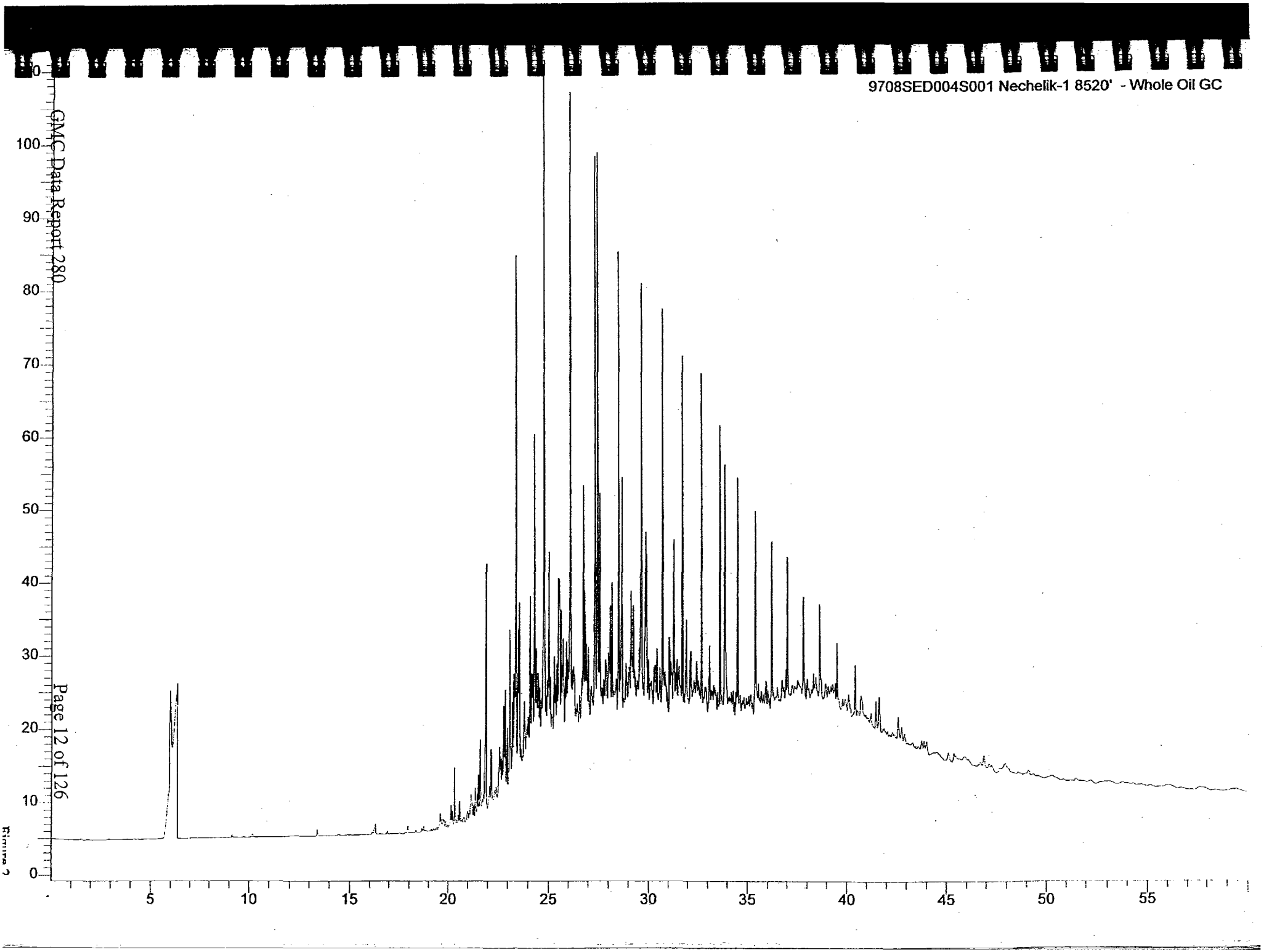
MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -31
Aromatics :
Residue :
Asphaltenes :
Kerogen : -30

STANDARD: NBS22 -29.8

Table 4


9708SED004S001 Nechelik-1 8520' - Whole Oil GC
GMC Data Report 280
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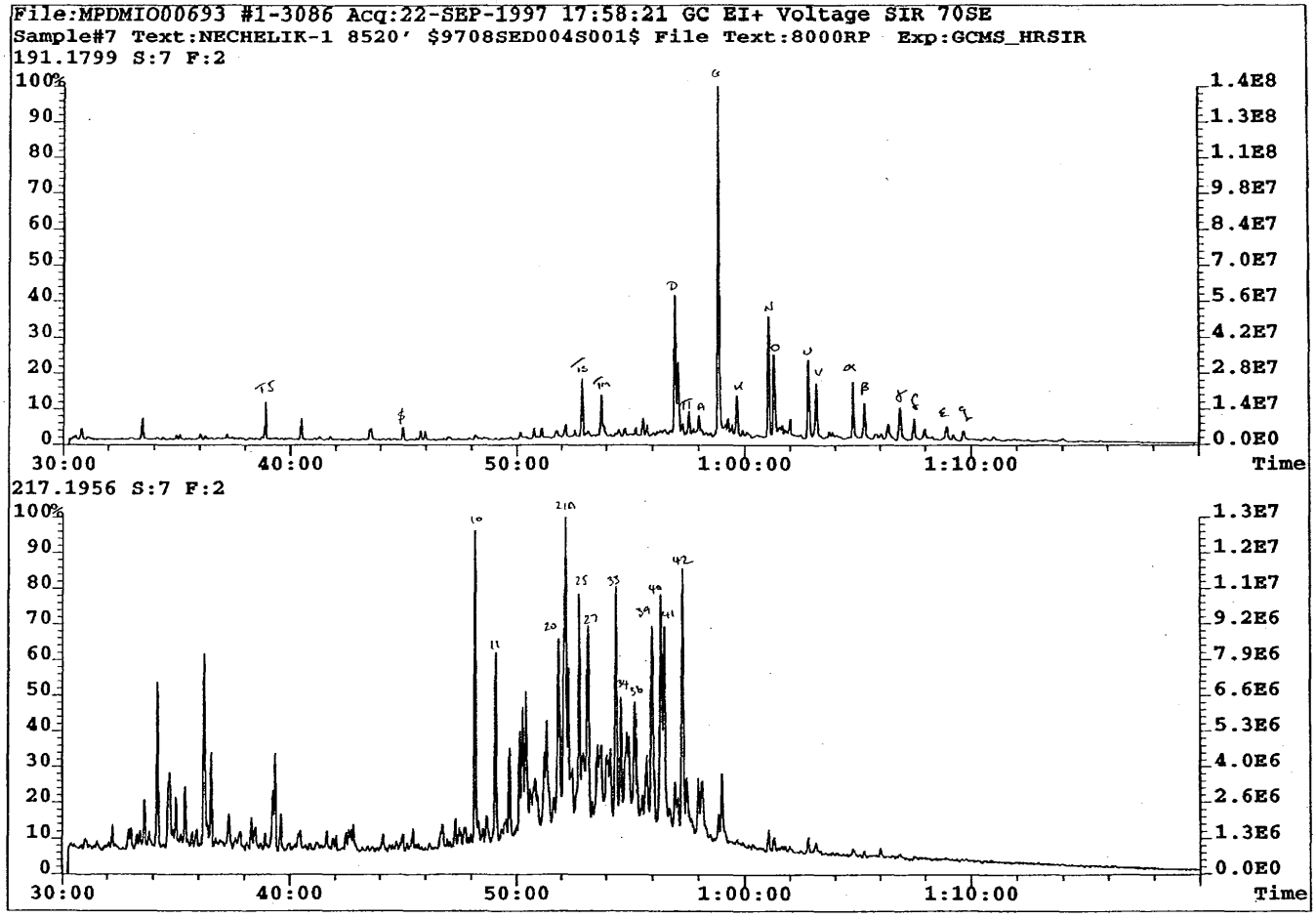
0
10
20
30
40
50
60
70
80
90
100
5
10
15
20
25
30
35
40
45
50
55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191.1799 S:7 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.4E8
1.3E8
1.1E8
9.8E7
8.4E7
7.0E7
5.6E7
4.2E7
2.8E7
1.4E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:7 F:2
1.3E7
1.2E7
1.1E7
9.2E6
7.9E6
6.6E6
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2.6E6
1.3E6
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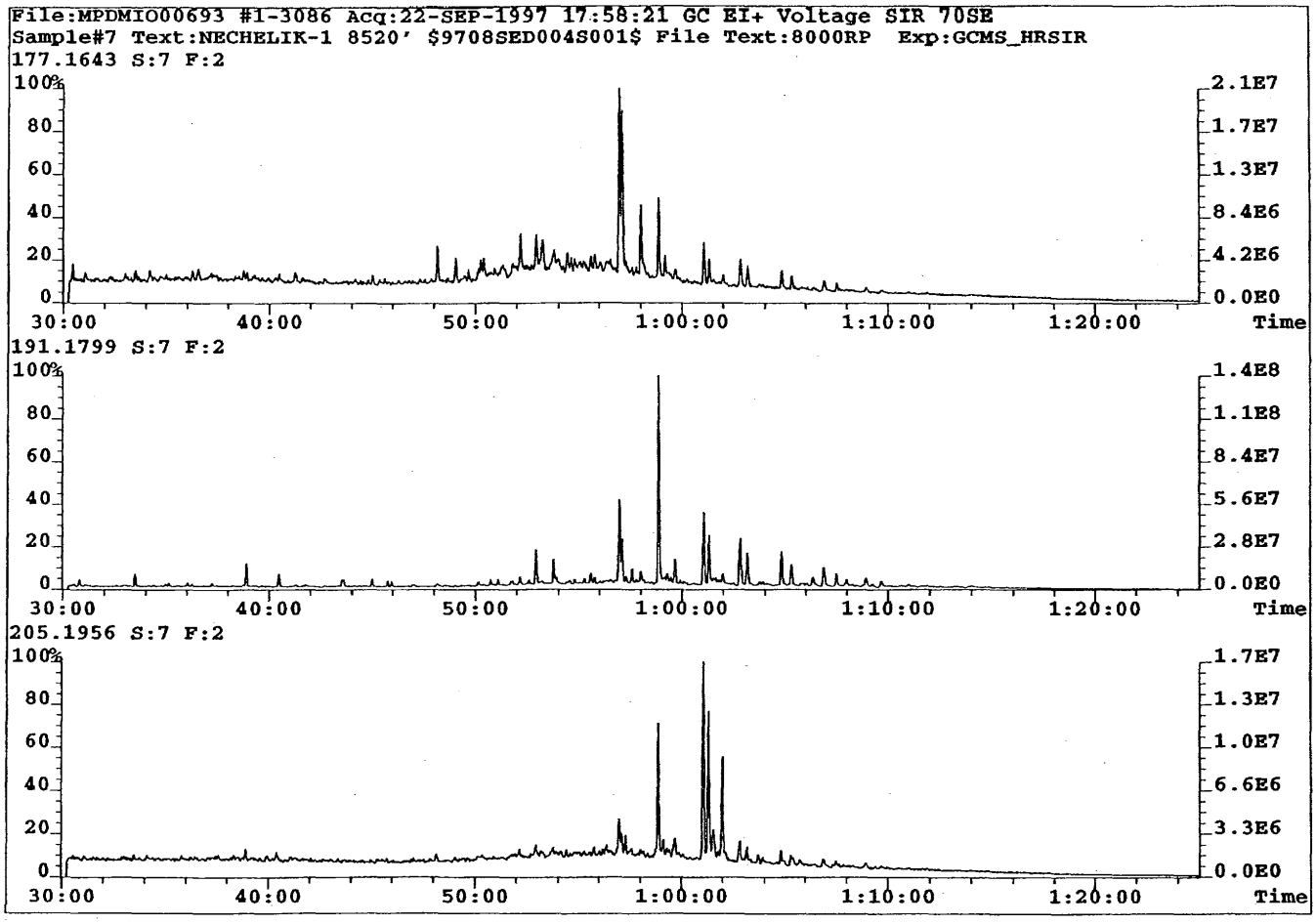
Figure 3.1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177.1643 S:7 F:2
100%
80
60
40
20
0
2.1E7
1.7E7
1.3E7
8.4E6
4.2E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:7 F:2
1.4E8
1.1E8
8.4E7
5.6E7
2.8E7
205.1956 S:7 F:2
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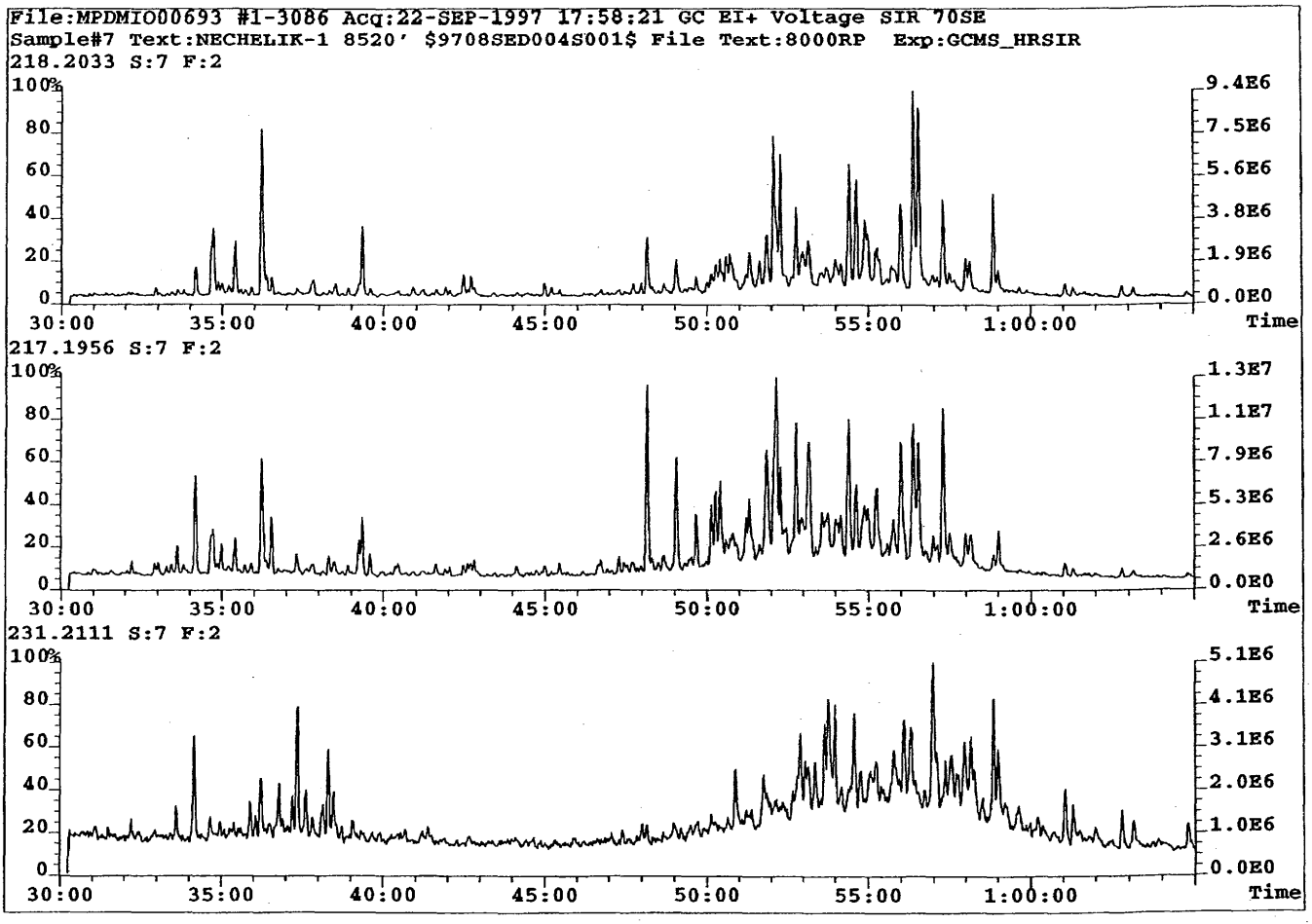
1.3E7
1.0E7
6.6E6
3.3E6

Figure 3.2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218.2033 S:7 F:2
100%
80
60
40
20
0
9.4E6
7.5E6
5.6E6
3.8E6
1.9E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:7 F:2
100%
80
60
40
20
0
1.3E7
1.1E7
7.9E6
5.3E6
2.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:7 F:2
100%
80
60
40
20
0
5.1E6
4.1E6
3.1E6
2.0E6
1.0E6
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35:00
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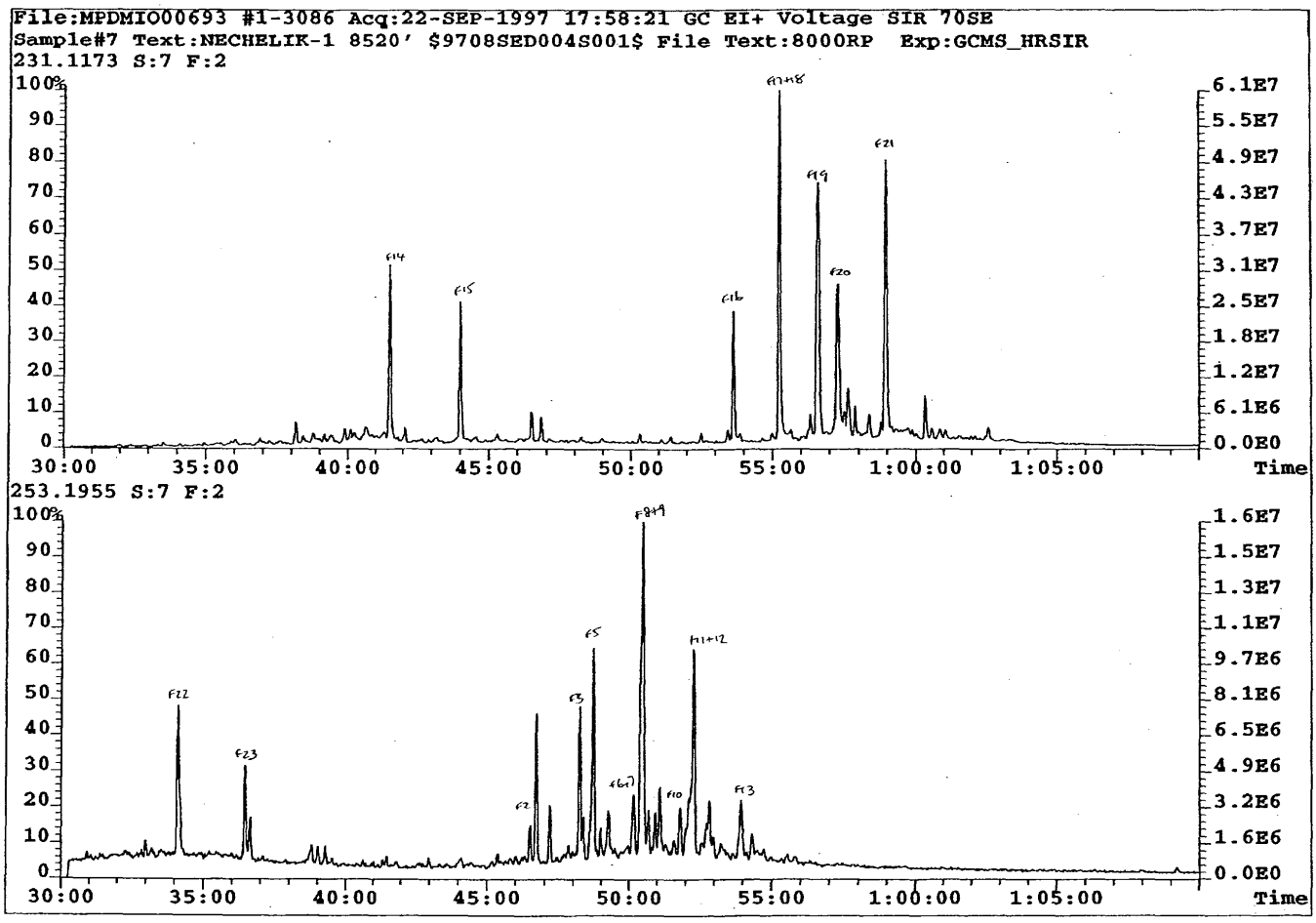
55:00
1:00:00
Time

Figure 3.3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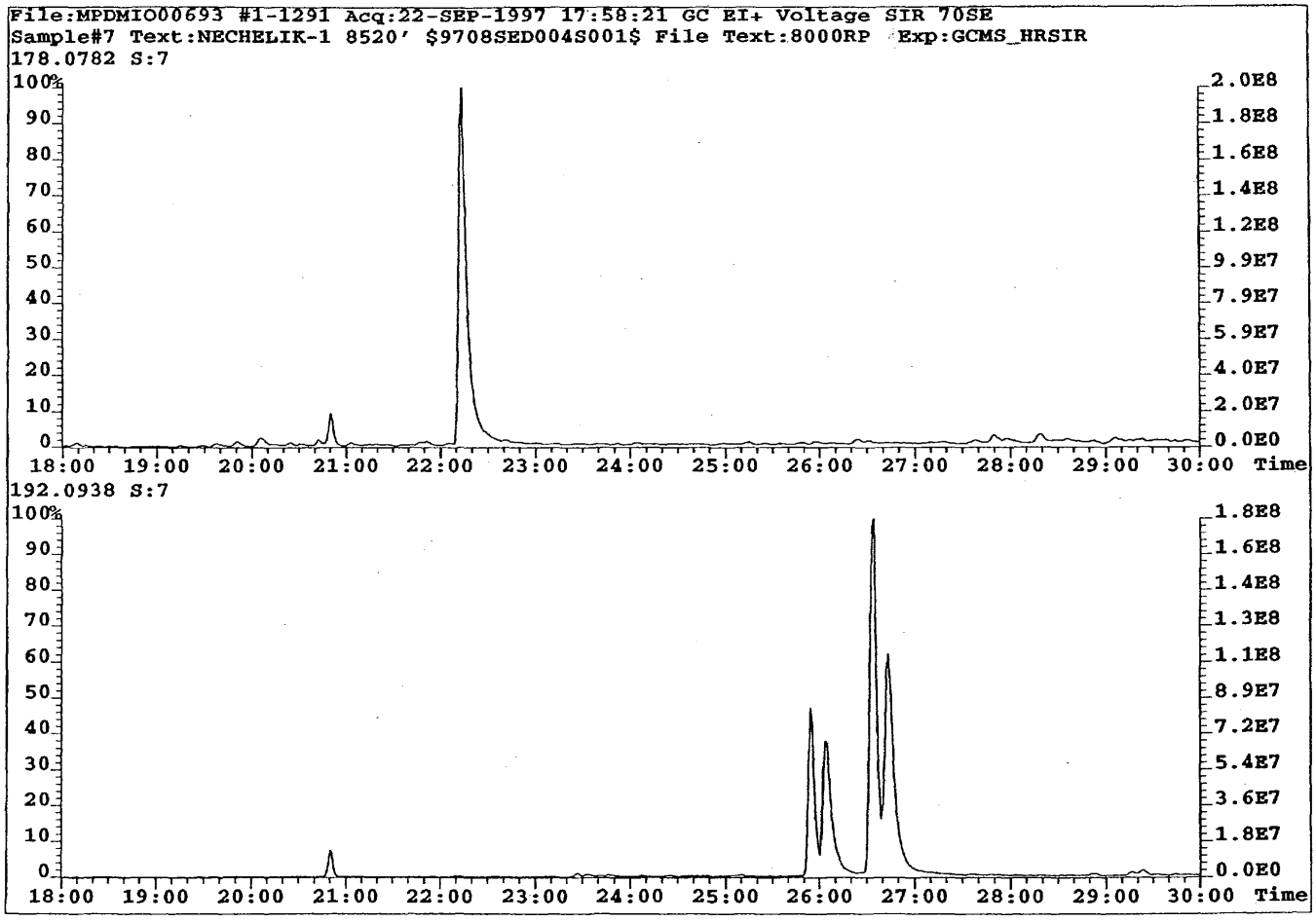
231.1173 S:7 F:2
253.1955 S:7 F:2
Time
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00

Figure 4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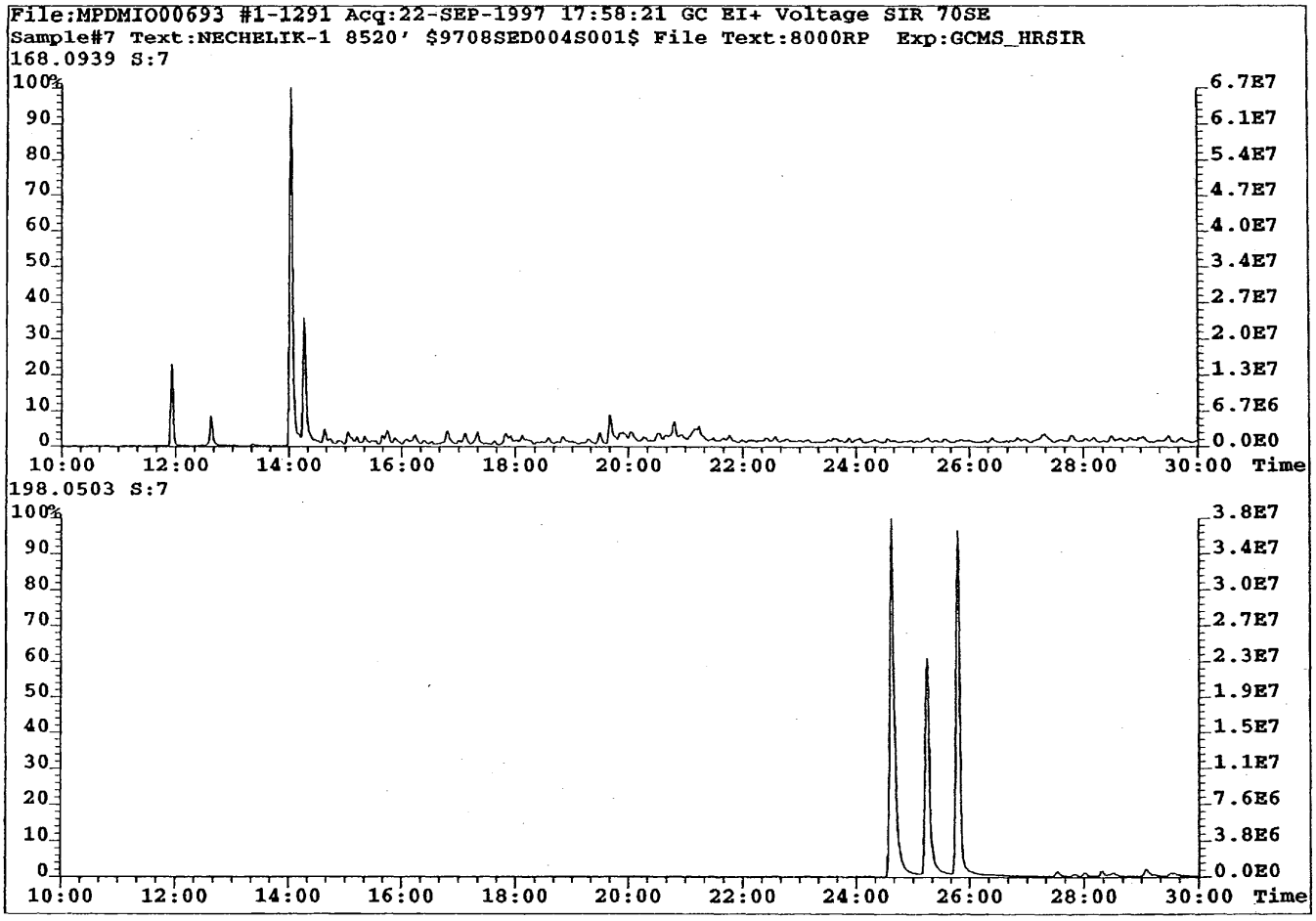
178.0782 S:7
100%
90
80
70
60
50
40
30
20
10
0
2.0E8
1.8E8
1.6E8
1.4E8
1.2E8
9.9E7
7.9E7
5.9E7
4.0E7
2.0E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:7
100%
90
80
70
60
50
40
30
20
10
0
1.8E8
1.6E8
1.4E8
1.3E8
1.1E8
8.9E7
7.2E7
5.4E7
3.6E7
1.8E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 5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168.0939 S:7
100%
90
80
70
60
50
40
30
20
10
0
6.7E7
6.1E7
5.4E7
4.7E7
4.0E7
3.4E7
2.7E7
2.0E7
1.3E7
6.7E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:7
100%
90
80
70
60
50
40
30
20
10
0
3.8E7
3.4E7
3.0E7
2.7E7
2.3E7
1.9E7
1.5E7
1.1E7
7.6E6
3.8E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 6

Atigaru Point-1 Data

TABLE 5

LITHOLOGY AND STRATIGRAPHY

COUNTRY: **Alaska**
WELL: **Atigaru Pt-1**

DEPTH ft	DEPTHRANGE ft	FORMATION	AGE	LITHOLOGY	PICKED LITHOLOGY	SAMPLE TYPE
7190				MDST-m bn/gy 70%:SLTST-lt-m bn sndy 30%	Mudstone	CUT
7280				MDST-m bn/gy 45%:SLTST-lt-m bn sndy 55%	Mudstone	CUT
7370				MDST-m-dk gy 80%:SLTST-m gy 20%	Mudstone	CUT
7460				MDST-dk gy shaley 95%:SLTST-m gy 5%:MDST-or Tr	Mudstone	CUT
7550				MDST-dk gy 100%:SLTST-m gy Tr:MDST-or Tr	Mudstone	CUT
7640				MDST-dk gy 100%:SLTST-m gy Tr:MDST-or Tr	Mudstone	CUT
7730				MDST-dk gy 100%:SLTST-m gy Tr:MDST-or Tr	Mudstone	CUT
7820				MDST-dk gy 100%:SLTST-m gy Tr	Mudstone	CUT
7910				MDST-dk gy 100%:SLTST-m gy Tr	Mudstone	CUT
8000				MDST-dk gy/bk 100%:SLTST-m gy Tr	Mudstone	CUT
8090				MDST-dk gy/bk 100%:SLTST-m gy Tr	Mudstone	CUT
8180				MDST-dk gy/bk 100%:SLTST-m gy Tr	Mudstone	CUT
8360				MDST-dk gy calcareous 40%:SST-lt gy slty 60%	Mudstone	CUT
8450				MDST-dk gy calcareous 60%:SST-lt gy slty 40%	Mudstone	CUT
8540				MDST-dk gy calcareous 60%:SST-lt gy slty 40%	Mudstone	CUT
8600				MDST-dk gy calcareous 70%:SST-lt gy slty 30%	Mudstone	CUT

TABLE 6

OPTICAL SOURCE ROCK MATURITY INDICATORS

COUNTRY Alaska
WELL: Atigaru Point-1

DEPTH (ft)	FORMATION	VITRINITE (%Ro)	NO. of READINGS	CONFIDENCE	COMMENTS
7280		0.67	20	C	MOD;IPAR 90% VPAR+W 10% ;BS MOD/STR BW MOD/RI;SP L.O. L/MOD HYD SPE L.O. MOD
7910		0.64	20	D	L-MOD;IPAR 100% VPAR+WPAR TR;BS MOD/RI BW L/MOD;SP Y/O+L.O. MOD/RI ALG Y TR
8450		0.67	10	D	L;IPAR+WPAR 100% VWPAR TR;BS MOD/STR BW MOD;HYD SPE L.O. MOD Amorphinite M.O. M

Confidence A=Excellent B=Good C=Average D=Poor E=Unreliable

Vitrinite Reflectance Thermal Maturity Plot

Well Name : Atigaru Pt-1

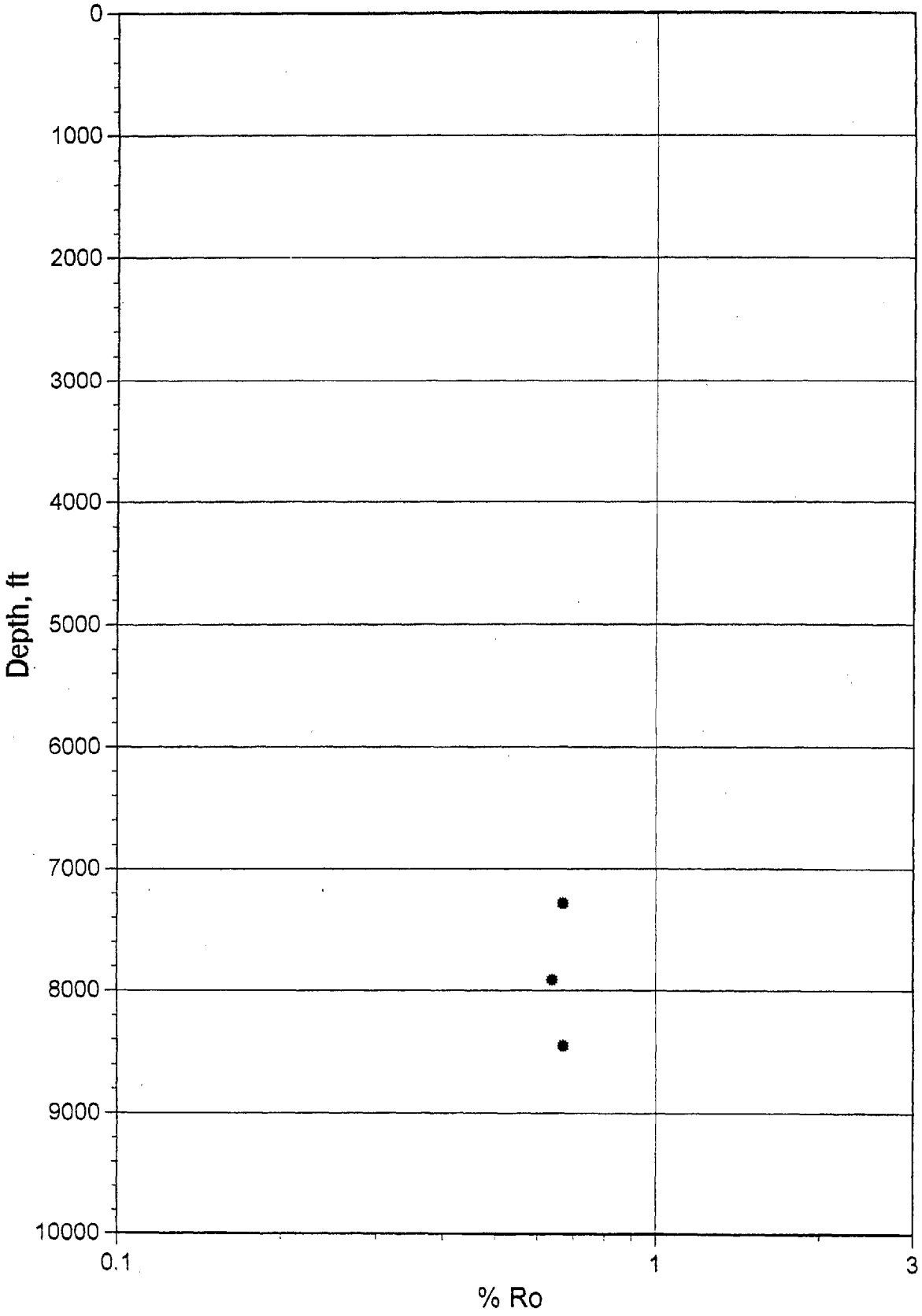


Figure 7

TABLE 7

SOURCE ROCK QUALITY INDICATORS

COUNTRY: Alaska
WELL: Atigaru Pt-1

DEPTH (ft)	DEPTHRANGE (ft)	FORMATION	PICKED LITHOLOGY	P1 (kg/t)	P1 (mg/gC)	P2 (kg/t)	TOC (%)	TMAX deg C	HI	GOGI	CARBT (%)	S (%)
7190			Mudstone	1.52	133.4	1.92	1.14	451	168		17.19	0.57
7280			Mudstone	1.33	107.4	1.74	1.24	447	141		16.42	0.97
7370			Mudstone	1.45	126.1	1.98	1.15	439	172		12.65	0.43
7460			Mudstone	1.06	83.2	2.27	1.27	441	178		9.06	0.95
7550			Mudstone	0.93	76.5	2.25	1.22	438	185		9.61	1.15
7640			Mudstone	1.32	99.1	2.97	1.33	441	223		7.52	1.16
7730			Mudstone	1.07	78.9	3.26	1.35	443	241		7.13	1.03
7820			Mudstone	0.91	65.5	4.05	1.38	441	292		7.11	1.06
7910			Mudstone	0.94	71.3	3.16	1.32	441	239		7.53	0.98
8000			Mudstone	1.00	84.2	2.57	1.19	441	217		7.26	0.85
8090			Mudstone	1.09	73.8	3.35	1.47	441	228		6.73	1.03
8180			Mudstone	1.19	60.0	5.54	1.98	442	280		7.97	1.51
8360			Mudstone	1.72	77.7	6.21	2.22	446	280		31.85	1.15
8450			Mudstone	1.31	67.0	6.21	1.95	441	318		61.18	0.99
8540			Mudstone	1.20	62.8	4.74	1.91	444	248		53.60	1.21
8600			Mudstone	1.72	48.7	9.21	3.54	446	260		33.05	1.39

Sediment Extract Analysis

Well name :	Atigaru Pt-1
Suite name :	NPRA Study
Country Of Origin :	Alaska
Depth (m) :	7820
Sample name :	

Extraction

TSE %wt : 0.100

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

I1 :	0.57	S1 : 0.53	M2 : 0.68
I2 :	0.55	S2 : 0.42	M3 : 0.68
I3 :	0.86	S3 : 35:28:36	M4 : 62.83
I4 :	0	S4 : 36:24:39	M5 :
I5 :	100:79:53:44:26:9	S5 : 34.53	A1 : 0.76
I6 :	0.41	S6 :	A2 : 0.77
I7 :	0.61	S7 : 48.71	A3 : 0.33
I8 :		S8 : 26.90	A4 : 0.16
I9 :		S9 :	A5 : 0.52
I10 :		S10 :	A6 : 0.83
I11 :	1.81		MDR : 1.50
I12 :	3.19		MBP : 5.10
I13 :	0.00		
I14 :	9.56		
I15 :	0.00		
I16 :	0.00		
I17 :	26.67		
I18 :	0.00		

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :	
Total Oil :	-30.9
Aromatics :	
Residue :	
Asphaltenes :	
Kerogen :	-30.6
STANDARD:	NBS22 -29.8

Table 8.1

Sediment/Extract Analysis

Well name : Atigaru Pt-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8090
Sample name :

Extraction

TSE %wt : 0.117

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.58
H2 : 0.55
H3 : 0.86
H4 : 0
H5 : 100:74:53:41:25:12
H6 : 0.56
H7 : 0.61
H8 :
H9 :
H10 :
H11 : 3.10
H12 : 3.56
H13 : 0.00
H14 : 11.62
H15 : 0.00
H16 : 0.00
H17 : 32.81
H18 : 0.00

S1 : 0.52
S2 : 0.49
S3 : 31:25:43
S4 : 32:23:43
S5 : 43.80
S6 :
S7 : 41.76
S8 : 26.46
S9 :
S10 :

M2 : 0.63
M3 : 0.61
M4 : 68.58
M5 :
A1 : 0.79
A2 : 0.80
A3 : 0.39
A4 : 0.20
A5 : 0.42
A6 : 0.76
MDR : 2.09
MBP : 4.74

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -30.9
Aromatics :
Residue :
Asphaltenes :
Kerogen : -29.6

STANDARD: NBS22 -29.8

Table 8.2

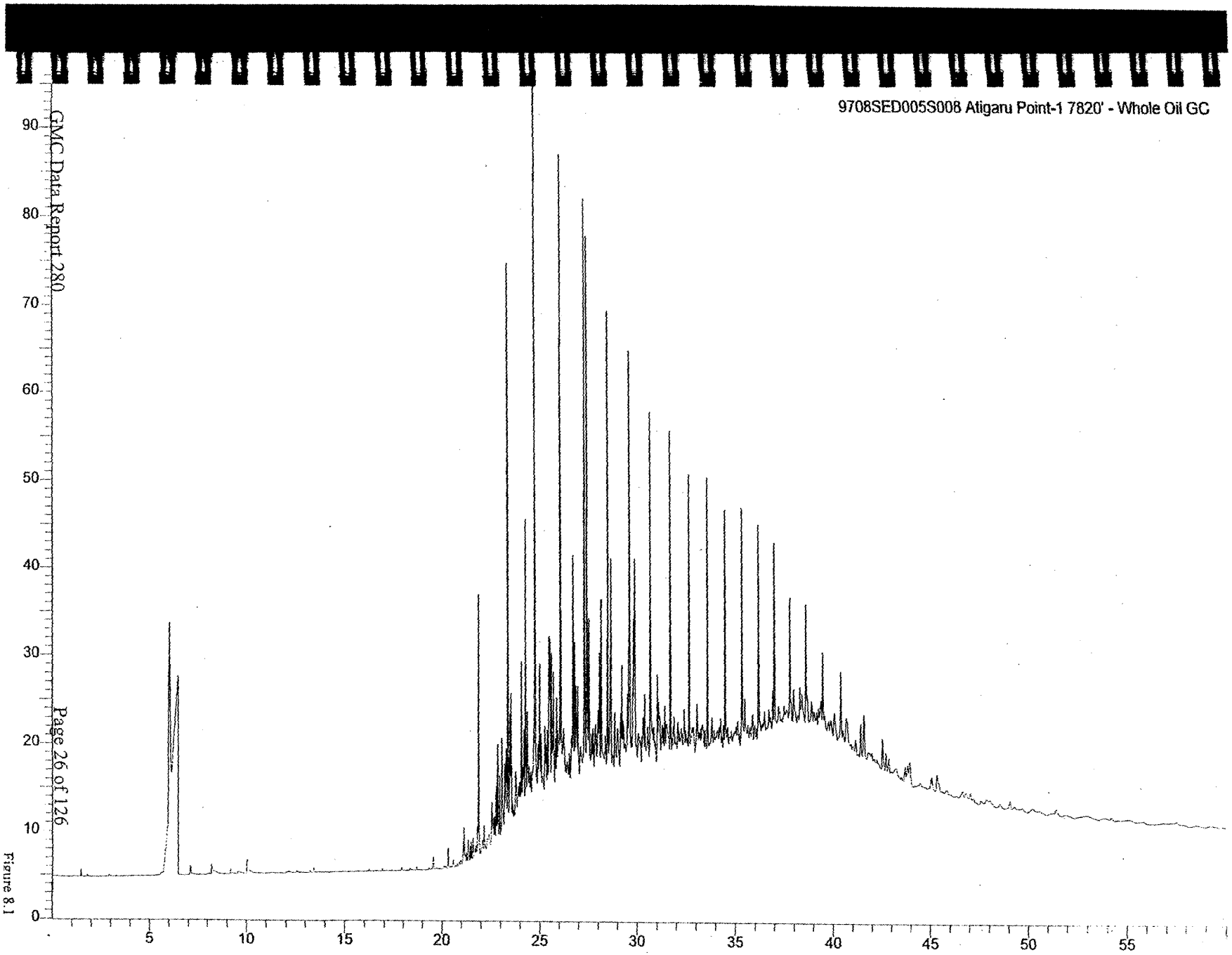

9708SED005S008 Atigaru Point-1 7820' - Whole Oil GC
GMC Data Report 280
Page 26 of 126
0
10
20
30
40
50
60
70
80
90
5
10
15
20
25
30
35
40
45
50
55

Figure 8.1

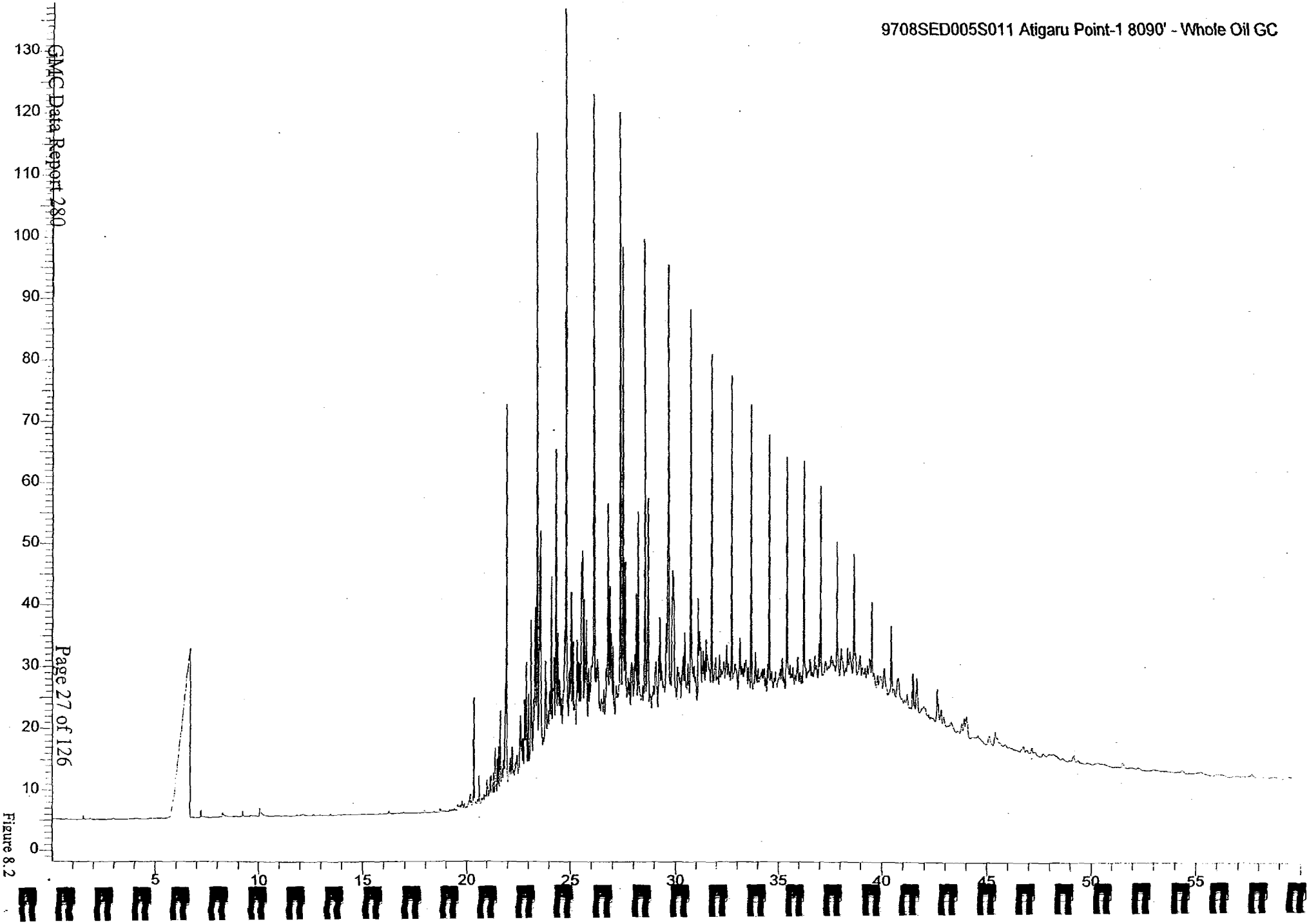

9708SED005S011 Atigaru Point-1 8090' - Whole Oil GC
130
120
110
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55

Figure 8.2

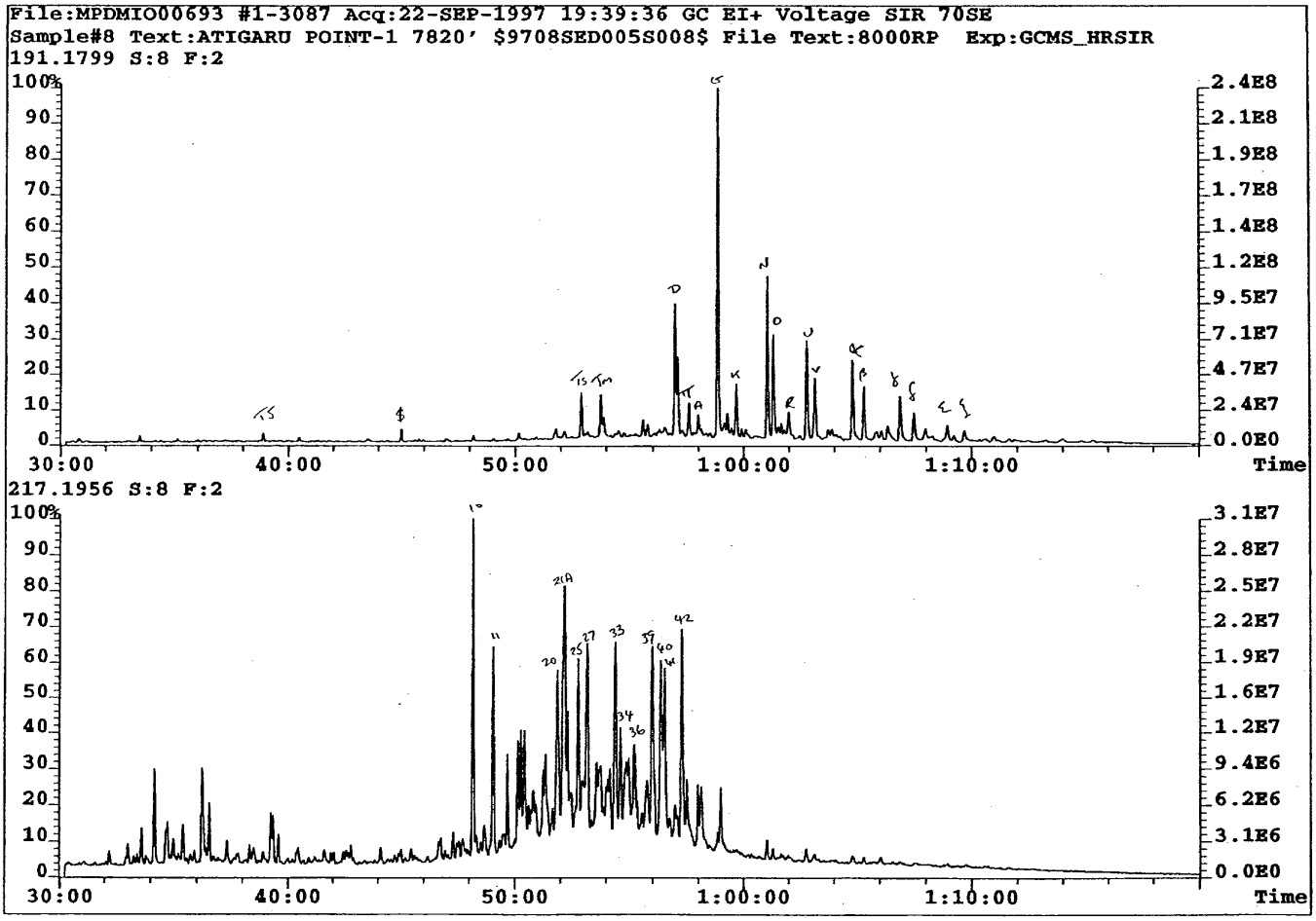

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:8 F:2
217.1956 S:8 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.4E8
2.1E8
1.9E8
1.7E8
1.4E8
1.2E8
9.5E7
7.1E7
4.7E7
2.4E7
0.0E0
3.1E7
2.8E7
2.5E7
2.2E7
1.9E7
1.6E7
1.2E7
9.4E6
6.2E6
3.1E6
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 9.1

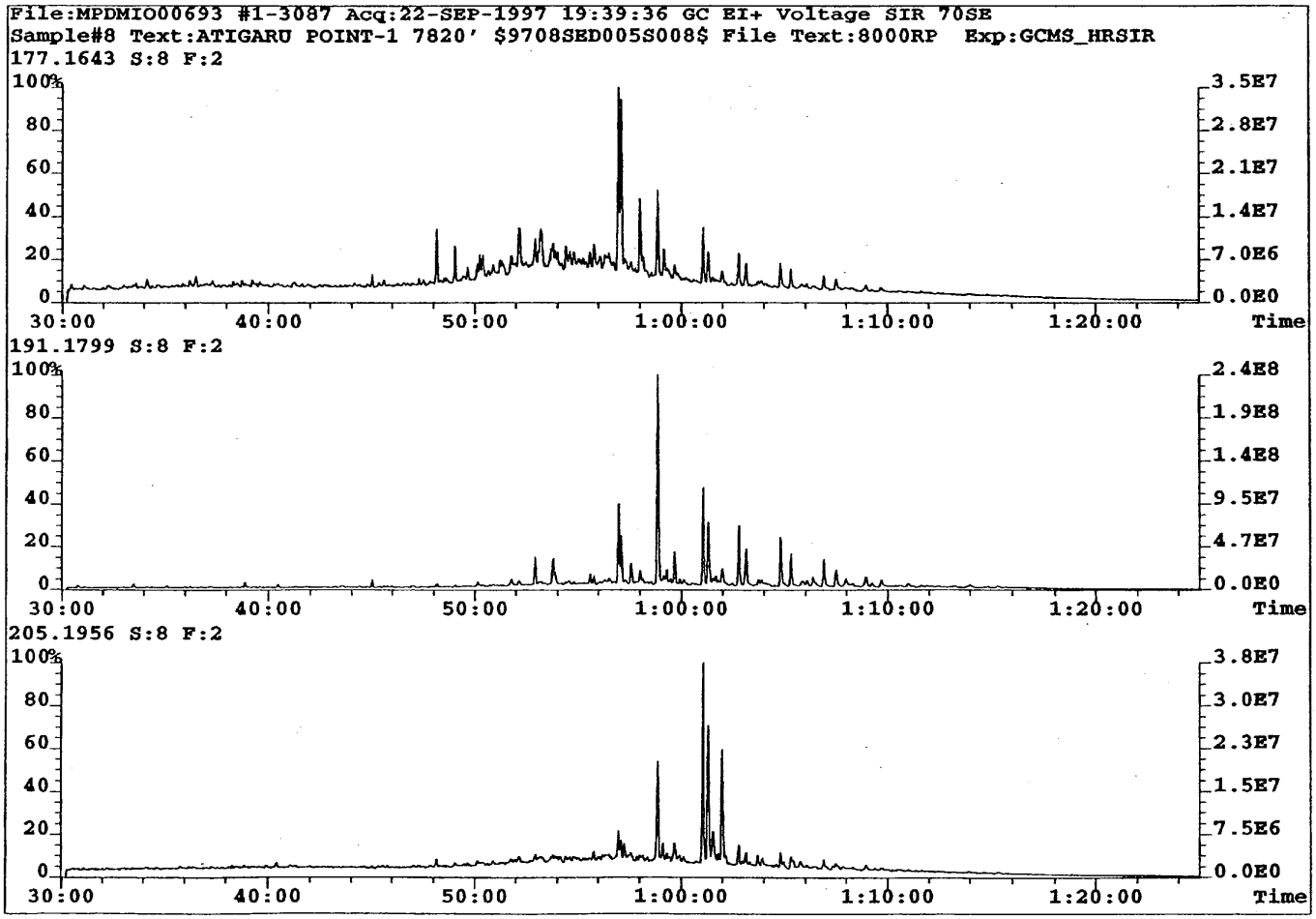

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:8 F:2
100%
80
60
40
20
0
3.5E7
2.8E7
2.1E7
1.4E7
7.0E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:8 F:2
100%
80
60
40
20
0
2.4E8
1.9E8
1.4E8
9.5E7
4.7E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:8 F:2
100%
80
60
40
20
0
3.8E7
3.0E7
2.3E7
1.5E7
7.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 9.2

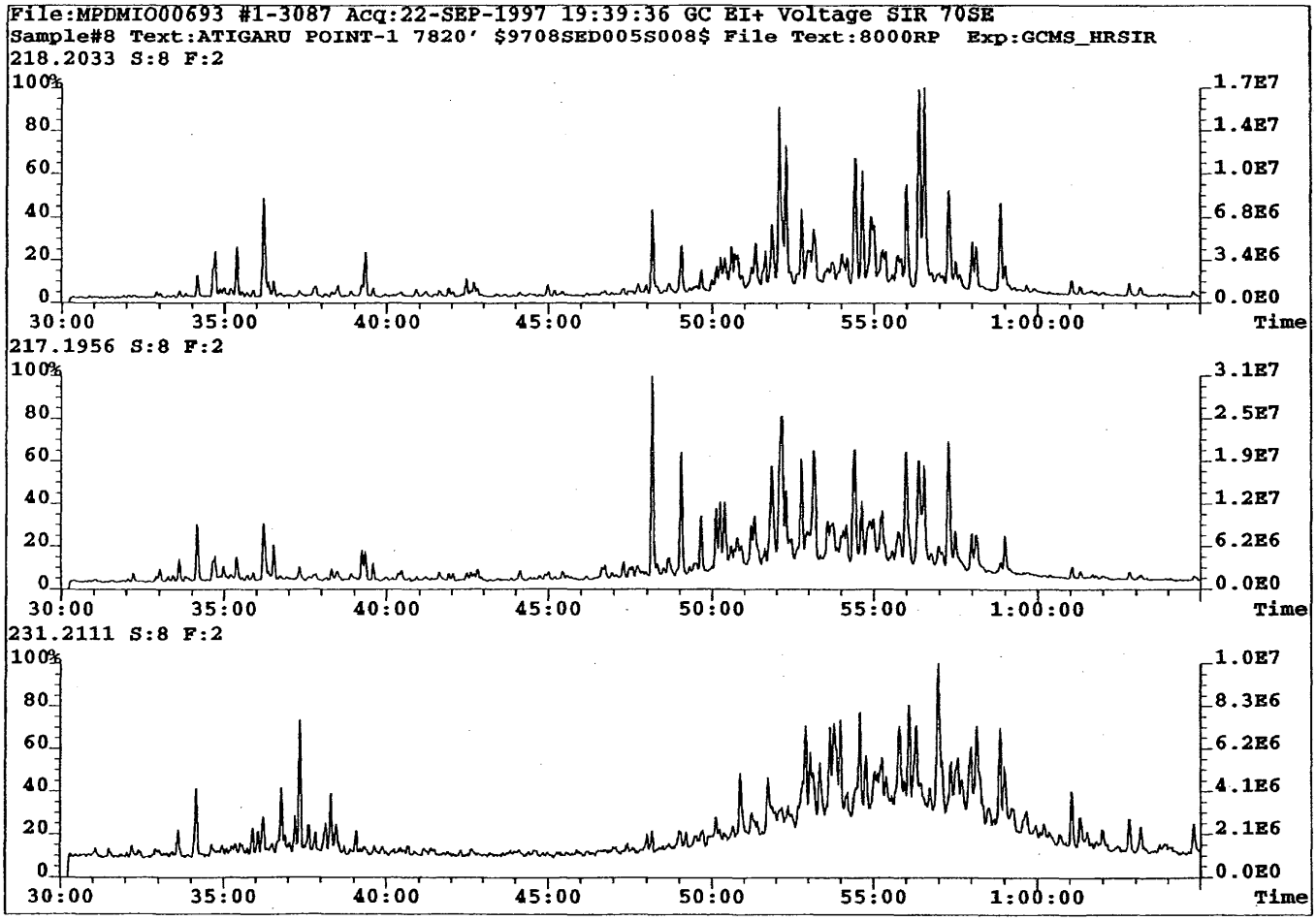

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:8 F:2
100%
80
60
40
20
0
1.7E7
1.4E7
1.0E7
6.8E6
3.4E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:8 F:2
100%
80
60
40
20
0
3.1E7
2.5E7
1.9E7
1.2E7
6.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:8 F:2
100%
80
60
40
20
0
1.0E7
8.3E6
6.2E6
4.1E6
2.1E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 9.3

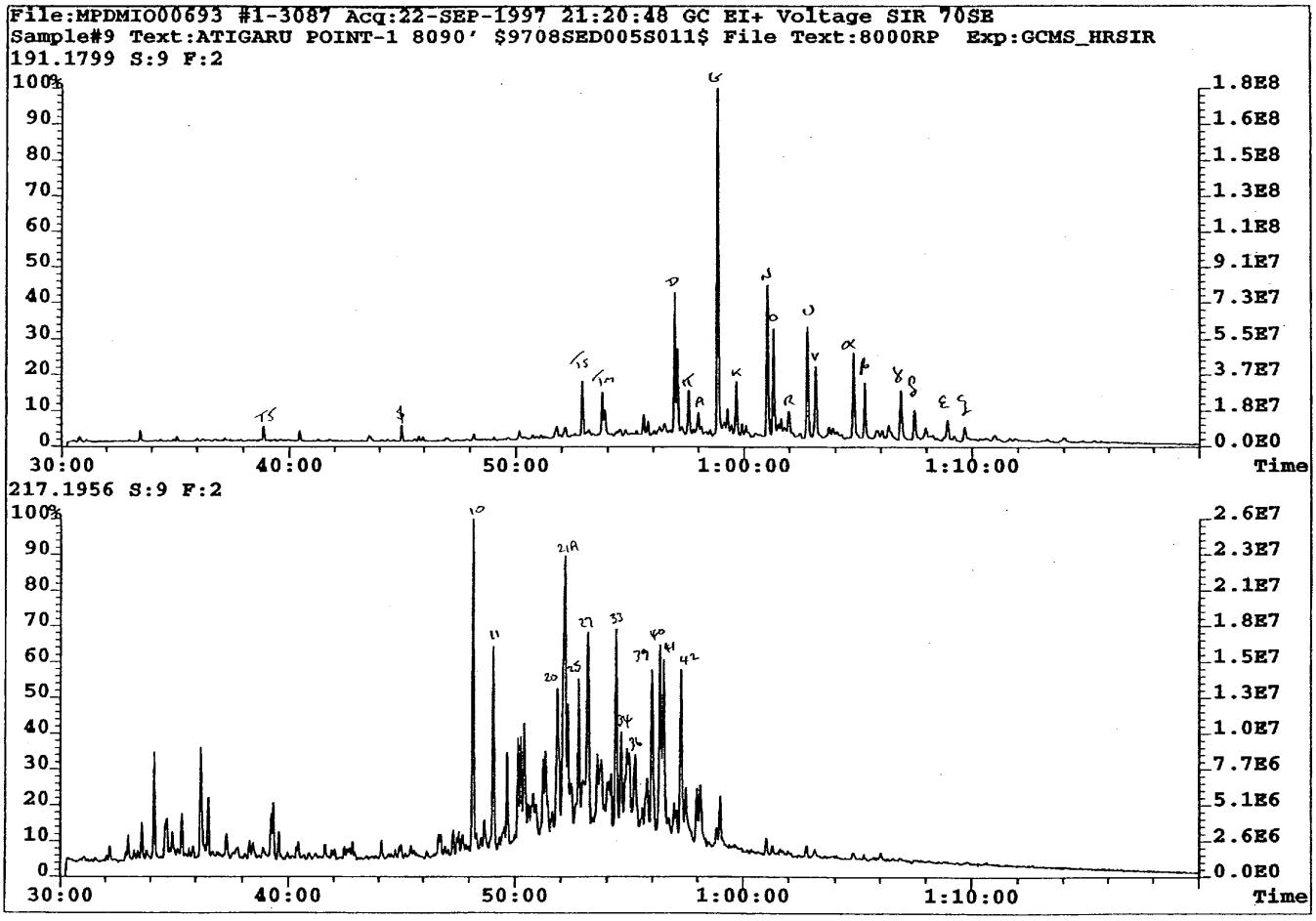

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:9 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.8E8
1.6E8
1.5E8
1.3E8
1.1E8
9.1E7
7.3E7
5.5E7
3.7E7
1.8E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:9 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.6E7
2.3E7
2.1E7
1.8E7
1.5E7
1.3E7
1.0E7
7.7E6
5.1E6
2.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 9.4

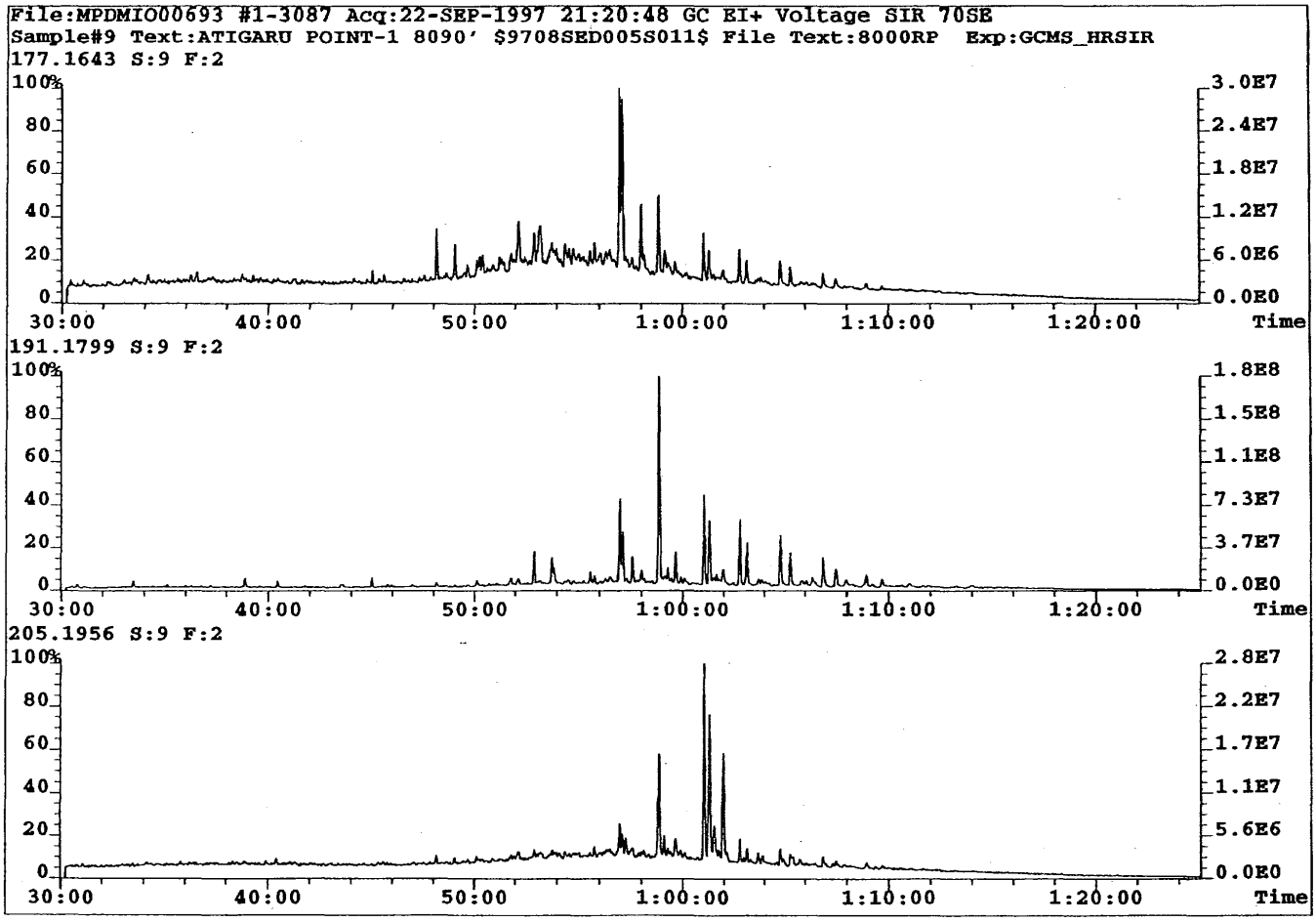

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:9 F:2
100%
80
60
40
20
0
3.0E7
2.4E7
1.8E7
1.2E7
6.0E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:9 F:2
100%
80
60
40
20
0
1.8E8
1.5E8
1.1E8
7.3E7
3.7E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:9 F:2
100%
80
60
40
20
0
2.8E7
2.2E7
1.7E7
1.1E7
5.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 9.5

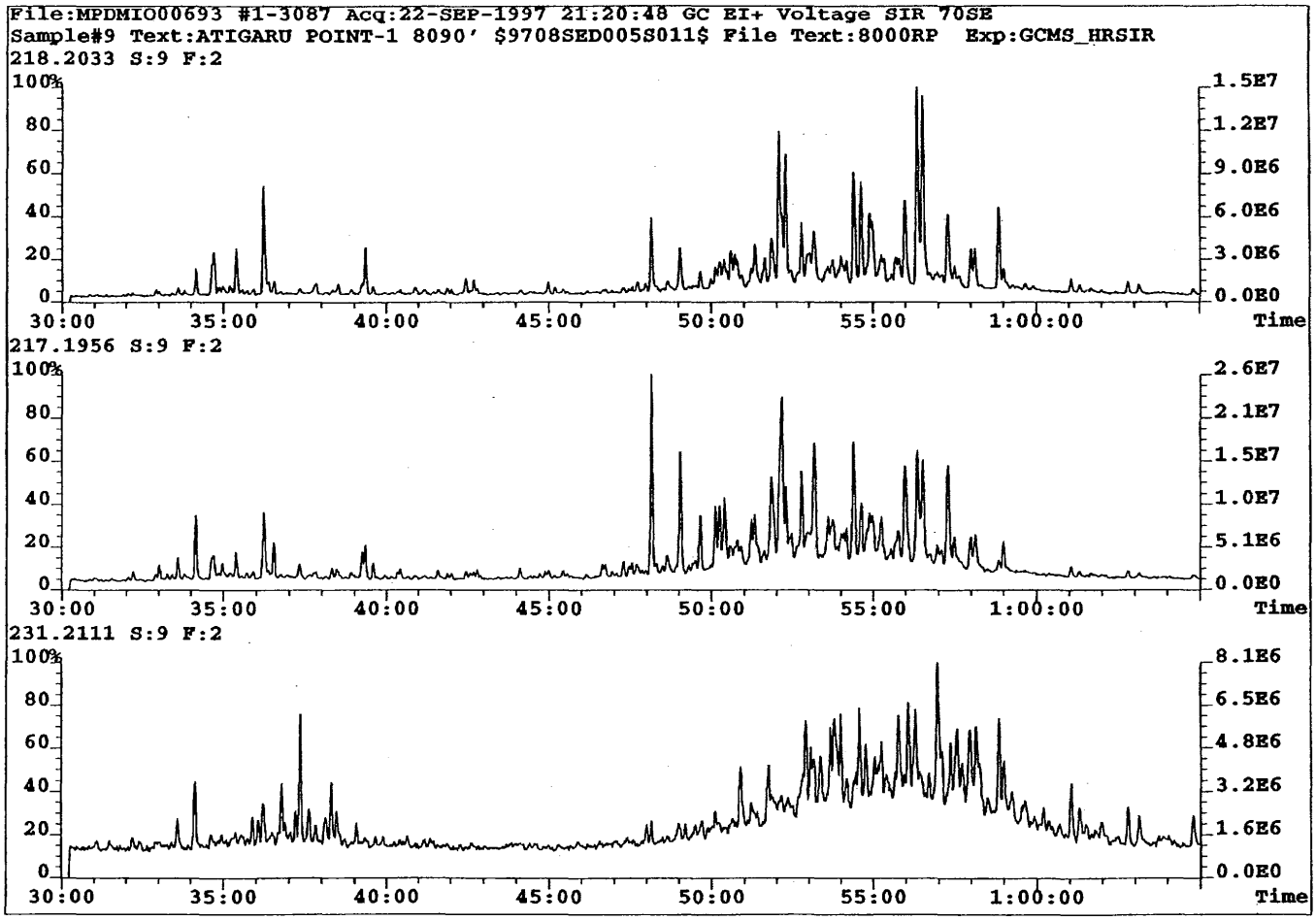

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:9 F:2
100%
80
60
40
20
0
1.5E7
1.2E7
9.0E6
6.0E6
3.0E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:9 F:2
100%
80
60
40
20
0
2.6E7
2.1E7
1.5E7
1.0E7
5.1E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:9 F:2
100%
80
60
40
20
0
8.1E6
6.5E6
4.8E6
3.2E6
1.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 9.6

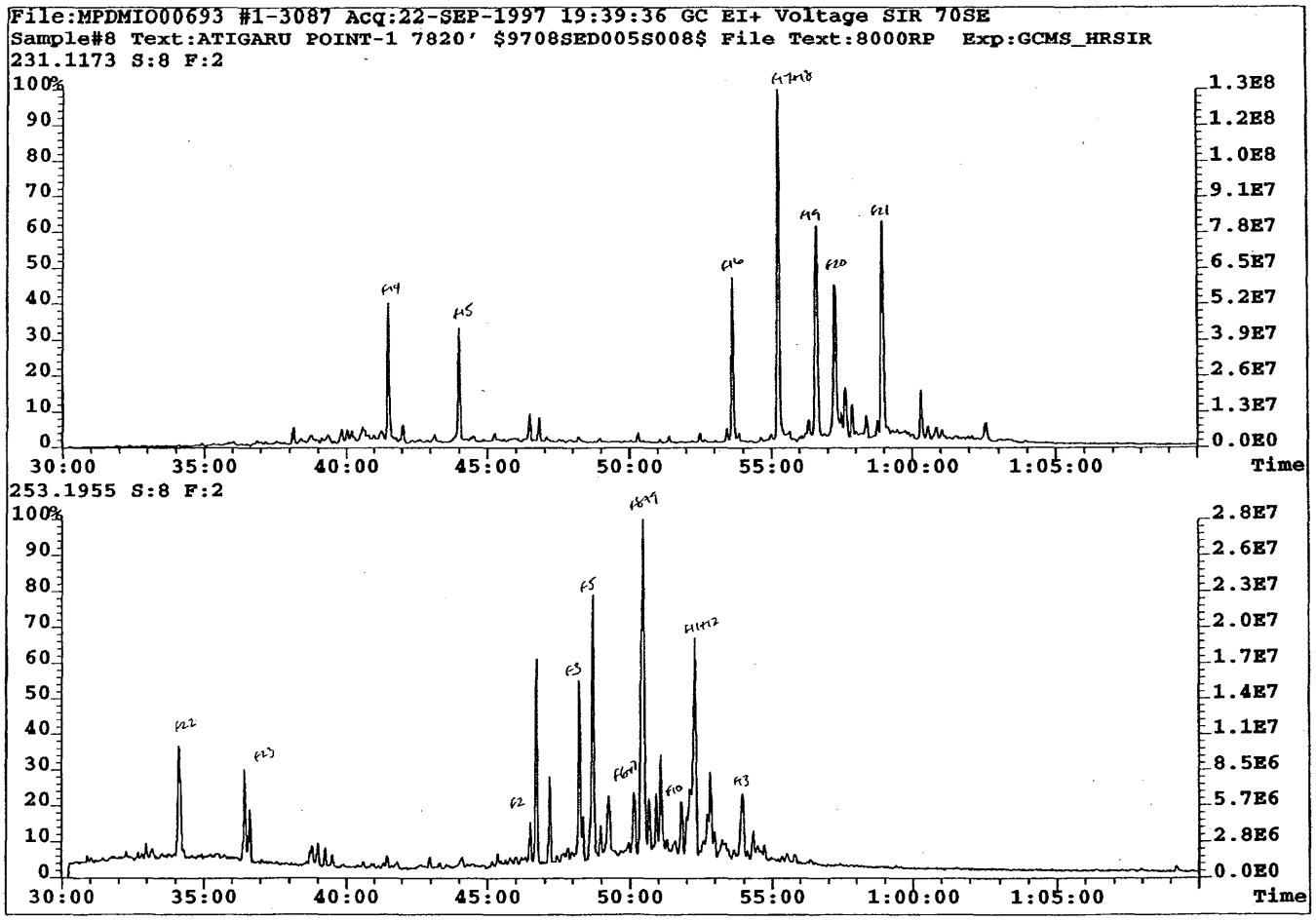

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:8 F:2
253.1955 S:8 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.3E8
1.2E8
1.0E8
9.1E7
7.8E7
6.5E7
5.2E7
3.9E7
2.6E7
1.3E7
0.0E0
2.8E7
2.6E7
2.3E7
2.0E7
1.7E7
1.4E7
1.1E7
8.5E6
5.7E6
2.8E6
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

Figure 10.1

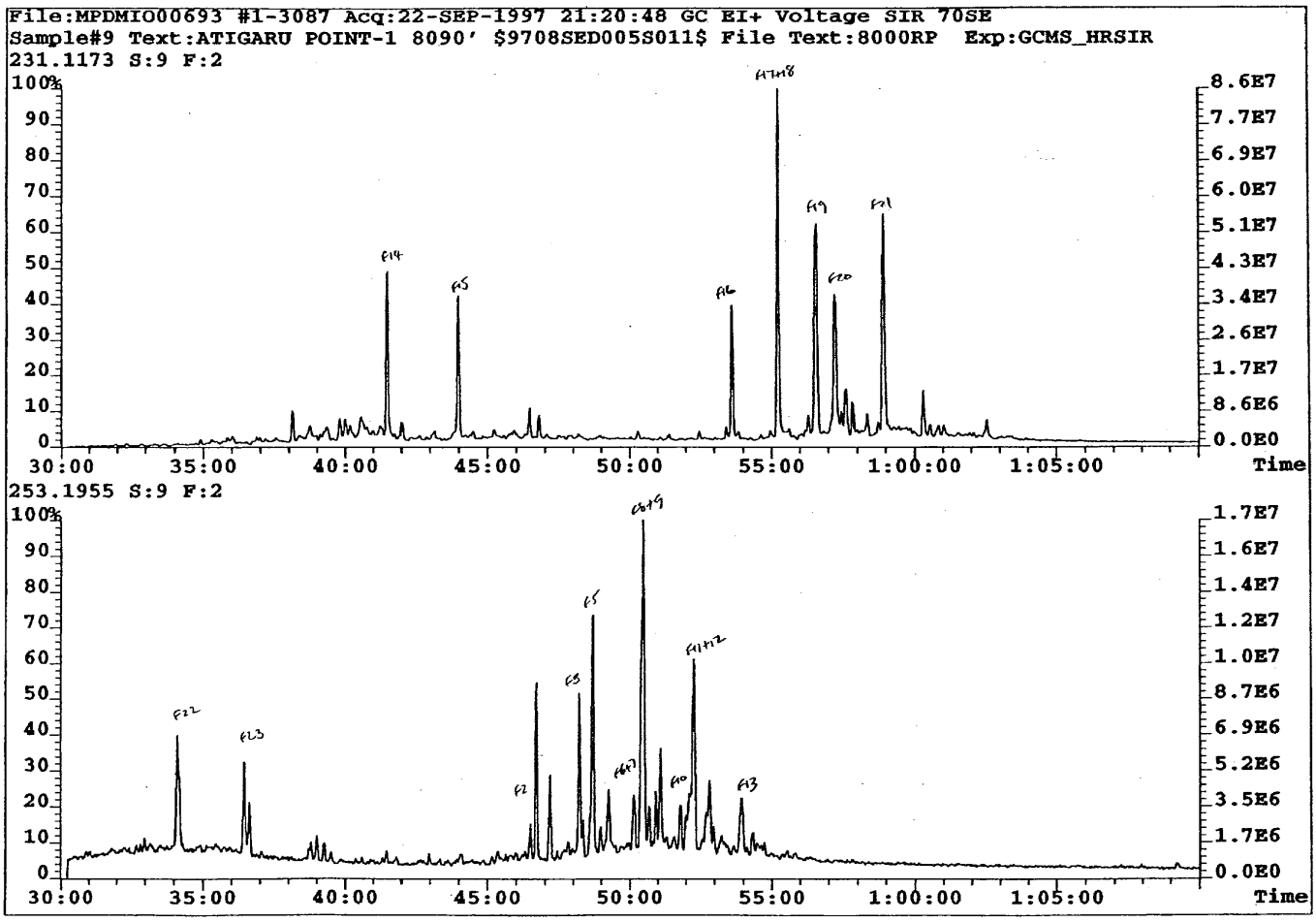

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:9 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.6E7
7.7E7
6.9E7
6.0E7
5.1E7
4.3E7
3.4E7
2.6E7
1.7E7
8.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:9 F:2
1.7E7
1.6E7
1.4E7
1.2E7
1.0E7
8.7E6
6.9E6
5.2E6
3.5E6
1.7E6
0.0E0

Figure 10.2

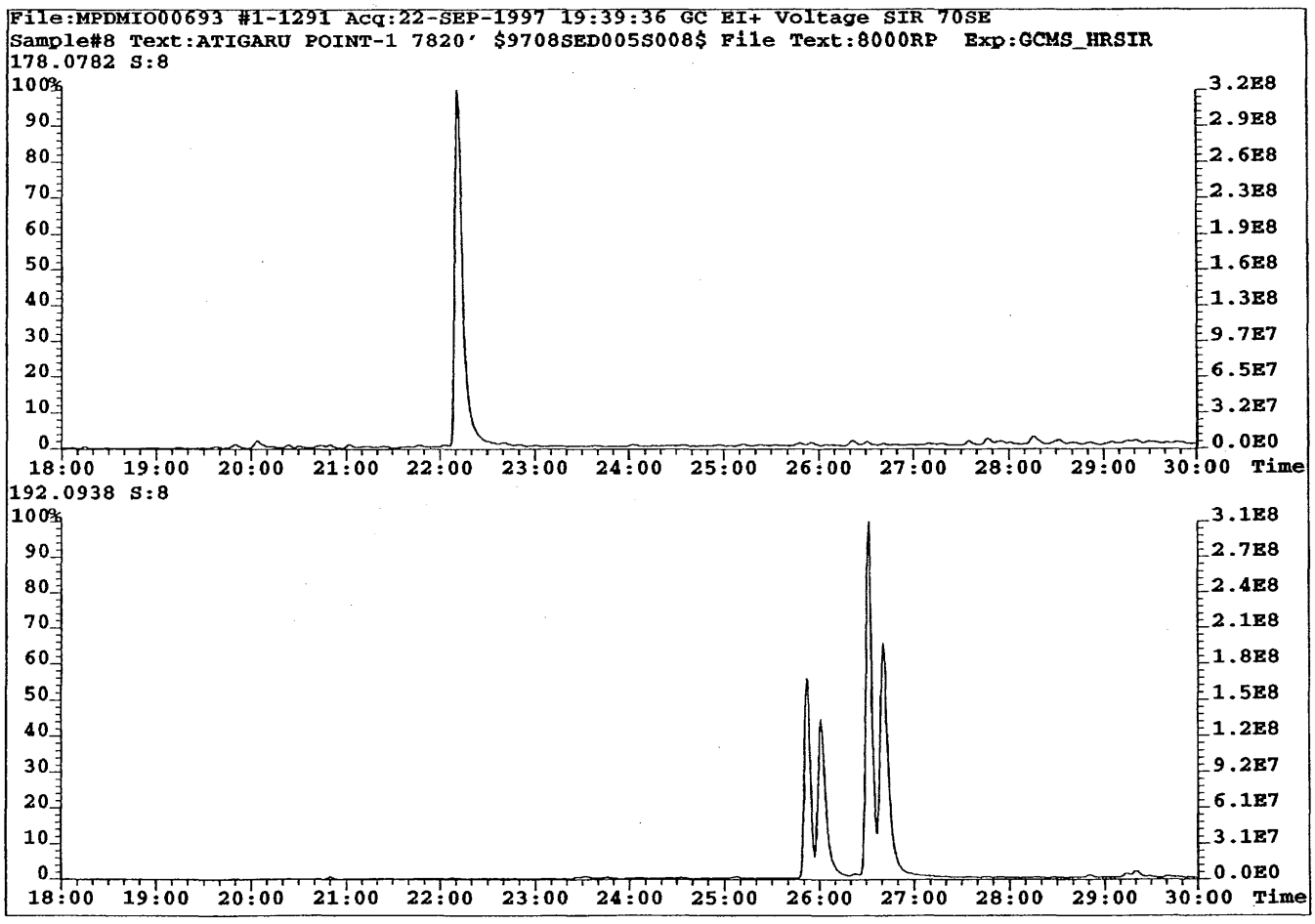

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:8
100%
90
80
70
60
50
40
30
20
10
0
3.2E8
2.9E8
2.6E8
2.3E8
1.9E8
1.6E8
1.3E8
9.7E7
6.5E7
3.2E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:8
100%
90
80
70
60
50
40
30
20
10
0
3.1E8
2.7E8
2.4E8
2.1E8
1.8E8
1.5E8
1.2E8
9.2E7
6.1E7
3.1E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 11.1

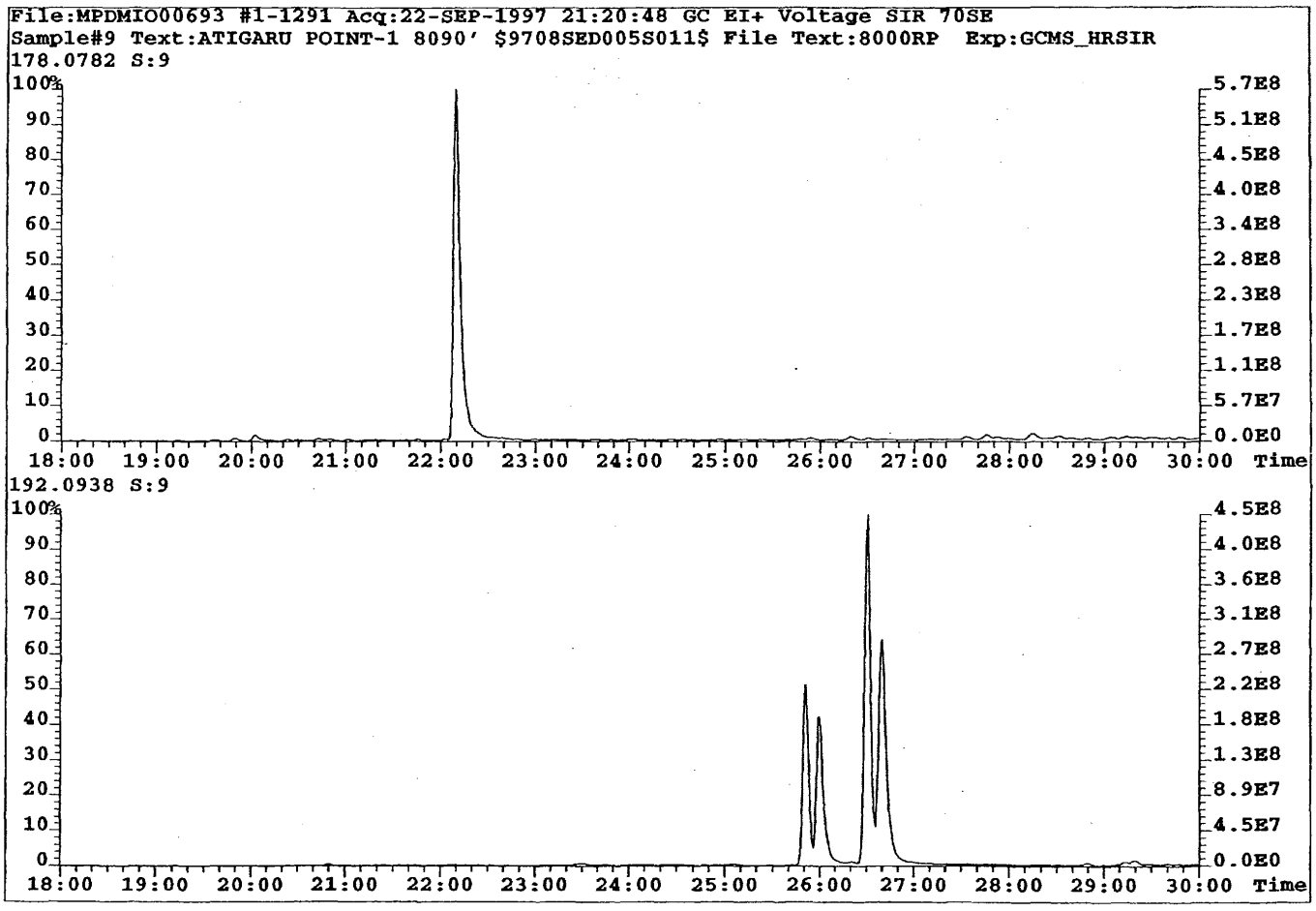

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:9
100%
90
80
70
60
50
40
30
20
10
0
5.7E8
5.1E8
4.5E8
4.0E8
3.4E8
2.8E8
2.3E8
1.7E8
1.1E8
5.7E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:9
100%
90
80
70
60
50
40
30
20
10
0
4.5E8
4.0E8
3.6E8
3.1E8
2.7E8
2.2E8
1.8E8
1.3E8
8.9E7
4.5E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 11.2

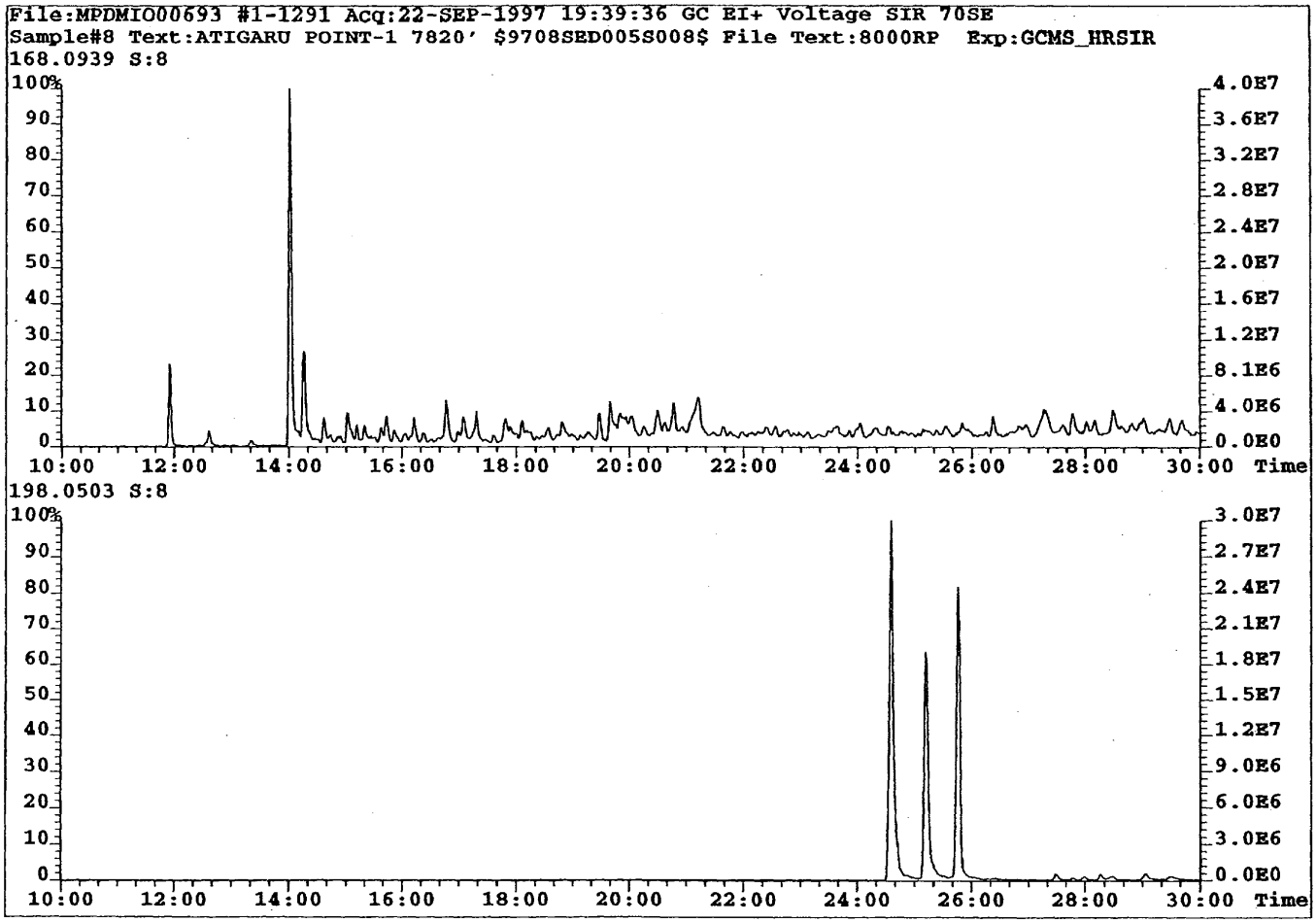

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 19:39:36 GC EI+ Voltage SIR 70SE
Sample#8 Text:ATIGARU POINT-1 7820' $9708SED005S008$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:8
100%
90
80
70
60
50
40
30
20
10
0
4.0E7
3.6E7
3.2E7
2.8E7
2.4E7
2.0E7
1.6E7
1.2E7
8.1E6
4.0E6
0.0E0
10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00 26:00 28:00 30:00 Time
198.0503 S:8
100%
90
80
70
60
50
40
30
20
10
0
3.0E7
2.7E7
2.4E7
2.1E7
1.8E7
1.5E7
1.2E7
9.0E6
6.0E6
3.0E6
0.0E0
10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00 26:00 28:00 30:00 Time

Figure 12.1

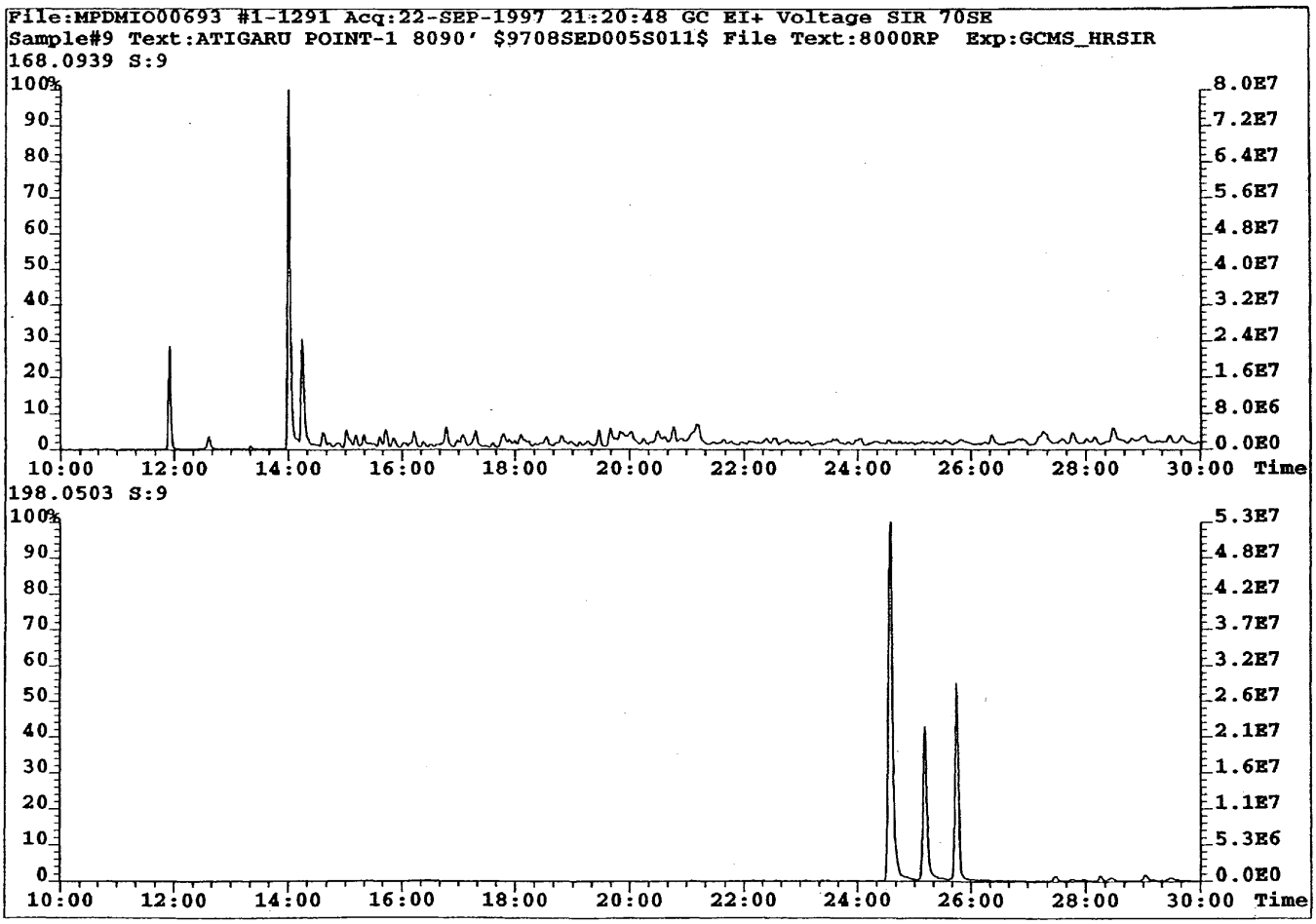

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 21:20:48 GC EI+ Voltage SIR 70SE
Sample#9 Text:ATIGARU POINT-1 8090' $9708SED005S011$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:9
100%
90
80
70
60
50
40
30
20
10
0
8.0E7
7.2E7
6.4E7
5.6E7
4.8E7
4.0E7
3.2E7
2.4E7
1.6E7
8.0E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:9
100%
90
80
70
60
50
40
30
20
10
0
5.3E7
4.8E7
4.2E7
3.7E7
3.2E7
2.6E7
2.1E7
1.6E7
1.1E7
5.3E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 12.2

East Teshekpuk-1 Data

TABLE 9

LITHOLOGY AND STRATIGRAPHY

COUNTRY: **Alaska**
WELL: **E. Teshekpuk-1**

DEPTH ft	DEPTHRANGE ft	FORMATION	AGE	LITHOLOGY	PICKED LITHOLOGY	SAMPLE TYPE
7090				MDST-m gy 100%	Mudstone	CUT
7180				MDST-dk gy shale 60%:SLTST-m gy 30%:SST-lt bn 10%	Mudstone	CUT
7270				MDST-dk gy shale 60%:SLTST-m gy 30%:SST-lt bn 10%	Mudstone	CUT
7360				MDST-dk gy shale 60%:SLTST-m gy 30%:SST-lt bn 10%	Mudstone	CUT
7450				MDST-dk gy shale 40%:SLTST-m bn 60%	Mudstone	CUT
7540				MDST-dk gy shale 40%:SLTST-m bn 60%	Mudstone	CUT
7630				MDST-m-dk gy shale 70%:SLTST-m bn 30%	Mudstone	CUT
7720				MDST-m-dk gy shale 80%:SLTST-m bn 20%	Mudstone	CUT
7810				MDST-m-dk gy shale 90%:SLTST-m bn 10%	Mudstone	CUT
7900				MDST-dk gy shale 95%:SLTST-m bn 5%	Mudstone	CUT
7990				MDST-dk gy shale 100%	Mudstone	CUT
8080				MDST-dk gy/bk shale 90%:SLTST-m bn 10%	Mudstone	CUT
8170				MDST-dk gy shale 80%:SLTST-m bn 20%	Mudstone	CUT
8260				MDST-dk gy shale 80%:SLTST-m bn 20%	Mudstone	CUT
8350				MDST-dk gy shale 80%:SLTST-m bn 20%	Mudstone	CUT
8440				MDST-dk gy calcareous occ. sndy 55%:QTZ-5%:LST-lt gy 40%	Mudstone	CUT
8550				MDST-dk gy occ. sndy 100%	Mudstone	CUT
8650				MDST-dk gy calcareous occ. sndy 15%:LST-m gy mddy 85%	Mudstone	CUT
8740				MDST-dk gy occ. sndy 30%:LST-m gy mddy 70%	Mudstone	CUT
8850				MDST-dk gy occ. sndy 40%:LST-m gy mddy 60%	Mudstone	CUT

TABLE 10

OPTICAL SOURCE ROCK MATURITY INDICATORS

COUNTRY Alaska
WELL: E Teshekpuk-1

DEPTH (ft)	FORMATION	VITRINITE (%Ro)	NO. of READINGS	CONFIDENCE	COMMENTS
7180		0.63	20	C	L-MOD; IPAR+WPAR 100% VWPAR+W TR;BS MOD+STR BW MOD;SP M.O. MOD
7900		0.73	20	D	MOD; IPAR 90% VW+WPAR 10%;BS MOD+STR BW MOD;SP M+D.O. Very L
8350		0.84	20	D	L-MOD; IPAR 100% VPAR+WPAR TR;BS MOD+STR BW MOD;SP M-D.O. L Amorphinite M.O. MOD

Confidence A=Excellent B=Good C=Average D=Poor E=Unreliable

Vitrinite Reflectance Thermal Maturity Plot

Well Name : E. Teshekpuk-1

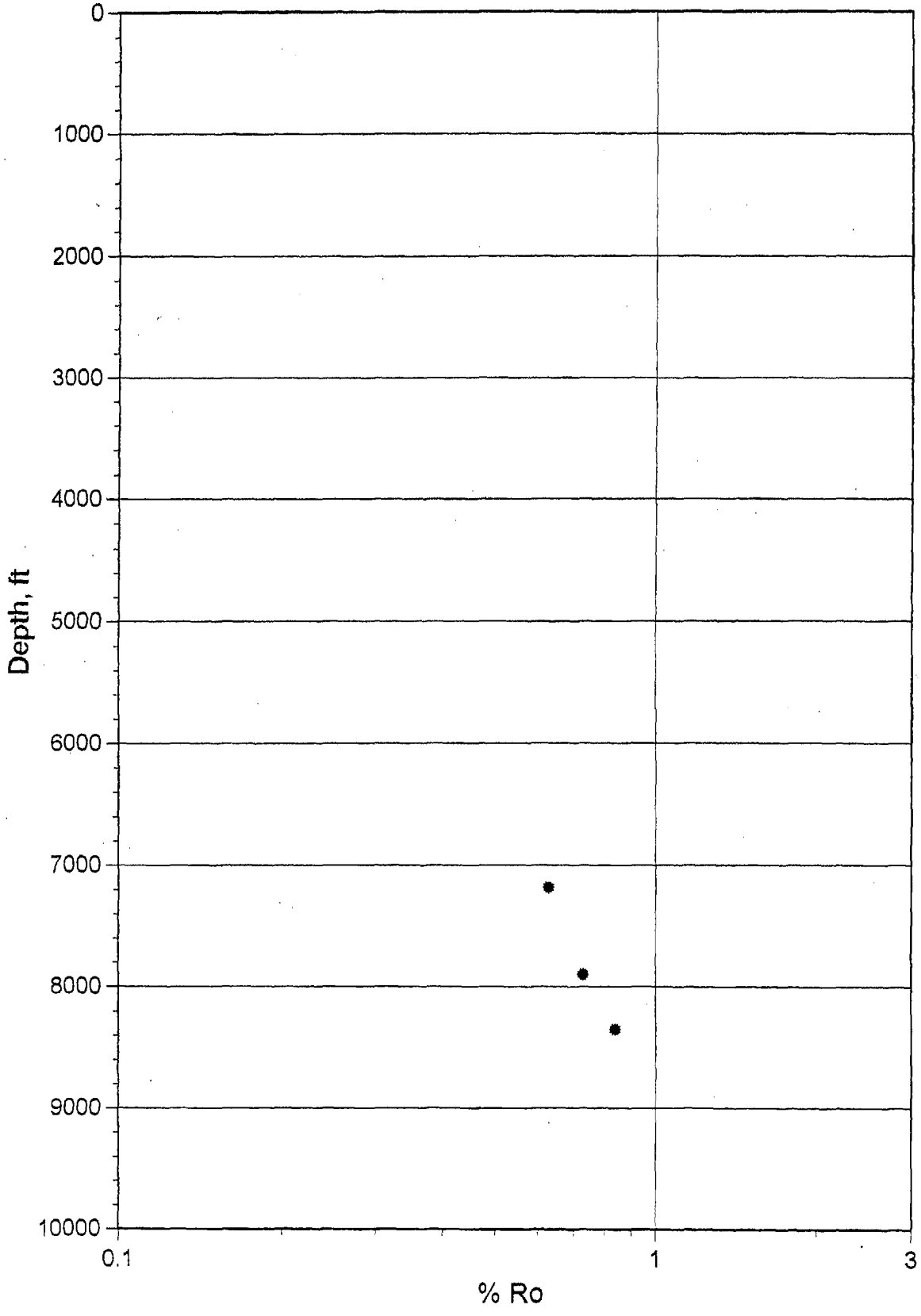


Figure 13

TABLE 11

SOURCE ROCK QUALITY INDICATORS

COUNTRY: Alaska
WELL: E. Teshekpuk-1

DEPTH (ft)	DEPTHRANGE (ft)	FORMATION	PICKED LITHOLOGY	P1 (kg/t)	P1 (mg/gC)	P2 (kg/t)	TOC (%)	TMAX deg C	HI	GOGI	CARBT (%)	S (%)
7090			Mudstone	2.21	54.4	7.61	4.07	445	187		11.04	2.01
7180			Mudstone	2.71	104.5	4.31	2.60	449	166		10.30	1.17
7270			Mudstone	1.77	69.2	3.16	2.56	450	124		8.49	0.94
7360			Mudstone	2.10	92.3	3.40	2.27	451	150		11.14	1.16
7450			Mudstone	1.91	72.1	3.17	2.65	450	120		7.14	1.20
7540			Mudstone	2.20	89.9	3.21	2.45	454	131		7.52	0.89
7630			Mudstone	1.62	89.7	2.76	1.81	453	152		7.32	0.96
7720			Mudstone	1.44	105.4	2.09	1.37	455	153		7.76	0.86
7810			Mudstone	1.30	107.2	1.81	1.22	454	149		7.59	1.16
7900			Mudstone	1.44	127.7	1.80	1.12	455	160		8.19	0.93
7990			Mudstone	1.46	114.8	1.90	1.27	454	150		7.84	1.10
8080			Mudstone	1.48	129.2	1.88	1.14	456	164		7.56	0.96
8170			Mudstone	1.66	132.2	2.19	1.26	455	174		7.39	0.94
8260			Mudstone	1.28	137.5	1.56	0.93	454	168		7.30	1.32
8350			Mudstone	1.37	109.3	1.86	1.25	455	148		9.38	0.98
8440			Mudstone	1.58	135.7	1.93	1.16	472	166		23.36	0.90
8550			Mudstone	1.87	75.1	2.40	2.49	456	96		6.87	1.63
8650			Mudstone	0.58	213.8	0.00	0.27	460	0		6.79	0.22
8740			Mudstone	1.22	148.6	1.40	0.82	451	171		15.95	0.45
8850			Mudstone	1.72	84.7	1.92	2.03	460	95		36.17	1.09

Sediment/Extract Analysis

Well name :	E. Teshekpuk-1
Suite name :	NPRA Study
Country Of Origin :	Alaska
Depth (m) :	7090
Sample name :	

Extraction

TSE %wt : 0.279

HPLC

Saturates %wt :	
Aromatics %wt :	
Residues %wt :	
Asphaltenes (Micro Method) %wt :	

Inspection Properties

API :	
Density @ 15 deg C :	
Wax Content %wt :	
Wax Melting Point deg C :	
Pour Point deg C :	
Viscocity cSt @ 20 deg C :	
Total Acidity mg KOH/g :	
Asphaltenes %wt (IP Method) :	
Nitrogen ppm :	
Sulphur %wt :	
Nickel ppm :	
Vanadium ppm :	
Nickel/Vanadium :	

Saturates GC

Pristane/Phytane :	
Pristane/nC17 :	
Phytane/nC18 :	
CPI :	
ALKIND :	
R22 :	

Biomarker Ratios

H1 :	0.56
H2 :	0.55
H3 :	0.89
H4 :	0
H5 :	100:51:41:22:14:5
H6 :	0.76
H7 :	0.60
H8 :	
H9 :	
H10 :	
H11 :	7.05
H12 :	4.05
H13 :	0.00
H14 :	23.39
H15 :	0.00
H16 :	0.00
H17 :	28.30
H18 :	0.00
S1 :	0.60
S2 :	0.57
S3 :	46:29:23
S4 :	37:26:35
S5 :	32.56
S6 :	
S7 :	66.39
S8 :	29.55
S9 :	
S10 :	
M2 :	0.59
M3 :	0.64
M4 :	52.64
M5 :	
A1 :	0.80
A2 :	0.85
A3 :	0.81
A4 :	0.62
A5 :	0.41
A6 :	1.25
MDR :	4.30
MBP :	5.24

Light Hydrocarbons

MCH % :	
HER :	
HXR :	

Stable Carbon Isotopes

Saturates :	
Total Oil :	-28.2
Aromatics :	
Residue :	
Asphaltenes :	
Kerogen :	-26.9
STANDARD:	NBS22 -29.8

Table 12.1

Sediment/Extract Analysis

Well name : E. Teshekpuk-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 7540
Sample name :

Extraction

TSE %wt : 0.091

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 :	0.57	S1 :	0.54	M2 :	0.81
H2 :	0.53	S2 :	0.53	M3 :	0.70
H3 :	0.87	S3 :	41:24:33	M4 :	70.62
H4 :	0	S4 :	32:28:38	M5 :	
H5 :	100:98:62:32:17:8	S5 :	44.28	A1 :	0.92
H6 :	0.55	S6 :		A2 :	0.89
H7 :	0.61	S7 :	55.09	A3 :	0.80
H8 :		S8 :	8.58	A4 :	0.56
H9 :		S9 :		A5 :	0.62
H10 :		S10 :		A6 :	1.94
H11 :	10.09			MDR :	5.18
H12 :	12.34			MBP :	17.77
H13 :	0.00				
H14 :	30.67				
H15 :	0.00				
H16 :	0.00				
H17 :	31.69				
H18 :	0.00				

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -26.6
Aromatics :
Residue :
Asphaltenes :
Kerogen : -23.7

STANDARD: NBS22 -29.8

Table 12.2

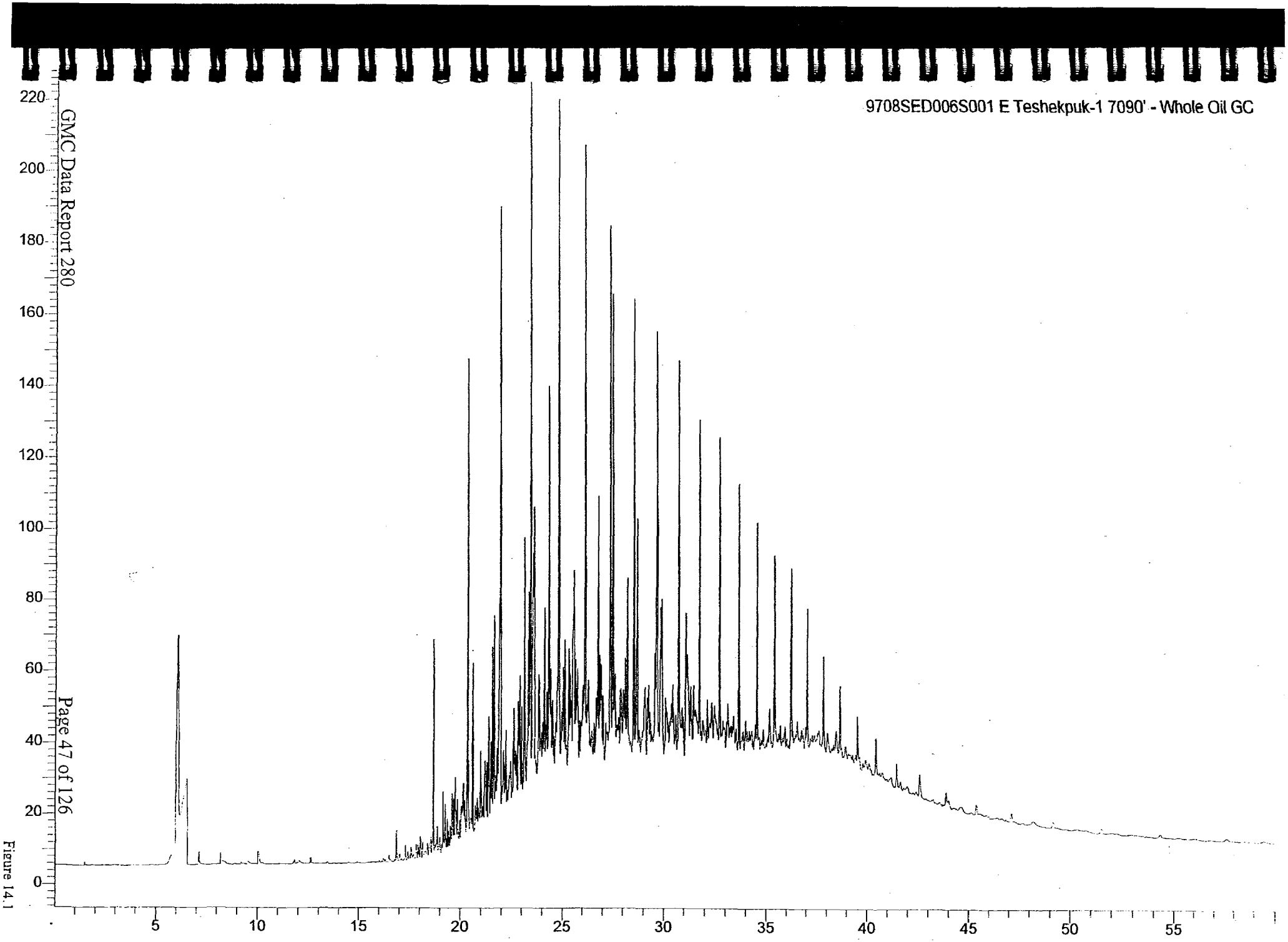
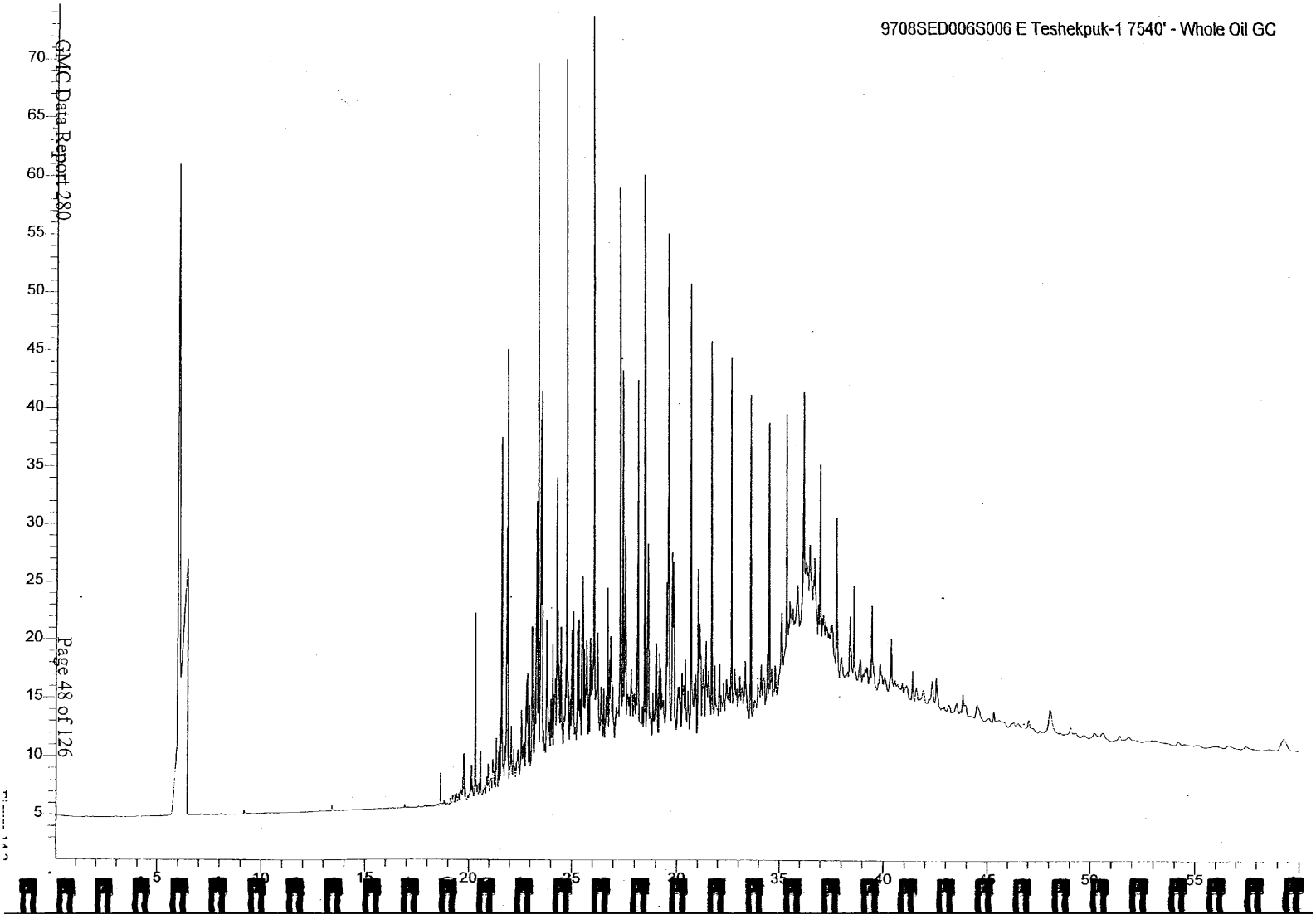

9708SED006S001 E Teshekpuk-1 7090' - Whole Oil GC
GMC Data Report 280
Page 47 of 126
220
200
180
160
140
120
100
80
60
40
20
0
5
10
15
20
25
30
35
40
45
50
55

Figure 14.1



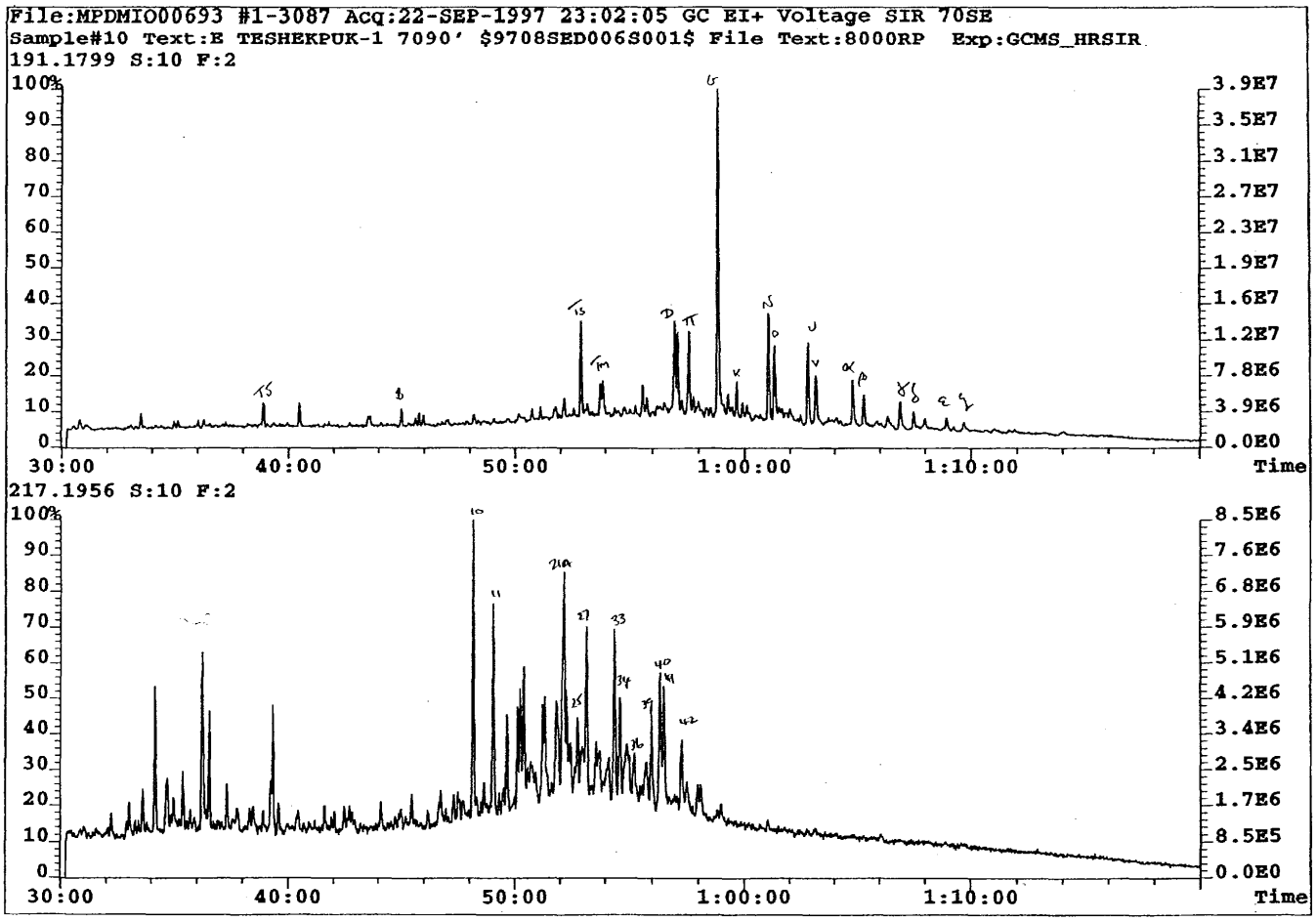

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:10 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.9E7
3.5E7
3.1E7
2.7E7
2.3E7
1.9E7
1.6E7
1.2E7
7.8E6
3.9E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:10 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.5E6
7.6E6
6.8E6
5.9E6
5.1E6
4.2E6
3.4E6
2.5E6
1.7E6
8.5E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 15.1

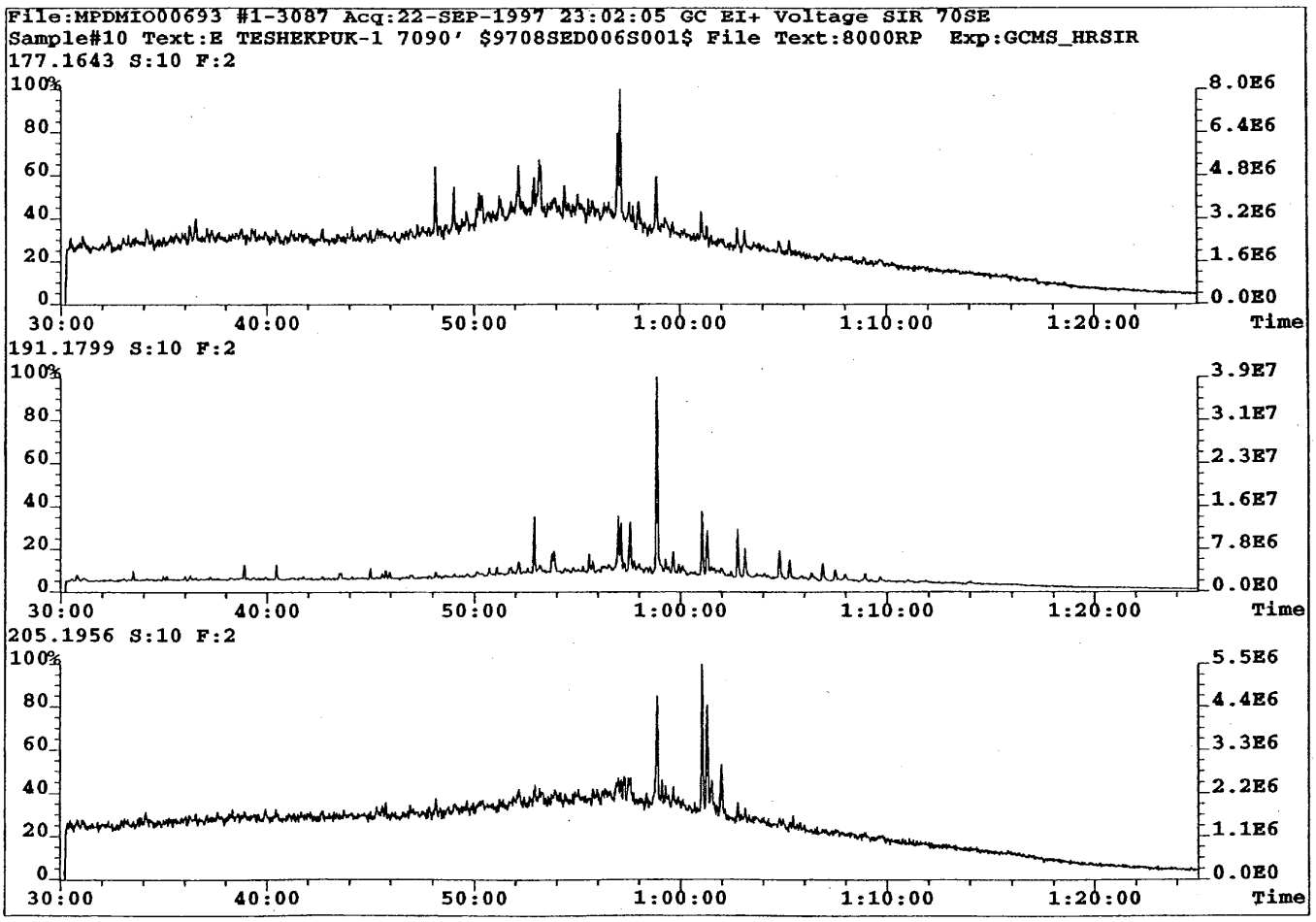

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:10 F:2
100%
80
60
40
20
0
8.0E6
6.4E6
4.8E6
3.2E6
1.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:10 F:2
100%
80
60
40
20
0
3.9E7
3.1E7
2.3E7
1.6E7
7.8E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:10 F:2
100%
80
60
40
20
0
5.5E6
4.4E6
3.3E6
2.2E6
1.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 15.2

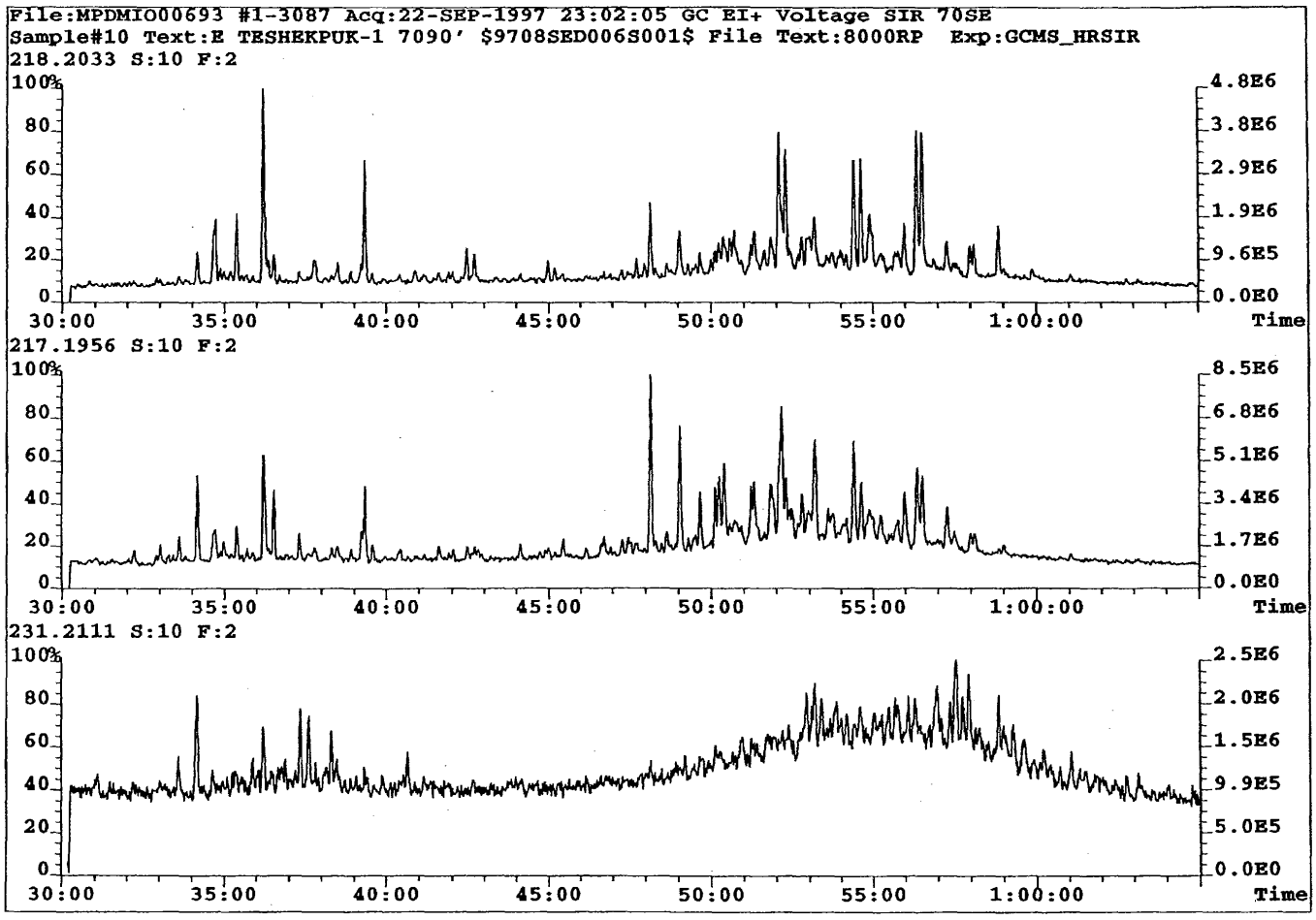

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:10 F:2
100%
80
60
40
20
0
4.8E6
3.8E6
2.9E6
1.9E6
9.6E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:10 F:2
100%
80
60
40
20
0
8.5E6
6.8E6
5.1E6
3.4E6
1.7E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:10 F:2
100%
80
60
40
20
0
2.5E6
2.0E6
1.5E6
9.9E5
5.0E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 15.3

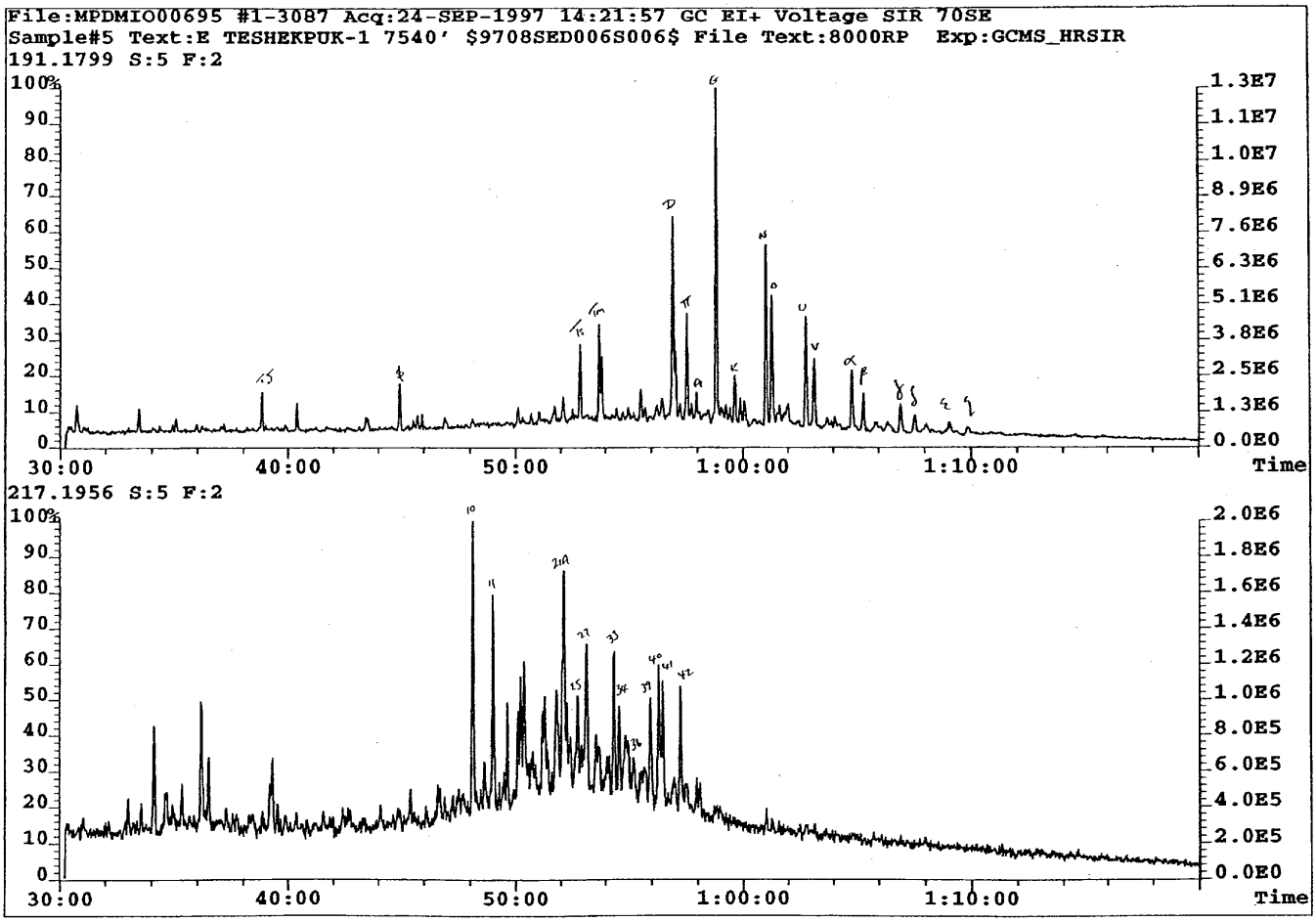

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:5 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.3E7
1.1E7
1.0E7
8.9E6
7.6E6
6.3E6
5.1E6
3.8E6
2.5E6
1.3E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:5 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.0E6
1.8E6
1.6E6
1.4E6
1.2E6
1.0E6
8.0E5
6.0E5
4.0E5
2.0E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 15.4

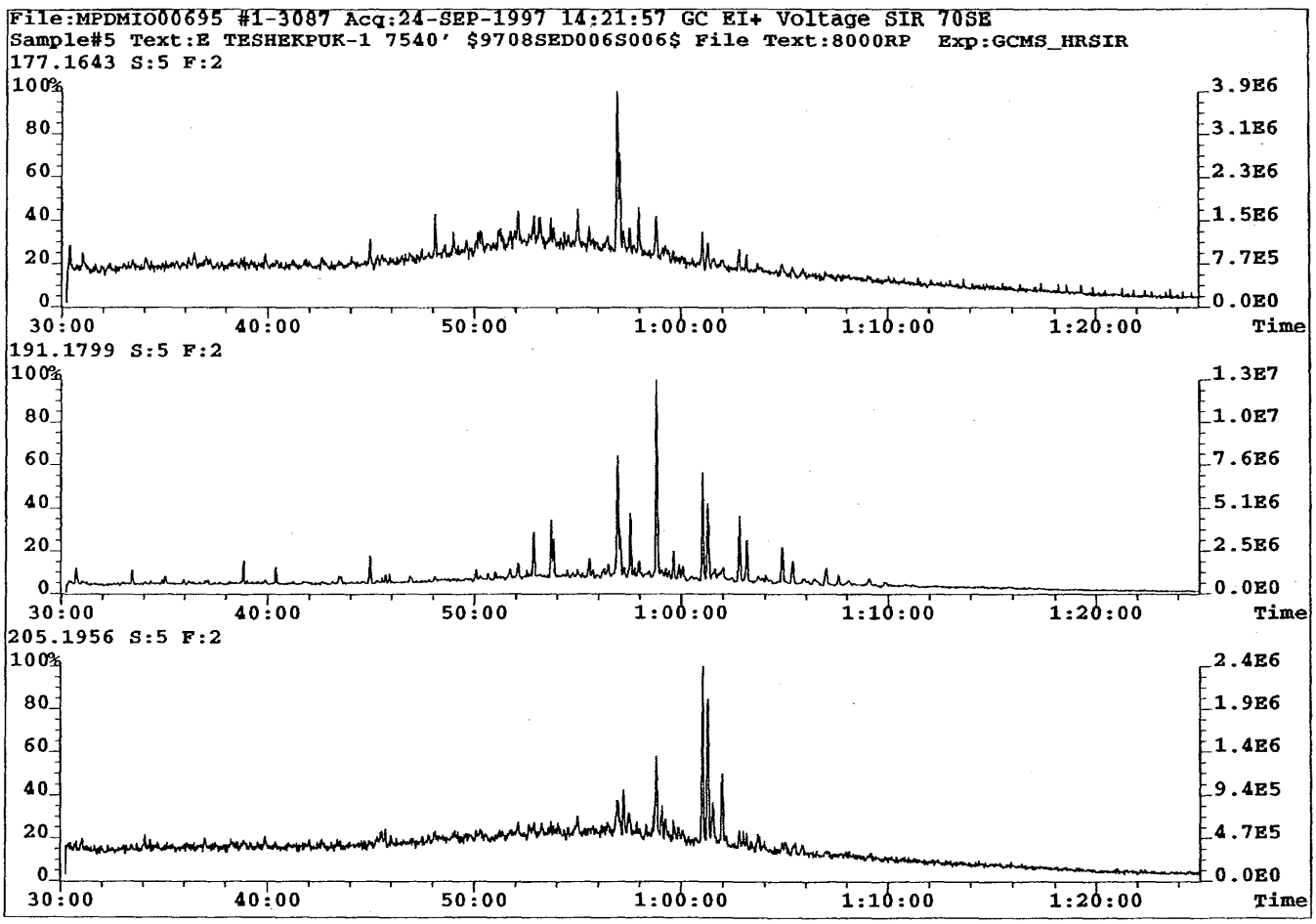

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:5 F:2
100%
80
60
40
20
0
3.9E6
3.1E6
2.3E6
1.5E6
7.7E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:5 F:2
100%
80
60
40
20
0
1.3E7
1.0E7
7.6E6
5.1E6
2.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:5 F:2
100%
80
60
40
20
0
2.4E6
1.9E6
1.4E6
9.4E5
4.7E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 15.5

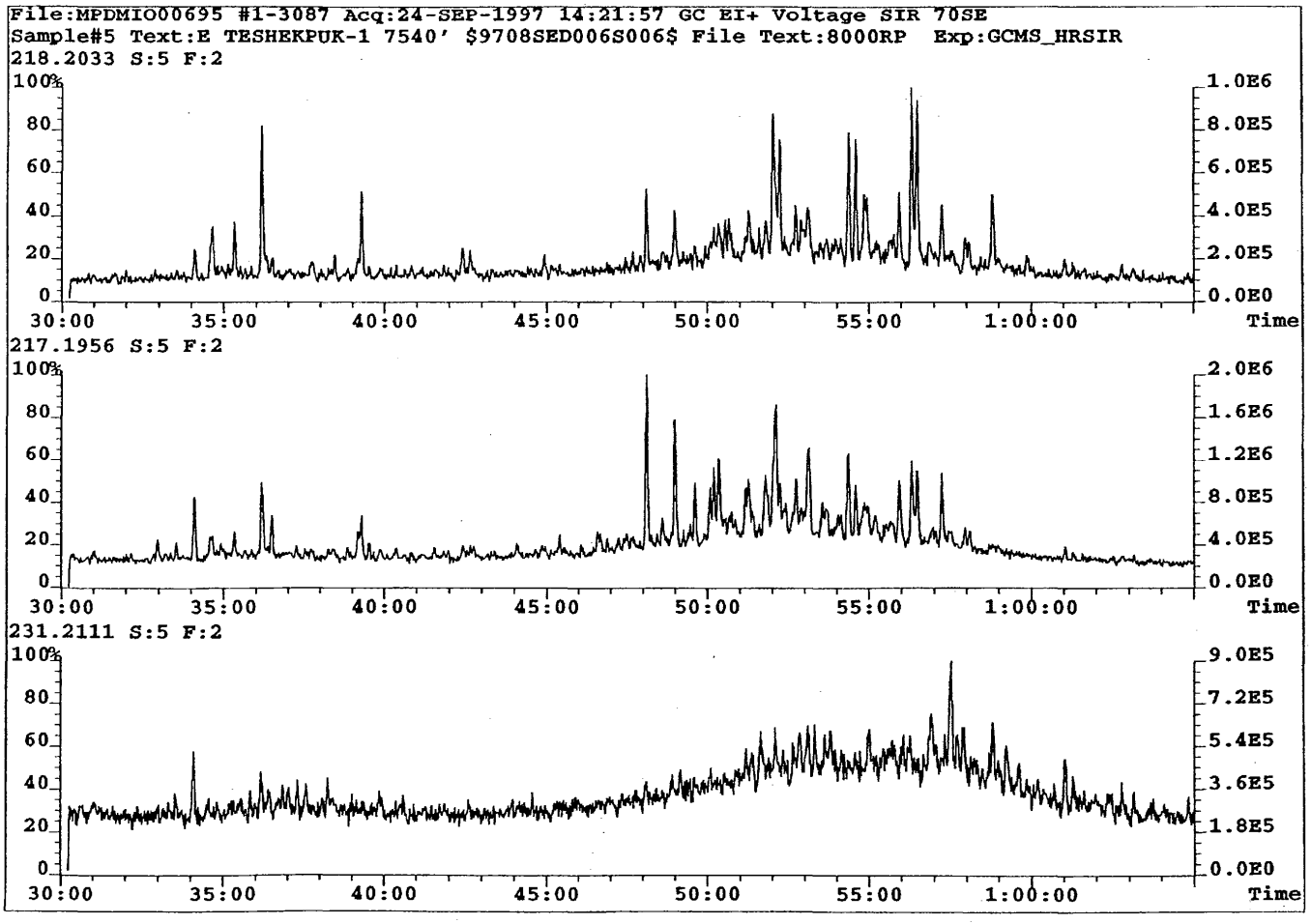

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:5 F:2
100%
80
60
40
20
0
1.0E6
8.0E5
6.0E5
4.0E5
2.0E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:5 F:2
100%
80
60
40
20
0
2.0E6
1.6E6
1.2E6
8.0E5
4.0E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:5 F:2
100%
80
60
40
20
0
9.0E5
7.2E5
5.4E5
3.6E5
1.8E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 15.6

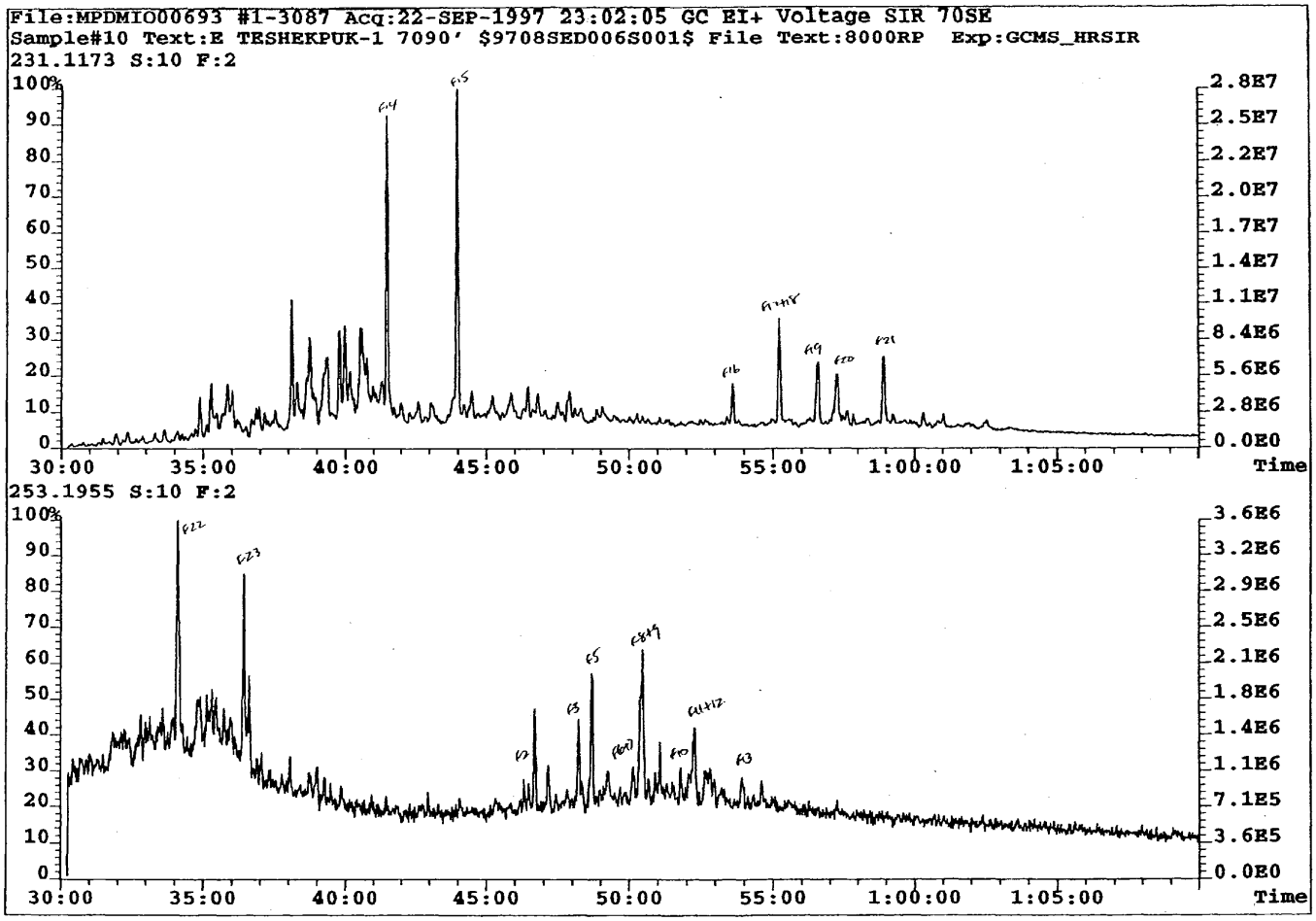

File:MPDMIO00693 #1-3087 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:10 F:2
253.1955 S:10 F:2
Time
Time

Figure 16.1

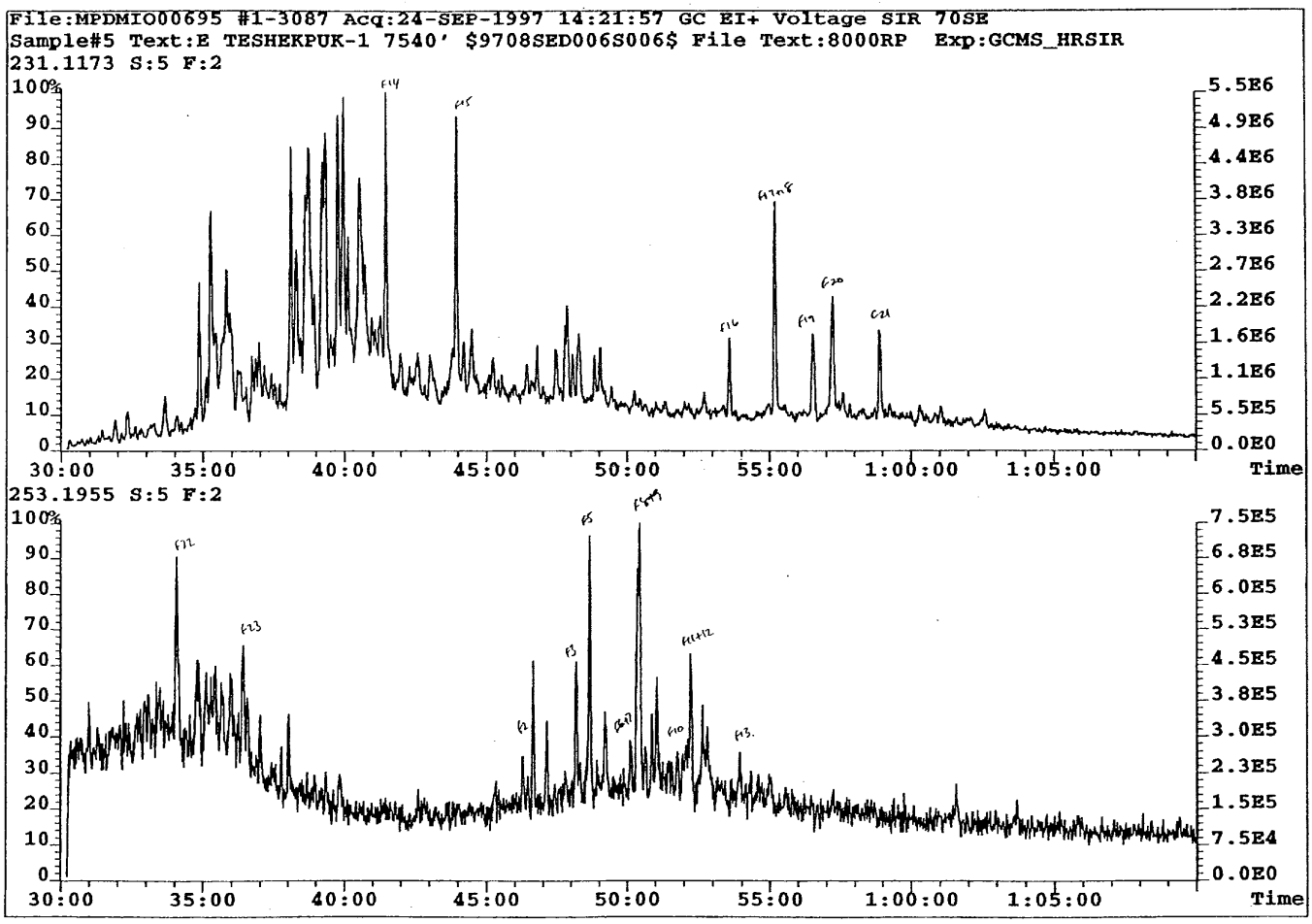

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:5 F:2
100%
90
80
70
60
50
40
30
20
10
0
5.5E6
4.9E6
4.4E6
3.8E6
3.3E6
2.7E6
2.2E6
1.6E6
1.1E6
5.5E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:5 F:2
100%
90
80
70
60
50
40
30
20
10
0
7.5E5
6.8E5
6.0E5
5.3E5
4.5E5
3.8E5
3.0E5
2.3E5
1.5E5
7.5E4
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

Figure 16.2

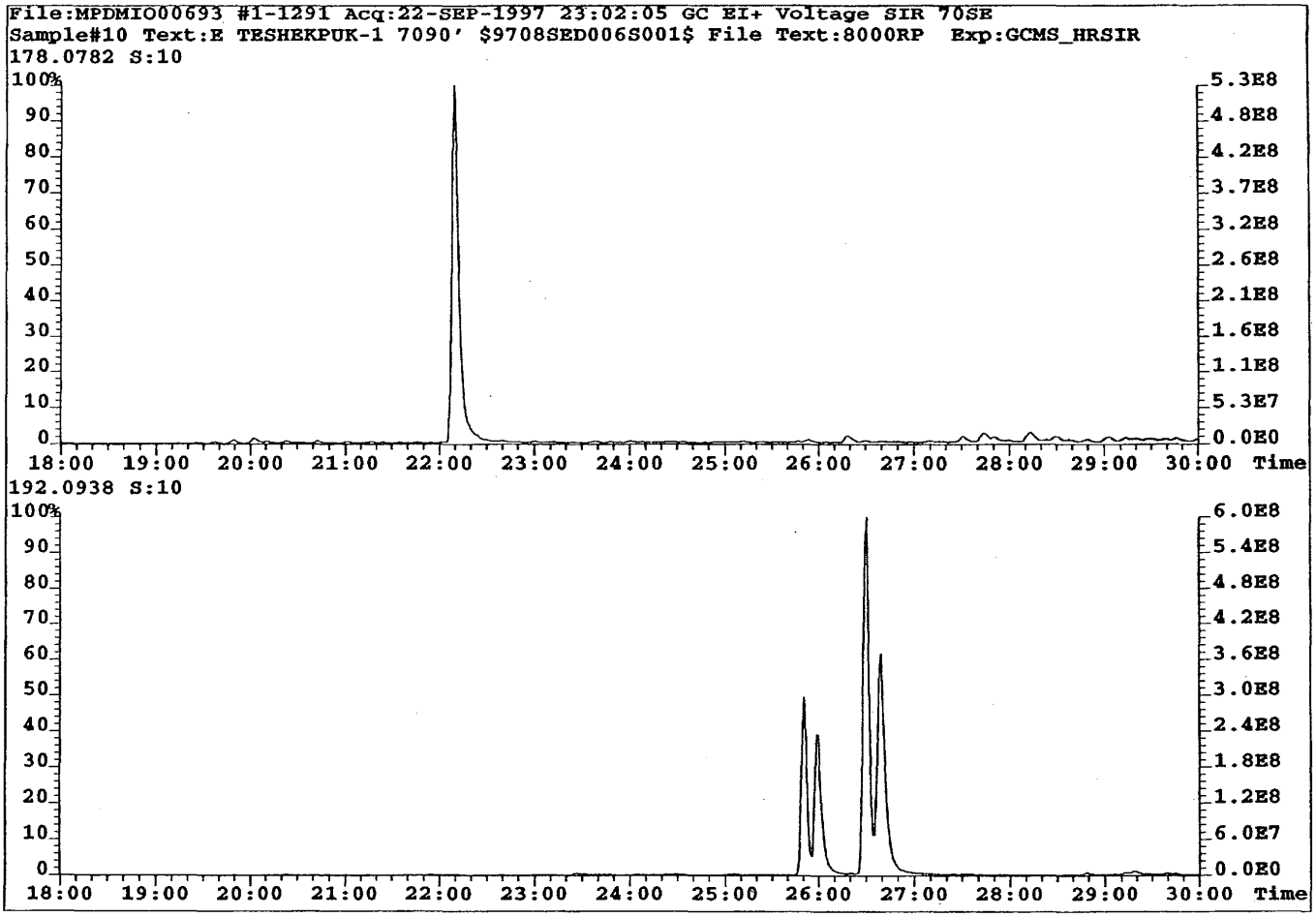

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:10
100%
90
80
70
60
50
40
30
20
10
0
5.3E8
4.8E8
4.2E8
3.7E8
3.2E8
2.6E8
2.1E8
1.6E8
1.1E8
5.3E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:10
100%
90
80
70
60
50
40
30
20
10
0
6.0E8
5.4E8
4.8E8
4.2E8
3.6E8
3.0E8
2.4E8
1.8E8
1.2E8
6.0E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 17.1

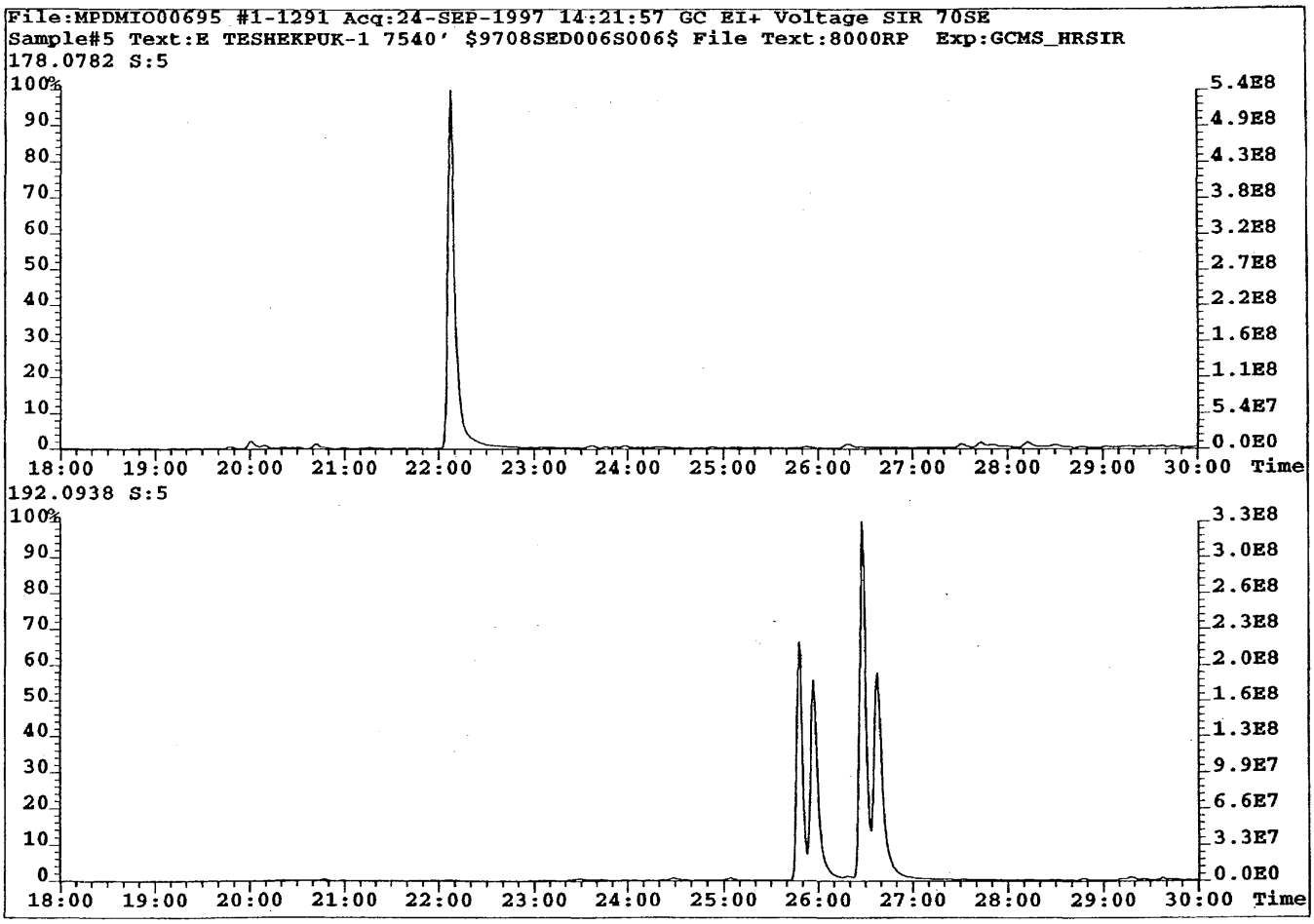

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:5
100%
90
80
70
60
50
40
30
20
10
0
5.4E8
4.9E8
4.3E8
3.8E8
3.2E8
2.7E8
2.2E8
1.6E8
1.1E8
5.4E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:5
100%
90
80
70
60
50
40
30
20
10
0
3.3E8
3.0E8
2.6E8
2.3E8
2.0E8
1.6E8
1.3E8
9.9E7
6.6E7
3.3E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 17.2

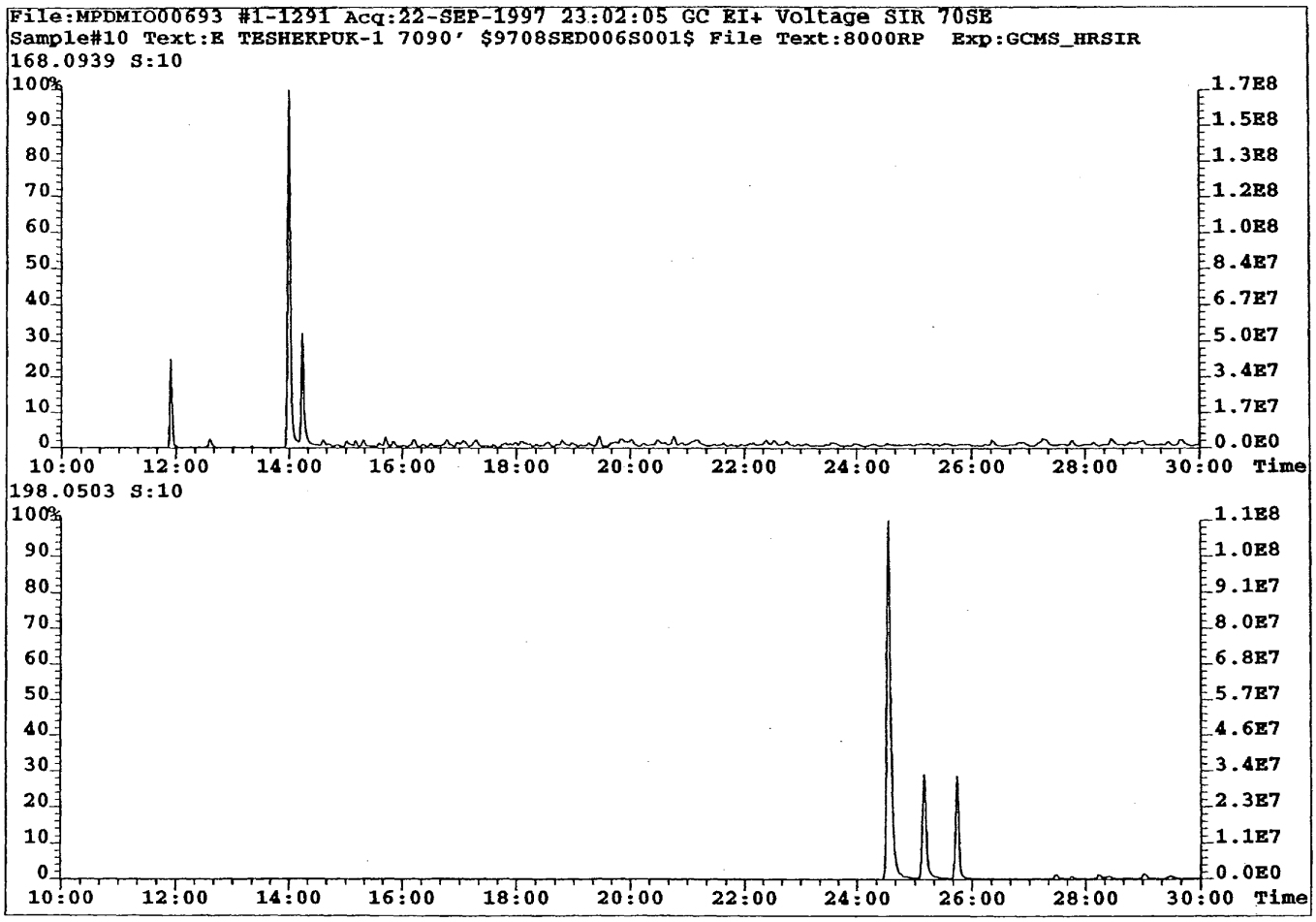

File:MPDMIO00693 #1-1291 Acq:22-SEP-1997 23:02:05 GC EI+ Voltage SIR 70SE
Sample#10 Text:E TESHEKPUK-1 7090' $9708SED006S001$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:10
100%
90
80
70
60
50
40
30
20
10
0
1.7E8
1.5E8
1.3E8
1.2E8
1.0E8
8.4E7
6.7E7
5.0E7
3.4E7
1.7E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:10
100%
90
80
70
60
50
40
30
20
10
0
1.1E8
1.0E8
9.1E7
8.0E7
6.8E7
5.7E7
4.6E7
3.4E7
2.3E7
1.1E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 18.1

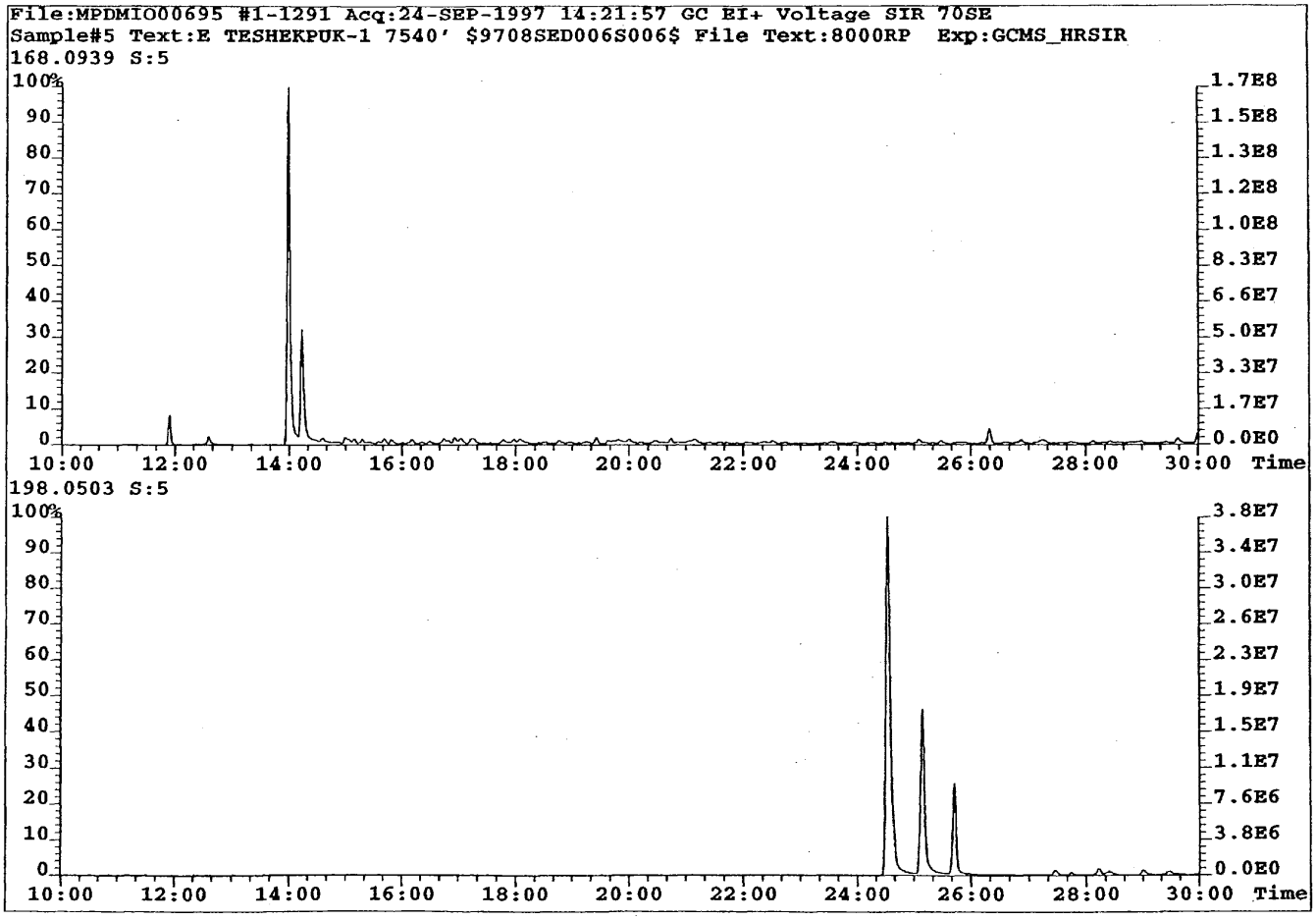

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 14:21:57 GC EI+ Voltage SIR 70SE
Sample#5 Text:E TESHEKPUK-1 7540' $9708SED006S006$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:5
100%
90
80
70
60
50
40
30
20
10
0
1.7E8
1.5E8
1.3E8
1.2E8
1.0E8
8.3E7
6.6E7
5.0E7
3.3E7
1.7E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:5
100%
90
80
70
60
50
40
30
20
10
0
3.8E7
3.4E7
3.0E7
2.6E7
2.3E7
1.9E7
1.5E7
1.1E7
7.6E6
3.8E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 18.2

South Harrison Bay-1 Data

TABLE 13

LITHOLOGY AND STRATIGRAPHY

COUNTRY: **Alaska**
WELL: **S. Harrison Bay-1**

DEPTH ft	DEPTHRANGE ft	FORMATION	AGE	LITHOLOGY	PICKED LITHOLOGY	SAMPLE TYPE
5700				SST-lt-m bn slty 65%:SST-lt bn/gy 30%:QTZ-5%	Mudstone	CUT
5800				SST-lt-m bn slty 65%:SST-lt bn/gy 30%:QTZ-5%	Mudstone	CUT
7200				MDST-m-dk gy 70%:SST-lt-m bn slty 30%:MDST-or Tr	Mudstone	CUT
7300				MDST-m-dk gy 70%:SST-lt-m bn slty 30%:MDST-or Tr	Mudstone	CUT
7400				MDST-m-dk gy 80%:SST-lt-m bn slty 10%:MDST-or 10%	Mudstone	CUT
7500				MDST-m-dk gy 80%:SST-lt-m bn slty 20%	Mudstone	CUT
7600				MDST-m-dk gy 70%:SST-lt-m bn slty 30%	Mudstone	CUT
7700				MDST-m-dk gy 80%:SST-lt-m bn slty 20%	Mudstone	CUT
7800				MDST-m-dk gy 90%:SST-lt-m bn slty 10%	Mudstone	CUT
7900				MDST-dk gy 80%:SST-lt-m bn slty 10%:MDST-or 10%	Mudstone	CUT
8000				MDST-m-dk gy 80%:SST-lt-m bn slty 20%:MDST-or Tr	Mudstone	CUT
8100				MDST-m-dk gy 70%:SST-lt-m bn slty 20%:MDST-or 10%	Mudstone	CUT
8200				MDST-m-dk gy 70%:SST-lt-m bn slty 20%:MDST-or 10%	Mudstone	CUT
8300				MDST-m-dk gy 70%:SST-lt-m bn slty 30%	Mudstone	CUT
8400				MDST-m-dk gy 70%:SST-lt-m bn slty 30%	Mudstone	CUT
8500				MDST-dk gy/bk shale 100%	Mudstone	CUT
8600				MDST-dk gy/bk shale 100%	Mudstone	CUT
8700				MDST-dk gy/bk shale 100%	Mudstone	CUT
8800				MDST-dk gy/bk shale 100%	Mudstone	CUT
8900				MDST-dk gy/bk shale 100%	Mudstone	CUT
9000				MDST-dk gy/bk shale 80%:SST-lt gy 20%	Mudstone	CUT
9100				MDST-bk shale 95%:LST-dk gy mddy 5%	Limestone	CUT
9200				MDST-bk shale 95%:LST-dk gy mddy 5%	Limestone	CUT

TABLE 14

OPTICAL SOURCE ROCK MATURITY INDICATORS

COUNTRY Alaska
WELL: S Harrison Bay-1

DEPTH (ft)	FORMATION	VITRINITE (%Ro)	NO. of READINGS	CONFIDENCE	COMMENTS
7200		0.59	20	C	MOD;IPAR 90% VWPAR+PAR 10% ;BS MOD BW MOD;SP L.O. L Amorphinite L.O. MOD
8100		0.63	20	C	MOD;IPAR 90% VWPAR+PAR 10% ;BS MOD/STR BW MOD;SP L+M.O. L Amorphinite L.O. MOD
9200		0.92	10	E	TR;IPAR 100% VPAR+WPAR TR;BS STR;HYD SPE Y/O-L.O. MOD Amorphinite L-M.O. L

Confidence A=Excellent B=Good C=Average D=Poor E=Unreliable

Vitrinite Reflectance Thermal Maturity Plot

Well Name : S. Harrison Bay-1

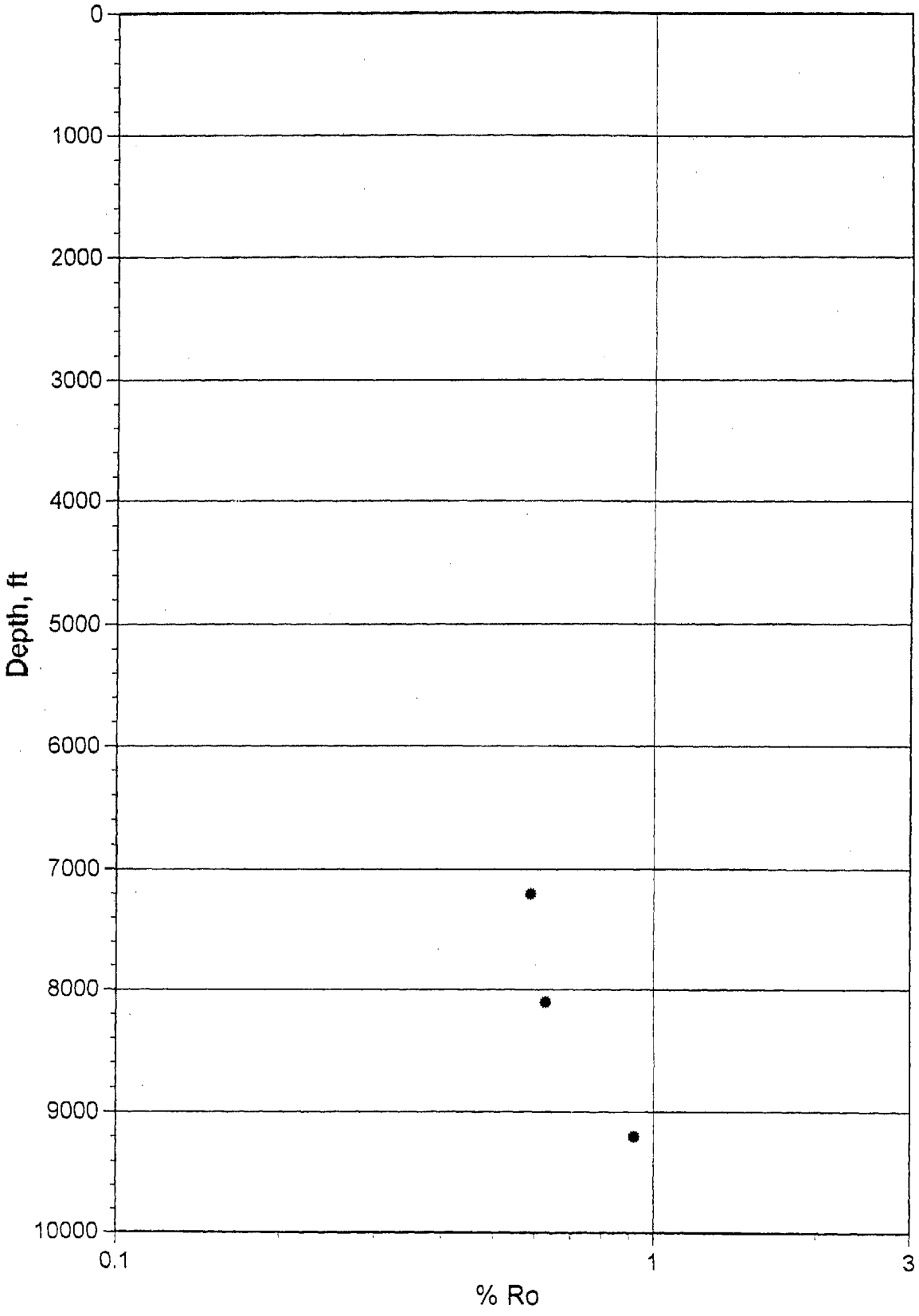


TABLE 15

SOURCE ROCK QUALITY INDICATORS

COUNTRY: Alaska
WELL: S. Harrison Bay-1

DEPTH (ft)	DEPTHRANGE (ft)	FORMATION	PICKED LITHOLOGY	P1 (kg/t)	P1 (mg/gC)	P2 (kg/t)	TOC (%)	TMAX deg C	HI	GOGI	CARBT (%)	S (%)
5700			Sandstone									
5800			Sandstone									
7200			Mudstone	1.17	92.0	1.67	1.28	496	131		20.37	0.13
7300			Mudstone	0.93	80.1	1.31	1.16	460	113		15.80	0.02
7400			Mudstone	0.97	87.1	1.42	1.12	478	127		14.11	0.78
7500			Mudstone	0.99	91.4	1.45	1.08	448	133		10.26	1.15
7600			Mudstone	0.85	85.6	1.50	0.99	436	150		10.27	1.50
7700			Mudstone	1.07	98.5	1.83	1.08	441	169		8.70	1.52
7800			Mudstone	0.70	58.4	1.56	1.21	441	129		8.40	1.04
7900			Mudstone	0.94	72.6	2.16	1.29	493	168		8.48	0.43
8000			Mudstone	1.07	89.8	1.90	1.20	445	159		9.75	0.31
8100			Mudstone	1.12	80.1	2.09	1.40	447	149		10.05	0.32
8200			Mudstone	0.90	67.2	1.59	1.34	451	119		10.08	2.10
8300			Mudstone	1.31	83.1	2.15	1.57	445	137		7.94	2.03
8400			Mudstone	0.93	58.4	2.35	1.60	443	147		9.76	1.48
8500			Mudstone	1.18	57.4	4.23	2.06	446	205		13.85	0.78
8600			Mudstone	1.61	71.3	4.72	2.26	447	209		6.47	0.86
8700			Mudstone	1.41	63.8	5.36	2.20	446	243		7.21	0.84
8800			Mudstone	1.43	61.5	5.02	2.32	447	216		8.60	0.96
8900			Mudstone	1.31	51.6	5.50	2.53	450	217		7.13	0.98
9000			Mudstone	1.10	51.9	3.99	2.12	448	188		6.76	1.10
9100			Limestone	1.53	106.5	2.41	1.44	455	168		75.83	0.66
9200			Limestone	1.21	75.1	2.49	1.62	444	154		65.49	0.69

Sediment/Extract Analysis

Well name : S. Harrison Bay-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 5700
Sample name :

Extraction

TSE %wt : 0.035

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.49
H2 : 0.46
H3 : 0.80
H4 : 0
H5 : 100:82:43:19:14:8
H6 : 0.28
H7 : 0.48
H8 :
H9 :
H10 :
H11 : 4.27
H12 : 2.99
H13 : 4.76
H14 : 9.05
H15 : 0.00
H16 : 0.00
H17 : 38.03
H18 : 0.00

S1 : 0.31
S2 : 0.42
S3 : 24:20:54
S4 : 27:29:42
S5 : 42.75
S6 :
S7 : 31.29
S8 : 15.32
S9 :
S10 :

M2 : 0.56
M3 : 0.51
M4 : 65.19
M5 :
A1 : 0.18
A2 : 0.23
A3 : 0.39
A4 : 0.19
A5 : 0.32
A6 : 1.11
MDR : 1.75
MBP : 18.40

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -28.3
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

Table 16.1

Sediment/Extract Analysis

Well name : S. Harrison Bay-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 5800
Sample name :

Extraction

TSE %wt : 0.043

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.54
H2 : 0.52
H3 : 0.86
H4 : 0
H5 : 100:65:43:24:17:10
H6 : 0.41
H7 : 0.55
H8 :
H9 :
H10 :
H11 : 3.86
H12 : 2.61
H13 : 0.00
H14 : 9.03
H15 : 0.00
H16 : 0.00
H17 : 38.07
H18 : 0.00

S1 : 0.47
S2 : 0.47
S3 : 30:27:41
S4 : 28:29:42
S5 : 35.46
S6 :
S7 : 42.25
S8 : 18.17
S9 :
S10 :

M2 : 0.51
M3 : 0.54
M4 : 58.95
M5 :
A1 : 0.35
A2 : 0.38
A3 : 0.23
A4 : 0.13
A5 : 0.22
A6 : 0.84
MDR : 1.88
MBP : 78.77

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -28.9
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

Table 16.2

Sediment Extract Analysis

Well name : S. Harrison Bay-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8600
Sample name :

Extraction

TSE %wt : 0.191

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :

Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.56
H2 : 0.53
H3 : 0.89
H4 : 0
H5 : 100:64:61:34:25:13
H6 : 0.58
H7 : 0.59
H8 :
H9 :
H10 :
H11 : 4.51
H12 : 5.14
H13 : 2.08
H14 : 45.12
H15 : 0.00
H16 : 0.00
H17 : 35.62
H18 : 0.00

S1 : 0.60
S2 : 0.56
S3 : 40:31:27
S4 : 32:27:39
S5 : 31.90
S6 :
S7 : 59.45
S8 : 33.49
S9 :
S10 :

M2 : 0.62
M3 : 0.67
M4 : 55.64
M5 :
A1 : 0.78
A2 : 0.84
A3 : 0.76
A4 : 0.61
A5 : 0.38
A6 : 0.77
MDR : 5.34
MBP : 5.22

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -29.1
Aromatics :
Residue :
Asphaltenes :
Kerogen : -29

STANDARD: NBS22 -29.8

Table 16.3

Sediment/Extract Analysis

Well name : S. Harrison Bay-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8700
Sample name :

Extraction

TSE %wt : 0.215

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.57
H2 : 0.53
H3 : 0.89
H4 : 0
H5 : 100:67:60:34:23:12
H6 : 0.52
H7 : 0.58
H8 :
H9 :
H10 :
H11 : 4.70
H12 : 5.11
H13 : 2.54
H14 : 44.03
H15 : 0.00
H16 : 0.00
H17 : 34.24
H18 : 0.00

S1 : 0.55
S2 : 0.59
S3 : 37:27:35
S4 : 33:27:38
S5 : 44.24
S6 :
S7 : 51.17
S8 : 27.38
S9 :
S10 :

M2 : 0.61
M3 : 0.65
M4 : 61.53
M5 :
A1 : 0.84
A2 : 0.87
A3 : 0.77
A4 : 0.62
A5 : 0.41
A6 : 0.79
MDR : 5.59
MBP : 4.79

Light Hydrocarbons

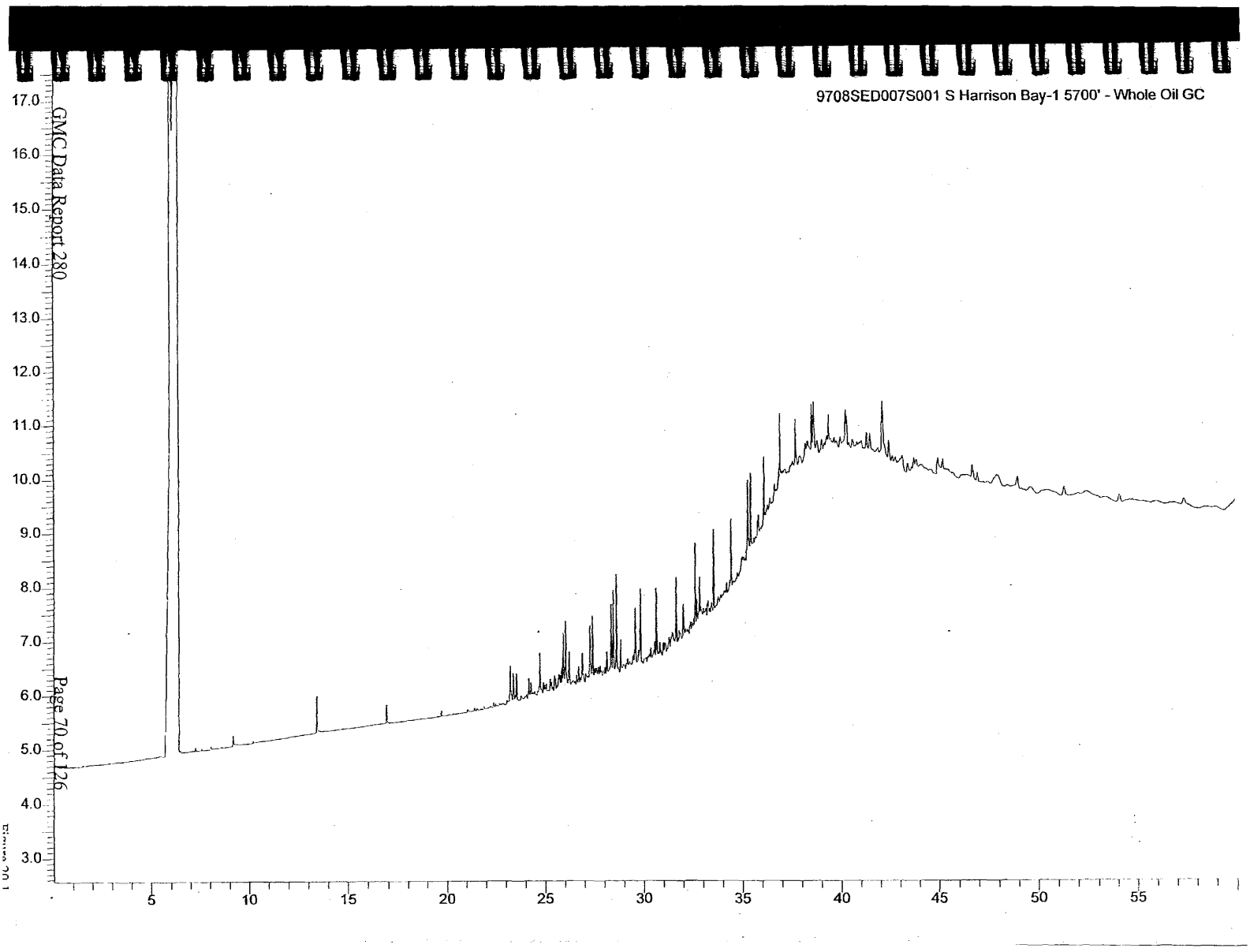
MCH % :
HER :
HXR :

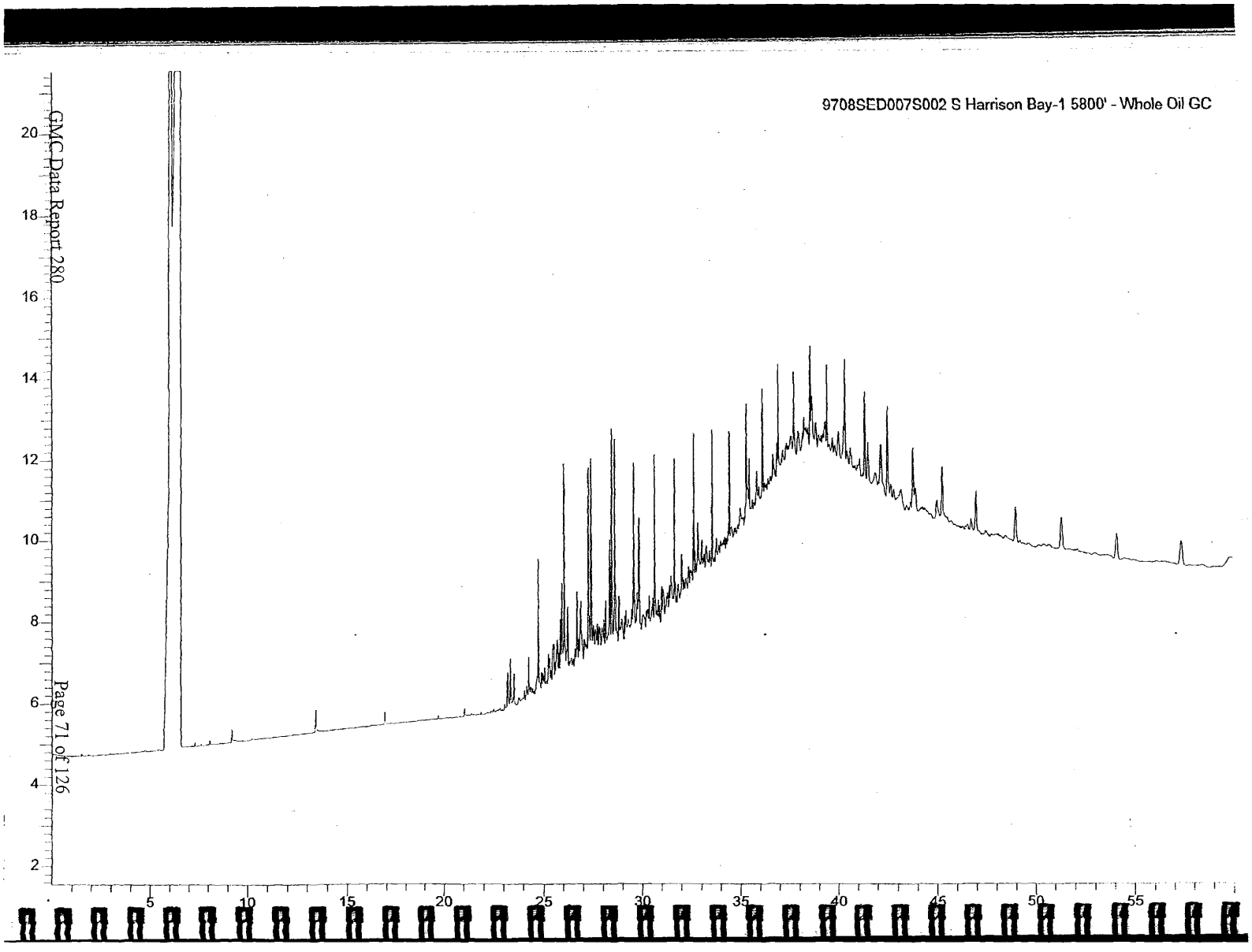
Stable Carbon Isotopes

Saturates :
Total Oil : -30.3
Aromatics :
Residue :
Asphaltenes :
Kerogen : -29.4

STANDARD: NBS22 -29.8

Table 16.4


9708SED007S001 S Harrison Bay-1 5700' - Whole Oil GC
GMC Data Report 280
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
5
10
15
20
25
30
35
40
45
50
55


9708SED007S002 S Harrison Bay-1 5800' - Whole Oil GC
GMC Data Report 280
Page 71 of 126
20
18
16
14
12
10
8
6
4
2
5
10
15
20
25
30
35
40
45
50
55

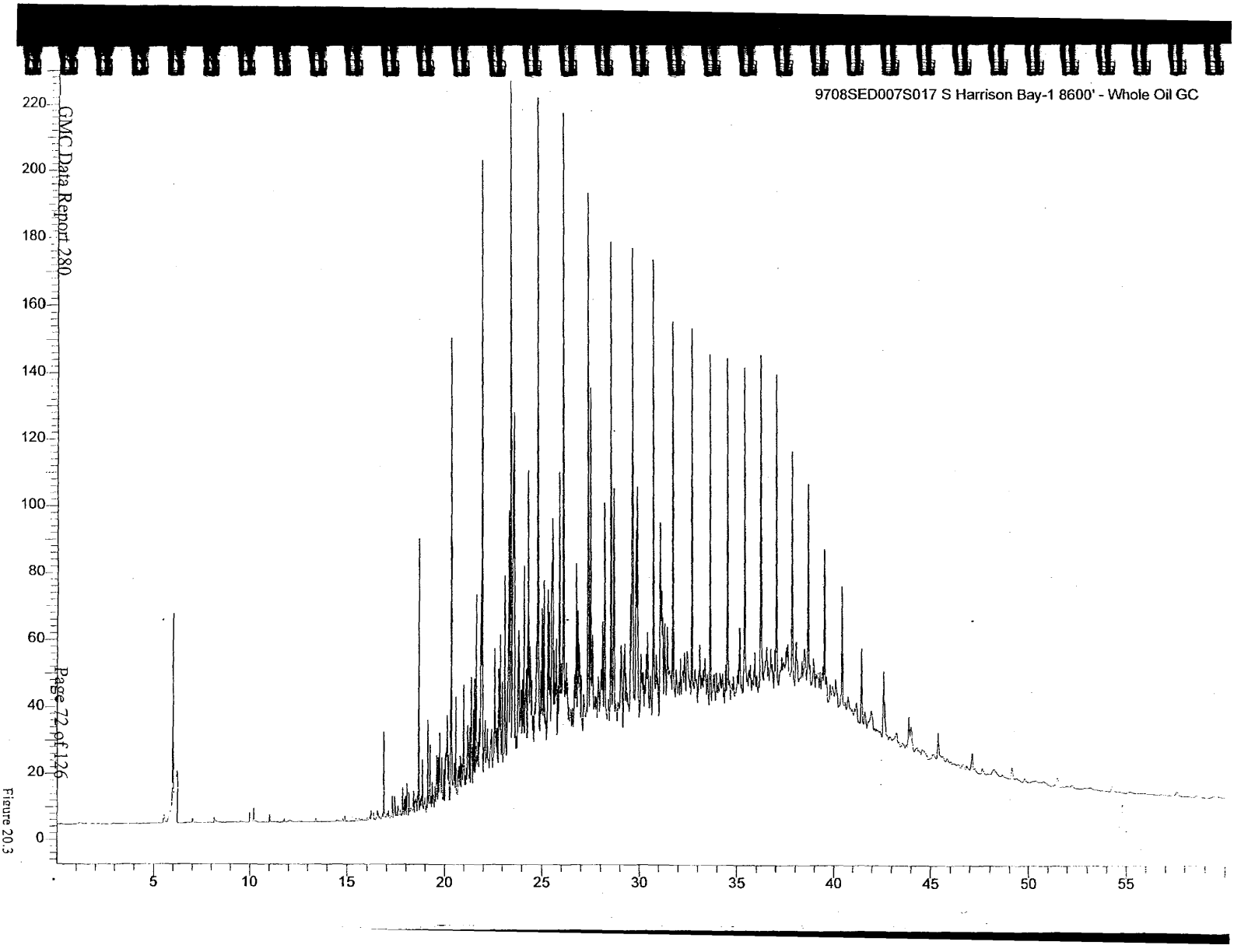

9708SED007S017 S Harrison Bay-1 8600' - Whole Oil GC
GMC Data Report 280
Page 72 of 126
220
200
180
160
140
120
100
80
60
40
20
0
5
10
15
20
25
30
35
40
45
50
55

Figure 20.3

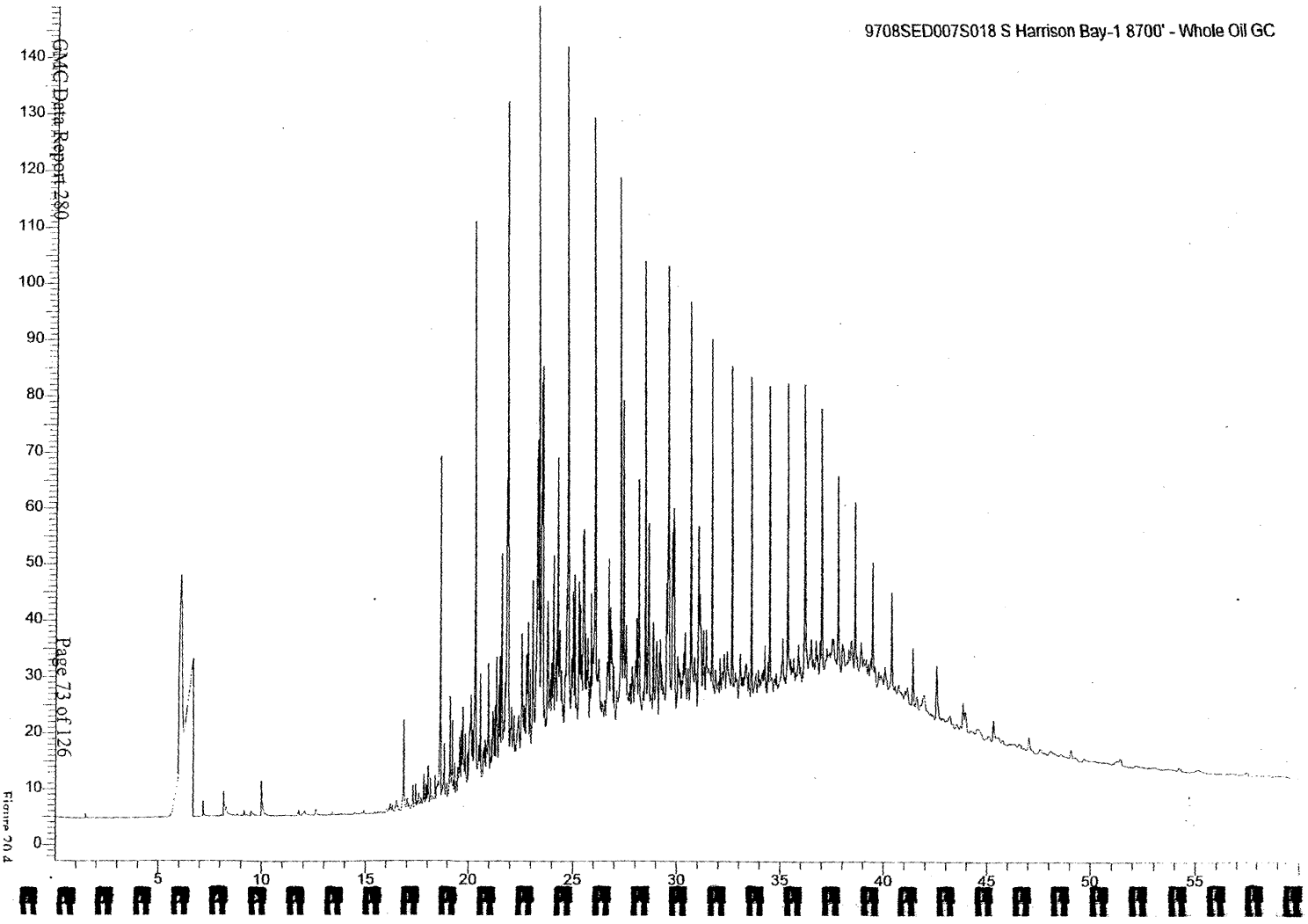

9708SED007S018 S Harrison Bay-1 8700' - Whole Oil GC
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55

Figure 20 d

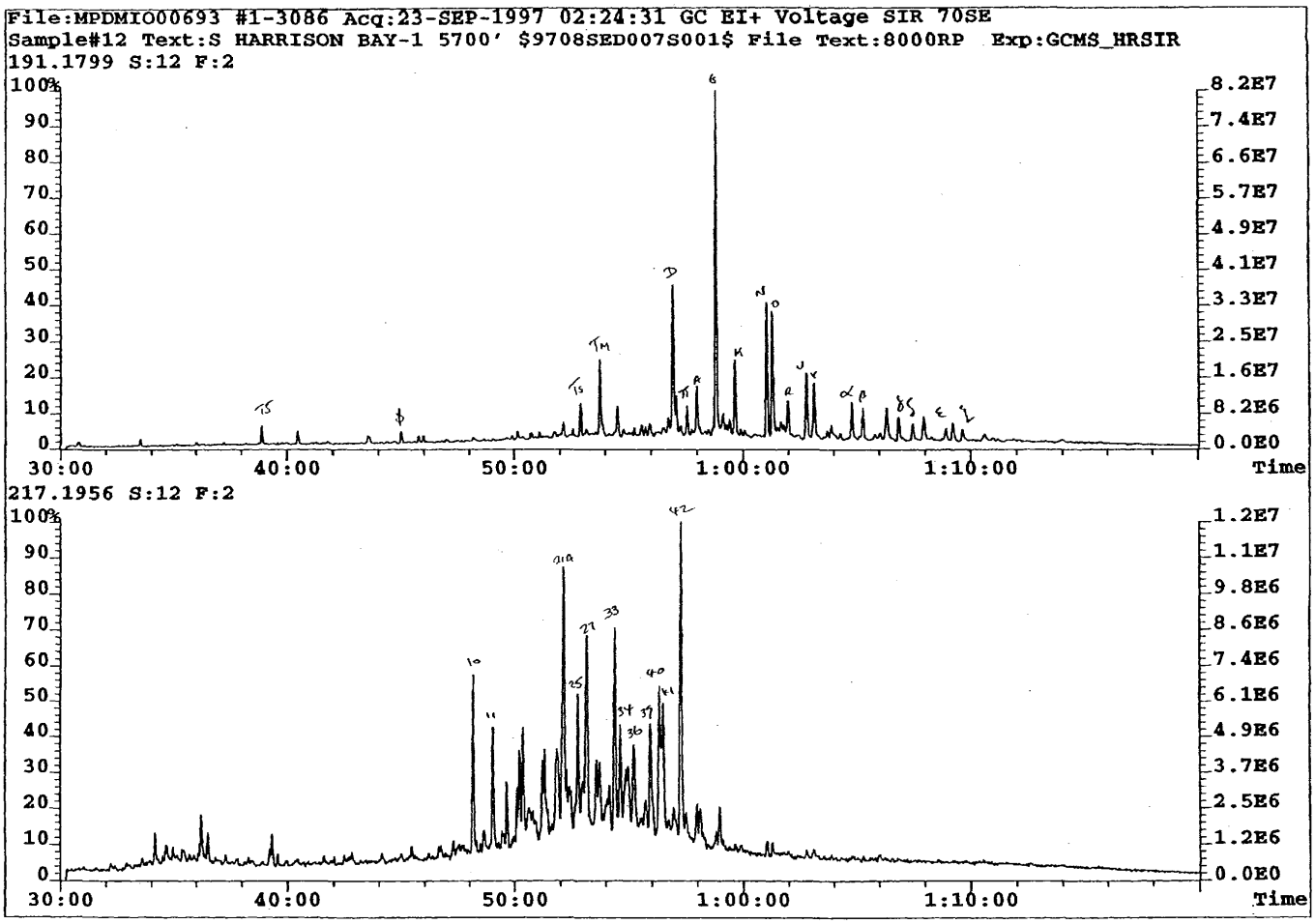

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:12 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.2E7
7.4E7
6.6E7
5.7E7
4.9E7
4.1E7
3.3E7
2.5E7
1.6E7
8.2E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:12 F:2
1.2E7
1.1E7
9.8E6
8.6E6
7.4E6
6.1E6
4.9E6
3.7E6
2.5E6
1.2E6
0.0E0

Figure 21.1

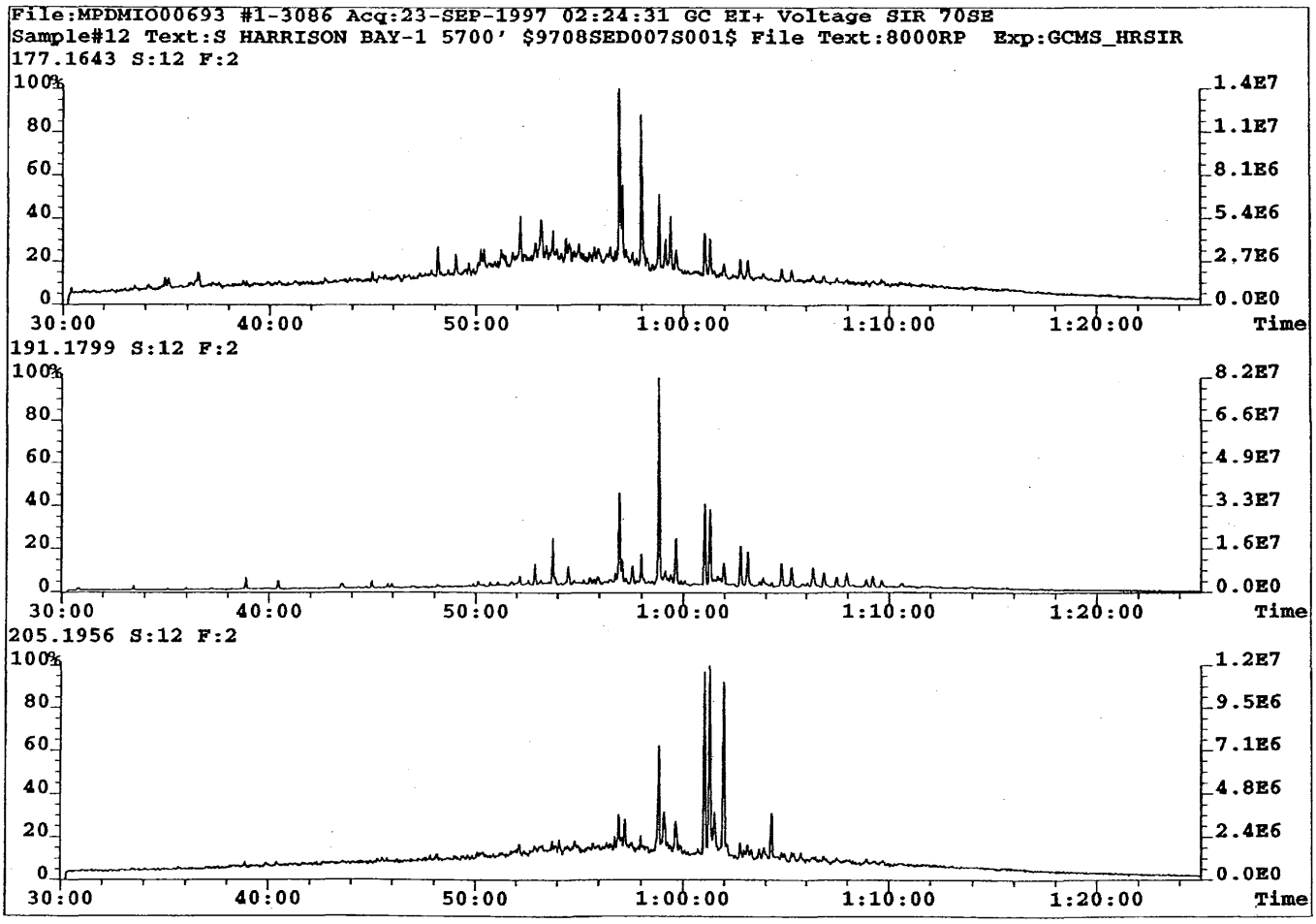

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:12 F:2
100%
80
60
40
20
0
1.4E7
1.1E7
8.1E6
5.4E6
2.7E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:12 F:2
8.2E7
6.6E7
4.9E7
3.3E7
1.6E7
0.0E0
205.1956 S:12 F:2
1.2E7
9.5E6
7.1E6
4.8E6
2.4E6
0.0E0

Figure 21.2

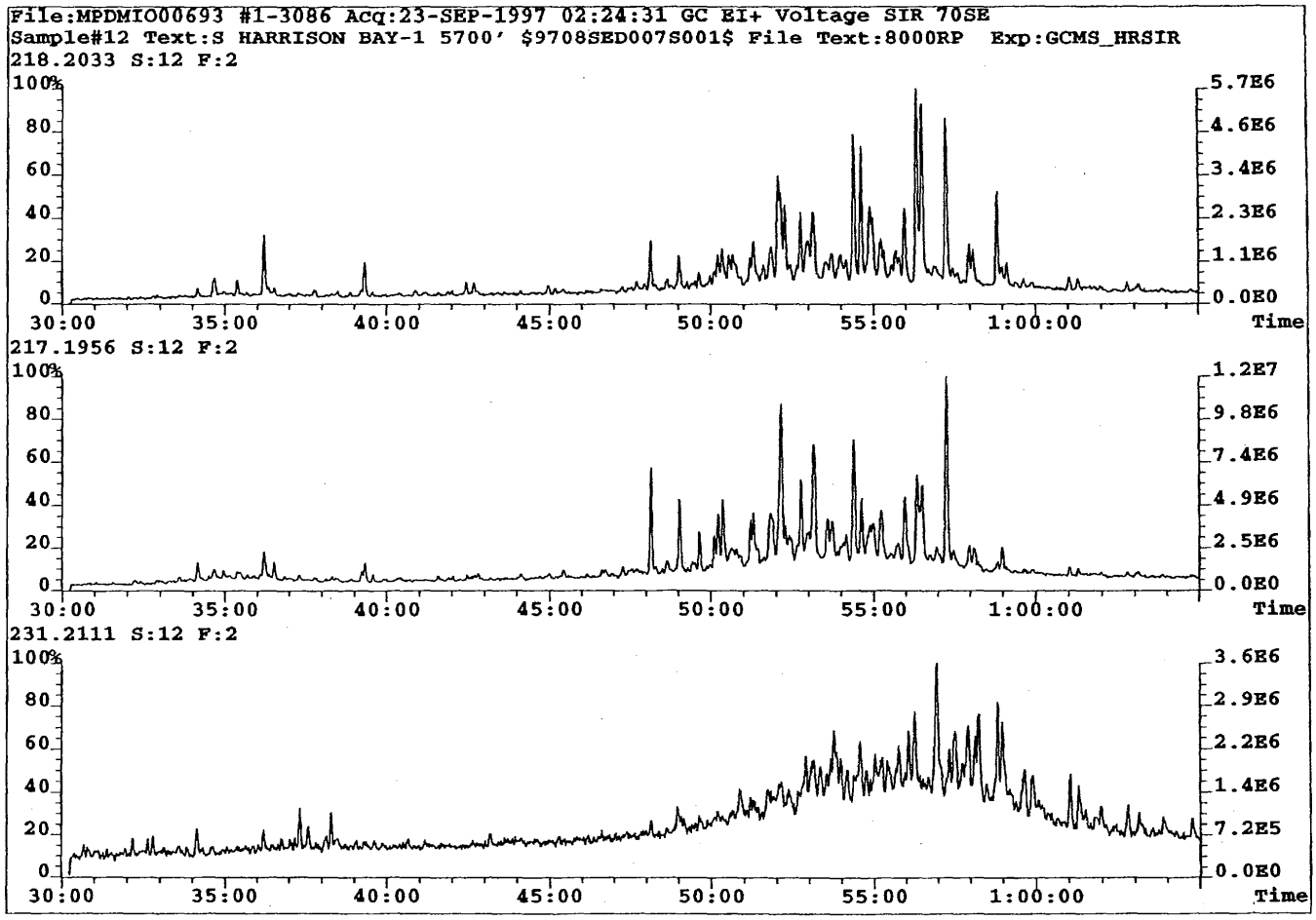

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:12 F:2
100%
80
60
40
20
0
5.7E6
4.6E6
3.4E6
2.3E6
1.1E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:12 F:2
100%
80
60
40
20
0
1.2E7
9.8E6
7.4E6
4.9E6
2.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:12 F:2
100%
80
60
40
20
0
3.6E6
2.9E6
2.2E6
1.4E6
7.2E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 21.3

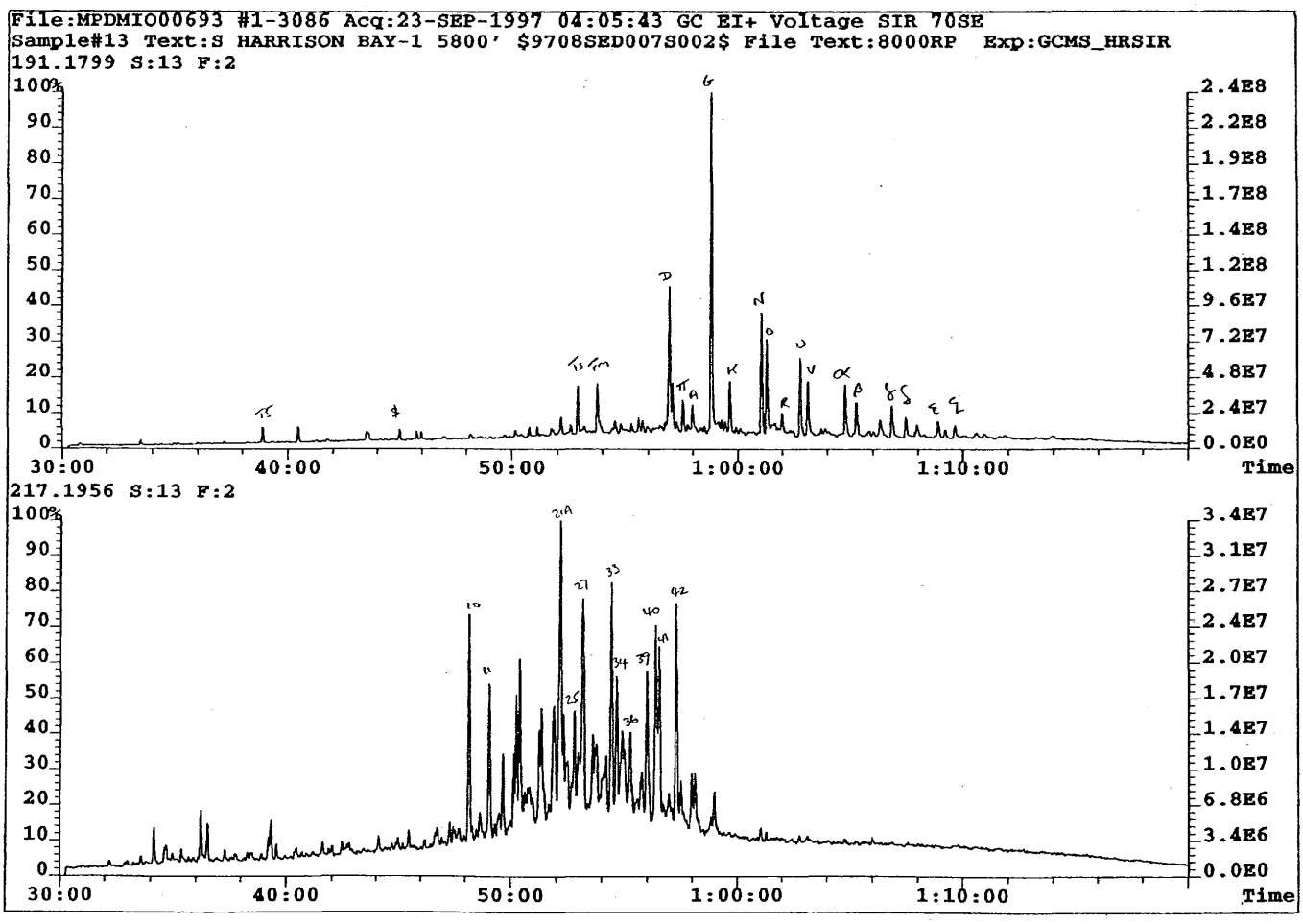

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:13 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.4E8
2.2E8
1.9E8
1.7E8
1.4E8
1.2E8
9.6E7
7.2E7
4.8E7
2.4E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:13 F:2
3.4E7
3.1E7
2.7E7
2.4E7
2.0E7
1.7E7
1.4E7
1.0E7
6.8E6
3.4E6
0.0E0

Figure 21.4

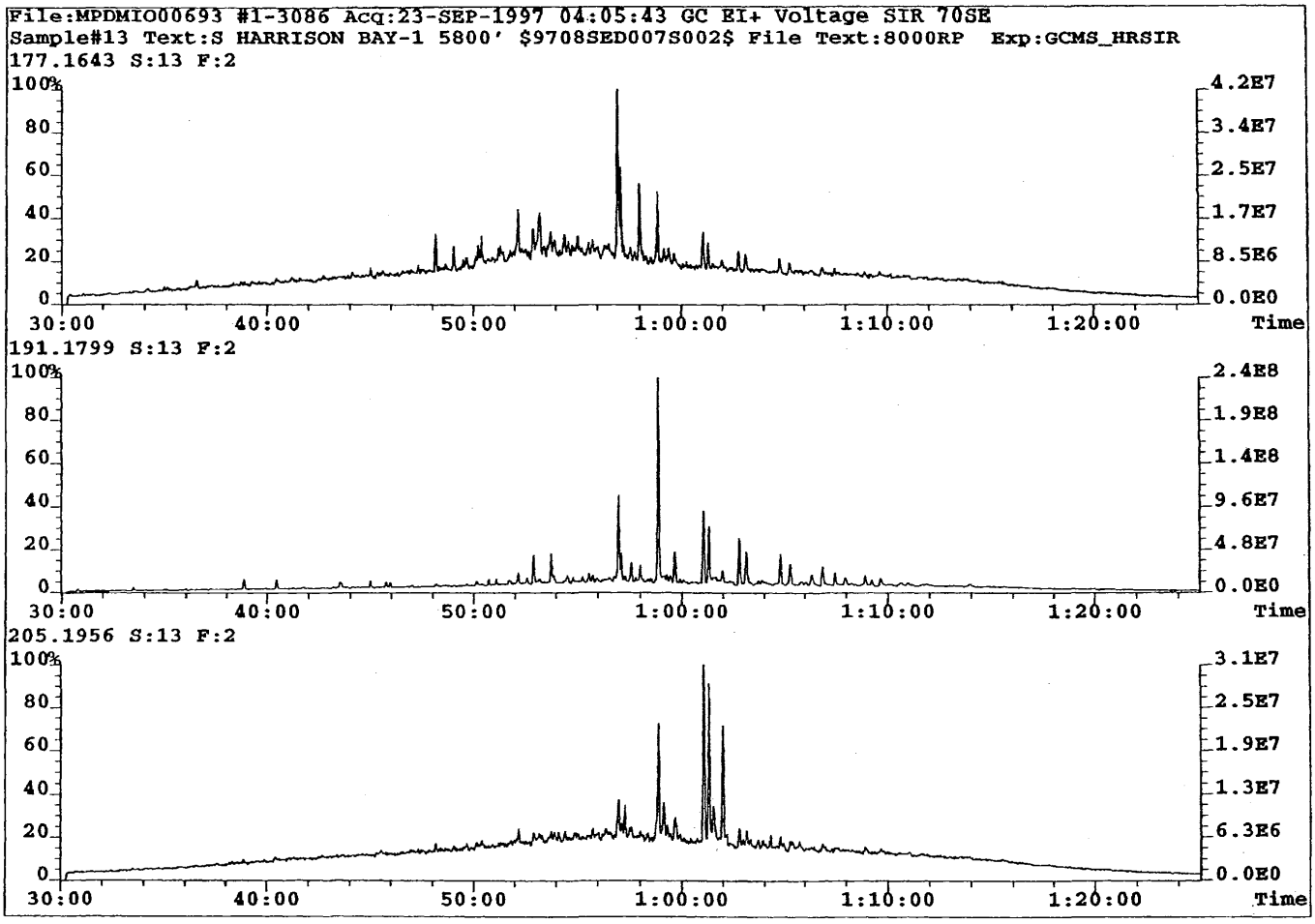

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:13 F:2
100%
80
60
40
20
0
4.2E7
3.4E7
2.5E7
1.7E7
8.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:13 F:2
2.4E8
1.9E8
1.4E8
9.6E7
4.8E7
0.0E0
205.1956 S:13 F:2
3.1E7
2.5E7
1.9E7
1.3E7
6.3E6
0.0E0

Figure 21.5

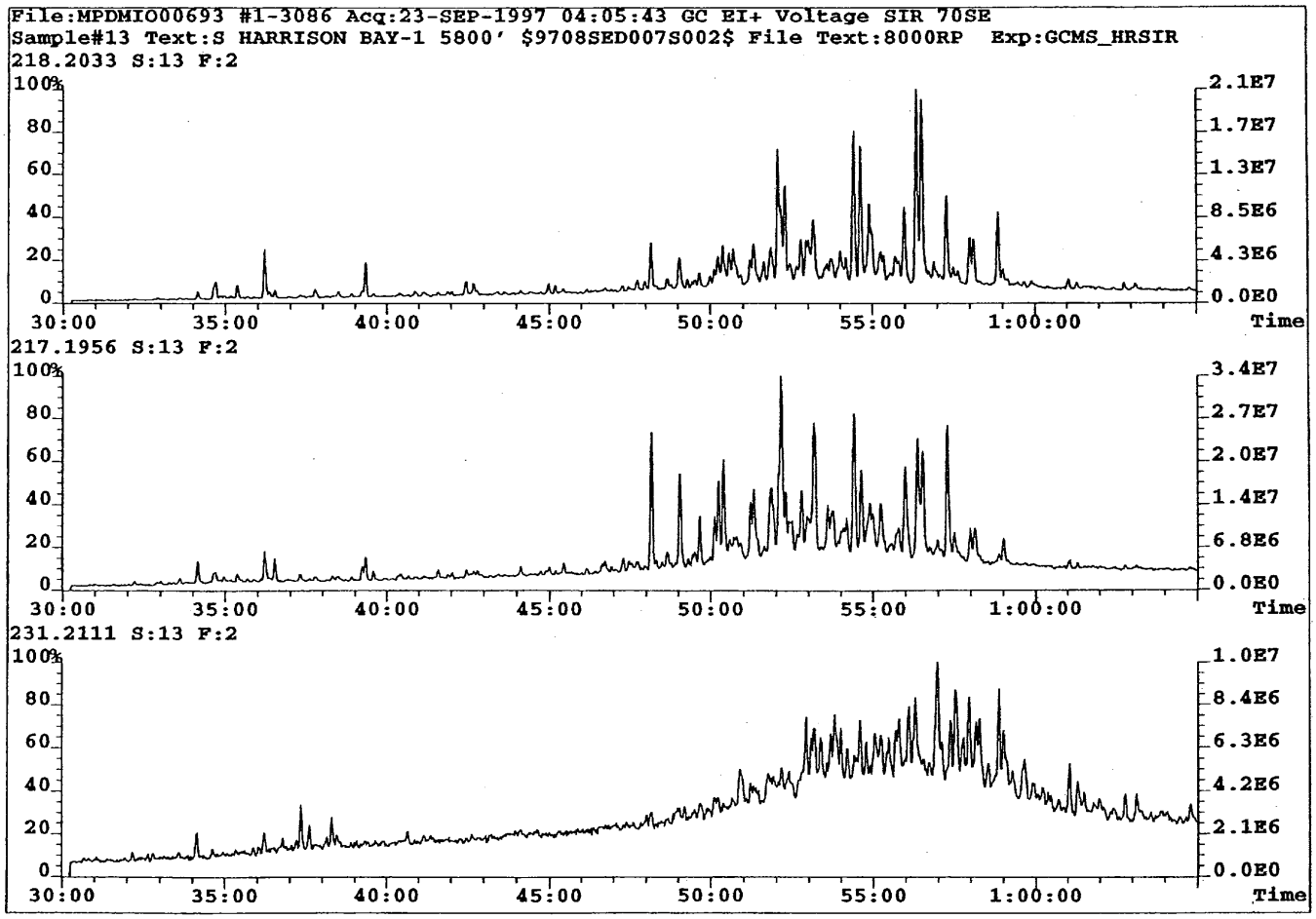

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:13 F:2
100%
80
60
40
20
0
2.1E7
1.7E7
1.3E7
8.5E6
4.3E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:13 F:2
100%
80
60
40
20
0
3.4E7
2.7E7
2.0E7
1.4E7
6.8E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:13 F:2
100%
80
60
40
20
0
1.0E7
8.4E6
6.3E6
4.2E6
2.1E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 21.6

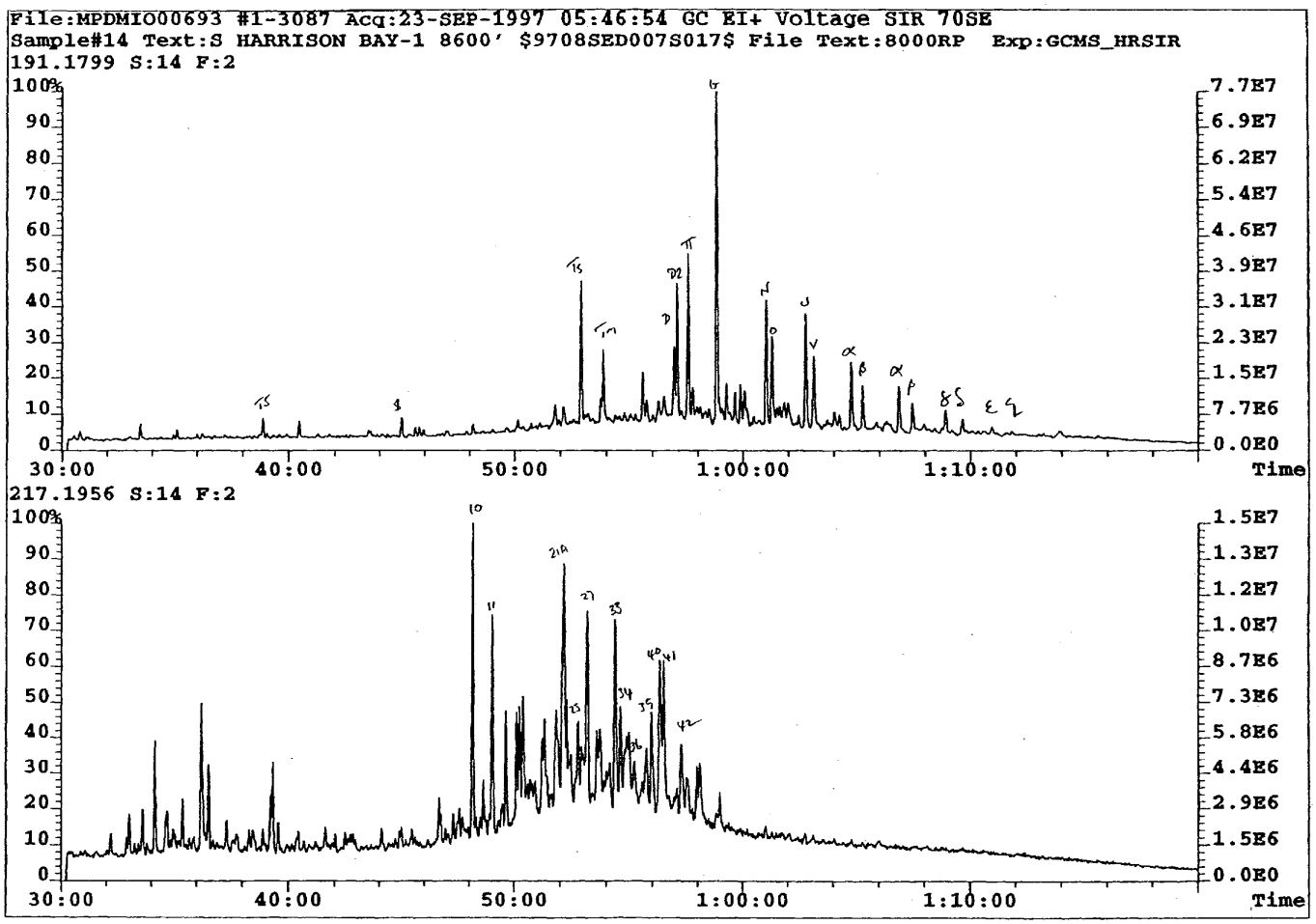

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:14 F:2
100%
90
80
70
60
50
40
30
20
10
0
7.7E7
6.9E7
6.2E7
5.4E7
4.6E7
3.9E7
3.1E7
2.3E7
1.5E7
7.7E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:14 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.5E7
1.3E7
1.2E7
1.0E7
8.7E6
7.3E6
5.8E6
4.4E6
2.9E6
1.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 21.7

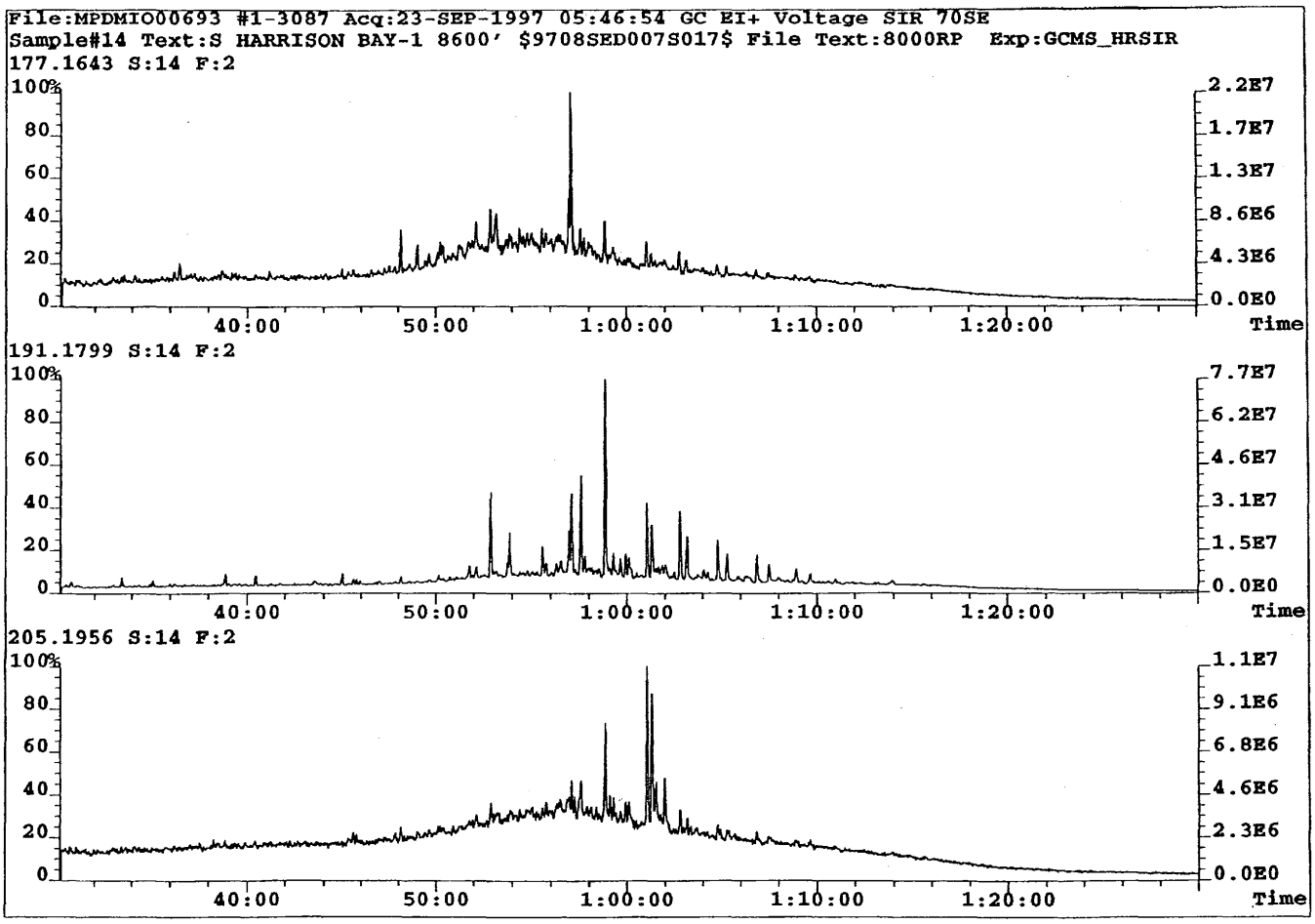

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:14 F:2
100%
80
60
40
20
0
2.2E7
1.7E7
1.3E7
8.6E6
4.3E6
0.0E0
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:14 F:2
100%
80
60
40
20
0
7.7E7
6.2E7
4.6E7
3.1E7
1.5E7
0.0E0
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:14 F:2
100%
80
60
40
20
0
1.1E7
9.1E6
6.8E6
4.6E6
2.3E6
0.0E0
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 21.8

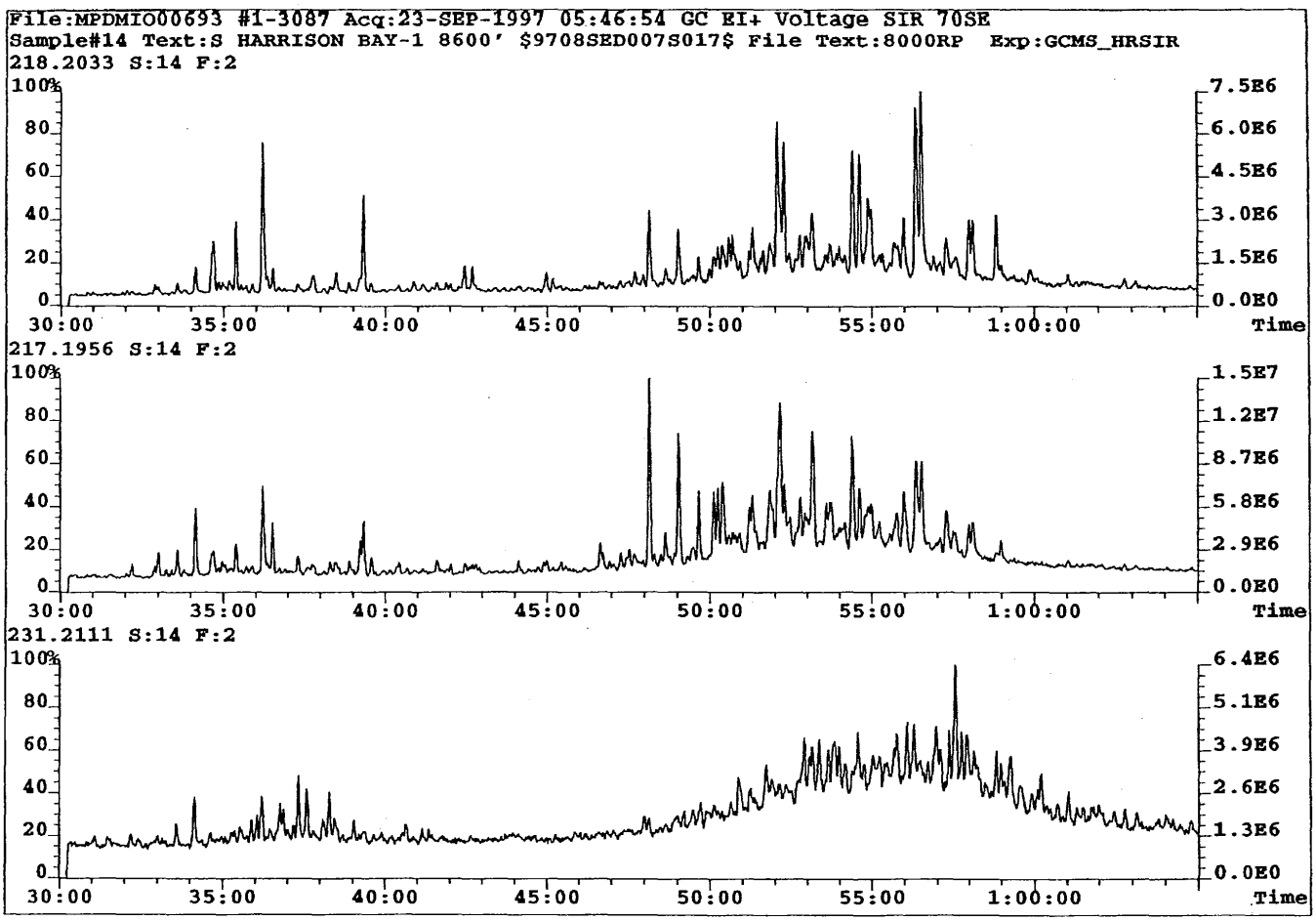

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:14 F:2
100%
80
60
40
20
0
7.5E6
6.0E6
4.5E6
3.0E6
1.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:14 F:2
1.5E7
1.2E7
8.7E6
5.8E6
2.9E6
231.2111 S:14 F:2
6.4E6
5.1E6
3.9E6
2.6E6
1.3E6

Figure 21.9

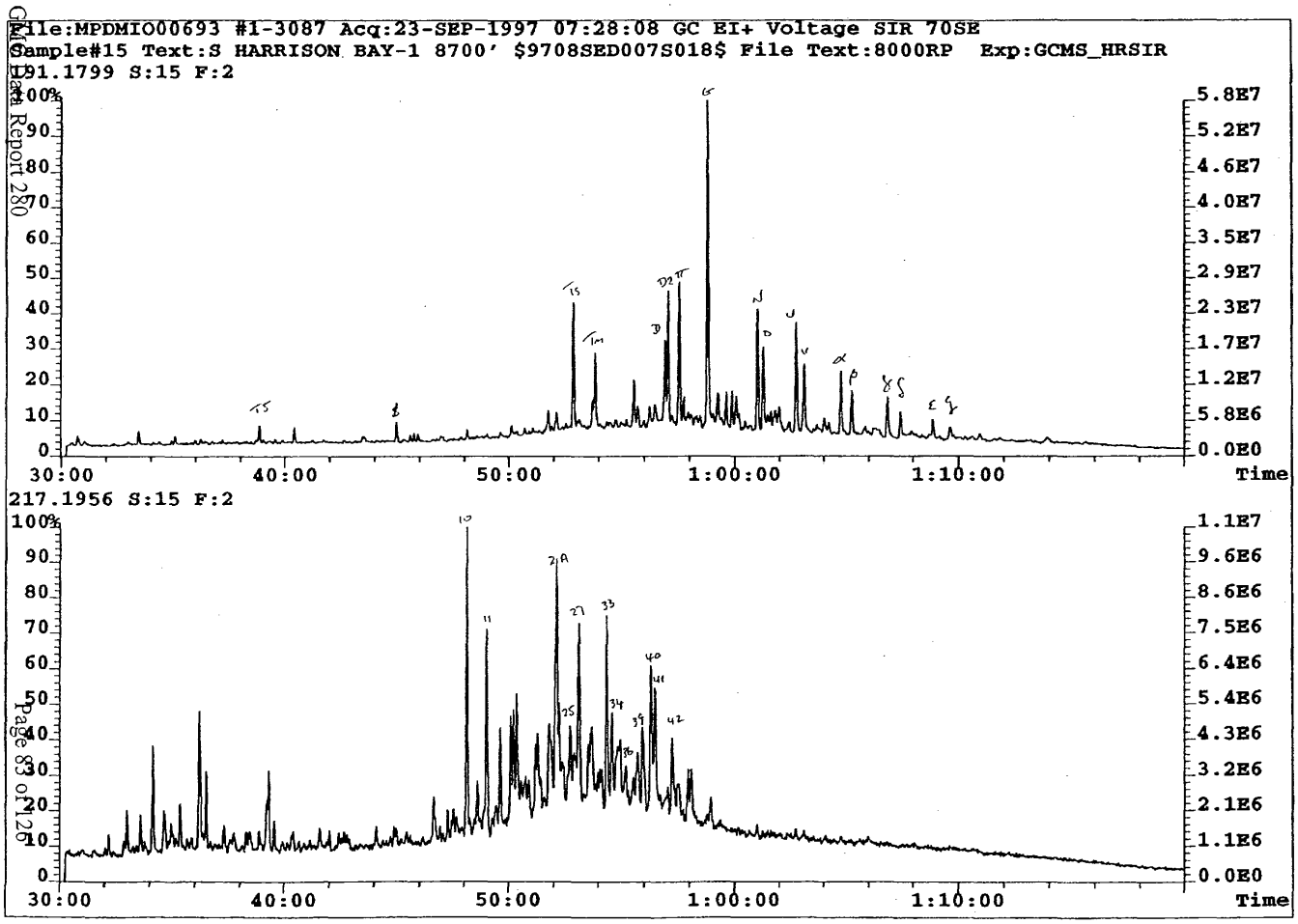


Figure 21.10

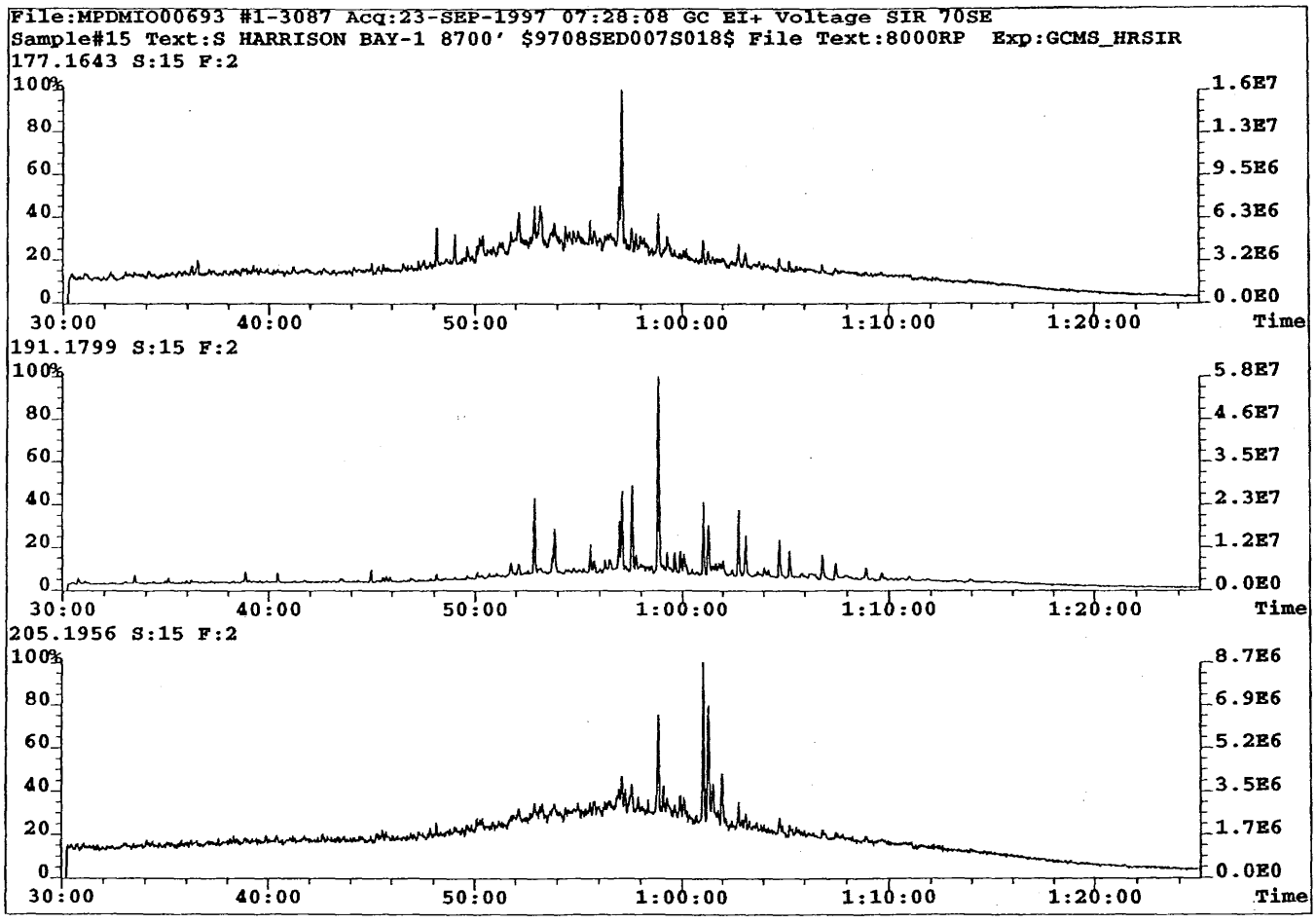

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 07:28:08 GC EI+ Voltage SIR 70SE
Sample#15 Text:S HARRISON BAY-1 8700' $9708SED007S018$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:15 F:2
100%
80
60
40
20
0
1.6E7
1.3E7
9.5E6
6.3E6
3.2E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:15 F:2
100%
80
60
40
20
0
5.8E7
4.6E7
3.5E7
2.3E7
1.2E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:15 F:2
100%
80
60
40
20
0
8.7E6
6.9E6
5.2E6
3.5E6
1.7E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 21.11

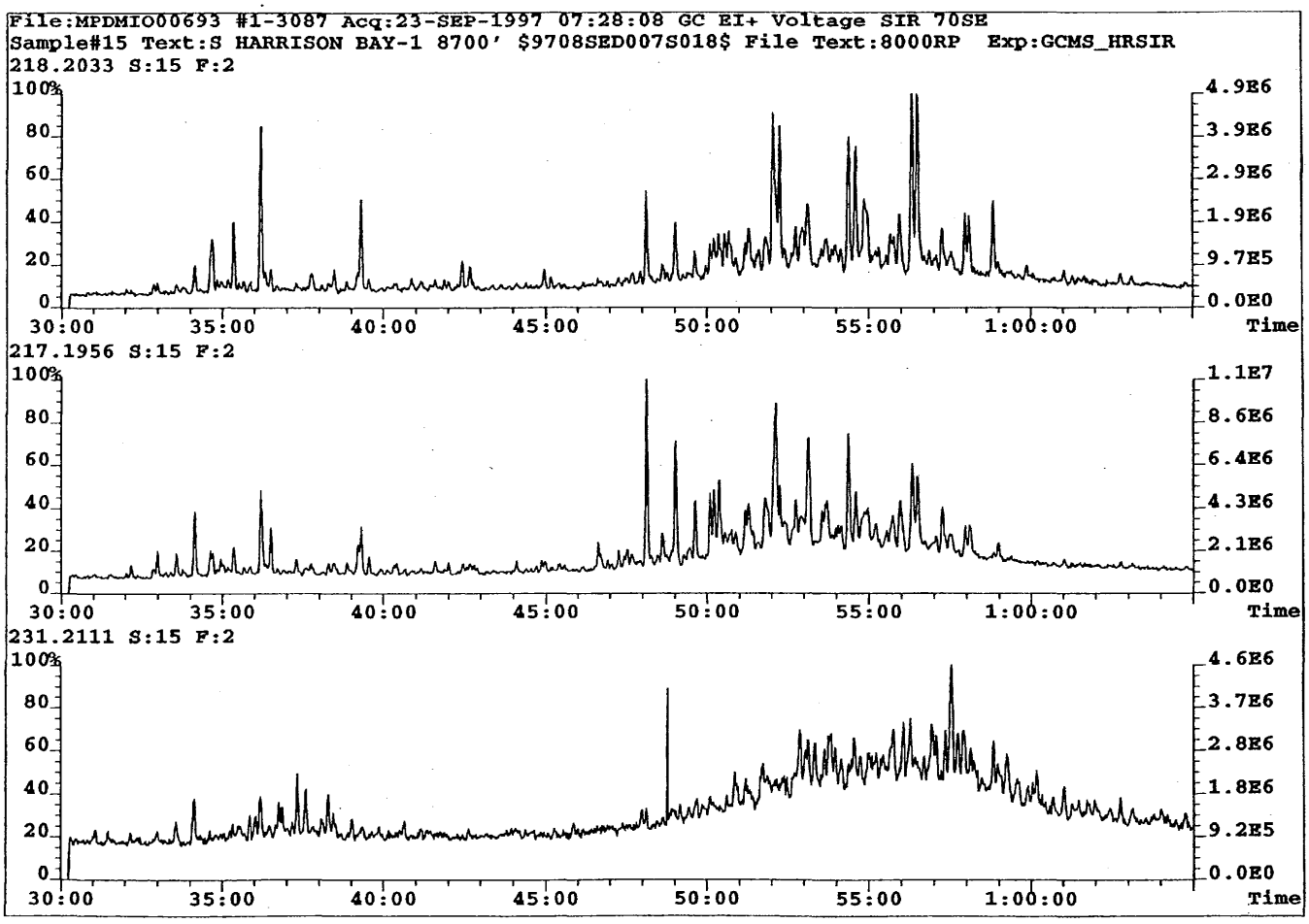

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 07:28:08 GC EI+ Voltage SIR 70SE
Sample#15 Text:S HARRISON BAY-1 8700' $9708SED007S018$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:15 F:2
100%
80
60
40
20
0
4.9E6
3.9E6
2.9E6
1.9E6
9.7E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:15 F:2
100%
80
60
40
20
0
1.1E7
8.6E6
6.4E6
4.3E6
2.1E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:15 F:2
100%
80
60
40
20
0
4.6E6
3.7E6
2.8E6
1.8E6
9.2E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 21.12

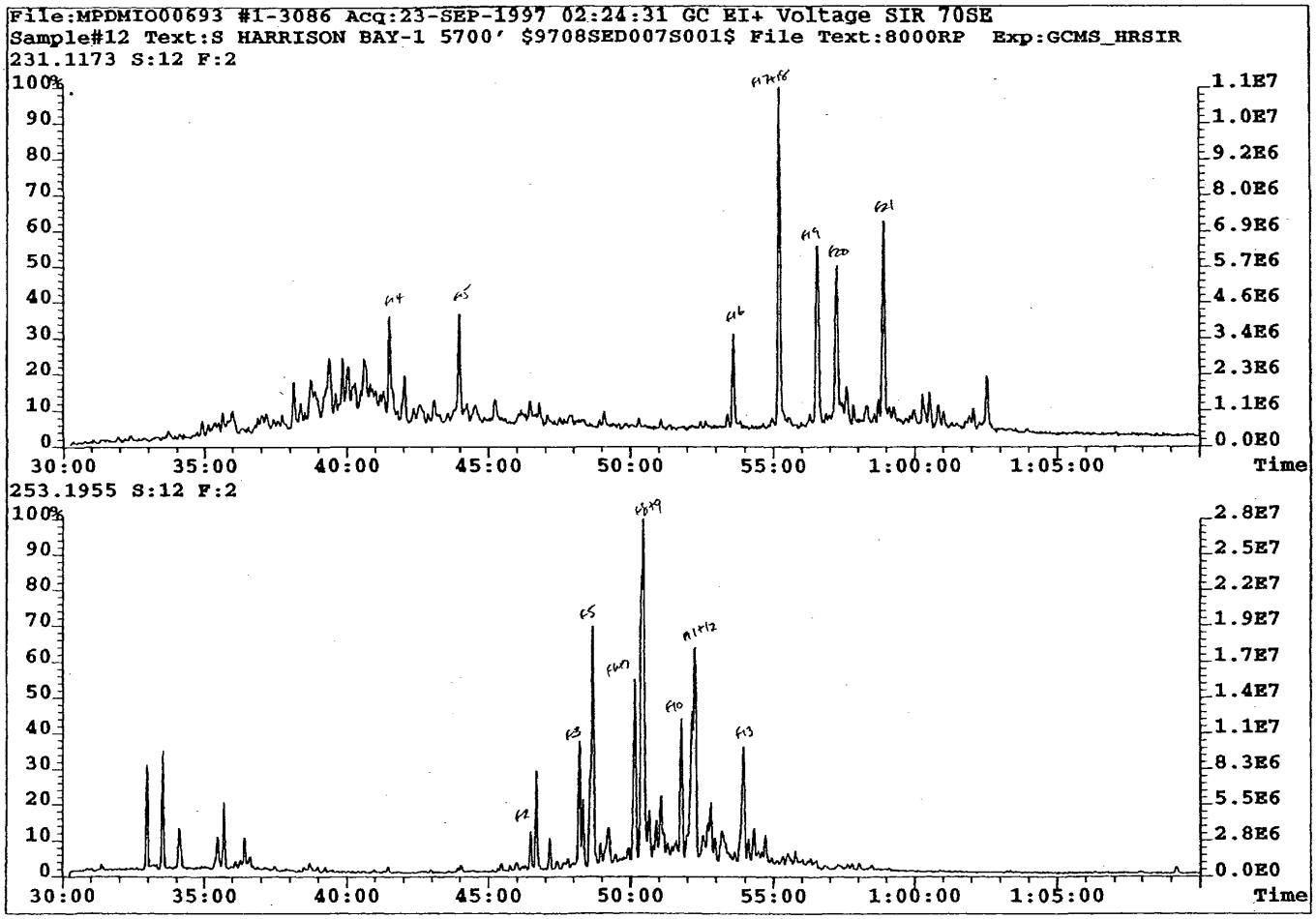

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:12 F:2
253.1955 S:12 F:2
Time

Figure 22.1

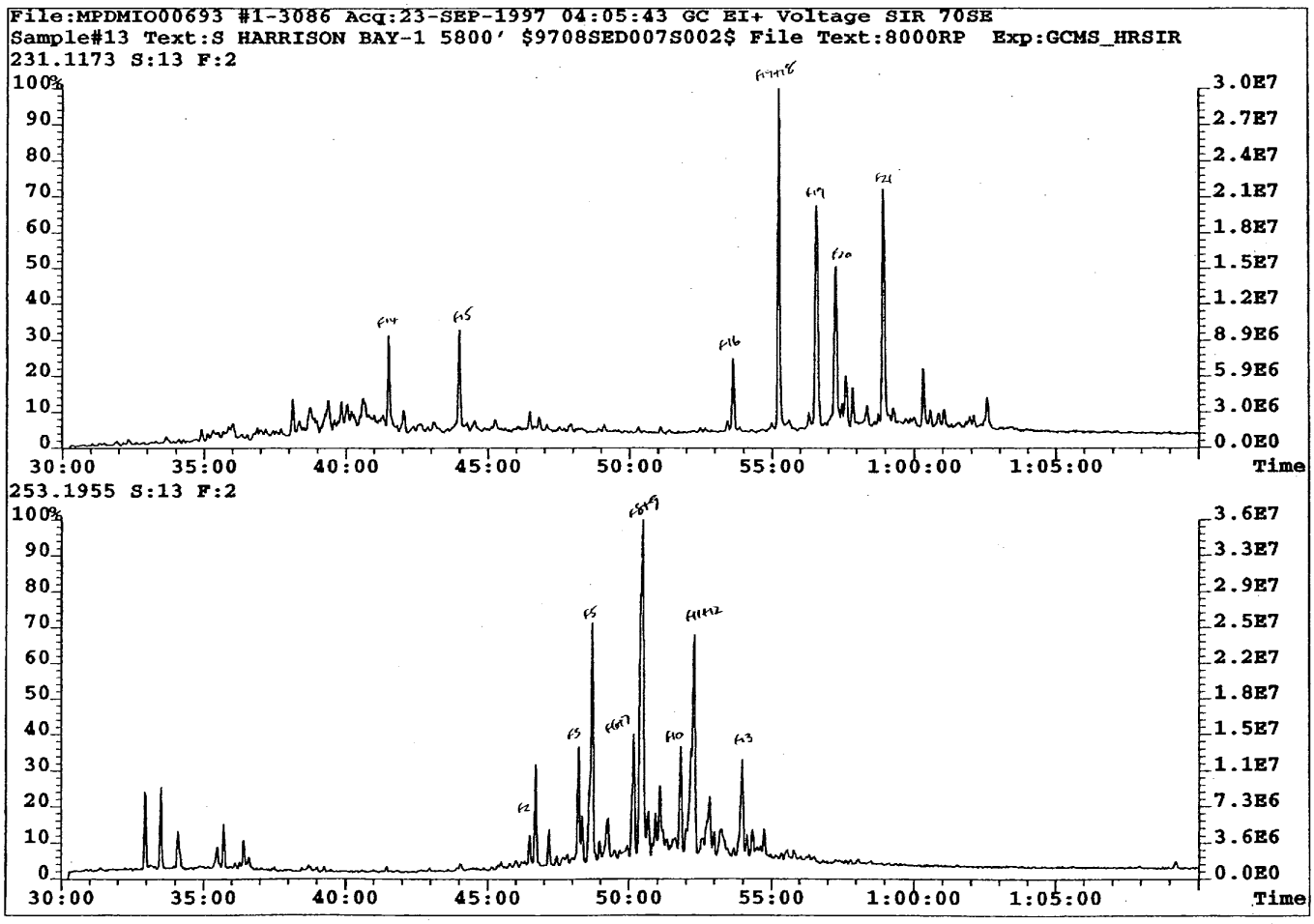

File:MPDMIO00693 #1-3086 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:13 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.0E7
2.7E7
2.4E7
2.1E7
1.8E7
1.5E7
1.2E7
8.9E6
5.9E6
3.0E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:13 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.6E7
3.3E7
2.9E7
2.5E7
2.2E7
1.8E7
1.5E7
1.1E7
7.3E6
3.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

Figure 22.2

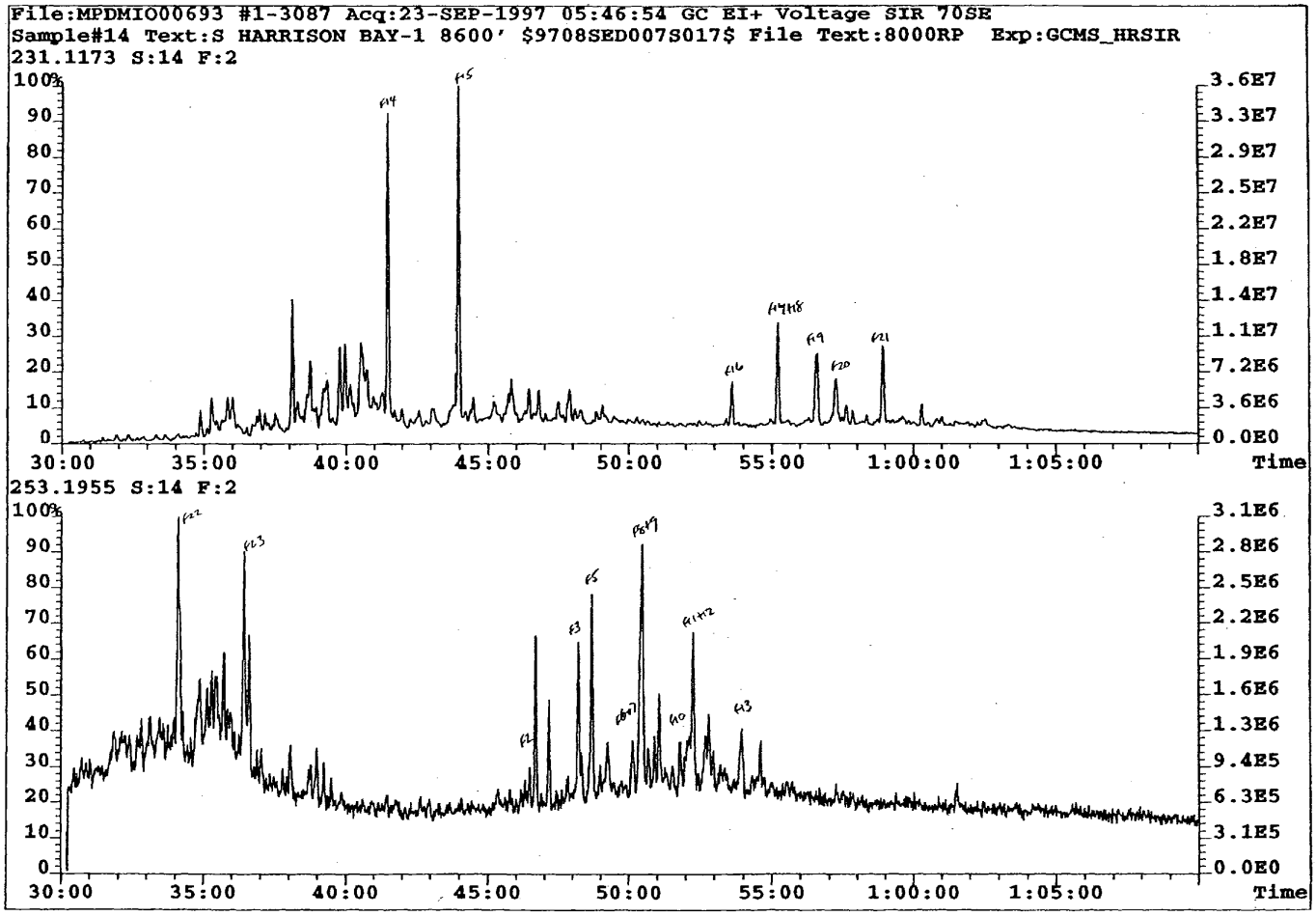

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:14 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.6E7
3.3E7
2.9E7
2.5E7
2.2E7
1.8E7
1.4E7
1.1E7
7.2E6
3.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:14 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.1E6
2.8E6
2.5E6
2.2E6
1.9E6
1.6E6
1.3E6
9.4E5
6.3E5
3.1E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

Figure 22.3

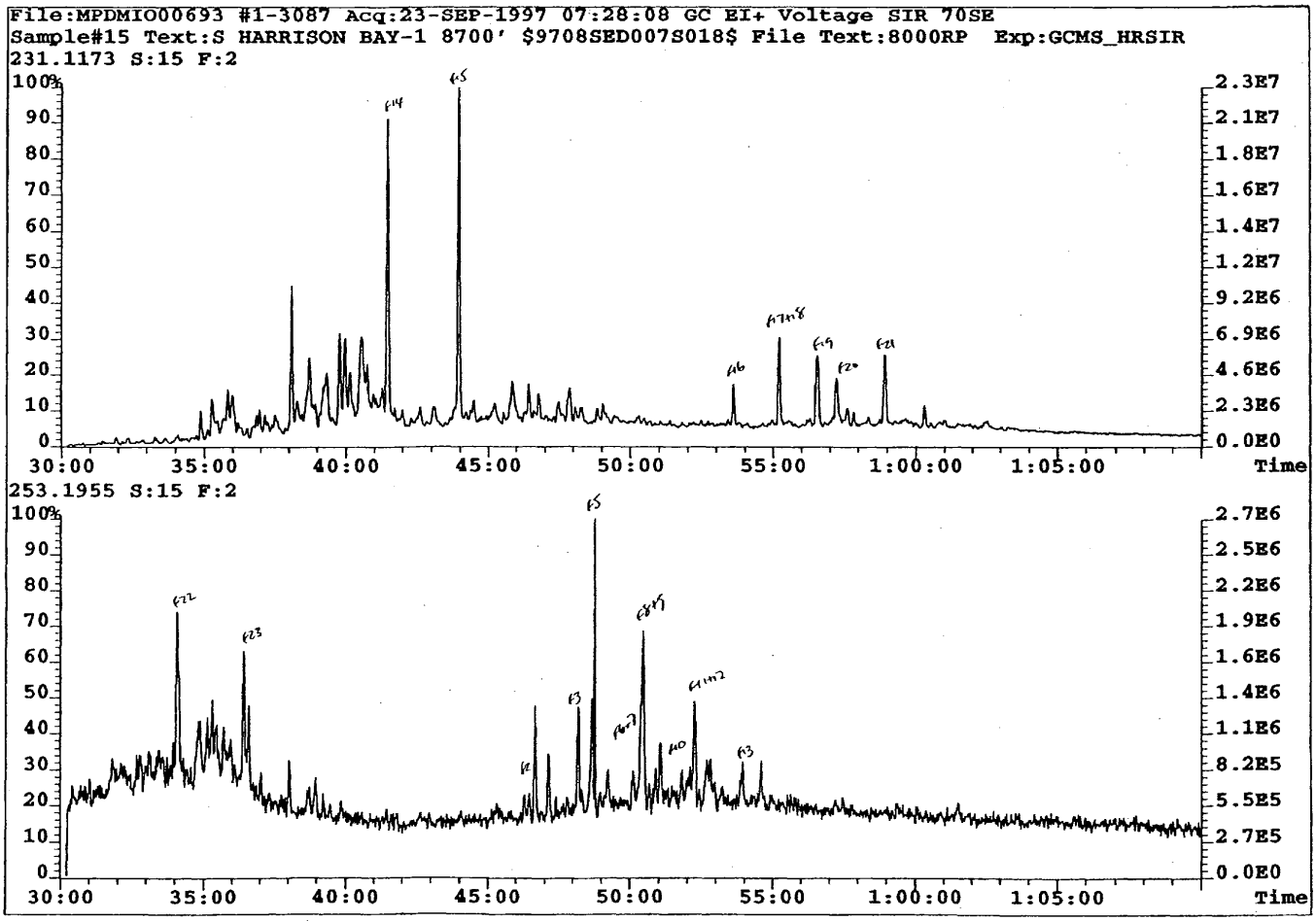

File:MPDMIO00693 #1-3087 Acq:23-SEP-1997 07:28:08 GC EI+ Voltage SIR 70SE
Sample#15 Text:S HARRISON BAY-1 8700' $9708SED007S018$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:15 F:2
253.1955 S:15 F:2
Time
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00

Figure 22.4

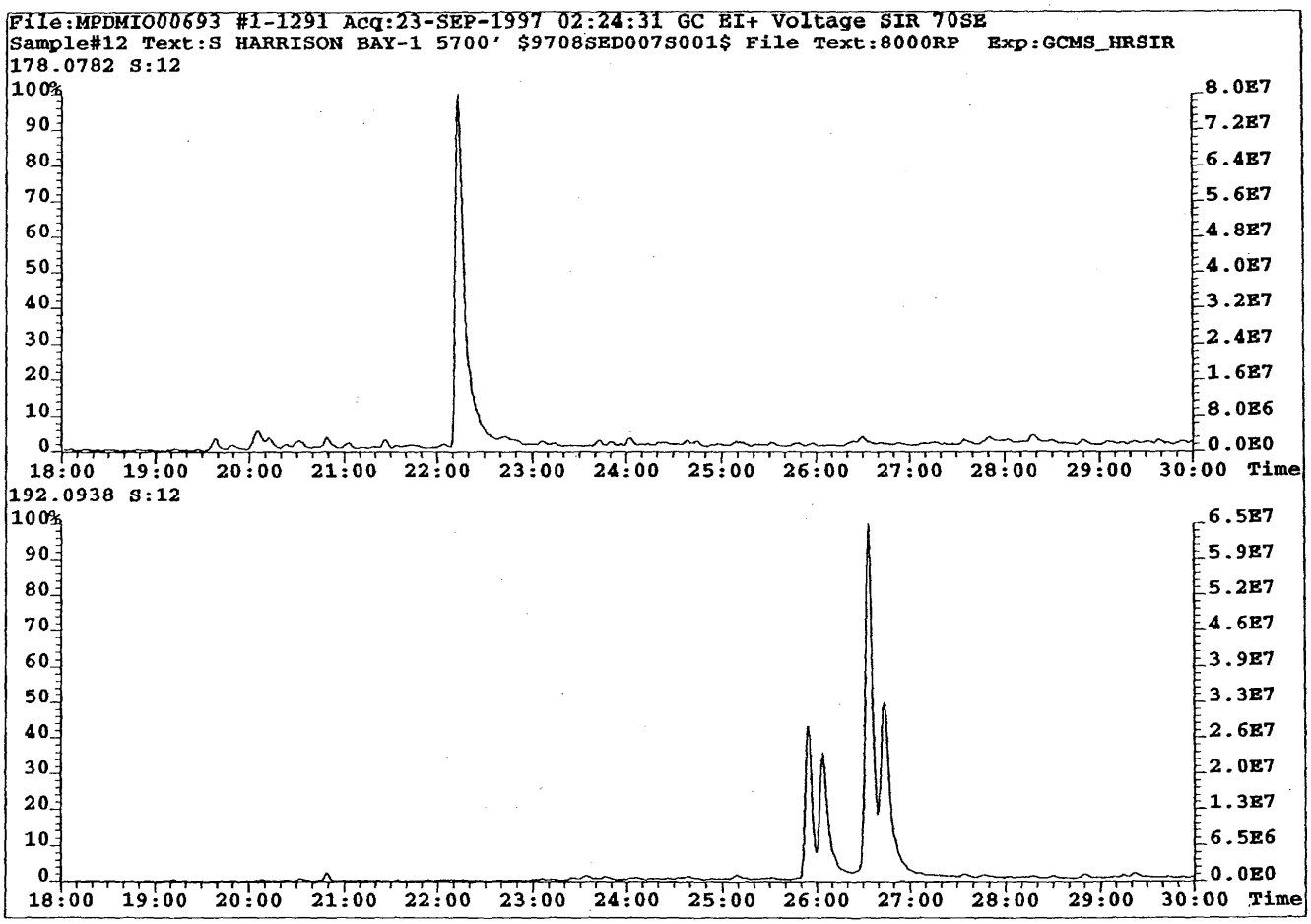

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:12
100%
90
80
70
60
50
40
30
20
10
0
8.0E7
7.2E7
6.4E7
5.6E7
4.8E7
4.0E7
3.2E7
2.4E7
1.6E7
8.0E6
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:12
100%
90
80
70
60
50
40
30
20
10
0
6.5E7
5.9E7
5.2E7
4.6E7
3.9E7
3.3E7
2.6E7
2.0E7
1.3E7
6.5E6
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 23.1

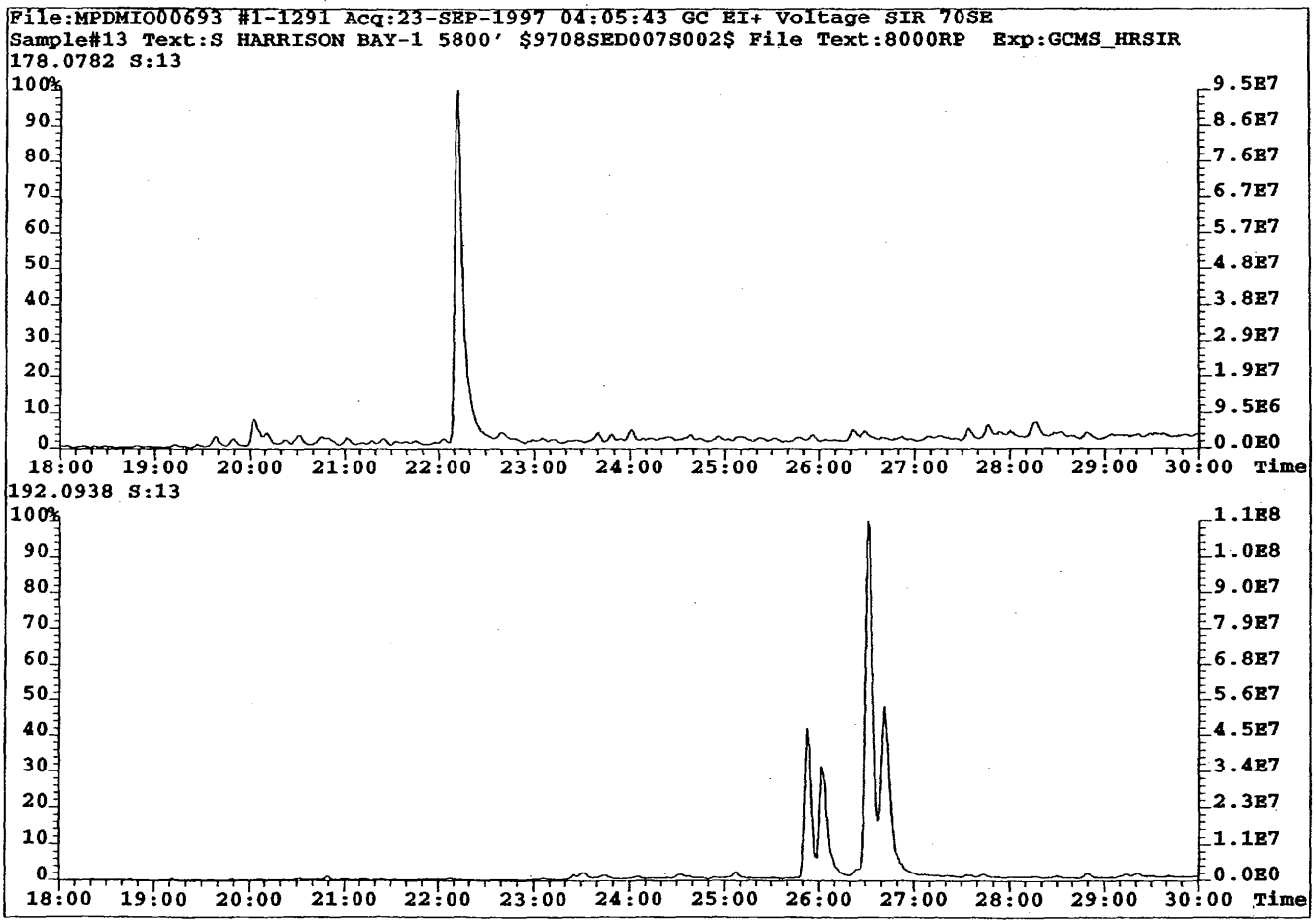

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:13
100%
90
80
70
60
50
40
30
20
10
0
9.5E7
8.6E7
7.6E7
6.7E7
5.7E7
4.8E7
3.8E7
2.9E7
1.9E7
9.5E6
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:13
100%
90
80
70
60
50
40
30
20
10
0
1.1E8
1.0E8
9.0E7
7.9E7
6.8E7
5.6E7
4.5E7
3.4E7
2.3E7
1.1E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 23.2

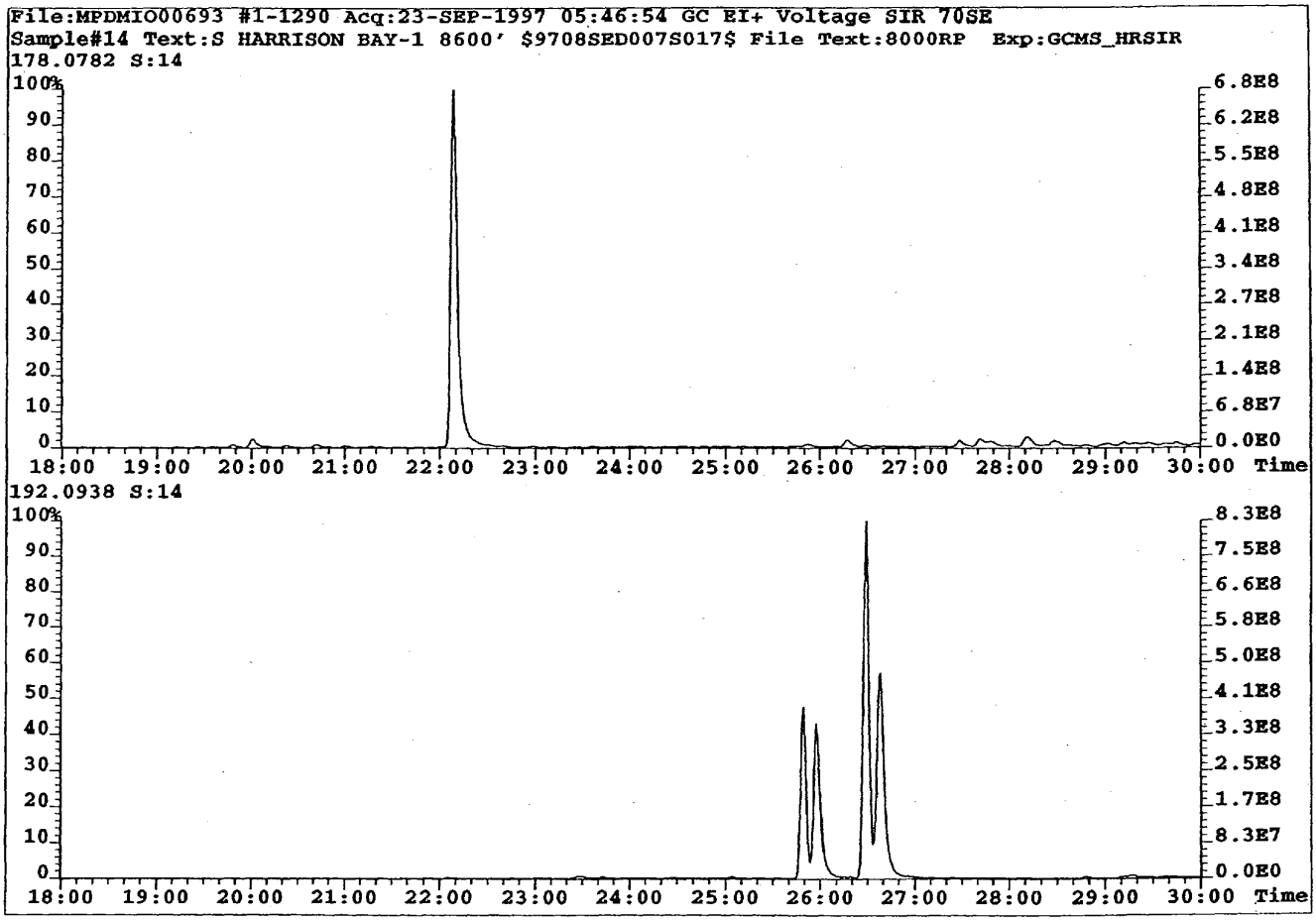

File:MPDMIO00693 #1-1290 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:14
100%
90
80
70
60
50
40
30
20
10
0
6.8E8
6.2E8
5.5E8
4.8E8
4.1E8
3.4E8
2.7E8
2.1E8
1.4E8
6.8E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:14
100%
90
80
70
60
50
40
30
20
10
0
8.3E8
7.5E8
6.6E8
5.8E8
5.0E8
4.1E8
3.3E8
2.5E8
1.7E8
8.3E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 23.3

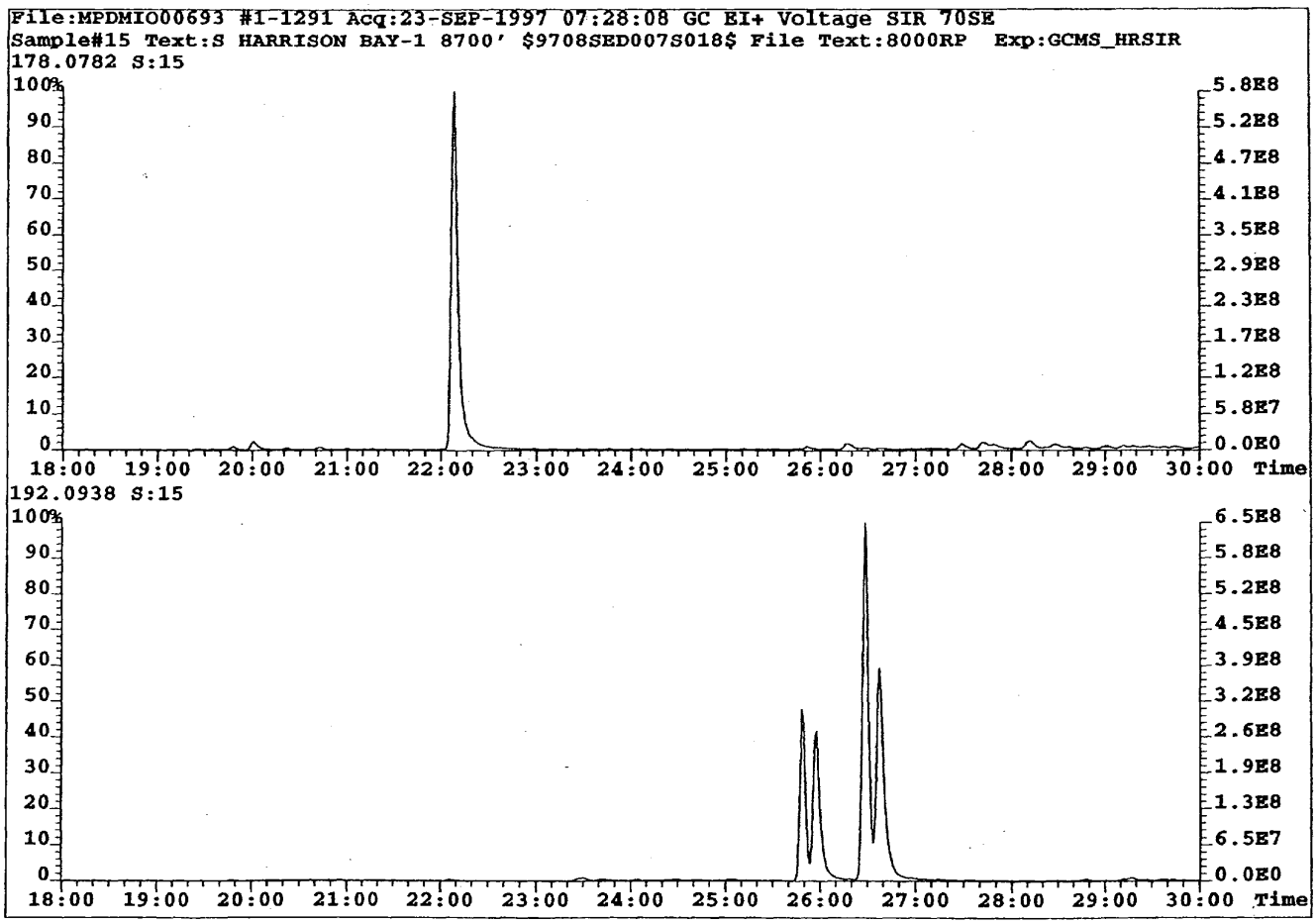

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 07:28:08 GC EI+ Voltage SIR 70SE
Sample#15 Text:S HARRISON BAY-1 8700' $9708SED007S018$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:15
100%
90
80
70
60
50
40
30
20
10
0
5.8E8
5.2E8
4.7E8
4.1E8
3.5E8
2.9E8
2.3E8
1.7E8
1.2E8
5.8E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:15
100%
90
80
70
60
50
40
30
20
10
0
6.5E8
5.8E8
5.2E8
4.5E8
3.9E8
3.2E8
2.6E8
1.9E8
1.3E8
6.5E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 23.4

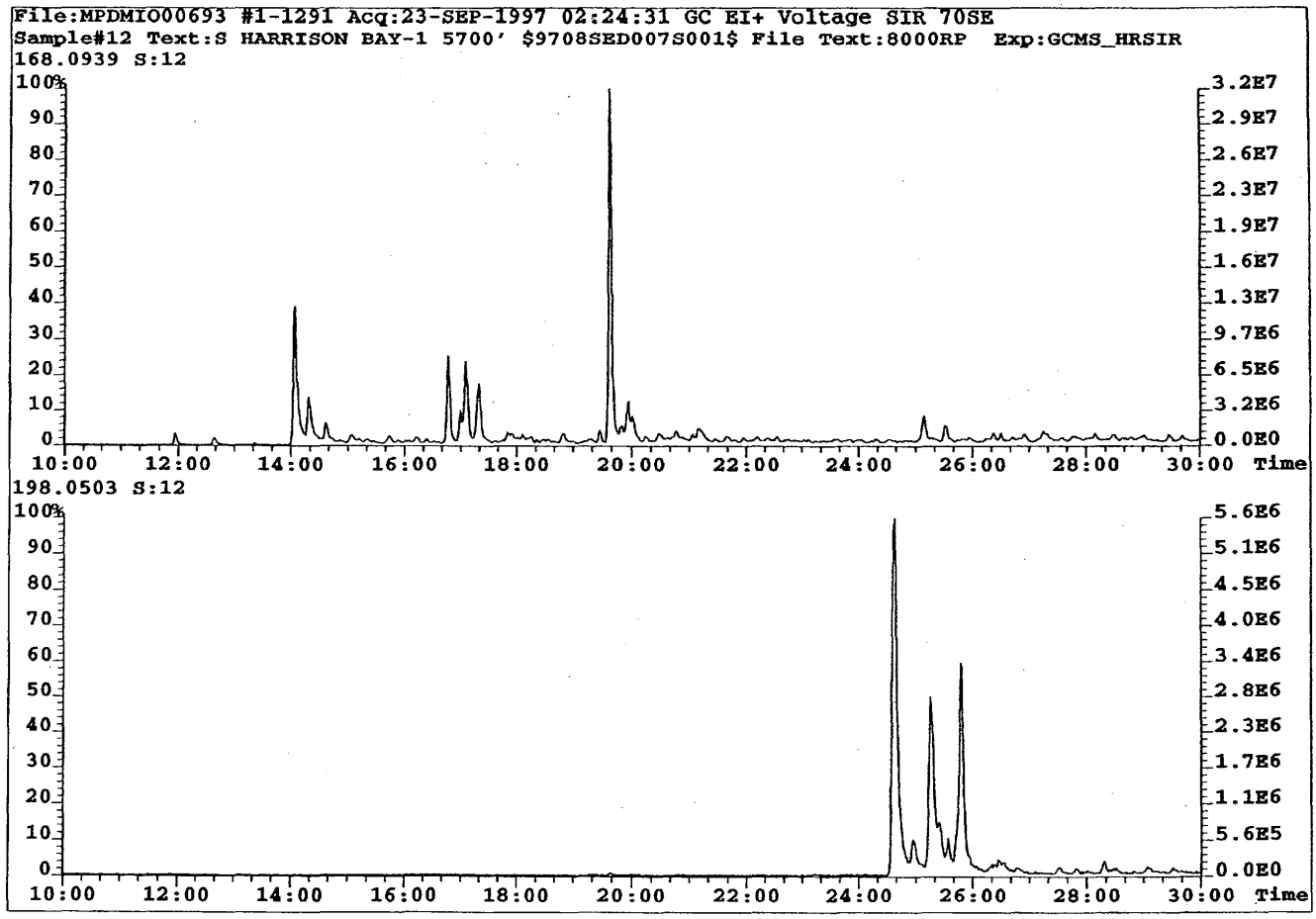

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 02:24:31 GC EI+ Voltage SIR 70SE
Sample#12 Text:S HARRISON BAY-1 5700' $9708SED007S001$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:12
100%
90
80
70
60
50
40
30
20
10
0
3.2E7
2.9E7
2.6E7
2.3E7
1.9E7
1.6E7
1.3E7
9.7E6
6.5E6
3.2E6
0.0E0
10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00 26:00 28:00 30:00 Time
198.0503 S:12
100%
90
80
70
60
50
40
30
20
10
0
5.6E6
5.1E6
4.5E6
4.0E6
3.4E6
2.8E6
2.3E6
1.7E6
1.1E6
5.6E5
0.0E0
10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00 26:00 28:00 30:00 Time

 Figure 24.1

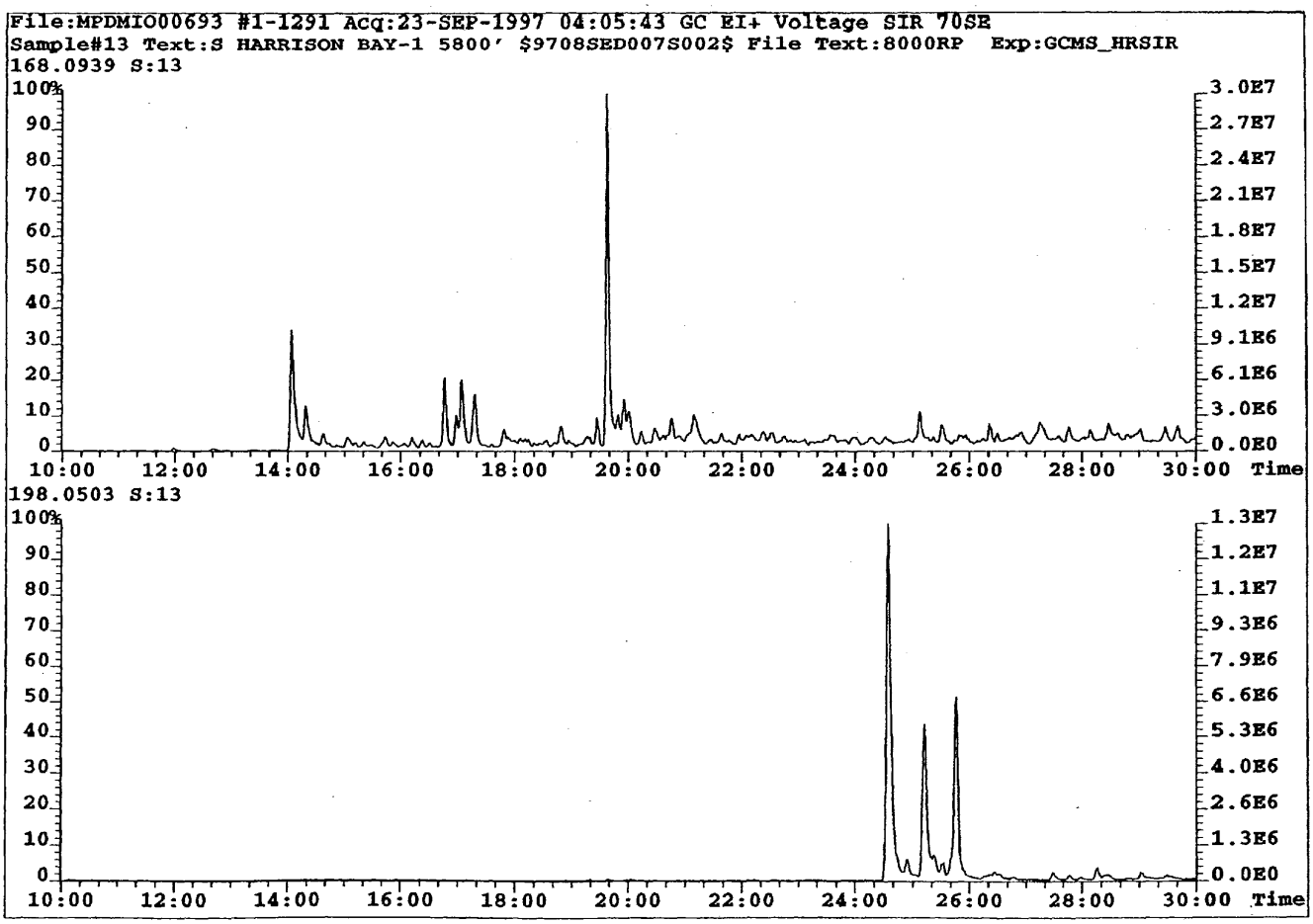

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 04:05:43 GC EI+ Voltage SIR 70SE
Sample#13 Text:S HARRISON BAY-1 5800' $9708SED007S002$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:13
100%
90
80
70
60
50
40
30
20
10
0
3.0E7
2.7E7
2.4E7
2.1E7
1.8E7
1.5E7
1.2E7
9.1E6
6.1E6
3.0E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:13
100%
90
80
70
60
50
40
30
20
10
0
1.3E7
1.2E7
1.1E7
9.3E6
7.9E6
6.6E6
5.3E6
4.0E6
2.6E6
1.3E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 24.2

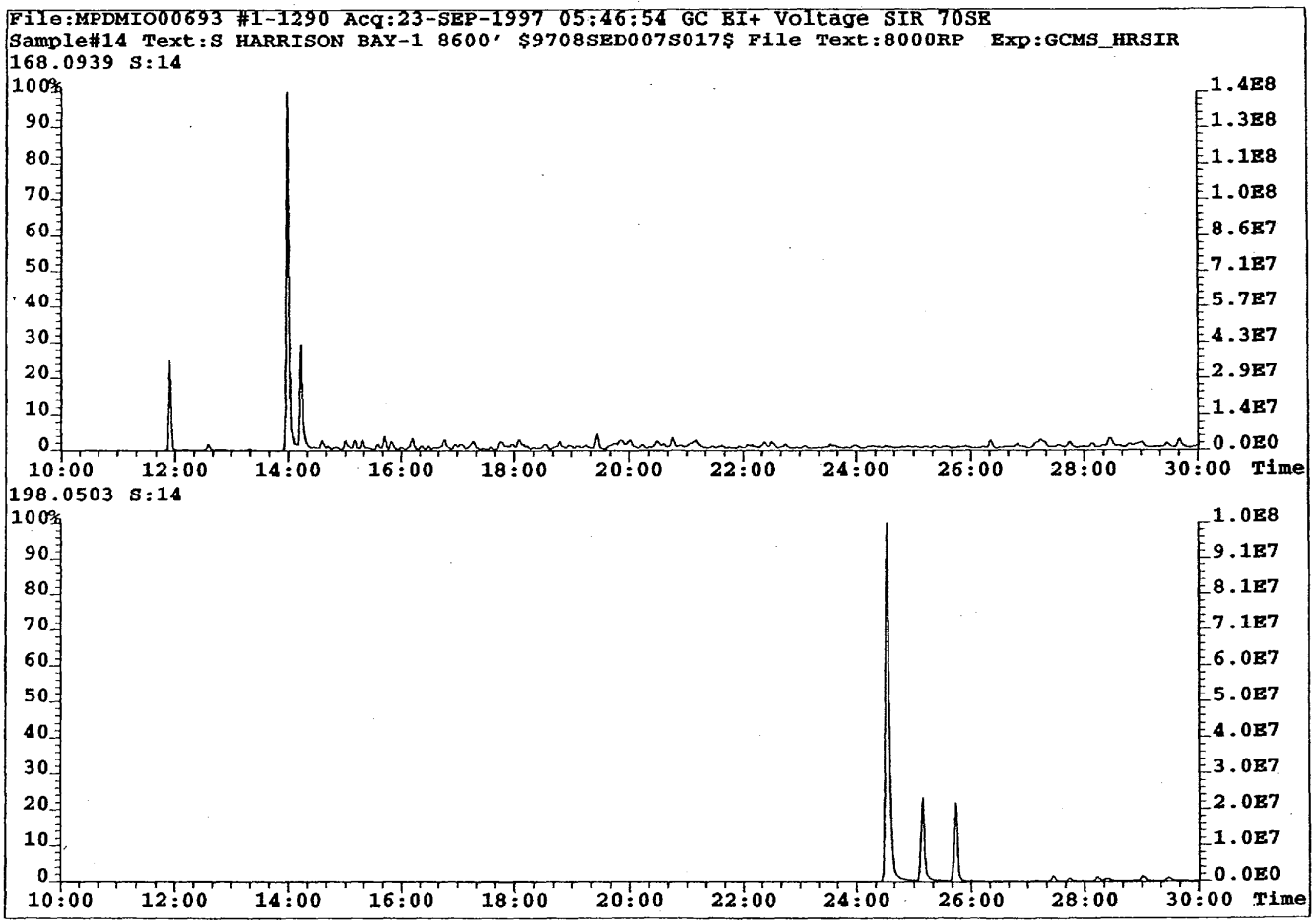

File:MPDMIO00693 #1-1290 Acq:23-SEP-1997 05:46:54 GC EI+ Voltage SIR 70SE
Sample#14 Text:S HARRISON BAY-1 8600' $9708SED007S017$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:14
100%
90
80
70
60
50
40
30
20
10
0
1.4E8
1.3E8
1.1E8
1.0E8
8.6E7
7.1E7
5.7E7
4.3E7
2.9E7
1.4E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:14
100%
90
80
70
60
50
40
30
20
10
0
1.0E8
9.1E7
8.1E7
7.1E7
6.0E7
5.0E7
4.0E7
3.0E7
2.0E7
1.0E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 24.3

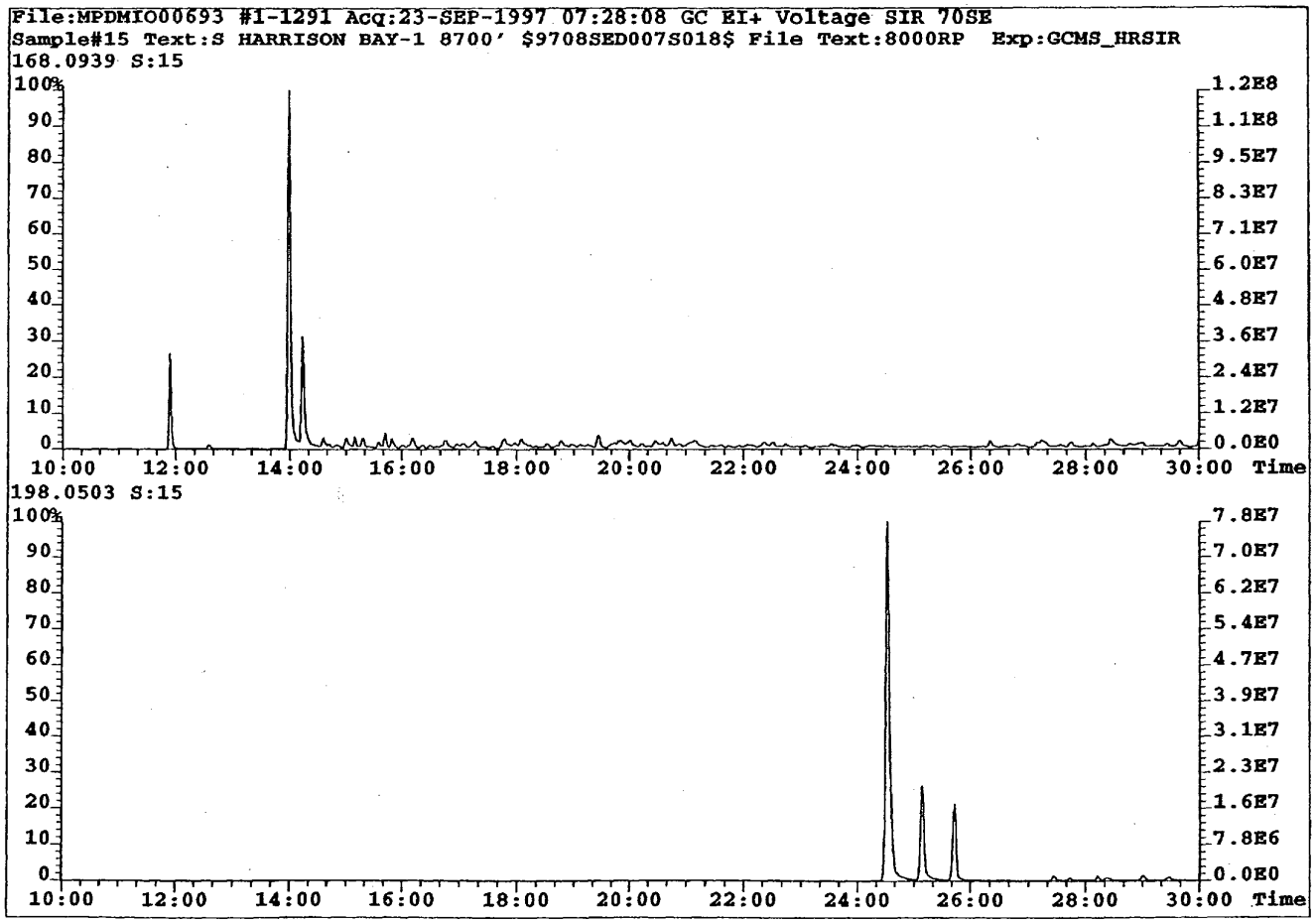

File:MPDMIO00693 #1-1291 Acq:23-SEP-1997 07:28:08 GC EI+ Voltage SIR 70SE
Sample#15 Text:S HARRISON BAY-1 8700' $9708SED007S018$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:15
100%
90
80
70
60
50
40
30
20
10
0
1.2E8
1.1E8
9.5E7
8.3E7
7.1E7
6.0E7
4.8E7
3.6E7
2.4E7
1.2E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:15
100%
90
80
70
60
50
40
30
20
10
0
7.8E7
7.0E7
6.2E7
5.4E7
4.7E7
3.9E7
3.1E7
2.3E7
1.6E7
7.8E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 24.4

West Fish Creek-1 Data

TABLE 17

LITHOLOGY AND STRATIGRAPHY

COUNTRY: Alaska
WELL: W. Fish Creek-1

DEPTH ft	DEPTHRANGE ft	FORMATION	AGE	LITHOLOGY	PICKED LITHOLOGY	SAMPLE TYPE
7290				MDST-dk gy shaley 50%:MDST-rd/bn 10%:SST-lt-m bn 40%	Mudstone	CUT
7380				MDST-dk gy shaley 70%:MDST-rd/bn 10%:SST-lt-m bn 20%	Mudstone	CUT
7470				MDST-dk gy shaley 90%:SST-lt-m bn 10%	Mudstone	CUT
7560				MDST-dk gy shaley 65%:SST-lt-m bn 35%	Mudstone	CUT
7650				MDST-dk gy shaley 70%:SST-lt-m bn 30%	Mudstone	CUT
7740				MDST-dk gy shaley 50%:MDST-m-dk bn slty 30%:SST-lt-m bn 20%	Mudstone	CUT
7830				MDST-dk gy/bn shaley 50%:MDST-m-dk bn slty 30%:SST-lt-m bn 20%:MDST-or Tr:QTZ-Tr	Mudstone	CUT
7920				MDST-dk gy/bn shaley 75%:MDST-m-dk bn slty 20%:SST-lt-m bn 5%:MDST-or Tr:QTZ-Tr	Mudstone	CUT
8010				MDST-dk gy/bn shaley 90%:MDST-m-dk bn slty 5%:SST-lt-m bn 5%:QTZ-Tr	Mudstone	CUT
8100				MDST-dk gy/bn shaley 90%:MDST-m-dk bn slty 5%:SST-lt-m bn 5%:QTZ-Tr	Mudstone	CUT
8190				MDST-dk gy shaley 30%:SLTST-lt-m bn 60%:SST-lt-m bn 10%	Mudstone	CUT
8280				MDST-dk gy shaley 30%:SLTST-lt-m bn 60%:SST-lt-m bn 5%:QTZ-5%	Mudstone	CUT
8370				MDST-dk gy shaley 70%:SLTST-lt-m bn mddy 30%:QTZ-Tr	Mudstone	CUT
8460				MDST-dk gy shaley 60%:SLTST-lt-m bn 35%:QTZ-5%	Mudstone	CUT
8550				MDST-dk gy shaley 70%:SLTST-lt-m bn mddy 30%	Mudstone	CUT
8640				MDST-dk gy shaley 60%:SLTST-lt-m bn mddy 30%:QTZ-10%	Mudstone	CUT
8730				MDST-dk gy shaley 30%:SLTST-lt-m bn mddy 70%	Mudstone	CUT
8820				MDST-dk gy shaley 50%:SLTST-lt-m bn mddy 50%	Mudstone	CUT
8910				MDST-dk gy shaley 50%:SLTST-lt-m bn mddy 40%:MDST-m bn/or 5%:QTZ-5%	Mudstone	CUT
9000				MDST-dk gy shaley 55%:SLTST-lt-m bn mddy 40%:QTZ-5%	Mudstone	CUT
9090				MDST-dk gy shaley 80%:SLTST-lt-m bn mddy 10%:SST-lt bn Tr:QTZ-10%	Mudstone	CUT
9180				MDST-dk gy shaley 70%:SLTST-lt-m bn mddy 30%	Mudstone	CUT
9270				MDST-dk gy shaley 30%:SLTST-lt-m bn mddy 40%:LST-lt bn mddy 30%	Mudstone	CUT
9360				LST-dk gy mddy 40%:LST-lt gy 30%:SST-lt bn/gy 30%	Limestone	CUT
9500				LST-dk gy mddy 85%:LST-bk oolitic wh cement Tr:LST-lt gy 15%	Limestone	CUT

TABLE 18

OPTICAL SOURCE ROCK MATURITY INDICATORS

COUNTRY Alaska
WELL: W Fish Creek-1

DEPTH (ft)	FORMATION	VITRINITE (%Ro)	NO. of READINGS	CONFIDENCE	COMMENTS
7290		0.61	20	D	MOD;IPAR 100% VPAR+WPAR TR;BS MOD BW MOD;Amorphinite L-M.O.MOD ALG Y/O-L.O. Very
8370		0.6	20	C	L-MOD;IPAR 90% VW+WPAR 10%;BS MOD/STR BW MOD;Amorphinite M-D.O. RI ALG Y/O-L.O. T
9500		0.92	6	D	TR;IPAR 100% VPAR+WPAR TR;BS STR;Amorphinite M.O. L SP M-D.O. TR

Confidence A=Excellent B=Good C=Average D=Poor E=Unreliable

Vitrinite Reflectance Thermal Maturity Plot

Well Name : West Fish Creek-1

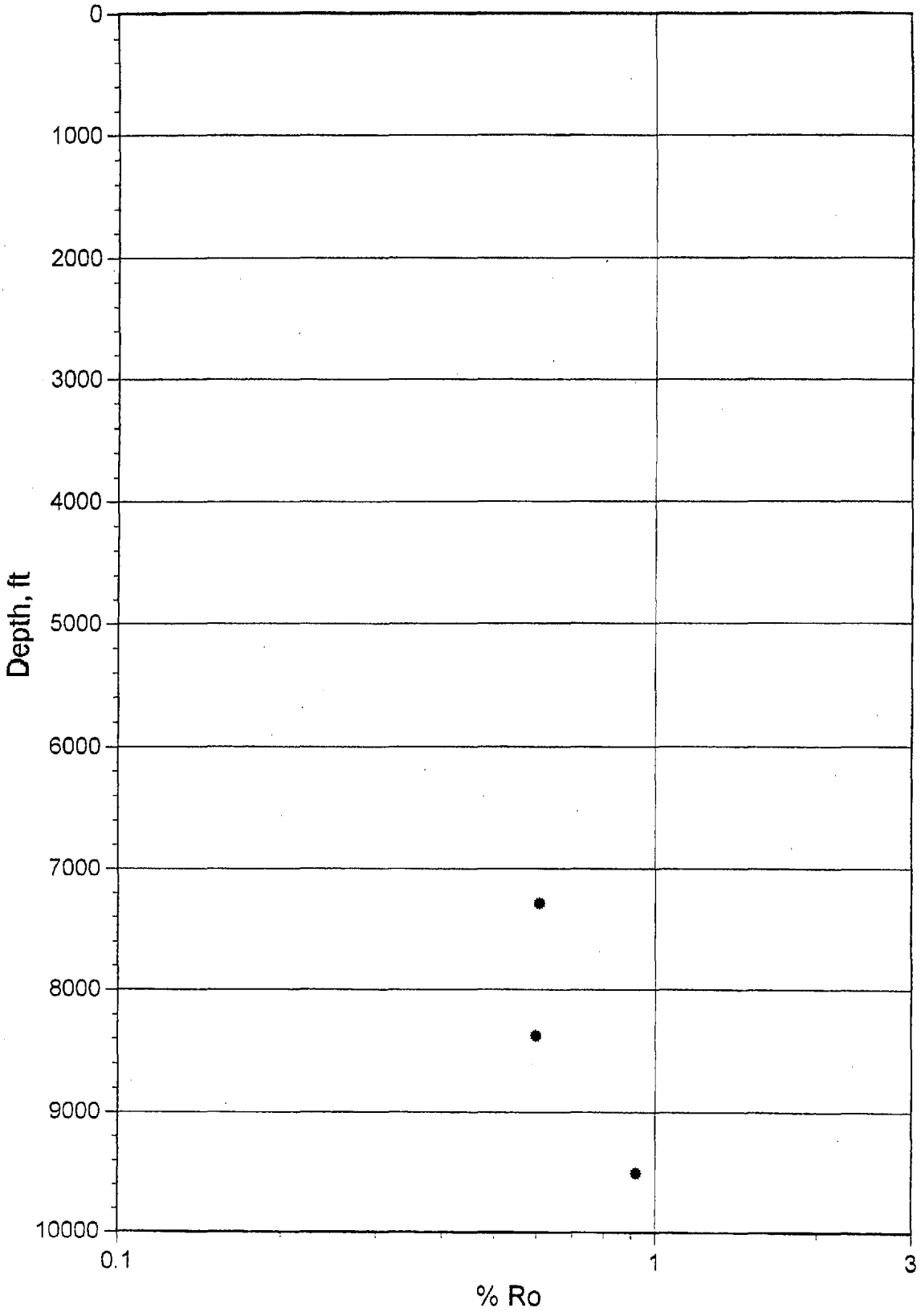


Figure 25

TABLE 19

SOURCE ROCK QUALITY INDICATORS

COUNTRY: Alaska
WELL: W. Fish Creek-1

DEPTH (ft)	DEPTHRANGE (ft)	FORMATION	PICKED LITHOLOGY	P1 (kg/t)	P1 (mg/gC)	P2 (kg/t)	TOC (%)	TMAX deg C	HI	GOGI	CARBT (%)	S (%)
7290			Mudstone	1.39	101.4	1.83	1.37	445	134		11.33	0.90
7380			Mudstone	1.19	78.5	1.95	1.51	443	129		20.05	1.10
7470			Mudstone	0.79	48.1	1.72	1.65	443	104		8.32	0.78
7560			Mudstone	1.31	77.0	2.16	1.71	442	127		7.99	0.96
7650			Mudstone	1.14	71.8	1.93	1.58	443	122		9.37	0.70
7740			Mudstone	1.43	82.5	2.27	1.73	439	131		8.96	0.90
7830			Mudstone	1.04	69.2	1.80	1.50	444	120		11.10	0.78
7920			Mudstone	0.00	0.0	0.84	1.39	445	60		7.87	0.83
8010			Mudstone	0.00	0.0	0.00	1.60	445	0		7.41	0.90
8100			Mudstone	0.89	57.8	1.85	1.54	445	121		7.78	0.91
8190			Mudstone	1.06	71.5	2.14	1.48	446	145		9.32	0.83
8280			Mudstone	0.96	66.4	1.98	1.44	445	137		9.08	0.72
8370			Mudstone	1.00	63.6	2.30	1.57	445	147		8.40	0.86
8460			Mudstone	0.89	56.9	2.10	1.56	447	135		8.54	0.73
8550			Mudstone	0.97	64.7	2.39	1.51	441	159		9.45	0.70
8640			Mudstone	0.95	63.9	2.31	1.49	445	155		9.63	0.69
8730			Mudstone	1.28	83.9	2.30	1.52	445	151		9.32	0.63
8820			Mudstone	1.14	71.3	2.59	1.60	442	162		9.49	0.53
8910			Mudstone	0.97	64.8	2.18	1.50	448	146		9.49	0.65
9000			Mudstone	1.81	84.4	2.97	2.15	450	138		8.25	1.03
9090			Mudstone	1.93	60.6	6.01	3.18	451	189		6.54	1.16
9180			Mudstone	1.31	48.8	4.47	2.68	446	167		7.93	0.86
9270			Mudstone	0.54	135.3	0.83	0.40	450	210		6.70	0.26
9360			Limestone	1.25	96.8	2.00	1.29	489	155		75.50	0.56
9500			Limestone	1.77	63.2	3.20	2.79	452	115		38.42	1.82

Sediment/Extract Analysis

Well name : W. Fish Creek-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8550
Sample name :

Extraction

TSE %wt : 0.111

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.59
H2 : 0.52
H3 : 0.88
H4 : 0
H5 : 100:73:42:28:14:4
H6 : 0.47
H7 : 0.62
H8 :
H9 :
H10 :
H11 : 0.78
H12 : 4.97
H13 : 0.00
H14 : 15.01
H15 : 0.00
H16 : 0.00
H17 : 23.27
H18 : 0.00

S1 : 0.51
S2 : 0.51
S3 : 34:19:46
S4 : 33:21:45
S5 : 43.62
S6 :
S7 : 42.70
S8 : 0.00
S9 :
S10 :

M2 : 0.74
M3 : 0.66
M4 : 88.54
M5 :
A1 : 0.84
A2 : 0.85
A3 : 0.56
A4 : 0.35
A5 : 0.36
A6 : 0.91
MDR : 2.93
MBP : 12.29

Light Hydrocarbons

MCH % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -26
Aromatics :
Residue :
Asphaltenes :
Kerogen : -23.6

STANDARD: NBS22 -29.8

Table 20.1

Sediment/Extract Analysis

Well name : W. Fish Creek-1
Suite name : NPRA Study
Country Of Origin : Alaska
Depth (m) : 8820
Sample name :

Extraction

TSE %wt : 0.119

HPLC

Saturates %wt :
Aromatics %wt :
Residues %wt :
Asphaltenes (Micro Method) %wt :

Inspection Properties

API :
Density @ 15 deg C :
Wax Content %wt :
Wax Melting Point deg C :
Pour Point deg C :
Viscocity cSt @ 20 deg C :
Total Acidity mg KOH/g :
Asphaltenes %wt (IP Method) :
Nitrogen ppm :
Sulphur %wt :
Nickel ppm :
Vanadium ppm :
Nickel/Vanadium :

Saturates GC

Pristane/Phytane :
Pristane/nC17 :
Phytane/nC18 :
CPI :
ALKIND :
R22 :

Biomarker Ratios

H1 : 0.58
H2 : 0.53
H3 : 0.88
H4 : 0
H5 : 100:70:40:27:14:4
H6 : 0.51
H7 : 0.60
H8 :
H9 :
H10 :
H11 : 0.69
H12 : 4.71
H13 : 0.00
H14 : 16.05
H15 : 0.00
H16 : 0.00
H17 : 23.25
H18 : 0.00

S1 : 0.53
S2 : 0.44
S3 : 36:24:38
S4 : 33:23:42
S5 : 37.44
S6 :
S7 : 48.80
S8 : 0.00
S9 :
S10 :

M2 : 0.74
M3 : 0.66
M4 : 85.61
M5 :
A1 : 0.85
A2 : 0.85
A3 : 0.53
A4 : 0.35
A5 : 0.31
A6 : 0.95
MDR : 2.71
MBP : 11.61

Light Hydrocarbons

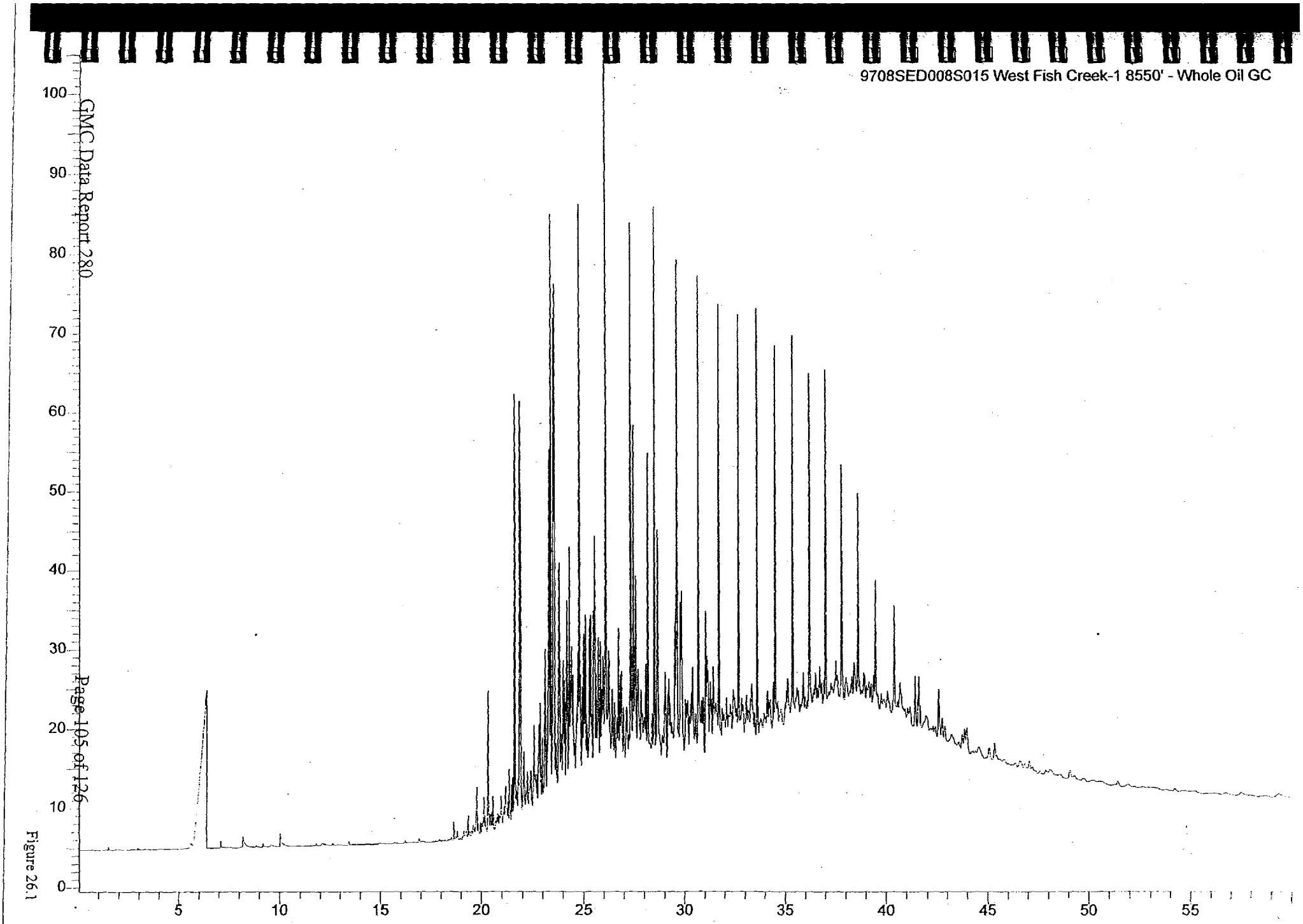
MCII % :
HER :
HXR :

Stable Carbon Isotopes

Saturates :
Total Oil : -25.7
Aromatics :
Residue :
Asphaltenes :
Kerogen : -25.5

STANDARD: NBS22 -29.8

Table 20.2



GMC Data Report 280

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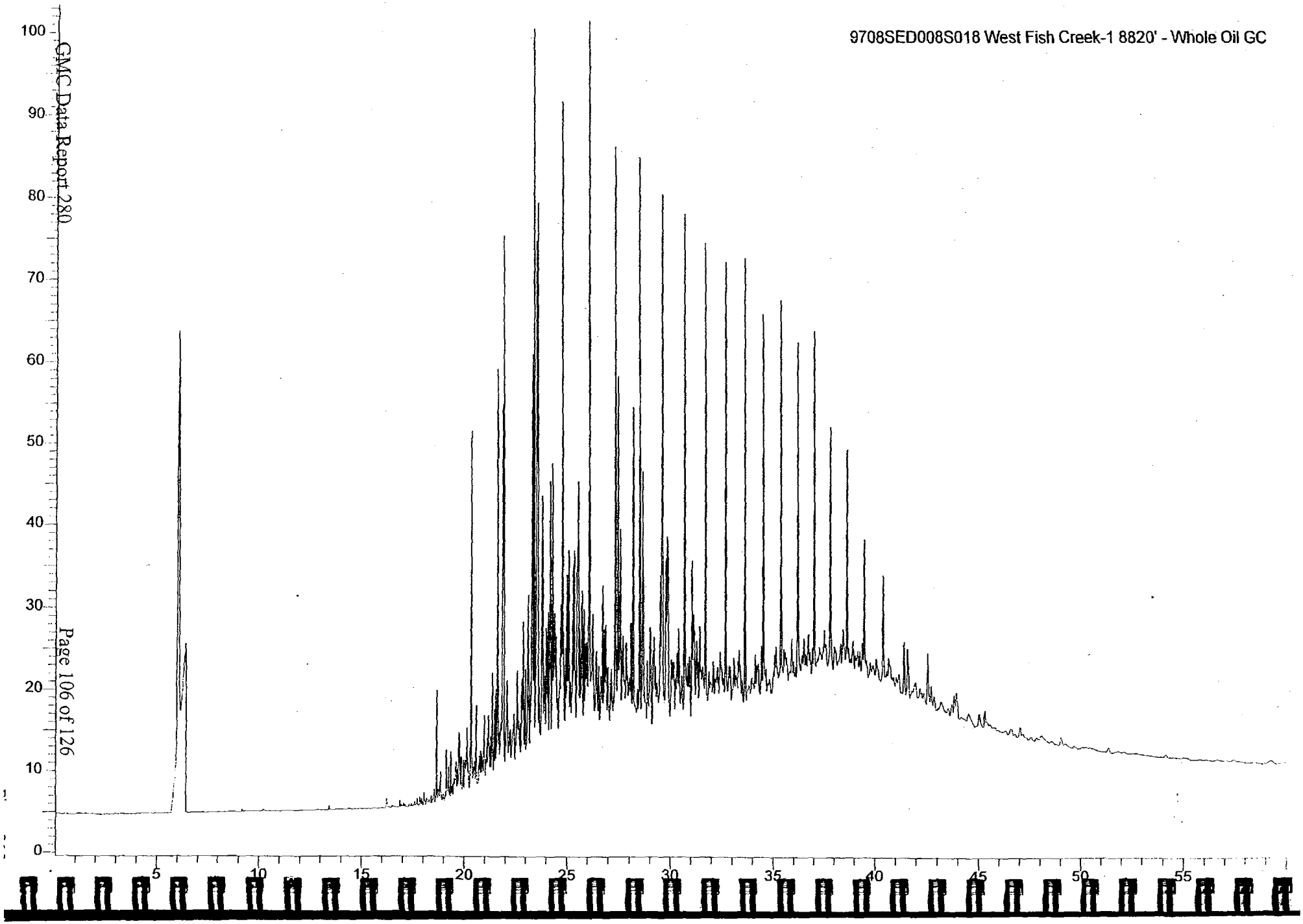
Figure 26.1


9708SED008S018 West Fish Creek-1 8820' - Whole Oil GC
GMC Data Report 280
Page 106 of 126
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55

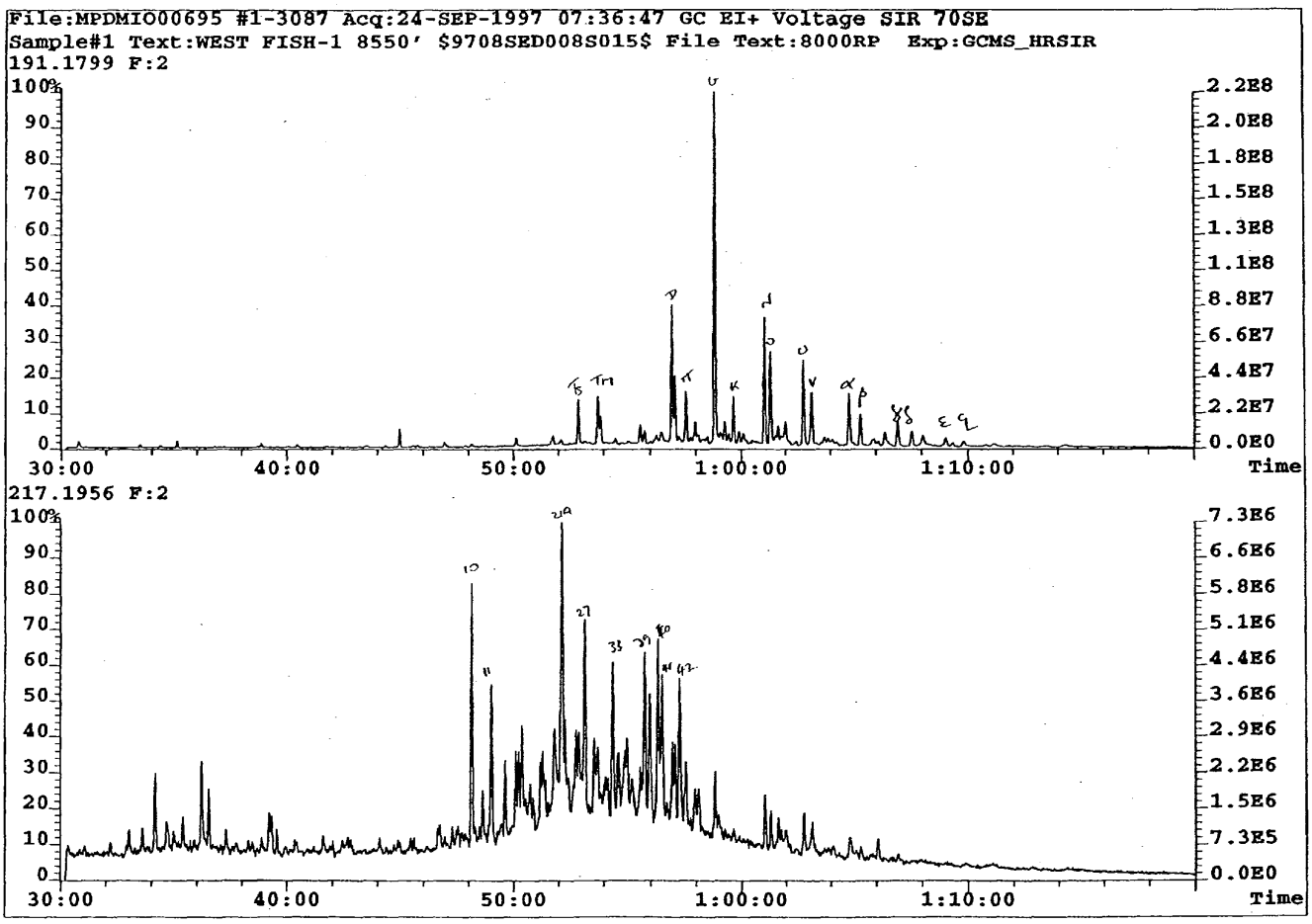

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.2E8
2.0E8
1.8E8
1.5E8
1.3E8
1.1E8
8.8E7
6.6E7
4.4E7
2.2E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 F:2
100%
90
80
70
60
50
40
30
20
10
0
7.3E6
6.6E6
5.8E6
5.1E6
4.4E6
3.6E6
2.9E6
2.2E6
1.5E6
7.3E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Figure 27.1

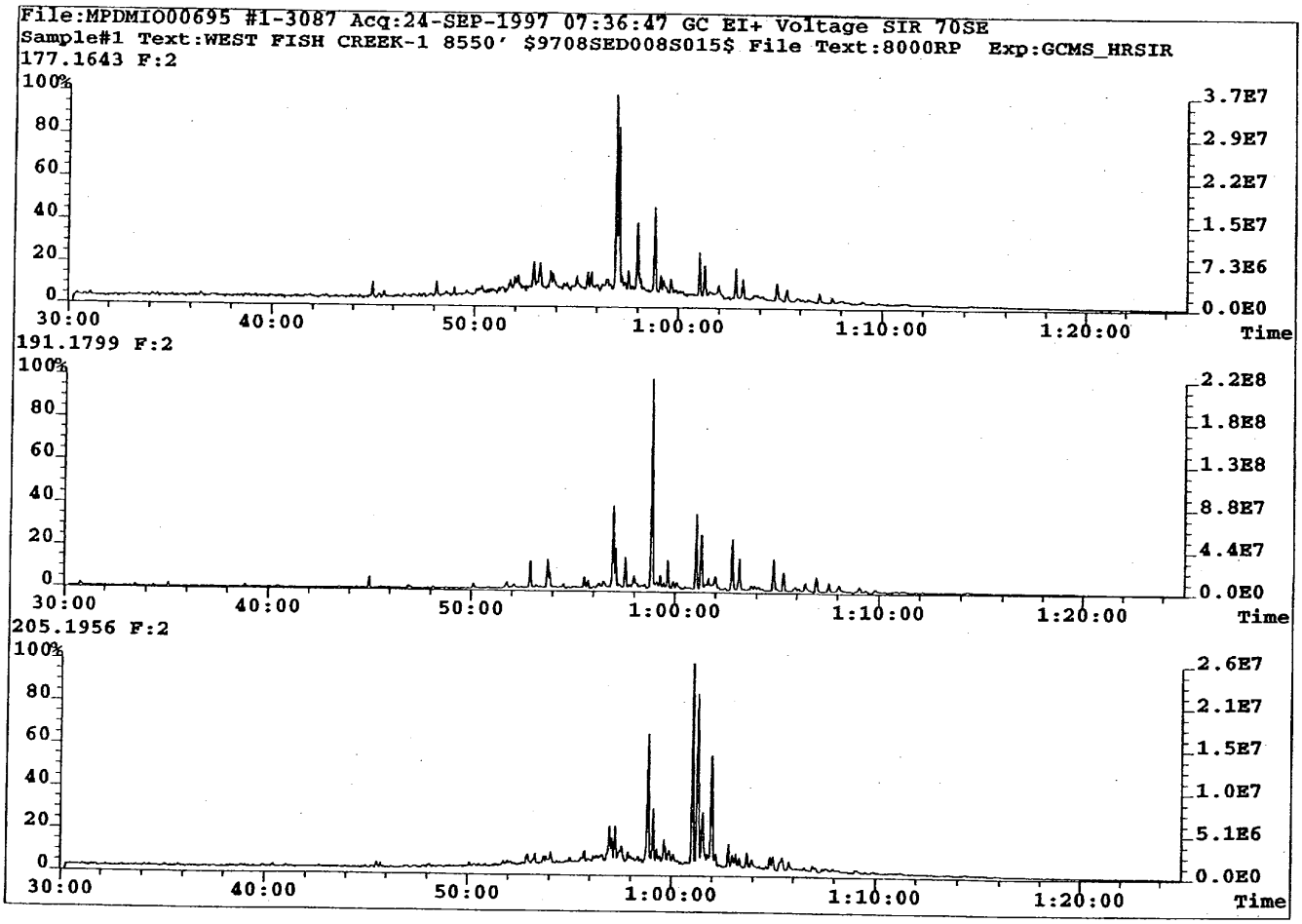

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH CREEK-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 F:2
100%
80
60
40
20
0
3.7E7
2.9E7
2.2E7
1.5E7
7.3E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 F:2
100%
80
60
40
20
0
2.2E8
1.8E8
1.3E8
8.8E7
4.4E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 F:2
100%
80
60
40
20
0
2.6E7
2.1E7
1.5E7
1.0E7
5.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 27.2

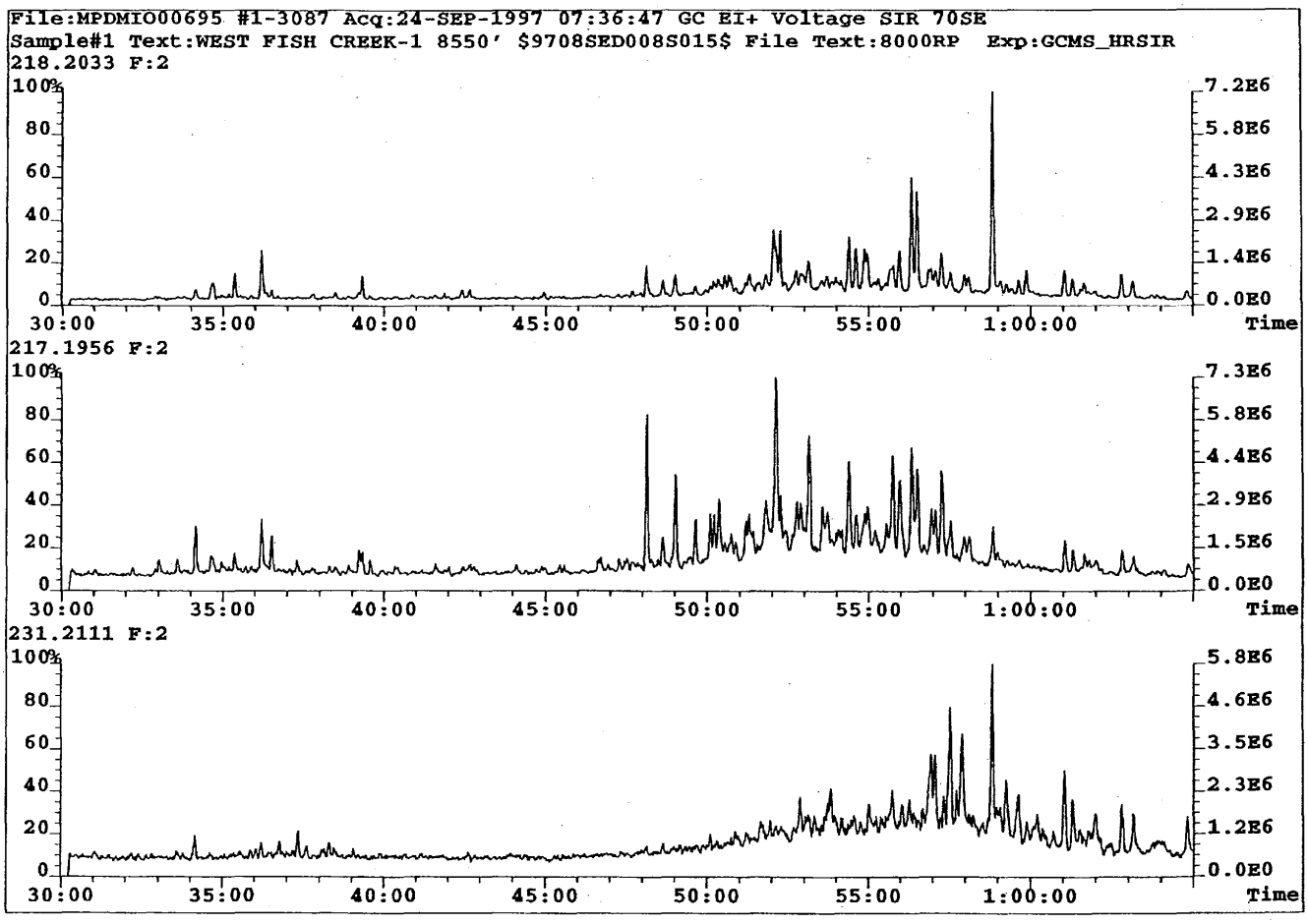

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH CREEK-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 F:2
100%
80
60
40
20
0
7.2E6
5.8E6
4.3E6
2.9E6
1.4E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 F:2
100%
80
60
40
20
0
7.3E6
5.8E6
4.4E6
2.9E6
1.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 F:2
100%
80
60
40
20
0
5.8E6
4.6E6
3.5E6
2.3E6
1.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Figure 27.3

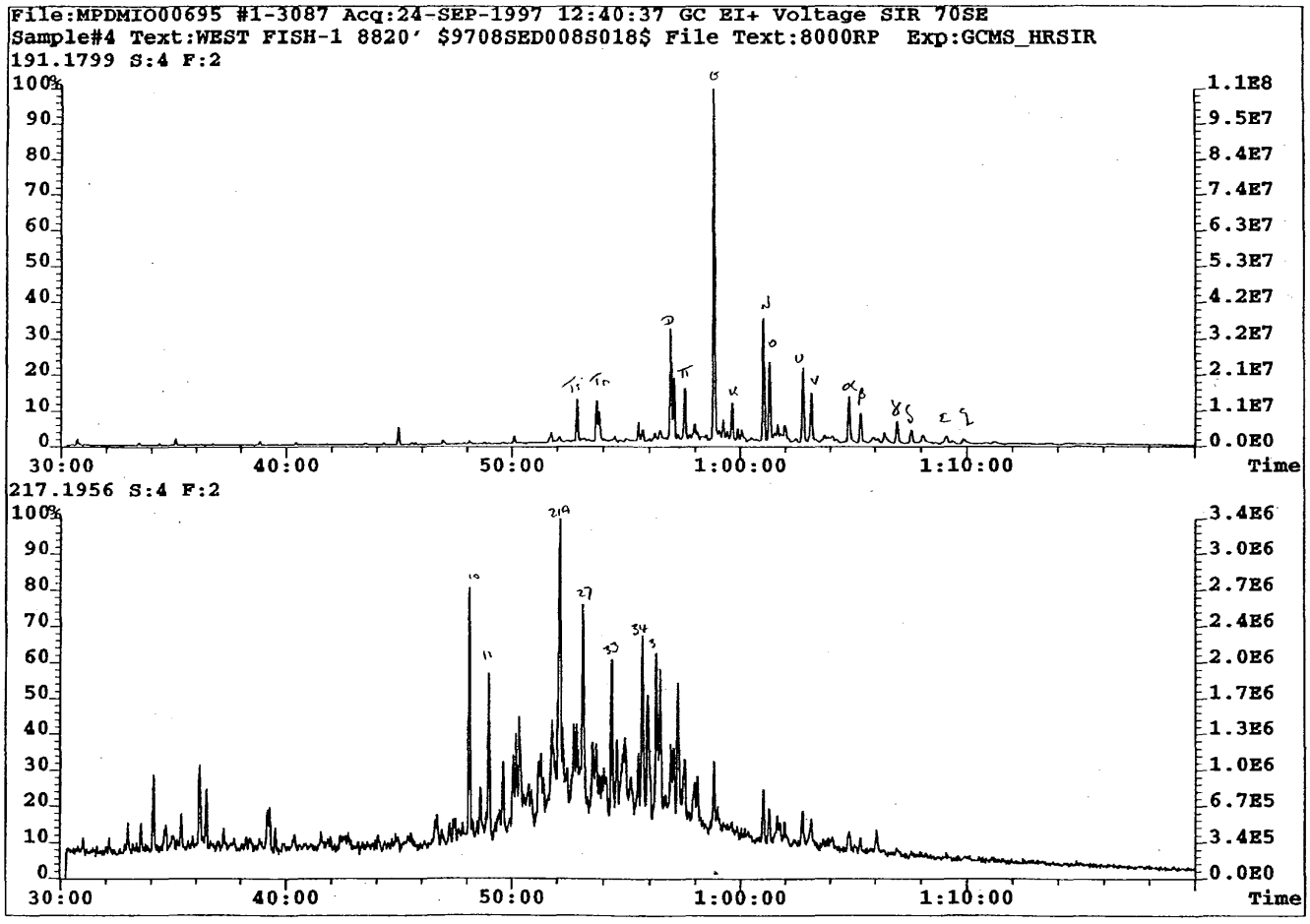

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
191.1799 S:4 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.1E8
9.5E7
8.4E7
7.4E7
6.3E7
5.3E7
4.2E7
3.2E7
2.1E7
1.1E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:4 F:2
3.4E6
3.0E6
2.7E6
2.4E6
2.0E6
1.7E6
1.3E6
1.0E6
6.7E5
3.4E5
0.0E0

Figure 27.4

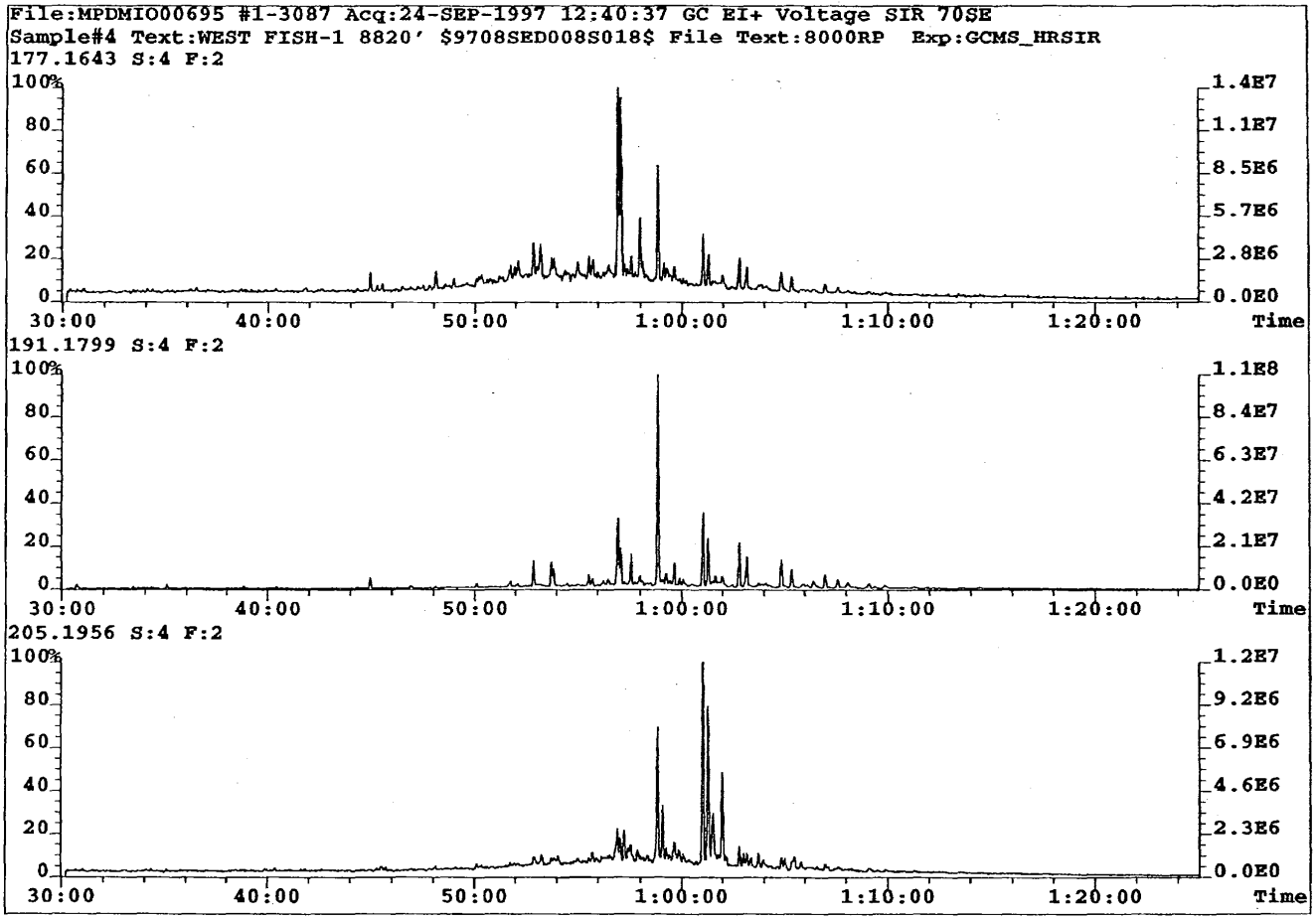
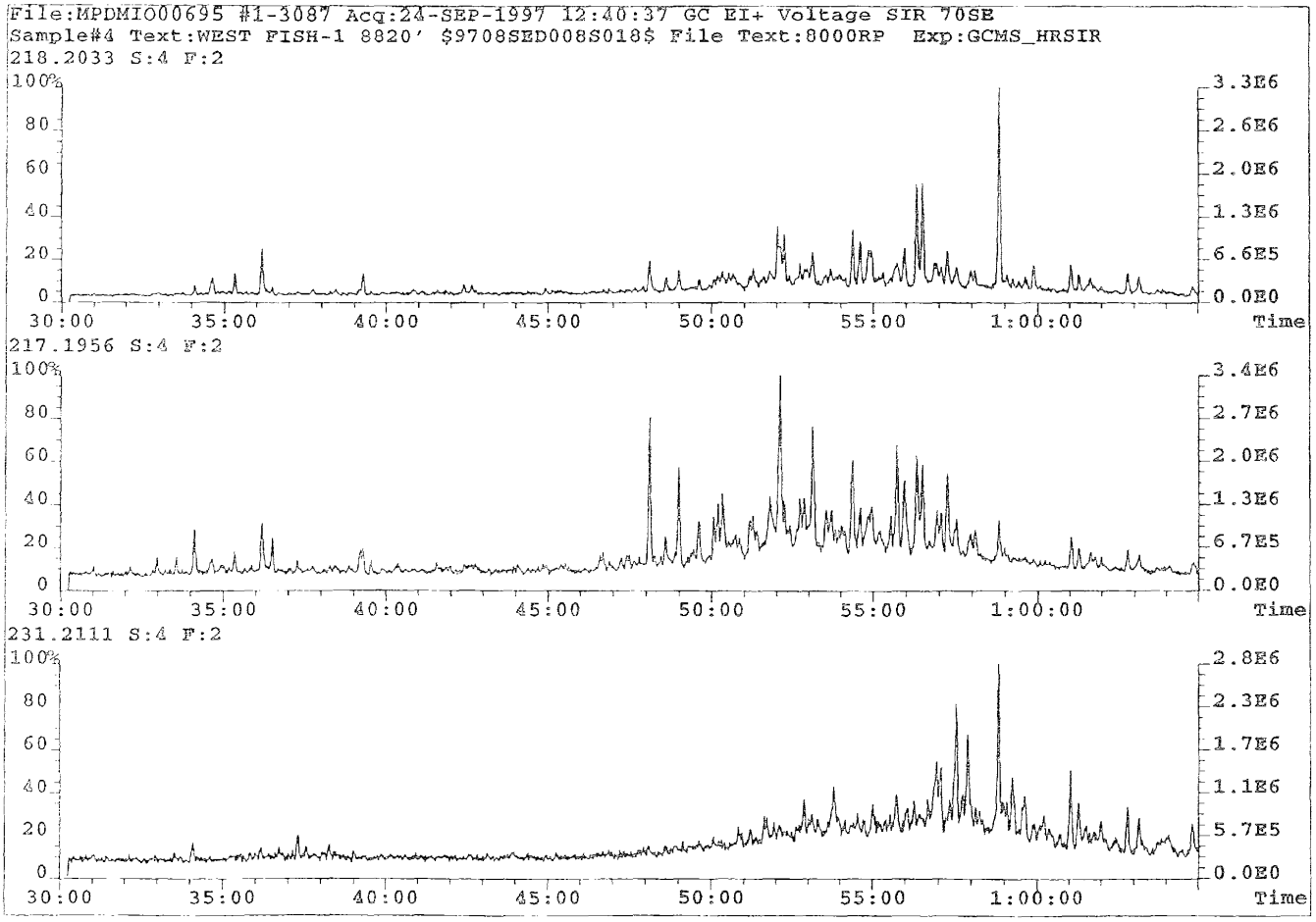

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
177.1643 S:4 F:2
100%
80
60
40
20
0
1.4E7
1.1E7
8.5E6
5.7E6
2.8E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:4 F:2
100%
80
60
40
20
0
1.1E8
8.4E7
6.3E7
4.2E7
2.1E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:4 F:2
100%
80
60
40
20
0
1.2E7
9.2E6
6.9E6
4.6E6
2.3E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Figure 27.5


File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
218.2033 S:4 F:2
100%
80
60
40
20
0
3.3E6
2.6E6
2.0E6
1.3E6
6.6E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:4 F:2
100%
80
60
40
20
0
3.4E6
2.7E6
2.0E6
1.3E6
6.7E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:4 F:2
100%
80
60
40
20
0
2.8E6
2.3E6
1.7E6
1.1E6
5.7E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

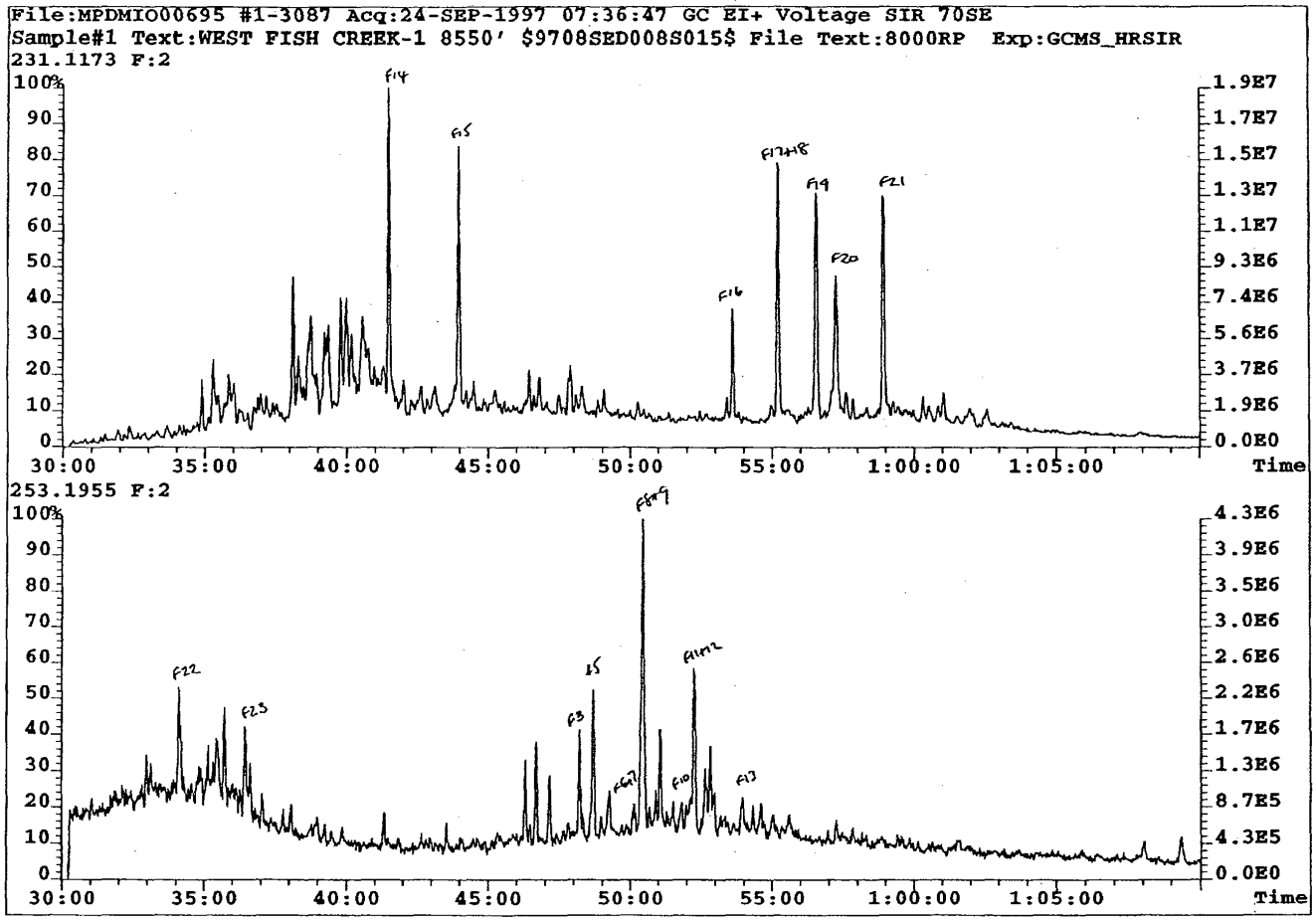

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH CREEK-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 F:2
F14
F15
F17+18
F19
F21
F16
F20
100%
90
80
70
60
50
40
30
20
10
0
1.9E7
1.7E7
1.5E7
1.3E7
1.1E7
9.3E6
7.4E6
5.6E6
3.7E6
1.9E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 F:2
F8+9
F22
F23
F3
F5
F11+12
F7
F10
F13
4.3E6
3.9E6
3.5E6
3.0E6
2.6E6
2.2E6
1.7E6
1.3E6
8.7E5
4.3E5
0.0E0
Time

Figure 28.1

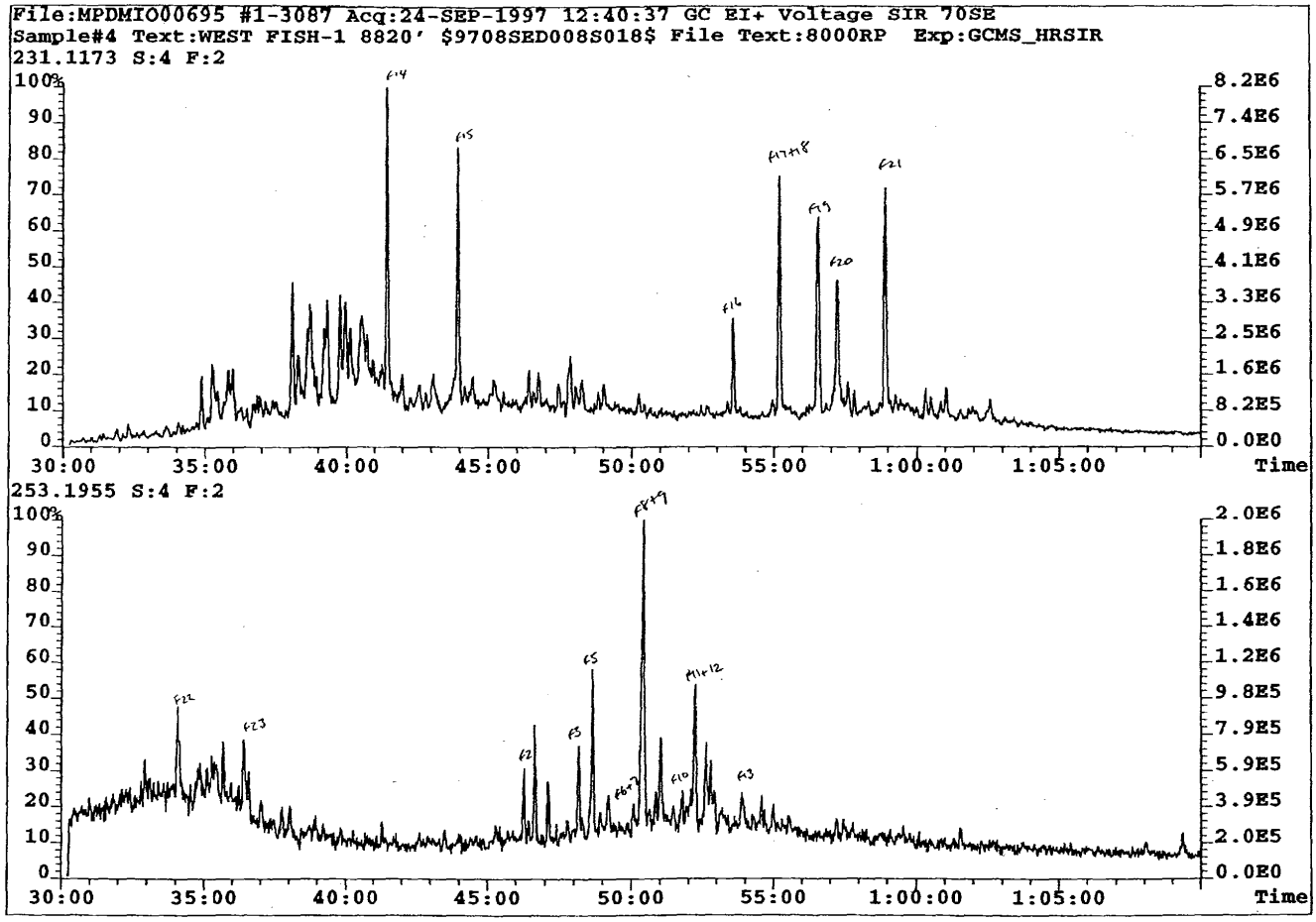

File:MPDMIO00695 #1-3087 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
231.1173 S:4 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.2E6
7.4E6
6.5E6
5.7E6
4.9E6
4.1E6
3.3E6
2.5E6
1.6E6
8.2E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:4 F:2
2.0E6
1.8E6
1.6E6
1.4E6
1.2E6
9.8E5
7.9E5
5.9E5
3.9E5
2.0E5
0.0E0

Figure 28.2

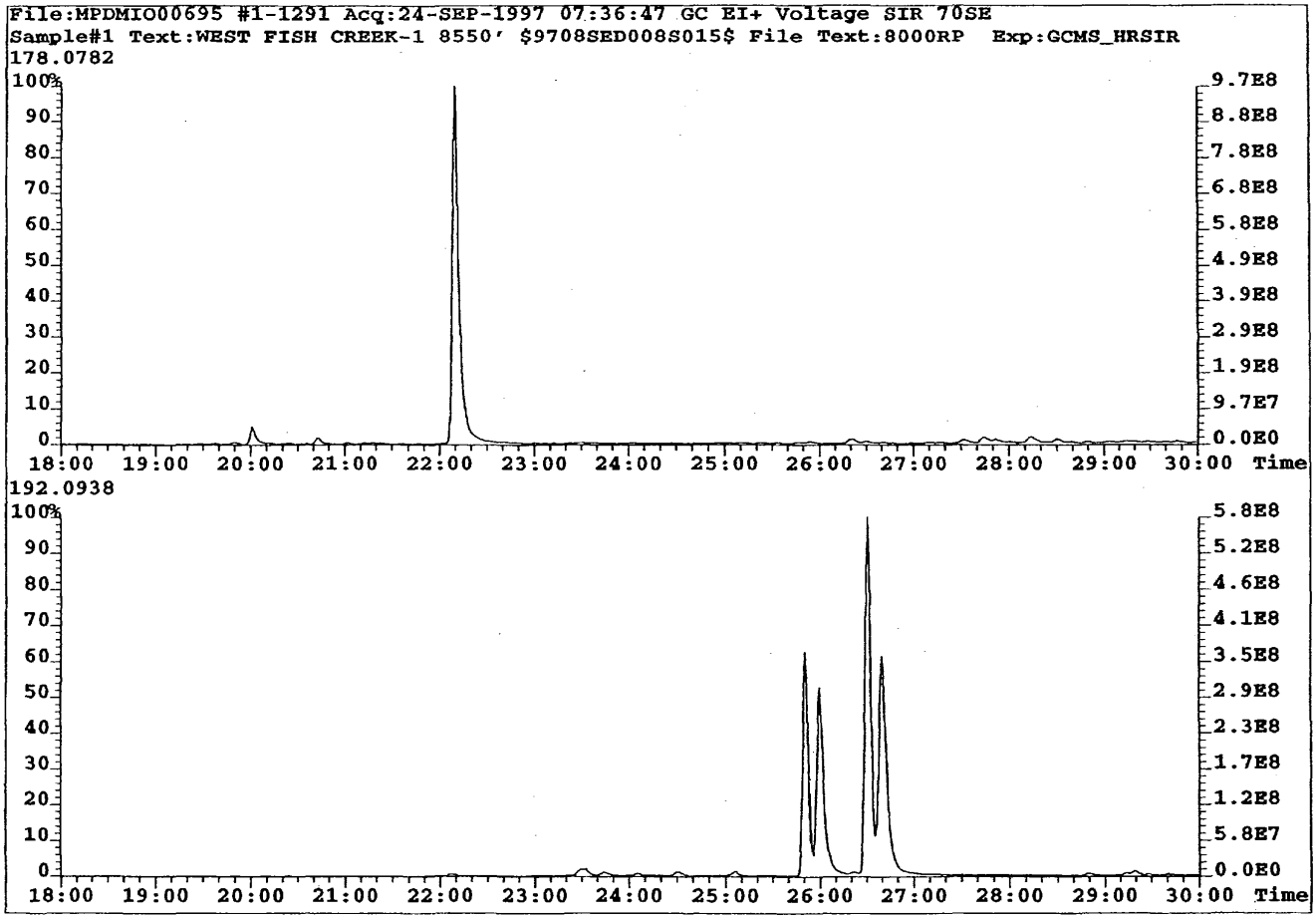

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH CREEK-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
178.0782
100%
90
80
70
60
50
40
30
20
10
0
9.7E8
8.8E8
7.8E8
6.8E8
5.8E8
4.9E8
3.9E8
2.9E8
1.9E8
9.7E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938
100%
90
80
70
60
50
40
30
20
10
0
5.8E8
5.2E8
4.6E8
4.1E8
3.5E8
2.9E8
2.3E8
1.7E8
1.2E8
5.8E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 29.1

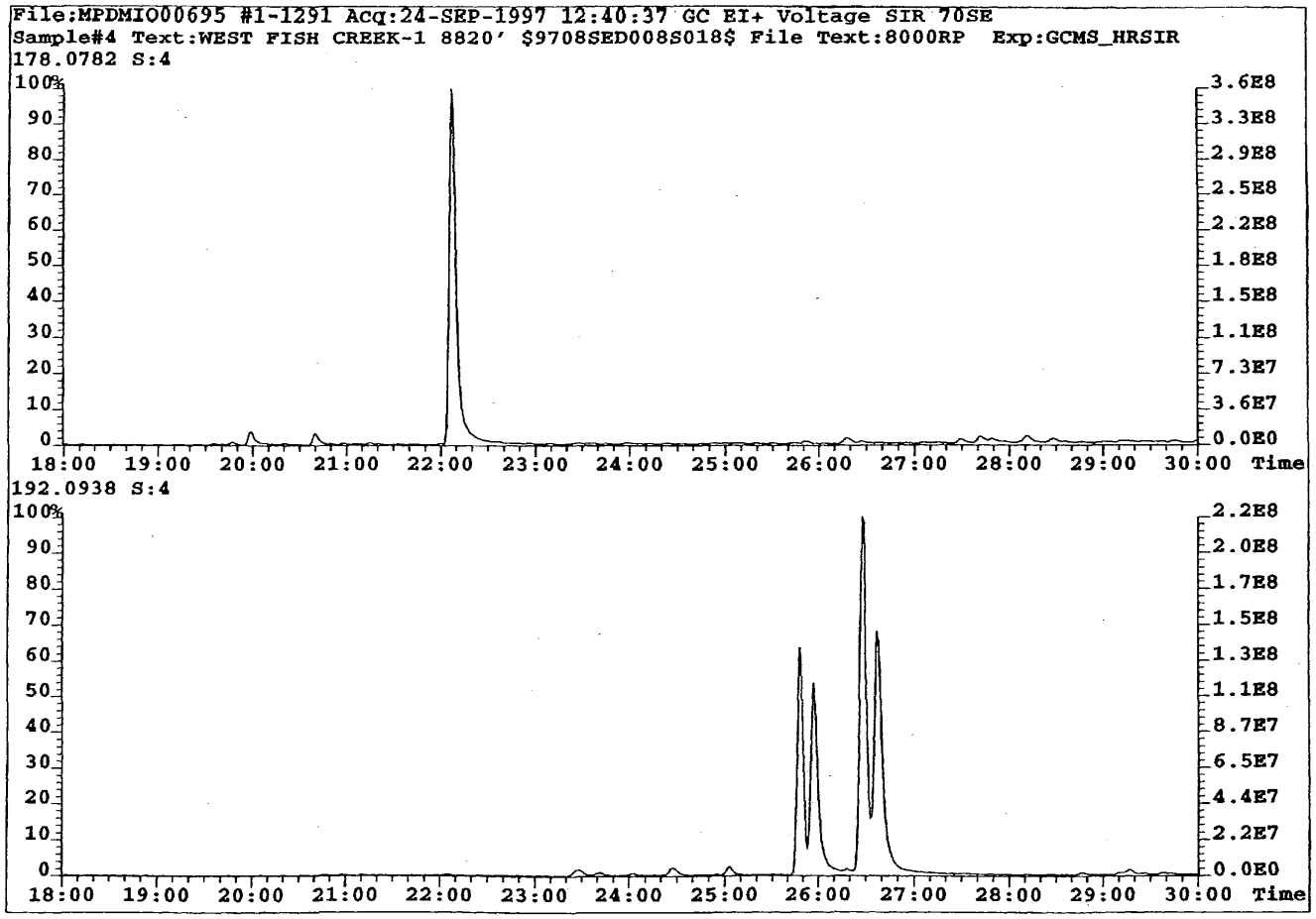

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH CREEK-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
178.0782 S:4
100%
90
80
70
60
50
40
30
20
10
0
3.6E8
3.3E8
2.9E8
2.5E8
2.2E8
1.8E8
1.5E8
1.1E8
7.3E7
3.6E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:4
100%
90
80
70
60
50
40
30
20
10
0
2.2E8
2.0E8
1.7E8
1.5E8
1.3E8
1.1E8
8.7E7
6.5E7
4.4E7
2.2E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time

Figure 29.2

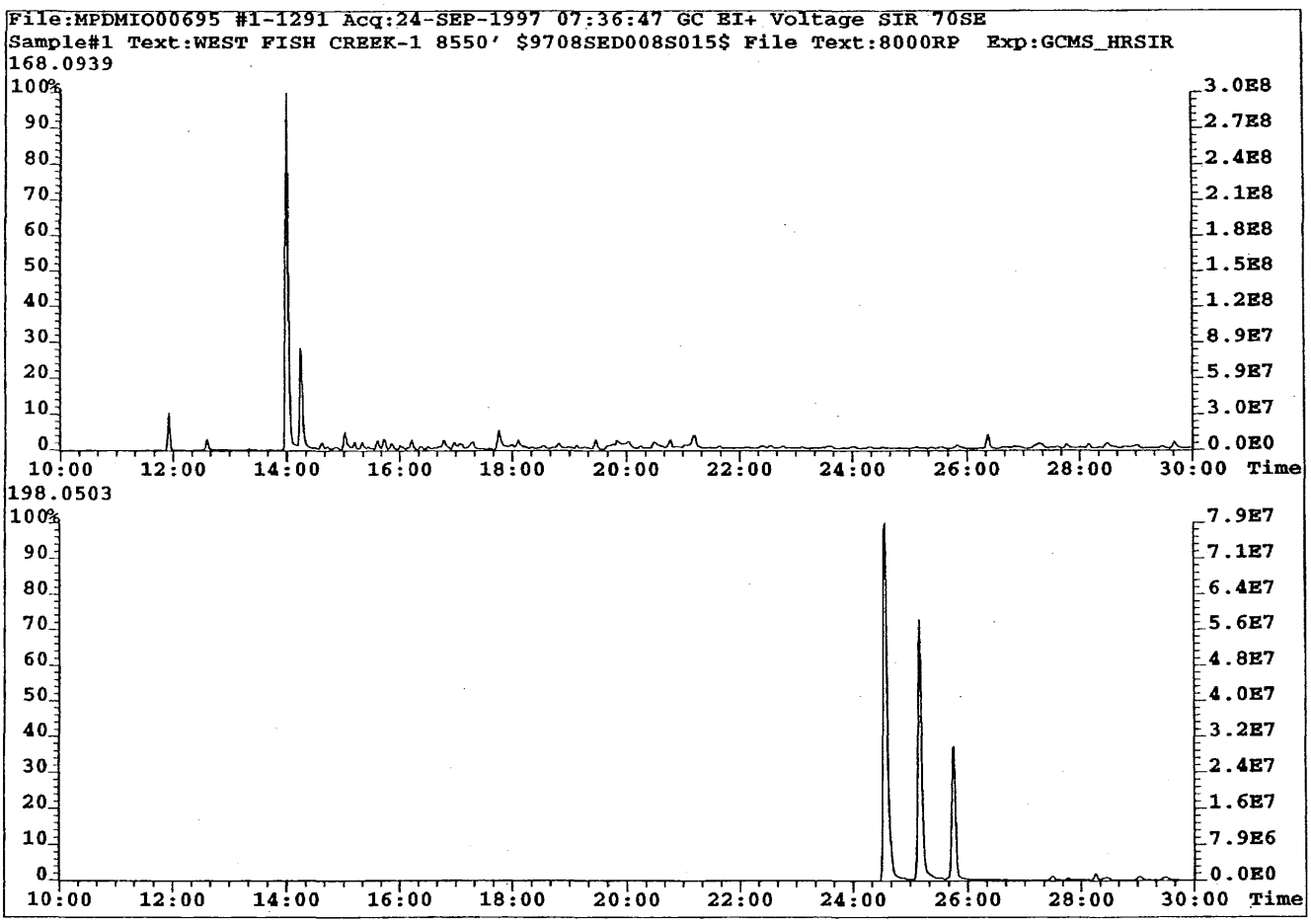

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 07:36:47 GC EI+ Voltage SIR 70SE
Sample#1 Text:WEST FISH CREEK-1 8550' $9708SED008S015$ File Text:8000RP Exp:GCMS_HRSIR
168.0939
100%
90
80
70
60
50
40
30
20
10
0
3.0E8
2.7E8
2.4E8
2.1E8
1.8E8
1.5E8
1.2E8
8.9E7
5.9E7
3.0E7
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503
100%
90
80
70
60
50
40
30
20
10
0
7.9E7
7.1E7
6.4E7
5.6E7
4.8E7
4.0E7
3.2E7
2.4E7
1.6E7
7.9E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 30.1

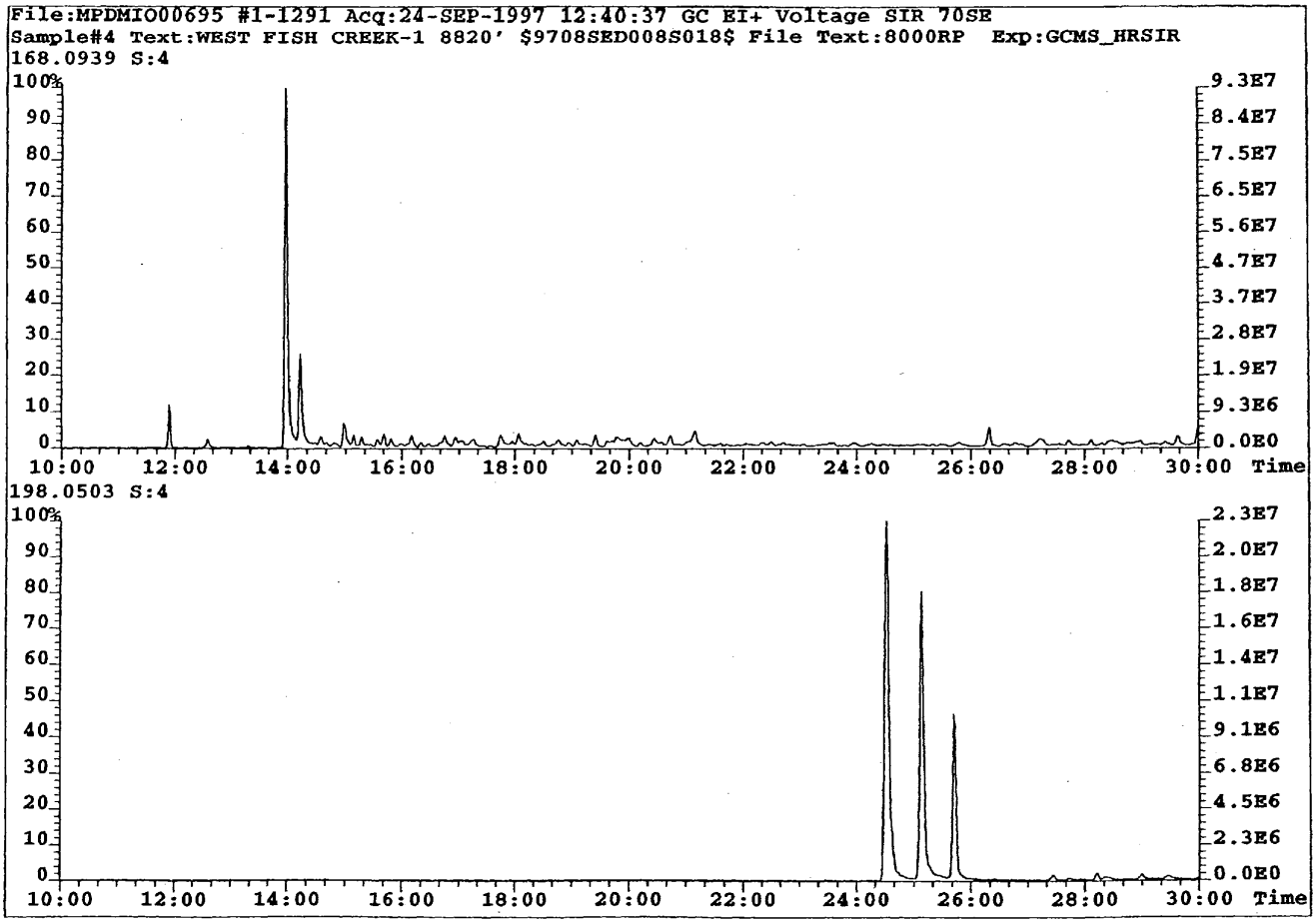

File:MPDMIO00695 #1-1291 Acq:24-SEP-1997 12:40:37 GC EI+ Voltage SIR 70SE
Sample#4 Text:WEST FISH CREEK-1 8820' $9708SED008S018$ File Text:8000RP Exp:GCMS_HRSIR
168.0939 S:4
100%
90
80
70
60
50
40
30
20
10
0
9.3E7
8.4E7
7.5E7
6.5E7
5.6E7
4.7E7
3.7E7
2.8E7
1.9E7
9.3E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:4
100%
90
80
70
60
50
40
30
20
10
0
2.3E7
2.0E7
1.8E7
1.6E7
1.4E7
1.1E7
9.1E6
6.8E6
4.5E6
2.3E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time

Figure 30.2

Appendix A

Vitrinite reflectance Codes

VITRINITE ABBREVIATIONS

ANS - Anisotropic
BAR - Virtually Barren
BS - Bitumen Staining
CARB - Carbargilite
COR - Corroded
DD - Differentiation Difficult
DMA - Drilling Mud Additive
F - Few
FR - Fragments
G - Good
HI - High
IGN - Igneous Traces
IRON - Iron Oxides
LGN - Lignite
LT - Light
M - Mostly
NDP - No Determination Possible
OBS - Overall Bitumen Staining
OX - Indications of Oxidation
PAR - Particles
PL - Plentiful or Plenty
PY - Pyrite
RES - Resin
RM - Reworked Material
S - Some
SH - Shale
SML - Small
STC - Structure
SUB - Subordinate
TEL - Telinitic
V - Vitrinite
VL - Very Low Organic Content
VST - Vitrinite Stringers
W - Wisps or Wispy
* - Allocthonous
? - Questionable

B - Bitumen
BL - Blebs
BW - Bitumen Wisps
CAV - Caved
CTGS - Cuttings
DEC - Decomposed
DOM - Dominant
FL - Fluorescence
GN - Gnarled
HAE - Haematite
I - Inertinite
INST - Interstitial
L - Low
LOW - Low Reflectances
MAT - Maturity
MOD - Moderate
NTV - No True Vitrinite
OCC - Occasional
P - Poor
PHY - Phytoclast content
POS - Possibly
R - Reworked
RI - Rich
RO - Reflectance Measurement
SC - Scruffy
SLT - Siltstone
SPE - Specks
STR - Strongly
TB - Turbo-drilled
TR - Trace
VAR - Variable RO
VLT - Very Light
VW - Vitrinite Wisps
WH - Wholly
= - Equal Proportions

SPORE FLUORESCENCE COLOURS UNDER ULTRAVIOLET LIGHT

G - Green
O - Orange
LT - Light
D - Deep
ALG - Algae
HYD - Hydrocarbon
RH - Rhombs

Y - Yellow
R - Red
M - Mid
P - Pale
CAR - Carbonate
RES - Resin
SP - Spores

Appendix B

Molecular Parameters List

MOLECULAR PARAMETER LIST

LGC CODE	PARAMETER	USE
H1	C32 HOPANE 22S/(22S+22R)	M
H2	C31 HOPANE 22S/(22S+22R)	M
H3	C30 HOPANE/(C30 HOPANE+C30 MORETANE)	MS
H4	ββ HOPANES PRESENT/ABSENT	M
H5	C30:C31:C32:C33:C34:C35 HOPANE DISTRIBUTION	S
H6	C27 HOPANES Ts/(Ts+Tm)	MS
H7	C33 HOPANE 22S/(22S+22R)	M
H8	C34 HOPANE 22S/(22S+22R)	M
H9	C35 HOPANE 22S/(22S+22R)	M
H10	RESIN DITERPANES % RELATIVE TO C30 HOPANE (PEAK G)	S
H11	C23 EXT TRICYCLIC TERPANE % RELATIVE TO C30 HOPANE (PEAK G)	S
H12	C24 TETRACYCLIC TERPANE % RELATIVE TO C30 HOPANE (PEAK G)	S
H13	28,30 BISNORHOPANE (PEAK X) % RELATIVE TO C30 HOPANE (PEAK G)	S
H14	PENTACYCLANE Π % RELATIVE TO C30 HOPANE (PEAK G)	S
H15	OLEANANE % RELATIVE TO C30 HOPANE (PEAK G)	S
H16	GAMMACERANE % RELATIVE TO (PEAK G)	S
H17	HOPANES C35/(C34+C35) %	S
H18	25-NORHOPANE/C30 HOPANE %	B
S1	C29 ααα STERANES 20S/(20S+20R)	M
S2	C29 STERANES αββ/(αββ+ααα)	M
S3	STERANES ααα C27:C28:C29	S
S4	STERANES αββ C27:C28:C29	S
S5	βα DIASTERANES/(SAME+ααα+αββ STERANES) %	SM
S6	LOW MOLECULAR WEIGHT STERANES RELATIVE TO C29 STERANES	S
S7	STERANE INDEX C27/(C27+C29) % (FROM S3)	S
S8	4-ME C30 STERANE % RELATIVE TO C29 20R ααα STERANE (PEAK 42)	S
S9	4-ME STERANES INDEX C28/(C28+C30) %	S
S10	BICADINANES PRESENT/ABSENT	S
A1	C28 20R TRIAROM. STERANE/(SAME+C29 20R MONOAROM. STERANE)	M
A2	SUM TRIAROM. STERANES/(SAME+SUM MONOAROM. STERANES)	M
A3	C20 TRIAROM. STERANE/(SAME+C28 20R TRIAROM. STERANE)	M
A4	C20+C21 TRIAROM. STERANE/(SAME+SUM C26-C28 TRIAROM. STERANES)	M
A5	C26 20S TRIAROM. STERANE/C28 20S TRIAROM. STERANE	S
A6	C27 20R TRIAROM. STERANE/C28 20R TRIAROM. STERANE	S
M2	PHENANTHRENES (3ME+2ME)/(9ME+1ME)	M
M3	MPI [(3ME+2ME)/(PHENANTHRENE+9ME+1ME)] * 1.5	M
MBP	3-METHYL BIPHENYL/2-METHYL BIPHENYL	M
MDR	4-METHYLDIBENZOTHIOPHENE/1-METHYLDIBENZOTHIOPHENE	M
M4	SUM C27-C35 HOPANES/(SAME+ SUM C27-C29 STERANES) %	S
ALKIND	ALKANE INDEX n-C17/(n-C17+n-C27) %	S
R22	R22 INDEX (2 * n-C22)/(n-C21+n-C23)	SM

NOTES:

1. S=SOURCE PARAMETER, M=MATURITY PARAMETER.
2. TRIAROM. STERANE=MONOMETHYL TRIAROMATIC STERANES
   MONOAROM. STERANE=DIMETHYL MONOAROMATIC STERANES. (13/11/92)

Appendix C

Biomarker Identifications

BIOMARKER IDENTIFICATION - PENTACYCLIC HYDROCARBONS

LGC CODE	TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 191)
I	9-DODECYLPERHYDROANTHRACENE [INTERNAL STANDARD]
Ts	18α(H)-22,29,30-TRISNORNEOHOPANE
Tm	17A(H)-22,29,30-TRISNORHOPANE
Q	17β(H)-22,29,30-TRISNORHOPANE
W	17A(H)-25,30-BISNORHOPANE
X	17α(H),18α(H),21β(H)-28,30-BISNORHOPANE
Y	17α(H)-25-NORHOPANE
D	17α(H),21β(H)-30-NORHOPANE
D2	18α(H)-30-NORNEOHOPANE
π	17α(H),15α(Me)-27-NORHOPANE ("DIAHOPANE")
A	17β(H),21α(H)-30-NORMORETANE
B	18α(H)-OLEANANE
G	17α(H),21β(H)-HOPANE
H	17β(H),21β(H)-30-NORHOPANE
K	17β(H),21α(H)-MORETANE
N	(22S)-17α(H),21β(H)-30-METHYLHOPANE
O	(22R)-17α(H),21β(H)-30-METHYLHOPANE
S	GAMMACERANE
P	17β(H),21β(H)-HOPANE
R	17β(H),21α(H)-30-METHYLMORETANE
U	(22S)-17α(H),21β(H)-30-ETHYLHOPANE
V	(22R)-17α(H),21β(H)-30-ETHYLHOPANE
J	17β(H),21β(H)-METHYLHOPANE
α	(22S)-17α(H),21β(H)-30-n-PROPYLHOPANE
β	(22R)-17α(H),21β(H)-30-n-PROPYLHOPANE
L	17β(H),21β(H)-ETHYLHOPANE
γ	(22S)-17α(H),21β(H)-30-n-BUTYLHOPANE
δ	(22R)-17α(H),21β(H)-30-n-BUTYLHOPANE
ε	(22S)-17α(H),21β(H)-30-n-PENTYLHOPANE
ζ	(22R)-17α(H),21β(H)-30-n-PENTYLHOPANE

BIOMARKER IDENTIFICATION - STERANES

LGC CODE	TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 217)
10	(20S)-13β(H),17α(H)-DIACHOLESTANE
11	(20R)-13β(H),17α(H)-DIACHOLESTANE
13	(20S)-13α(H),17β(H)-DIACHOLESTANE
14	(20R)-13α(H),17β(H)-DIACHOLESTANE
15	(24S/R)-(20S)-13β(H),17α(H)-24-METHYLDIACHOLESTANE
16	(24S/R)-(20S)-13β(H),17α(H)-24-METHYLDIACHOLESTANE
18	(24S/R)-(20R)-13β(H),17α(H)-24-METHYLDIACHOLESTANE
19	(24R/S)-(20R)-13β(H),17α(H)-24-METHYLDIACHOLESTANE
20A	(24S/R)-(20S)-13α(H),17β(H)-24-METHYLDIACHOLESTANE
20B	(20S)-5α(H),14α(H),17α(H)-CHOLESTANE
21A	(24R+S)-(20S)-13β(H),17α(H)-24-ETHYLDIACHOLESTANE
21B	(20R)-5α(H),14β(H),17β(H)-ISOCHOLESTANE
22	(20S)-5α(H),14β(H),17β(H)-ISOCHOLESTANE
25	(20R)-5α(H),14α(H),17α(H)-CHOLESTANE
27	(24S+R)-(20R)-13β(H),17α(H)-24-ETHYLDIACHOLESTANE
29	(24S+R)-(20S)-13α(H),17β(H)-24-ETHYLDIACHOLESTANE
33A	(24S+R)-(20R)-5α(H),14β(H)17β(H)-24-METHYLISOCHOLESTANE
33B	(24S+R)-(20R)-13α(H),17β(H)-24-ETHYLDIACHOLESTANE
34	(24S+R)-(20S)-5α(H),14β(H),17β(H)-24-METHYLISOCHOLESTANE
36	(24S+R)-(20R)-5α(H),14α(H),17α(H)-24-METHYLCHOLESTANE
39	(24S+R)-(20S)-5α(H),14α(H),17α(H)-24-ETHYLCHOLESTANE
40	(24S+R)-(20S)-5α(H),14β(H),17β(H)-24-ETHYLISOCHOLESTANE
41	(24S+R)-(20R)-5α(H),14β(H),17β(H)-24-ETHYLISOCHOLESTANE
42	(24S+R)-(20R)-5α(H),14α(H),17α(H)-24-ETHYLCHOLESTANE
46	(24S+R)-(20R)C_{30} STERANE

BIOMARKER IDENTIFICATION - AROMATIC STEROIDAL HYDROCARBONS (AROMATIC STERANES)

LGC CODE	TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 253 mass fragmentogram)
F22	C_{21} DIMETHYL MONOAROMATIC STEROID
F23	C_{22} DIMETHYL MONOAROMATIC STEROID
F2	C_{27}(20S)5β(H)DIMETHYL MONOAROMATIC STEROID
F3	C_{27}(20R)5β(H)DIMETHYL MONOAROMATIC STEROID
F4	C_{27}(20S)5α(H)DIMETHYL MONOAROMATIC STEROID
F5	C_{28}(20S)5β(H)DIMETHYL MONOAROMATIC STEROID
F6	C_{27}(20R)5α(H)DIMETHYL MONOAROMATIC STEROID
F7	C_{28}(20S)5α(H)DIMETHYL MONOAROMATIC STEROID
F8	C_{28}(20R)5β(H)DIMETHYL MONOAROMATIC STEROID
F9	C_{29}(20S)5β(H)DIMETHYL MONOAROMATIC STEROID
F10	C_{29}(20S)5α(H)DIMETHYL MONOAROMATIC STEROID
F11	C_{28}(20R)5α(H)DIMETHYL MONOAROMATIC STEROID
F12	C_{29}(20R)5β(H)DIMETHYL MONOAROMATIC STEROID
F13	C_{29}(20R)5α(H)DIMETHYL MONOAROMATIC STEROID
	(m/e 231 mass fragmentogram)
F14	C_{20}METHYL TRIAROMATIC STEROID
F15	C_{21}METHYL TRIAROMATIC STEROID
F16	C_{26}(20S)METHYL TRIAROMATIC STEROID
F17	C_{26}(20R)METHYL TRIAROMATIC STEROID
F18	C_{27}(20S)METHYL TRIAROMATIC STEROID
F19	C_{28}(20S)METHYL TRIAROMATIC STEROID
F20	C_{27}(20R)METHYL TRIAROMATIC STEROID
F21	C_{28}(20R)METHYL TRIAROMATIC STEROID

BIOMARKER IDENTIFICATION - NORHOPANES

LGC CODE	TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 177)
W	17α(H)-25,30-BISNORHOPANE
Y	17α(H)-25-NORHOPANE
D	17α(H),21β(H)-30-NORHOPANE
C1	(22S)-17α(H)-25-NOR-30-METHYLHOPANE
G	17α(H),21β(H)HOPANE
C2	(22R)-17α(H)-25-NOR-30-METHYLHOPANE
C3	(22S)-17α(H)-25-NOR-30-ETHYLHOPANE
C4	(22R)-17α(H)-25-NOR-30-ETHYLHOPANE
C5	(22S)-17α(H)-25-NOR-30-n-PROPYLHOPANE
C6	(22R)-17α(H)-25-NOR-30-n-PROPYLHOPANE
C7	(22S)-17α(H)-25-NOR-30-n-BUTYLHOPANE
C8	(22R)-17α(H)-25-NOR-30-n-BUTYLHOPANE
C9	(22S)-17α(H)-25-NOR-30-n-PENTYLHOPANE
C10	(22R)-17α(H)-25-NOR-30-n-PENTYLHOPANE