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

ARCO Alaska Inc. Bergschrund No. 1 (6,520' - 6,600')

ARCO Alaska Inc. Fiord No. 1 (6,560' - 6,720')

ARCO Alaska Inc. Fiord No. 2 (7,520' - 7,620').


Received 27 October 1997

Total of 85 pages in report

**Alaska Geologic Materials Center Data Report No. 275**

# *GEOCHEMISTRY*

*Geochemical Analysis of Cuttings Samples from Bergschrund-1, Fiord-1 and Fiord-2, Alaska*

by :SR Andrews
LGC (Teddington) Ltd.

Ref.: LFX/228/40

Prepared for:
Neil Piggott
BPX Sunbury
Chertsey Road
Sunbury on Thames

Ref.: 1001576

Authorised by: NS Goodwin
Date: 6th October-1997

## TABLE 1.2

## LITHOLOGY AND STRATIGRAPHY

COUNTRY: Alaska
WELL: Fiord-1

| DEPTH ft | DEPTHRANGE ft | FORMATION | AGE | LITHOLOGY | PICKED LITHOLOGY | SAMPLE TYPE |
|---|---|---|---|---|---|---|
| | 6560-6720 | HRZ | | MDST-dk gy shale 90%:SSt lt gy/br 10% | Mudstone | CUT |

TABLE

## TABLE 1.3

## LITHOLOGY AND STRATIGRAPHY

**COUNTRY:** Alaska
**WELL:** Fiord-2

| DEPTH ft | DEPTHRANGE ft | FORMATION | AGE | LITHOLOGY | PICKED LITHOLOGY | SAMPLE TYPE |
|---|---|---|---|---|---|---|
| | 7520-7550 | HRZ | | MDST-dk gy shale 90%:SSt lt gy/br 10% | Mudstone | CUT |
| | 7550-7580 | HRZ | | MDST-dk gy shale 90%:SSt lt gy/br 10% | Mudstone | CUT |
| | 7580-7620 | HRZ | | MDST-dk gy shale 90%:SSt lt gy 10% | Mudstone | CUT |

**TABLE 2.1**

**SOURCE ROCK QUALITY INDICATORS**

COUNTRY: Alaska
WELL: Bergschrund-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 (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6530 | | HRZ | Mudstone | 1.1 | 16.7 | 22.7 | 6.6 | 443 | 344 | | 7.1 | 1.9 |
| 6540 | | HRZ | Mudstone | 1.1 | 22.4 | 13.5 | 4.9 | 427 | 276 | | 8.9 | 3.8 |
| 6550 | | HRZ | Mudstone | 1.1 | 24.4 | 13.5 | 4.5 | 426 | 300 | | 9.8 | 2.1 |
| 6560 | | HRZ | Mudstone | 1 | 19.6 | 14.7 | 5.1 | 428 | 288 | | 8.2 | 3.3 |
| 6570 | | HRZ | Mudstone | 1 | 22.2 | 17.3 | 4.5 | 424 | 384 | | 8.7 | 3 |
| 6580 | | HRZ | Mudstone | 1.3 | 21.7 | 18.9 | 6 | 423 | 315 | | 7.4 | 2.5 |
| 6590 | | HRZ | Mudstone | 1.1 | 15.9 | 18.4 | 6.9 | 428 | 267 | | 7 | 2.6 |
| 6600 | | HRZ | Mudstone | 1 | 19.6 | 15.1 | 5.1 | 433 | 296 | | 8.2 | 2.5 |

**TABLE 2.2**

**SOURCE ROCK QUALITY INDICATORS**

COUNTRY: Alaska
WELL: Fiord-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 (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6560-6720 | HRZ | Mudstone | 1.01 | 16.6 | 15.14 | 6.1 | 430 | 248 | | 8.72 | 3.44 |

**TABLE 2.3**

**SOURCE ROCK QUALITY INDICATORS**

COUNTRY: Alaska
WELL: Fiord-2

| DEPTH (ft) | DEPTHRANGE (ft) | FORMATION | PICKED LITHOLOGY | PI (kg/t) | PI (mg/gC) | P2 (kg/t) | TOC (%) | TMAX deg C | HI | GOGI | CARBT (%) | S (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7520-7550 | HRZ | Mudstone | 0.86 | 27.7 | 7.27 | 3.1 | 426 | 234 | | 8.61 | 2.19 |
| | 7550-7580 | HRZ | Mudstone | 1.13 | 16.6 | 20.21 | 6.82 | 421 | 296 | | 6.47 | 3.67 |
| | 7580-7620 | HRZ | Mudstone | 1.06 | 16.2 | 19.68 | 6.57 | 429 | 300 | | 7.86 | 2.93 |

**TABLE 3.1**

**OPTICAL SOURCE ROCK MATURITY INDICATORS**

**COUNTRY:** Alaska
**WELL:** Bergschrund-1

| DEPTH ft | FORMATION | VITRINITE (%Ro) | NO. of READINGS | CONFIDENCE | COMMENTS |
|---|---|---|---|---|---|
| 6560 | HRZ | 0.5 | 20 | D | MOD PHY;IPAR100% VPAR TR; MOD BS, MOD/RI BW;L ALG Y/O,TR HYD SPE Y/O, TR SP LT O |

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

**TABLE 3.2**

**OPTICAL SOURCE ROCK MATURITY INDICATORS**

**COUNTRY:** Alaska
**WELL:** Fiord-1

| DEPTH ft | FORMATION | VITRINITE (%Ro) | NO. of READINGS | CONFIDENCE | COMMENTS |
|---|---|---|---|---|---|
| 6720 | HRZ | 0.54 | 20 | C | MOD-RI PHY;IPAR 70%, VW+VW PAR 30%;MOD-STR BS, MOD-RI BW, TR ALG Y/O-L.O, TR SP LT O |

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

**TABLE 3.3**

**OPTICAL SOURCE ROCK MATURITY INDICATORS**

**COUNTRY:** Alaska
**WELL:** Fiord-2

| DEPTH ft | FORMATION | VITRINITE (%Ro) | NO. of READINGS | CONFIDENCE | COMMENTS |
|---|---|---|---|---|---|
| 7550 | HRZ | 0.57 | 20 | D | MOD-RI PHY;IPAR 100%,TR VW PAR+PAR; MOD/STR BS, MOD-RI BW+BL; TR ALG LT O, TR SP LT-M O |

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

## 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

| ORIGIN | L.C.C. | SAMPLE | Our Ref: 606564/52167<br>Your Ref: HD79 |
|---|---|---|---|

**LITHOLOGY**

| | % |
|---|---|
| SHALE | 100 |

**SPECIAL MINERALOGY**

RATHER PYRITIC

**BITUMEN**

| Form | Content |
|---|---|
| STAINING | MOD./STRONG |
| WISPS | MOD./RICH |

**PHYTOCLASTS**

Content: MODERATE – RICH

| Character | Form | % |
|---|---|---|
| INERTINITE | PARTICLES | 70 |
| VITRINITE | WISPS + WISPY PARTICLES | 30 |

Condition

**FLUORESCENCE**

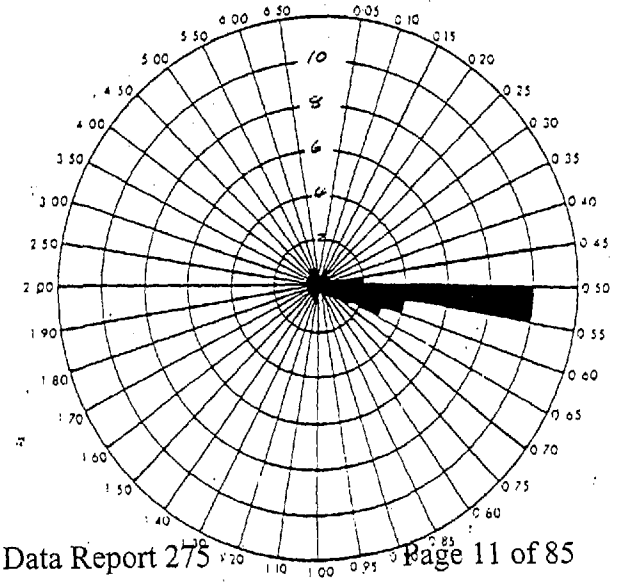
| Character | Content | Colour |
|---|---|---|
| ARGILE | TRACE | Y/O-LO |
| SPORES | TRACE | L.O |

| PREPARATION | WAVELENGTH | R.I. OF IMMERSION OIL |
|---|---|---|
| Isopropyl Alcohol / ~~Water~~ | 546nm / | 1·516 / |

| | | | | | |
|---|---|---|---|---|---|
| 0·46 | 0·57 | 0·60 | 0·67 | | |
| 0·48 | 0·50 | 0·59 | 0·60 | | |
| 0·51 | 0·56 | 0·54 | 0·51 | | |
| 0·54 | 0·50 | 0·50 | 0·60 | | |
| 0·52 | 0·51 | 0·56 | 0·52 | | |

TOTAL No. OF PARTICLES MEASURED 20

| REFLECTIVITY (%) | | No. OF PARTICLES |
|---|---|---|
| $\bar{R}_{max}$ / $\bar{R}_{aver.}$ | 0·54 | 20 |



COMMENTS

C

GEOLAB UK

Unit 14 Enterprise Court
Nelson Industrial Estate
Cramlington
Northumberland NE23 1WZ
United Kingdom

Signature Date

| ORIGIN | SAMPLE |
|---|---|
| L.G.C. | Our Ref: 606564/52167<br>Your Ref: HD 78 |

**LITHOLOGY**

| | % |
|---|---|
| SHALE | 100 |

**PHYTOCLASTS**

Content: MODERATE

| Character | Form | % |
|---|---|---|
| INERTINITE | PARTICLES | 100 |
| VITRINITE | PARTICLES | TRACE |

**SPECIAL MINERALOGY**

**Condition**

SOME H/C IMPREGNATION OF VITRINITE

**BITUMEN**

| Form | Content |
|---|---|
| STAINING | MOD |
| WISPS | MOD/RICH (STRONG) |

**FLUORESCENCE**

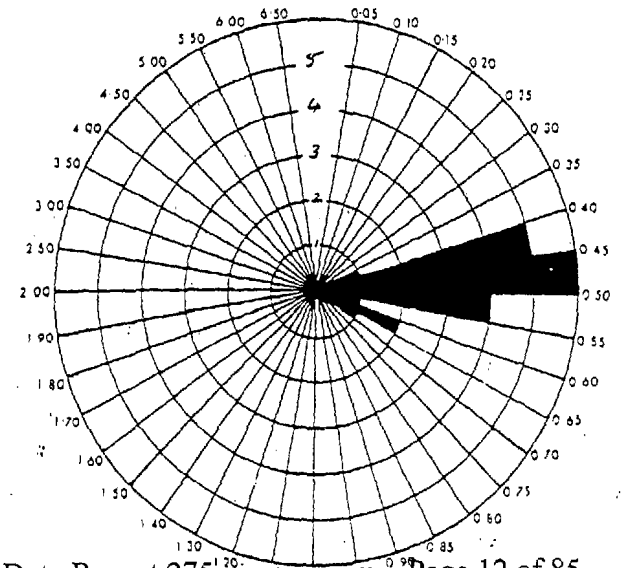
| Character | Content | Colour |
|---|---|---|
| ALGAE | LOW | Y/O |
| H/C SPECKS | TRACE | Y/O |
| SPORES | TRACE | L.O |

| PREPARATION | WAVELENGTH | R.I. OF IMMERSION OIL |
|---|---|---|
| Isopropyl Alcohol / ~~Water~~ | 546nm / | 1·516 / |

| | | | | | |
|---|---|---|---|---|---|
| 0·51 | 0·54 | 0·49 | 0·49 | | |
| 0·54 | 0·46 | 0·42 | 0·445 | | |
| 0·43 | 0·37 | 0·49 | 0·49 | | |
| 0·55 | 0·51 | 0·42 | 0·64 | | |
| 0·60 | 0·42 | 0·67 | 0·43 | | |

TOTAL No. OF PARTICLES MEASURED 20

| REFLECTIVITY (%) | | No. OF PARTICLES |
|---|---|---|
| $\bar{R}_{max}$ / $\bar{R}_{aver.}$ | 0·50 | 20 |
| | | |
| | | |



COMMENTS

1)

GEOLAB UK
Unit 14 Enterprise Court
Nelson Industrial Estate
Cramlington
Northumberland NE23 8LC
United Kingdom

Signature Date

| ORIGIN | L. C. C. | SAMPLE | Our Ref: 606564/52167<br>Your Ref: HD 80 |
|---|---|---|---|

**LITHOLOGY**

| | % |
|---|---|
| SHALE | 100 |

**PHYTOCLASTS**

Content: MODERATE - RICH

| Character | Form | % |
|---|---|---|
| INERTINITE | PARTICLES | 100 |
| VITRINITE | WISPY PARTICLES + PARTICLES | TRACE |

Condition:

**SPECIAL MINERALOGY**

RATHER PYRITIC

**BITUMEN**

| Form | Content |
|---|---|
| STAINING | MOD / STRONG |
| WISPS + BLEBS | MOD / RICH |

**FLUORESCENCE**

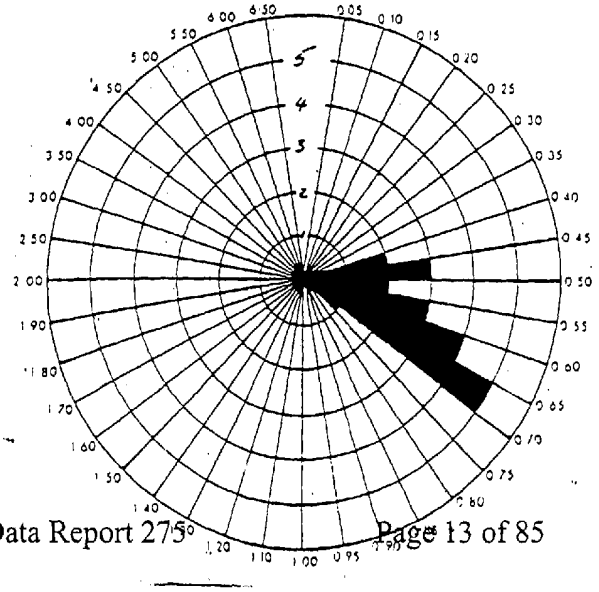
| Character | Content | Colour |
|---|---|---|
| ALGAE | TRACE | L.O. |
| SPORES | TRACE | L-M.O. |

| PREPARATION | WAVELENGTH | R.I. OF IMMERSION OIL |
|---|---|---|
| Isopropyl Alcohol / ~~Water~~ | 546nm / | 1·516 / |

| | | | | | |
|---|---|---|---|---|---|
| 0·60 | 0·67 | 0·52 | 0·61 | | |
| 0·62 | 0·57 | 0·51 | 0·65 | | |
| 0·42 | 0·62 | 0·56 | 0·45 | | |
| 0·71 | 0·68 | 0·55 | 0·65 | | |
| 0·41 | 0·67 | 0·47 | 0·46 | | |

TOTAL No. OF PARTICLES MEASURED 20

| REFLECTIVITY (%) | | No. OF PARTICLES |
|---|---|---|
| $\bar{R}_{max}$ | 0·57 | 20 |
| / $\bar{R}_{aver.}$ | | |




COMMENTS

1

GEOLAB UK
Unit 14 Enterprise Court
Nelson Industrial Estate
Cramlington
Northumberland NE23 9LZ
United Kingdom

Signature Date

Table 4

Kerogen Source Rock Isotope Values

| Well | Sample Depth (ft) | del C13 per mil |
|---|---|---|
| Bergschrund-1 | 6520-6530 | -27.8 |
| | 6530-6540 | -27.5 |
| | 6540-6550 | -27.5 |
| | 6550-6560 | -27.7 |
| | 6560-6570 | -27.9 |
| | 6570-6580 | -28. |
| | 6580-6590 | -28.2 |
| | 6590-6600 | -27.8 |
| Fiord-1 | 6560-6720 | -27.8 |
| Fiord-2 | 7520-7550 | -27.6 |
| | 7550-7580 | -28.3 |
| | 7580-7620 | -28 |

# Sediment/Extract Analysis

Well name : Bergschrund-1
Suite name : Bergschrund-1 Source Rock Study
Country Of Origin : Alaska
Depth (m) : 6590
Sample name : HRZ unit

## Extraction

TSE %wt : 0.240

## 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 : 0.39
H2 : 0.45
H3 : 0.73
H4 : 0
H5 : 100:105:41:31:18:13
H6 : 0.19
H7 : 0.43
H8 :
H9 :
H10 :
H11 : 8.12
H12 : 3.51
H13 : 4.18
H14 : 9.03
H15 : 0.00
H16 : 0.00
H17 : 42.70
H18 : 0.00

S1 : 0.22
S2 : 0.32
S3 : 36:28:34
S4 : 32:34:32
S5 : 45.03
S6 :
S7 : 51.28
S8 : 28.17
S9 :
S10 :

M2 : 0.66
M3 : 0.58
M4 : 35.08
M5 :
A1 : 0.17
A2 : 0.15
A3 : 0.28
A4 : 0.07
A5 : 0.68
A6 : 2.31
MDR : 0.54
MBP : 4.86

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil :
Aromatics :
Residue :
Asphaltenes :
Kerogen : -28.2

STANDARD: NBS22 -29.8

# Sediment/Extract Analysis

Well name : Fiord-2
Suite name : Fiord-2 Source Rock Study
Country Of Origin : Alaska
Depth (m) : 7620
Sample name : HRZ unit

## Extraction

TSE %wt : 0.200

## 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

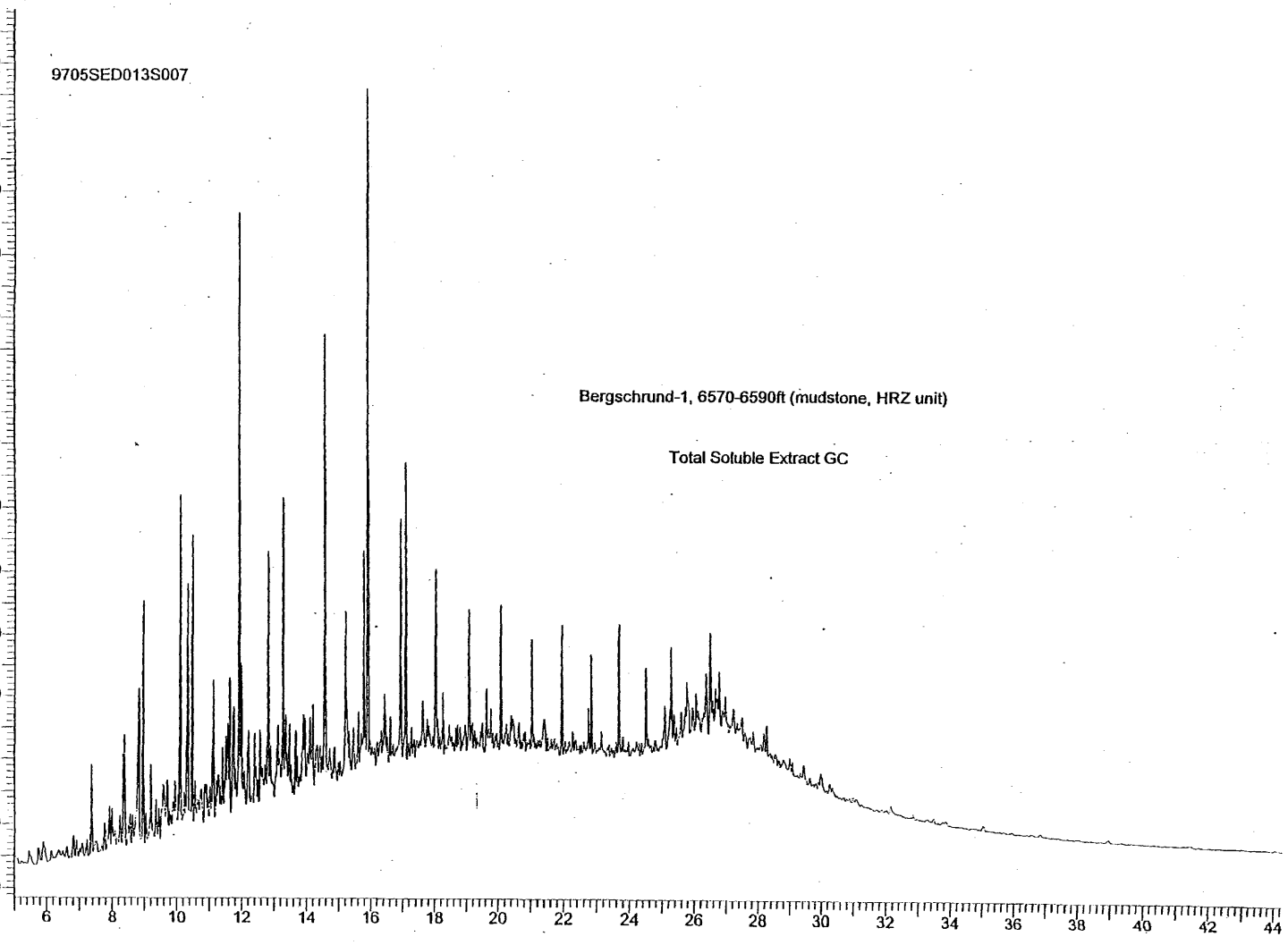
| | | | | | |
|---|---|---|---|---|---|
| HI : | 0.41 | S1 : | 0.20 | M2 : | 0.63 |
| H2 : | 0.48 | S2 : | 0.26 | M3 : | 0.58 |
| H3 : | 0.72 | S3 : | 35:28:35 | M4 : | 37.78 |
| H4 : | 0 | S4 : | 32:35:32 | M5 : | |
| H5 : | 100:99:39:28:18:12 | S5 : | 44.73 | A1 : | 0.22 |
| H6 : | 0.18 | S6 : | | A2 : | 0.20 |
| H7 : | 0.40 | S7 : | 49.99 | A3 : | 0.25 |
| H8 : | | S8 : | 21.51 | A4 : | 0.06 |
| H9 : | | S9 : | | A5 : | 0.81 |
| H10 : | | S10 : | | A6 : | 2.25 |
| H11 : | 6.51 | | | MDR : | 0.46 |
| H12 : | 2.64 | | | MBP : | 4.54 |
| H13 : | 5.24 | | | | |
| H14 : | 11.98 | | | | |
| H15 : | 0.00 | | | | |
| H16 : | 0.39 | | | | |
| H17 : | 40.33 | | | | |
| H18 : | 0.00 | | | | |

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

| | |
|---|---|
| Saturates : | |
| Total Oil : | -29.4 |
| Aromatics : | |
| Residue : | |
| Asphaltenes : | |
| Kerogen : | -28 |
| STANDARD: | NBS22 -29.8 |


9705SED013S007
Bergschrund-1, 6570-6590ft (mudstone, HRZ unit)
Total Soluble Extract GC
0
20
40
60
80
100
120
140
160
180
200
220
240
260
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44

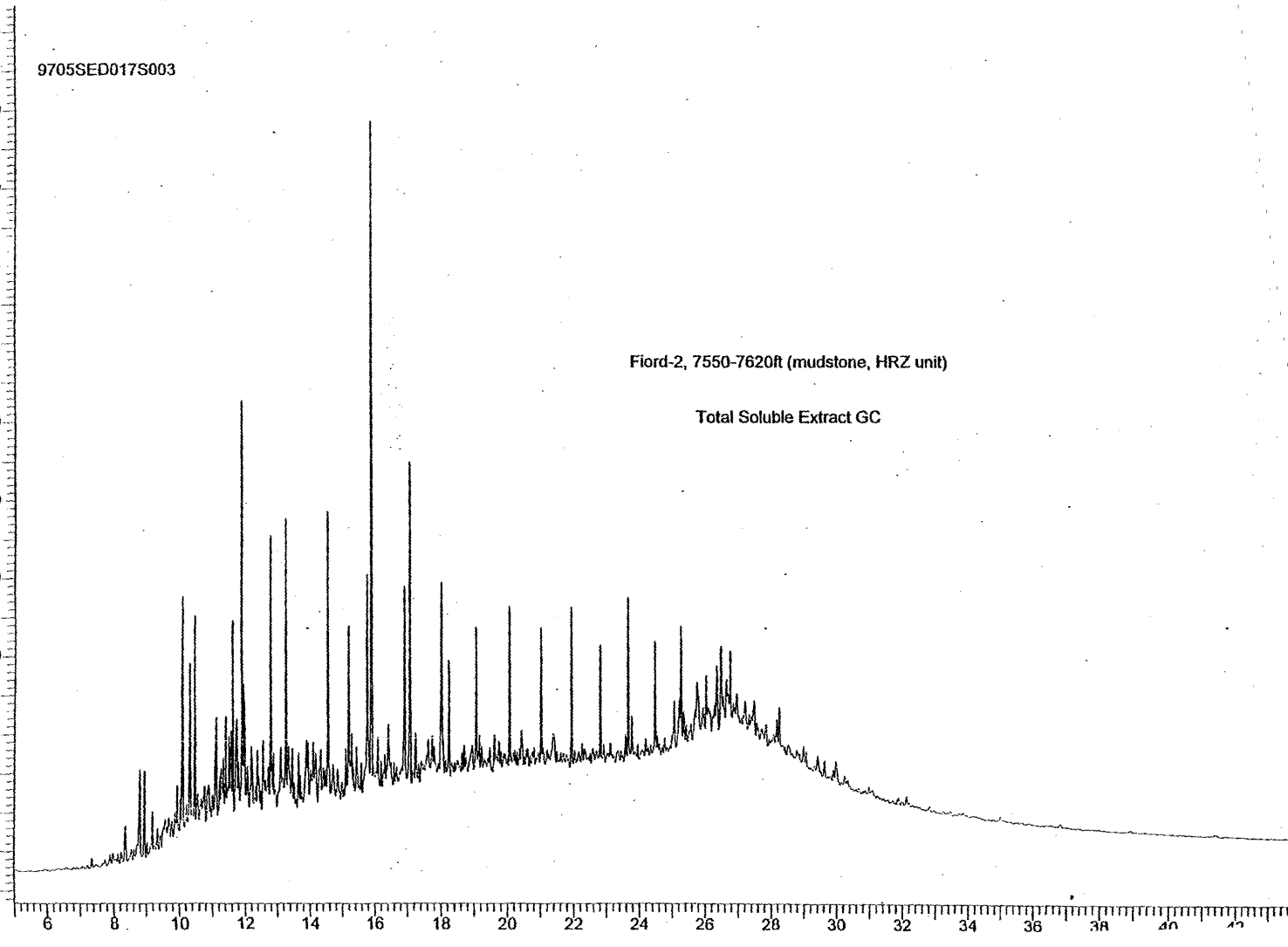
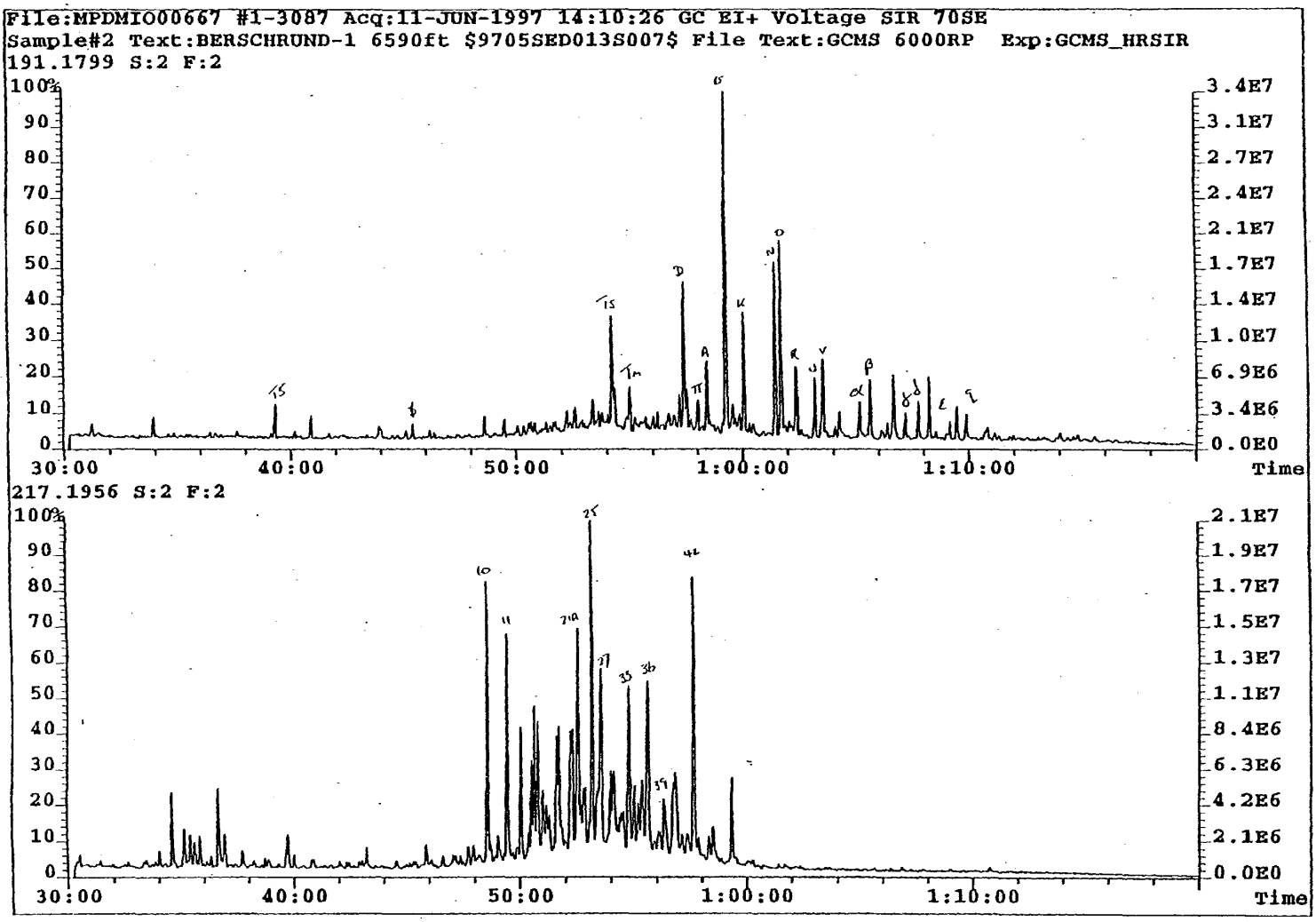

9705SED017S003
Fiord-2, 7550-7620ft (mudstone, HRZ unit)
Total Soluble Extract GC
0
20
40
60
80
100
120
140
160
180
200
220
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40

Fig 2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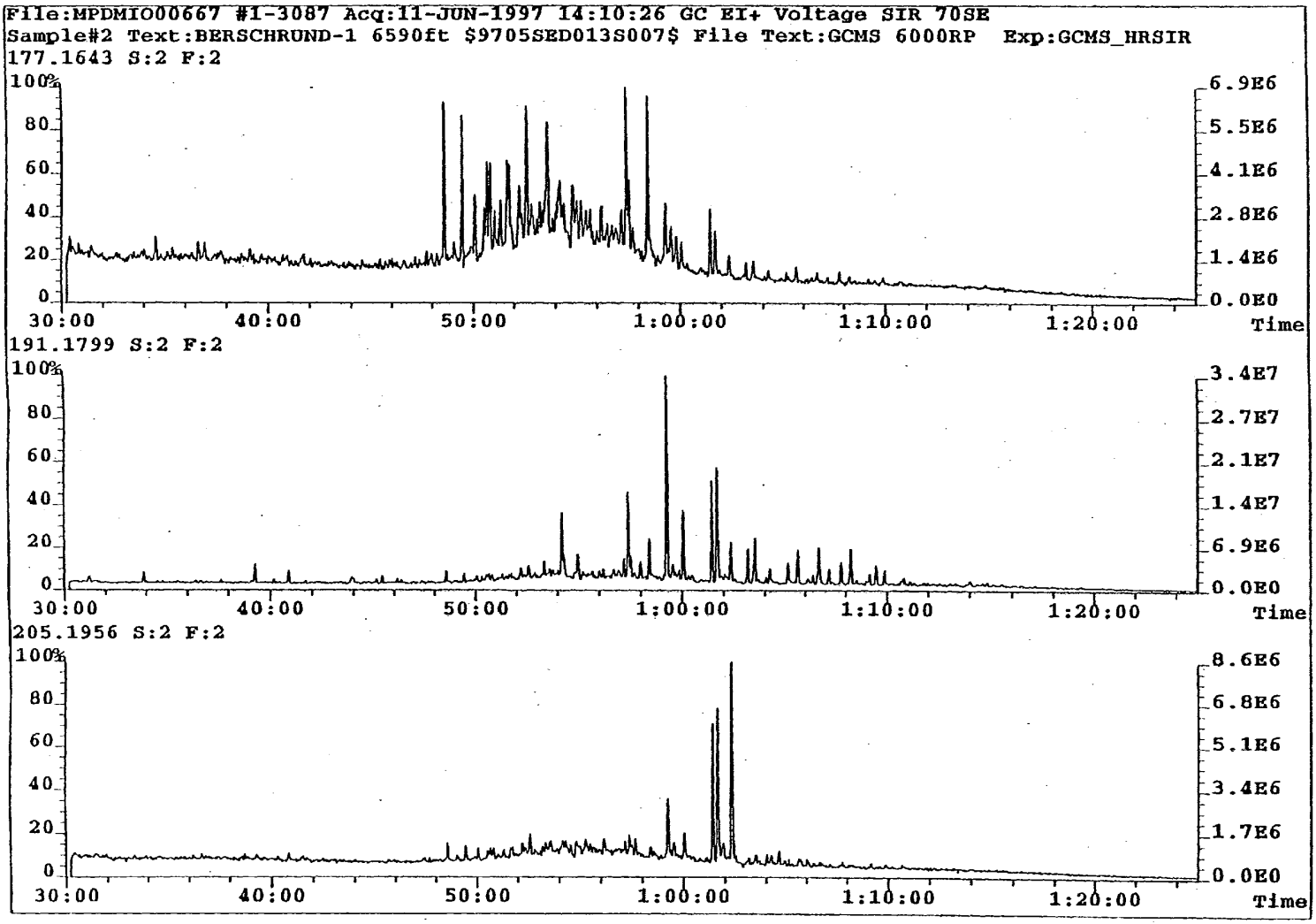
Sample#2 Text:BERSCHROUND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.4E7
3.1E7
2.7E7
2.4E7
2.1E7
1.7E7
1.4E7
1.0E7
6.9E6
3.4E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.1E7
1.9E7
1.7E7
1.5E7
1.3E7
1.1E7
8.4E6
6.3E6
4.2E6
2.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig 3.1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Sample#2 Text:BERSCHROND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:2 F:2
100%
80
60
40
20
0
6.9E6
5.5E6
4.1E6
2.8E6
1.4E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:2 F:2
100%
80
60
40
20
0
3.4E7
2.7E7
2.1E7
1.4E7
6.9E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:2 F:2
100%
80
60
40
20
0
8.6E6
6.8E6
5.1E6
3.4E6
1.7E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Fig 3-2

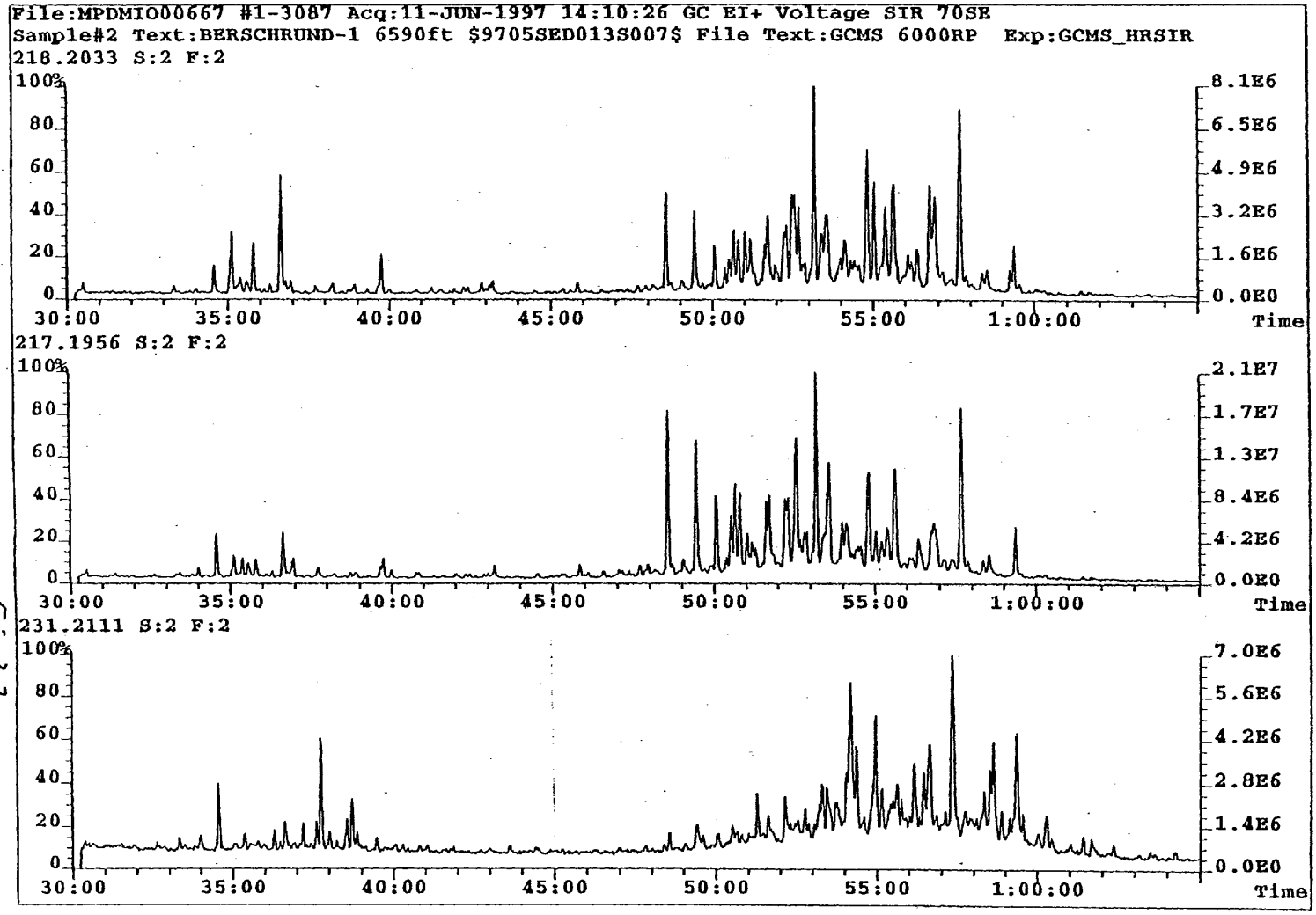

File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 14:10:26 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERSCHRUND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:2 F:2
100%
80
60
40
20
0
8.1E6
6.5E6
4.9E6
3.2E6
1.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:2 F:2
2.1E7
1.7E7
1.3E7
8.4E6
4.2E6
0.0E0
231.2111 S:2 F:2
7.0E6
5.6E6
4.2E6
2.8E6
1.4E6
0.0E0

Fig 3.3

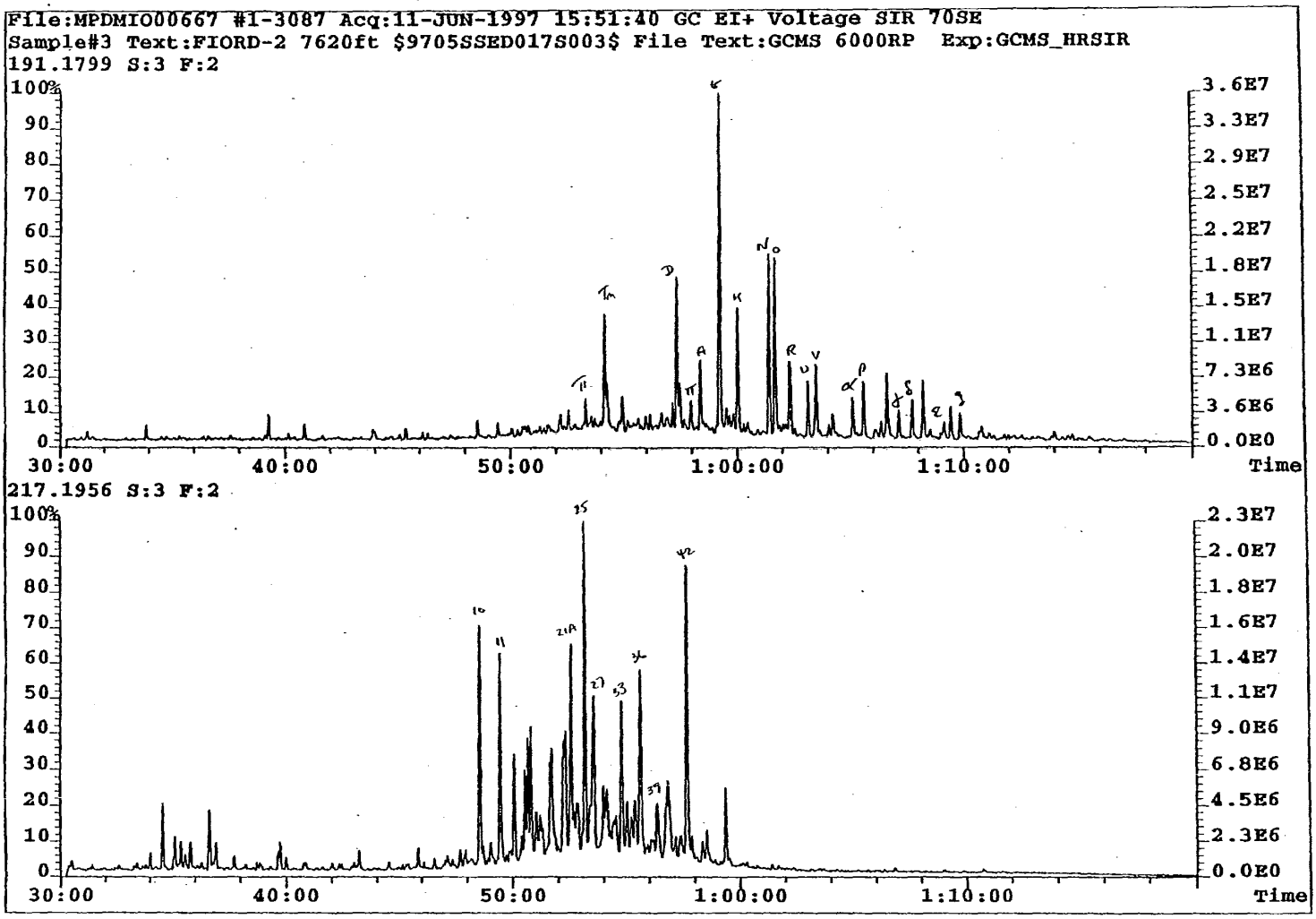

File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.6E7
3.3E7
2.9E7
2.5E7
2.2E7
1.8E7
1.5E7
1.1E7
7.3E6
3.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.3E7
2.0E7
1.8E7
1.6E7
1.4E7
1.1E7
9.0E6
6.8E6
4.5E6
2.3E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig 4.1

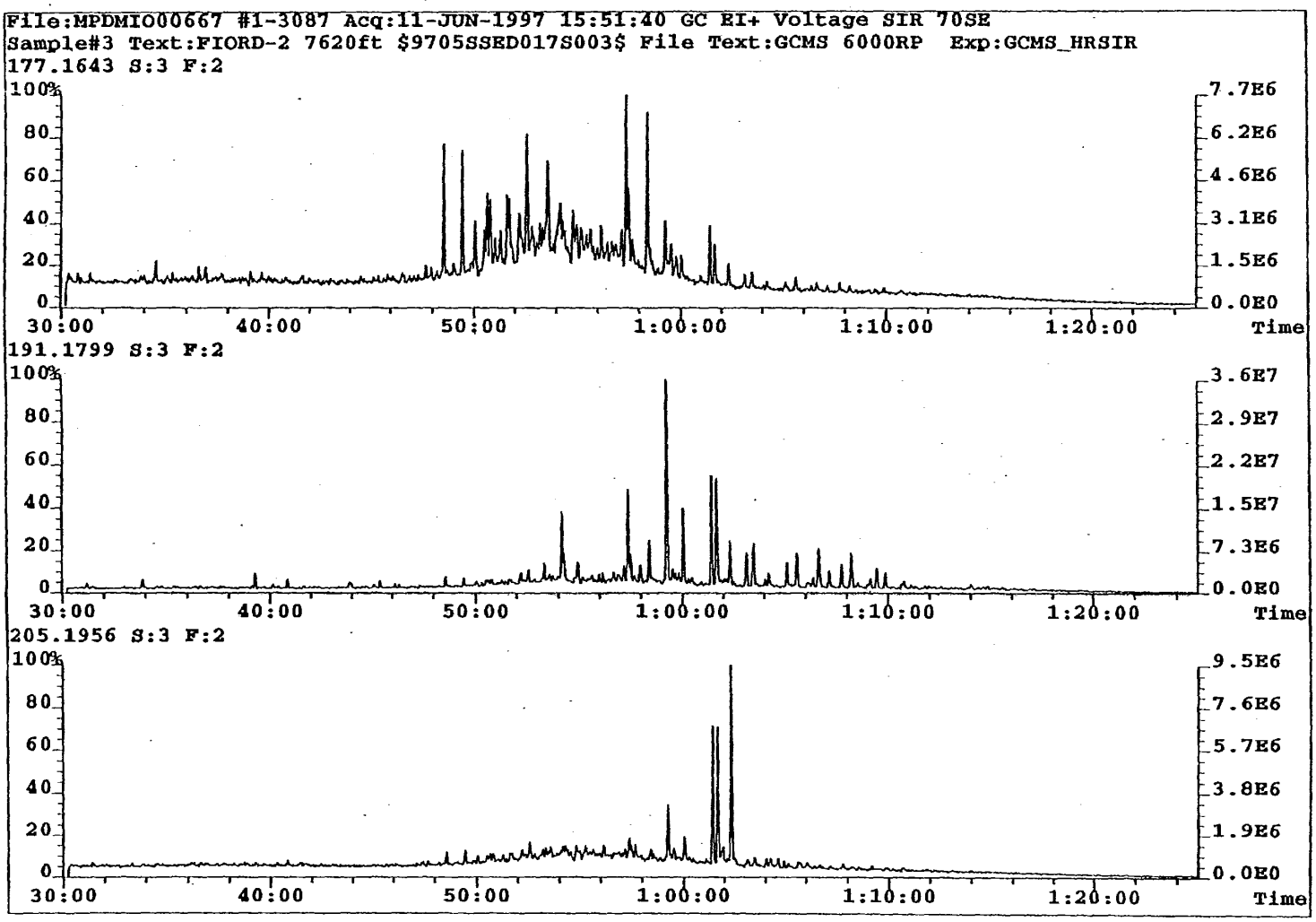

File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:3 F:2
100%
80
60
40
20
0
7.7E6
6.2E6
4.6E6
3.1E6
1.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:3 F:2
100%
80
60
40
20
0
3.6E7
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
205.1956 S:3 F:2
100%
80
60
40
20
0
9.5E6
7.6E6
5.7E6
3.8E6
1.9E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Fig 4-2

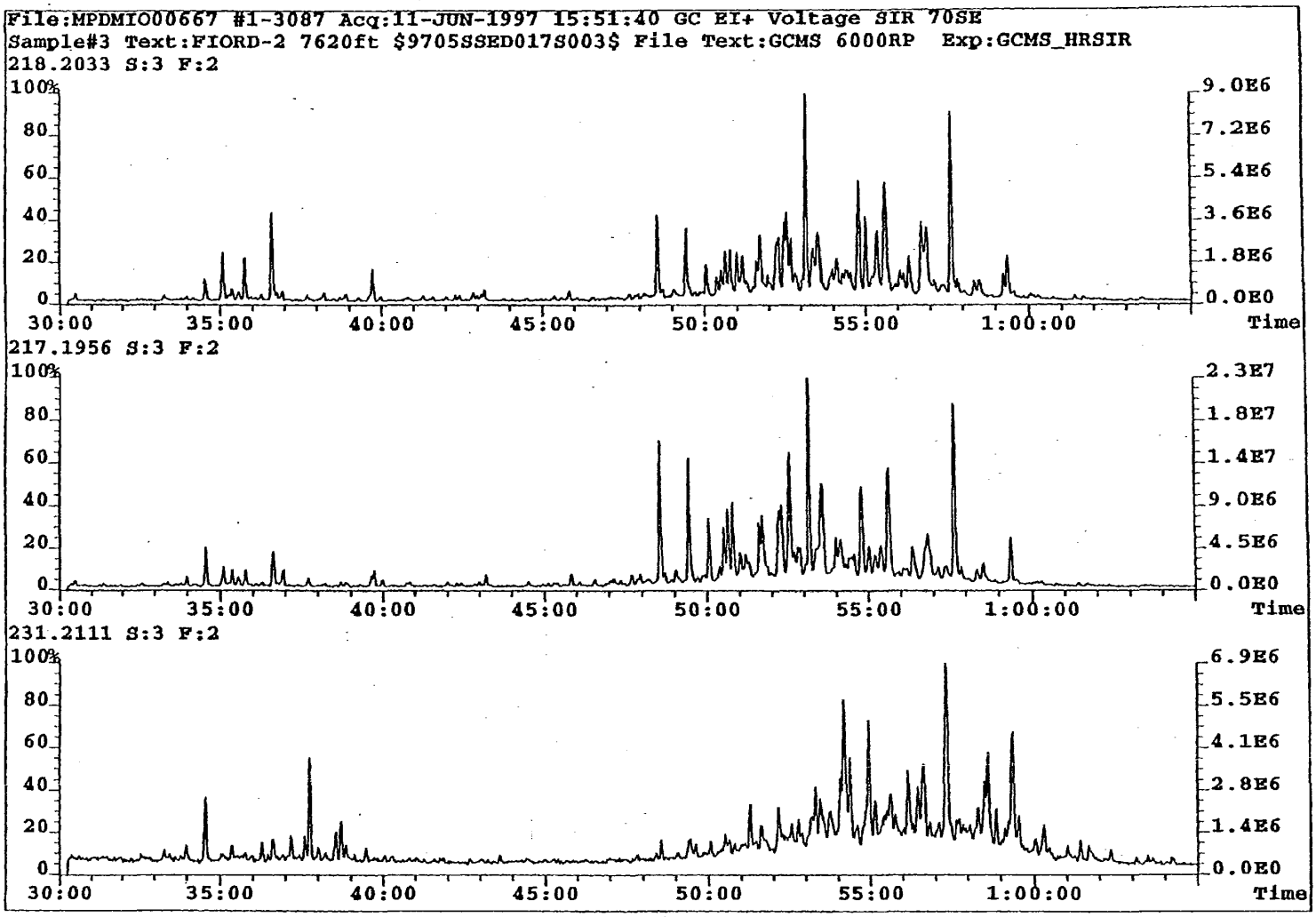

File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:3 F:2
100%
80
60
40
20
0
9.0E6
7.2E6
5.4E6
3.6E6
1.8E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:3 F:2
100%
80
60
40
20
0
2.3E7
1.8E7
1.4E7
9.0E6
4.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:3 F:2
100%
80
60
40
20
0
6.9E6
5.5E6
4.1E6
2.8E6
1.4E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Fig 4-3

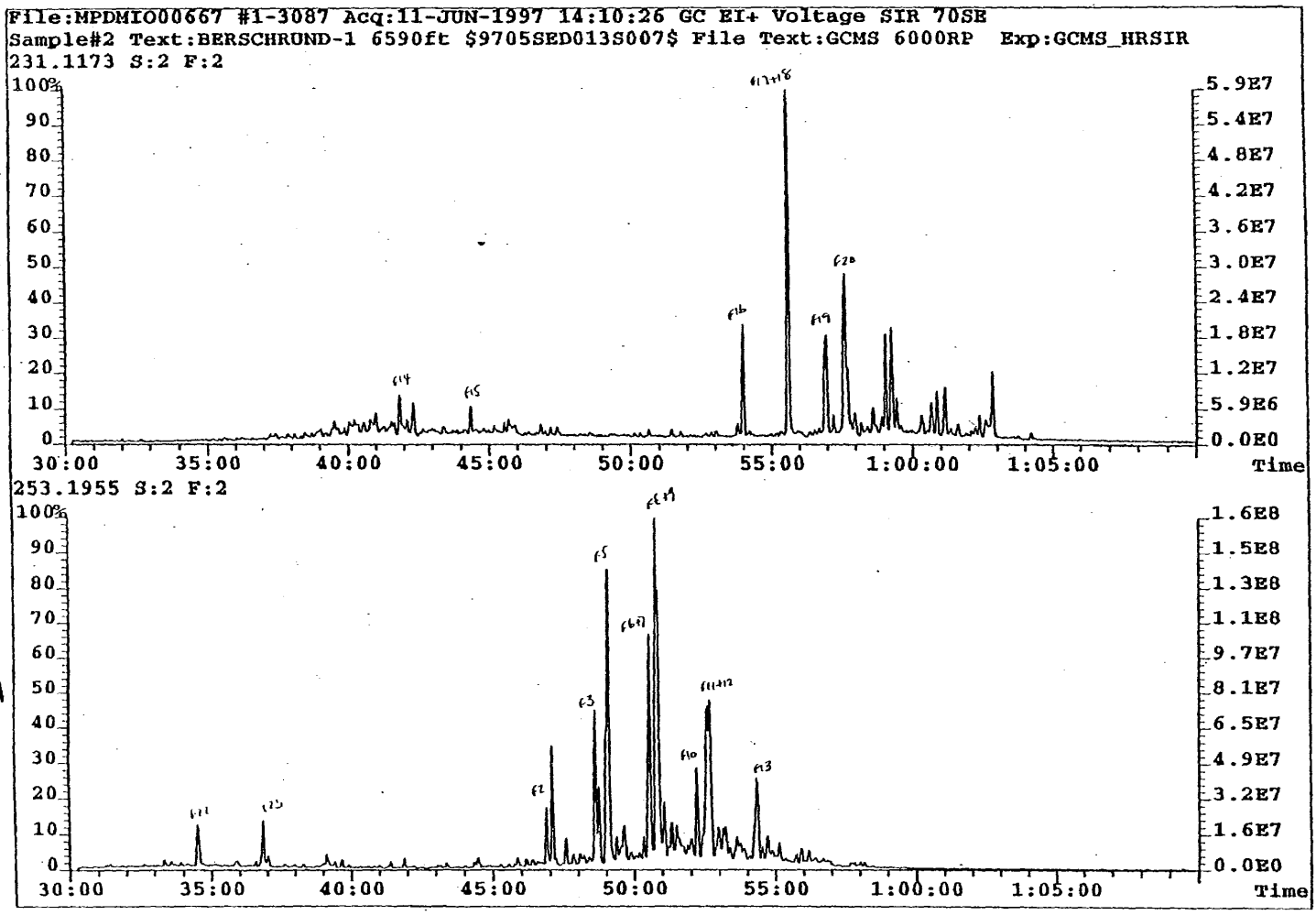
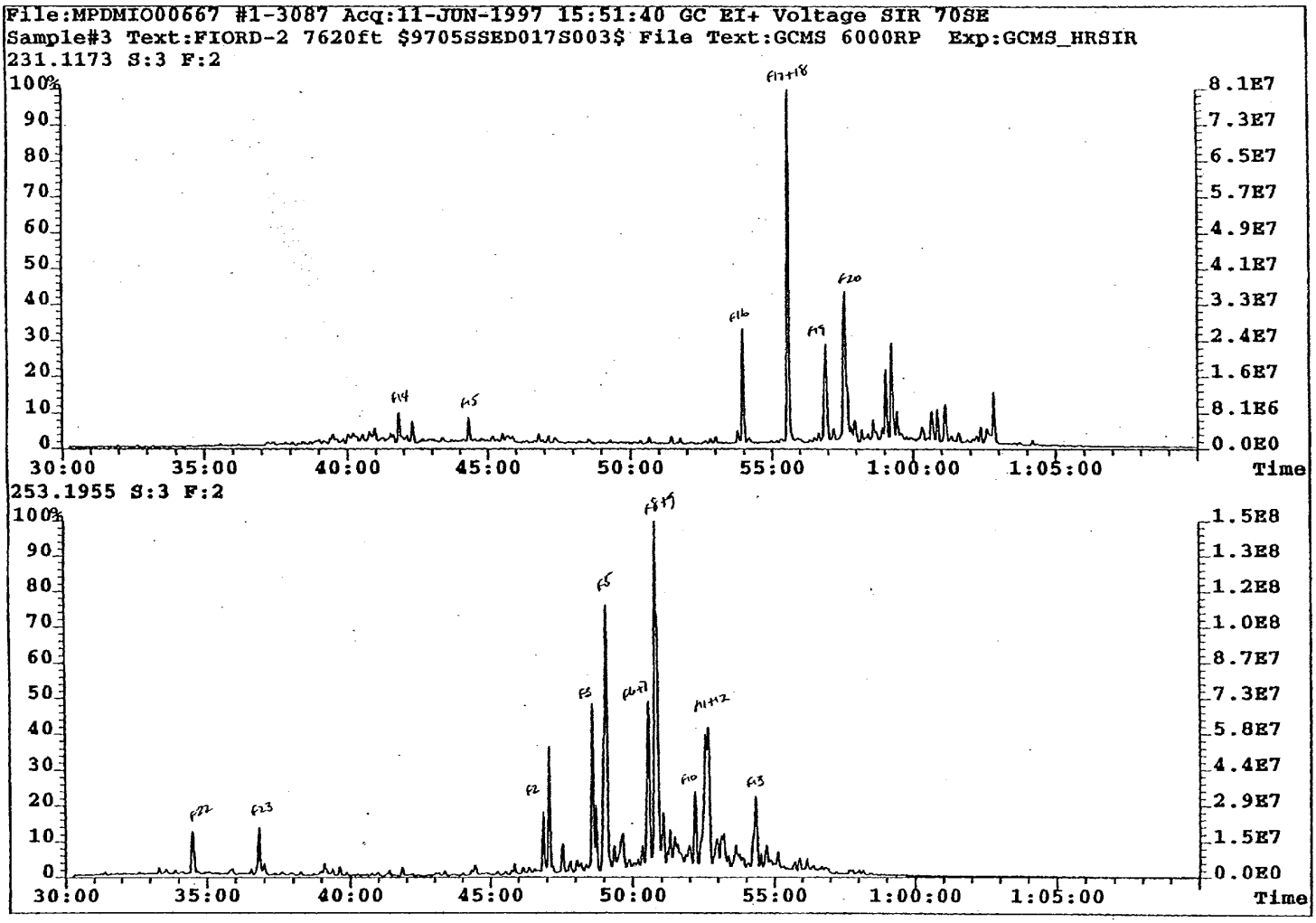

File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 14:10:26 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERSCHROUND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
5.9E7
5.4E7
4.8E7
4.2E7
3.6E7
3.0E7
2.4E7
1.8E7
1.2E7
5.9E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.6E8
1.5E8
1.3E8
1.1E8
9.7E7
8.1E7
6.5E7
4.9E7
3.2E7
1.6E7
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

Fig 5


File:MPDMIO00667 #1-3087 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.1E7
7.3E7
6.5E7
5.7E7
4.9E7
4.1E7
3.3E7
2.4E7
1.6E7
8.1E6
0.0E0
F4
F5
F16
F17+18
F19
F20
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.5E8
1.3E8
1.2E8
1.0E8
8.7E7
7.3E7
5.8E7
4.4E7
2.9E7
1.5E7
0.0E0
F22
F23
F2
F3
F5
F6+7
F8+9
F10
A1+12
F13
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

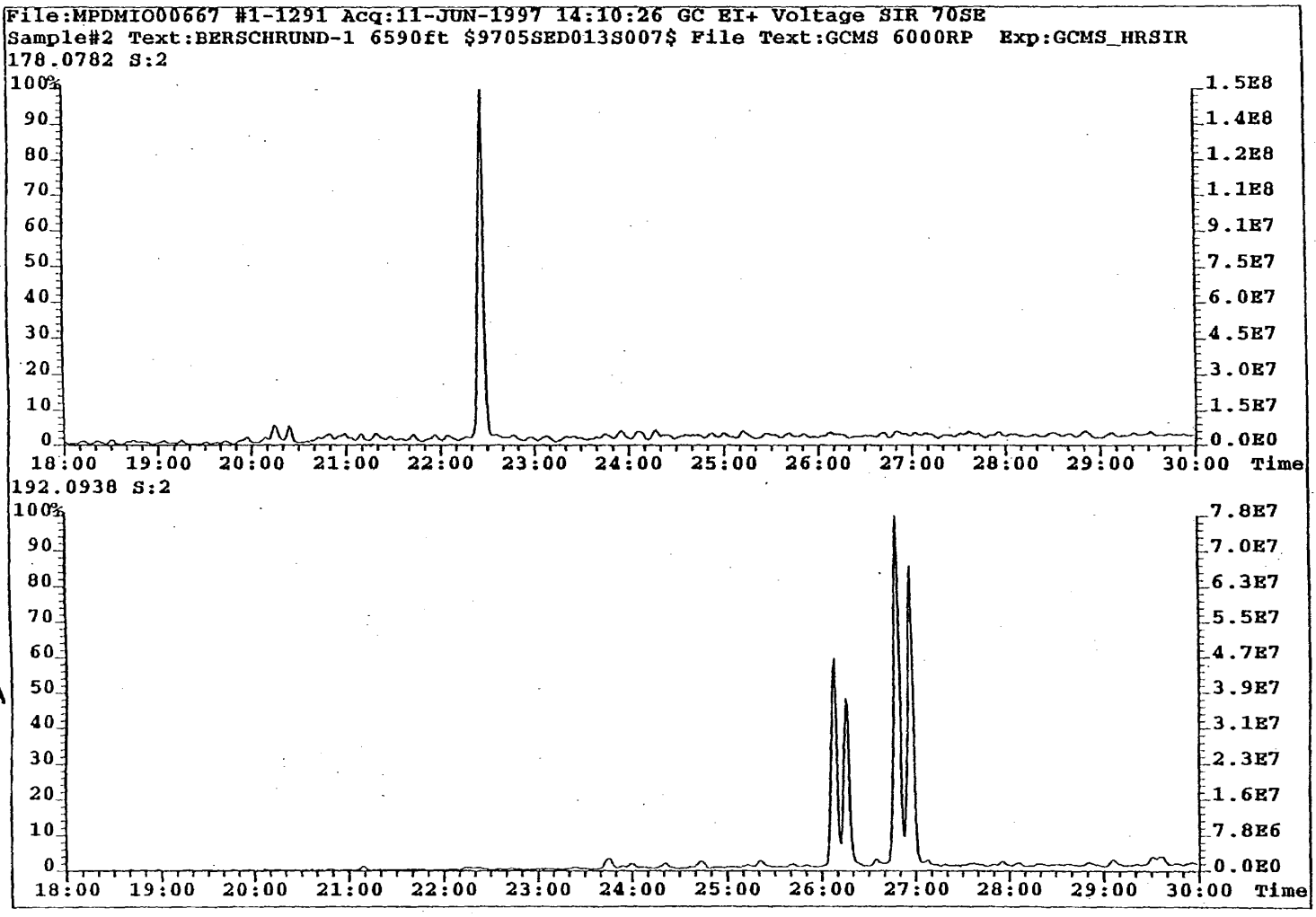
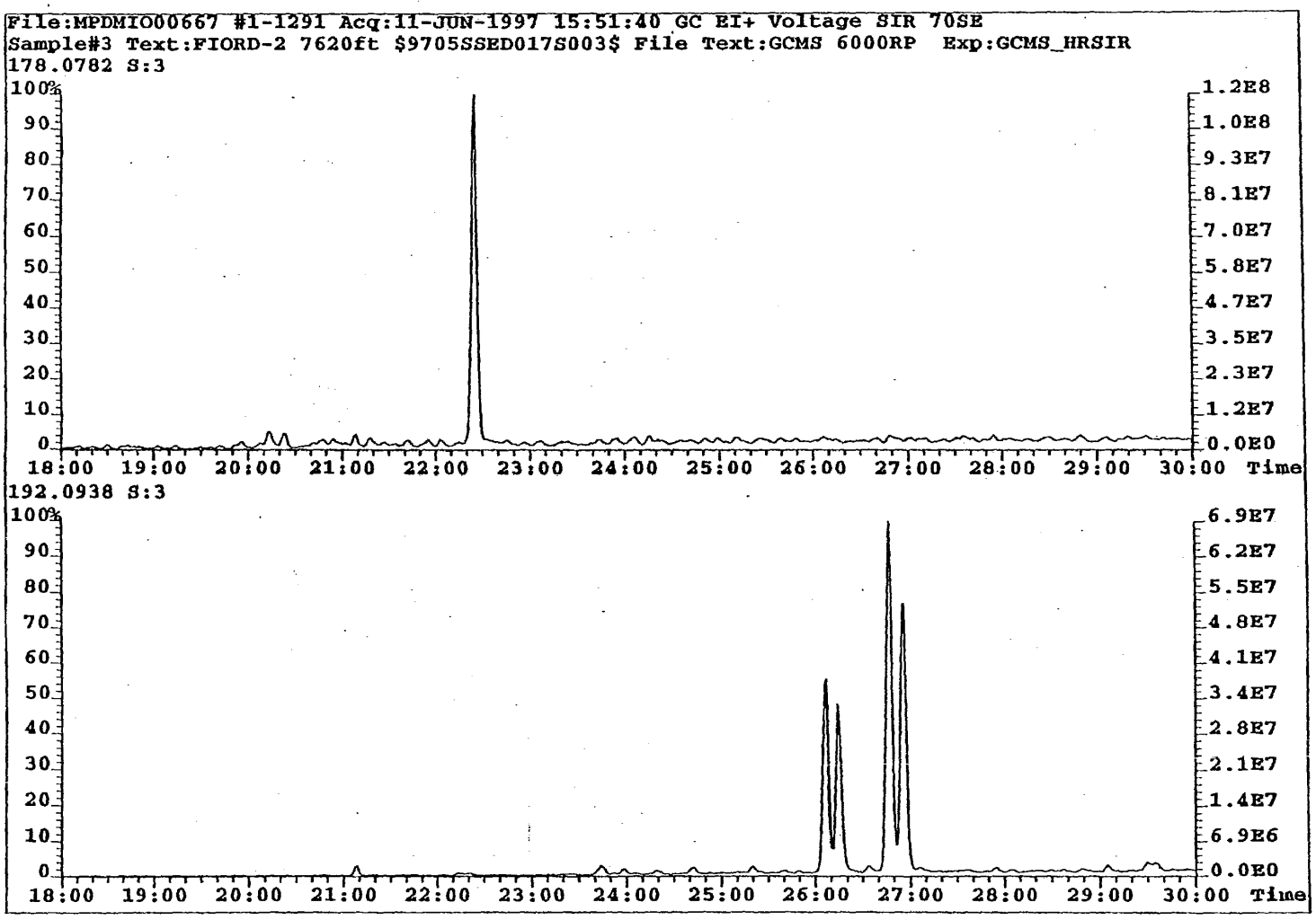
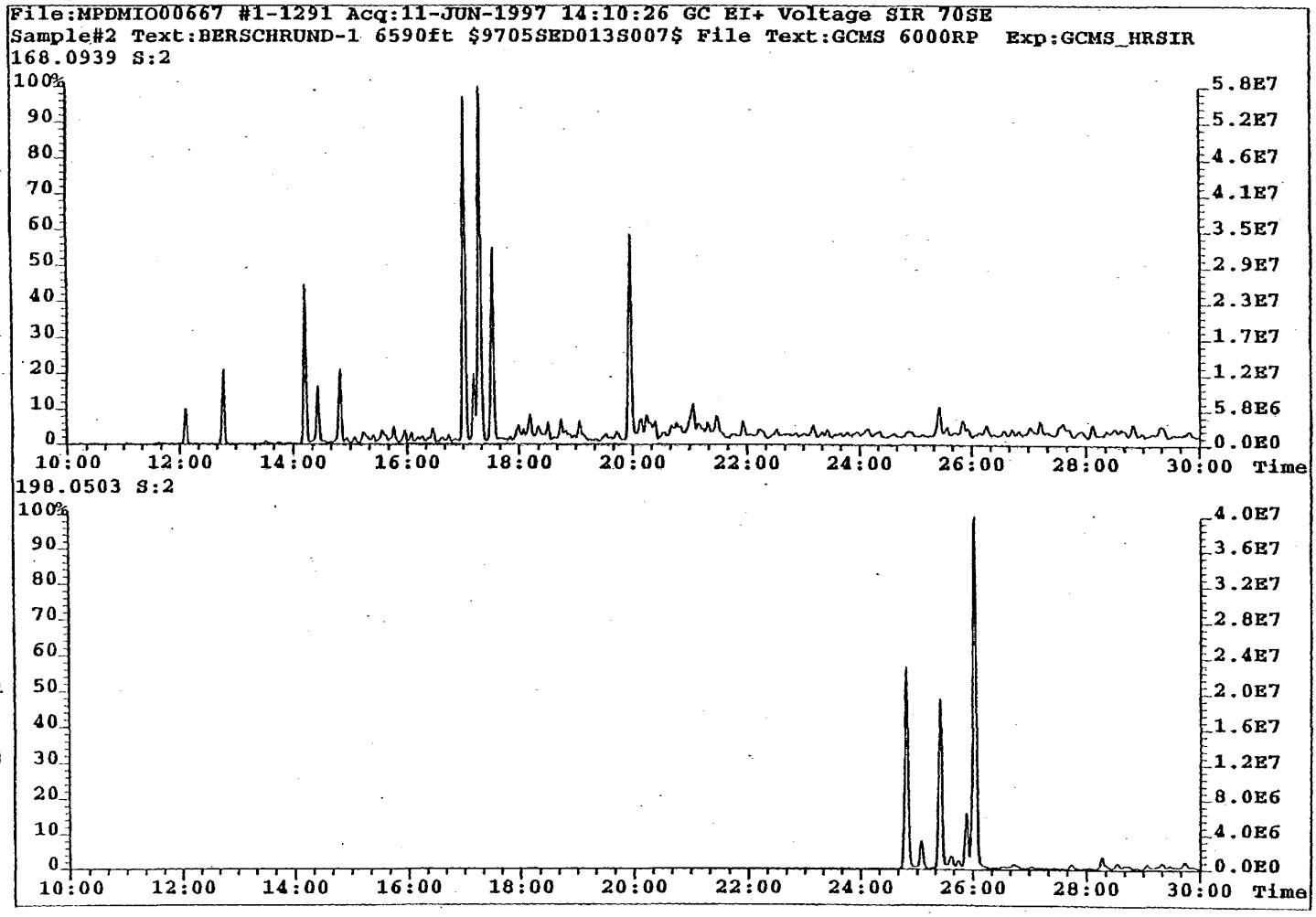
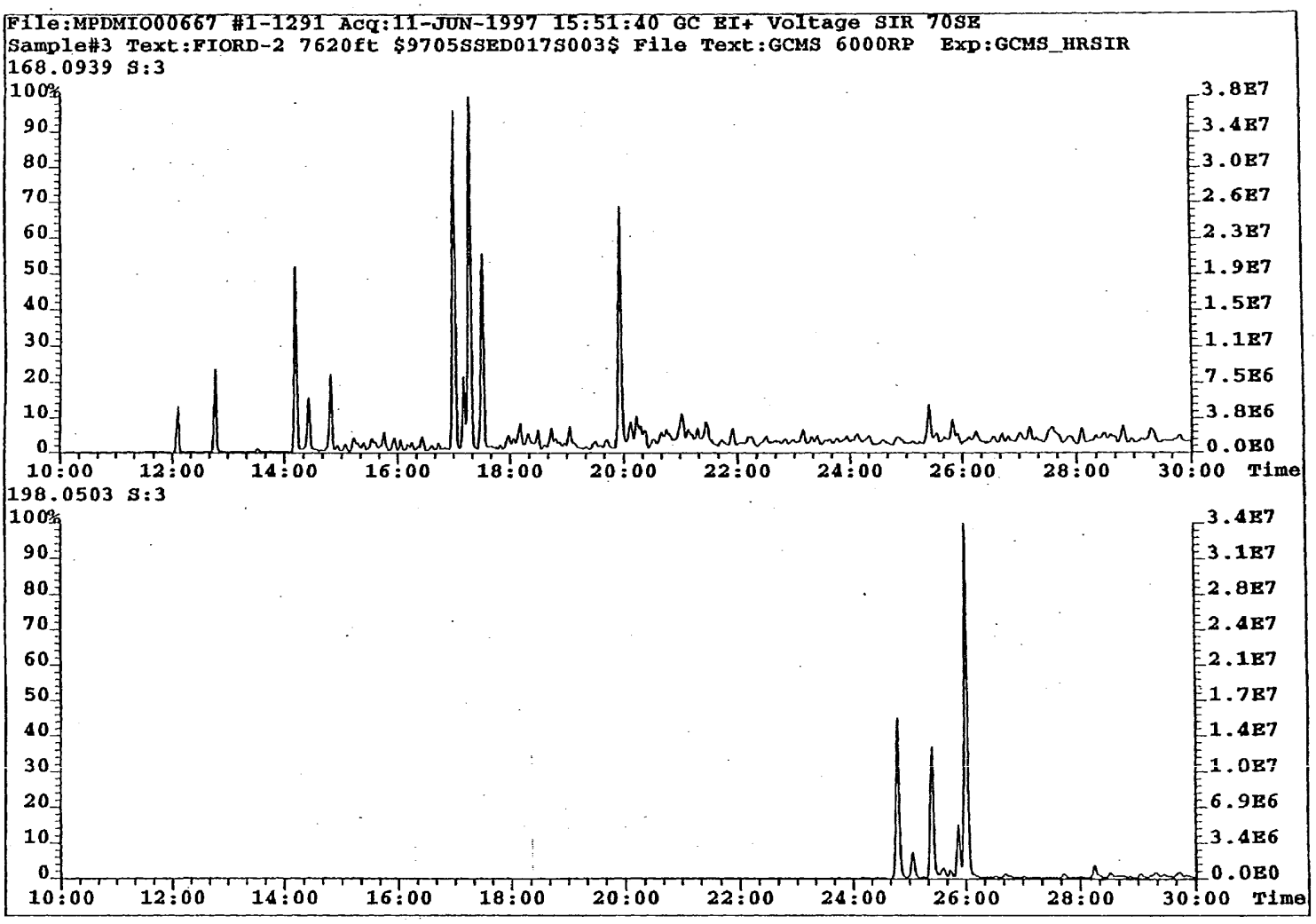

File:MPDMIO00667 #1-1291 Acq:11-JUN-1997 14:10:26 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERSCHRUND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:2
100%
90
80
70
60
50
40
30
20
10
0
1.5E8
1.4E8
1.2E8
1.1E8
9.1E7
7.5E7
6.0E7
4.5E7
3.0E7
1.5E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:2
100%
90
80
70
60
50
40
30
20
10
0
7.8E7
7.0E7
6.3E7
5.5E7
4.7E7
3.9E7
3.1E7
2.3E7
1.6E7
7.8E6
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

Fig 7


File:MPDMIO00667 #1-1291 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:3
100%
90
80
70
60
50
40
30
20
10
0
1.2E8
1.0E8
9.3E7
8.1E7
7.0E7
5.8E7
4.7E7
3.5E7
2.3E7
1.2E7
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:3
100%
90
80
70
60
50
40
30
20
10
0
6.9E7
6.2E7
5.5E7
4.8E7
4.1E7
3.4E7
2.8E7
2.1E7
1.4E7
6.9E6
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


File:MPDMIO00667 #1-1291 Acq:11-JUN-1997 14:10:26 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERSCHRUND-1 6590ft $9705SED013S007$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:2
100%
90
80
70
60
50
40
30
20
10
0
5.8E7
5.2E7
4.6E7
4.1E7
3.5E7
2.9E7
2.3E7
1.7E7
1.2E7
5.8E6
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
198.0503 S:2
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
8.0E6
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


File:MPDMIO00667 #1-1291 Acq:11-JUN-1997 15:51:40 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7620ft $9705SSED017S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:3
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
7.5E6
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
198.0503 S:3
100%
90
80
70
60
50
40
30
20
10
0
3.4E7
3.1E7
2.8E7
2.4E7
2.1E7
1.7E7
1.4E7
1.0E7
6.9E6
3.4E6
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

# Sediment/Extract Analysis

Well name : Bergschrund-1
Suite name : Bergschrund-1 Extract Study
Country Of Origin : Alaska
Depth (m) : 6960
Sample name : Alpine unit, Bulked

## Extraction

TSE %wt : 0.150

## 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 : 0.52
H3 : 0.86
H4 : 0
H5 : 100:72:50:31:23:15
H6 : 0.45
H7 : 0.57
H8 :
H9 :
H10 :
H11 : 6.57
H12 : 3.18
H13 : 0.00
H14 : 9.74
H15 : 0.00
H16 : 0.00
H17 : 39.54
H18 : 0.00

S1 : 0.51
S2 : 0.50
S3 : 38:29:32
S4 : 32:27:40
S5 : 30.92
S6 :
S7 : 54.19
S8 : 31.62
S9 :
S10 :

M2 : 0.68
M3 : 0.68
M4 : 65.48
M5 :
A1 : 0.59
A2 : 0.59
A3 : 0.25
A4 : 0.13
A5 : 0.44
A6 : 0.75
MDR : 2.15
MBP : 10.71

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil : -30.6
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

# Sediment/Extract Analysis

Well name : Bergschrund-1
Suite name : Bergschrund-1 Extract Study
Country Of Origin : Alaska
Depth (m) : 7100
Sample name : Nuiqsut unit

## Extraction

TSE %wt : 0.080

## 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 : | 0.48 | S1 : | 0.28 | M2 : | 0.74 |
| H2 : | 0.48 | S2 : | 0.42 | M3 : | 0.57 |
| H3 : | 0.75 | S3 : | 33:26:39 | M4 : | 68.15 |
| H4 : | 20 | S4 : | 28:30:40 | M5 : | |
| H5 : | 100:100:46:26:17:11 | S5 : | 38.39 | A1 : | 0.21 |
| H6 : | 0.18 | S6 : | | A2 : | 0.22 |
| H7 : | 0.50 | S7 : | 45.40 | A3 : | 0.21 |
| H8 : | | S8 : | 22.98 | A4 : | 0.07 |
| H9 : | | S9 : | | A5 : | 0.58 |
| H10 : | | S10 : | | A6 : | 1.43 |
| H11 : | 3.41 | | | MDR : | 0.96 |
| H12 : | 2.97 | | | MBP : | 9.71 |
| H13 : | 0.00 | | | | |
| H14 : | 7.62 | | | | |
| H15 : | 0.00 | | | | |
| H16 : | 0.00 | | | | |
| H17 : | 39.09 | | | | |
| H18 : | 0.00 | | | | |

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil : -28.5
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

TABLE 7.2

# Sediment/Extract Analysis

| | |
|---|---|
| **Well name :** | Bergschrund-1 |
| **Suite name :** | Bergschrund-1 Extract Study |
| **Country Of Origin :** | Alaska |
| **Depth (m) :** | 7350 |
| **Sample name :** | Nechelik unit |

## Extraction

**TSE %wt :** 0.050

## 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 :**
**H2 :**
**H3 :**
**H4 :**
**H5 :** :::::
**H6 :**
**H7 :**
**H8 :**
**H9 :**
**H10 :**
**H11 :**
**H12 :**
**H13 :**
**H14 :**
**H15 :**
**H16 :**
**H17 :**
**H18 :**

**S1 :**
**S2 :**
**S3 :** ::
**S4 :** ::
**S5 :**
**S6 :**
**S7 :**
**S8 :**
**S9 :**
**S10 :**

**M2 :**
**M3 :**
**M4 :**
**M5 :**
**A1 :**
**A2 :**
**A3 :**
**A4 :**
**A5 :**
**A6 :**
**MDR :**
**MBP :**

## Light Hydrocarbons

**MCH % :**
**HER :**
**HXR :**

## Stable Carbon Isotopes

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

# Sediment/Extract Analysis

| | |
|---|---|
| Well name : | Fiord-1 |
| Suite name : | Fiord-1 Extract Study |
| Country Of Origin : | Alaska |
| Depth (m) : | 6920 |
| Sample name : | Kuparuk C unit |

## Extraction

TSE %wt : 0.060

## 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 :
H2 :
H3 :
H4 :
H5 : :::::
H6 :
H7 :
H8 :
H9 :
H10 :
H11 :
H12 :
H13 :
H14 :
H15 :
H16 :
H17 :
H18 :

S1 :
S2 :
S3 : ::
S4 : ::
S5 :
S6 :
S7 :
S8 :
S9 :
S10 :

M2 :
M3 :
M4 :
M5 :
A1 :
A2 :
A3 :
A4 :
A5 :
A6 :
MDR :
MBP :

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

| | |
|---|---|
| Saturates : | |
| Total Oil : | -28.7 |
| Aromatics : | |
| Residue : | |
| Asphaltenes : | |
| Kerogen : | |
| STANDARD: | NBS22 -29.8 |

TABLE 8.1

# Sediment/Extract Analysis

Well name : Fiord-1
Suite name : Fiord-1 Extract Study
Country Of Origin : Alaska
Depth (m) : 7200
Sample name : Nuiqsut unit

## Extraction

TSE %wt : 0.070

## 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 : 0.52
H2 : 0.52
H3 : 0.73
H4 : 0
H5 : 100:105:49:26:18:12
H6 : 0.11
H7 : 0.56
H8 :
H9 :
H10 :
H11 : 4.02
H12 : 3.42
H13 : 0.00
H14 : 5.20
H15 : 0.00
H16 : 0.00
H17 : 40.16
H18 : 0.00

S1 : 0.27
S2 : 0.30
S3 : 31:27:41
S4 : 30:30:38
S5 : 37.44
S6 :
S7 : 42.76
S8 : 27.74
S9 :
S10 :

M2 : 0.77
M3 : 0.60
M4 : 77.65
M5 :
A1 : 0.38
A2 : 0.38
A3 : 0.18
A4 : 0.06
A5 : 0.67
A6 : 1.38
MDR : 1.66
MBP : 9.16

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil : -28.6
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

# Sediment/Extract Analysis

| | |
|---|---|
| Well name : | Fiord-2 |
| Suite name : | Fiord-2 Extract study |
| Country Of Origin : | Alaska |
| Depth (m) : | 7780 |
| Sample name : | Kuparuk C unit |

## Extraction

TSE %wt : 0.070

## 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

| | | | | | |
|---|---|---|---|---|---|
| HI1 : | 0.58 | S1 : | 0.48 | M2 : | 0.72 |
| HI2 : | 0.51 | S2 : | 0.47 | M3 : | 0.59 |
| HI3 : | 0.87 | S3 : | 35:31:33 | M4 : | 64.06 |
| HI4 : | 0 | S4 : | 27:30:42 | M5 : | |
| HI5 : | 100:90:62:40:32:35 | S5 : | 17.14 | A1 : | 0.60 |
| HI6 : | 0.35 | S6 : | | A2 : | 0.63 |
| HI7 : | 0.52 | S7 : | 51.57 | A3 : | 0.13 |
| HI8 : | | S8 : | 37.12 | A4 : | 0.06 |
| HI9 : | | S9 : | | A5 : | 0.45 |
| HI10 : | | S10 : | | A6 : | 1.14 |
| HI11 : | 5.88 | | | MDR : | 2.27 |
| HI12 : | 2.16 | | | MBP : | 11.99 |
| HI13 : | 0.00 | | | | |
| HI14 : | 7.34 | | | | |
| HI15 : | 0.00 | | | | |
| HI16 : | 0.00 | | | | |
| HI17 : | 51.84 | | | | |
| HI18 : | 6.19 | | | | |

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

| | |
|---|---|
| Saturates : | |
| Total Oil : | -29.3 |
| Aromatics : | |
| Residue : | |
| Asphaltenes : | |
| Kerogen : | |
| STANDARD: | NBS22 -29.8 |

# Sediment/Extract Analysis

Well name : Fiord-2
Suite name : Fiord-2 Extract study
Country Of Origin : Alaska
Depth (m) : 7930
Sample name : Alpine unit

## Extraction

TSE %wt : 0.060

## 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 : 0.55
H2 : 0.42
H3 : 0.79
H4 : 17
H5 : 100:101:52:32:21:15
H6 : 0.28
H7 : 0.58
H8 :
H9 :
H10 :
H11 : 10.74
H12 : 5.33
H13 : 16.96
H14 : 7.07
H15 : 0.00
H16 : 0.00
H17 : 42.50
H18 : 0.00

S1 : 0.34
S2 : 0.40
S3 : 31:30:38
S4 : 26:32:40
S5 : 32.95
S6 :
S7 : 45.45
S8 : 30.42
S9 :
S10 :

M2 : 0.67
M3 : 0.54
M4 : 61.32
M5 :
A1 : 0.24
A2 : 0.24
A3 : 0.30
A4 : 0.10
A5 : 0.50
A6 : 1.54
MDR : 2.36
MBP : 12.18

## Light Hydrocarbons

MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil : -28.6
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

Table 9.2

# Sediment/Extract Analysis

Well name : Fiord-2
Suite name : Fiord-2 Extract study
Country Of Origin : Alaska
Depth (m) : 8100
Sample name : Nuiqsut unit

## Extraction

TSE %wt : 0.060

## 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 : 0.52
H2 : 0.44
H3 : 0.83
H4 : 10
H5 : 100:88:52:28:19:14
H6 : 0.31
H7 : 0.53
H8 :
H9 :
H10 :
H11 : 8.53
H12 : 3.65
H13 : 15.33
H14 : 7.07
H15 : 0.00
H16 : 0.00
H17 : 41.59
H18 : 0.00

S1 : 0.40
S2 : 0.47
S3 : 33:30:35
S4 : 26:33:39
S5 : 27.59
S6 :
S7 : 49.02
S8 : 34.91
S9 :
S10 :

M2 : 0.68
M3 : 0.54
M4 : 60.66
M5 :
A1 : 0.29
A2 : 0.31
A3 : 0.31
A4 : 0.14
A5 : 0.47
A6 : 1.12
MDR : 2.54
MBP : 9.93

## Light Hydrocarbons

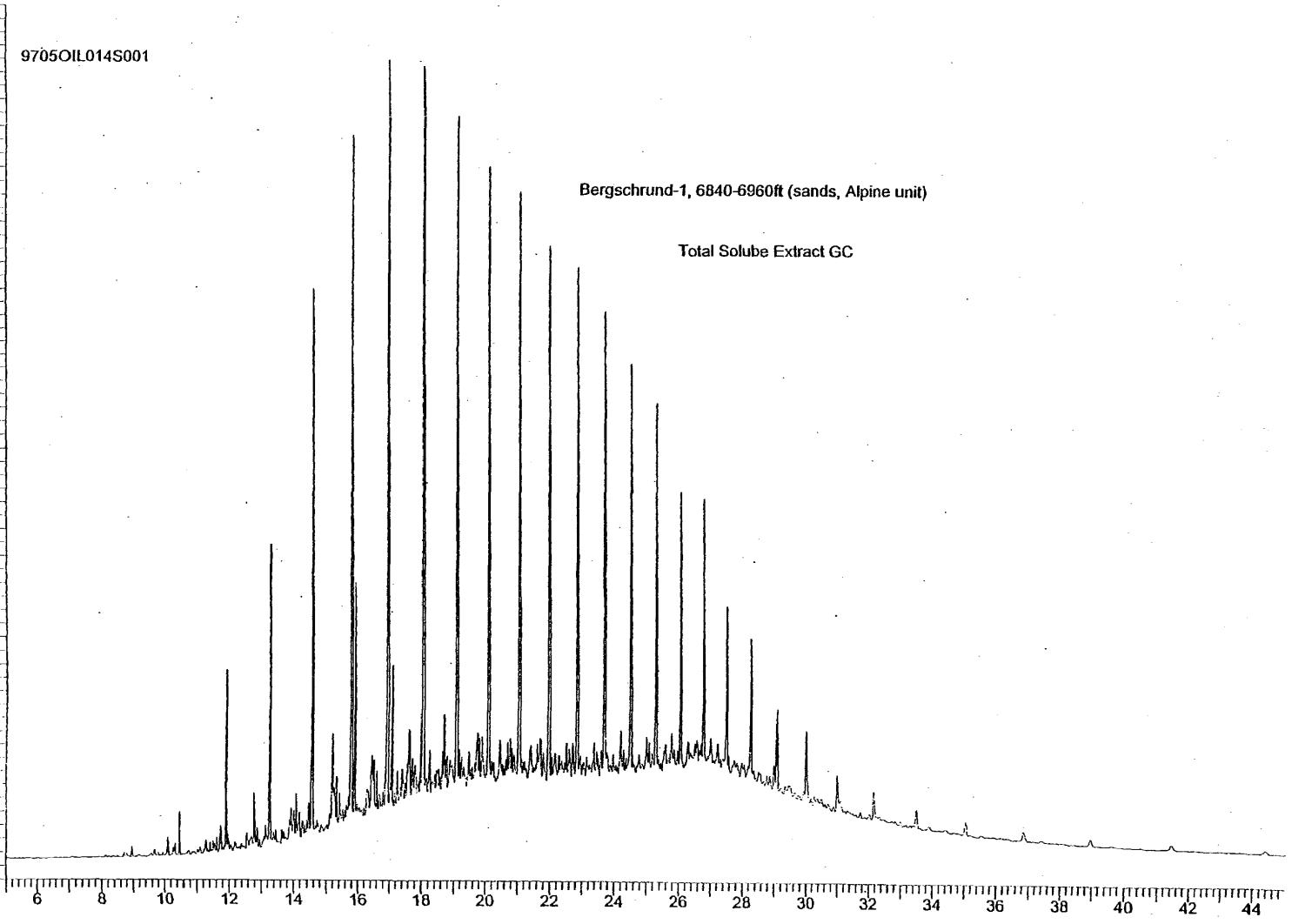
MCH % :
HER :
HXR :

## Stable Carbon Isotopes

Saturates :
Total Oil : -28.7
Aromatics :
Residue :
Asphaltenes :
Kerogen :

STANDARD: NBS22 -29.8

Table 9.3


9705OIL014S001
Bergschrund-1, 6840-6960ft (sands, Alpine unit)
Total Solube Extract GC
600
550
500
450
400
350
300
250
200
150
100
50
0
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44

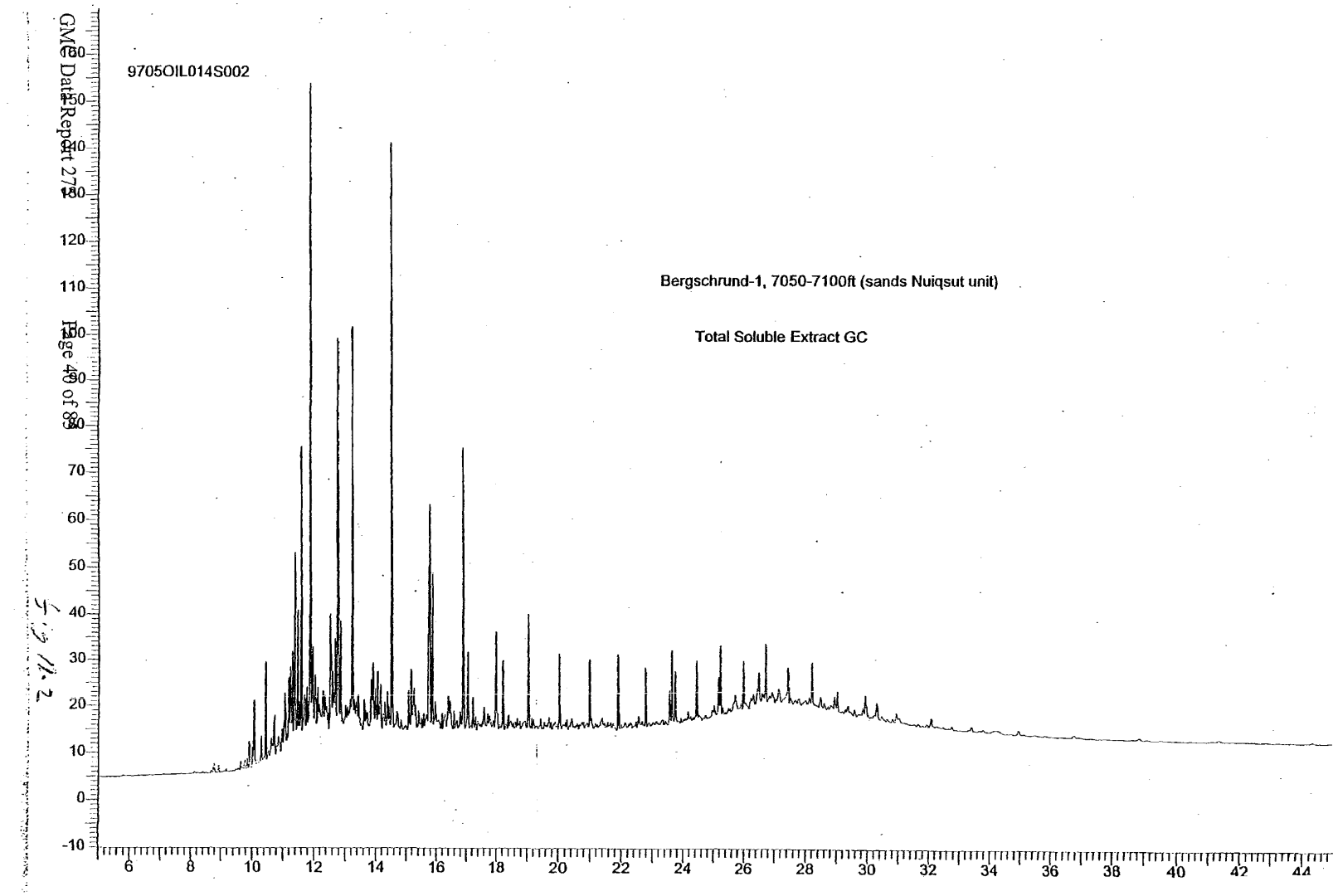





Fig. 11.2

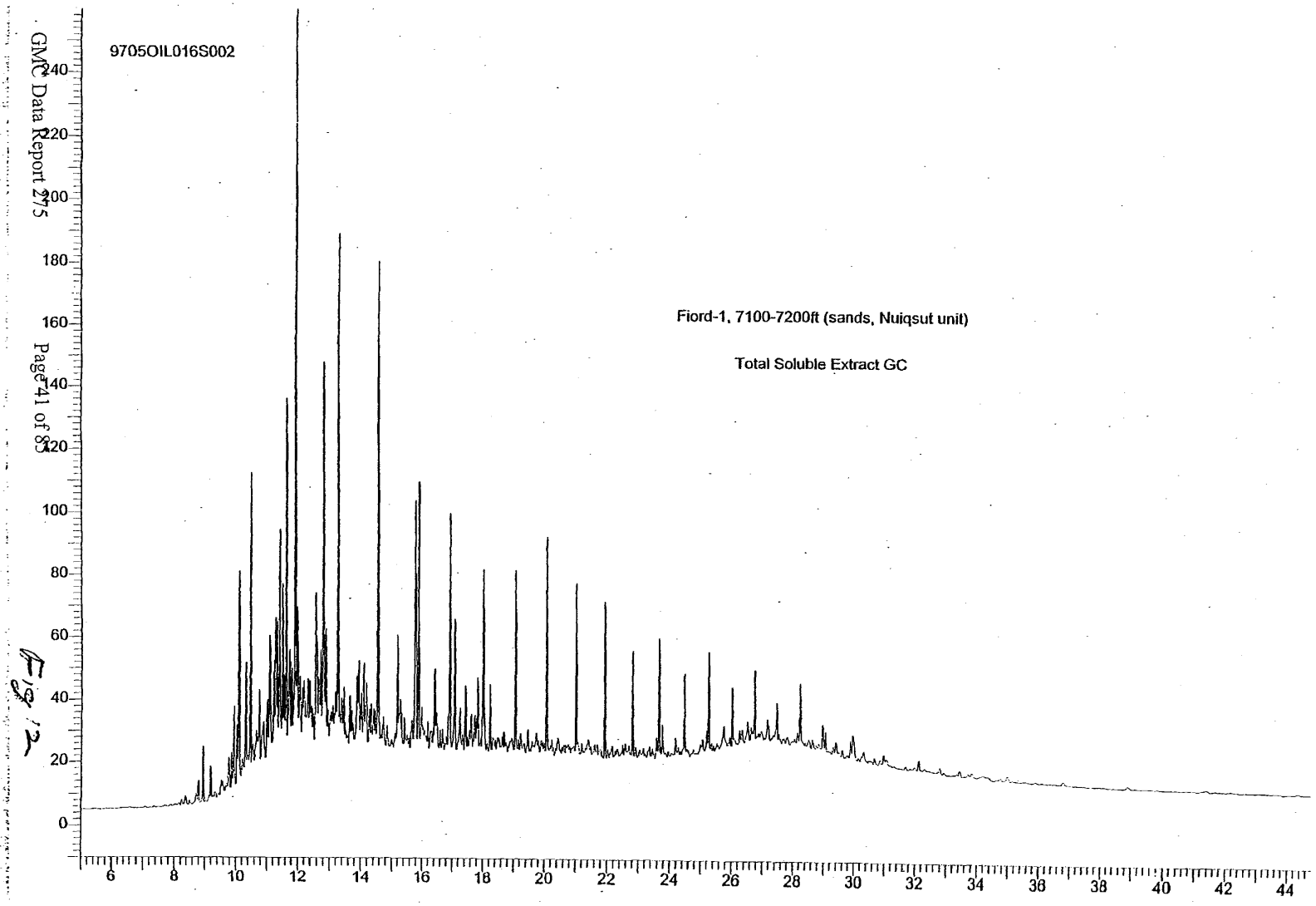
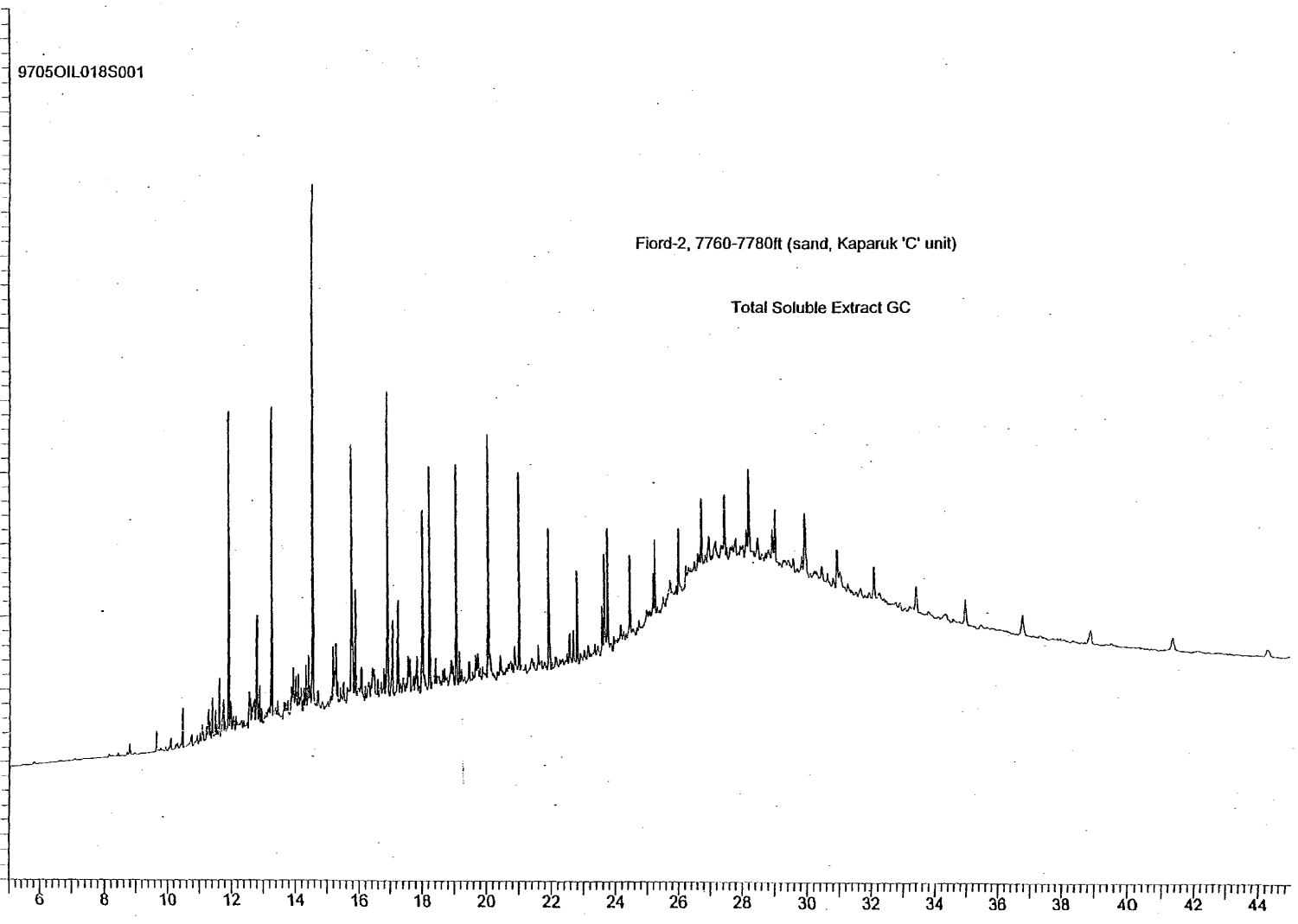
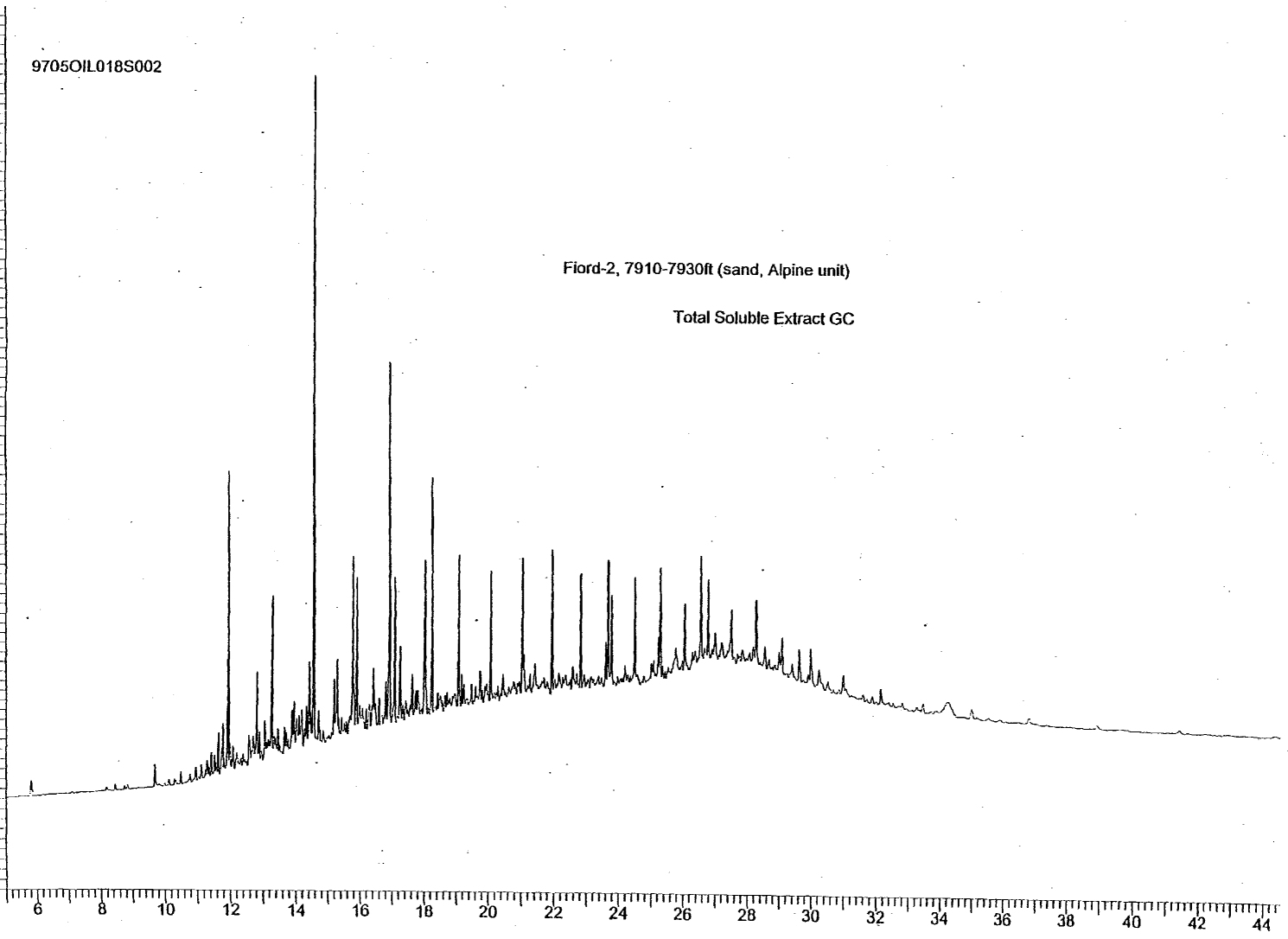

9705OIL016S002
Fiord-1, 7100-7200ft (sands, Nuiqsut unit)
Total Soluble Extract GC
0
20
40
60
80
100
120
140
160
180
200
220
240
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44

Fig. 2


9705OIL018S001
Fiord-2, 7760-7780ft (sand, Kaparuk 'C' unit)
Total Soluble Extract GC
0
5
10
15
20
25
30
35
40
45
50
55
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44


9705OIL018S002
Fiord-2, 7910-7930ft (sand, Alpine unit)
Total Soluble Extract GC
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44

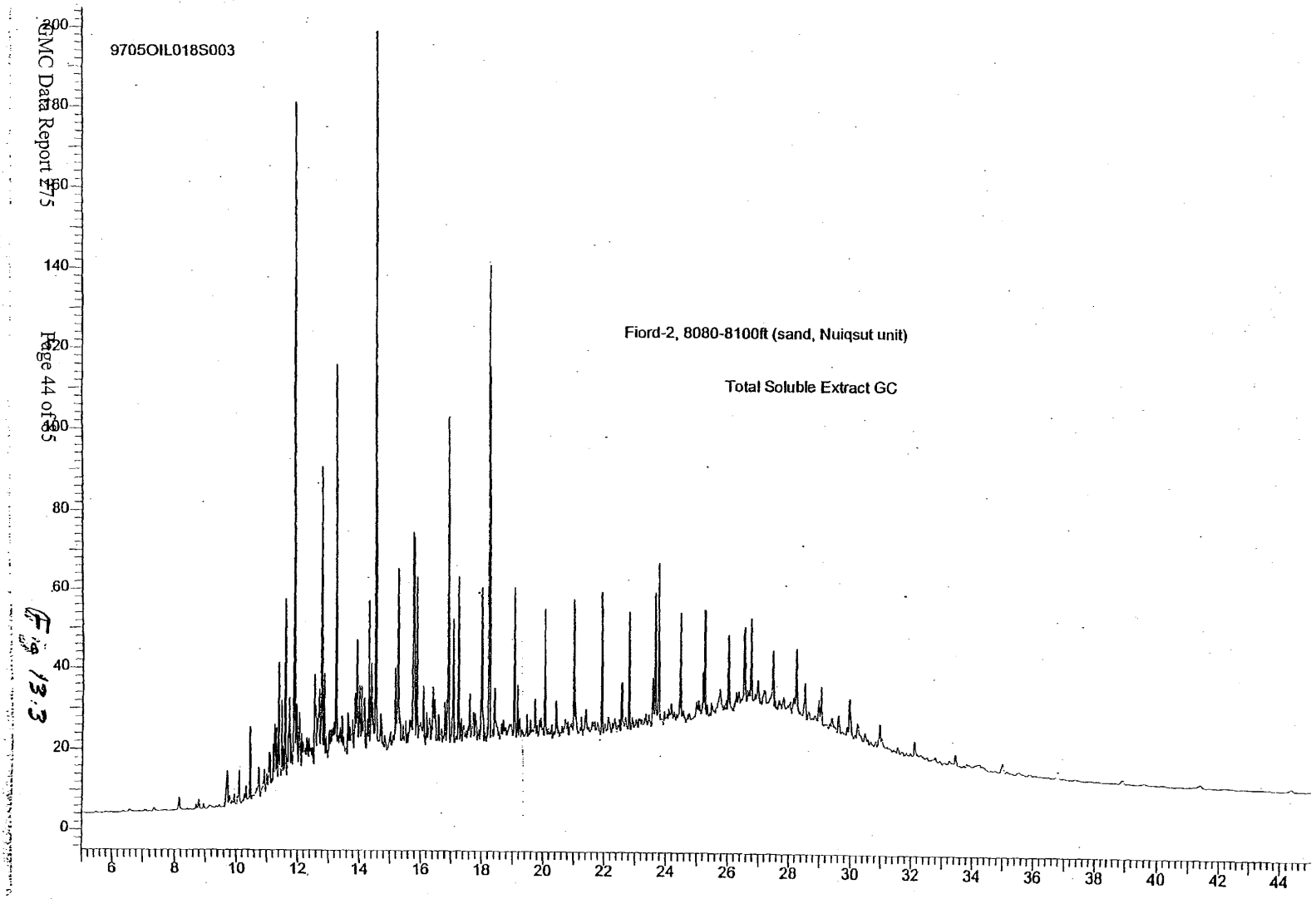

9705OIL018S003
Fiord-2, 8080-8100ft (sand, Nuiqsut unit)
Total Soluble Extract GC
0
20
40
60
80
100
120
140
160
180
200
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44

Fig. 13.3

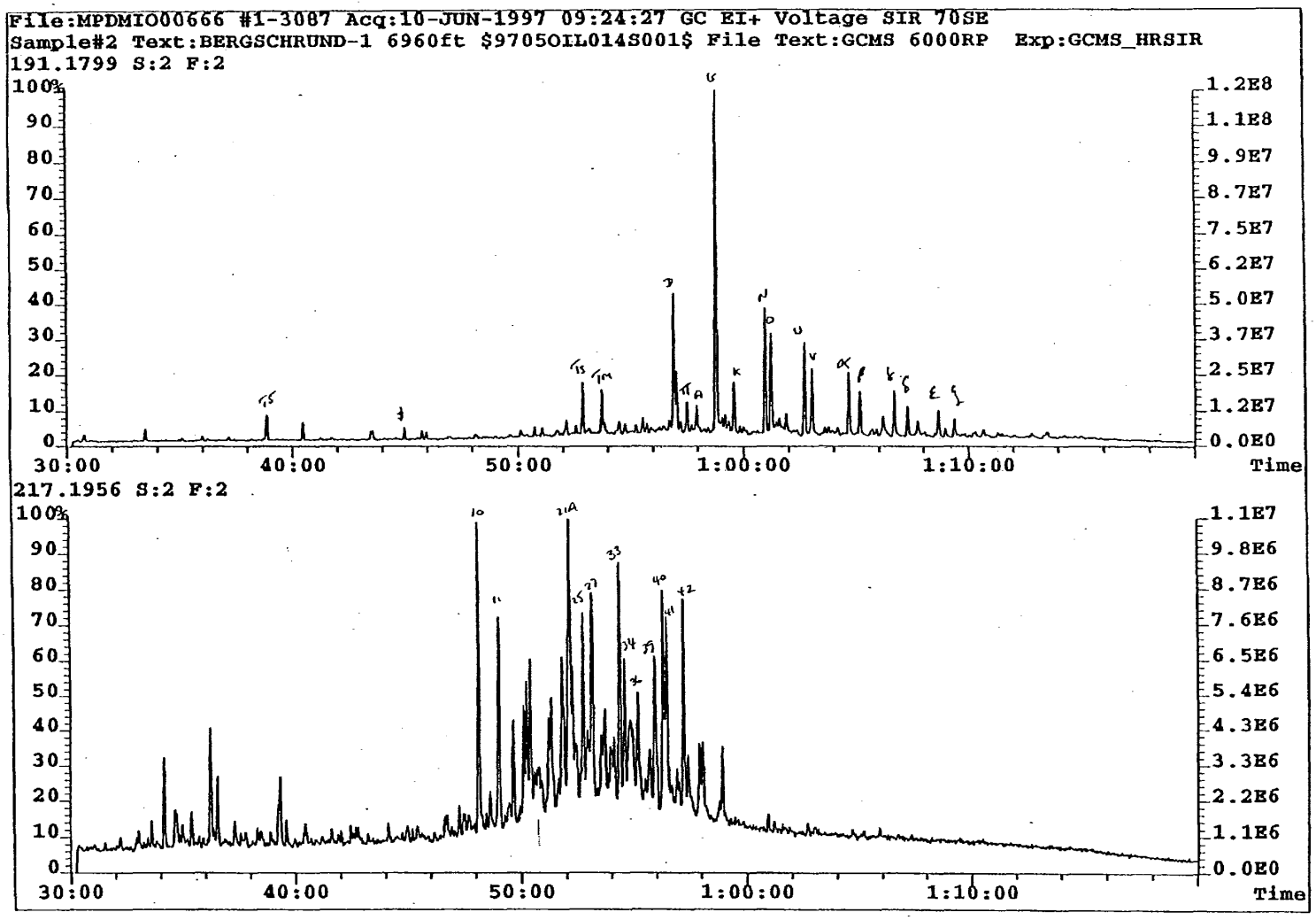

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.2E8
1.1E8
9.9E7
8.7E7
7.5E7
6.2E7
5.0E7
3.7E7
2.5E7
1.2E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.1E7
9.8E6
8.7E6
7.6E6
6.5E6
5.4E6
4.3E6
3.3E6
2.2E6
1.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig 14.1

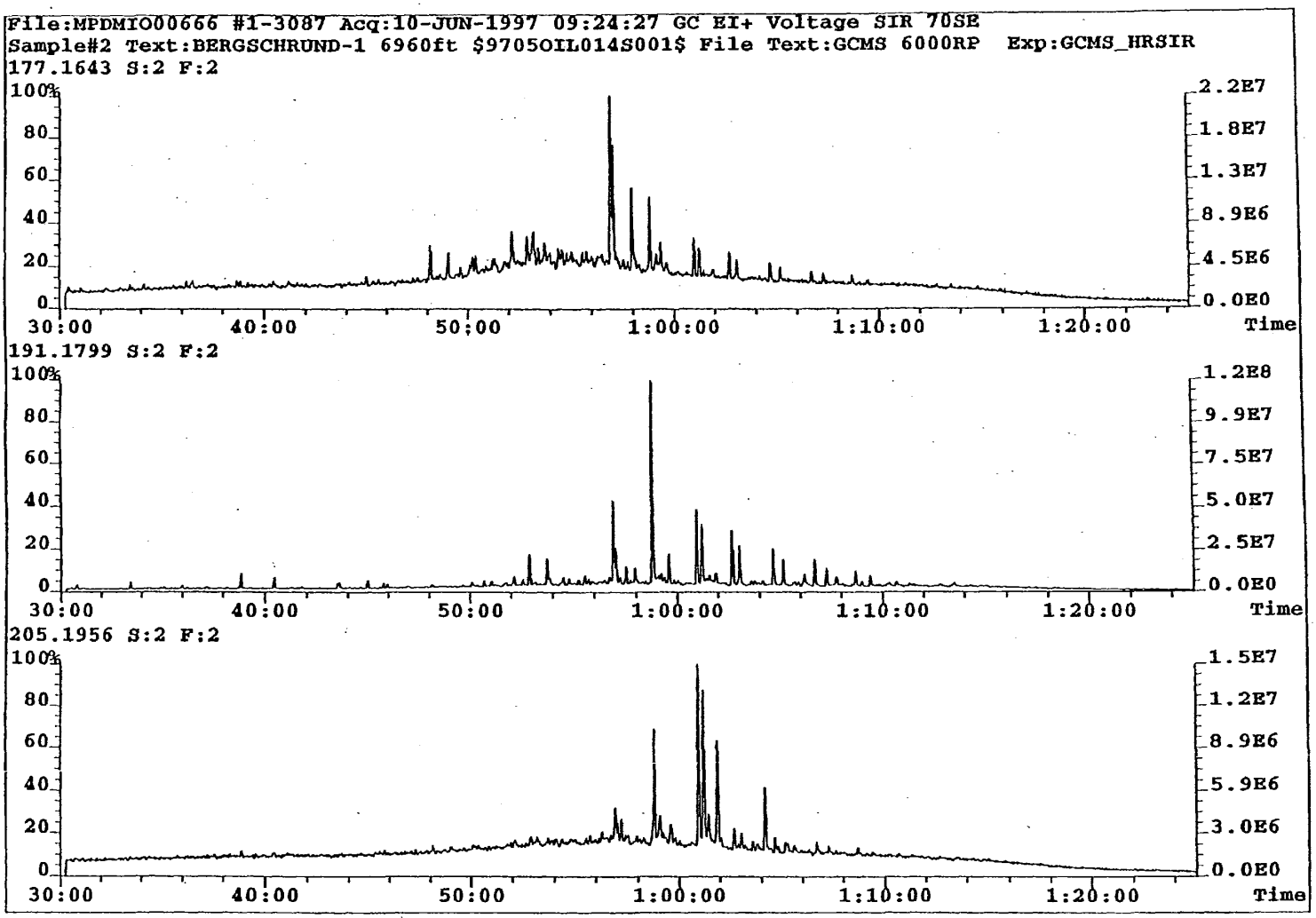

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:2 F:2
100%
80
60
40
20
0
2.2E7
1.8E7
1.3E7
8.9E6
4.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:2 F:2
100%
80
60
40
20
0
1.2E8
9.9E7
7.5E7
5.0E7
2.5E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:2 F:2
100%
80
60
40
20
0
1.5E7
1.2E7
8.9E6
5.9E6
3.0E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Fig 142

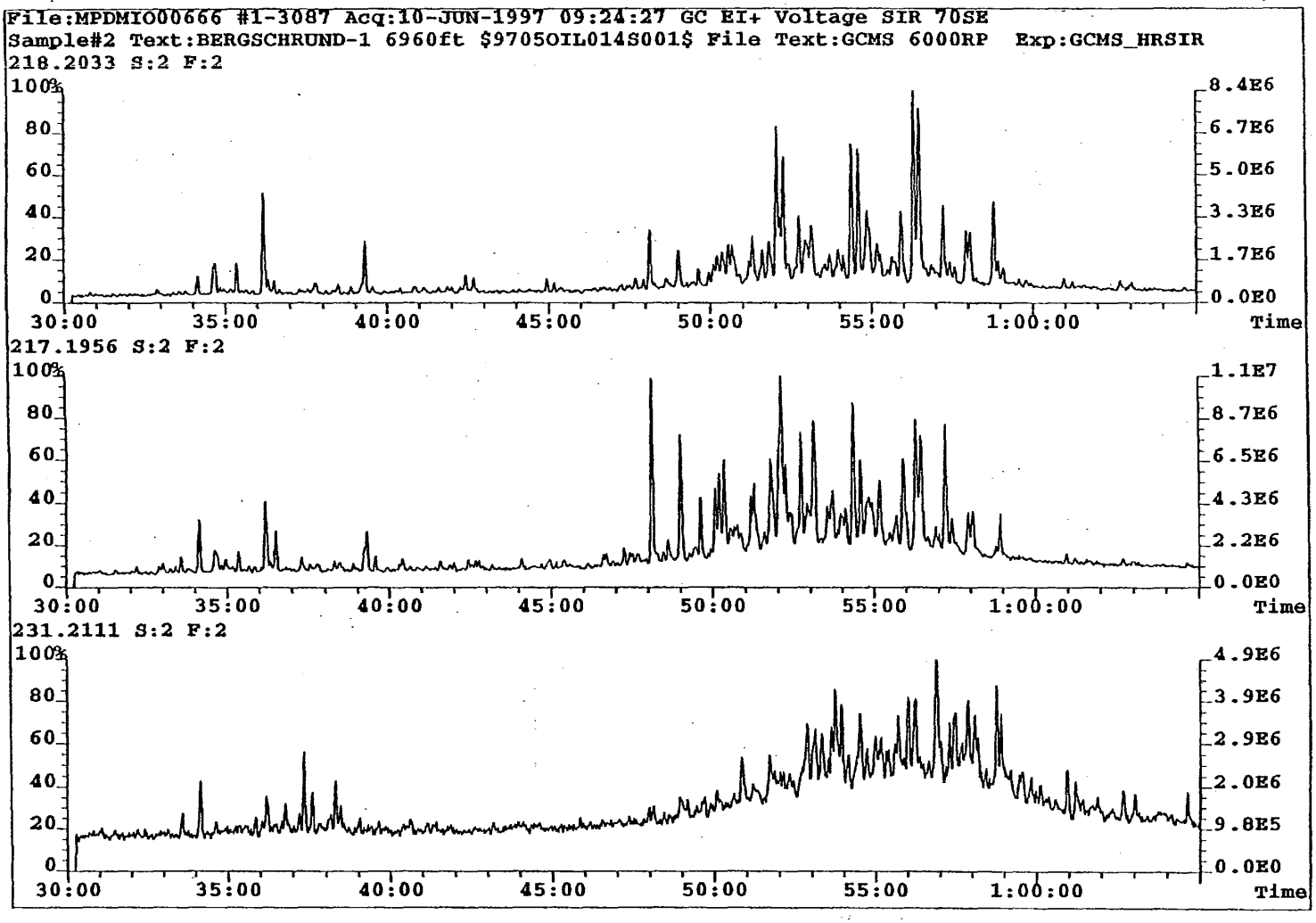

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:2 F:2
100%
80
60
40
20
0
8.4E6
6.7E6
5.0E6
3.3E6
1.7E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:2 F:2
100%
80
60
40
20
0
1.1E7
8.7E6
6.5E6
4.3E6
2.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:2 F:2
100%
80
60
40
20
0
4.9E6
3.9E6
2.9E6
2.0E6
9.8E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Fig 14.3

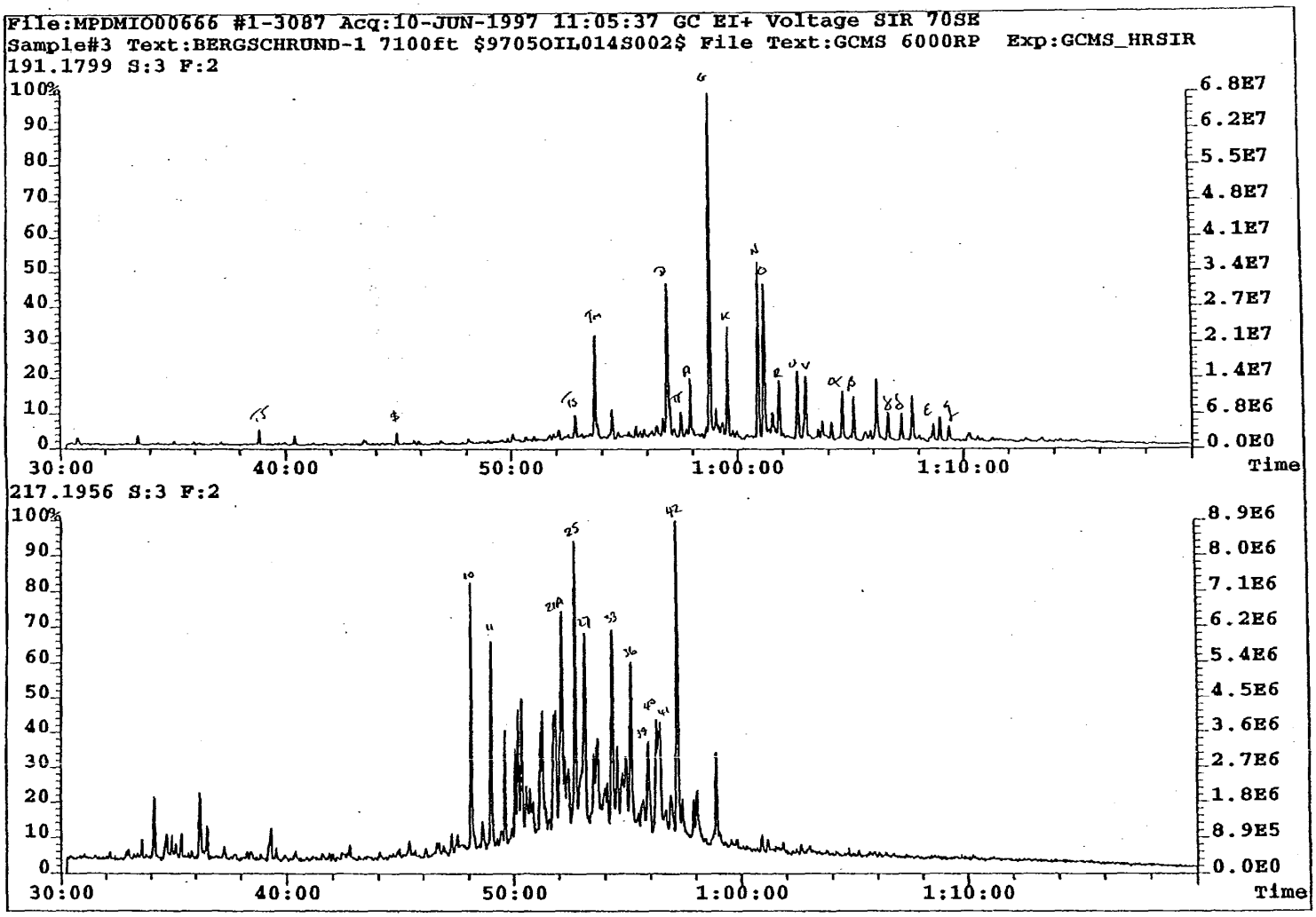
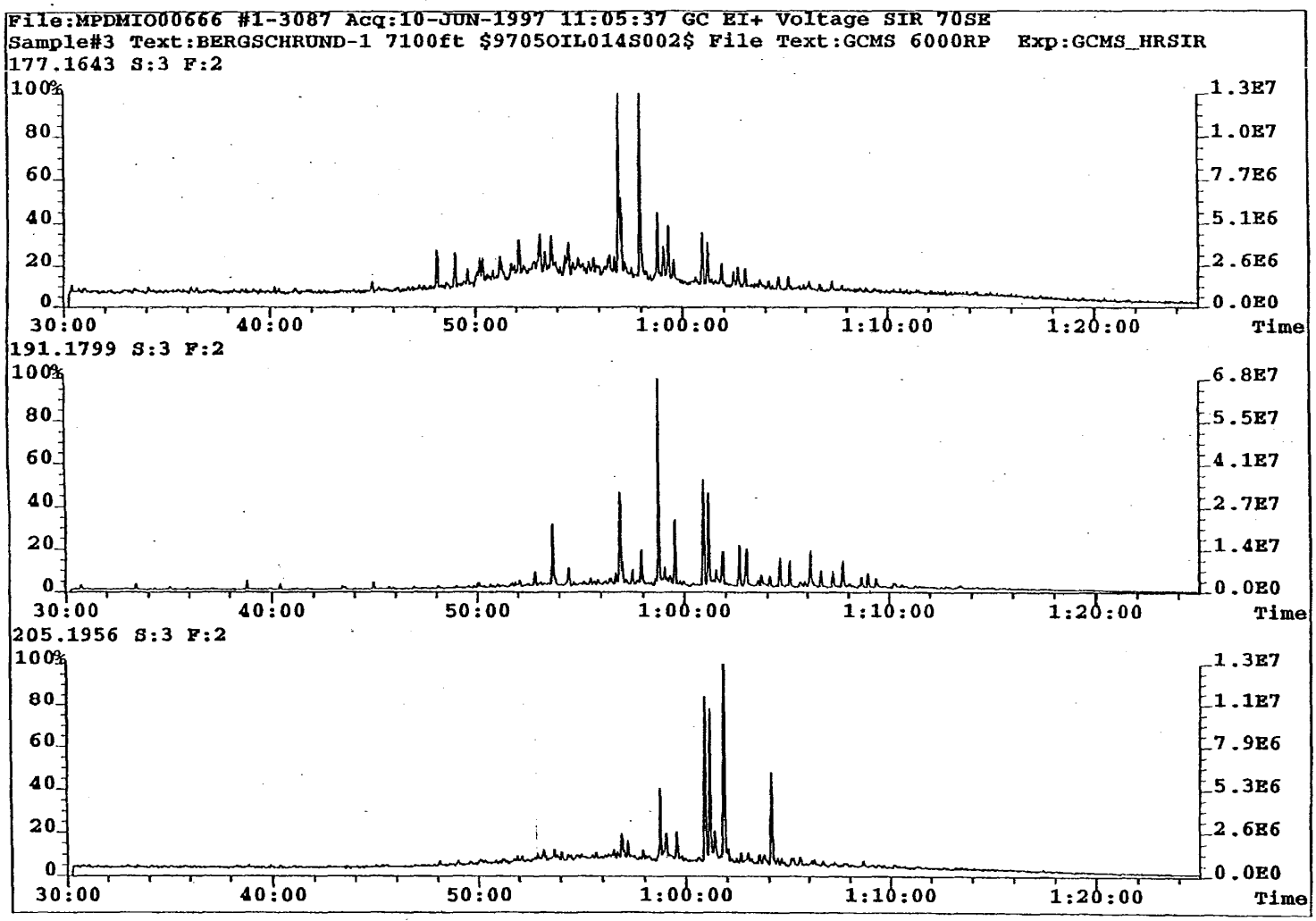

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
6.8E7
6.2E7
5.5E7
4.8E7
4.1E7
3.4E7
2.7E7
2.1E7
1.4E7
6.8E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.9E6
8.0E6
7.1E6
6.2E6
5.4E6
4.5E6
3.6E6
2.7E6
1.8E6
8.9E5
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig 14.4


File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:3 F:2
100%
80
60
40
20
0
1.3E7
1.0E7
7.7E6
5.1E6
2.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:3 F:2
100%
80
60
40
20
0
6.8E7
5.5E7
4.1E7
2.7E7
1.4E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
205.1956 S:3 F:2
100%
80
60
40
20
0
1.3E7
1.1E7
7.9E6
5.3E6
2.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

F-57 14.5

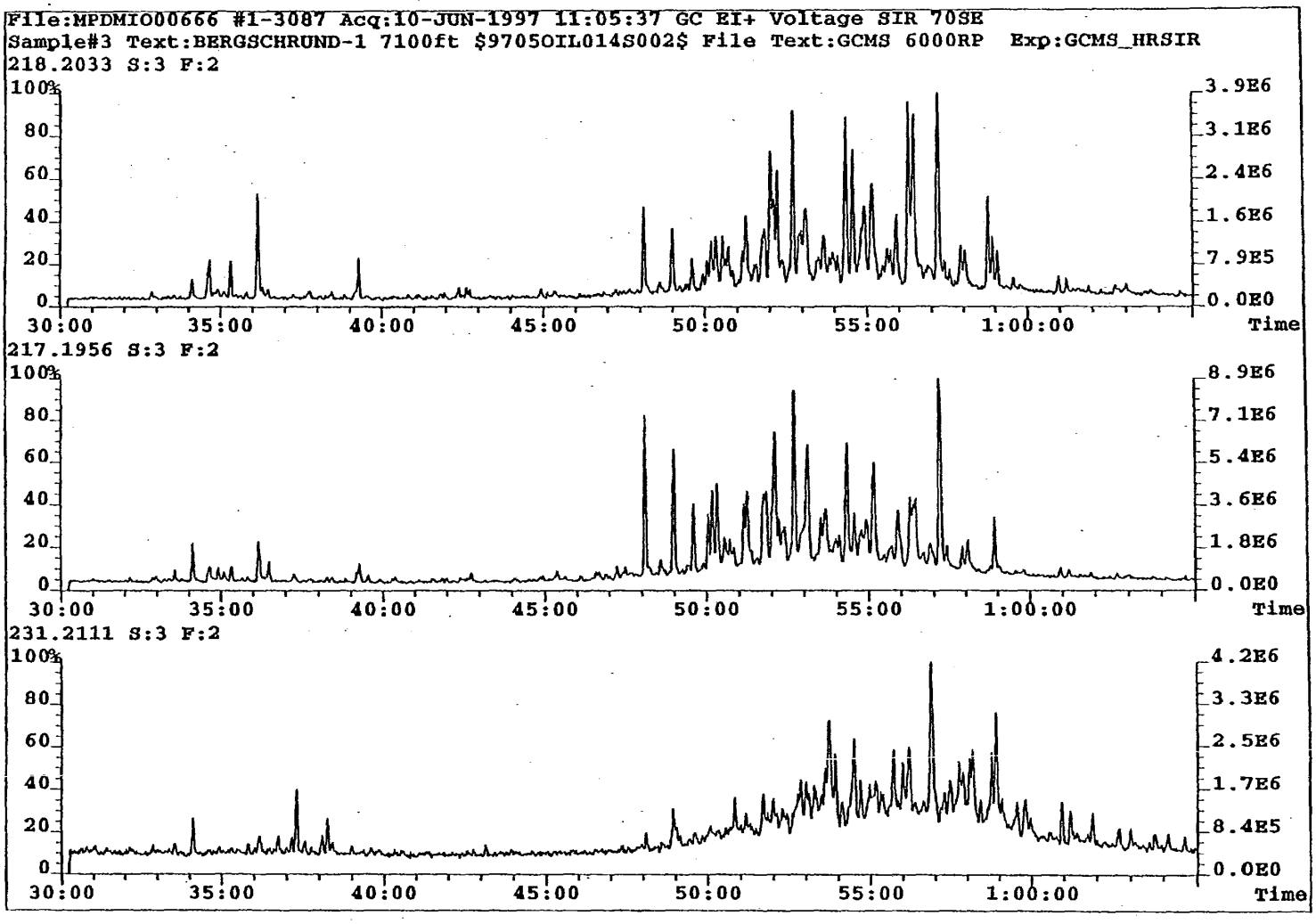

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:3 F:2
100%
80
60
40
20
0
3.9E6
3.1E6
2.4E6
1.6E6
7.9E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:3 F:2
100%
80
60
40
20
0
8.9E6
7.1E6
5.4E6
3.6E6
1.8E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:3 F:2
100%
80
60
40
20
0
4.2E6
3.3E6
2.5E6
1.7E6
8.4E5
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Fig 14.6

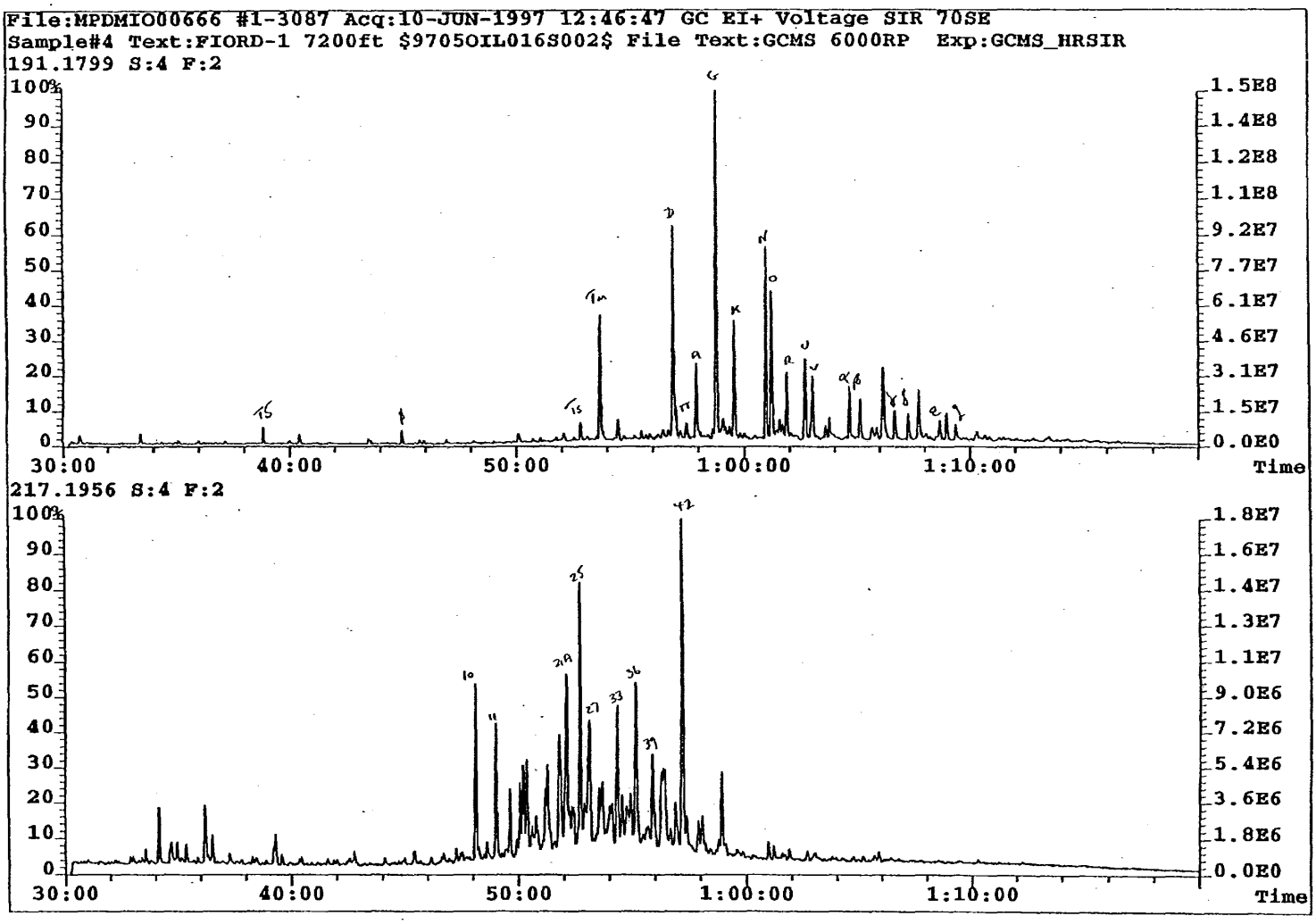

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:4 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.5E8
1.4E8
1.2E8
1.1E8
9.2E7
7.7E7
6.1E7
4.6E7
3.1E7
1.5E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:4 F:2
1.8E7
1.6E7
1.4E7
1.3E7
1.1E7
9.0E6
7.2E6
5.4E6
3.6E6
1.8E6
0.0E0

Fig 15.1

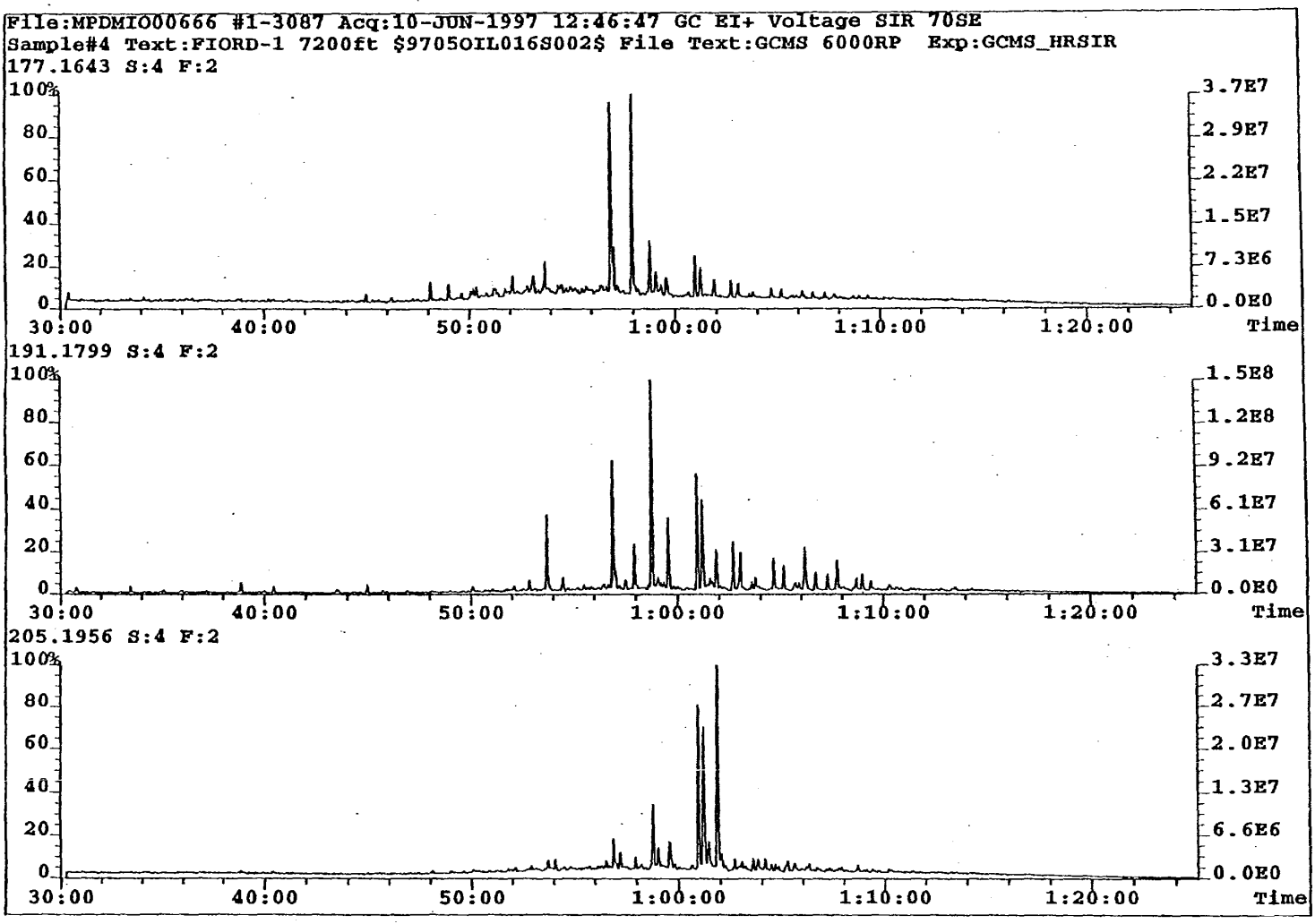

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:4 F:2
100%
80
60
40
20
0
3.7E7
2.9E7
2.2E7
1.5E7
7.3E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:4 F:2
100%
80
60
40
20
0
1.5E8
1.2E8
9.2E7
6.1E7
3.1E7
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
3.3E7
2.7E7
2.0E7
1.3E7
6.6E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

Fig 15.2

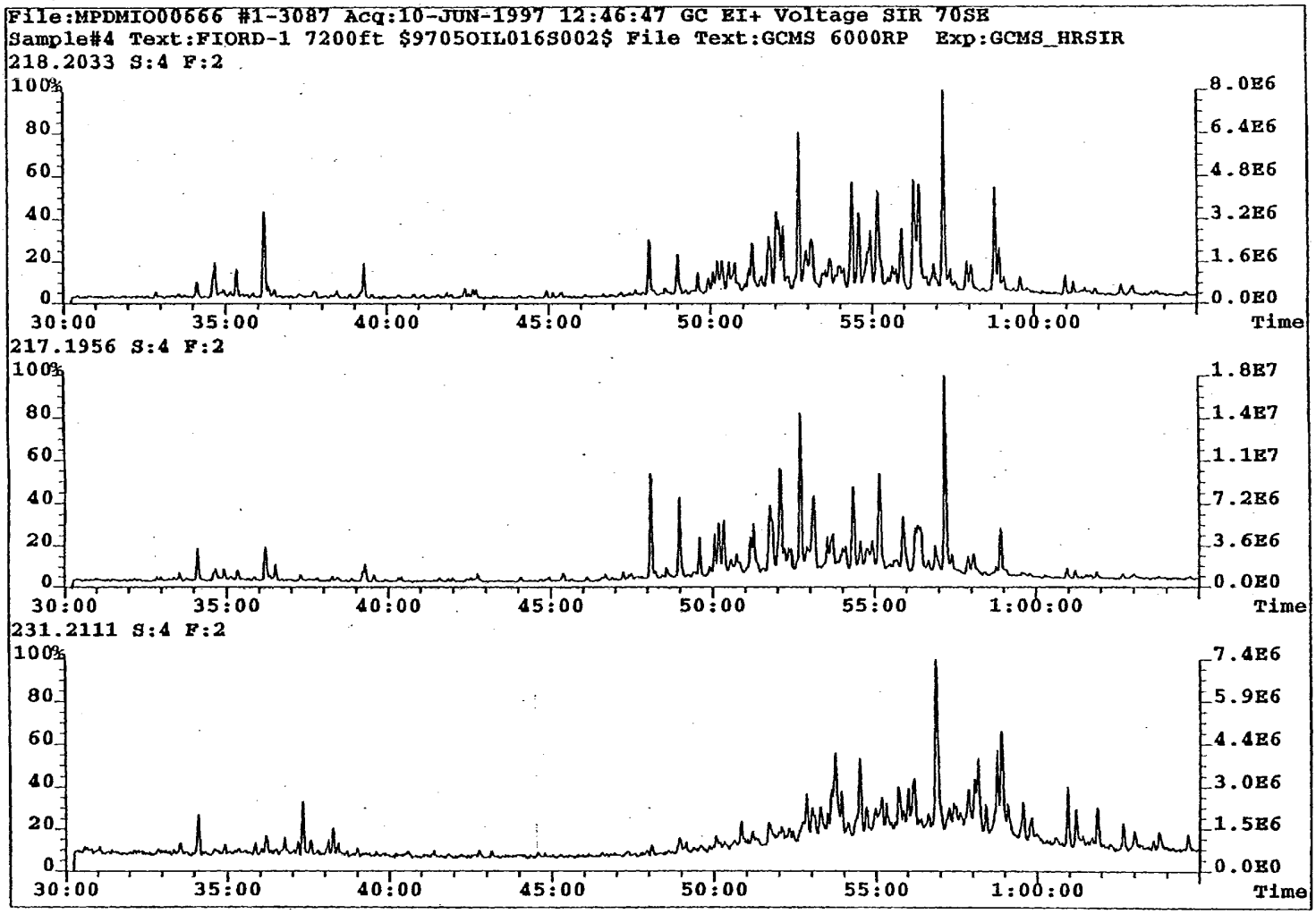

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:4 F:2
100%
80
60
40
20
0
8.0E6
6.4E6
4.8E6
3.2E6
1.6E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:4 F:2
100%
80
60
40
20
0
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
Time
231.2111 S:4 F:2
100%
80
60
40
20
0
7.4E6
5.9E6
4.4E6
3.0E6
1.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Fig 53

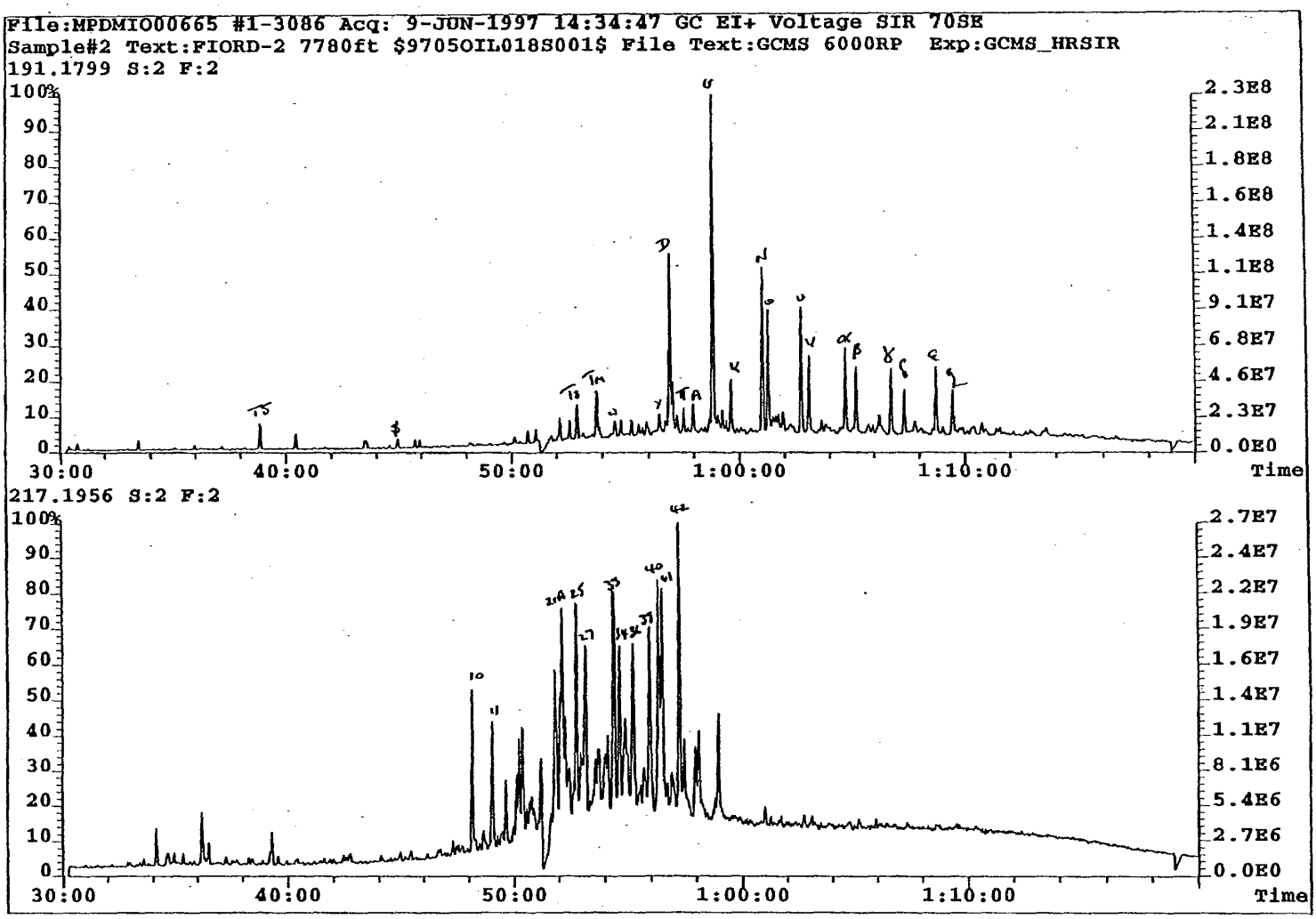

File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.3E8
2.1E8
1.8E8
1.6E8
1.4E8
1.1E8
9.1E7
6.8E7
4.6E7
2.3E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.7E7
2.4E7
2.2E7
1.9E7
1.6E7
1.4E7
1.1E7
8.1E6
5.4E6
2.7E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig 16.1

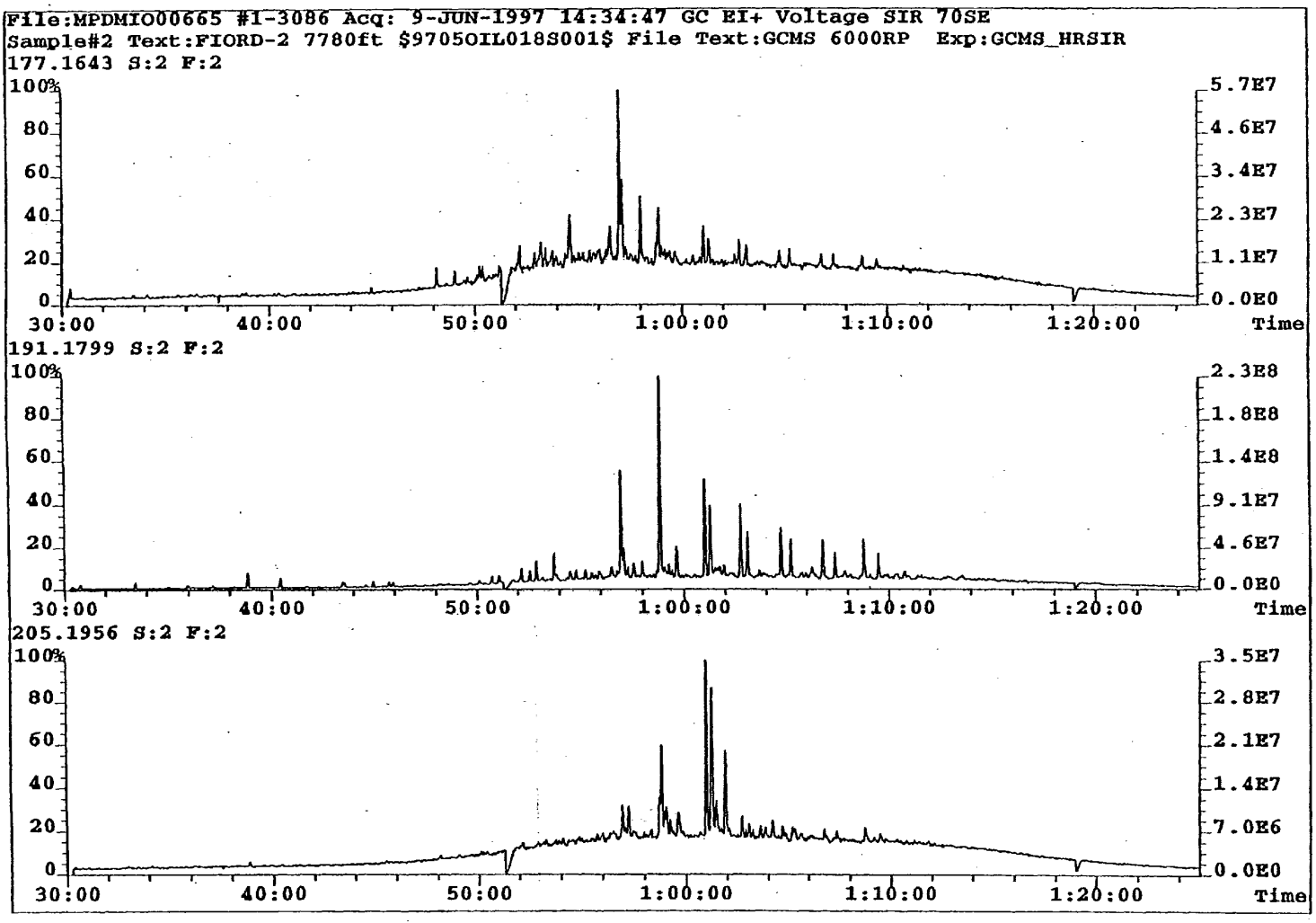
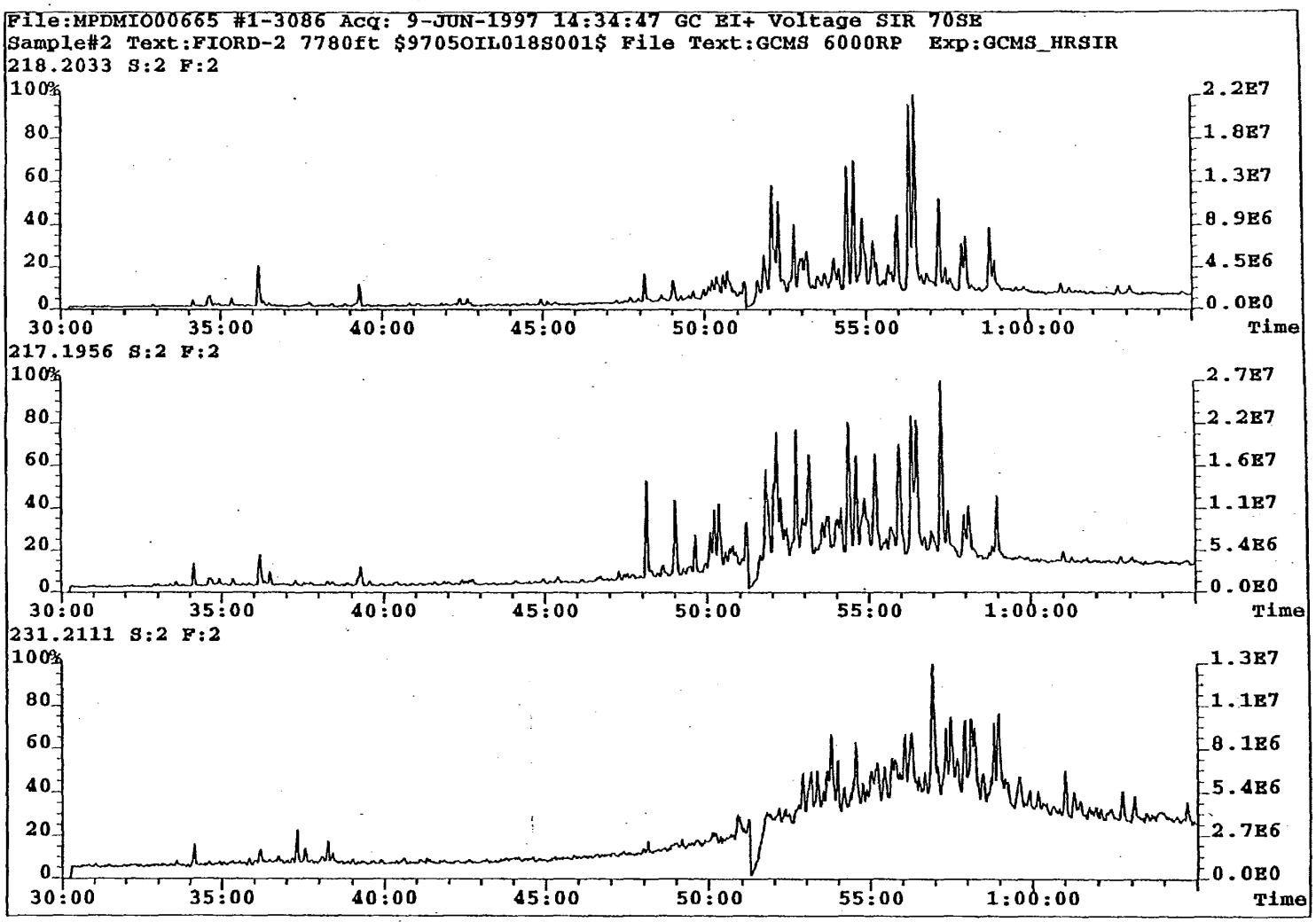
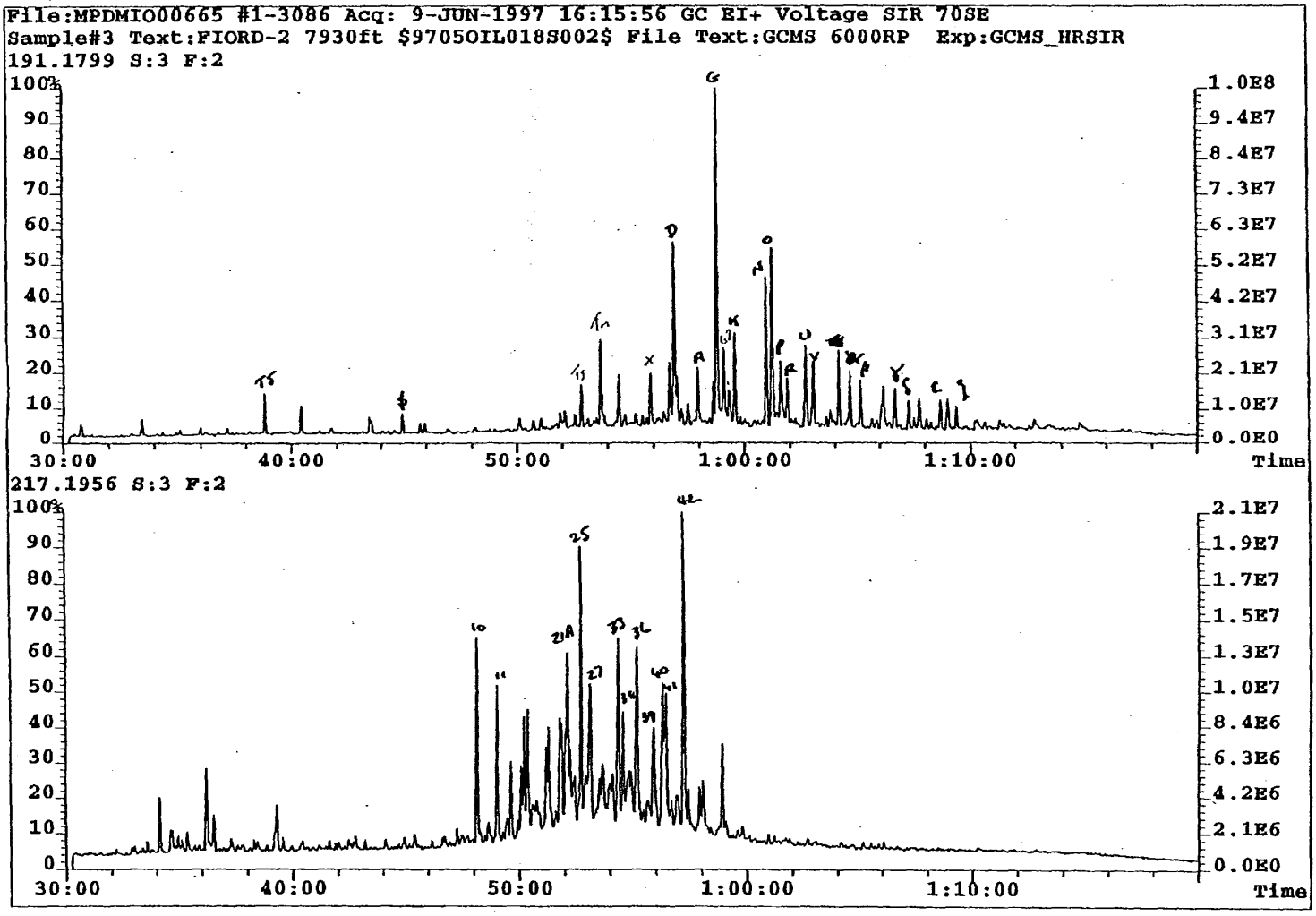
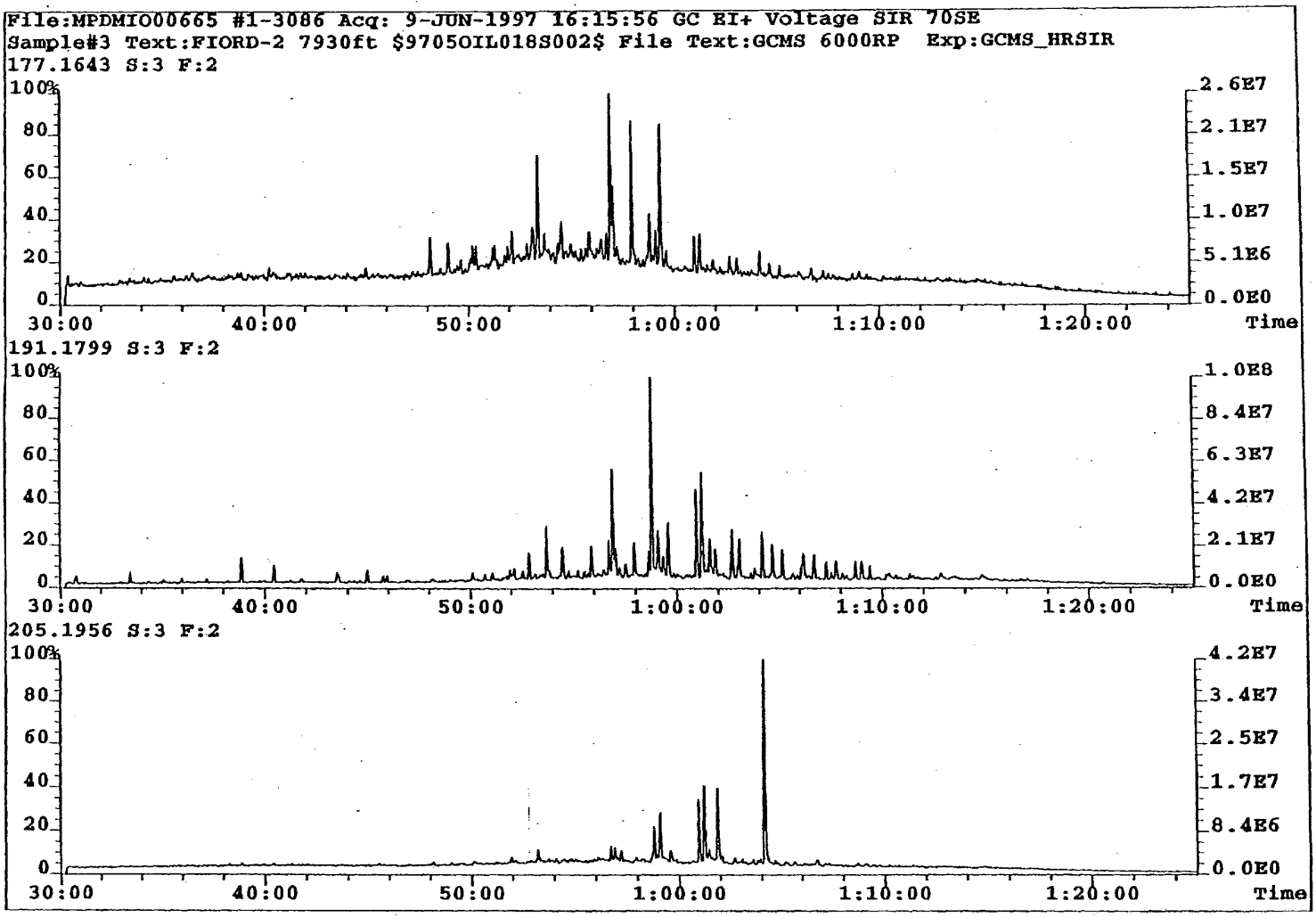
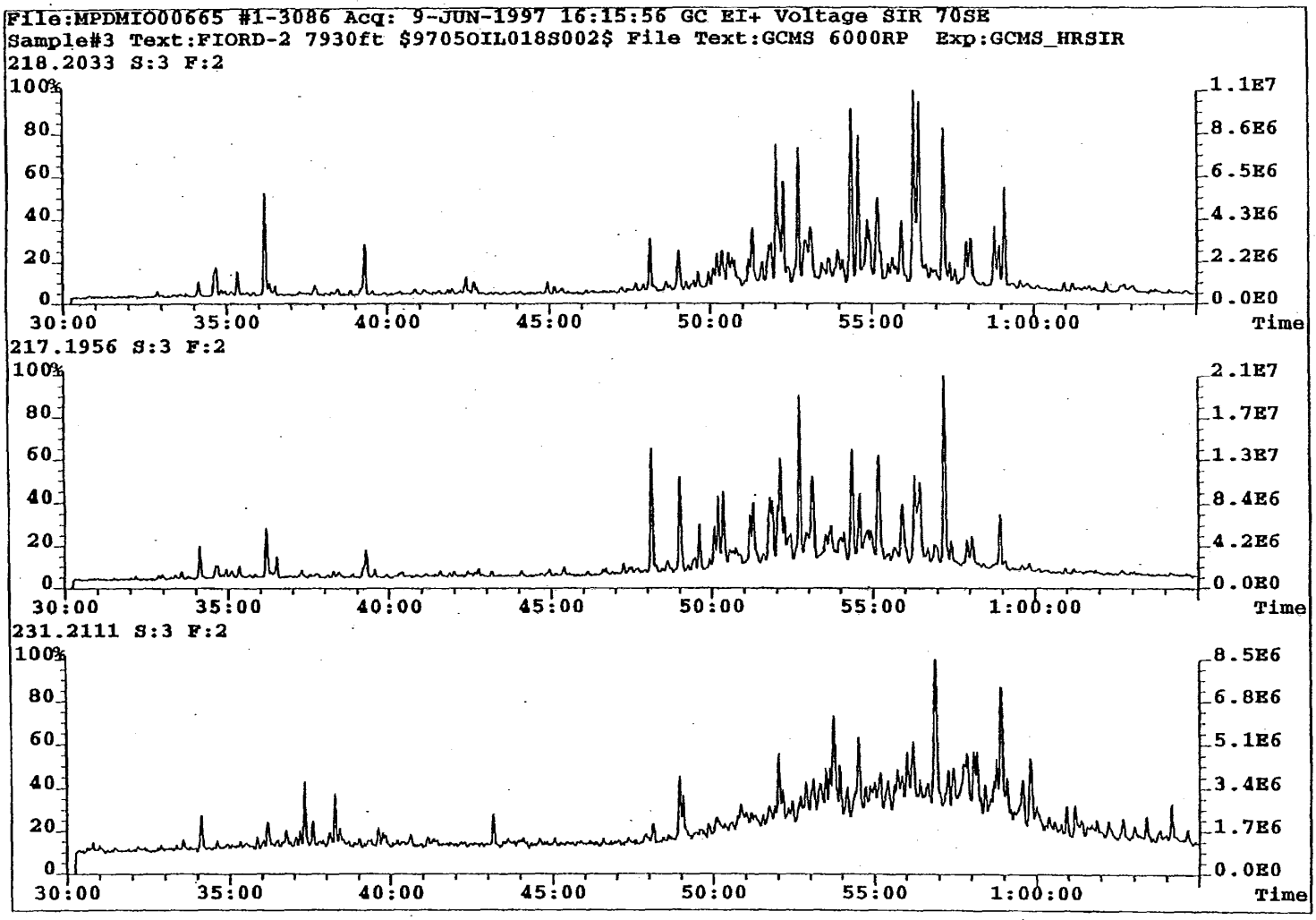

File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:2 F:2
100%
80
60
40
20
0
5.7E7
4.6E7
3.4E7
2.3E7
1.1E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time
191.1799 S:2 F:2
2.3E8
1.8E8
1.4E8
9.1E7
4.6E7
0.0E0
205.1956 S:2 F:2
3.5E7
2.8E7
2.1E7
1.4E7
7.0E6
0.0E0

Fig 12.2


File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:2 F:2
100%
80
60
40
20
0
2.2E7
1.8E7
1.3E7
8.9E6
4.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:2 F:2
100%
80
60
40
20
0
2.7E7
2.2E7
1.6E7
1.1E7
5.4E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:2 F:2
100%
80
60
40
20
0
1.3E7
1.1E7
8.1E6
5.4E6
2.7E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time


File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.0E8
9.4E7
8.4E7
7.3E7
6.3E7
5.2E7
4.2E7
3.1E7
2.1E7
1.0E7
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 S:3 F:2
2.1E7
1.9E7
1.7E7
1.5E7
1.3E7
1.0E7
8.4E6
6.3E6
4.2E6
2.1E6
0.0E0


File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 S:3 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
191.1799 S:3 F:2
100%
80
60
40
20
0
1.0E8
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:3 F:2
100%
80
60
40
20
0
4.2E7
3.4E7
2.5E7
1.7E7
8.4E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time


File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 S:3 F:2
100%
80
60
40
20
0
1.1E7
8.6E6
6.5E6
4.3E6
2.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 S:3 F:2
100%
80
60
40
20
0
2.1E7
1.7E7
1.3E7
8.4E6
4.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
231.2111 S:3 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

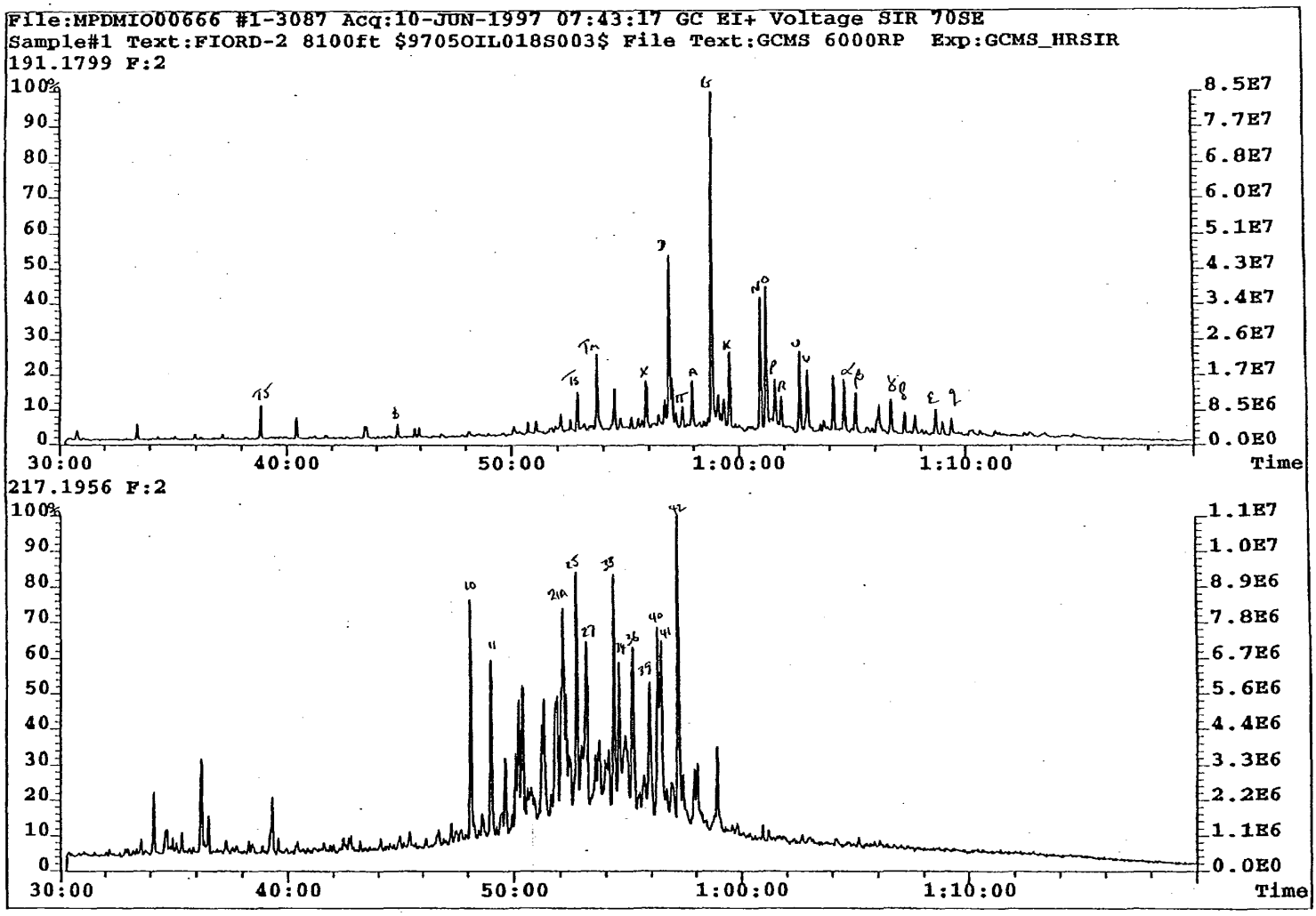
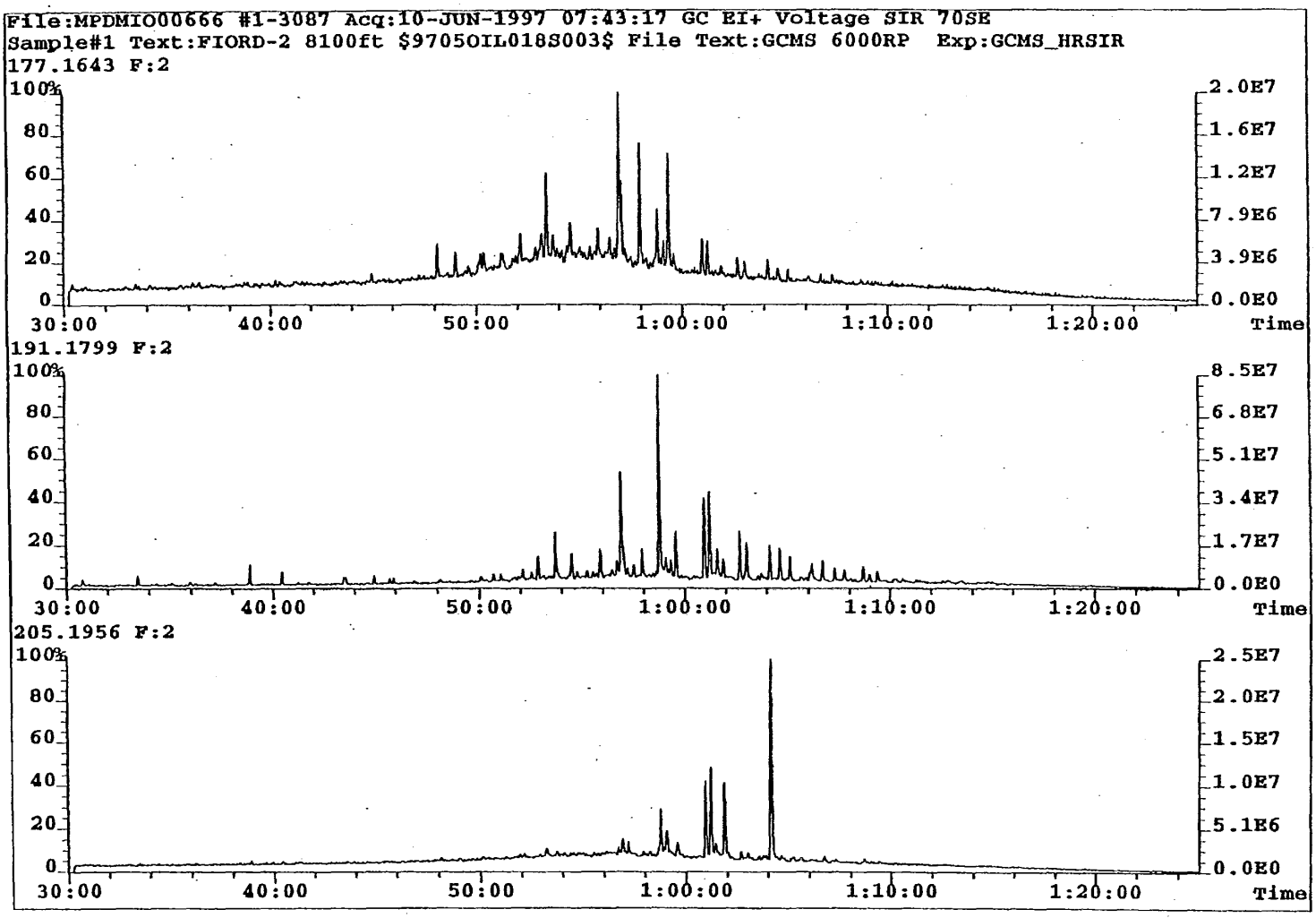

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
191.1799 F:2
100%
90
80
70
60
50
40
30
20
10
0
8.5E7
7.7E7
6.8E7
6.0E7
5.1E7
4.3E7
3.4E7
2.6E7
1.7E7
8.5E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time
217.1956 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.1E7
1.0E7
8.9E6
7.8E6
6.7E6
5.6E6
4.4E6
3.3E6
2.2E6
1.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
Time

Fig. 7


File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
177.1643 F:2
100%
80
60
40
20
0
2.0E7
1.6E7
1.2E7
7.9E6
3.9E6
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
8.5E7
6.8E7
5.1E7
3.4E7
1.7E7
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
2.5E7
2.0E7
1.5E7
1.0E7
5.1E6
0.0E0
30:00
40:00
50:00
1:00:00
1:10:00
1:20:00
Time

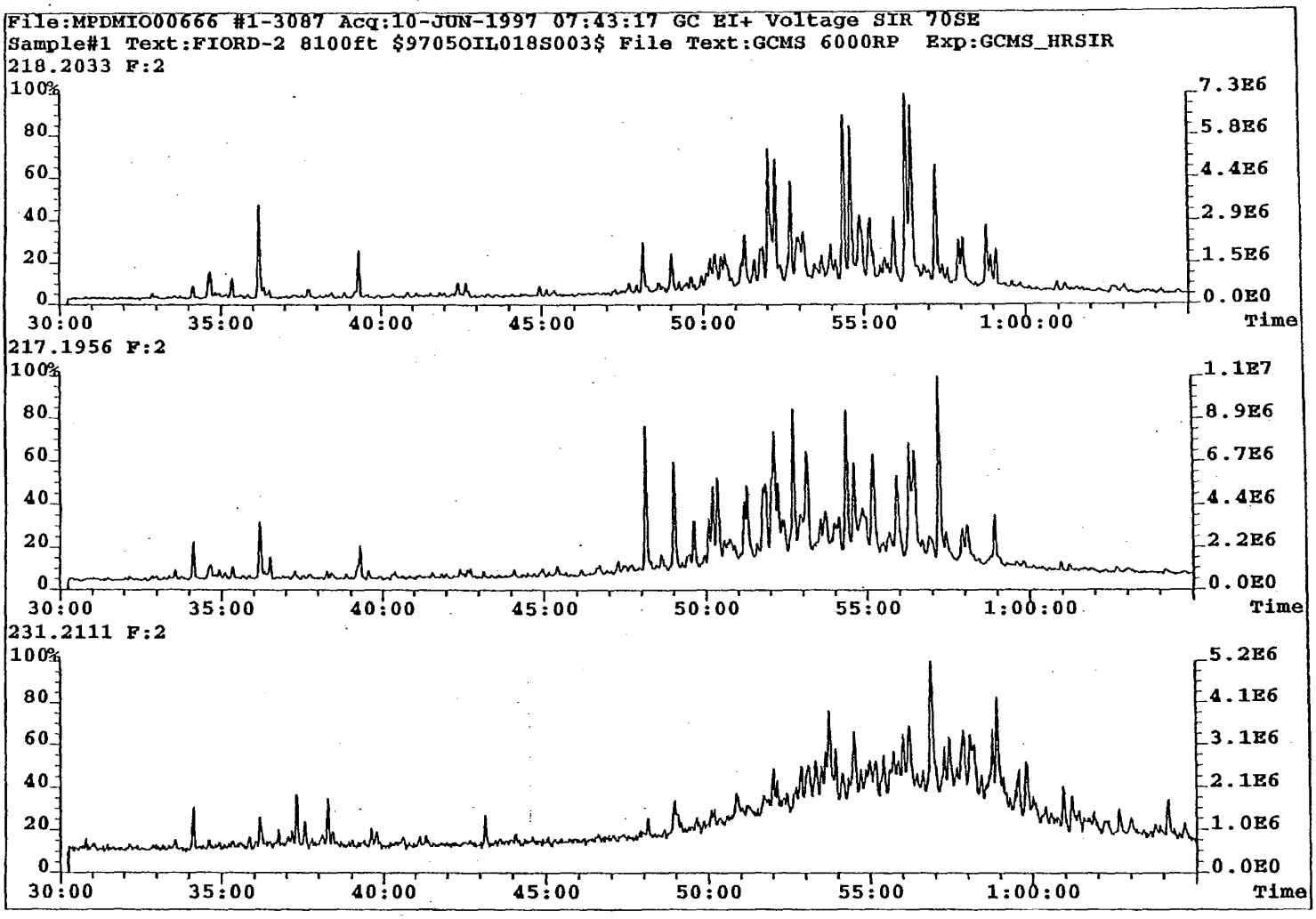
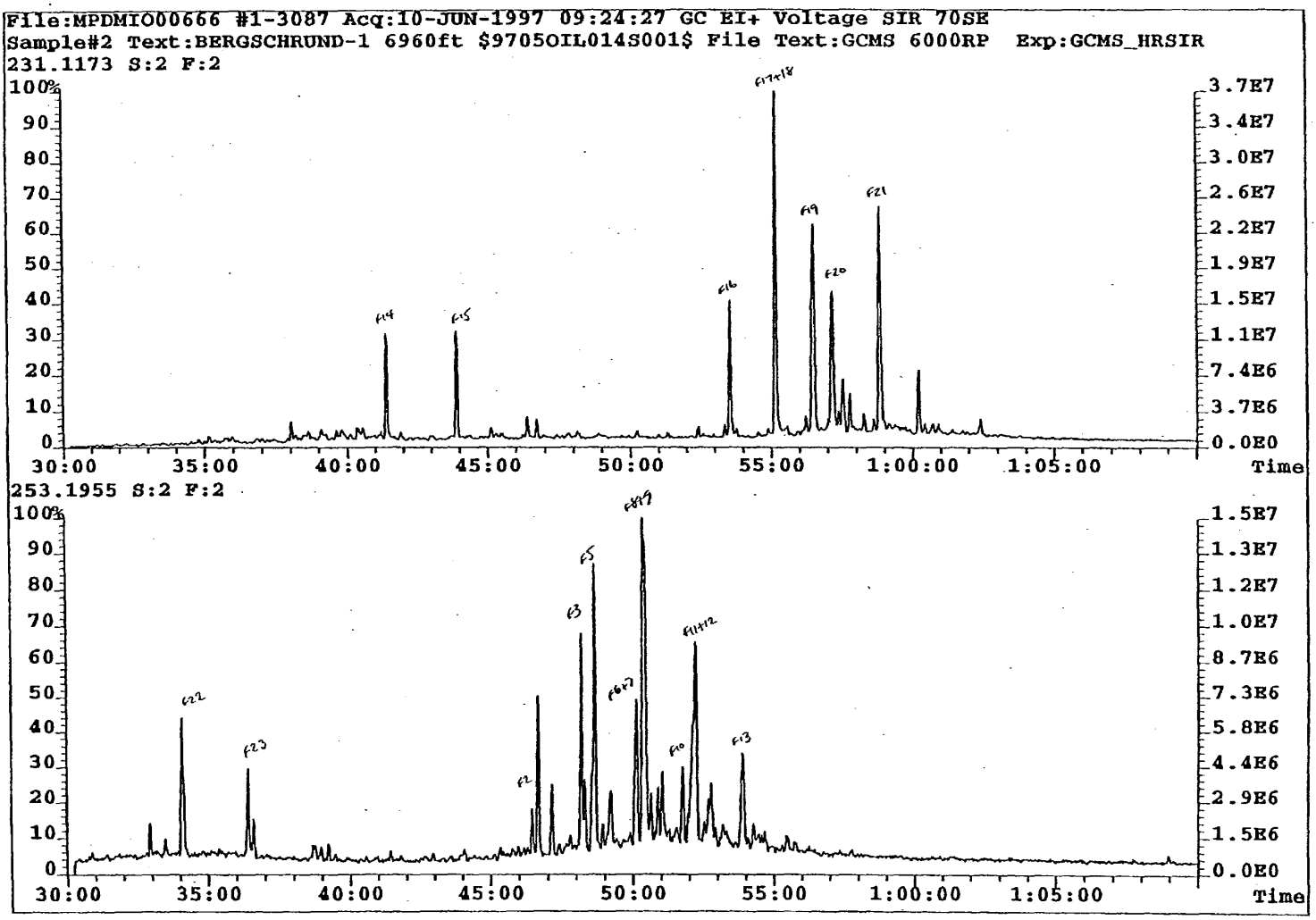
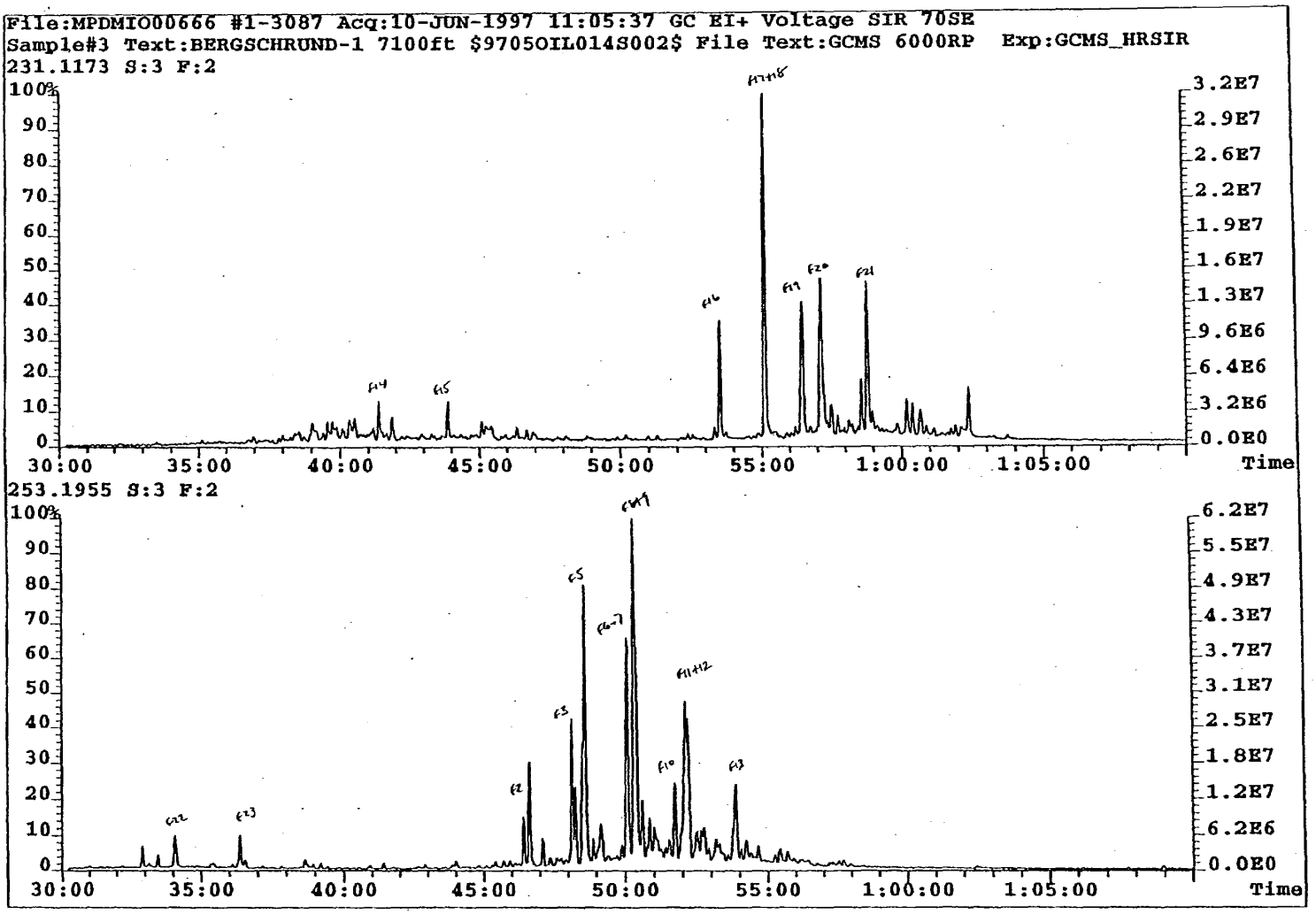

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
218.2033 F:2
100%
80
60
40
20
0
7.3E6
5.8E6
4.4E6
2.9E6
1.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time
217.1956 F:2
100%
80
60
40
20
0
1.1E7
8.9E6
6.7E6
4.4E6
2.2E6
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
5.2E6
4.1E6
3.1E6
2.1E6
1.0E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
Time

Fig. 9


File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.7E7
3.4E7
3.0E7
2.6E7
2.2E7
1.9E7
1.5E7
1.1E7
7.4E6
3.7E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:2 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
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

17.1


File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
3.2E7
2.9E7
2.6E7
2.2E7
1.9E7
1.6E7
1.3E7
9.6E6
6.4E6
3.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
6.2E7
5.5E7
4.9E7
4.3E7
3.7E7
3.1E7
2.5E7
1.8E7
1.2E7
6.2E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

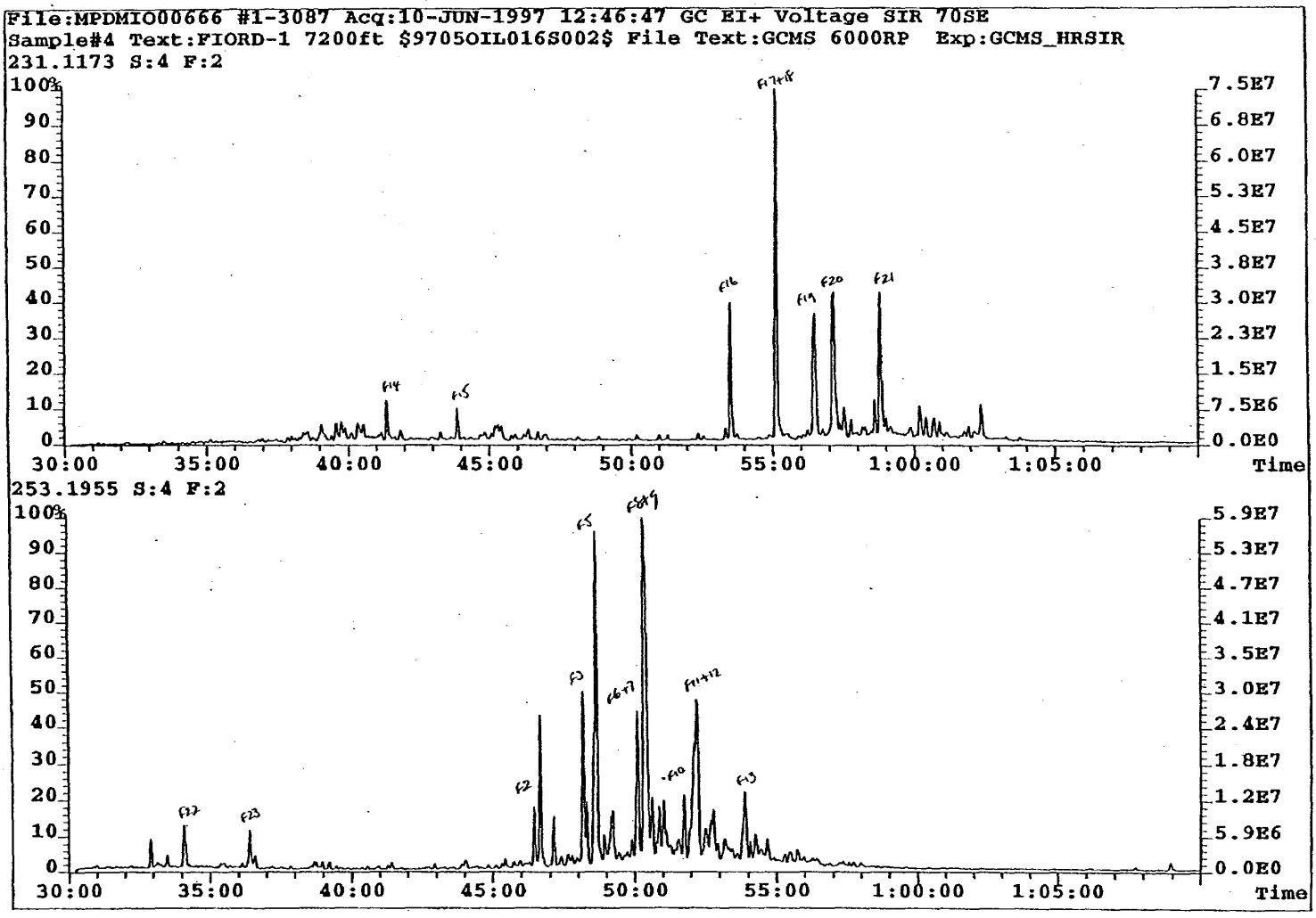
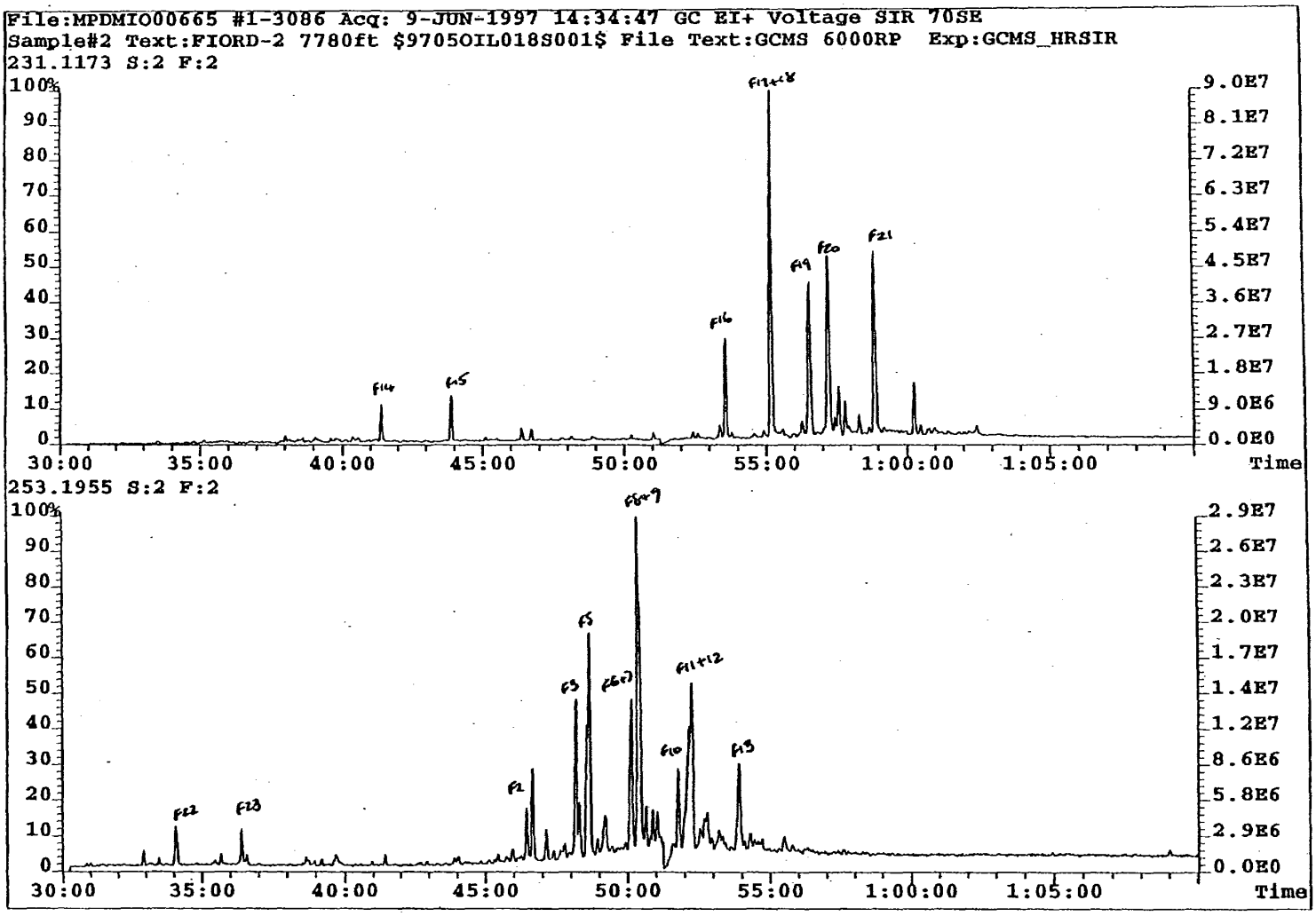
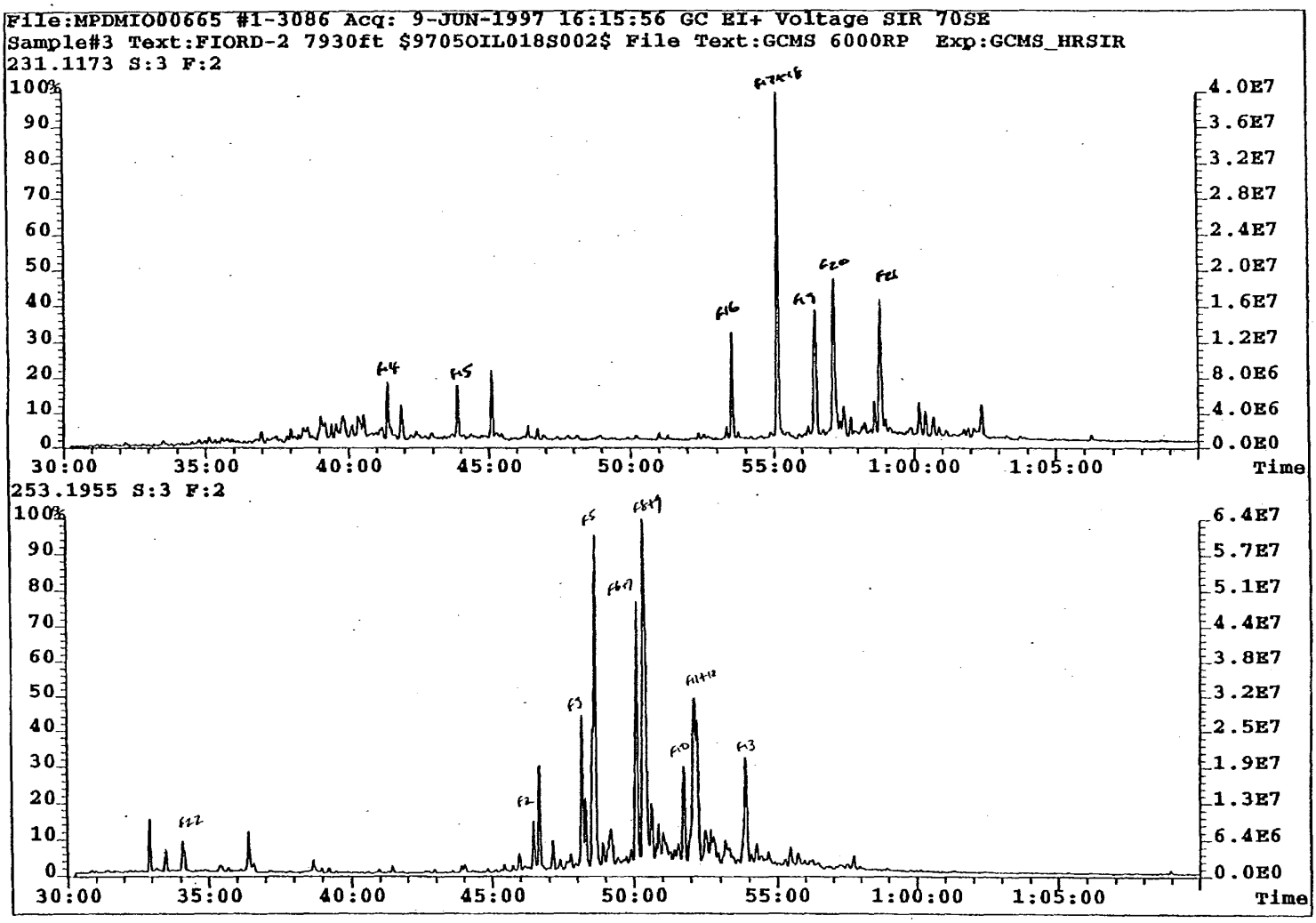
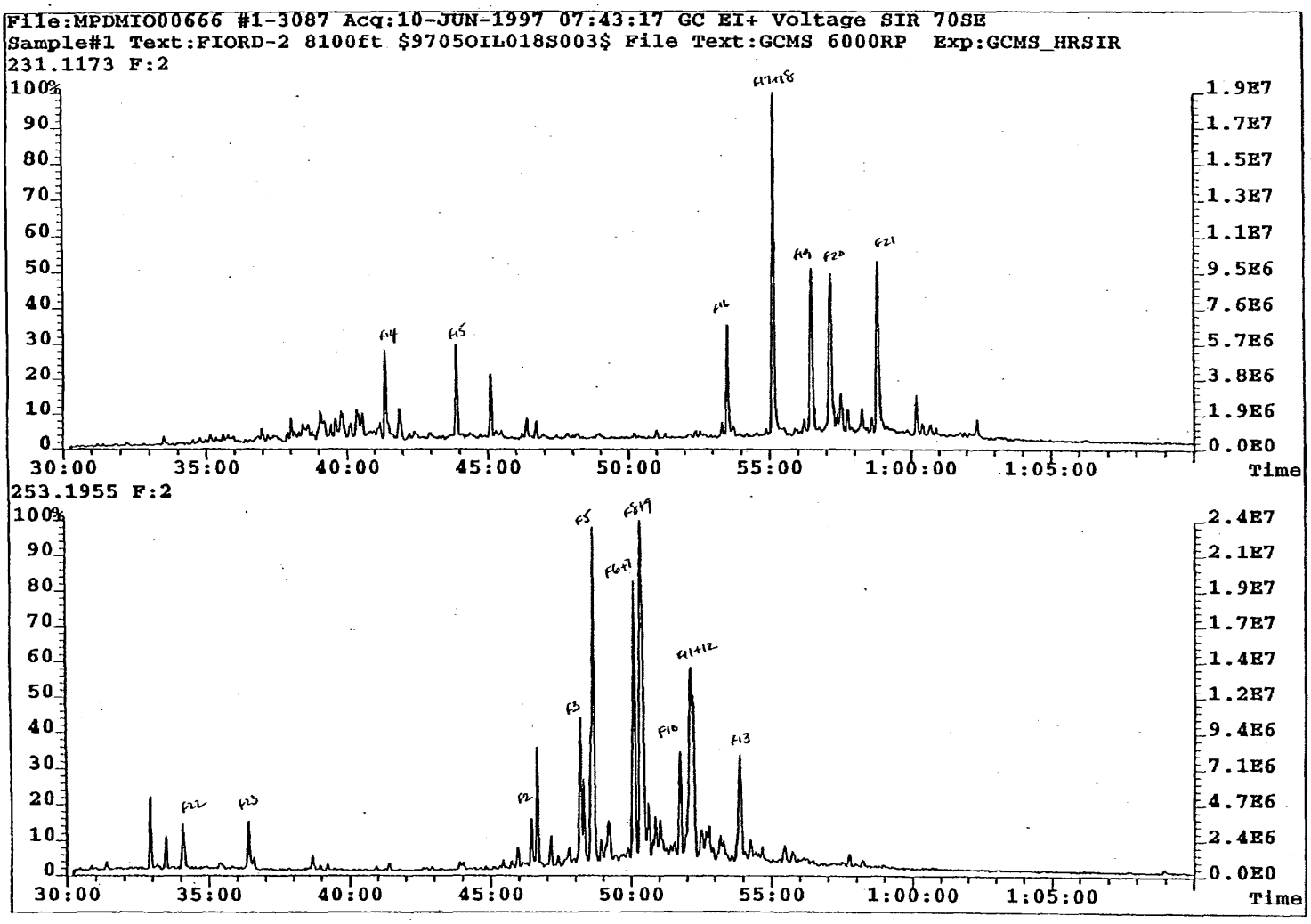
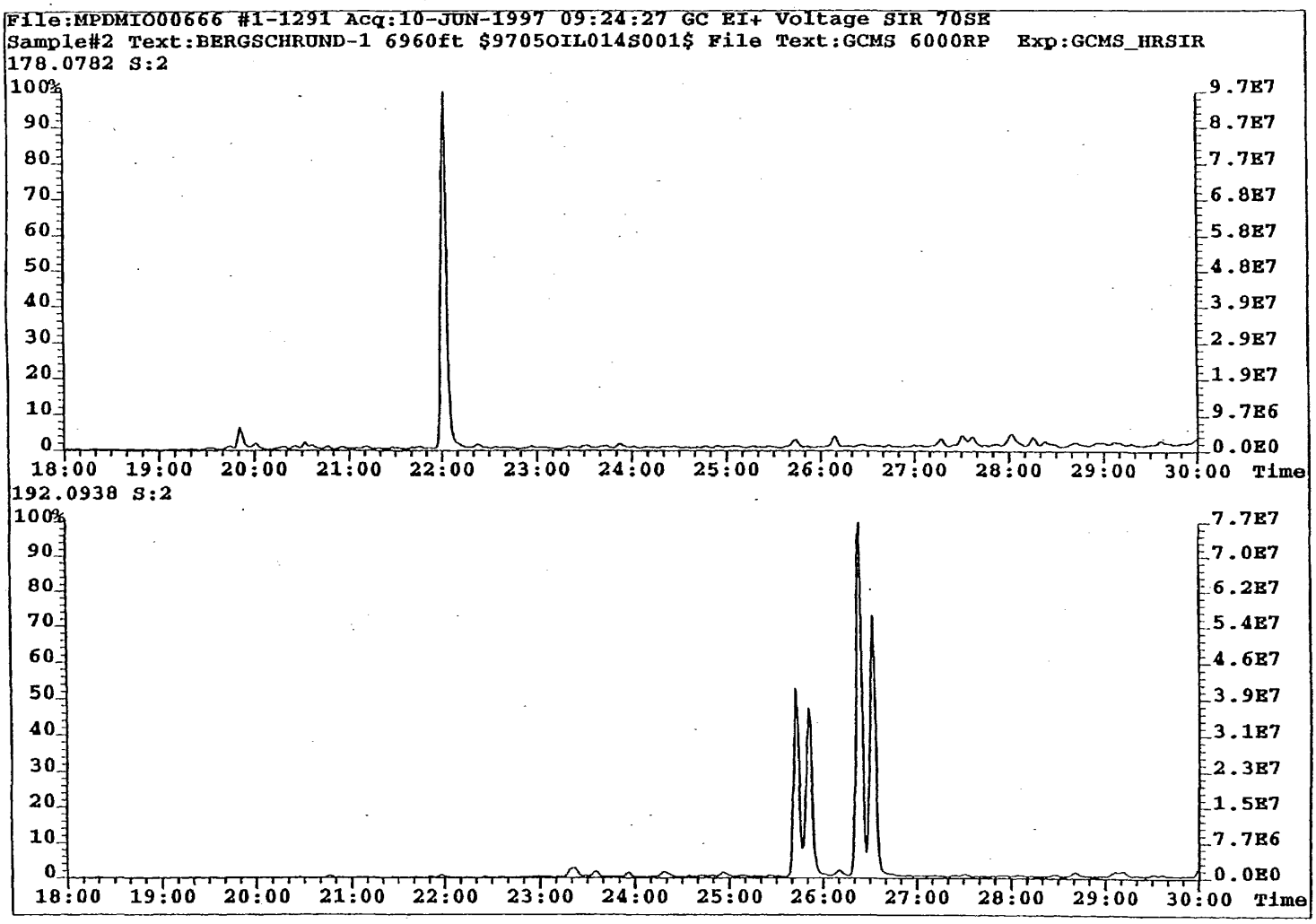

File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:4 F:2
100%
90
80
70
60
50
40
30
20
10
0
7.5E7
6.8E7
6.0E7
5.3E7
4.5E7
3.8E7
3.0E7
2.3E7
1.5E7
7.5E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:4 F:2
100%
90
80
70
60
50
40
30
20
10
0
5.9E7
5.3E7
4.7E7
4.1E7
3.5E7
3.0E7
2.4E7
1.8E7
1.2E7
5.9E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time

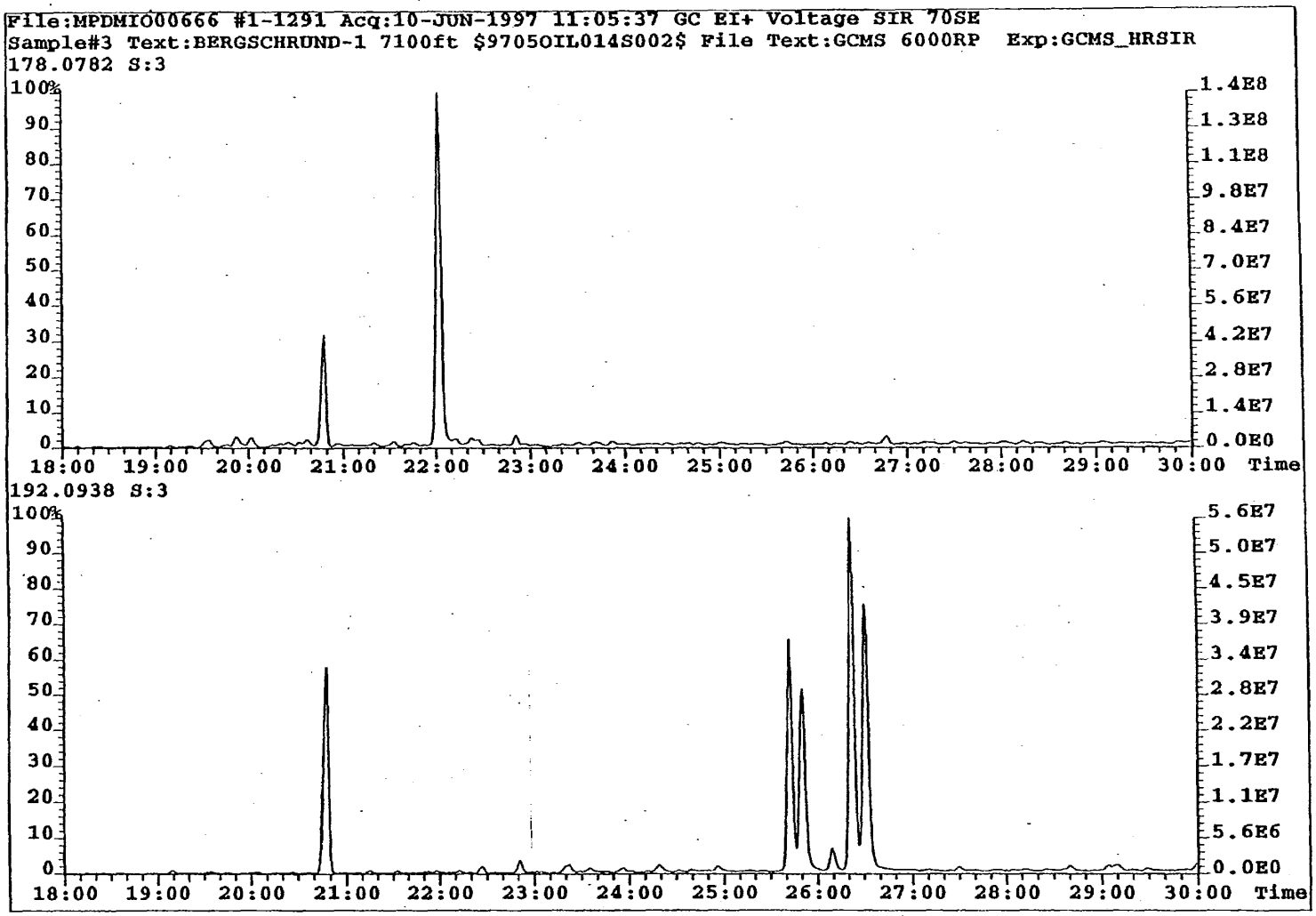
Fig 18

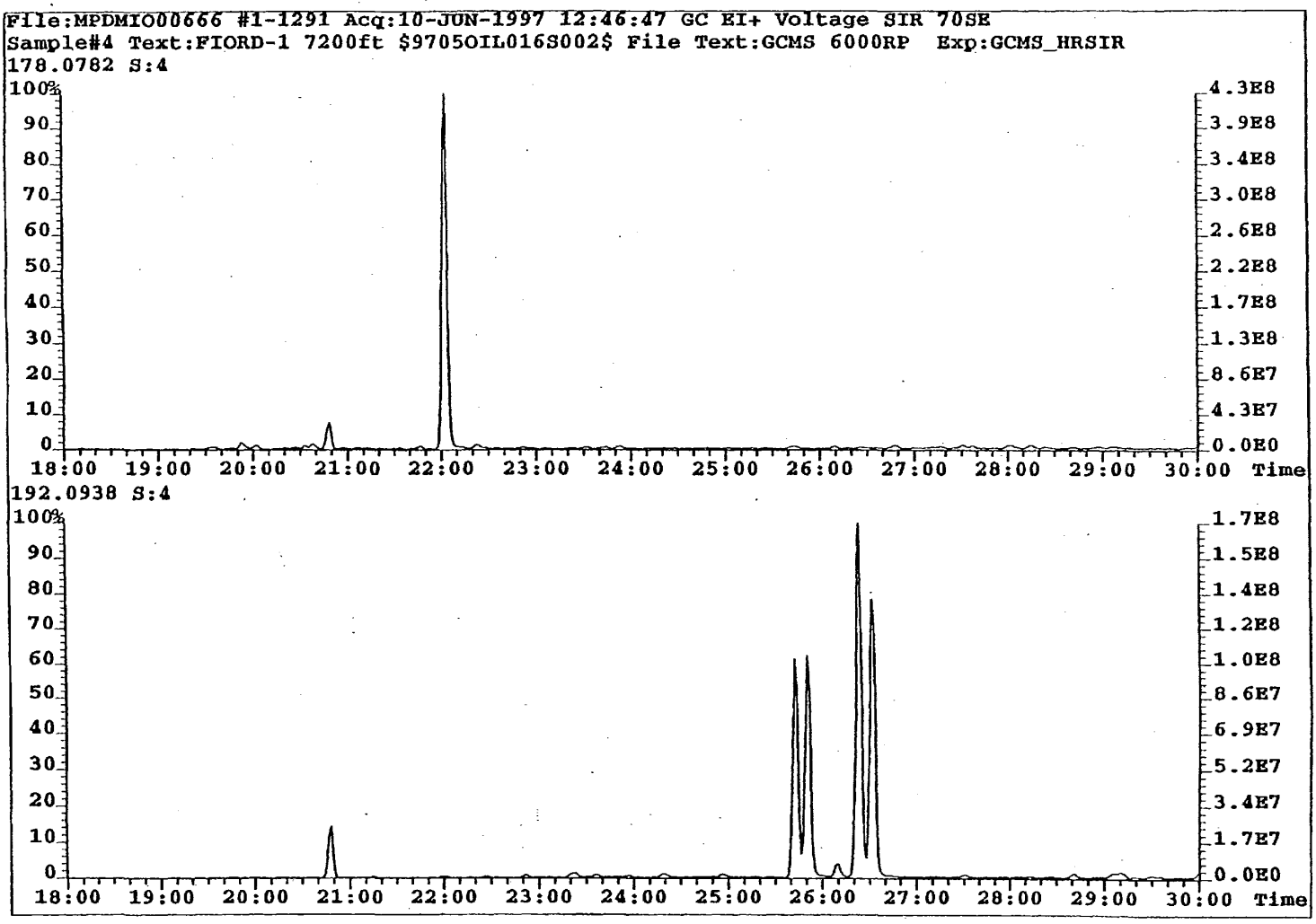

File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
9.0E7
8.1E7
7.2E7
6.3E7
5.4E7
4.5E7
3.6E7
2.7E7
1.8E7
9.0E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
F14
F15
F16
F17+18
F19
F20
F21
253.1955 S:2 F:2
100%
90
80
70
60
50
40
30
20
10
0
2.9E7
2.6E7
2.3E7
2.0E7
1.7E7
1.4E7
1.2E7
8.6E6
5.8E6
2.9E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
F22
F23
F2
F3
F5
F6+7
F8+9
F10
F11+12
F13


File:MPDMIO00665 #1-3086 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 S:3 F:2
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
8.0E6
4.0E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time
253.1955 S:3 F:2
100%
90
80
70
60
50
40
30
20
10
0
6.4E7
5.7E7
5.1E7
4.4E7
3.8E7
3.2E7
2.5E7
1.9E7
1.3E7
6.4E6
0.0E0
30:00
35:00
40:00
45:00
50:00
55:00
1:00:00
1:05:00
Time


File:MPDMIO00666 #1-3087 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
231.1173 F:2
100%
90
80
70
60
50
40
30
20
10
0
1.9E7
1.7E7
1.5E7
1.3E7
1.1E7
9.5E6
7.6E6
5.7E6
3.8E6
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
2.4E7
2.1E7
1.9E7
1.7E7
1.4E7
1.2E7
9.4E6
7.1E6
4.7E6
2.4E6
0.0E0


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:2
100%
90
80
70
60
50
40
30
20
10
0
9.7E7
8.7E7
7.7E7
6.8E7
5.8E7
4.8E7
3.9E7
2.9E7
1.9E7
9.7E6
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:2
100%
90
80
70
60
50
40
30
20
10
0
7.7E7
7.0E7
6.2E7
5.4E7
4.6E7
3.9E7
3.1E7
2.3E7
1.5E7
7.7E6
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


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:3
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
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:3
100%
90
80
70
60
50
40
30
20
10
0
5.6E7
5.0E7
4.5E7
3.9E7
3.4E7
2.8E7
2.2E7
1.7E7
1.1E7
5.6E6
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


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:4
100%
90
80
70
60
50
40
30
20
10
0
4.3E8
3.9E8
3.4E8
3.0E8
2.6E8
2.2E8
1.7E8
1.3E8
8.6E7
4.3E7
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:4
100%
90
80
70
60
50
40
30
20
10
0
1.7E8
1.5E8
1.4E8
1.2E8
1.0E8
8.6E7
6.9E7
5.2E7
3.4E7
1.7E7
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

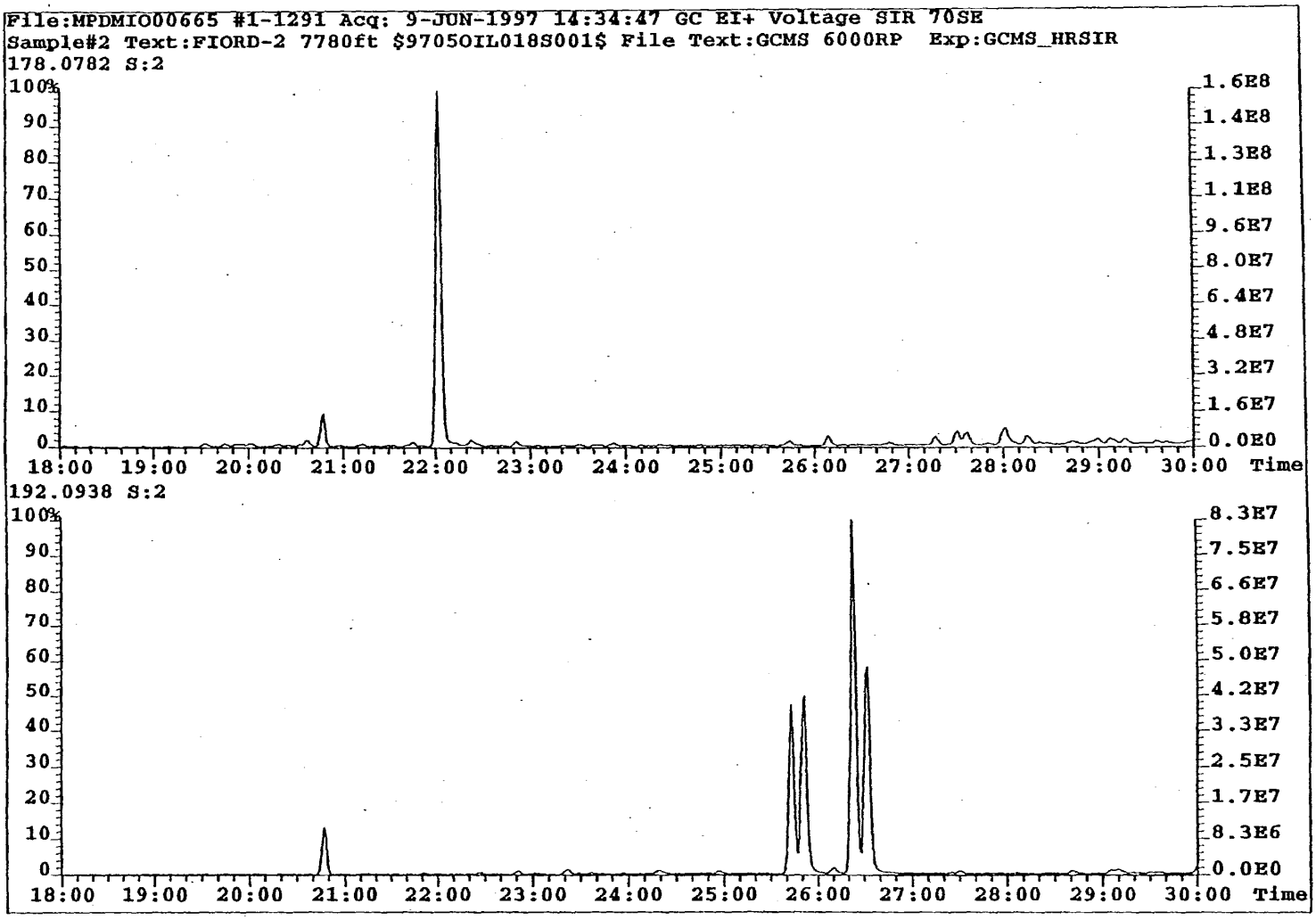

File:MPDMIO00665 #1-1291 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:2
100%
90
80
70
60
50
40
30
20
10
0
1.6E8
1.4E8
1.3E8
1.1E8
9.6E7
8.0E7
6.4E7
4.8E7
3.2E7
1.6E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:2
100%
90
80
70
60
50
40
30
20
10
0
8.3E7
7.5E7
6.6E7
5.8E7
5.0E7
4.2E7
3.3E7
2.5E7
1.7E7
8.3E6
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

Fig 22-1

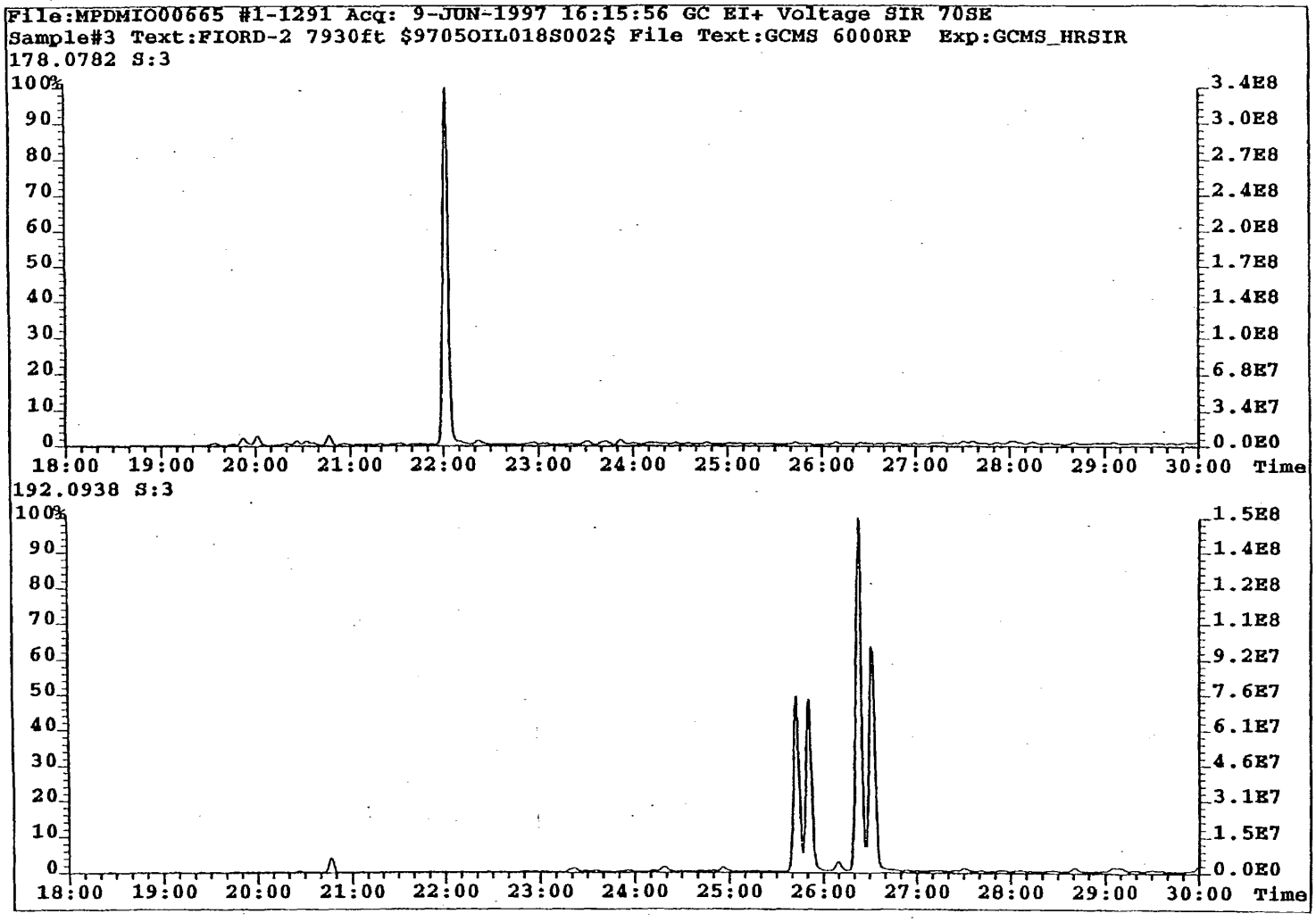

File:MPDMIO00665 #1-1291 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782 S:3
100%
90
80
70
60
50
40
30
20
10
0
3.4E8
3.0E8
2.7E8
2.4E8
2.0E8
1.7E8
1.4E8
1.0E8
6.8E7
3.4E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 24:00 25:00 26:00 27:00 28:00 29:00 30:00 Time
192.0938 S:3
100%
90
80
70
60
50
40
30
20
10
0
1.5E8
1.4E8
1.2E8
1.1E8
9.2E7
7.6E7
6.1E7
4.6E7
3.1E7
1.5E7
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

Fig 22.2

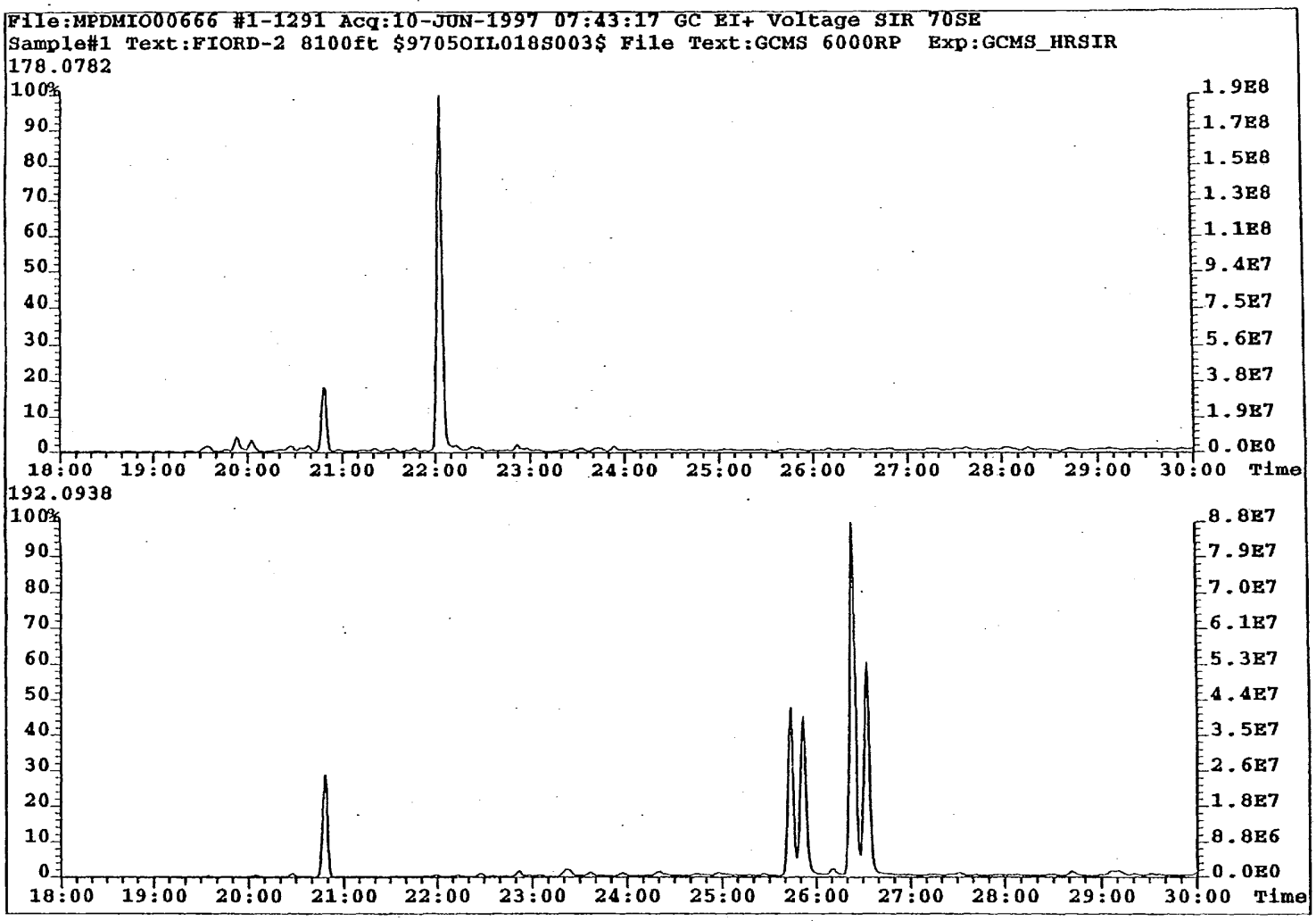
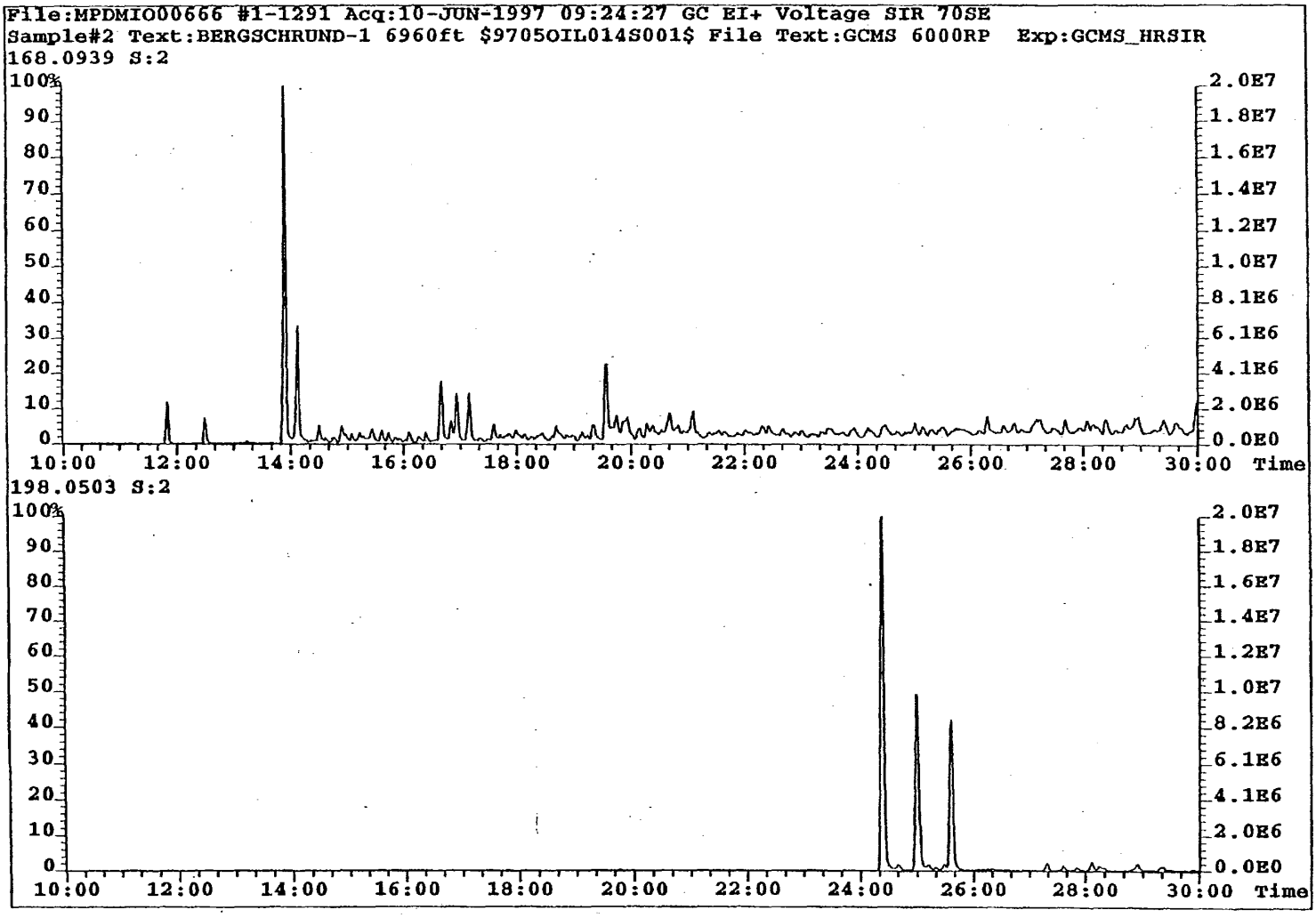
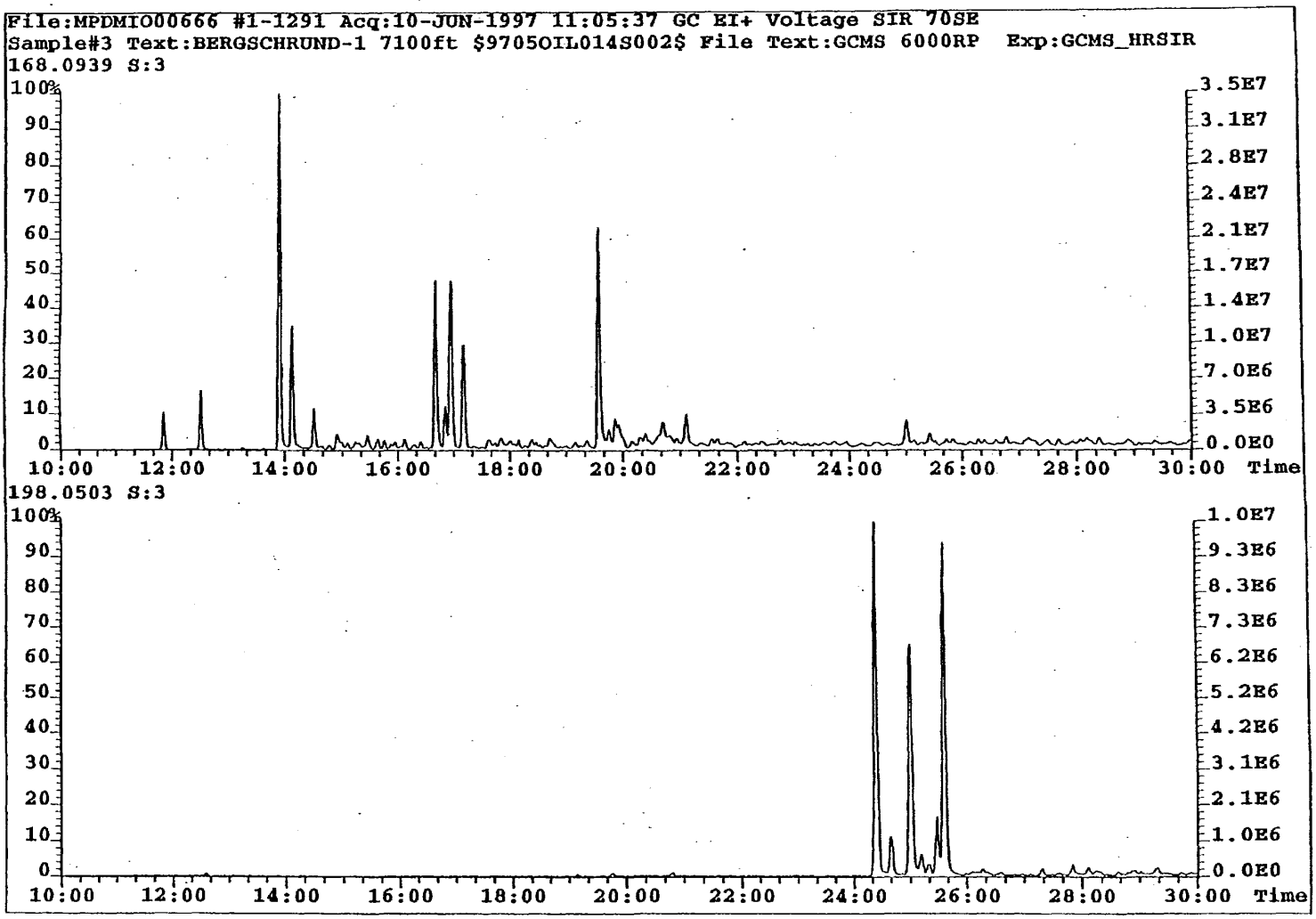

File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
178.0782
100%
90
80
70
60
50
40
30
20
10
0
1.9E8
1.7E8
1.5E8
1.3E8
1.1E8
9.4E7
7.5E7
5.6E7
3.8E7
1.9E7
0.0E0
18:00 19:00 20:00 21:00 22:00 23:00 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
8.8E7
7.9E7
7.0E7
6.1E7
5.3E7
4.4E7
3.5E7
2.6E7
1.8E7
8.8E6
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

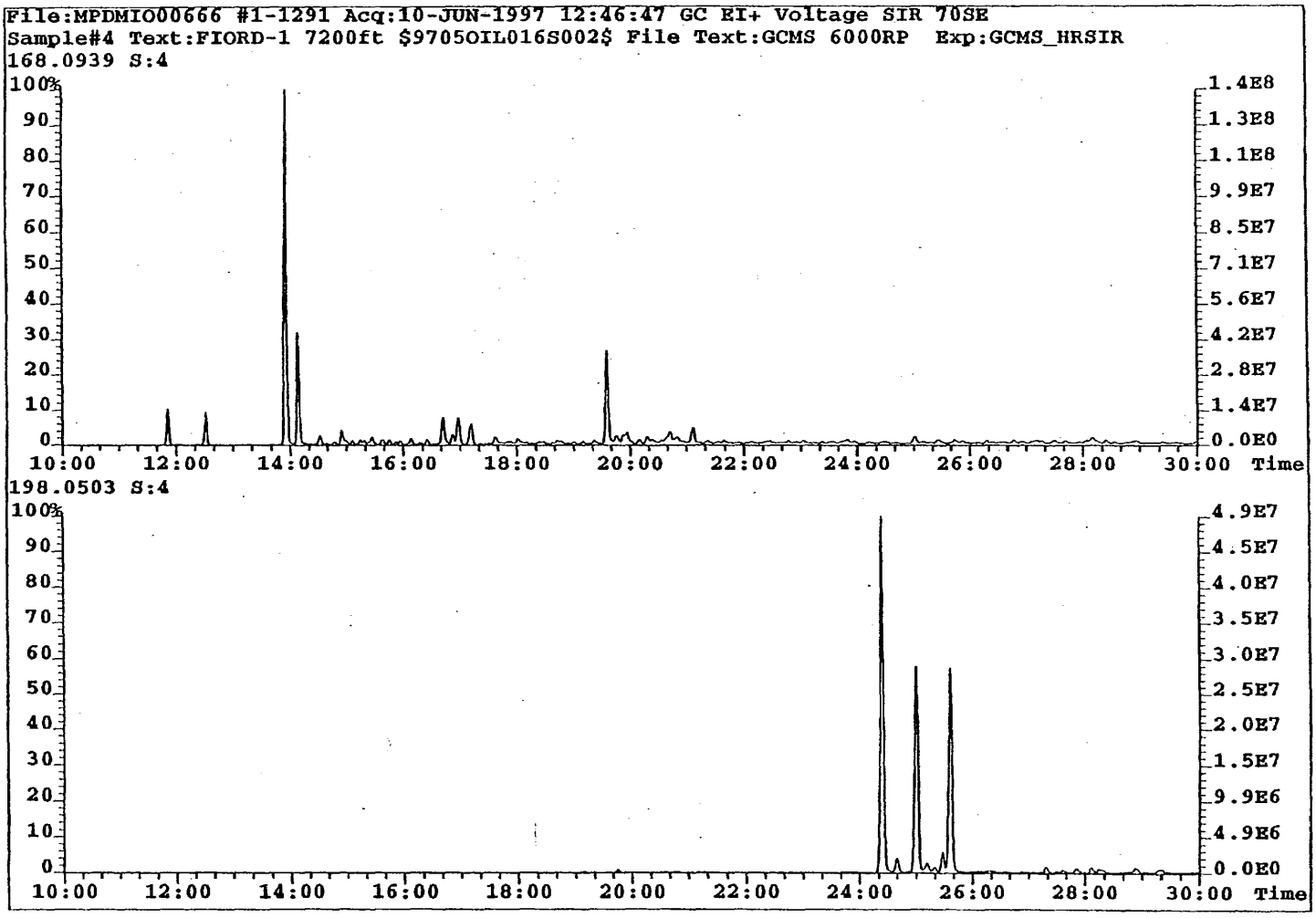
Fig 22-3


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 09:24:27 GC EI+ Voltage SIR 70SE
Sample#2 Text:BERGSCHRUND-1 6960ft $9705OIL014S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:2
100%
90
80
70
60
50
40
30
20
10
0
2.0E7
1.8E7
1.6E7
1.4E7
1.2E7
1.0E7
8.1E6
6.1E6
4.1E6
2.0E6
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:2
100%
90
80
70
60
50
40
30
20
10
0
2.0E7
1.8E7
1.6E7
1.4E7
1.2E7
1.0E7
8.2E6
6.1E6
4.1E6
2.0E6
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

23.1


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 11:05:37 GC EI+ Voltage SIR 70SE
Sample#3 Text:BERGSCHRUND-1 7100ft $9705OIL014S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:3
100%
90
80
70
60
50
40
30
20
10
0
3.5E7
3.1E7
2.8E7
2.4E7
2.1E7
1.7E7
1.4E7
1.0E7
7.0E6
3.5E6
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:3
100%
90
80
70
60
50
40
30
20
10
0
1.0E7
9.3E6
8.3E6
7.3E6
6.2E6
5.2E6
4.2E6
3.1E6
2.1E6
1.0E6
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

23.7


File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 12:46:47 GC EI+ Voltage SIR 70SE
Sample#4 Text:FIORD-1 7200ft $9705OIL016S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:4
100%
90
80
70
60
50
40
30
20
10
0
1.4E8
1.3E8
1.1E8
9.9E7
8.5E7
7.1E7
5.6E7
4.2E7
2.8E7
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:4
100%
90
80
70
60
50
40
30
20
10
0
4.9E7
4.5E7
4.0E7
3.5E7
3.0E7
2.5E7
2.0E7
1.5E7
9.9E6
4.9E6
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

24

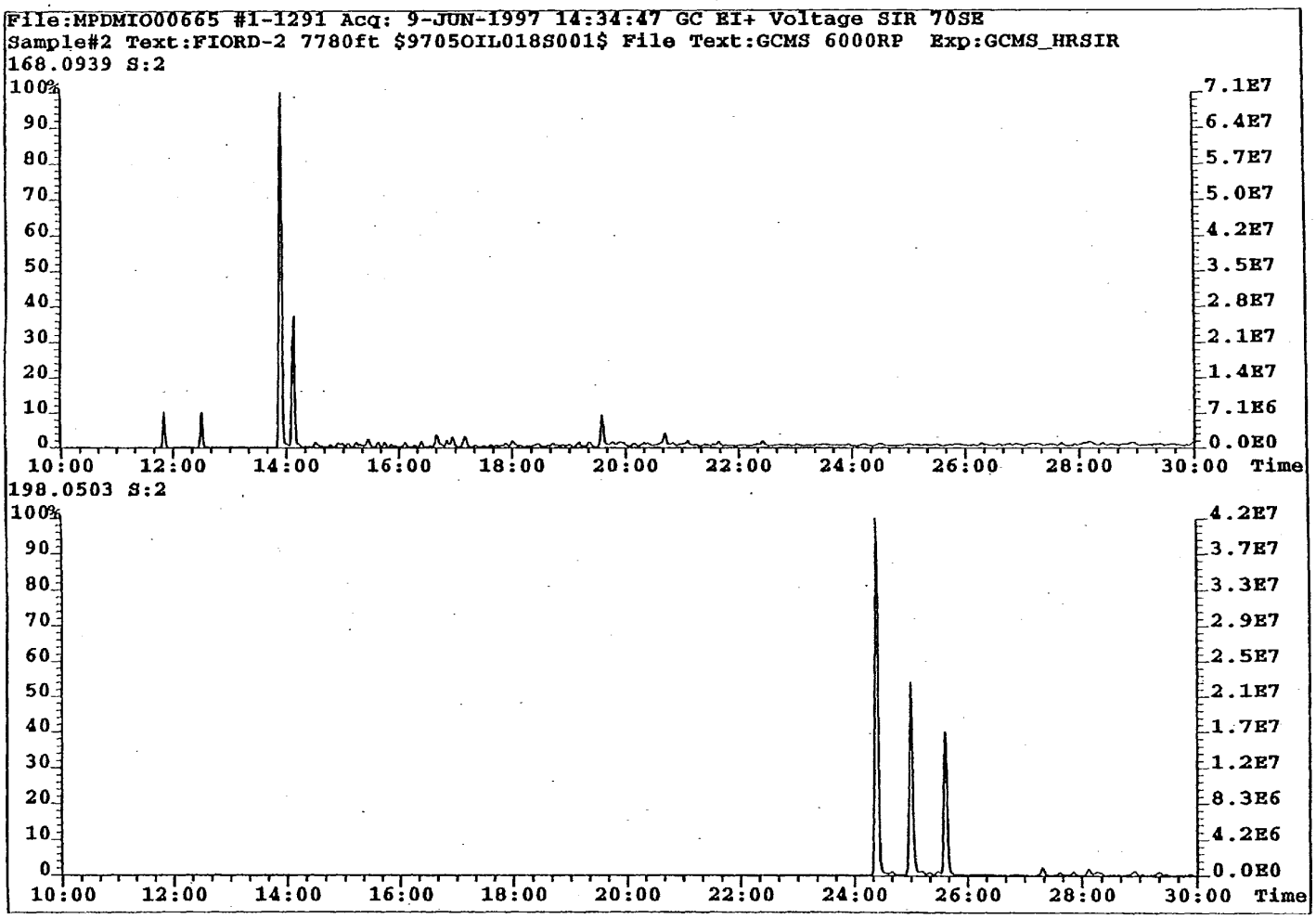

File:MPDMIO00665 #1-1291 Acq: 9-JUN-1997 14:34:47 GC EI+ Voltage SIR 70SE
Sample#2 Text:FIORD-2 7780ft $9705OIL018S001$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:2
100%
90
80
70
60
50
40
30
20
10
0
7.1E7
6.4E7
5.7E7
5.0E7
4.2E7
3.5E7
2.8E7
2.1E7
1.4E7
7.1E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:2
100%
90
80
70
60
50
40
30
20
10
0
4.2E7
3.7E7
3.3E7
2.9E7
2.5E7
2.1E7
1.7E7
1.2E7
8.3E6
4.2E6
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

Fig 25.1

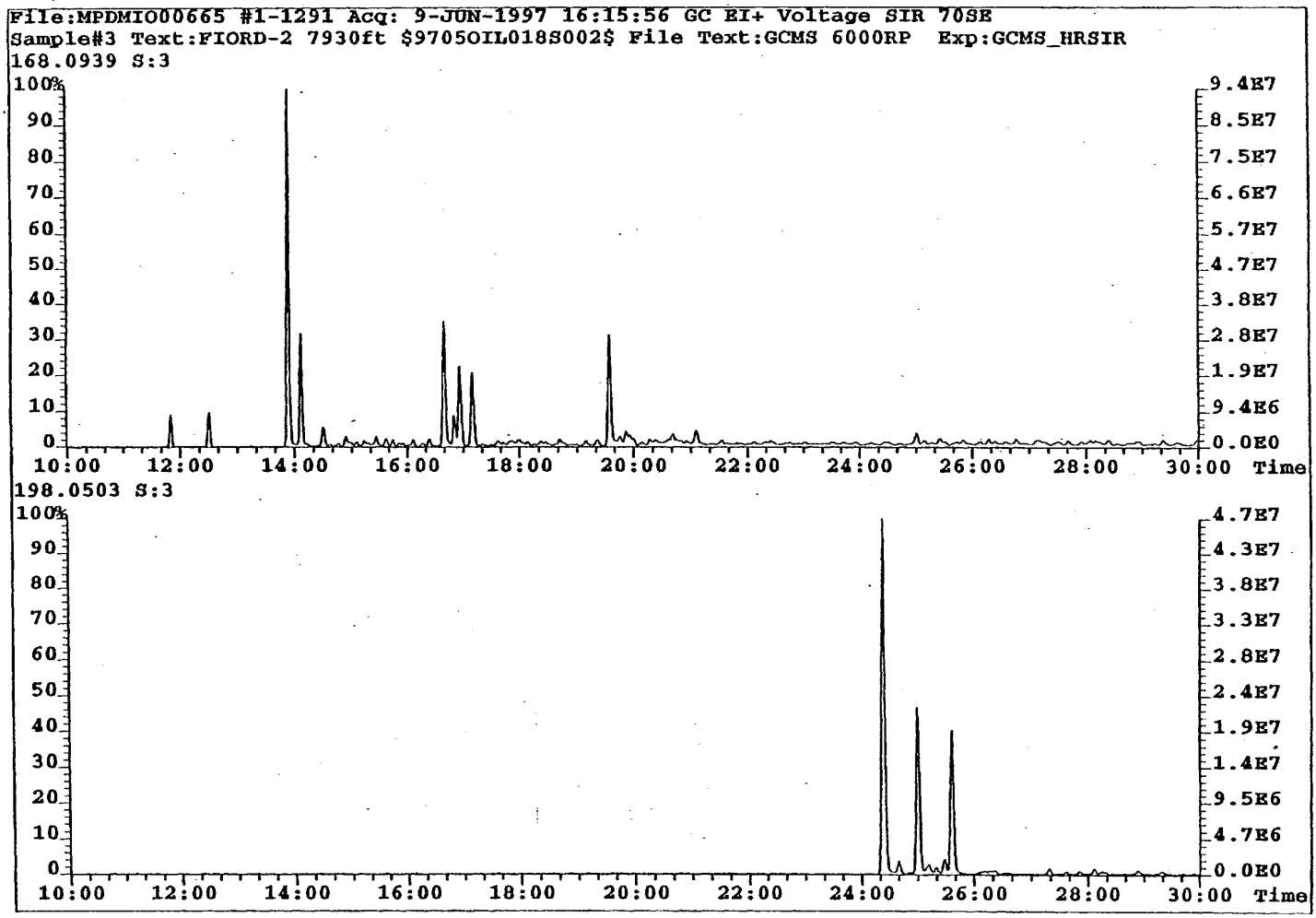

File:MPDMIO00665 #1-1291 Acq: 9-JUN-1997 16:15:56 GC EI+ Voltage SIR 70SE
Sample#3 Text:FIORD-2 7930ft $9705OIL018S002$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939 S:3
100%
90
80
70
60
50
40
30
20
10
0
9.4E7
8.5E7
7.5E7
6.6E7
5.7E7
4.7E7
3.8E7
2.8E7
1.9E7
9.4E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503 S:3
100%
90
80
70
60
50
40
30
20
10
0
4.7E7
4.3E7
3.8E7
3.3E7
2.8E7
2.4E7
1.9E7
1.4E7
9.5E6
4.7E6
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

Fig 2.5.2

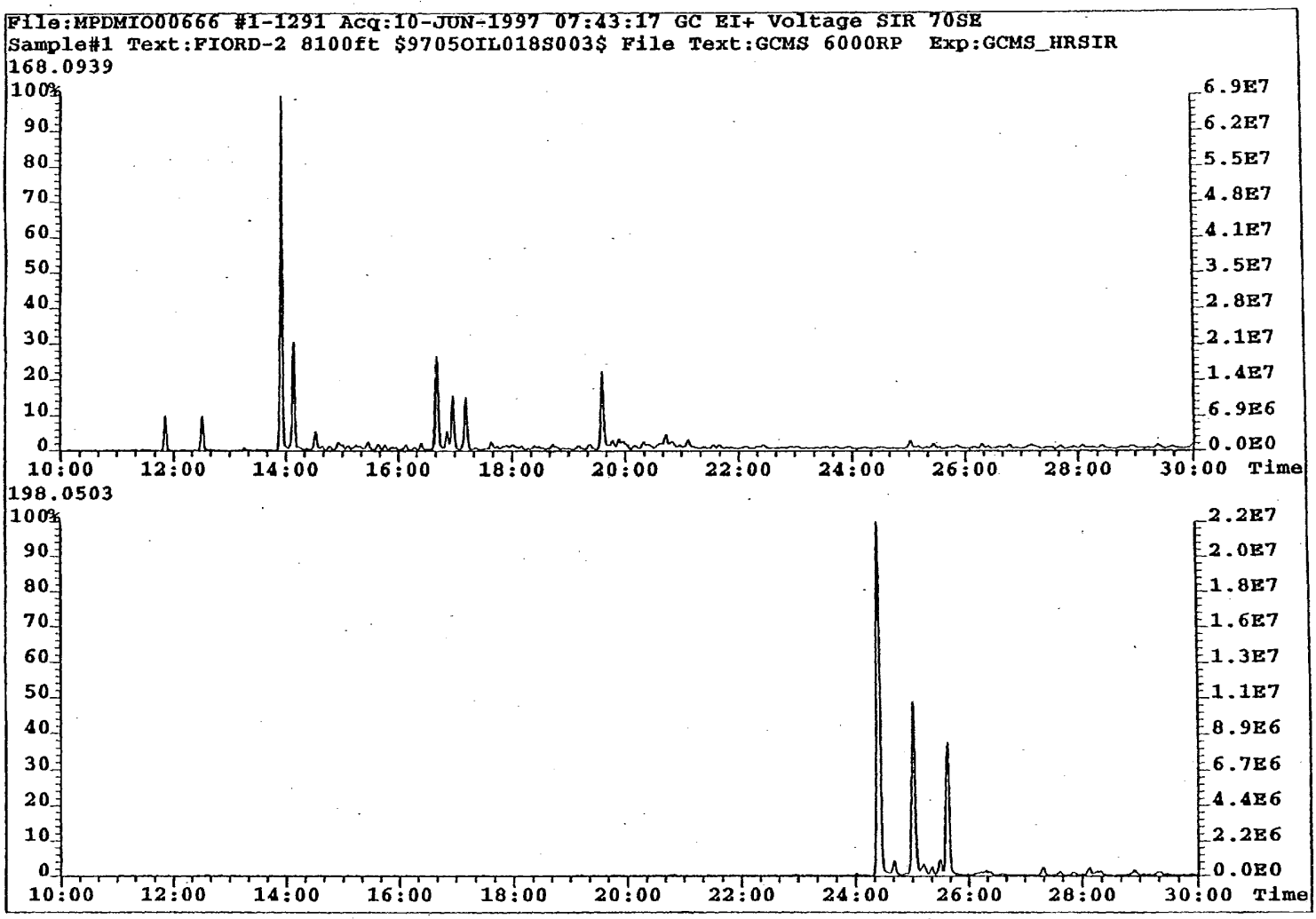

File:MPDMIO00666 #1-1291 Acq:10-JUN-1997 07:43:17 GC EI+ Voltage SIR 70SE
Sample#1 Text:FIORD-2 8100ft $9705OIL018S003$ File Text:GCMS 6000RP Exp:GCMS_HRSIR
168.0939
100%
90
80
70
60
50
40
30
20
10
0
6.9E7
6.2E7
5.5E7
4.8E7
4.1E7
3.5E7
2.8E7
2.1E7
1.4E7
6.9E6
0.0E0
10:00
12:00
14:00
16:00
18:00
20:00
22:00
24:00
26:00
28:00
30:00
Time
198.0503
100%
90
80
70
60
50
40
30
20
10
0
2.2E7
2.0E7
1.8E7
1.6E7
1.3E7
1.1E7
8.9E6
6.7E6
4.4E6
2.2E6
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

Fig 25-3

## MOLECULAR PARAMETER LIST

| BP CODE | PARAMETER | USE/NOTE |
|---|---|---|
| H1 | $C_{32}$ HOPANE 22S/(22S+22R) | M |
| H2 | $C_{31}$ HOPANE 22S/(22S+22R) | M 1 |
| H3 | $C_{30}$ HOPANE/($C_{30}$ HOPANE+$C_{30}$ MORETANE) | MS |
| H4 | ββ HOPANES PRESENT/ABSENT | M |
| H5 | $C_{30}$:$C_{31}$:$C_{32}$:$C_{33}$:$C_{34}$:$C_{35}$ HOPANE DISTRIBUTION | S |
| H6 | $C_{27}$ HOPANES $T_s$/($T_s$+$T_m$) | MS |
| H7 | $C_{33}$ HOPANE 22S/(22S+22R) | M |
| H8 | $C_{34}$ HOPANE 22S/(22S+22R) | M |
| H9 | $C_{35}$ HOPANE 22S/(22S+22R) | M |
| H10 | RESIN DITERPANES % RELATIVE TO $C_{30}$ HOPANE (PEAK G) | S |
| H11 | $C_{23}$ EXT TRICYCLIC TERPANE % RELATIVE TO $C_{30}$ HOPANE (PEAK G) | S |
| H12 | $C_{24}$ TETRACYCLIC TERPANE % RELATIVE TO $C_{30}$ HOPANE (PEAK G) | S |
| H13 | 28,30 BISNORHOPANE (PEAK X) % RELATIVE TO $C_{30}$ HOPANE (PEAK G) | S |
| H14 | 17a(H),15a(Me)-27-NORHOPANE (PEAK PI)% TO $C_{30}$ HOPANE (PEAK G) | S |
| H15 | OLEANANE % RELATIVE TO $C_{30}$ HOPANE (PEAK G) | S |
| H16 | GAMMACERANE % RELATIVE TO (PEAK G) | S |
| H17 | HOPANES $C_{35}$/($C_{34}$+$C_{35}$) % | S |
| | | |
| S1 | $C_{29}$ ααα STERANES 20S/(20S+20R) | M |
| S2 | $C_{29}$ STERANES αββ/(αββ+ααα) | M 2 |
| S3 | STERANES ααα $C_{27}$:$C_{28}$:$C_{29}$ | S |
| S4 | STERANES αββ $C_{27}$:$C_{28}$:$C_{29}$ | S |
| S5 | βα DIASTERANES/(SAME+ααα+αββ STERANES) % | SM 3 |
| S6 | LOW MOLECULAR WEIGHT STERANES RELATIVE TO $C_{29}$ STERANES | S |
| S7 | STERANE INDEX $C_{27}$/($C_{27}$+$C_{29}$) % (FROM S3) | S |
| S8 | 4-ME $C_{30}$ STERANE % RELATIVE TO $C_{29}$ 20R ααα STERANE (PEAK 42) | S 4 |
| S9 | 4-ME STERANES INDEX $C_{28}$/($C_{28}$+$C_{30}$) % | S 5 |
| S10 | BICADINANES PRESENT/ABSENT | S |
| | | |
| A1 | $C_{28}$ 20R TRIAROM. STERANE/(SAME+$C_{29}$ 20R MONOAROM. STERANE) | M 6 |
| A2 | SUM TRIAROM. STERANES/(SAME+SUM MONOAROM. STERANES) | M |
| A3 | $C_{20}$ TRIAROM. STERANE/(SAME+$C_{28}$ 20R TRIAROM. STERANE) | M |
| A4 | $C_{20}$+$C_{21}$ TRIAROM. STERANE/(SAME+SUM $C_{26}$-$C_{28}$ TRIAROM. STERANES) | M |
| A5 | $C_{26}$ 20S TRIAROM. STERANE/$C_{28}$ 20S TRIAROM. STERANE | S |
| A6 | $C_{27}$ 20R TRIAROM. STERANE/$C_{28}$ 20R TRIAROM. STERANE | S |
| | | |
| M2 | PHENANTHRENES (3ME+2ME)/(9ME+1ME) | M 7 |
| M3 | MPI [(3ME+2ME)/(PHENANTHRENE+9ME+1ME)] * 1.5 | M 7 |
| MBP | 3-METHYL BIPHENYL/2-METHYL BIPHENYL | M |
| MDR | 4-METHYLDIBENZOTHIOPHENE/1-METHYLDIBENZOTHIOPHENE | M |
| M4 | SUM $C_{27}$-$C_{35}$ HOPANES/(SAME+ SUM $C_{27}$-$C_{29}$ STERANES) % | S 8 |
| | | |
| ALKIND | ALKANE INDEX n-$C_{17}$/(n-$C_{17}$+n-$C_{27}$) % | S |
| R22 | R22 INDEX (2 * n-$C_{22}$)/(n-$C_{21}$+n-$C_{23}$) | SM |

NOTES:

| | |
|---|---|
| 1 | m/z 205 |
| 2 | αββ m/z218, aaa m/z217 |
| 3 | $C_{27}$'s backcalculated using S1, S2 and S3 |
| 4 | m/z217 |
| 5 | m/z 231 |
| 6 | Corrected as in Mackenzie, 1980 PhD. |
| 7 | Corrected for response factores, i.e. equivalent to GC measurement |
| 8 | From m/z 191 and m/z 217 |

S=SOURCE PARAMETER, M=MATURITY PARAMETER.
TRIAROM. STERANE=MONOMETHYL TRIAROMATIC STERANES
MONOAROM. STERANE=DIMETHYL MONOAROMATIC STERANES.

(25/04/94)

## BIOMARKER IDENTIFICATION - PENTACYCLIC HYDROCARBONS

| BPCODE | TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 191) |
|---|---|
| I | 9-DODECYLPERHYDROANTHRACENE [INTERNAL STANDARD] |
| $T_s$ | 18α(H)-22,29,30-TRISNORNEOHOPANE |
| $T_m$ | 17α(H)-22,29,30-TRISNORHOPANE |
| Q | 17β(H)-22,29,30-TRISNORHOPANE |
| W | 17α(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

| BP 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)

| BP 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

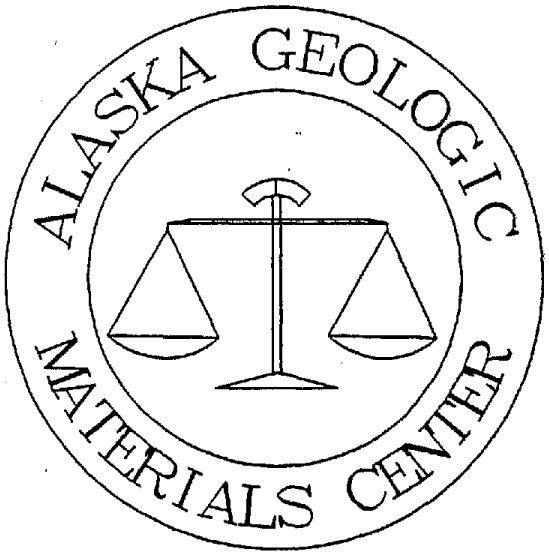
| BP CODE | TENTATIVE ASSIGNMENT BASED ON MASS SPECTROMETRY (m/e 177) |
|---|---|
| W | 17α(H)-25,30-BISNORHOPANE |
| Y | 17α(H)-25-NORHOPANE |
| D | 17α(H),21β(H)-30-NORHOPANE |
| C1 | (22S)-17α(H)-25-NOR-30-METHYLHOPANE |
| G | 17α(H),21β(H)HOPANE |
| C2 | (22R)-17α(H)-25-NOR-30-METHYLHOPANE |
| C3 | (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 |

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

ARCO Alaska Inc. Bergschrund No. 1 (6,520' - 6,600')

ARCO Alaska Inc. Fiord No. 1 (6,560' - 6,720')

ARCO Alaska Inc. Fiord No. 2 (7,520' - 7,620').

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