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August 7, 1998

Ms. Tina Berry
Tosco Marketing Company
2000 Crow Canyon, Suite 400
San Ramon, CA 94583

Re: Unocal #7376 - 4191 First Street, Pleasanton, California

Dear Ms. Berry:

I have examined the analytical data derived from the chemical analysis of two soil samples. Several different analytical procedures were used to derive the information needed for interpretation.

The samples were first extracted with carbon disulfide and an aliquot of the extract was injected into a gas chromatograph with an FID detector calibrated to measure the amount and time of elution of a series of n-alkanes at various elution times. This is known as a Simulated Distillation Method developed by ASTM. The curves showed that there is a small amount of volatile components and a larger proportion of semi-volatile and high boiling components, with final boiling temperatures exceeding 1300°F. Based on the curves generated by this method, it is evident that sample B-11-10.5 has a dominantly higher boiling point than sample B-11-61 (see Figure 1).

Because of the presence of a low boiling point components, the soil samples were tested for the presence of gasoline range hydrocarbons using a purge and trap coupled to a gas chromatograph with an FID detector. The results shown in Tables 1 and 2 and the attached chromatograms demonstrate that the low boiling fuel component is a low octane (regular) gasoline. Sample B-11-61 appears to show very little weathering, whereas sample B-11-10.5 is more weathered. This latter sample is highly concentrated in the BTEX hydrocarbons, which constitute about 54% of the total light end composition. This finding suggests that the volatile fuel component appears to constitute a mixture of gasoline and refined aromatics.

Evidence for the presence of a relatively recently released gasoline (post-1987) comes from the presence of MTBE in both sample B-11-61 and sample B-11-10.5. The latter sample contains about ten times higher concentration than B-11-61 (i.e., 2520 versus 228 μg/kg, see Table 3).

Another portion of soil was extracted with methylene chloride and the extracts were analyzed using gas chromatography. The results of analyses are shown in Figures 2-4 and a reference diesel chromatogram is shown in Figure 5. The chromatograms (in duplicate) for sample B-11-61 (Figures 2 and 3) illustrates a highly weathered mid-range to high boiling hydrocarbon component. The individual peaks represent iso-alkanes with no n-alkanes (n-paraffins) present. The gas chromatogram for sample extract B-11-10.5 (Figure 4) demonstrates a very severely weathered component with no recognizable individual peaks (except the internal standard).

To confirm the composition of the soil extracts, they were further analyzed by GC-mass spectrometry. The data shown in the package labeled Figures 6 plus are the mass chromatograms generated at different ion fragments. The data show that sample B-11-61 has a wide range of hydrocarbons from about C_{10} to $>C_{20}$. It has a suite of iso-alkanes, methylcyclohexanes, C_4-alkylbenzenes, terpanes and steranes all characteristic of a wide-carbon-range petroleum product. This wide range is also visible from the distribution pattern in the bar diagram displaying the PAH compounds. This pattern is indicative of a weathered crude oil. Present in only trace amounts in the PAH measurements are the "pyrogenic" hydrocarbons. This argues against the petroleum derivative being a refined product, such as heating oil #6 or Bunker C oil. Sample B-11-10.5 has almost no recognizable hydrocarbons remaining, with the exception of the highly resistant terpanes and steranes. Among the polynuclear aromatic hydrocarbons, the monoaromatic- and triaromatic steranes dominate with only very small amounts of other PAH compounds. This attests to the state of degradation of the hydrocarbon suite. Because of the state of degradation of the hydrocarbons in sample B-11-10.5 it is more difficult to assign a fuel origin, however, the lack of "pyrogenic" PAH compounds in this sample also suggests that it is a crude oil.

To summarize, hydrocarbons in the soil represent a mixture of about 10% gasoline and 90% semi-volatile and high boiling components identified as crude oil. Whereas the gasoline fraction is not highly weathered, the crude oil fraction varies from highly weathered (B-11-61) to very severely weathered (B-11-10.5).

Sincerely,

Isaac Kaplan

Isaac Kaplan, Ph.D.
President

A4483-report.wpd

TABLES

Table 1

Detailed Gasoline Range (C3-C10) Hydrocarbon Analysis for two soil samples submitted by Unocal

(relative %)

	Sample	B-11-61	B-11-61	B-11-10.5
GGC ID		4483-1	4483-1D	4483-2
1	Propane	0.01	0.01	0.05
2	Isobutane	0.17	0.19	0.05
3	Isobutene			0.04
4	Butane/Methanol	0.48	0.53	
5	trans-2-Butene			
6	cis-2-Butene	0.03	0.03	
7	3-Methyl-1-butene	0.04	0.04	
8	Isopentane	4.06	4.39	0.34
9	1-Pentene	0.18	0.18	
10	2-Methyl-1-butene	0.13	0.14	0.02
11	Pentane	1.95	2.03	0.17
12	trans-2-Pentene	0.42	0.46	0.03
13	cis-2-Pentene/t-Butanol	0.18	0.19	
14	2-Methyl-2-butene	0.62	0.66	0.28
15	2,2-Dimethylbutane	0.13	0.13	0.05
16	Cyclopentane	0.18	0.18	0.01
17	2,3-Dimethylbutane/MTBE	1.39	1.45	4.09
18	2-Methylpentane	4.12	4.26	1.38
19	3-Methylpentane	2.54	2.62	1.03
20	Hexane	2.59	2.67	1.03
21	trans-2-Hexene	0.42	0.43	0.06
22	3-Methylcyclopentene	0.46	0.48	0.63
23	3-Methyl-2-pentene	0.33	0.31	0.10
24	cis-2-Hexene	0.45	0.46	0.67
25	3-Methyl-trans-2-pentene	0.07	0.07	0.05
26	Methylcyclopentane	4.30	4.35	4.47
27	2,4-Dimethylpentane	0.94	1.01	0.68
28	Benzene	1.50	1.60	28.18
29	5-Methyl-1-hexene	0.21	0.21	0.21
30	Cyclohexane	1.60	1.61	2.26
31	2-Methylhexane/TAME	2.35	2.47	1.69
32	2,3-Dimethylpentane	1.41	1.50	1.47
33	3-Methylhexane	2.54	2.68	2.32
34	2-Methyl-1-hexene	1.77	1.82	1.60
35	2,2,4-Trimethylpentane	2.73	3.00	1.85
IS1	α,α,α-Trifluorotoluene			
36	n-Heptane	2.51	2.62	2.24
37	Methylcyclohexane	4.63	4.49	4.27
38	2,5-Dimethylhexane	1.31	1.37	1.34
39	2,4-Dimethylhexane	0.92	0.99	0.84
40	2,3,4-Trimethylpentane	2.00	2.06	2.35
41	Toluene	13.69	13.60	11.63
42	2,3-Dimethylhexane	0.59	0.62	0.57

Table 1 (cont)

Detailed Gasoline Range (C3-C10) Hydrocarbon Analysis for two soil samples submitted by Unocal

(relative %)

	Sample	B-11-61	B-11-61	B-11-10.5
	GGC ID	4483-1	4483-1D	4483-2
43	2-Methylheptane	1.32	1.18	0.82
44	4-Methylheptane	0.42	0.45	0.35
45	3,4-Dimethylhexane	0.23	0.24	0.20
46	3-Ethyl-3-methylpentane	1.22	1.30	0.98
47	3-Methylheptane	0.24	0.25	0.22
48	2-Methyl-1-heptene	0.57	0.59	0.27
49	n-Octane	1.03	1.09	0.56
50	2,2-Dimethylheptane	0.20	0.21	0.05
51	2,4-Dimethylheptane	0.19	0.19	0.04
52	Ethylcyclohexane	0.32	0.31	0.06
53	2,6-Dimethylheptane	0.19	0.20	0.07
54	Ethylbenzene	4.11	3.80	4.49
55	m + p Xylenes	9.93	9.00	11.03
56	4-Methyloctane	0.26	0.26	0.08
57	2-Methyloctane	0.42	0.43	0.08
58	3-Ethylheptane	0.51	0.52	0.08
59	3-Methyloctane	0.22	0.22	0.04
60	o-Xylene	3.76	3.39	1.91
61	1-Nonene			
62	n-Nonane	0.36	0.36	0.02
IS2	p-Bromofluorobenzene			
63	Isopropylbenzene	0.30	0.27	0.11
64	3,3,5-Trimethylheptane	0.03	0.03	
65	2,4,5-Trimethylheptane	0.23	0.22	
66	n-Propylbenzene	0.72	0.69	0.11
67	1-Methyl-3-ethylbenzene	1.75	1.63	0.16
68	1-Methyl-4-ethylbenzene	0.78	0.72	0.11
69	1,3,5-Trimethylbenzene	0.61	0.58	
70	3,3,4-Trimethylheptane	0.18	0.17	
71	1-Methyl-2-ethylbenzene	0.63	0.59	0.03
72	3-Methylnonane	0.15	0.15	
73	1,2,4-Trimethylbenzene	1.51	1.40	
74	Isobutylbenzene	0.12	0.13	
75	sec-Butylbenzene	0.09	0.09	
76	n-Decane	0.12	0.12	0.05
77	1,2,3-Trimethylbenzene	0.34	0.35	
78	Indan	0.40	0.40	0.01
79	1,3-Diethylbenzene	0.14	0.13	
80	1,4-Diethylbenzene	0.08	0.08	

Table 1 (cont)

Detailed Gasoline Range (C3-C10) Hydrocarbon Analysis for two soil samples submitted by Unocal

(relative %)

Sample		B-11-61	B-11-61	B-11-10.5
GGC ID		4483-1	4483-1D	4483-2
81	n-Butylbenzene	0.08	0.07	
82	1,3-Dimethyl-5-ethylbenzene	0.04	0.04	
83	1,4-Dimethyl-2-ethylbenzene	0.05	0.05	
84	1,3-Dimethyl-4-ethylbenzene	0.06	0.07	
85	1,2-Dimethyl-4-ethylbenzene	0.04	0.04	
86	Undecene			
87	1,2,4,5-Tetramethylbenzene			
88	1,2,3,5-Tetramethylbenzene			
89	1,2,3,4-Tetramethylbenzene	0.08	0.09	
90	Naphthalene			
91	2-Methyl-naphthalene			
92	1-Methyl-naphthalene			

Table 2

Degradation ratios and bulk composition calculated from the gasoline range (C3-C10) analysis for two soil samples submitted by Unocal

Sample	B-11-61	B-11-61	B-11-10.5
GGC ID	4483-1	4483-1D	4483-2
Evaporation			
n-Pentane/n-Heptane	0.78	0.77	0.08
2-Methylpentane/2-Methylheptane	3.12	3.62	1.68
Waterwashing			
Benzene/Cyclohexane	0.93	1.00	12.46
Toluene/Methylcyclohexane	2.96	3.03	2.73
Aromatics/Total Paraffins(n+iso+cyc)	0.71	0.65	1.40
Aromatics/Naphthenes	3.42	3.28	4.83
Biodegradation			
(C4-C8 Para+Isopara)/C4-C8 Olefins	7.38	7.49	7.20
3-Methylhexane/n-Heptane	1.01	1.02	1.04
Methylcyclohexane/n-Heptane	1.84	1.71	1.91
Isoparaffins+Naphthenes/Paraffins	4.88	4.85	8.28
Octane rating			
2,2,4-Trimethylpentane/Methylcyclohexane	0.59	0.67	0.43
Relative percentages - Bulk hydrocarbon composition as PIANO			
% Paraffinic	9.35	9.71	4.31
% Isoparaffinic	34.28	35.78	24.13
% Aromatic	38.95	36.98	55.85
% Naphthenic	11.38	11.28	11.57
% Olefinic	6.05	6.24	4.14

Table 3

Date sampled:6/9/98
Date analyzed:7/29/98
Sample type: Soil
Method:GGC (OXY)

Oxygenate data for samples submitted by Tosco

Sample ID	GGC ID	Ethanol	tert-Butanol	MTBE	DIPE	ETBE	TAME
		µg/kg					
Method Blank:		<200	<40	<2	<2	<10	<10
B-11-61	4483-1	<1000	<200	228	<10	<50	<50
B-11-10.5	4483-2	<2000	<400	2520	<20	<100	<100

MTBE:Methyl tert-Butyl Ether
DIPE: Diisopropyl Ether
ETBE: Ethyl tert-Butyl Ether
TAME: tert-Amyl Methyl Ether

Table 4

Concentration of extracts and hydrocarbon fractions for samples submitted by Unocal

Sample ID	GGC ID	Sample Weight for Extraction (g)	Extract Weight (mg)	Sample Concentration (mg/g)	Saturate+ Aromatic (%)	Polar+ Asphaltenes (%)
B-11-61	4483-1	30.2	172	5.70	77.1	22.9
B-11-10.5	4483-2	15.0	178	11.9	31.3	68.7

FIGURES

Figure 1: Simulated Distillation Curves

Global Geochemistry Corporation

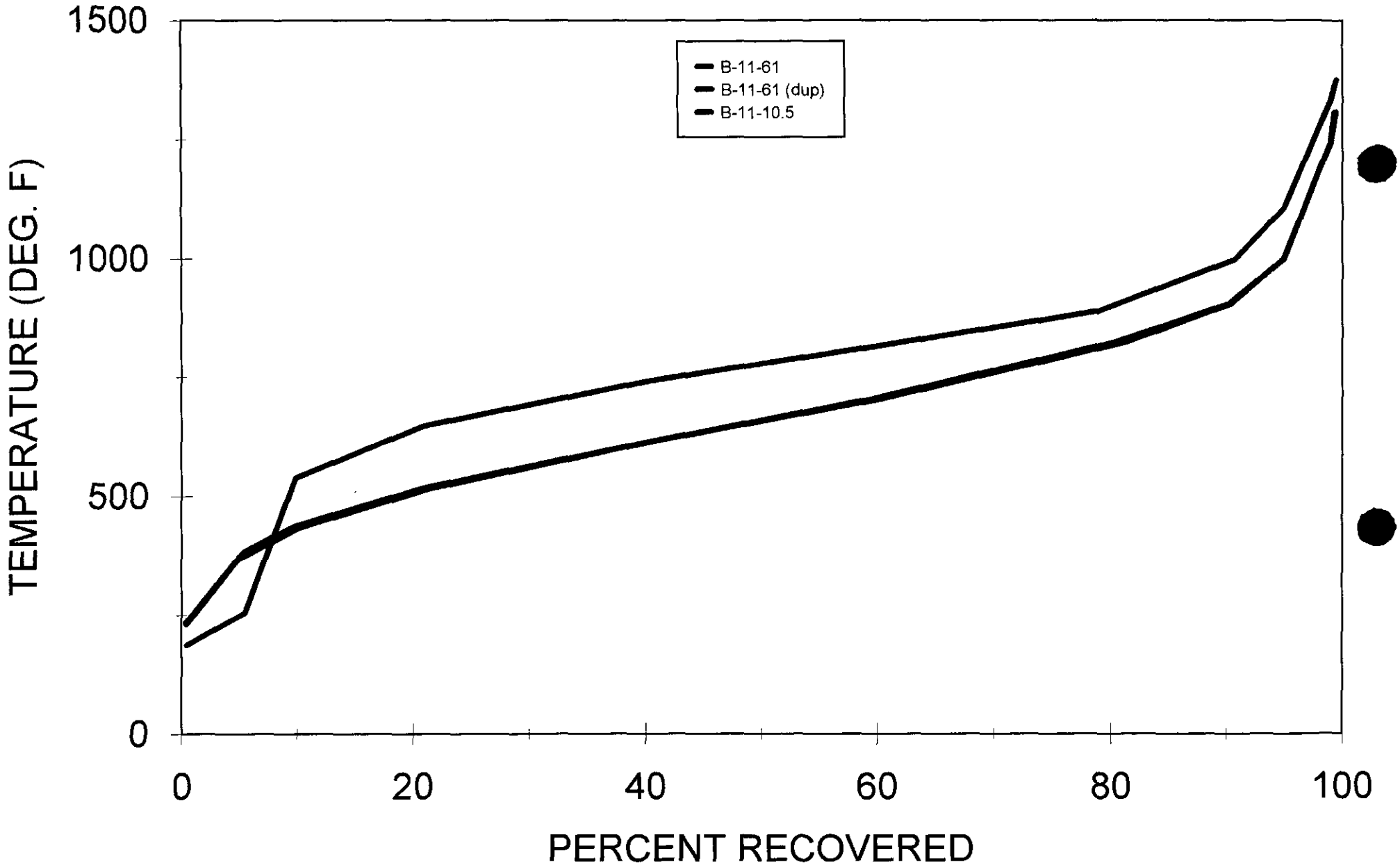


Figure 2 - Sample B-11-61, gas chromatogram of soil extract

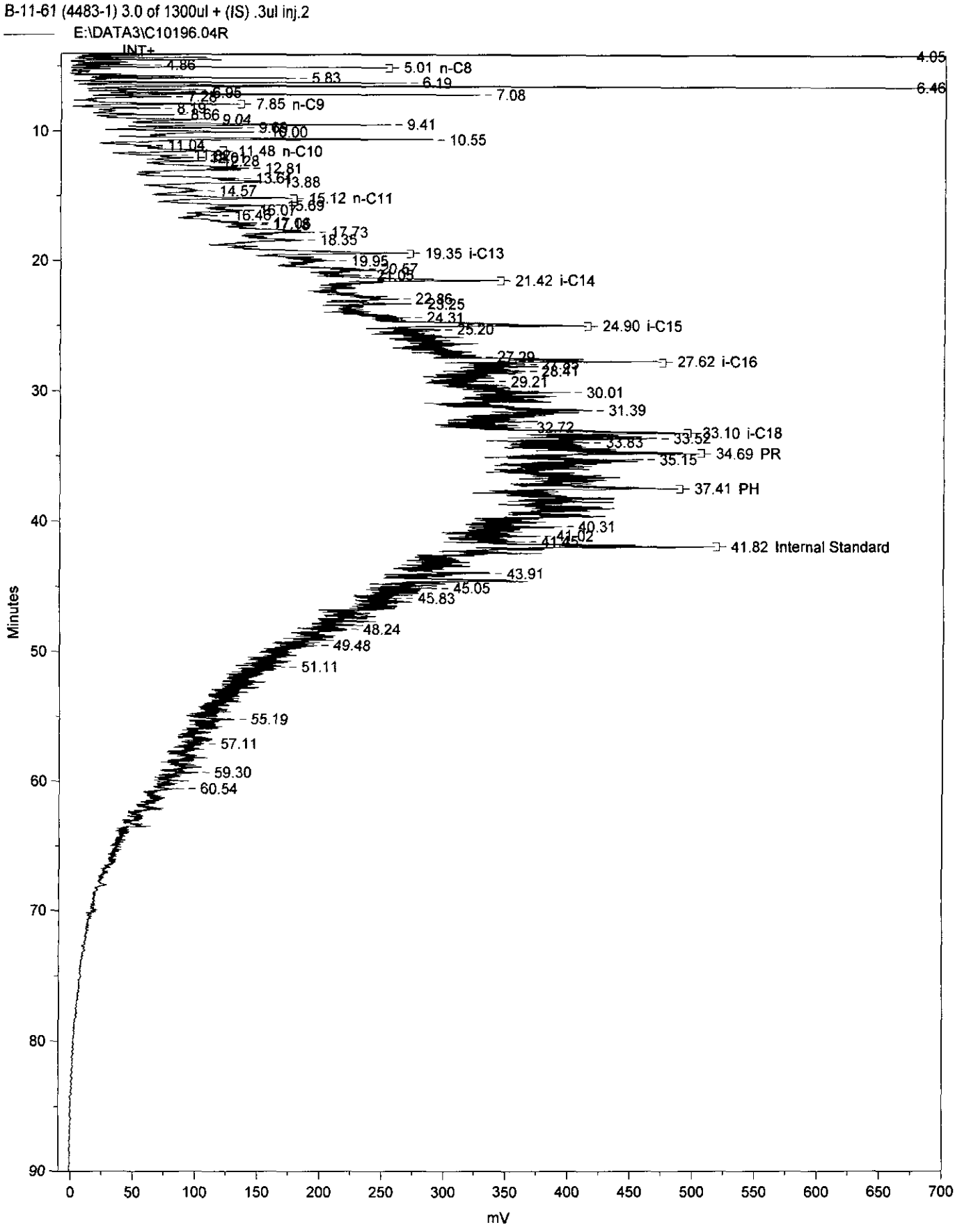


Figure 3 - Sample B-11-61 (duplicate), gas chromatogram of soil extract

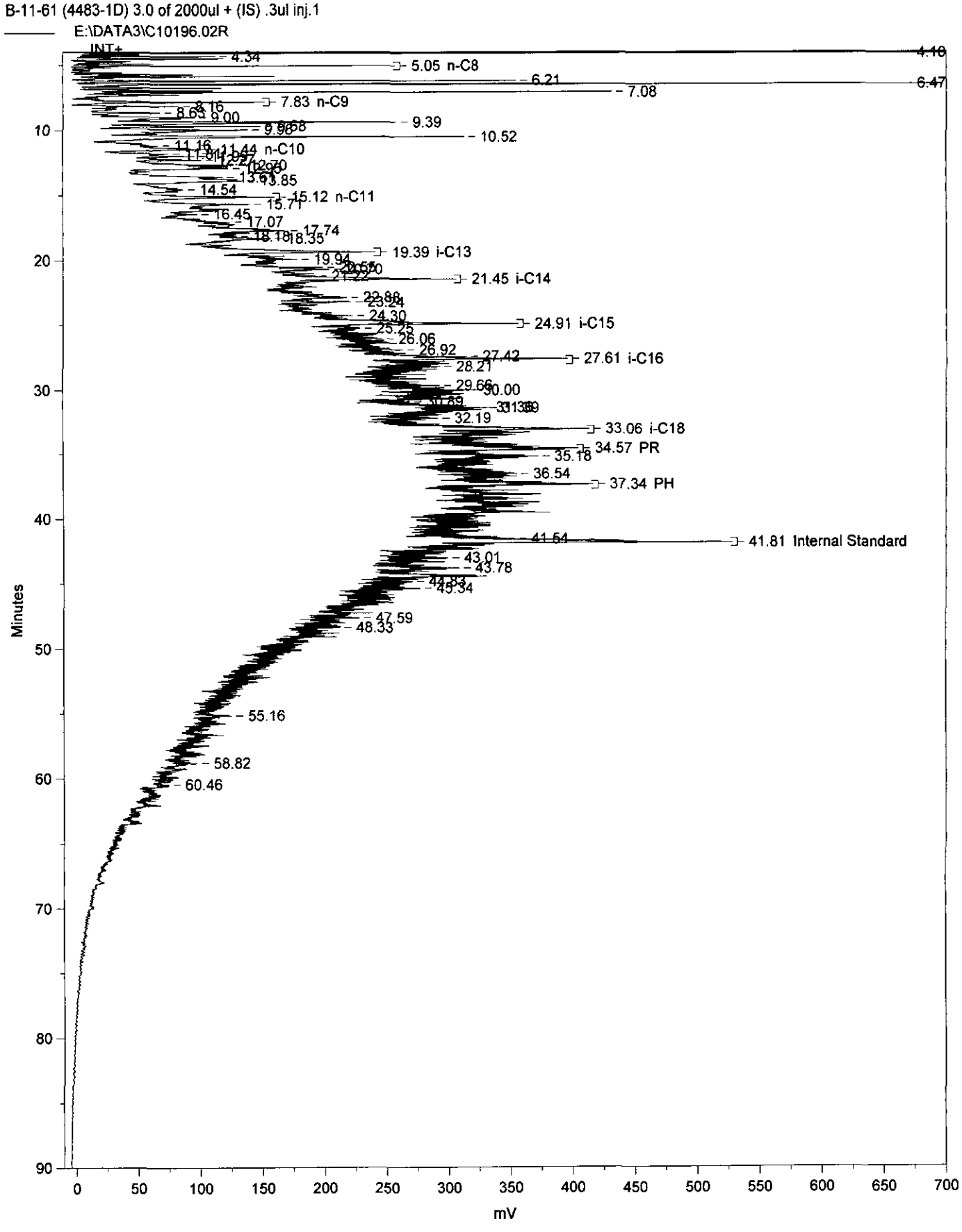


Figure 4 - Sample B-11-10.5, gas chromatogram of soil extract

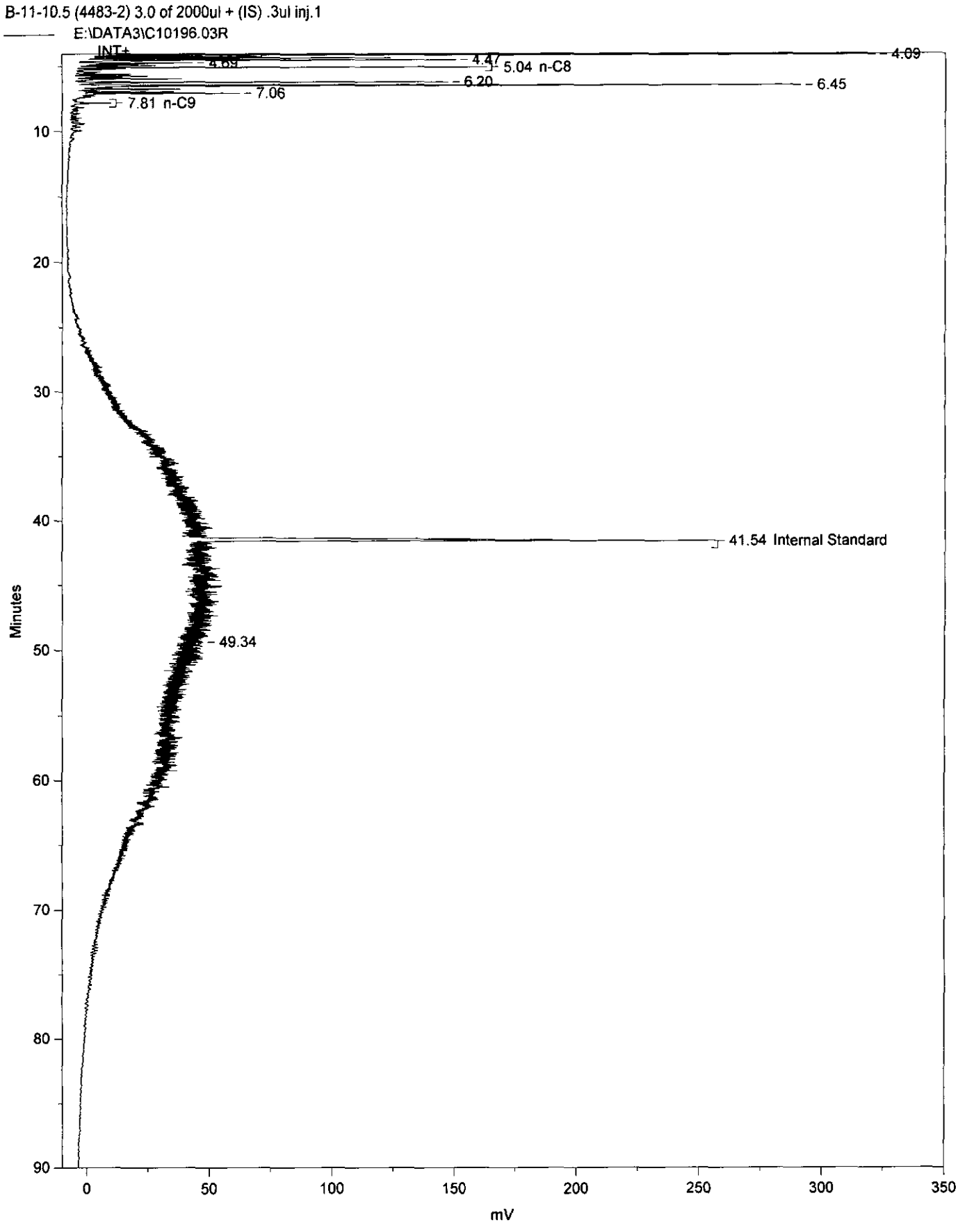
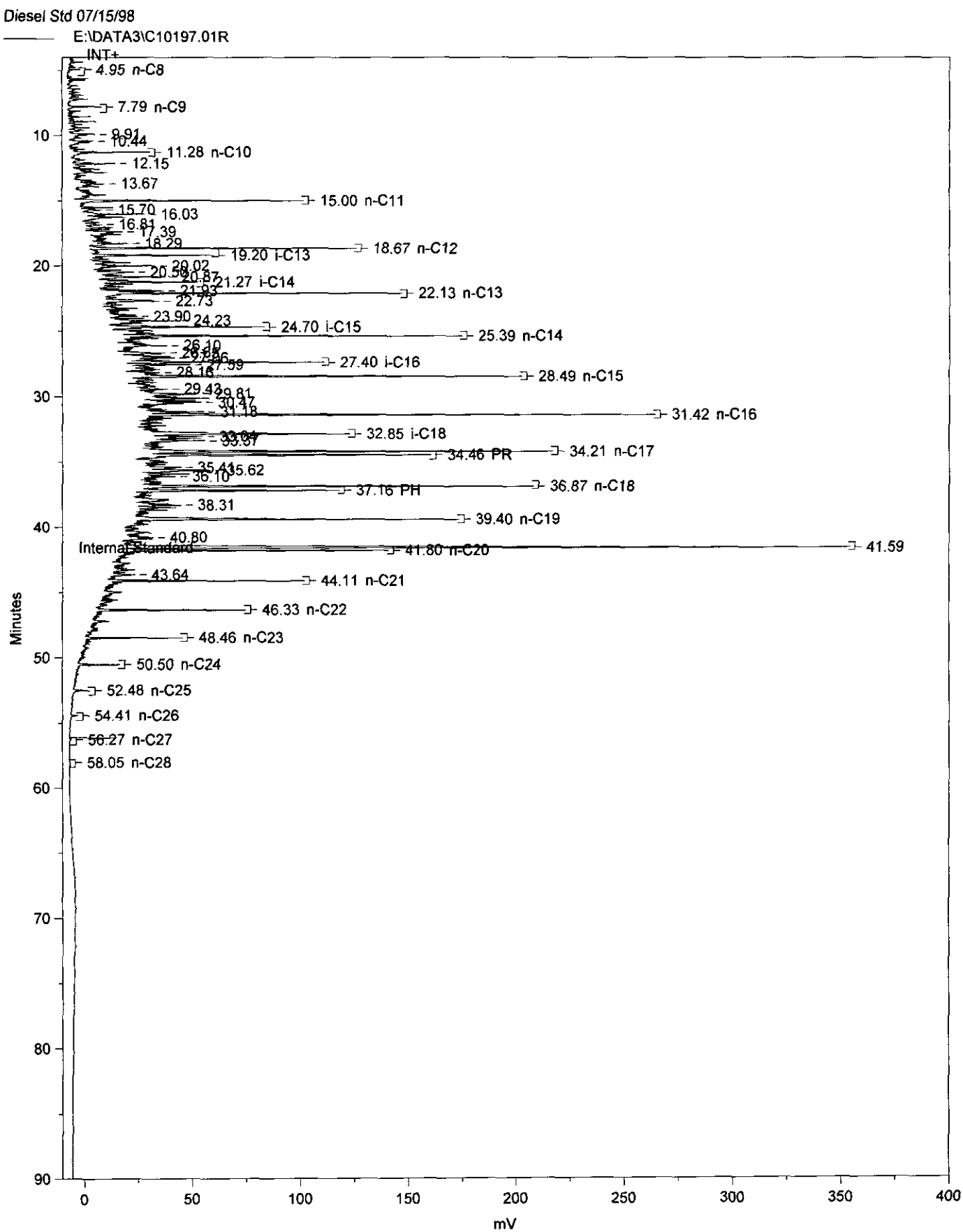
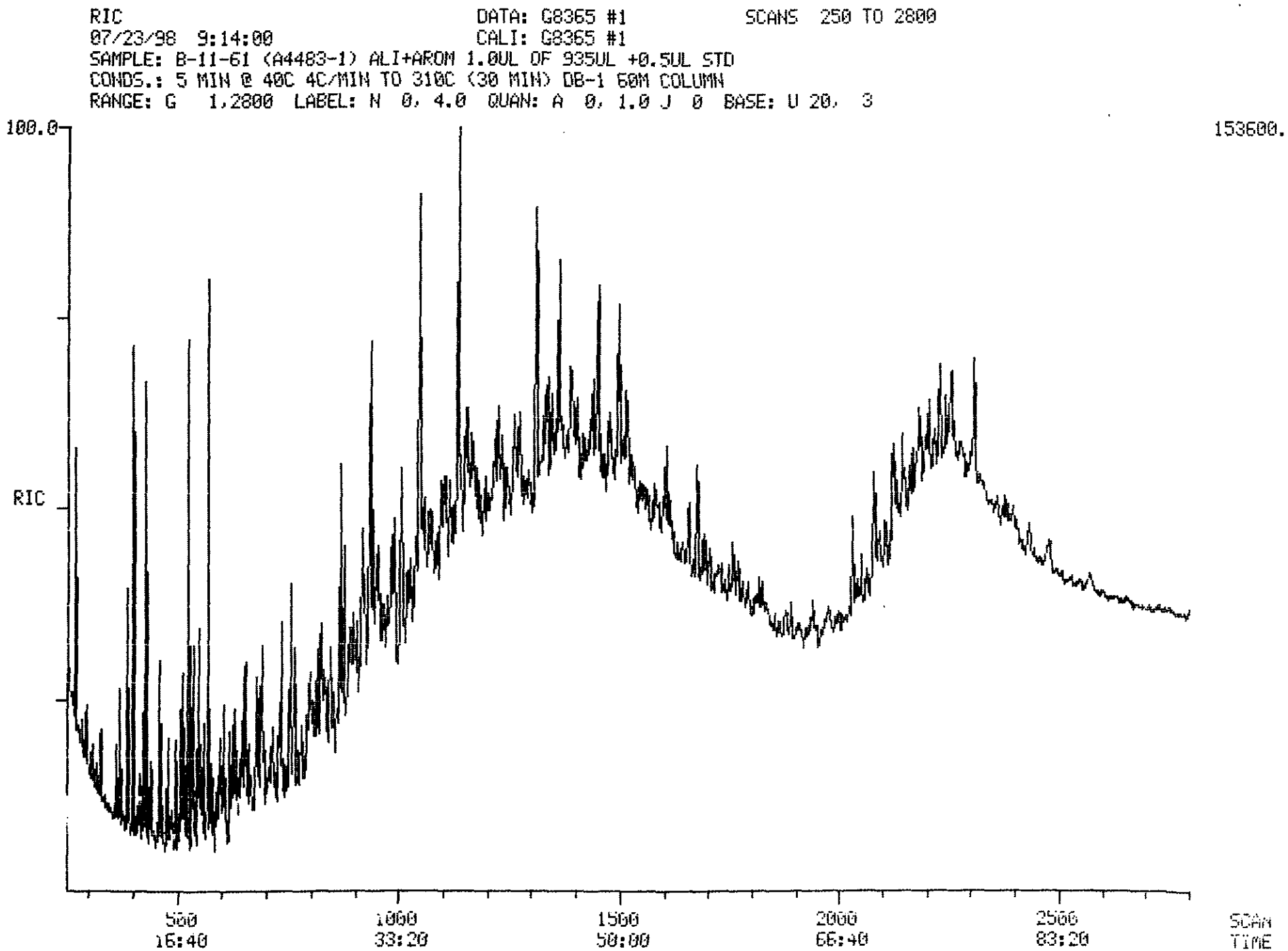


Figure 5 - Gas chromatogram of diesel standard

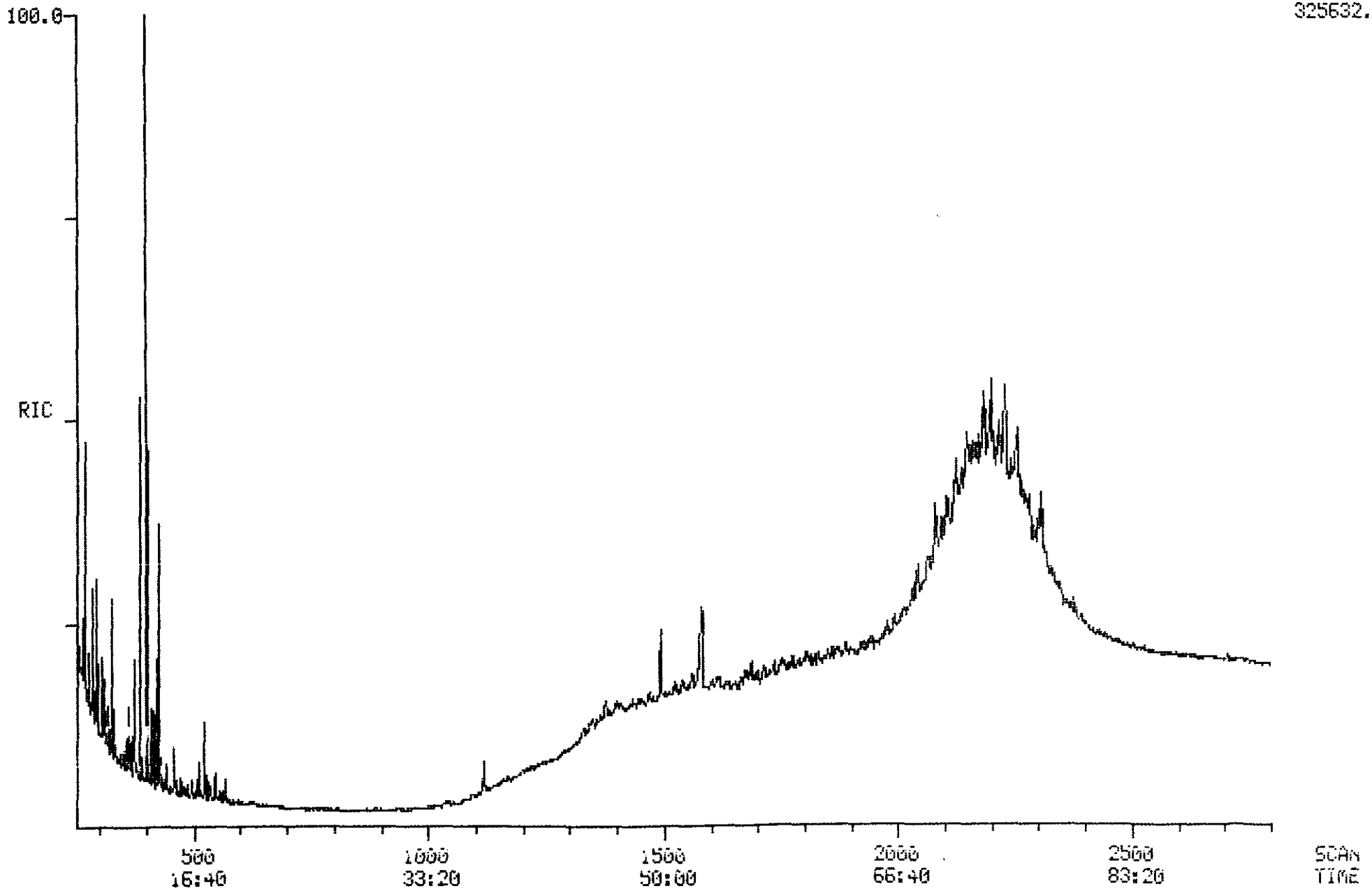


FIGURES 6+

MASS CHROMATOGRAMS OF THE EXTRACTS OF TWO SOILS (B-11-61 & B-11-10.5) ANALYZED AT VARIOUS MASS FRAGMENTS


RIC
07/23/98 9:14:00
DATA: G8365 #1
CALI: G8365 #1
SCANS 250 TO 2800
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1.2800 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0
153600.
RIC
500
16:40
1000
33:20
1500
50:00
2000
66:40
2500
83:20
SCAN
TIME

RIC DATA: G8366 #1 SCANS 250 TO 2800
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

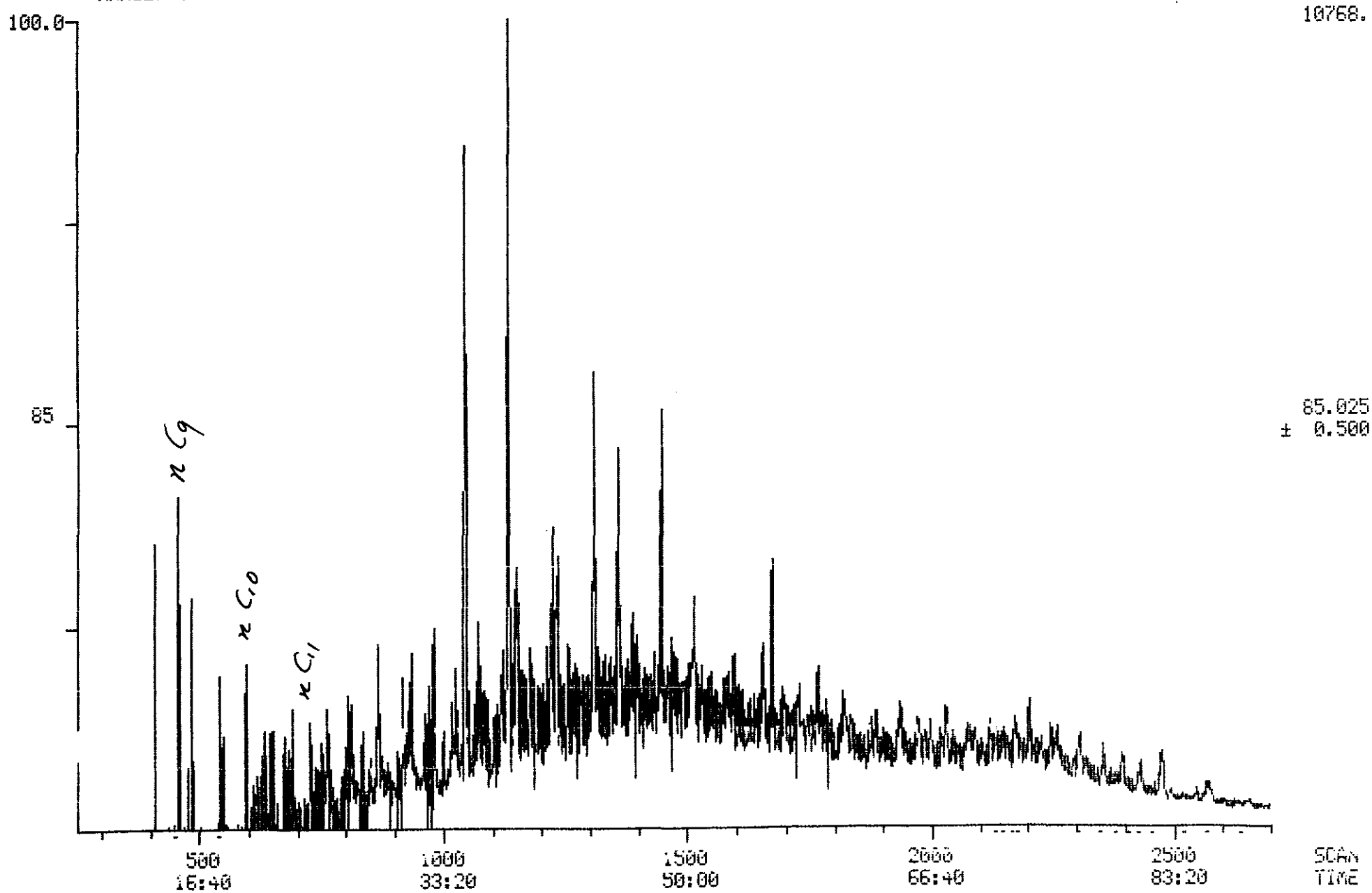


Table

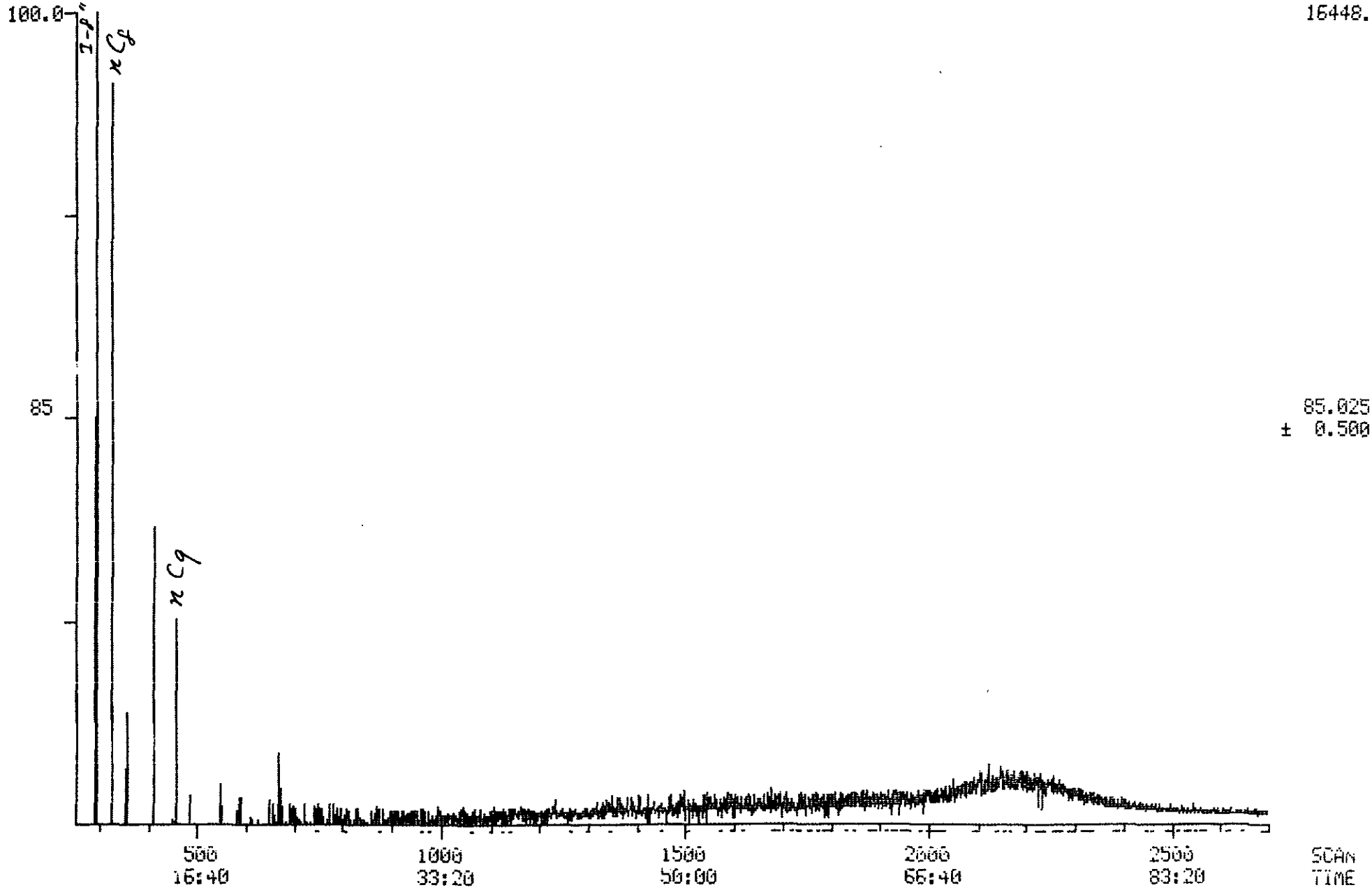
Key to Chromatogram Symbol Identification

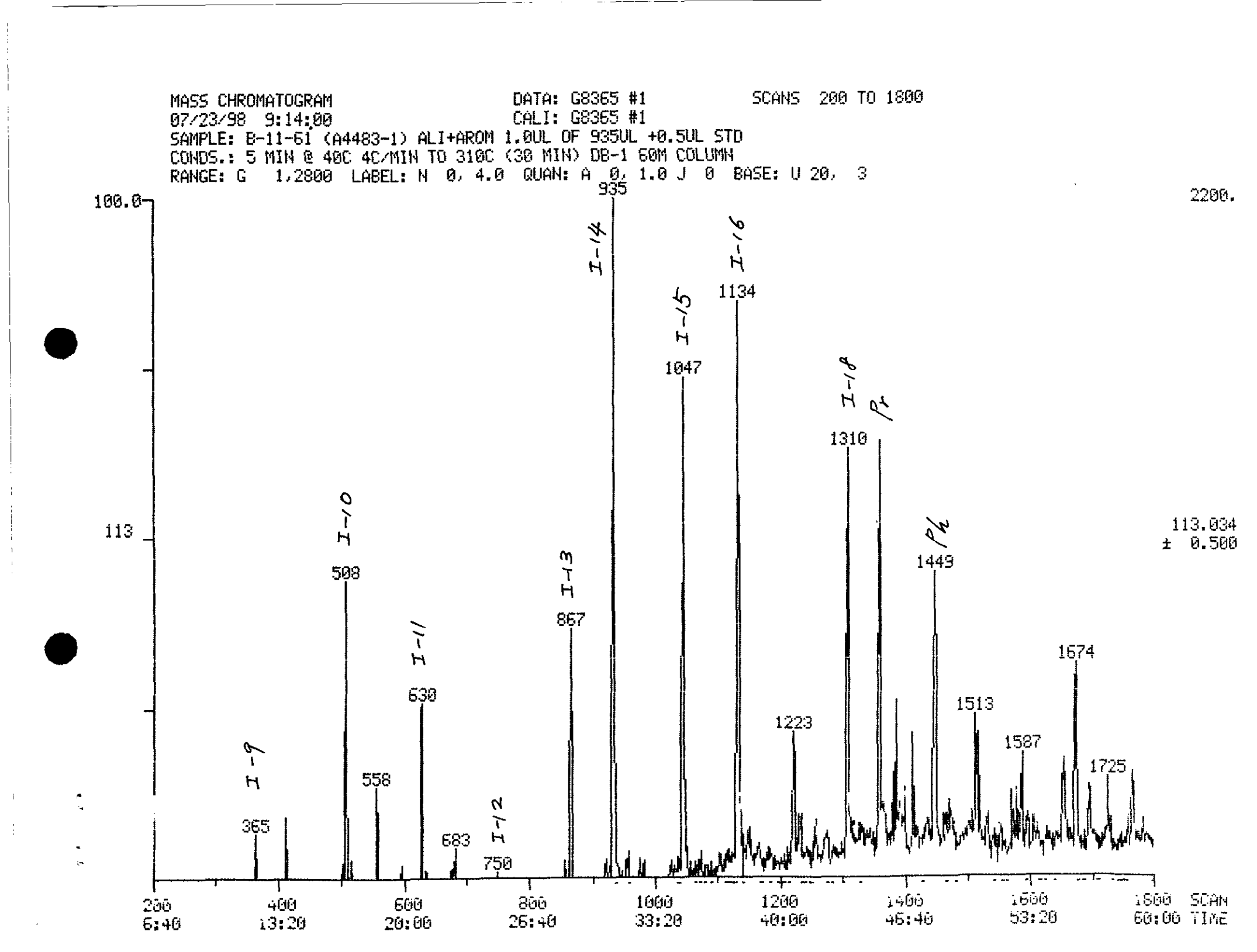
Symbol	Detail
i-10	Iso-alkane with 10 carbon atoms
i-15	Farnesane (isoprenoid with 15 carbon atoms)
i-16	Isoprenoid with 16 carbon atoms
Pr	Pristane (isoprenoid with 19 carbon atoms)
Ph	Phytane (isoprenoid with 20 carbon atoms)
nC_8	n-C_8 normal alkane
nC_{15}	n-C_{15} normal alkane
i-8	2,5-(2,4)-Dimethylhexane
i-8'	2,3,4-Trimethylpentane
i-8"	2,3-Dimethylhexane
CH-*n*	Alkylcyclohexane (where *n* indicates number of carbon atoms in the side chain)

MASS CHROMATOGRAM DATA: G8365 #1 SCANS 250 TO 2700
07/23/98 9:14:00 CALI: G8365 #1
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



MASS CHROMATOGRAM DATA: G8366 #1 SCANS 250 TO 2700
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1.2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

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07/23/98 9:14:00
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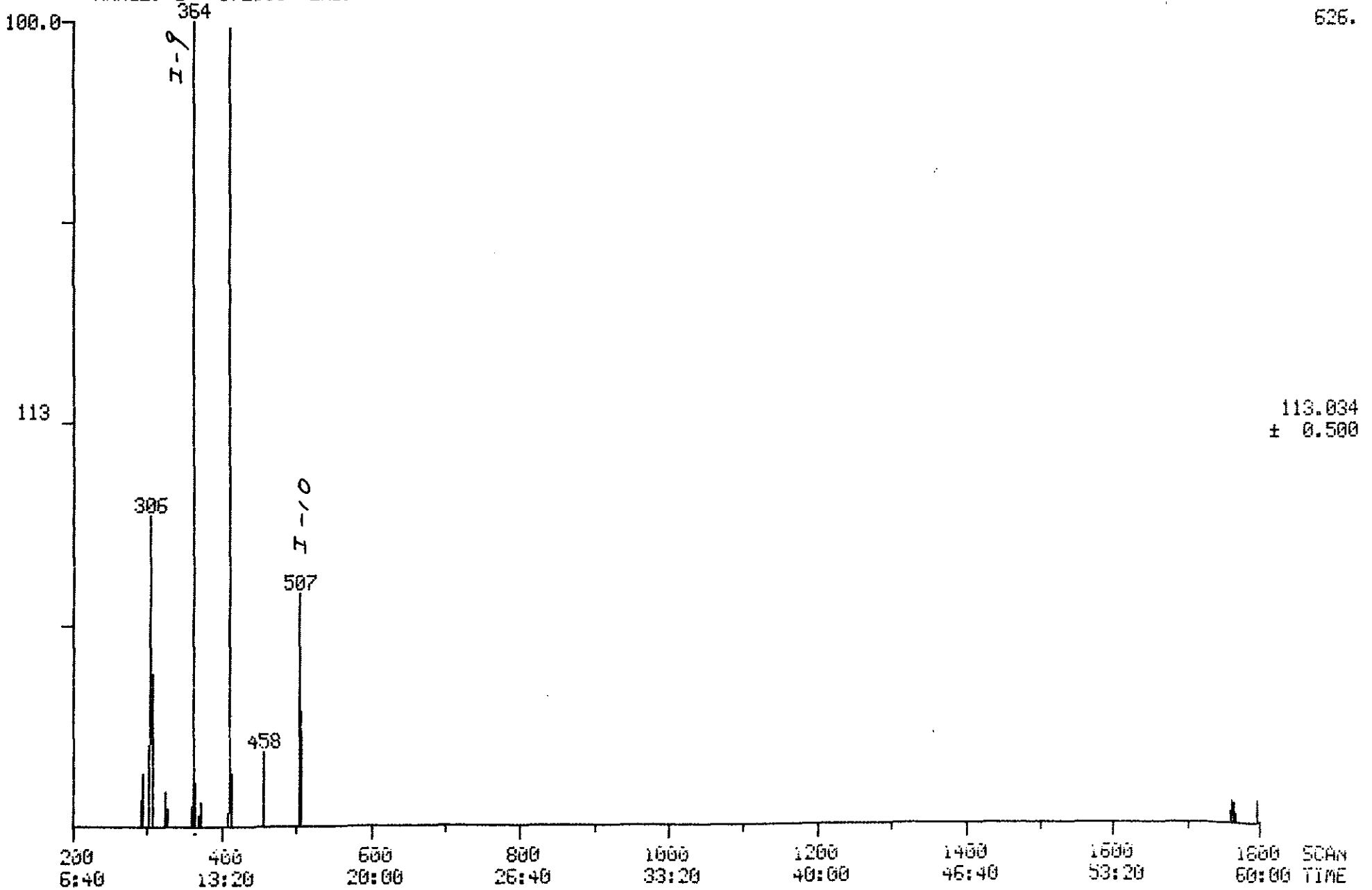
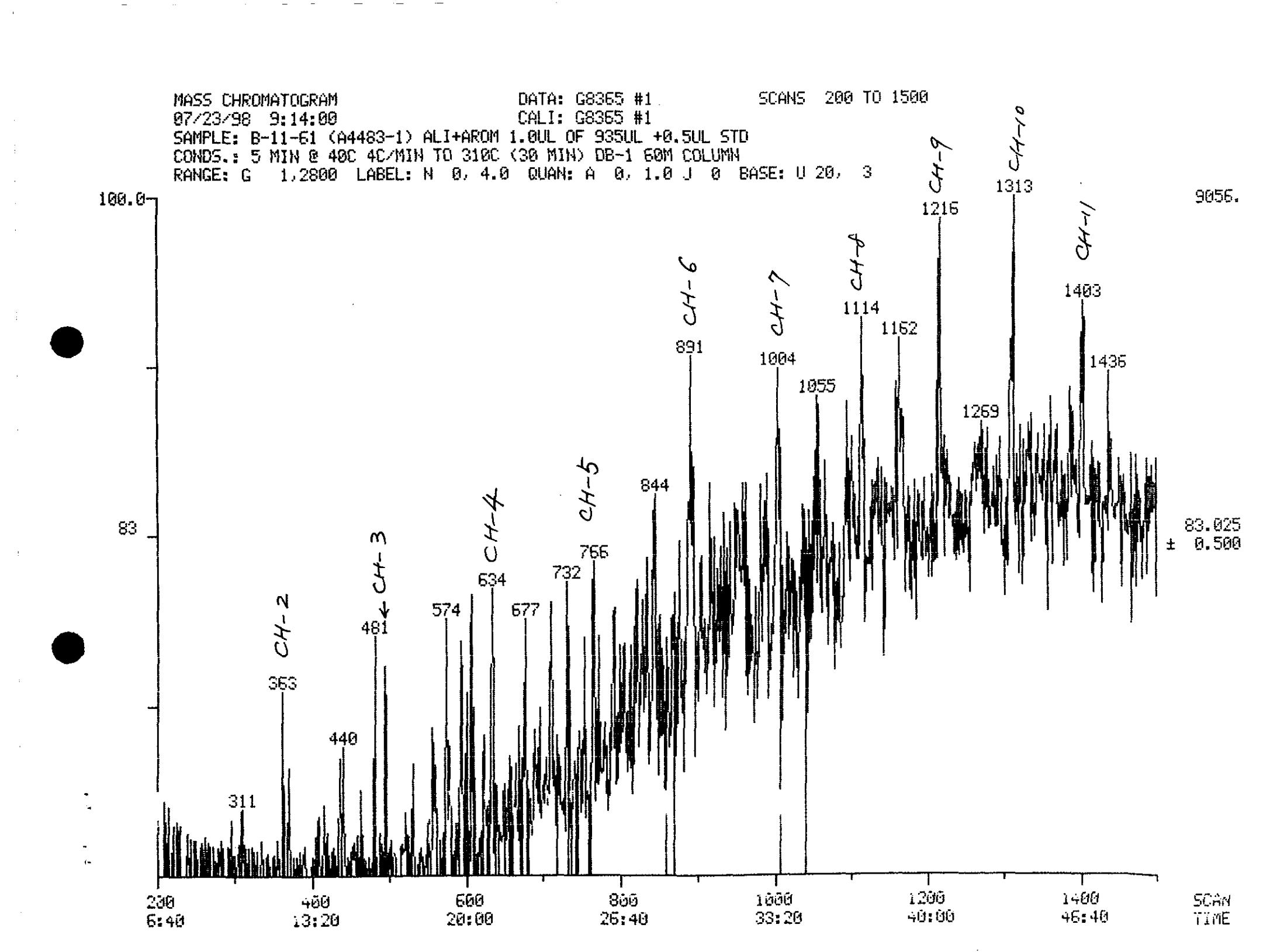
CALI: G8365 #1
SCANS 200 TO 1800
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
113
2200.
113.034
± 0.500
I-9
365
I-10
508
558
I-11
630
683
I-12
750
I-13
867
935
I-14
1047
I-15
1134
I-16
1223
1310
I-18
Pr
1449
Pk
1513
1587
1674
1725
200
6:40
400
13:20
600
20:00
800
26:40
1000
33:20
1200
40:00
1400
46:40
1600
53:20
1800
60:00
SCAN
TIME

MASS CHROMATOGRAM DATA: G8366 #1 SCANS 200 TO 1800
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

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07/23/98 9:14:00
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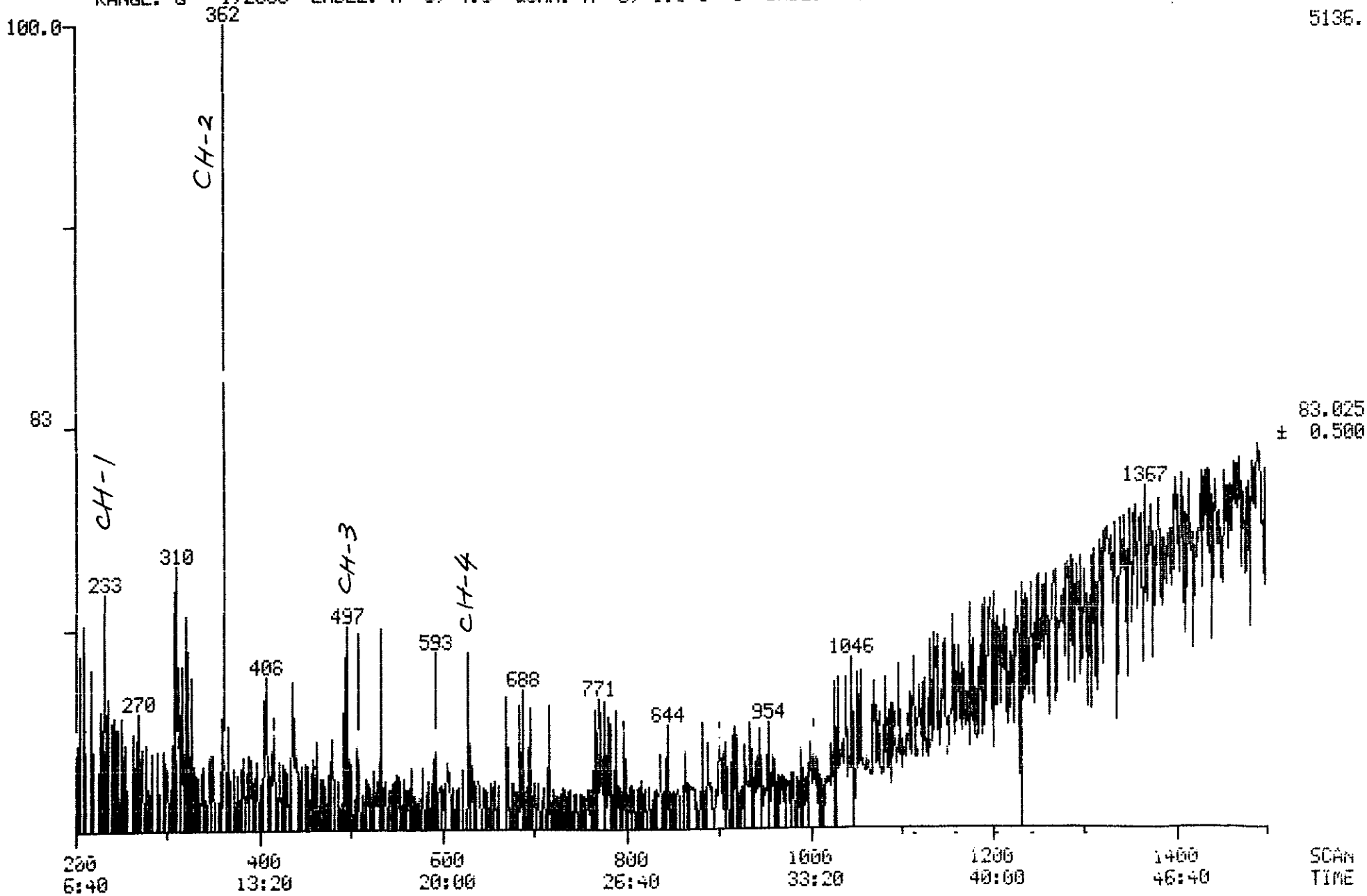
CALI: G8365 #1
SCANS 200 TO 1500
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
83
9056.
83.025
± 0.500
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
311
363
440
481
574
634
677
732
766
844
891
1004
1055
1114
1162
1216
1269
1313
1403
1436
200
6:40
400
13:20
600
20:00
800
26:40
1000
33:20
1200
40:00
1400
46:40
SCAN
TIME

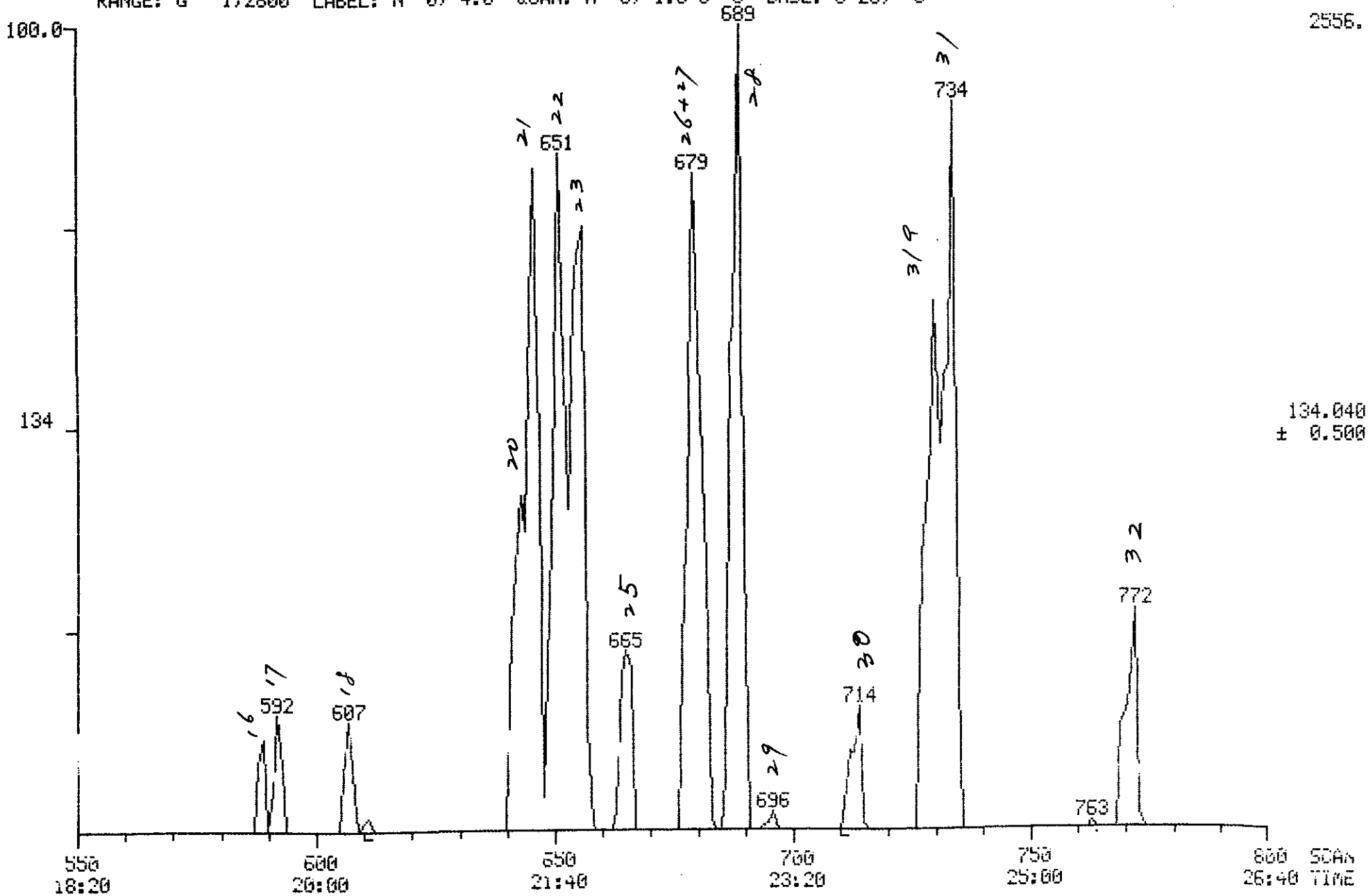
MASS CHROMATOGRAM DATA: G8366 #1 SCANS 200 TO 1500
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



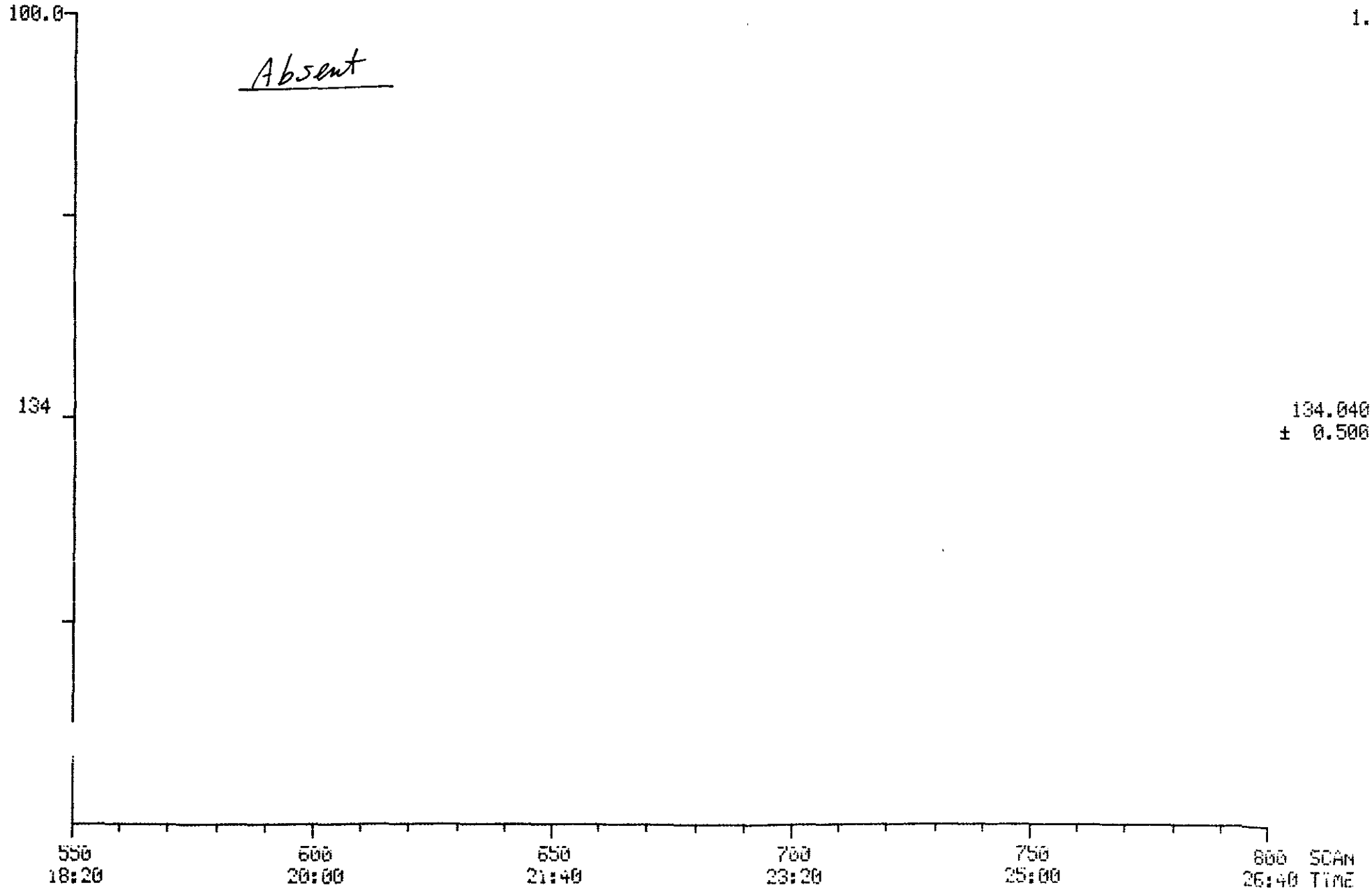
Table

Key for C_4-Alkylbenzenes (m/z 134 chromatogram)

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

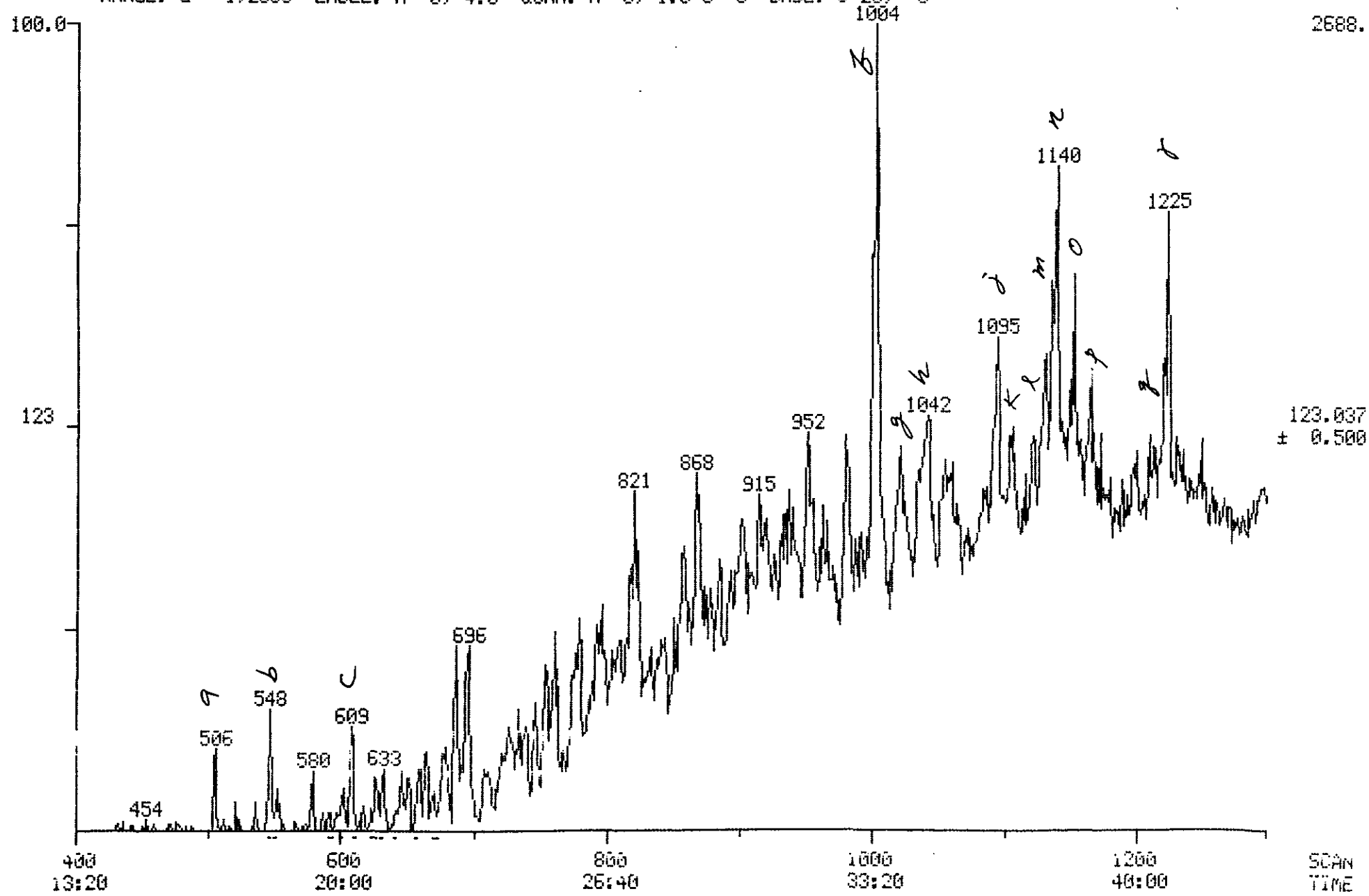

MASS CHROMATOGRAM
07/23/98 9:14:00
DATA: G8365 #1
CALI: G8365 #1
SCANS 550 TO 800
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
134
2556.
134.040
± 0.500
592
607
651
665
679
689
696
714
734
763
772
550
18:20
600
20:00
650
21:40
700
23:20
750
25:00
800 SCAN
26:40 TIME

MASS CHROMATOGRAM DATA: G8366 #1 SCANS 550 TO 800
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

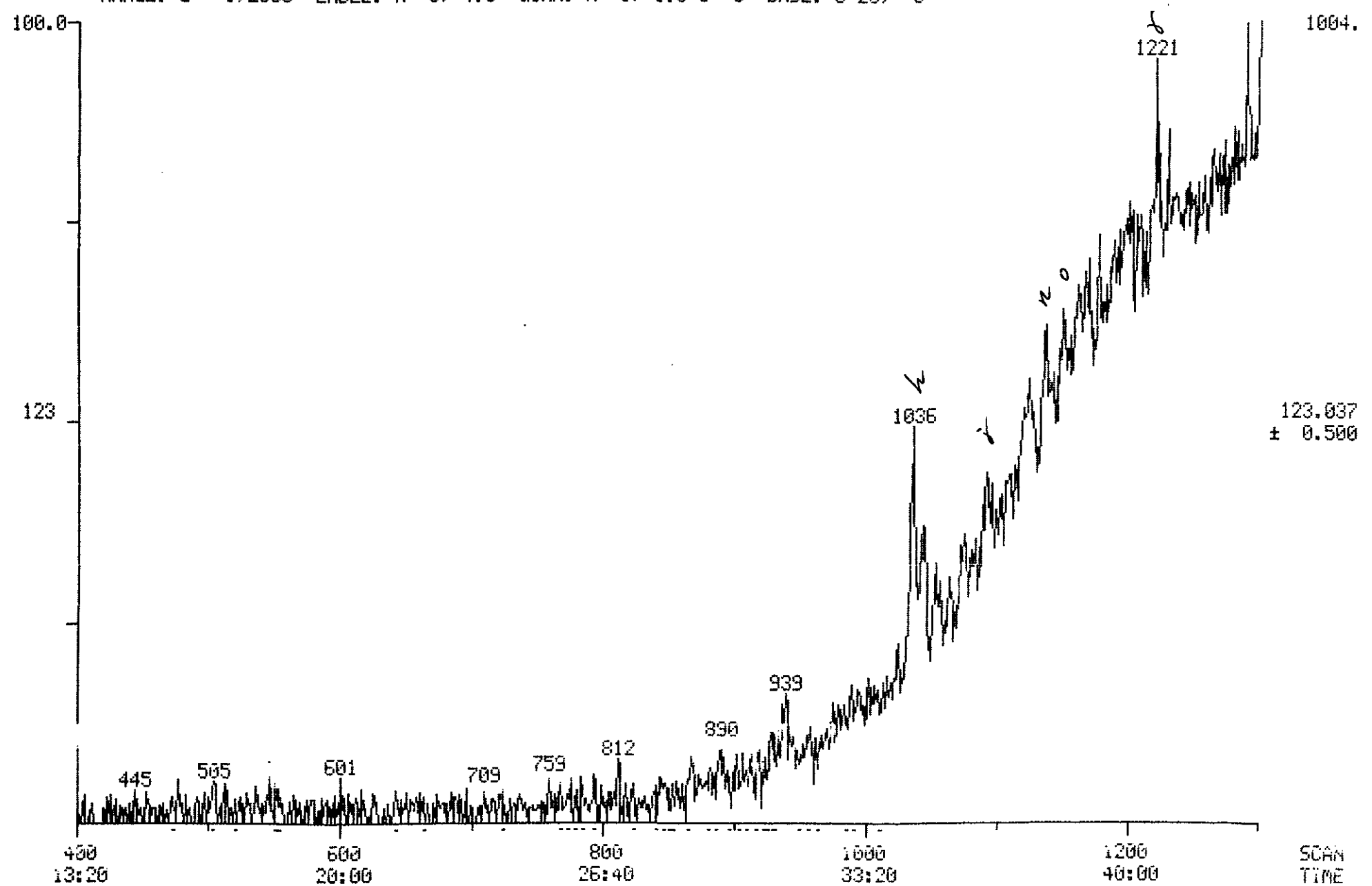


Key for identification of the bicyclanes (m/z 123)

Peak No.	Identity	Formula	M.W.
a	2,2,3-Trimethylbicyloheptane	$C_{10}H_{18}$	138
b	C_{10} bicyclic	$C_{10}H_{18}$	138
c	3,3,7-Trimethylbicycloheptane	$C_{10}H_{18}$	138
d	C_{11} decalin	$C_{11}H_{20}$	152
f	Nordrimane	$C_{14}H_{26}$	194
g	Nordrimane	$C_{14}H_{26}$	194
h	Rearranged drimane	$C_{15}H_{28}$	208
j	Rearranged drimane	$C_{15}H_{28}$	208
k	Isomer of eudesmane	$C_{15}H_{28}$	208
l	4β(H) Eudesmane	$C_{15}H_{28}$	208
m	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
n	8β(H) Drimane	$C_{15}H_{28}$	208
o	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
p	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
q	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
r	8β(H) Homodrimane	$C_{16}H_{30}$	222


MASS CHROMATOGRAM
07/23/98 9:14:00
DATA: G8365 #1
CALI: G8365 #1
SCANS 400 TO 1300
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
123
2688.
123.037
± 0.500
1004
1140
1225
1095
1042
952
915
868
821
696
609
548
506
580
633
454
400
13:20
600
20:00
800
26:40
1000
33:20
1200
40:00
SCAN
TIME

MASS CHROMATOGRAM DATA: G8366 #1 SCANS 400 TO 1300
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



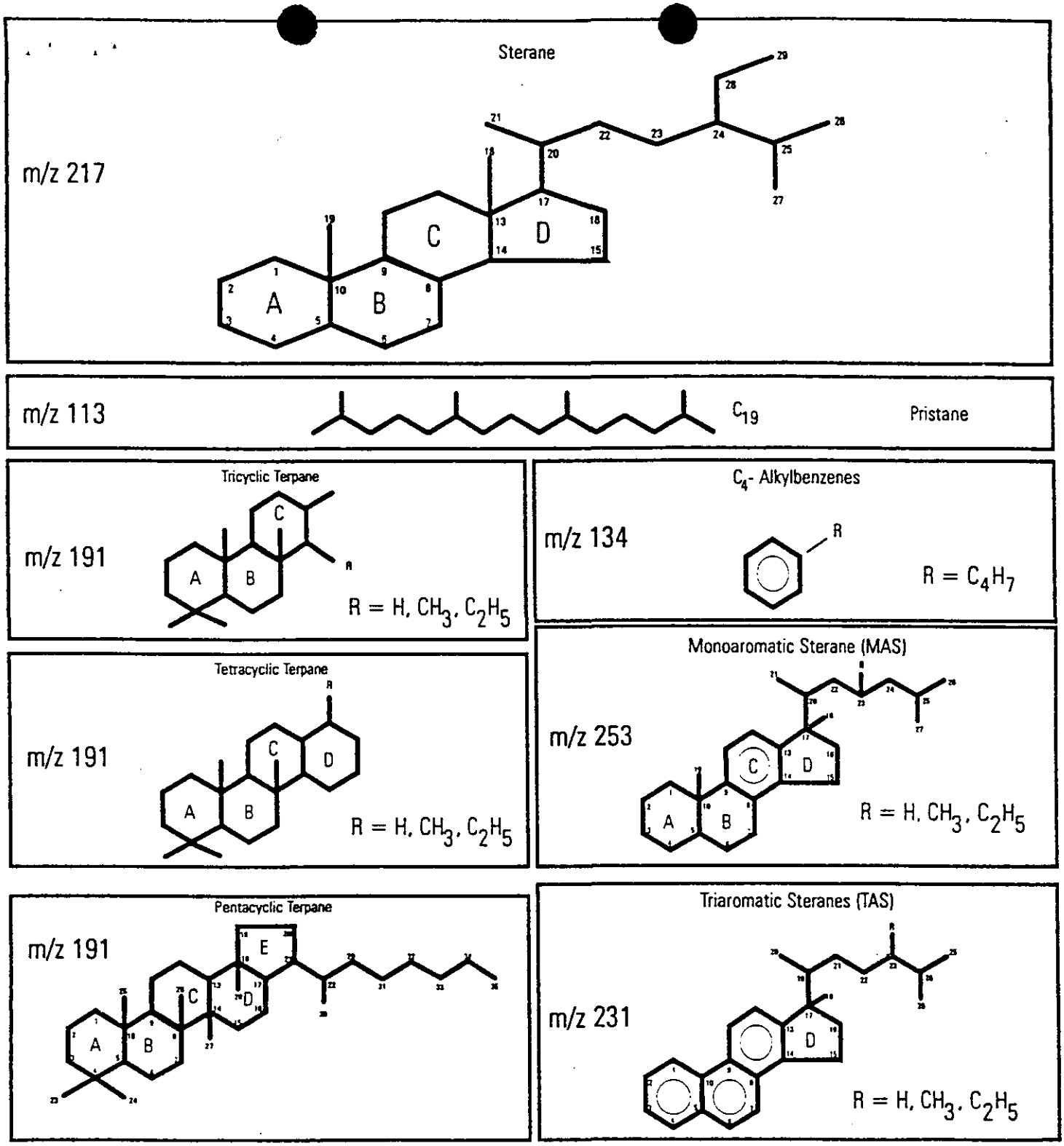
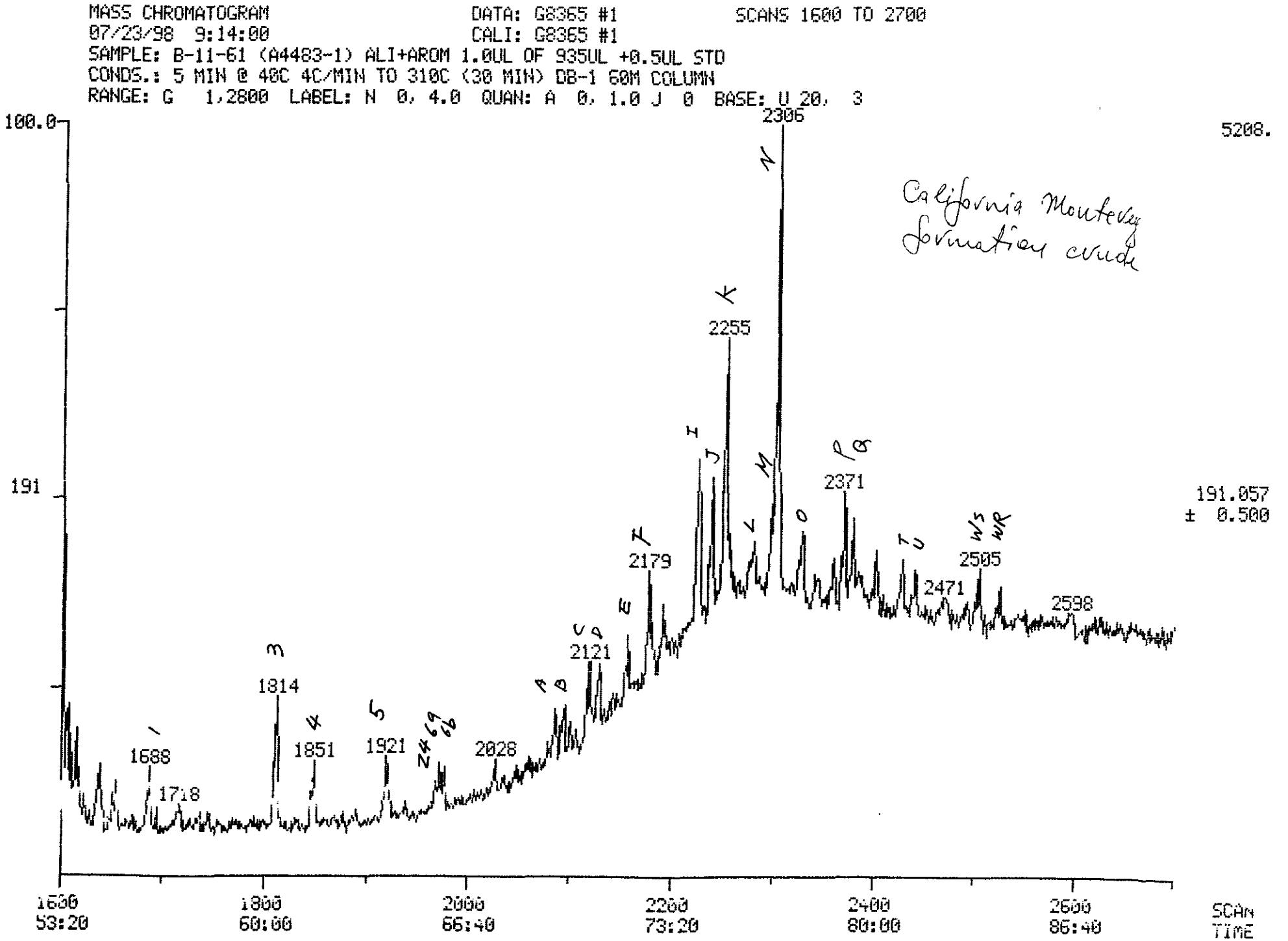


Figure 10: The compound structures of pristane, C4-alkylbenzene, sterane; terpanes; monoaromatic and triaromatic steranes

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

Code	Identity	Carbon #
0	C_{20}-Tricyclic Terpane	20
1	C_{21}-Tricyclic Terpane	21
2	C_{22}-Tricyclic Terpane	22
3	C_{23}-Tricyclic Terpane	23
4	C_{24}-Tricyclic Terpane	24
5	C_{25}-Tricyclic Terpane	25
Z4	C_{24}-Tetracyclic Terpane	24
6a	C_{26}-Tricyclic Terpane	26
6b	C_{26}-Tricyclic Terpane	26
7	C_{27}-Tricyclic Terpane	27
A	C_{28}-Tricyclic Terpane #1	28
B	C_{28}-Tricyclic Terpane #2	28
C	C_{29}-Tricyclic Terpane #1	29
D	C_{29}-Tricyclic Terpane #2	29
E	18α-22,29,30-Trisnorneohopane (Ts)	27
F	17α-22,29,30-Trisnorhopane (Tm)	27
G	17ß-22,29-30-Trisnorhopane	27
H	17α-23,28-Bisnorlupane	28
10a	C_{30}-Tricyclic Terpane #1	30
10b	C_{30}-Tricyclic Terpane #2	30
I	17α-28,30-Bisnorhopane	28
11a	C_{31}-Tricyclic Terpane #1	31
J	17α-25-Norhopane	29
11b	C_{31}-Tricyclic Terpane #2	31
K	17α,21ß-30-Norhopane	29
C_{29}Ts	18α-30-Norneohopane	29
C_{30}*	17α-Diahopane	30
L	17ß-21α-30-Normoretane	29
Ma	18α-Oleanane	30
Mb	18ß-Oleanane	30
N	17α,21ß-Hopane	30
O	17ß,21α-Moretane	30
13a	C_{33}-Tricyclic Terpane #1	33
13b	C_{33}-Tricyclic Terpane #2	33
P	22S-17α,21ß-30-Homohopane	31
Q	22R-17α,21ß-30-Homohopane	31
R	Gammacerane	30
14a	C_{34}-Tricyclic Terpane #1	34
S	17ß,21α-Homomoretane	31
14b	C_{34}-Tricyclic Terpane #2	34
T	22S-17α,21ß-30-Bishomohopane	32
U	22R-17α,21ß-30-Bishomohopane	32
15a	C_{35}-Tricyclic Terpane #1	35
15b	C_{35}-Tricyclic Terpane #2	35
V	17ß,21α-C_{32}-Bishomomoretane	32
WS	22S-17α,21ß-30,31,32-Trishomohopane	33
WR	22R-17α,21ß-30,31,32-Trishomohopane	33
16a	C_{36}-Tricyclic Terpane #1	36
16b	C_{36}-Tricyclic Terpane #2	36
XS	22S-17α,21ß-30,31,32,33-Tetrahomohopane	34
XR	22R-17α,21ß-30,31,32,33-Tetrahomohopane	34
YS	22S-17α,21ß-30,31,32,33,34-Pentahomohopane	35
YR	22R-17α,21ß-30,31,32,33,34-Pentahomohopane	35


MASS CHROMATOGRAM
07/23/98 9:14:00
DATA: G8365 #1
CALI: G8365 #1
SCANS 1600 TO 2700
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
191
5208.
191.057
± 0.500
California Monterey formation crude
1688
1718
1814
1851
1921
2028
2121
2179
2255
2306
2371
2471
2505
2598
1600
53:20
1800
60:00
2000
66:40
2200
73:20
2400
80:00
2600
86:40
SCAN TIME

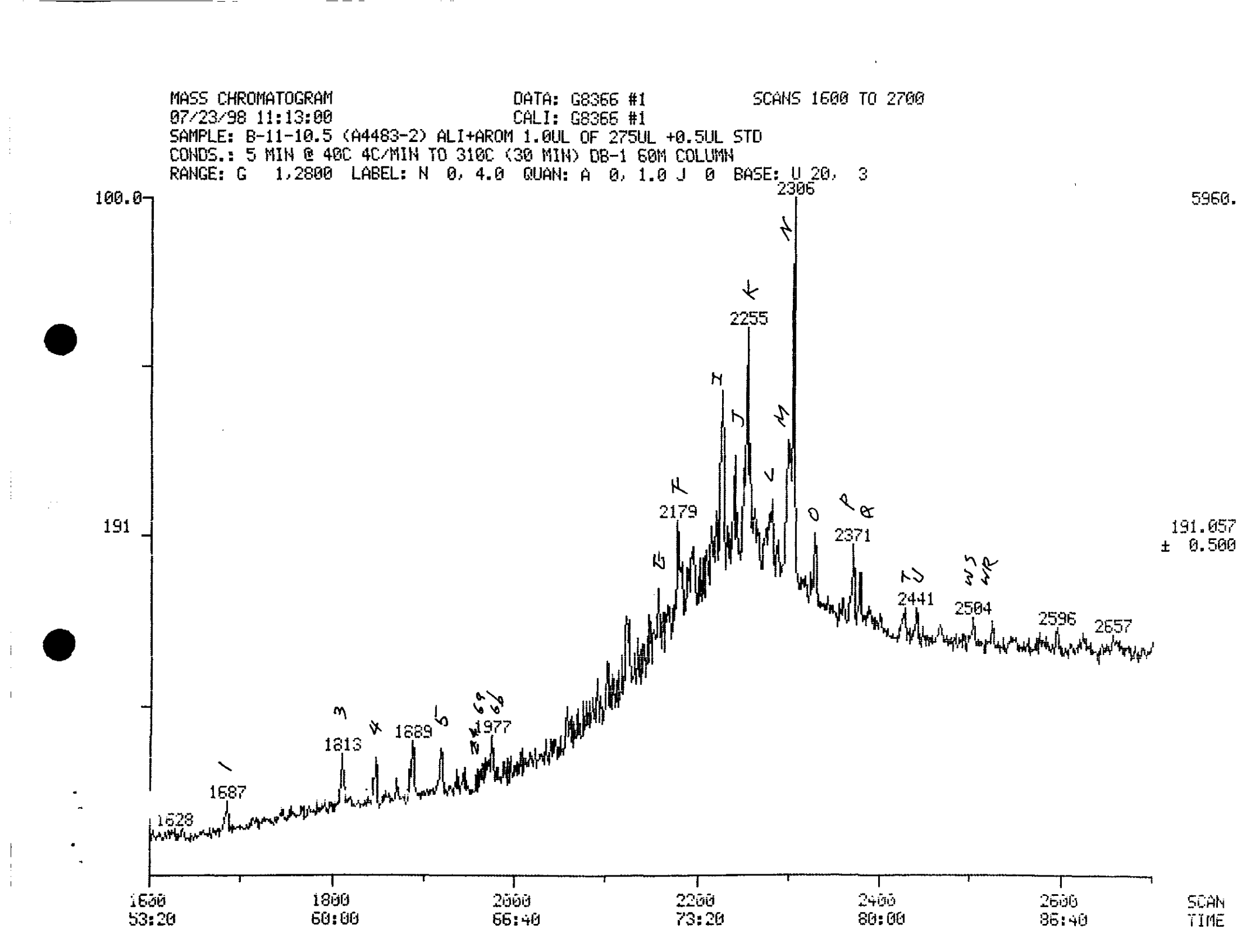

MASS CHROMATOGRAM
07/23/98 11:13:00
DATA: G8366 #1
CALI: G8366 #1
SCANS 1600 TO 2700
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
191
5960.
191.057
± 0.500
1628
1687
1813
1689
1977
2179
2255
2306
2371
2441
2504
2596
2657
1600
53:20
1800
60:00
2000
66:40
2200
73:20
2400
80:00
2600
86:40
SCAN
TIME

Table : Key for Steranes Identification (m/z 217 chromatogram)

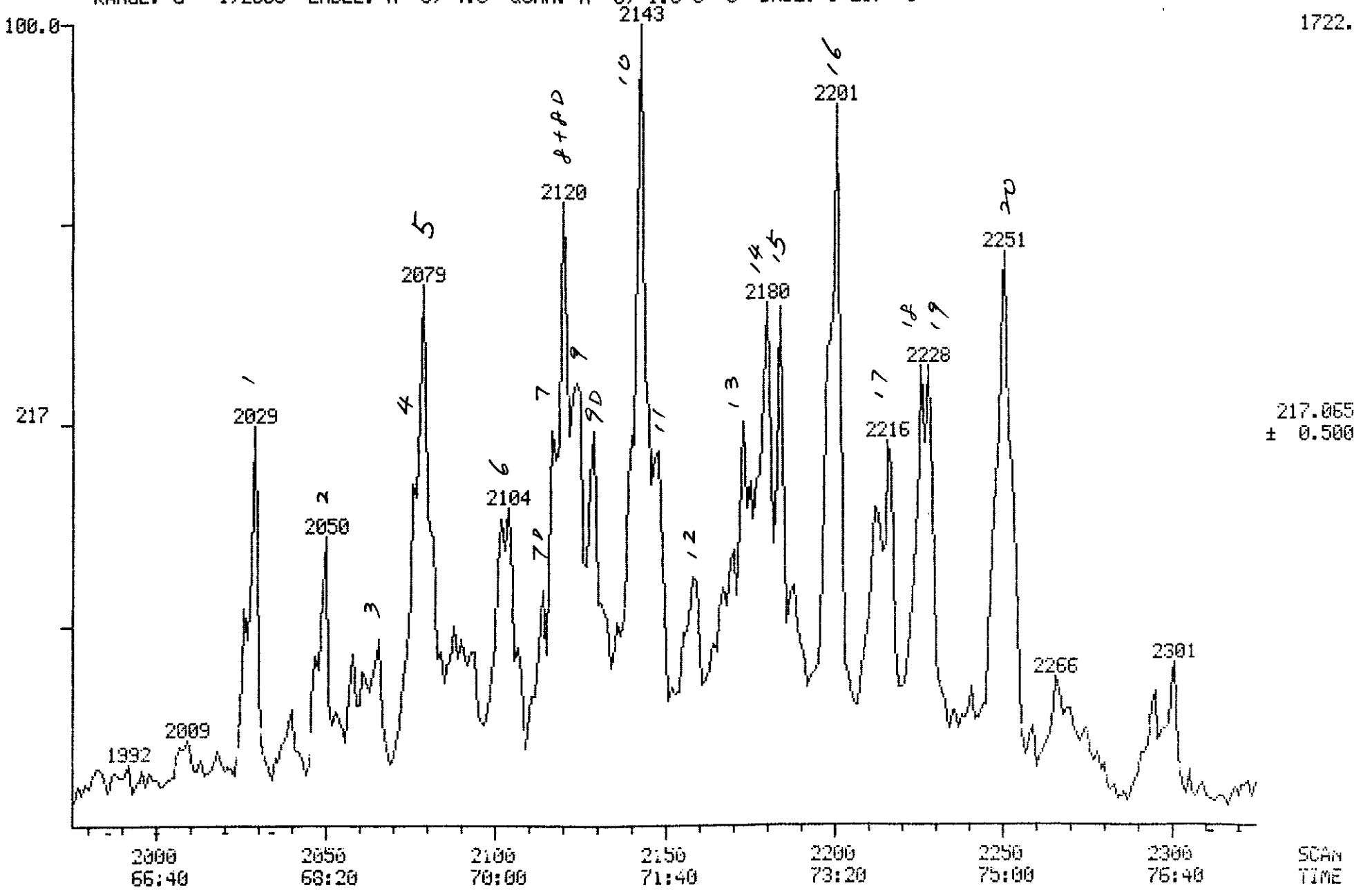
Code	Identity	Carbon No.
1	13ß,17α-diacholestane (20S)	27
2	13ß,17α-diacholestane (20R)	27
3	13α,17ß-diacholestane (20S)	27
4	13α,17ß-diacholestane (20R)	27
5	24-methyl-13ß,17α-diacholestane (20S)	28
6	24-methyl-13ß,17α-diacholestane (20R)	28
7D	24-methyl-13α,17ß-diacholestane (20S)	28
7	14α,17α-cholestane (20S)	27
8+8D	14ß,17ß-cholestane (20R) + 24-ethyl-13ß,17α-diacholestane (20S)	27+29
9	14ß,17ß-cholestane (20S)	27
9D	24-methyl-13α,17ß-diacholestane (20R)	28
10	14α,17α-cholestane (20R)	27
11	24-ethyl-13ß,17α-diacholestane (20R)	29
12	24-ethyl-13α,17ß-diacholestane (20S)	29
13	24-methyl-14α,17α-cholestane (20S)	28
14+14D	24-methyl-14ß,17ß-cholestane (20R) + 24-ethyl-13α,17ß-diacholestane (20R)	28+29
15	24-methyl-14ß,17ß-cholestane (20S)	28
16	24-methyl-14α,17α-cholestane (20R)	28
17	24-ethyl-14α-cholestane (20S)	29
18	24-ethyl-14ß,17ß-cholestane (20R)	29
19	24-ethyl-14ß,17ß-cholestane (20S)	29
20	24-ethyl-14α,17α-cholestane (20R)	29
21A	24-n-Propylcholestanes	30
21B	4-Methyl-24-ethylcholestane	30

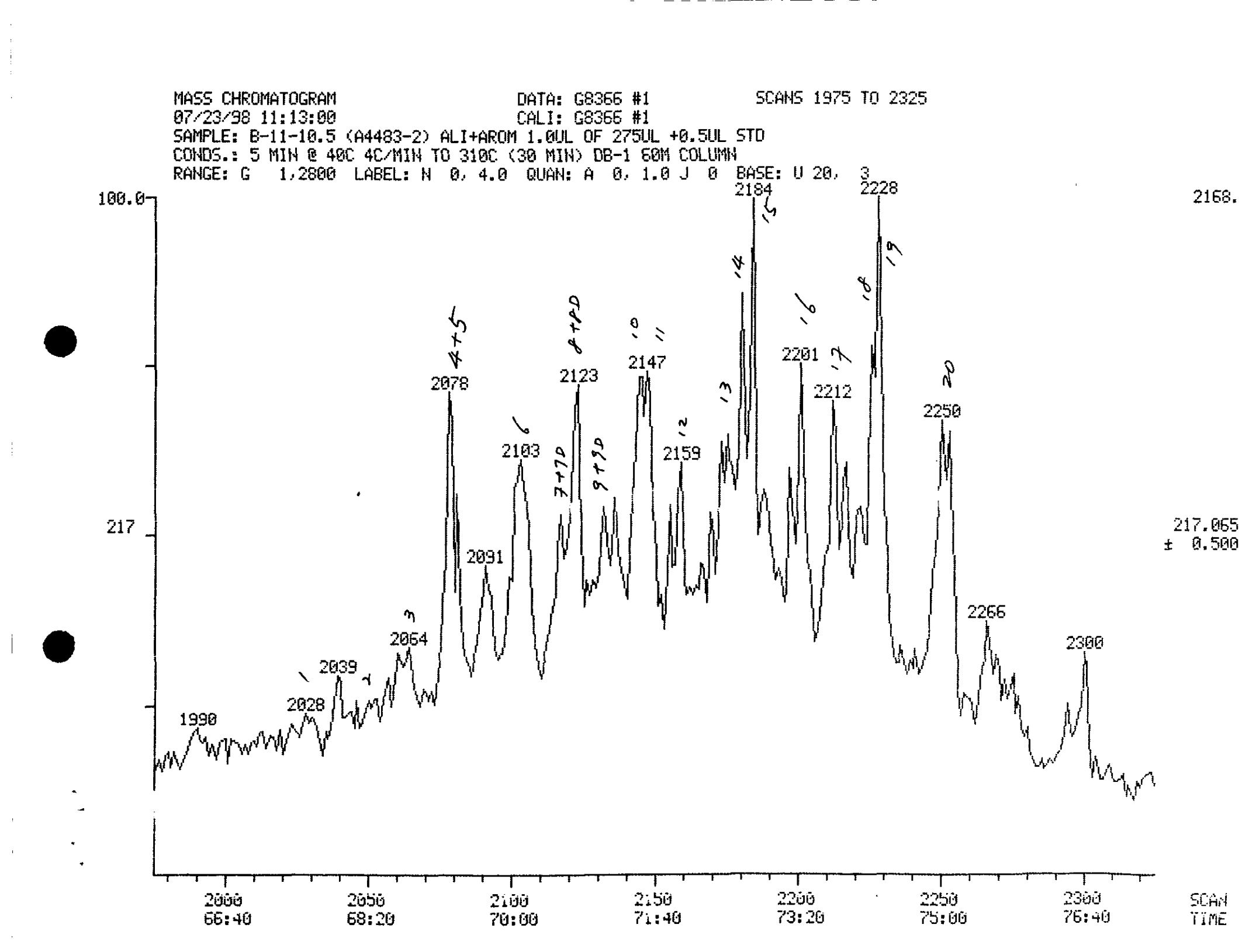
MASS CHROMATOGRAM
07/23/98 9:14:00

DATA: G8365 #1
CALI: G8365 #1

SCANS 1975 TO 2325

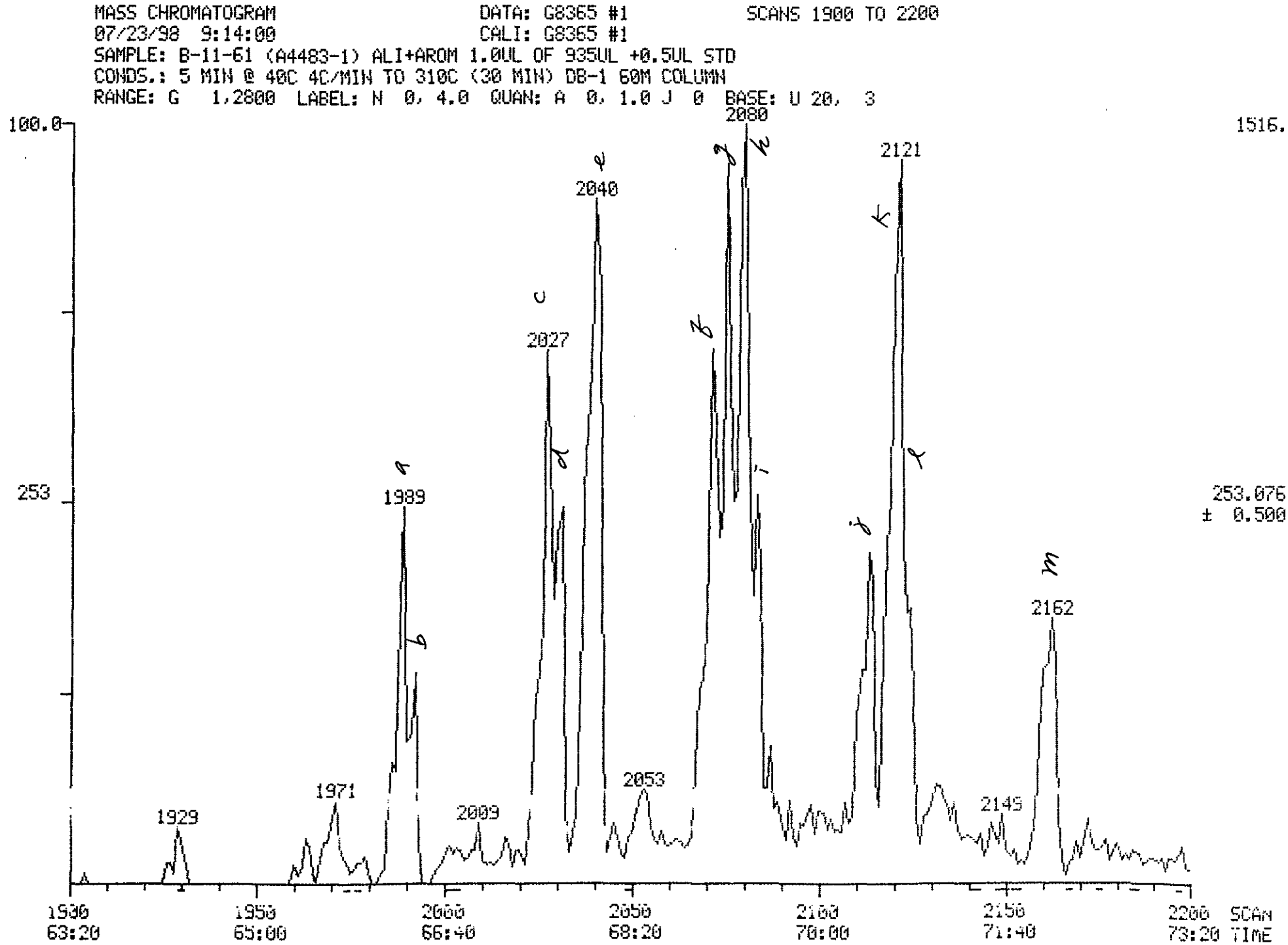
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1.2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

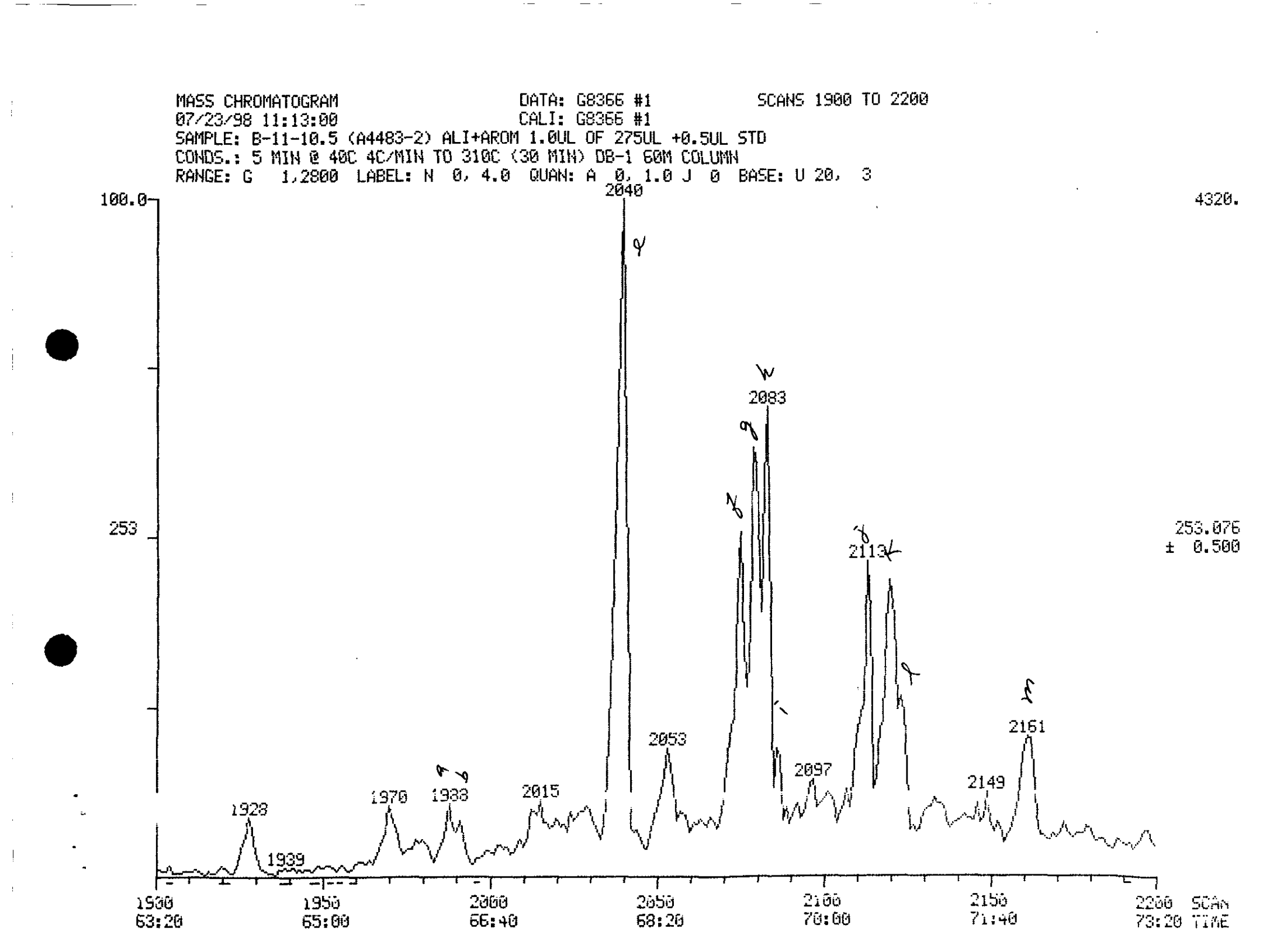



MASS CHROMATOGRAM
07/23/98 11:13:00
DATA: G8366 #1
CALI: G8366 #1
SCANS 1975 TO 2325
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
217
2168.
217.065
± 0.500
1990
2028
2039
2064
2078
2091
2103
2123
2147
2159
2184
2201
2212
2228
2250
2266
2300
4+5
6
7+7D
8+8D
9+9D
10
11
12
13
14
15
16
17
18
19
20
2000
66:40
2050
68:20
2100
70:00
2150
71:40
2200
73:20
2250
75:00
2300
76:40
SCAN
TIME

Key for Monoaromatic Sterane Hydrocarbon Identification (m/z 253 fragmentograms)

CODE	IDENTITY	ELEMENTAL COMPOSITION
a	20S, 5β C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
b	20S, dia C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
c	20R, 5β C_{27}-Monoaromatic sterane + 20R C_{27} dia MAS	$C_{27}H_{42}$
d	20S, 5α C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
e	20S, 5β C_{28}-Monoaromatic sterane + 20S C_{28} dia MAS	$C_{28}H_{44}$
f	20R, 5α C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
g	20S, 5α C_{28}-Monoaromatic sterane	$C_{28}H4_4$
h	20R, 5β C_{28}-Monoaromatic sterane + 20R C_{28} dia MAS	$C_{28}H_{44}$
i	20S, 5β C_{29}-Monoaromatic sterane + 20S C_{29} dia MAS	$C_{29}H_{46}$
j	20S, 5α C_{29}-Monoaromatic sterane	$C_{29}H_{46}$
k	20R, 5α C_{28}-Monoaromatic sterane	$C_{28}H_{44}$
l	20R, 5β C_{29}-Monoaromatic sterane + 20R C_{29} dia MAS	$C_{29}H_{46}$
m	20R, 5α C_{29}-Monoaromatic sterane	$C_{29}H_{46}$

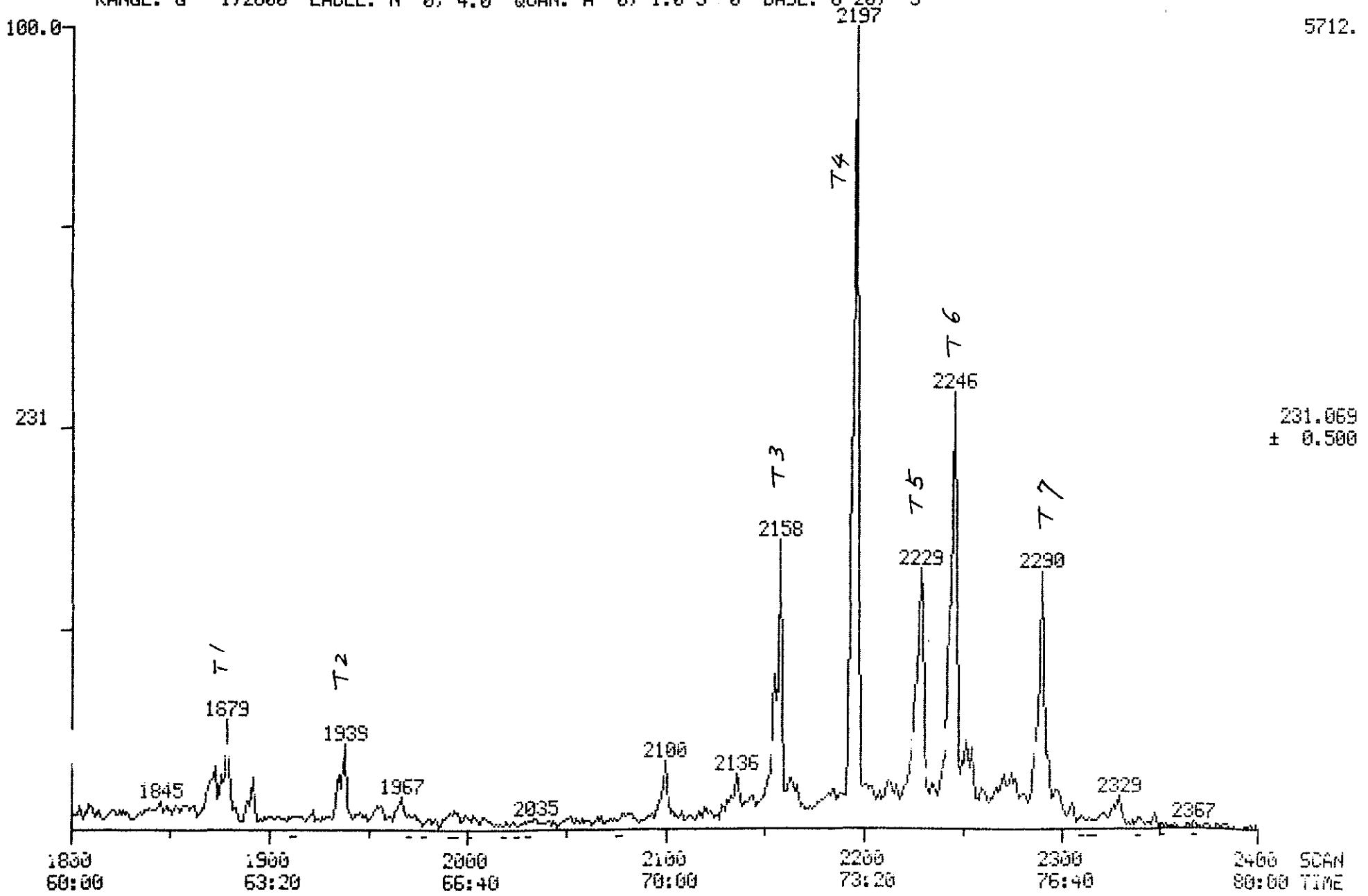

MASS CHROMATOGRAM
07/23/98 9:14:00
DATA: G8365 #1
CALI: G8365 #1
SCANS 1900 TO 2200
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
1516.
253
253.076
± 0.500
1929
1971
1989
2009
2027
2040
2053
2080
2121
2145
2162
a
b
c
d
e
f
g
h
i
j
k
l
m
1900
63:20
1950
65:00
2000
66:40
2050
68:20
2100
70:00
2150
71:40
2200
73:20
SCAN
TIME


MASS CHROMATOGRAM
07/23/98 11:13:00
DATA: G8366 #1
CALI: G8366 #1
SCANS 1900 TO 2200
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1.2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
4320.
253
253.076
± 0.500
2040
2083
2113
1928
1939
1970
1988
2015
2053
2097
2149
2161
1900
63:20
1950
65:00
2000
66:40
2050
68:20
2100
70:00
2150
71:40
2200
73:20
SCAN
TIME

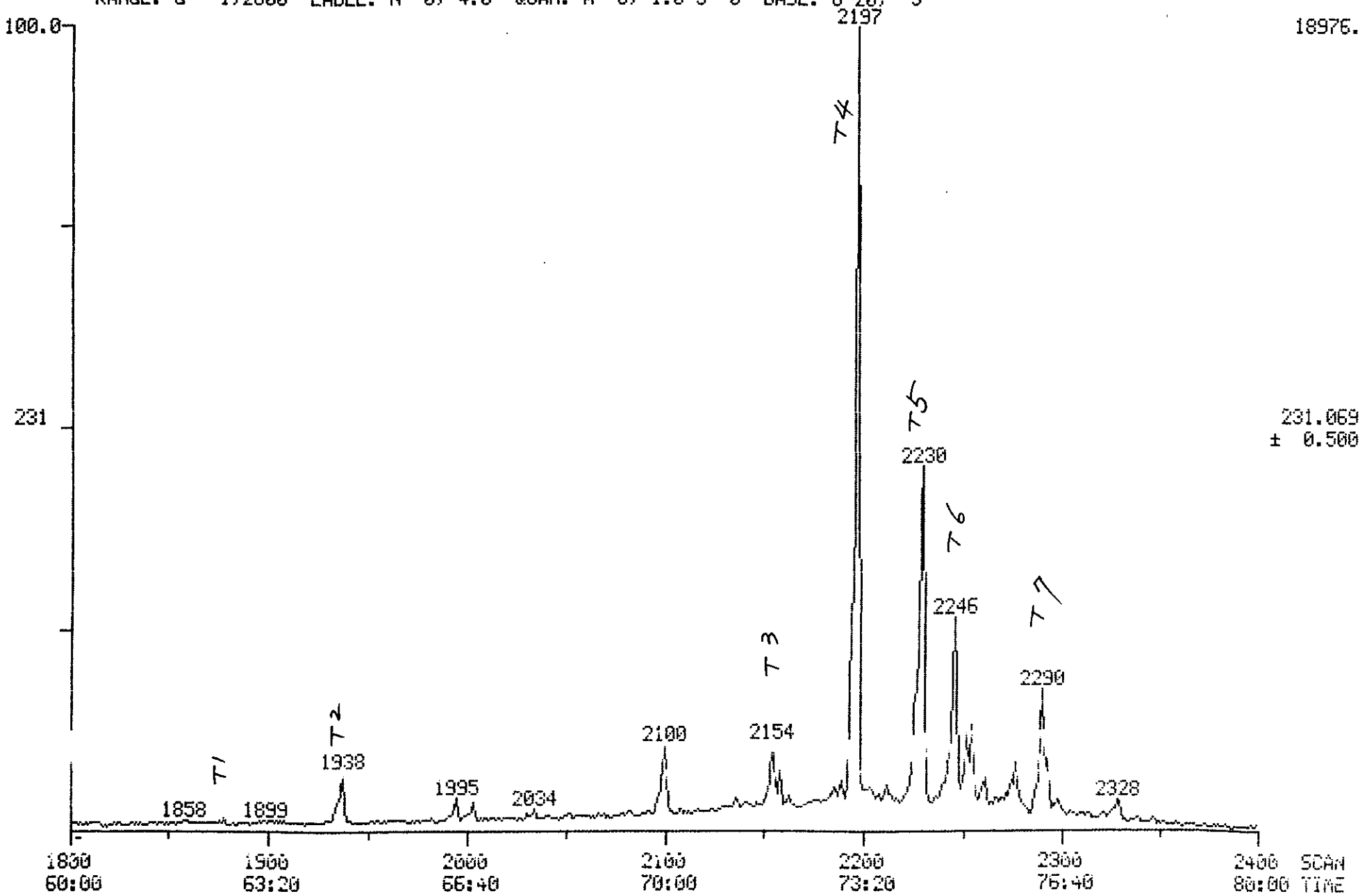
Key for Triaromatic Steranes Identification
(m/z 231 chromatogram)

Code	Identity	Elemental Composition
T1	C_{20} Triaromatic sterane	$C_{20}H_{20}$
T2	C_{21} Triaromatic sterane	$C_{21}H_{22}$
T3	20S C_{26} Triaromatic sterane	$C_{26}H_{32}$
T4	20R C_{26} + 20S C_{27}-Triaromatic steranes	$C_{26}H_{32} + C_{27}H_{34}$
T5	20S C_{28}-Triaromatic sterane	$C_{28}H_{36}$
T6	20R C_{27}-Triaromatic sterane	$C_{27}H_{34}$
T7	20R C_{28}-Triaromatic sterane	$C_{28}H_{36}$

MASS CHROMATOGRAM DATA: G8365 #1 SCANS 1800 TO 2400
07/23/98 9:14:00 CALI: G8365 #1
SAMPLE: B-11-61 (A4483-1) ALI+AROM 1.0UL OF 935UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



MASS CHROMATOGRAM DATA: G8366 #1 SCANS 1800 TO 2400
07/23/98 11:13:00 CALI: G8366 #1
SAMPLE: B-11-10.5 (A4483-2) ALI+AROM 1.0UL OF 275UL +0.5UL STD
CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



Key for Aromatic Compound Identification

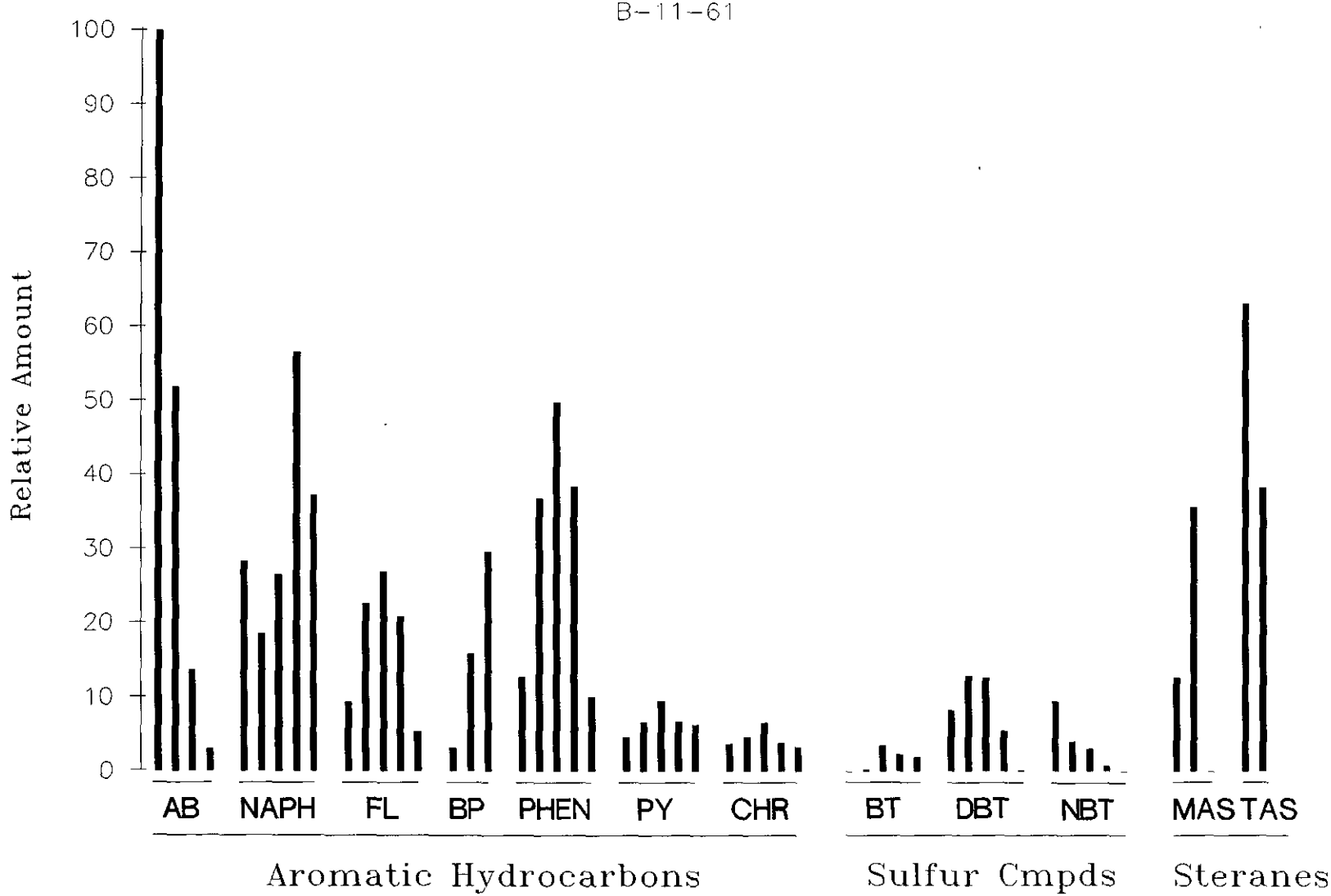
AB:	C_3-C_6 Alkylbenzenes
NAPH:	C_0-C_4 Naphthalenes
FL:	C_0-C_4 Fluorenes
BP:	C_0-C_2 BP Biphenyl/Dibenzofuran
PHEN:	C_0-C_4 Phenanthrenes
PY:	C_0-C_4 Pyrenes/Fluoranthenes
CHR:	C_0-C_4 Chrysenes
BT:	C_1-C_5 Benzothiophenes
DBT:	C_0-C_4 Dibenzothiophenes
NBT:	C_0-C_4 Naphthobenzothiophenes
MAS:	Monoaromatic Steranes
TAS:	Triaromatic Steranes

Key for Identifying Aromatic Hydrocarbons

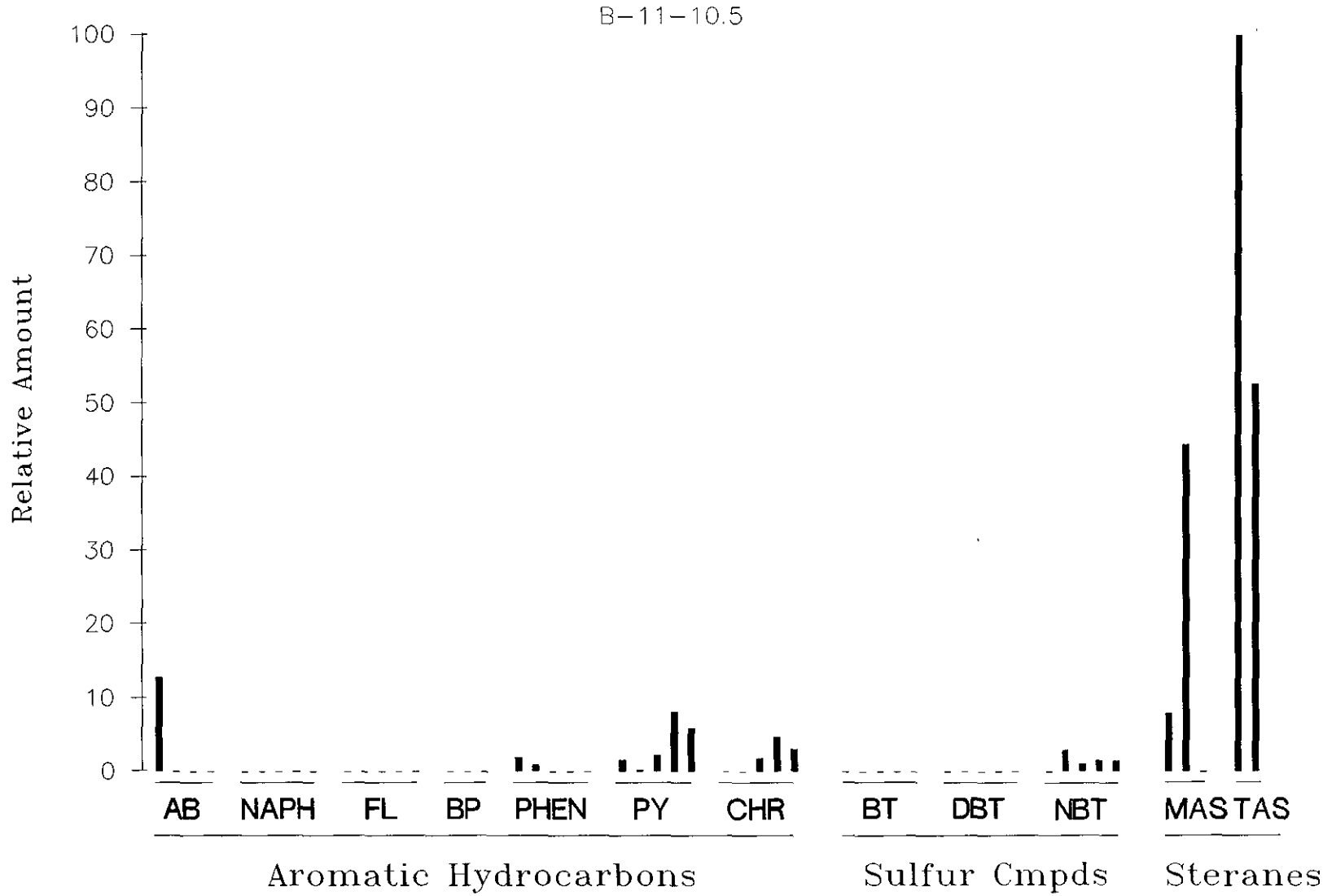
No.	m/z	Compound
1	120	C_3-alkylbenzenes
2	134	C_4-alkylbenzenes
3	148	C_5-alkylbenzenes
4	162	C_6-alkylbenzenes
5	128	C_0-naphthalene
6	142	C_1-naphthalenes
7	156	C_2-naphthalenes
8	170	C_3-naphthalenes
9	184	C_4-naphthalenes
10	166	C_0-fluorene
11	180	C_1-fluorenes
12	194	C_2-fluorenes
13	208	C_3-fluorenes
14	222	C_4-fluorenes
15	154	C_0-biphenyl
16	168	C_1-biphenyls + dibenzofuran
17	182	C_2-biphenyls + C_1-dibenzofuran
18	178	C_0-phenanthrene
19	192	C_1-phenanthrenes
20	206	C_2-phenanthrenes
21	220	C_3-phenanthrenes
22	234	C_4-phenanthrenes
23	202	C_0-pyrene/fluoranthene
24	216	C_1-pyrenes/fluoranthenes
25	230	C_2-pyrenes/fluoranthenes
26	244	C_3-pyrenes/fluoranthenes
27	258	C_4-pyrenes/fluoranthenes
28	228	C_0-chrysene
29	242	C_1-chrysenes
30	256	C_2-chrysenes
31	270	C_3-chrysenes
32	284	C_4-chrysenes
33	148	C_1-benzothiophenes
34	162	C_2-benzothiophenes
35	176	C_3-benzothiophenes
36	190	C_4-benzothiophenes
37	204	C_5-benzothiophenes
28	184	C_0-dibenzothiophene
39	198	C_1-dibenzothiophenes
40	212	C_2-dibenzothiophenes
41	226	C_3-dibenzothiophenes
42	240	C_4-dibenzothiophenes
43	234	C_0-naphthobenzothiophene
44	248	C_1-naphthobenzothiophenes
45	262	C_2-naphthobenzothiophenes
46	276	C_3-naphthobenzothiophenes
47	290	C_4-naphthobenzothiophenes
48	253	Monoaromatic steranes
49	267	Monoaromatic steranes
50	239	Monoaromatic steranes
51	231	Triaromatic steranes
52	245	Triaromatic steranes

Aromatic Hydrocarbon Distribution

B-11-61



Aromatic Hydrocarbon Distribution



Global Geochemistry Corporation

APPENDIX

QA/QC DATA

&

CHAIN OF CUSTODY

Date analyzed:7/29/98

August 3, 1998

Surrogate Recovery

Sample ID	GGC ID	Acetone Recovery (%)
Method Blank		106
B-11-61	4483-1	87
B-11-10.5	4483-2	88
	Blk MS	103
	Blk MSD	97

Batch Matrix Spike and Matrix Spike Duplicate Recovery

Sample ID	GGC ID	Ethanol	tert-Butanol	MTBE	DIPE	ETBE	TAME
		Recovery %					
METHOD BLANK		ND	ND	ND	ND	ND	ND
	Blk MS	118	117	101	96	100	102
	Blk MSD	117	109	94	90	94	93
Spike Added (ppb):		25000	2000	250	250	250	250

MS = Matrix Spike
MSD= Matrix Spike Duplicate

Date analyzed:7/29/98

August 3, 1998

Quality control data for oxygenate analysis

Sample ID	GGCID	Ethanol	Acetone (surrogate)	tert-Butanol	MTBE	DIPE	ETBE	TAME	Acceptance Limit
		Retention Time (min)							
Standard oxygenate		16.41	17.14	18.05	20.48	22.11	22.99	25.74	±0.5
B-11-61	4483-1	ND	17.17	ND	20.47	ND	ND	ND	±0.5
B-11-10.5	4483-2	ND	17.11	ND	20.40	ND	ND	ND	±0.5
	Blk MS	16.44	17.15	18.09	20.45	22.06	22.93	25.64	±0.5
	Blk MSD	16.52	17.17	18.18	20.46	22.06	22.93	25.63	±0.5

ND: Not Detected

Date analyzed:7/29/98

August 3, 1998

Instrument calibration control for oxygenate analysis

Analytes	RF	RF_D	% Difference	Acceptance Limit (%)
Ethanol	7649	7732	1.1	± 15
tert-Butanol	73070	75193	2.9	± 15
MTBE	752379	696332	-7.4	± 15
DIPE	996303	1030148	3.4	± 15
ETBE	807293	768404	-4.8	± 15
TAME	1018701	946068	-7.1	± 15

RF = Linear response factor from 3 point calibration
RF_D = Daily response factor from calibration check standards
MTBE: Methyl tert-Butyl Ether
DIPE: Diisopropyl Ether
ETBE: Ethyl tert-Butyl Ether
TAME: tert-Amyl Methyl Ether

Calibration file:OXPT208.CAL

Chromatography by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE....7/20/98 TIME.....1:51:10 PM
RAW DATA FILE NAME..E:\DATA3\C10196.04R
SAMPLE NAME.....B-11-61 (4483-1) 3.0 of 1300ul + (IS) .3ul inj.2
DATE TAKEN..07-15-1998 18:05:24
METHOD FILE.....E:\DATA3\C8196B.MET
METHOD:..C8+ Analysis
CALIBRATION FILE...E:\DATA3\C8_196B.CAL CAL. FILE VERSION....3
INSTRUMENT.....Carlo Erba--FID OPERATOR....Lev Baycher
RUN TIME.....90
AREA REJECT.....100 COM PORT....3
HEADING 1..C8+ Analysis
HEADING 2..
FORMAT FILE..E:\DATA3\NORMAL.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
1	1	4.053		2552158	987681	
2	2	4.857		396961	63775	
3	3	5.012	n-C8	499708	254919	
4	4	5.833		1136658	180108	
5	5	6.185		1126375	269016	
6	6	6.455		3638945	712368	
7	7	6.953		516796	99535	
8	8	7.084		1320067	328052	
9	9	7.284		786289	79704	
10	10	7.846	n-C9	996798	134043	
11	11	8.194		507247	69183	
12	12	8.664		503262	76496	
13	13	9.038		1524207	99228	
14	14	9.408		2157651	245071	
15	15	9.689		875285	123859	
16	16	9.995		2054476	130706	
17	17	10.554		2629337	270529	
18	18	11.043		302928	39989	
19	19	11.479	n-C10	1226522	91865	
20	20	11.819		407750	52536	
21	21	12.005		538086	63692	
22	22	12.28		868581	70824	
23	23	12.807		2306020	99924	
24	24	13.607		975446	83735	
25	25	13.884		1769190	102952	
26	26	14.574		903882	44882	
27	27	15.116	n-C11	1329393	111430	
28	28	15.689		1238540	87546	
29	29	16.071		929298	60444	
30	30	16.456		396112	35235	
31	31	17.055		813850	59412	
32	32	17.177		513678	56866	
33	33	17.726		2647513	97111	
34	34	18.348		1276845	80915	
35	35	19.35	i-C13	2192441	132187	
36	36	19.953		796096	44872	
37	37	20.568		220293	34512	
38	38	21.05		141761	34014	
39	39	21.417	i-C14	2074284	144783	
40	40	22.86		1529467	62530	
41	41	23.252		477079	69458	

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
42	42	24.309		1054552	54195	
43	43	24.898	i-C15	2540591	174667	
44	44	25.201		372272	46860	
45	45	27.294		1056033	38783	
46	46	27.625	i-C16	1954788	176067	
47	47	27.852		294277	54582	
48	48	28.407		868251	66930	
49	49	29.206		785165	55952	
50	50	30.009		4949878	112956	
51	51	31.394		3667110	124737	
52	52	32.721		402962	61820	
53	53	33.101	i-C18	2880145	193454	
54	54	33.524		3068158	167159	
55	55	33.832		2288922	112401	
56	56	34.693	PR	4668803	196549	
57	57	35.155		7572944	149708	
58	58	37.405	PH	4037997	167913	
59	59	40.307		1174061	77155	
60	60	41.015		758480	70919	
61	61	41.446		395144	65865	
62	62	41.818	Internal Standard	4661651	224276	
63	63	43.909		1157831	80109	
64	64	45.051		540855	54723	
65	65	45.832		320027	38179	
66	66	48.238		489846	41486	
67	67	49.48		329540	34526	
68	68	51.114		1837148	40127	
69	69	55.193		339403	36221	
70	70	57.105		253303	19554	
71	71	59.304		887357	31494	
72	72	60.544		285934	30741	

Group	Group Amount	Amount %
0	0.000	N/A

TOTAL AREA DETECTED = 1.049907E+08

Analyzed by Bayc Lev Baycher

Checked by Shan-Tan Lin Date 7/20/18

Chromatography by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE....7/20/98 TIME.....1:37:40 PM
RAW DATA FILE NAME..E:\DATA3\C10196.02R
SAMPLE NAME.....B-11-61 (4483-1D) 3.0 of 2000ul + (IS) .3ul inj.1
DATE TAKEN..07-15-1998 13:48:14
METHOD FILE.....E:\DATA3\C8196B.MET
METHOD:..C8+ Analysis
CALIBRATION FILE...E:\DATA3\C8_196B.CAL CAL. FILE VERSION....3
INSTRUMENT.....Carlo Erba--FID OPERATOR....Lev Baycher
RUN TIME.....90
AREA REJECT.....100 COM PORT....3
HEADING 1..C8+ Analysis
HEADING 2..
FORMAT FILE..E:\DATA3\NORMAL.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
1	1	4.103		1726340	865018	
2	2	4.336		278956	115493	
3	3	5.053	n-C8	2765850	260078	
4	4	6.205		1042705	358255	
5	5	6.466		3358173	699185	
6	6	7.078		2403341	433895	
7	7	7.833	n-C9	1054272	154714	
8	8	8.158		821251	84956	
9	9	8.633		487145	67142	
10	10	8.996		939831	92099	
11	11	9.392		1933300	251931	
12	12	9.676		872045	141193	
13	13	9.955		1990665	128931	
14	14	10.517		2444279	299801	
15	15	11.159		622813	48801	
16	16	11.443	n-C10	1145921	83115	
17	17	11.805		383981	51423	
18	18	11.991		540200	70452	
19	19	12.266		611864	73824	
20	20	12.699		1125045	95900	
21	21	12.945		1242008	89261	
22	22	13.606		928251	78793	
23	23	13.851		1609015	93428	
24	24	14.543		922337	38902	
25	25	15.116	n-C11	1210875	107391	
26	26	15.708		1967879	81738	
27	27	16.453		365512	31607	
28	28	17.07		721347	52127	
29	29	17.741		1828933	90799	
30	30	18.18		605918	46176	
31	31	18.347		1076892	71780	
32	32	19.385	i-C13	2391492	142231	
33	33	19.942		1536158	70287	
34	34	20.547		747613	81196	
35	35	20.702		1126303	84075	
36	36	21.221		851302	64665	
37	37	21.449	i-C14	3511124	174136	
38	38	22.875		1578967	63930	
39	39	23.236		864810	61573	
40	40	24.303		654288	46557	
41	41	24.913	i-C15	2095295	170201	

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
42	42	25.253		522228	37245	
43	43	26.057		123783	38501	
44	44	26.916		553838	51753	
45	45	27.42		910959	99321	
46	46	27.614	i-C16	1721015	179490	
47	47	28.214		1976261	71857	
48	48	29.662		787595	61230	
49	49	30.001		2150413	80767	
50	50	30.892		101453	28618	
51	51	31.355		834922	80621	
52	52	31.389		1430743	85272	
53	53	32.189		255685	40286	
54	54	33.059	i-C18	2227365	155862	
55	55	34.566	PR	5932445	136105	
56	56	35.18		2491068	98299	
57	57	36.536		1637664	70867	
58	58	37.34	PH	1687716	126239	
59	59	41.541		2103052	84537	
60	60	41.814	Internal Standard	3452867	262513	
61	61	43.01		786408	43610	
62	62	43.785		602712	59703	
63	63	44.828		414481	43026	
64	64	45.337		749046	57107	
65	65	47.591		207639	42181	
66	66	48.334		143230	37943	
67	67	55.159		766143	30559	
68	68	58.816		302380	25569	
69	69	60.462		183723	15990	

Group	Group Amount	Amount %
0	0.000	N/A

TOTAL AREA DETECTED = 8.944111E+07

Analyzed by _____ Lev Baycher

Checked by _____ Date 7/20 '98

Chromatography by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE....7/20/98 TIME.....1:43:07 PM
RAW DATA FILE NAME..E:\DATA3\C10196.03R
SAMPLE NAME.....B-11-10.5 (4483-2) 3.0 of 2000ul + (IS) .3ul inj.1
DATE TAKEN..07-15-1998 15:43:10
METHOD FILE.....E:\DATA3\C8196C.MET
METHOD:..C8+ Analysis
CALIBRATION FILE...E:\DATA3\C8_196B.CAL CAL. FILE VERSION....3
INSTRUMENT.....Carlo Erba--FID OPERATOR....Lev Baycher
RUN TIME.....90
AREA REJECT.....100 COM PORT....3
HEADING 1..C8+ Analysis
HEADING 2..
FORMAT FILE..E:\DATA3\NORMAL.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
1	1	4.09		1401149	325703	
2	2	4.475		457734	154408	
3	3	4.693		295227	46971	
4	4	5.044	n-C8	808027	167392	
5	5	6.196		380708	152197	
6	6	6.445		1368673	296384	
7	7	7.059		461438	68269	
8	8	7.806	n-C9	76394	16138	
9	9	41.536	Internal Standard	1883333	214953	
10	10	49.337		101856	9917	

Group	Group Amount	Amount %
0	0.000	N/A

TOTAL AREA DETECTED = 7234540

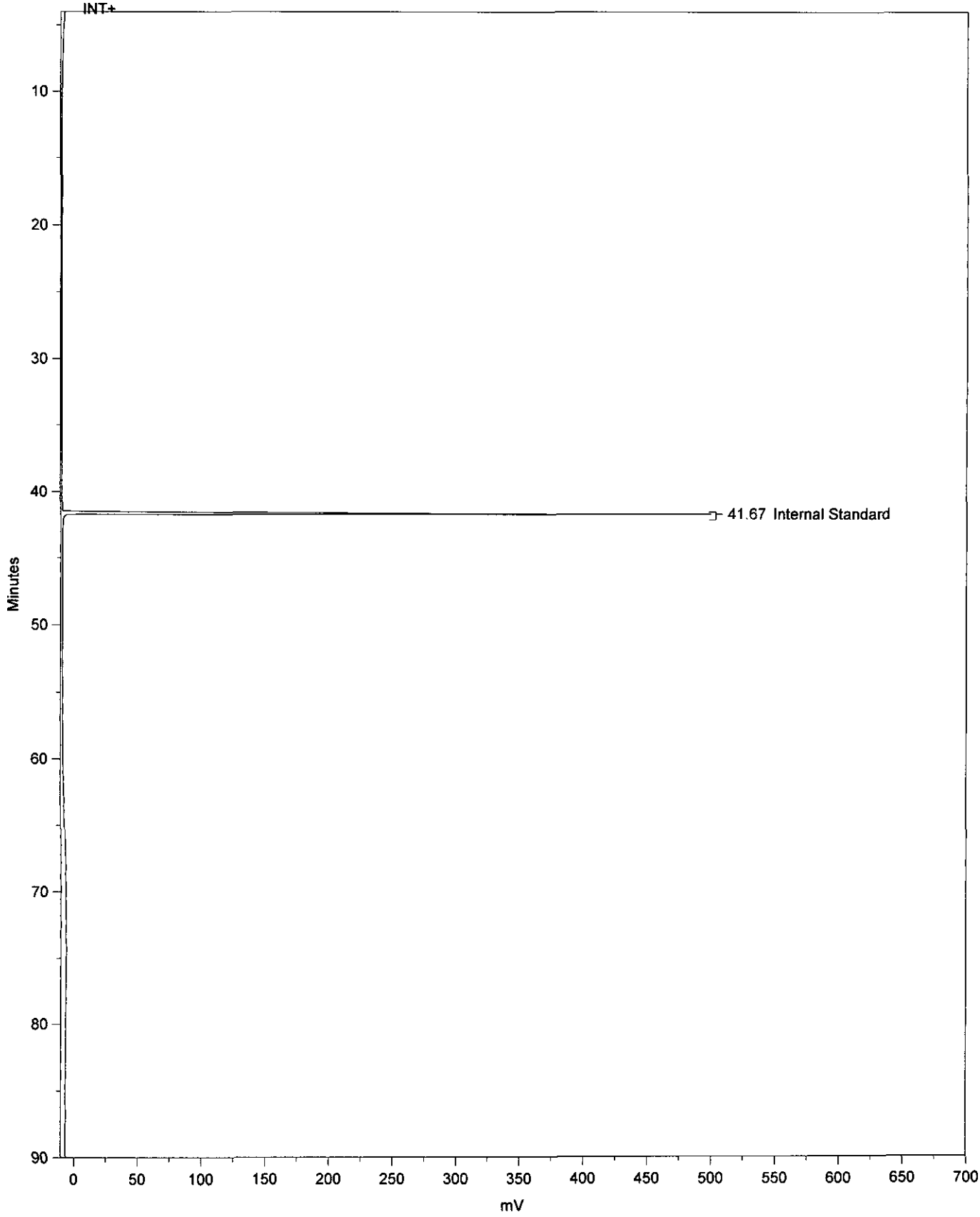
Analyzed by Bay Lev Baycher

Checked by [signature] Date 7/20/98

Method-Blank for W.O. #4483

E:\DATA3\C10201.01R

INT+



Chromatography by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE....7/20/98 TIME.....3:49:03 PM
RAW DATA FILE NAME..E:\DATA3\C10201.01R
SAMPLE NAME.....Method-Blank for W.O. #4483
DATE TAKEN..07-20-1998 15:43:19
METHOD FILE.....E:\DATA3\C8196B.MET
METHOD:..C8+ Analysis
CALIBRATION FILE...E:\DATA3\C8_196B.CAL CAL. FILE VERSION....3
INSTRUMENT.....Carlo Erba--FID OPERATOR....Lev Baycher
RUN TIME.....90
AREA REJECT.....100 COM PORT....3
HEADING 1..C8+ Analysis
HEADING 2..
FORMAT FILE..E:\DATA3\NORMAL.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
1	1	41.672	Internal Standard	3074563	508614	

Group	Group Amount	Amount %
0	0.000	N/A

TOTAL AREA DETECTED = 3074563

Analyzed by _____ Lev Baycher

Checked by _____ Date 7/20 '98

Chromatography by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE....7/20/98 TIME.....12:58:25 PM
RAW DATA FILE NAME..E:\DATA3\C10197.01R
SAMPLE NAME.....Diesel Std 07/15/98
DATE TAKEN..07-16-1998 16:22:05
METHOD FILE.....!E:\DATA3\C8187B.MET
METHOD:..C8+ Analysis
CALIBRATION FILE...!E:\DATA3\C8_187B.CAL CAL. FILE VERSION....1
INSTRUMENT.....Carlo Erba--FID OPERATOR....Lev Baycher
RUN TIME.....90
AREA REJECT.....100 COM PORT....3
HEADING 1..C8+ Analysis
HEADING 2..
FORMAT FILE..E:\DATA3\NORMAL.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
1	1	4.951	n-C8	12826	5240	
2	2	7.79	n-C9	60935	15600	
3	3	9.914		89455	11397	
4	4	10.437		116147	11302	
5	5	11.28	n-C10	157844	35696	
6	6	12.145		75490	19281	
7	7	13.673		61408	10779	
8	8	15.	n-C11	478054	105469	
9	9	15.696		82039	10701	
10	10	16.032		354097	29755	
11	11	16.807		39072	7686	
12	12	17.388		237314	17098	
13	13	18.29		170139	18416	
14	14	18.666	n-C12	456447	123248	
15	15	19.2	i-C13	313765	56585	
16	16	20.016		153832	26818	
17	17	20.5		175420	17019	
18	18	20.873		171584	30996	
19	19	21.272	i-C14	186941	43041	
20	20	21.93		134401	28981	
21	21	22.128	n-C13	629658	139057	
22	22	22.725		224415	25872	
23	23	23.904		109655	12714	
24	24	24.226		274325	31389	
25	25	24.705	i-C15	363723	71146	
26	26	25.392	n-C14	583051	154771	
27	27	26.105		91421	17481	
28	28	26.654		172301	21520	
29	29	27.056		366326	24019	
30	30	27.403	i-C16	383928	91288	
31	31	27.586		117850	27609	
32	32	28.164		158042	15195	
33	33	28.492	n-C15	892302	180809	
34	34	29.431		321214	17466	
35	35	29.806		414257	31016	
36	36	30.468		442007	31076	
37	37	31.183		187823	31105	
38	38	31.423	n-C16	1155819	239568	
39	39	32.85	i-C18	788571	95738	
40	40	33.039		249789	26851	
41	41	33.37		135944	26287	

	Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height	Component Amount
42	42	34.211	*n*-C17	1072589	190889	
43	43	34.459	PR	849922	135695	
44	44	35.41		141018	16932	
45	45	35.62		252844	30901	
46	46	36.099		93183	13908	
47	47	36.869	n-C18	844540	181681	
48	48	37.162	PH	494487	93348	
49	49	38.306		416110	22892	
50	50	39.405	n-C19	922407	153957	
51	51	40.802		332366	15181	
52	52	41.586	*Internal Standard*	2097702	339439	
53	53	41.799	n-C20	777811	126576	
54	54	43.645		93960	11032	
55	55	44.111	n-C21	473354	91524	
56	56	46.332	n-C22	278927	69366	
57	57	48.464	n-C23	212280	45116	
58	58	50.501	n-C24	110614	19864	
59	59	52.482	n-C25	51789	8061	
60	60	54.408	n-C26	12271	3213	
61	61	56.271	n-C27	3874	890	
62	62	58.046	*n*-C28	1065	370	

Group	Group Amount	Amount %
0	0.000	N/A
1	0.000	N/A
2	0.000	N/A

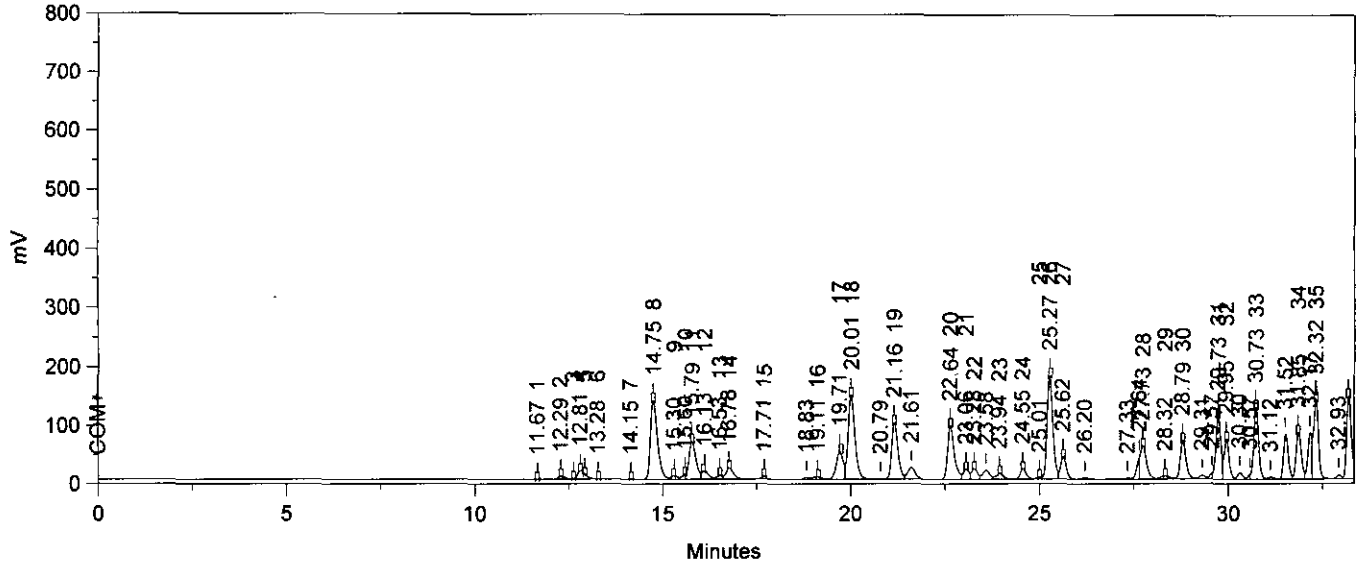
TOTAL AREA DETECTED = 2.112274E+07

Analyzed by _____ Lev Baycher

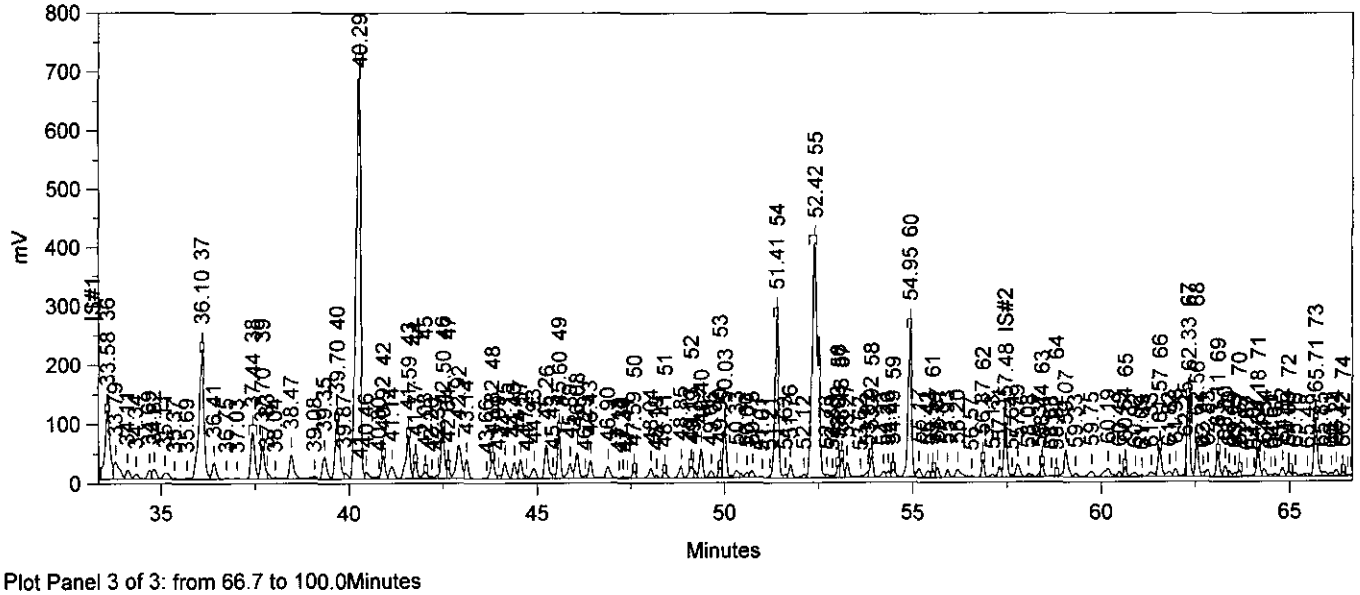
Checked by _____ Date 7/22/98

E:\DATA6\C310191.03R --- 4483-1 (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 19:48:16

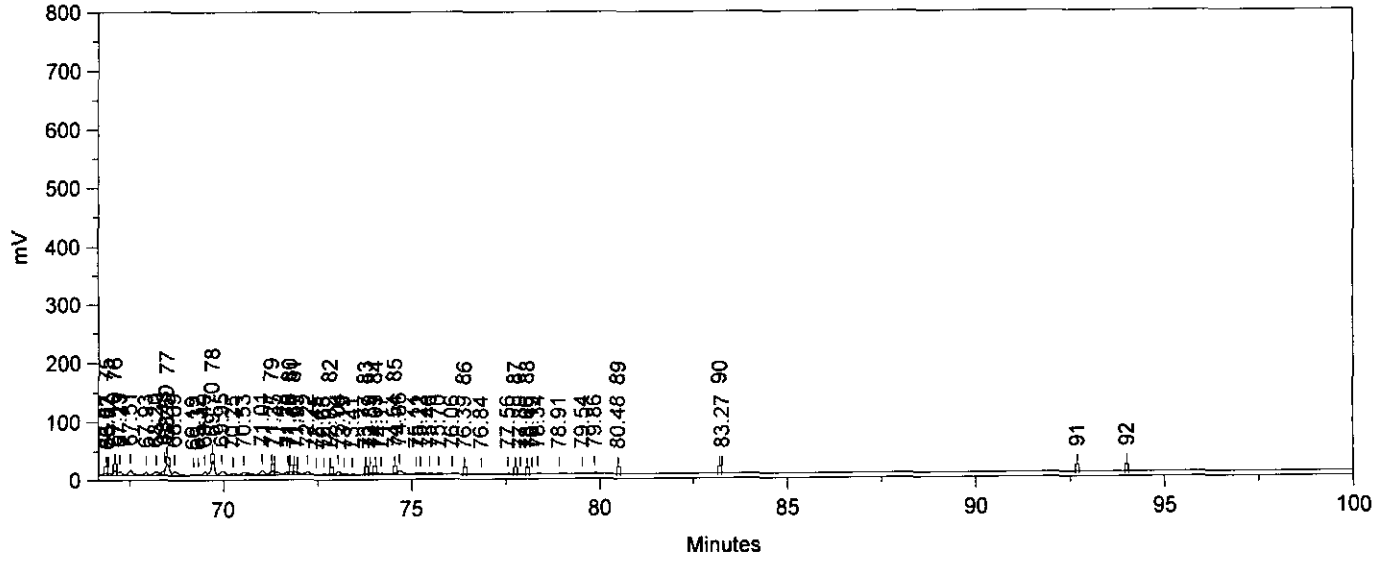
Plot Panel 1 of 3: from 0.0 to 33.3Minutes



Plot Panel 2 of 3: from 33.3 to 66.7Minutes



Plot Panel 3 of 3: from 66.7 to 100.0Minutes



E:\DATA6\C310191.03R --- 4483-1 (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 19:48:16

C3 to C10 ANALYSIS by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE: 7/15/98 TIME: 8:14:48 AM
RAW DATA FILE NAME: E:\DATA6\C310191.03R
SAMPLE NAME.....4483-1 (1g sample/5mL water) + 3uL IS-007
DATE TAKEN: 07-10-1998 19:48:16
METHOD FILE: !E:\DATA6\C310191C.MET
METHOD: C3-C10 Analysis
CALIBRATION FILE: !E:\DATA6\C310191C.CAL
INSTRUMENT: HP5890/ALS--FID OPERATOR: R.deLeon
RUN TIME: 110min
COM PORT: 6
HEADING 1: HP5890/Autosampler purge&trap
HEADING 2: GC range=2^1
FORMAT FILE: E:\DATA6\C3C10.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM:

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
1	11.67	1	4148	324
2	12.29	2	73480	5452
3	12.81	4	211718	14576
4	13.28	6	11825	857
5	14.15	7	16192	1153
6	14.75	8	1781157	135400
7	15.30	9	80128	6435
8	15.60	10	57382	9126
9	15.79	11	857428	65274
10	16.13	12	183265	14315
11	16.53	13	78602	7157
12	16.78	14	271164	19695
13	17.71	15	58077	4413
14	18.83		39511	3663
15	19.11	16	80569	4748
16	19.71	17	611185	48659
17	20.01	18	1807313	144449
18	20.79		7003	605
19	21.16	19	1115795	96697
20	21.61		280151	19650
21	22.64	20	1138466	92155
22	23.06	21	184027	17541
23	23.28	22	202809	18564
24	23.58		199895	15468
25	23.94	23	143295	10364
26	24.55	24	195919	18080
27	25.01	25	28593	3615
28	25.27	26	1885928	177172
29	25.62	27	412993	38545
30	26.20		38846	3106
31	27.33		17223	2037
32	27.64		193900	38394
33	27.73	28	658426	57517
34	28.32	29	93285	5543
35	28.79	30	704254	65699
36	29.31		63518	6055
37	29.57		50673	10772
38	29.73	31	1031275	108592
39	29.95	32	618781	69007
40	30.30		108654	11447
41	30.57		34898	8566
42	30.73	33	1113549	122928
43	31.12		40657	4192
44	31.52		673572	76177
45	31.85	34	776586	79233
46	32.17		599791	78703
47	32.32	35	1198725	136333
48	32.93		58586	7009
49	33.19	IS#1	1281479	141863
50	33.58	36	1102200	114769
51	33.79		307853	29067
52	34.11		115259	14961
53	34.34		69268	8264
54	34.69		99170	14713

E:\DATA6\C310191.03R --- 4483-1 (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 19:48:16

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
55	34.82		130653	16075
56	35.11		114073	9841
57	35.37		17494	2201
58	35.69		24654	2828
59	36.10	37	2031223	219392
60	36.41		213229	27940
61	36.75		17393	2086
62	37.03		13342	1681
63	37.44	38	576237	78872
64	37.70	39	404694	53291
65	37.83		45074	10221
66	38.04		17229	2269
67	38.47		326404	40131
68	39.08		39129	3553
69	39.35		305668	37891
70	39.70	40	879858	100942
71	39.87		67198	9821
72	40.29	41	6008502	712914
73	40.46		104388	10963
74	40.80		18197	4484
75	40.92	42	260100	39374
76	41.14		179975	20396
77	41.59	43	579351	73329
78	41.77	44	183953	29521
79	42.03	45	102315	10974
80	42.20		18544	3372
81	42.37		24872	6024
82	42.50	46	535685	82597
83	42.64	47	103389	19084
84	42.92		543113	56661
85	43.14		211739	33520
86	43.66		6032	1040
87	43.82	48	250624	33067
88	43.99		35439	6336
89	44.15		194669	27585
90	44.40		165672	26970
91	44.57		201471	32712
92	44.72		25266	4770
93	44.93		146002	17459
94	45.26		397351	57136
95	45.43		35921	7328
96	45.60	49	452623	80781
97	45.89		193259	24960
98	46.08		303340	43529
99	46.29		23504	4292
100	46.43		182181	30397
101	46.90		153395	19268
102	47.18		7566	1311
103	47.30		24872	3868
104	47.41		12967	2567
105	47.59	50	89130	13209
106	48.04		125446	17857
107	48.19		28125	4937
108	48.41	51	84472	10429
109	48.85		156292	21151
110	49.13	52	140555	19667
111	49.19		63527	14993
112	49.40		314068	49066
113	49.66		95994	12096
114	49.90	53	85472	17139
115	50.03		519161	84685
116	50.33		91777	12443
117	50.60		53118	8727
118	50.75		90650	11894
119	51.01		22118	2917
120	51.21		15645	4701
121	51.41	54	1804699	276610
122	51.63		34860	5741
123	51.76		148144	23641
124	52.12		59073	6218
125	52.42	55	4357595	399734

E:\DATA6\C310191.03R --- 4483-1 (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 19:48:16

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
126	52.73		42643	6770
127	52.88		23802	4125
128	53.03	56	115930	21799
129	53.13	57	184225	33863
130	53.27		144558	25512
131	53.62		19828	3434
132	53.82		57304	10152
133	53.92	58	223741	36327
134	54.23		81636	10485
135	54.36		65238	11310
136	54.49	59	97787	13222
137	54.95	60	1648423	255541
138	55.17		130484	16724
139	55.42		88415	12314
140	55.54	61	86679	13384
141	55.67		106351	18164
142	55.93		83869	13766
143	56.20		151364	14617
144	56.57		21124	3302
145	56.87	62	156266	29947
146	57.13		42580	5260
147	57.31		104717	17951
148	57.48	IS#2	555120	92676
149	57.64		18192	4123
150	57.79		183836	21762
151	58.08		33442	5770
152	58.37		23874	7804
153	58.44	63	131019	22539
154	58.68		22095	3363
155	58.82	64	14945	2705
156	59.07		352082	47120
157	59.33		55214	6997
158	59.75		114973	10478
159	60.19		201033	15024
160	60.49		62049	9922
161	60.64	65	99333	17665
162	60.92		76393	7098
163	61.09		20978	3665
164	61.33		90327	8195
165	61.57	66	318164	48662
166	61.82		85037	9405
167	61.98		97996	14213
168	62.25		44390	25601
169	62.33	67	770386	135952
170	62.56	68	342295	60877
171	62.71		38699	7087
172	62.83		83997	11451
173	63.11	69	269200	43058
174	63.30		121885	19160
175	63.40		56058	10859
176	63.55		39595	6920
177	63.67	70	77928	12104
178	63.87		29171	2947
179	64.07		14127	3716
180	64.18	71	276198	46734
181	64.34		91892	13904
182	64.51		26301	4469
183	64.62		35234	5094
184	64.82		101590	15145
185	64.99	72	65609	9987
186	65.16		48990	6713
187	65.48		69396	5070
188	65.71	73	660679	99345
189	65.85		65785	7499
190	66.11		39961	5709
191	66.24		75792	11649
192	66.42	74	52918	6995
193	66.55		5356	2505
194	66.63		19112	2846
195	66.87	75	38910	4479
196	66.92		21165	4111

E:\DATA6\C310191.03R --- 4483-1 (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 19:48:16

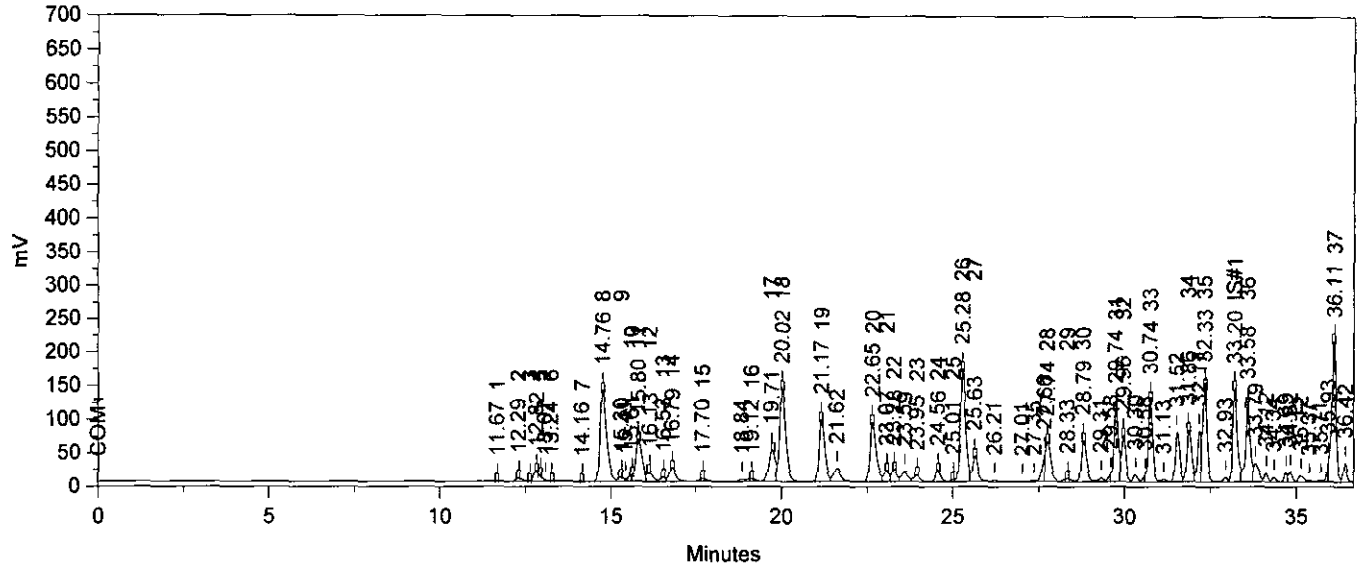
Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
197	67.10	76	53974	9346
198	67.23		54236	7548
199	67.51		89312	9747
200	67.93		42396	5703
201	68.20		66435	6281
202	68.43		46903	10643
203	68.50	77	148847	20639
204	68.69		74336	7366
205	69.19		28767	2953
206	69.32		22635	3314
207	69.49		42514	7129
208	69.70	78	175022	25924
209	69.95		82175	7767
210	70.25		40400	3860
211	70.53		88060	5288
212	71.01		77483	7909
213	71.27	79	60771	7263
214	71.35		48085	5350
215	71.70		36608	5445
216	71.76	80	36589	5669
217	71.87	81	36470	5421
218	71.95		19453	3729
219	72.22		59420	5666
220	72.45		13401	1852
221	72.65		22371	2597
222	72.82	82	19222	2583
223	73.04		56699	7044
224	73.19		26940	2710
225	73.41		30668	2140
226	73.77	83	23442	3187
227	73.89		28779	3854
228	74.03	84	26366	3827
229	74.17		26426	3135
230	74.54	85	17569	3370
231	74.66		81349	7058
232	75.11		26087	2643
233	75.22		22286	3031
234	75.46		23815	3169
235	75.70		22425	2991
236	76.06		22490	1641
237	76.39	86	19311	1837
238	76.84		13552	1604
239	77.56		17791	1832
240	77.89		14975	1343
241	78.06	88	2155	461
242	78.19		3149	645
243	78.34		17608	2320
244	78.91		3505	665
245	79.54		9572	989
246	79.86		26346	1924
247	80.48	89	33976	961
248	83.27		3916	537

TOTAL AREA DETECTED = 6.026092E+07

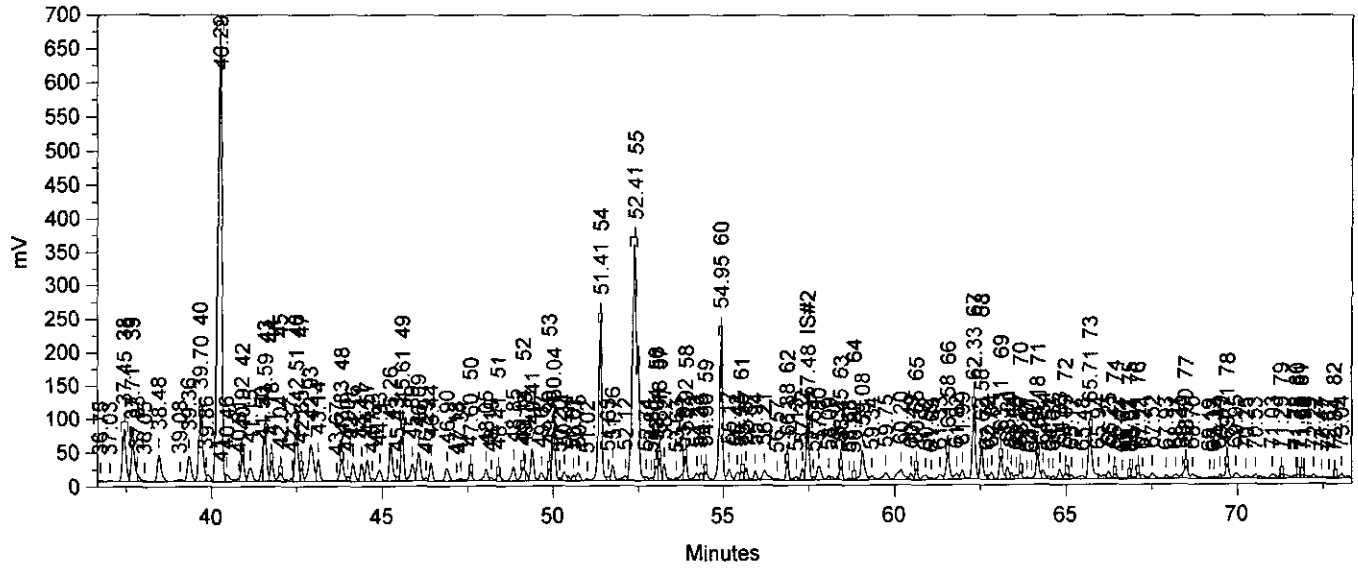
Processed by: _____ Date: 7-15-98

E:\DATA6\C310191.04R --- 4483-1D (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 21:56:45

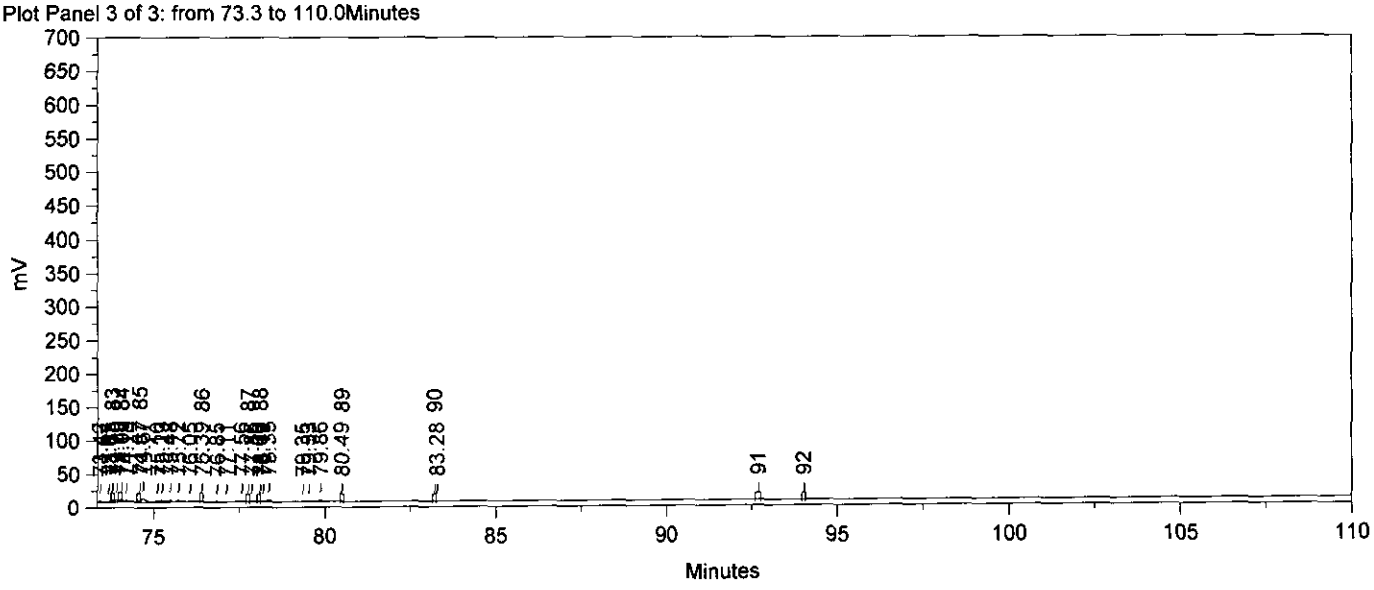
Plot Panel 1 of 3: from 0.0 to 36.7Minutes



Plot Panel 2 of 3: from 36.7 to 73.3Minutes



Plot Panel 3 of 3: from 73.3 to 110.0Minutes



E:\DATA6\C310191.04R --- 4483-1D (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 21:56:45

C3 to C10 ANALYSIS by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE: 7/15/98 TIME: 8:10:36 AM
RAW DATA FILE NAME: E:\DATA6\C310191.04R
SAMPLE NAME.....4483-1D (1g sample/5mL water) + 3uL IS-007
DATE TAKEN: 07-10-1998 21:56:45
METHOD FILE: !E:\DATA6\C310191D.MET
METHOD: C3-C10 Analysis
CALIBRATION FILE: !E:\DATA6\C310191D.CAL
INSTRUMENT: HP5890/ALS--FID OPERATOR: R.deLeon
RUN TIME: 110min
COM PORT: 6
HEADING 1: HP5890/Autosampler purge&trap
HEADING 2: GC range=2^1
FORMAT FILE: E:\DATA6\C3C10.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM:

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
1	11.67	1	4376	387
2	12.29	2	77543	5757
3	12.82	4	215706	15300
4	13.07		10376	2305
5	13.24	6	12385	907
6	14.16	7	15422	1222
7	14.76	8	1801995	134896
8	15.30	9	72557	6551
9	15.41		14157	3941
10	15.61	10	58497	9497
11	15.80	11	834157	62936
12	16.13	12	187175	14374
13	16.53	13	77101	7109
14	16.79	14	272468	19852
15	17.70	15	52151	4227
16	18.84		41347	3787
17	19.12	16	75670	4565
18	19.71	17	593849	46985
19	20.02	18	1750406	138174
20	21.17	19	1074660	91860
21	21.62		267780	18757
22	22.65	20	1095594	88033
23	23.07	21	176862	16651
24	23.28	22	195921	17749
25	23.59		198451	14818
26	23.95	23	128695	9812
27	24.56	24	186947	17161
28	25.01	25	27819	3522
29	25.28	26	1788287	166193
30	25.63	27	414547	38037
31	26.21		37053	3007
32	27.01		18353	1115
33	27.35		17101	1895
34	27.66		204528	39586
35	27.74	28	659057	59464
36	28.33	29	88168	5419
37	28.79	30	659256	61364
38	29.31		61967	5600
39	29.58		51747	10756
40	29.74	31	1014062	107351
41	29.96	32	617775	67868
42	30.30		103187	10925
43	30.58		37765	8913
44	30.74	33	1100816	121569
45	31.13		38523	3891
46	31.52		647665	72935
47	31.86	34	746035	75677
48	32.17		565657	75001
49	32.33	35	1230681	139559
50	32.93		53889	6461
51	33.20	IS#1	1240731	137377
52	33.58	36	1077078	113269
53	33.79		281545	26942
54	34.12		106904	13758

E:\DATA6\C310191.04R --- 4483-1D (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 21:56:45

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
55	34.34		63208	7604
56	34.69		90308	13525
57	34.82		120431	14762
58	35.12		104556	8996
59	35.37		14754	1955
60	35.71		23663	2503
61	35.93		84378	33104
62	36.11	37	1845074	207494
63	36.42		209278	27475
64	36.75		15350	1902
65	37.03		11604	1520
66	37.45	38	560984	76993
67	37.71	39	406155	53806
68	37.83		41507	9689
69	38.05		15354	2029
70	38.48		319814	39357
71	39.08		35045	3274
72	39.36		296737	37204
73	39.70	40	847232	99985
74	39.86		67820	9298
75	40.29	41	5582789	672871
76	40.46		95173	10248
77	40.81		19191	4492
78	40.92	42	254418	38929
79	41.15		174217	19791
80	41.50		86545	24436
81	41.59	43	483248	73717
82	41.78	44	183821	29701
83	42.04	45	99900	10865
84	42.37		23795	5568
85	42.51	46	531937	82596
86	42.65	47	101518	18997
87	42.93		521164	54112
88	43.14		198576	31611
89	43.67		5052	951
90	43.83	48	241801	32304
91	44.00		33537	5816
92	44.16		185382	26553
93	44.41		156451	25801
94	44.57		193165	31393
95	44.72		22781	4445
96	44.93		133528	15804
97	45.26		369846	53921
98	45.43		34989	6710
99	45.61	49	449074	80107
100	45.89		184466	24375
101	46.09		290276	41621
102	46.29		20923	3879
103	46.44		162634	27183
104	46.90		145579	18444
105	47.18		6017	1154
106	47.31		24507	3607
107	47.60	50	85095	12950
108	48.05		117128	16584
109	48.19		24038	4426
110	48.41	51	79100	10132
111	48.85		147917	19936
112	49.14	52	128810	19192
113	49.18		67243	14538
114	49.41		295908	46473
115	49.67		88142	11132
116	49.90	53	82618	16845
117	50.04		500009	81639
118	50.20		15877	3540
119	50.34		87400	11776
120	50.61		50015	8377
121	50.75		86986	11528
122	51.02		20375	2701
123	51.41	54	1560904	240004
124	51.63		32901	5520
125	51.76		141767	22600

E:\DATA6\C310191.04R --- 4483-1D (1g sample/5mL water) + 3uL IS-007 --- 07-10-1998 21:56:45

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
126	52.12		54808	5962
127	52.41	55	3694040	353399
128	52.74		39593	6273
129	52.88		24761	3876
130	53.04	56	105577	20819
131	53.13	57	174950	32044
132	53.27		134866	23521
133	53.63		18309	3203
134	53.82		52462	9506
135	53.92	58	213613	34420
136	54.23		75019	9597
137	54.36		61842	10666
138	54.50	59	92159	12608
139	54.95	60	1393075	220111
140	55.17		124879	15679
141	55.42		83635	11608
142	55.55	61	78570	12517
143	55.67		101918	17081
144	55.94		77110	12897
145	56.21		143262	13668
146	56.57		19950	3100
147	56.88	62	145995	27976
148	57.13		39207	4887
149	57.32		97310	16546
150	57.48	IS#2	507924	85362
151	57.64		18533	3840
152	57.80		171786	20292
153	58.09		30456	5404
154	58.37		18585	6139
155	58.45	63	112370	18543
156	58.68		19120	3102
157	58.82	64	13228	2430
158	59.08		326276	43481
159	59.34		49552	6421
160	59.75		105557	9681
161	60.20		185384	14063
162	60.49		56862	9280
163	60.65	65	89803	15976
164	60.92		69661	6471
165	61.09		19067	3406
166	61.33		70839	7523
167	61.58	66	284506	39664
168	61.82		71001	8640
169	61.99		89717	13094
170	62.33	67	668920	111649
171	62.56	68	296610	49080
172	62.72		23722	6545
173	62.84		72854	10492
174	63.11	69	237433	34320
175	63.31		101601	18111
176	63.41		51291	9916
177	63.56		39841	6463
178	63.67	70	69072	11172
179	63.87		26322	2788
180	64.00		1649	1760
181	64.18	71	241167	37471
182	64.34		81527	12973
183	64.51		25689	4207
184	64.63		32675	4791
185	64.83		95025	14212
186	64.99	72	62812	9393
187	65.17		43665	6264
188	65.48		63854	4748
189	65.71	73	574400	77570
190	65.94		65371	6581
191	66.25		69400	10719
192	66.42	74	52814	6473
193	66.64		21135	2679
194	66.87	75	38010	4194
195	66.94		16826	3718
196	67.11	76	51022	8753

E:\DATA6\C310191.04R --- 4483-1D (1g sample/5mL water) + 3uL IS-007 — 07-10-1998 21:56:45

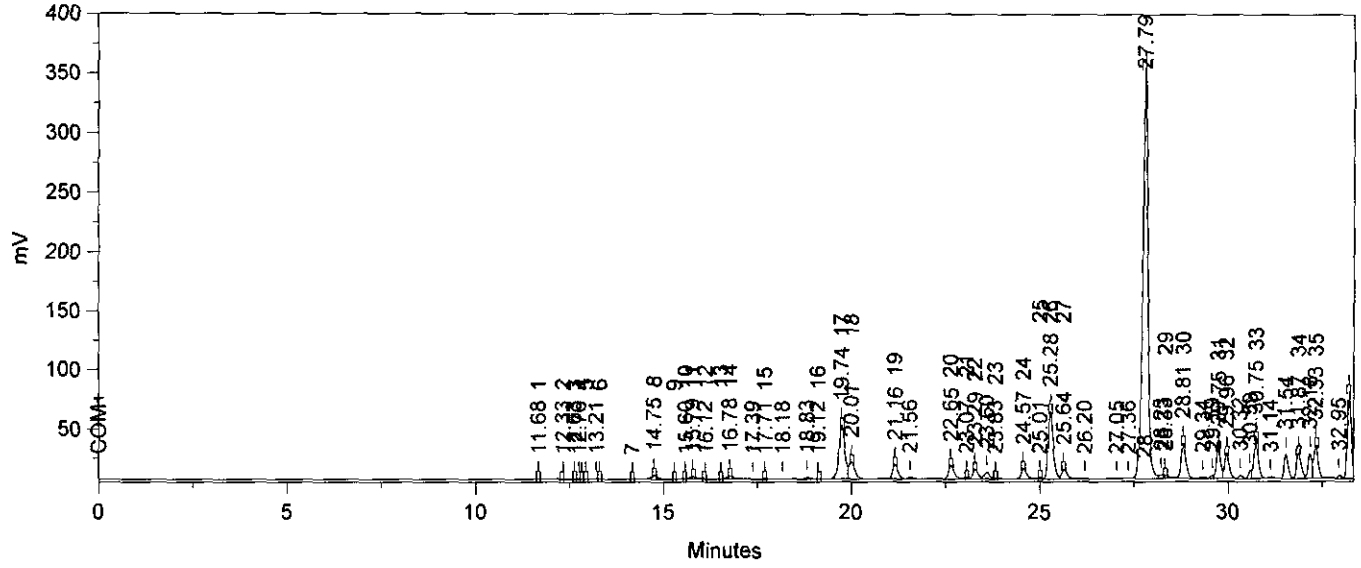
Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
197	67.24		49224	6655
198	67.52		79985	8546
199	67.93		39909	5357
200	68.21		62131	5864
201	68.40		25471	6947
202	68.50	77	141854	16721
203	68.70		67329	6888
204	69.19		18936	2837
205	69.33		21540	3122
206	69.49		30999	6759
207	69.71	78	163233	21193
208	69.95		69027	7417
209	70.25		37393	3638
210	70.53		46936	5041
211	71.03		69831	6771
212	71.29	79	52850	5885
213	71.72		30018	4802
214	71.75	80	32933	4944
215	71.88	81	29391	4600
216	71.95		19549	3703
217	72.22		60031	5385
218	72.47		11503	1743
219	72.67		21997	2555
220	72.84	82	16697	2117
221	73.04		55900	6908
222	73.42		16340	2123
223	73.67		5134	1351
224	73.78	83	22139	2831
225	73.90		26406	3639
226	74.05	84	29996	3792
227	74.18		32117	2710
228	74.57	85	16842	3204
229	74.67		70312	6157
230	75.10		19050	2523
231	75.23		20813	2948
232	75.48		23772	3144
233	75.72		22081	2824
234	76.05		21823	1633
235	76.39	86	19762	1806
236	76.85		15658	1570
237	77.11		8139	990
238	77.56		16589	1790
239	77.86		14592	1369
240	78.09	88	1897	385
241	78.19		4014	627
242	78.35		17926	2351
243	79.35		4644	758
244	79.53		8355	909
245	79.86		15814	1940
246	80.49	89	36786	909
247	83.28		5133	609

TOTAL AREA DETECTED = 5.641705E+07

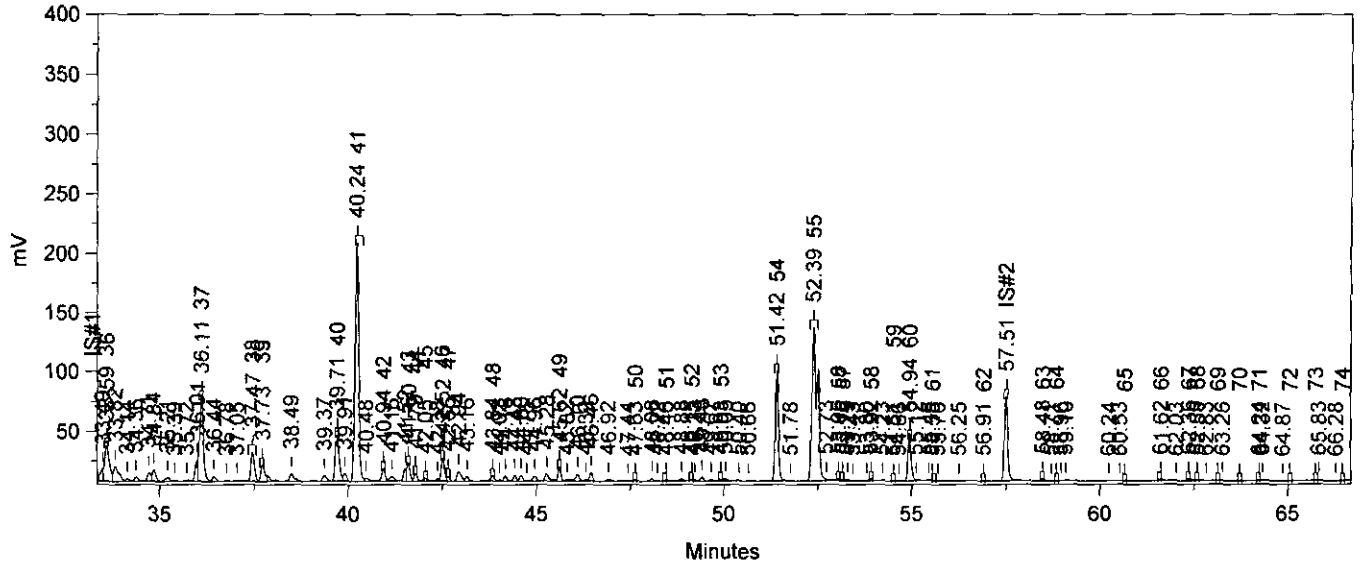
Processed by: _____ Date: 7-15-98

E:\DATA6\C310191.06R --- 4483-2 (0.1182g sample/5mL water) + 3uL IS-007 --- 07-11-1998 02:15:14

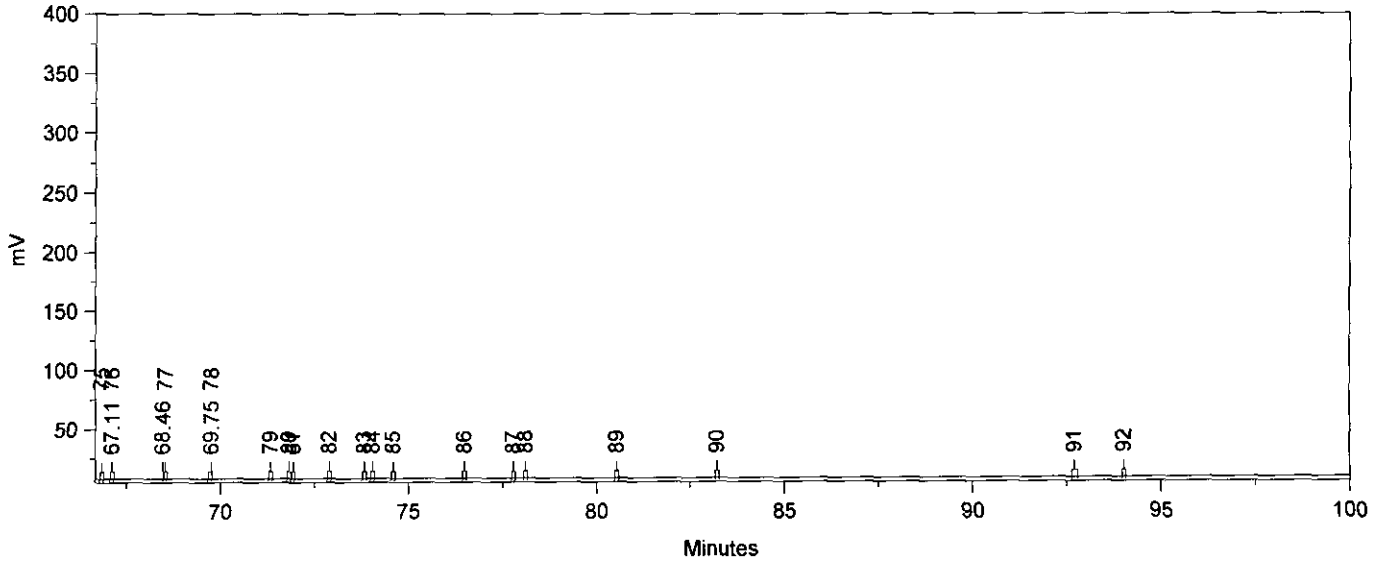
Plot Panel 1 of 3: from 0.0 to 33.3Minutes



Plot Panel 2 of 3: from 33.3 to 66.7Minutes



Plot Panel 3 of 3: from 66.7 to 100.0Minutes



E:\DATA6\C310191.06R --- 4483-2 (0.1182g sample/5mL water) + 3uL IS-007 --- 07-11-1998 02:15:14

C3 to C10 ANALYSIS by GLOBAL GEOCHEMISTRY CORPORATION

TODAY'S DATE: 7/15/98 TIME: 8:07:46 AM
RAW DATA FILE NAME: E:\DATA6\C310191.06R
SAMPLE NAME.....4483-2 (0.1182g sample/5mL water) + 3uL IS-007
DATE TAKEN: 07-11-1998 02:15:14
METHOD FILE: !E:\DATA6\C310191F.MET
METHOD: C3-C10 Analysis
CALIBRATION FILE: !E:\DATA6\C310191F.CAL
INSTRUMENT: HP5890/ALS--FID OPERATOR: R.deLeon
RUN TIME: 110min
COM PORT: 6
HEADING 1: HP5890/Autosampler purge&trap
HEADING 2: GC range=2^1
FORMAT FILE: E:\DATA6\C3C10.FMT

PEAKS DETECTED IN THIS CHROMATOGRAM:

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
1	11.68	1	5673	317
2	12.33	2	5931	435
3	12.63	3	4795	454
4	12.76		4173	396
5	13.21		5007	156
6	14.75	8	40652	3361
7	15.60	10	2600	288
8	15.79	11	20795	1856
9	16.12	12	3249	284
10	16.78	14	33832	2747
11	17.39		513	97
12	17.71	15	6320	570
13	18.18		681	110
14	18.83		17952	1577
15	19.12	16	1757	275
16	19.74	17	491358	45709
17	20.01	18	165778	14921
18	21.16	19	124081	12250
19	21.56		18137	1586
20	22.65	20	124078	11658
21	23.07	21	7615	1000
22	23.29	22	75255	7851
23	23.60		54097	5059
24	23.83	23	12575	1084
25	24.57	24	80411	8582
26	25.01	25	5514	731
27	25.28	26	536315	57627
28	25.64	27	82033	8260
29	26.20		5553	486
30	27.05		3883	363
31	27.36		3648	493
32	27.79	28	3383672	348478
33	28.23		30351	3260
34	28.33	29	24991	2775
35	28.81	30	271645	30197
36	29.34		14692	1599
37	29.59		16139	2827
38	29.75	31	202797	25229
39	29.96	32	176197	21586
40	30.32		24185	2955
41	30.59		41752	7347
42	30.75	33	278785	34285
43	31.14		10164	1283
44	31.54		162961	21152
45	31.87	34	192606	22100
46	32.18		156485	21256
47	32.33	35	222325	28767
48	32.95		22563	2999
49	33.21	IS#1	549124	73934
50	33.49		52095	10106
51	33.59	36	268422	30025
52	33.82		128868	12712
53	34.14		15586	2120
54	34.36		26056	3526

E:\DATA6\C310191.06R --- 4483-2 (0.1182g sample/5mL water) + 3uL IS-007 --- 07-11-1998 02:15:14

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
55	34.71		44493	6945
56	34.84		65416	9108
57	35.21		31711	3418
58	35.39		8495	1074
59	35.72		10072	1074
60	36.01		81920	17580
61	36.11	37	512268	69898
62	36.44		31159	4218
63	36.78		6526	761
64	37.05		5527	670
65	37.47	38	160584	24495
66	37.73	39	101375	13786
67	38.49		73578	6365
68	39.37		39273	5144
69	39.71	40	282745	39044
70	39.91		41378	6150
71	40.24	41	1396979	201364
72	40.48		31783	2728
73	40.94	42	68477	10808
74	41.16		32349	3595
75	41.52		51011	10778
76	41.60	43	98828	15743
77	41.79	44	42476	7052
78	42.05	45	24123	2684
79	42.38		10101	2006
80	42.52	46	118071	19493
81	42.66	47	26153	4838
82	42.94		71024	8632
83	43.16		27060	4274
84	43.84	48	31902	4361
85	44.02		10105	1607
86	44.18		30128	4806
87	44.43		29615	5091
88	44.60		30227	5079
89	44.75		4929	964
90	44.96		32057	4198
91	45.28		47072	6316
92	45.62	49	67735	12291
93	45.82		9280	1403
94	46.10		38725	5815
95	46.32		4946	1074
96	46.46		41100	7176
97	46.92		14389	1677
98	47.44		2989	544
99	47.63	50	6080	827
100	48.08		17252	2630
101	48.22		5549	991
102	48.46	51	5297	1103
103	48.88		16521	1724
104	49.15	52	6809	1190
105	49.23		8517	1520
106	49.43		21981	3779
107	49.67		9341	1486
108	49.93	53	8055	1486
109	50.05		12322	1852
110	50.40		5918	787
111	50.66		3608	624
112	51.42	54	539308	92091
113	51.78		6540	798
114	52.39	55	1324136	129391
115	52.73		12656	1389
116	53.06	56	9676	1591
117	53.16	57	10130	1890
118	53.29		8784	1387
119	53.43		2484	284
120	53.80		4859	603
121	53.92	58	9251	1573
122	54.23		3955	465
123	54.51	59	4545	442
124	54.66		793	159
125	54.94	60	229475	36808

E:\DATA6\C310191.06R --- 4483-2 (0.1182g sample/5mL water) + 3uL IS-007 --- 07-11-1998 02:15:14

Peak #	Ret Time (min)	Peak Name	Peak Area	Peak Height
126	55.12		6542	851
127	55.46		4055	456
128	55.55	61	2085	427
129	55.70		3448	455
130	56.25		7444	332
131	56.91	62	2844	542
132	57.51	IS#2	434281	70856
133	58.48	63	12939	2180
134	58.71		857	197
135	58.96		707	140
136	59.10		4845	660
137	60.24		6249	263
138	60.53		3452	241
139	61.62	66	12649	1428
140	62.03		1275	215
141	62.36	67	18732	1804
142	62.59	68	13668	1143
143	62.83		1998	291
144	63.26		8936	402
145	64.24	71	3392	515
146	64.32		3373	502
147	64.87		4454	215
148	65.83		7909	466
149	66.28		1930	223
150	67.11	76	5768	152
151	68.46		2160	261
152	69.75	78	1068	170

TOTAL AREA DETECTED = 1.497777E+07

Processed by: _____ Date: 7-15-98

A-44483

CHAIN OF CUSTODY/LABORATORY ANALYSIS REPORT FORM

Columbia Analytical Services, Inc.
An Employee-Owned Company
3334 Victor Court • Santa Clara, CA 95054
(408) 437-2400 • FAX (408) 437-9356

SERVICE REQUEST NO. _____ P.O.# _____ PAGE 1 OF 1

PROJECT NAME _____ # 5980483

PROJECT MGR. Steve Green

COMPANY Columbia Analytical Services

ADDRESS _____

PHONE _____

FAX _____

TO: Global Geochemistry Corp.

~~SAMPLER'S SIGNATURE~~

	SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	ANALYSIS REQUESTED																		REMARKS
							PRESERVATIVE	HCl	HCl	HCl	NP	NP	NP	HCl	HCl	HNO_3	NP	H_2SO_4	H_2SO_4	H_2SO_4	NaOH				
							Volatile Organics GC/MS 624/8240/8260	Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐	TPH as Gas/BTEX MTBE ☐ DHS LUFT / 8020	TPH as Diesel/HBHC DHS LUFT	Base/Neu/Acid Organics GC/MS 625/8270	Pesticides / PCBs 608/8080	TRPH - 418.1	Oil and Grease Method	Metals (total or dissolved) List Below	pH, Cond, Cl, SO_4, F, TDS, TSS Alk, NO_3, NO_2 (circle)	NH_3-N, COD, Total-P, TKN, NO_3 / NO_2 (circle)	Total Organic Carbon TOC	Total Phenols	Cyanide	5 Metals	CAM 17			
1	B-11-6'	6/9/98			Soil	1															X	X			
2	B-11-10.5	↓			↓	1															X	X			

RELINQUISHED BY:
Signature: Dan Loudermilk
Printed Name: Dan Lovelace
Firm: CAS/SC
Date/Time: 6/30/98 1310

RECEIVED BY:
Signature: Rob Brewer
Printed Name: R.W. Brewer
Firm: GGC
Date/Time: 7-1-98 915

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS
___ 1 day ___ 2 day ___ 3 day
___ 5 day ___ Other
___ Standard (10 working days)
Results Due _____

REPORT REQUIREMENTS
___ I. Routine Report
___ II. Report (includes MS, MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ MDLs/PQLs/Trace #
___ Electronic Data Deliverables

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

Shipped Via/Tracking # _____

SAMPLE RECEIPT: Condition _____ Custody Seals _____

SPECIAL INSTRUCTIONS/COMMENTS: CAS/SC sent original samples to Global Geochem.

Circle which metals are to be analyzed:

Metals: Al Sb Ba Be B Cd Ca Cr Co Cu Fe Mg Mn Mo Ni K Ag Na Sn V Zn
As Pb Se Tl Hg

Clyde Galantine from Gettler-Ryan to fax analysis instructions Phone: (510)551-7555

Storage:

*Will sample results be used in connection with drinking water regulations? ☐ Yes ☒ No If yes, you must so indicate by writing "DW" for each such sample.