

OPERATIONAL LQC FORM

Service Company : ATLAS WIRELINE SERVICES
 Engineer : McGEE/SELNES
 Witness : TIM HERRETT

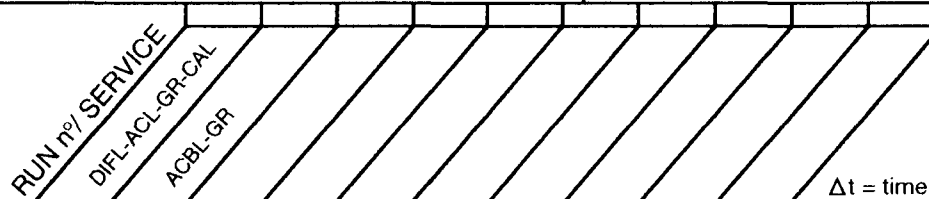
WELL : 24/9-5
 FIELD : EXPLORATION
 COUNTRY : NORWAY
 DATE : 20 th DEC 1993

INTERVAL : 1377m TO SEABED (WITH GR)
 BIT SIZE : 17 1/2" MAX. DEVIATION : 3.09°
 at 1087 m
 DRILL PIPE LOGGING : N
 OPERATION COST ESTIMATE :



OPERATIONAL CHECK

✓ Check only these boxes when problems exist



Δ TIME (MINUTES)/TEMPERATURE

Δt	T °C/F	Δt	T °C/F
660	30°C		

Δt = time logger on bottom - time circulation stopped

HEADING INCOMPLETE AND/OR INCORRECT
 (Rm, Rmf, Rmc, Mudtype, Mud salinity ...)

CALIBRATION ANOMALIES	<input checked="" type="checkbox"/>														
POOR REPEATABILITY	<input checked="" type="checkbox"/>														
STANDARD CURVES MISSING	<input type="checkbox"/>														
TOOL RESPONSE ANOMALY	<input checked="" type="checkbox"/>														
ANOMALIES DUE TO HOLE CONDITIONS	<input type="checkbox"/>														
POOR DEPTH MATCHING (Reference log, driller's depth..)	<input type="checkbox"/>														
POOR OPERATING TECHNIQUE (Logging speed, Centralizer, Standoff...)	<input type="checkbox"/>														
VERIFICATION OF MAGNETIC SUPPORT	<input type="checkbox"/>														
LOG QUAL. RATING: 0 TO 5	0 : POOR 5 : EXCELLENT	3	4												

LOG QUALITY COMMENTS

- * CALIPER TOOL DID NOT RESPOND CORRECTLY
 IN CASING. POOH & CHANGED GR, CAL &
 TELEMETRY CARTRIDGE. NEW CAL DID NOT
 RESPOND CORRECTLY.
- * SP DID NOT REPEAT. POSSIBLE SURFACE
 INTERFERENCE.
- * COMPUTER FAILED (LOCKED) WHILST RUNNING
 IN HOLE (LOGGING) ON MAIN LOG

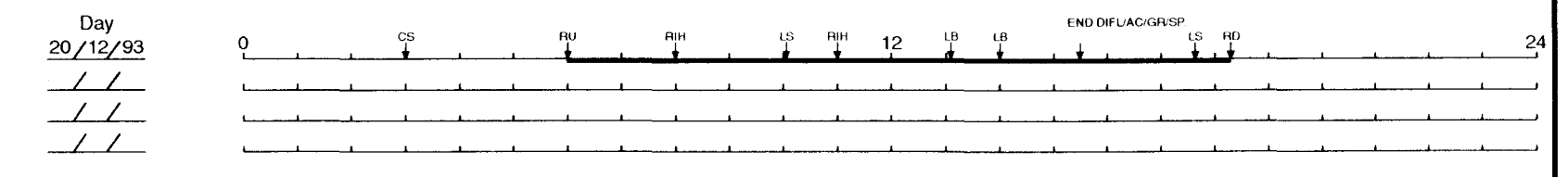
FORMATION TESTER
 Number of runs :
 Pressure attempts :
 Good pressure tests :
 Fluid attempts :
 Good fluid samples :


TIME SUMMARY
 Operations Lost Time LT : 1.75
 Total operating time OT : 12.25
 Ratio LT/OT : 14.3%
 Number of failures
 with LT > 30 min : 1

TIMING
 Time circulation stopped : 20 DEC 93, 03:00 HRS
 Duration of circulation : 4.5 HRS
 CS : Circulation stopped RU : Rig up
 LS : Logger on surface RIH : Run in hole
 LB : Logger on bottom RD : Rig down

MUD PROPERTIES
 Mud Type : KCI/PAC/PHPA
 Mud Weight : 1.25 gm/cc
 Rm : 0.078 at 9.33 °C
 Rmf : 0.075 at 9.16 °C
 Rmc : 0.202 at 9.88 °C

SIDEWALL CORES
 Total SWS attempted :
 Recovered :
 Misfired :
 Lost bullets :
 No recovery :



OPERATIONAL LQC FORM		WELL : 24/9-5	INTERVAL : 1941m TO 1346m	
Service Company : ATLAS WIRELINE SERVICES	FIELD : EXPLORATION	COUNTRY : NORWAY	BIT SIZE : 12 1/4" MAX. DEVIATION : 5.9" at 1768 m	
Engineer : McGEE/SELNES	DATE : 27 th DECEMBER 1993	DRILL PIPE LOGGING : <input checked="" type="checkbox"/> N	OPERATION COST ESTIMATE :	
Witness : TIM HERRETT				

OPERATIONAL CHECK	RUN n% SERVICE	DIFL-ACL-GR-CAL	ACBL-GR															Δ TIME (MINUTES)/TEMPERATURE				
																			Δt	T °C/F	Δt	T °C/F
																			588	43		
																		Δt = time logger on bottom - time circulation stopped				

✓ Check only these boxes when problems exist																	
HEADING INCOMPLETE AND/OR INCORRECT (Rm, Rmf, Rmc, Mudtype, Mud salinity ...)																	
CALIBRATION ANOMALIES																	
POOR REPEATABILITY																	
STANDARD CURVES MISSING																	
TOOL RESPONSE ANOMALY			✓														
ANOMALIES DUE TO HOLE CONDITIONS			✓														
POOR DEPTH MATCHING (Reference log, driller's depth..)																	
POOR OPERATING TECHNIQUE (Logging speed, Centralizer, Standoff...)																	
VERIFICATION OF MAGNETIC SUPPORT																	
LOG QUAL. RATING: 0 TO 5	0: POOR 5: EXCELLENT	3	5														

LOG QUALITY COMMENTS

* COULD NOT GET PAST 1881m. TOOL HUNG UP AT THIS DEPTH DESPITE SEVERAL ATTEMPTS TO RUN TO BOTTOM. MAXIMUM 3000 LB OVERPULL ON PICKING UP.

* CALIPER DRIFTED. WORKED OK AT SHOE ON WAY IN HOLE. WAS 1.65" OUT WHEN LOGGING IN CASING AFTER MAIN LOG.

FORMATION TESTER	TIME SUMMARY	TIMING	MUD PROPERTIES
Number of runs :	Operations Lost Time LT : 0	Time circulation stopped : 27 DEC 93, 10:50 HRS	Mud Type : KCI/PAC/PHPA
Pressure attempts :	Total operating time OT : 8.75 HRS	Duration of circulation : 2.17 HRS	Mud Weight : 1.43 g/cc
Good pressure tests :	Ratio LT/OT : -	CS: Circulation stopped RU : Rig up	Rm : 0.097 at 13.6 °C
Fluid attempts :	Number of failures	LS: Logger on surface RIH: Run in hole	Rmf : 0.079 at 13.4 °C
Good fluid samples :	with LT > 30 min : 0	LB: Logger on bottom RD : Rig down	Rmc : 0.378 at 13.7 °C

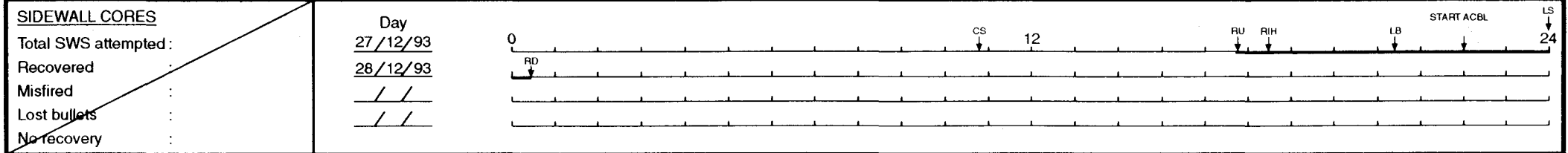


Fig. 8.2

OPERATIONAL LQC FORM

Service Company : ATLAS WIRELINE SERVICES
 Engineer : McGEE/KLEINBICHLER
 Witness : WATTS/HUSSEY

WELL : 24/9-5
 FIELD : OFFSHORE
 COUNTRY : NORWAY
 DATE : 12 th - 19 th JANUARY 1994

INTERVAL : 2860m TO 1935m
 BIT SIZE : 8.5" MAX. DEVIATION : 2.58"
 at 1972 m
 DRILL PIPE LOGGING : N
 OPERATION COST ESTIMATE :



SHEET 1 OF 2

OPERATIONAL CHECK

✓ Check only these boxes when problems exist

HEADING INCOMPLETE AND/OR INCORRECT
 (Rm, Rmf, Rmc, Mudtype, Mud salinity ...)

CALIBRATION ANOMALIES

POOR REPEATABILITY

STANDARD CURVES MISSING

TOOL RESPONSE ANOMALY

ANOMALIES DUE TO HOLE CONDITIONS

POOR DEPTH MATCHING
 (Reference log, driller's depth..)

POOR OPERATING TECHNIQUE
 (Logging speed, Centralizer, Standoff...)

VERIFICATION OF MAGNETIC SUPPORT

LOG QUAL. RATING: 0 TO 5

0 : POOR
 5 : EXCELLENT

FORMATION TESTER

Number of runs : 4
 Pressure attempts : 43
 Good pressure tests : 40
 Fluid attempts : 4
 Good fluid samples : 3

TIME SUMMARY

Operations Lost Time LT : 3
 Total operating time OT : 82.5
 Ratio LT/OT : 3.64%
 Number of failures
 with LT > 30 min : 2

TIMING

Time circulation stopped : 2 JAN 94, 04:00 HRS
 Duration of circulation : 0.67 HRS
 CS : Circulation stopped RU : Rig up
 LS : Logger on surface RIH : Run in hole
 LB : Logger on bottom RD : Rig down

MUD PROPERTIES

Mud Type : KCL/PAC/PHPA/GLYCOL
 Mud Weight : 1.25 + g/cc
 Rm : 0.078 at 12.1 °C
 Rmf : 0.074 at 11.6 °C
 Rmc : 0.123 at 12.7 °C

SIDEWALL CORES

Total SWS attempted : 25
 Recovered : 21
 Misfired : 1
 Lost bullets : 1
 No recovery : 2

Day
 12/01/94
 13/01/94
 14/01/94
 15/01/94

	1	2	3	4	5	6	7	8	9	10
RUN P/ SERVICE										
DIF/ACL/GR/SP/ CAL/CHT										
ZD/CN/GR/CAL/ 3C										
DLL/MLL/SL/SP/ CAL/CHT 3A										
FMT/GR/CHT 3A										
CBL/NDL/GR/ CCL										
HD/PI/GR/CHT 3A										
VSP										
FMT/GR/CHT 3A										
FMT/GR/CHT 3B										
FMT/GR/CHT 3C										
FMT/GR/CHT 3D										

Δ TIME (MINUTES)/TEMPERATURE

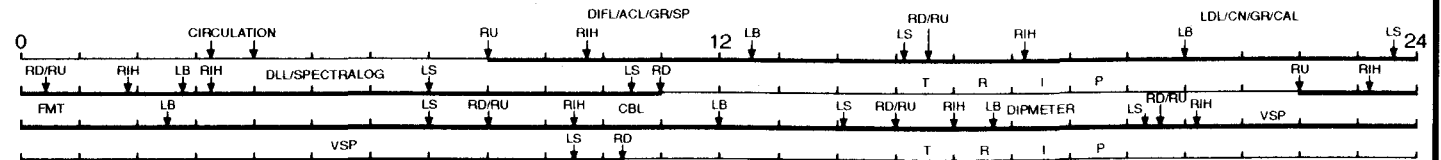
Δt	T °C/F	Δt	T °C/F
8.5	68		
16	72		
27	75*		


* To 2350m only

Δt = time logger on bottom - time circulation stopped

LOG QUALITY COMMENTS

- * INTIAL DLL BADLY PROGRAMMED BY ENGINEER, LT 3 HOURS, CORRECTED BY SENIOR ENGINEER
- * CNL READINGS HIGH IN THE HERMOD SANDSTONE, CAUSE UNKNOW.
- * FMT TEMPERATURE COMPENSATION NOT OPERATIVE ON RUN 3A
- * SYSTEM DID NOT WRITE TO TAPE (FMT 3A)



OPERATIONAL LQC FORM	WELL : 24/9-5	INTERVAL : 2860m TO 1935m	
Service Company : ATLAS WIRELINE SERVICES	FIELD : OFFSHORE	BIT SIZE : 8.5" MAX. DEVIATION : 2.58"	
Engineer : McGEE/KLEINBICHLER	COUNTRY : NORWAY	at 1972 m	
Witness : WATTS/HUSSEY	DATE : 12 th - 19 th JANUARY 1994	DRILL PIPE LOGGING : <input checked="" type="checkbox"/> N	
		OPERATION COST ESTIMATE :	

SHEET 2 OF 2

OPERATIONAL CHECK

✓ Check only these boxes when problems exist

HEADING INCOMPLETE AND/OR INCORRECT (Rm, Rmf, Rmc, Mudtype, Mud salinity ...)																				
CALIBRATION ANOMALIES																				
POOR REPEATABILITY																				
STANDARD CURVES MISSING																				
TOOL RESPONSE ANOMALY																				
ANOMALIES DUE TO HOLE CONDITIONS																				
POOR DEPTH MATCHING (Reference log, driller's depth..)																				
POOR OPERATING TECHNIQUE (Logging speed, Centralizer, Standoff...)																				
VERIFICATION OF MAGNETIC SUPPORT																				
LOG QUAL. RATING: 0 TO 5	0 : POOR 5 : EXCELLENT	N/A																		

11	3A																				
RUN IN/ SERVICE	SWC/RFC																				

Δ TIME (MINUTES)/TEMPERATURE

Δt	T °C/F	Δt	T °C/F	Δt	T °C/F	Δt	T °C/F	Δt	T °C/F

Δt = time logger on bottom - time circulation stopped

LOG QUALITY COMMENTS

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

FORMATION TESTER

Number of runs : 4

Pressure attempts : 43

Good pressure tests : 40

Fluid attempts : 4

Good fluid samples : 3

TIME SUMMARY

Operations Lost Time LT : 3

Total operating time OT : 82.5

Ratio LT/OT : 3.64%

Number of failures with LT > 30 min : 2

TIMING

Time circulation stopped : 2 JAN 94, 04:00 HRS

Duration of circulation : 0.67 HRS

CS : Circulation stopped RU : Rig up

LS : Logger on surface RIH : Run in hole

LB : Logger on bottom RD : Rig down

MUD PROPERTIES

Mud Type : KCL/PAC/PHPA/GLYCOL

Mud Weight : 1.25 + g/cc

Rm : 0.078 at 12.1 °C

Rmf : 0.074 at 11.6 °C

Rmc : 0.123 at 12.7 °C

SIDEWALL CORES

Total SWS attempted : 25

Recovered : 21

Misfired : 1

Lost bullets : 1

No recovery : 2

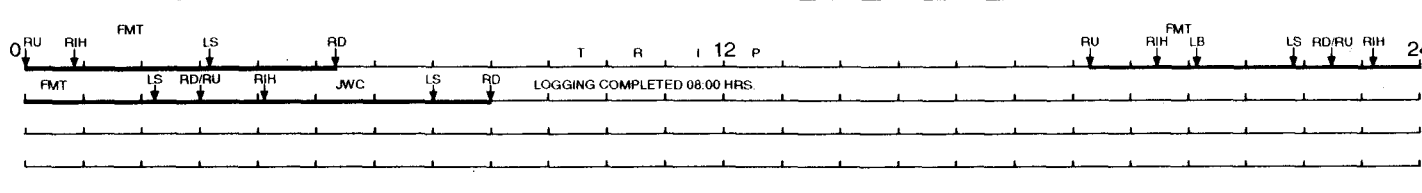
Day

16 / 01 / 94

17 / 01 / 94

///

///

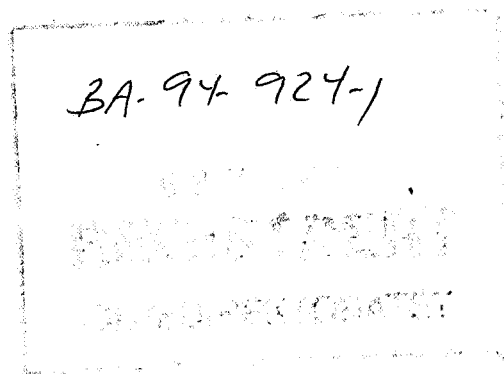


FMT DATA

RUN NO.	POINT No.	DEPTH	TVD	HYDROSTATIC PRESSURE	FORMATION PRESSURE
3A	1	2012.5	2010.0	3647.0	2901.4
	2	2013.5	2011.0	3649.4	2902.5
	3	2014.5	2012.0	3650.7	2903.7
	4	2015.5	2013.0	3652.8	2905.2
	5	2016.5	2014.0	3654.8	2906.1
	6	2017.5	2015.0	3656.0	2907.4
	7	2018.5	2015.9	3653.1	0.0
	8	2011.5	2009.0	3646.1	0.0
	9	2011.6	2009.1	3646.1	0.0
	10	2013.5	2011.0	3649.0	2902.4
	11	2017.5	2015.0	3655.7	2907.1
	12	2051.0	2048.5	3716.4	2952.6
	13	2057.0	2054.5	3726.8	2961.2
	14	2062.0	2059.5	3735.4	2968.4
	15	2066.0	2063.5	3742.3	2974.3
	16	2069.0	2066.5	3748.1	2978.7
	17	2073.0	2070.5	3755.2	2984.5
	18	2098.5	2096.0	3804.2	3024.4
	19	2103.0	2100.5	3812.6	3031.0
	20	2107.0	2104.5	3819.8	3036.9
	21	2111.5	2109.0	3827.7	3043.4
	22	2197.5	2195.0	3982.0	3081.5
	23	2199.5	2197.0	3986.0	3084.4
	24	2202.0	2199.5	3989.9	3088.0
	25	2207.0	2204.5	3998.9	3095.2
	26	2300.0	2297.5	4166.7	3228.1
	27	2310.0	2307.5	4184.3	3242.6
	28	2320.0	2317.5	4202.3	3257.2
3B	1	2012.5	2010.0	3680.8	2907.8
3C	1	2017.5	2015.0	3591.4	2912.0
3D	1	2012.5	2010.0	3583.9	2906.8
	2	2017.5	2015.0	3593.3	2912.8
	3	2051.0	2048.5	3653.7	2957.8
	4	2057.0	2054.5	3663.5	2966.6
	5	2062.0	2059.5	3672.0	2973.7
	6	2066.0	2063.5	3679.2	2979.5
	7	2069.0	2066.5	3684.6	2983.9
	8	2073.0	2070.5	3691.7	2989.8
	9	2097.0	2094.5	3734.3	3024.7
	10	2100.0	2097.5	3739.6	3029.1
	11	2107.0	2104.5	3752.3	3039.4
	12	2111.5	2109.0	3760.3	3046.0
13	2017.5	2015.0	3594.4	2912.2	



**NORWAY CONTINENTAL SHELF WELL 24/9-5
(PL150)
GEOCHEMICAL CHARACTERISATION
OF THE 24/9-5 CRUDE OIL
& COMPARISON WITH PREVIOUS BLOCK 24/9 PETROLEUMS**



REPORT : EGG/R060

AUTHORS : B. Mycke

DATE : April 1994

PROJECT : EGG/94-003

FOR : Fina Exploration Norway u.a.s.

**WORK BY : B. MYCKE
J. PAULET
GEOCHEM GROUP LTD.
GEOMARK RESEACH INC**

APPROVED BY : R. Burwood

A handwritten signature in dark ink, appearing to read "R. Burwood".

TABLE 1 OIL/BITUMEN DATA - ACQUISITION PROGRAMME

NOCS OIL - KEY TO SAMPLE

SAMPLE IDENTIFICATION	WELL	FIELD		TEST/DEPTH
HA607B/GNS025* 9197-001**	24/9-5	-		FMT#1 (PVT chamber) 2012.5/2018.5m

* GeoMark Research Inc. System

** Geochem Group Ltd System

TABLE 2 QUALITY DATA FOR BLOCK 24/9 CRUDE OILS AND BITUMENS

Well	24/9-5	24/9-3	24/9-4 "U"*	24/9-4 "L"*
API Gravity	34.80°	19.50°	n.d.	n.d.
Pour Point (°C)	-45.00	-4.00	n.d.	n.d.
Wax Cont. (%)	1.00	3.50	<1	<1
Wax Melt. Point (°C)	30.00	31.00	n.d.	n.d.
Sulfur (%)	0.24	0.54	4.65	1.04
Nitrogen (%)	0.06	0.23	n.d.	n.d.
Asph. Cont. (%)	0.85	2.32	9.48	24.16

* Compositated SWC bitumen extracts

"U" Cores n° 17 + 19

"L" Cores n° 9 - 11

TABLE 3 EVALUATION OF BIODEGRADATION IN BLOCK 24/9 PETROLEUMS AND BITUMENS

Well	24/9-5	24/9-3	24/9-4 "U"	24/9-4 "L"
ABR ⁺	0.01	0.18	0.62	0.60
DTR [*]	0.90	0.30	0.36	0.65

⁺ = Acyclic Biodegradation Ratio (pristane/pristane + underlying unresolved complex mixture ("hump"))

^{*} = Desmethyhopane Transformation Ratio (25-norhopanes/25-norhopanes + regular hopanes)

Prepared for

FINA EXPLORATION AND PRODUCTION

GEOCHEMICAL ANALYSES UPON

CRUDE OIL HA 607B

GEOCHEM GROUP / GEOMARK RESEARCH

RAW DATA SET

March 1994

APPENDIX 1

GEOCHEM GROUP LTD

TABLE 1
CRUDE OIL COMPOSITION - PHYSICAL

JOB 9197	DEPTH/ IDENTITY	SPECIFIC GRAVITY (g/cc)	API GRAVITY	VISCOSITY (cp)	POUR POINT (°C)	DISTILLATE TO 210°C (%)
GEOCHEM SAMPLE NUMBER						

WELL:

9197-001	OIL	0.8508	34.8		-45.00	34.00
----------	-----	--------	------	--	--------	-------

TABLE 2
CRUDE OIL COMPOSITION - CHEMICAL

JOB 9197							
GEOCHEM SAMPLE NUMBER	DEPTH/ IDENTITY	WAX CONTENT (%)	WAX MELTING POINT (°C)	SULPHUR (%)	NITROGEN (%)	V (ppm)	Ni (ppm)

WELL:

9197-001	OIL	1	30	0.24	0.06	1.0	1.0
----------	-----	---	----	------	------	-----	-----

TABLE 3
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL

JOB 9197 GEOCHEM SAMPLE NUMBER	L I T H O	DEPTH/ IDENTITY	HYDROCARBONS		NON HYDROCARBONS		
			Saturates	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non-Eluted NSO's

WELL:

9197-001	OIL	72.43	17.75	0.85	7.91	1.06
----------	-----	-------	-------	------	------	------

TABLE 4
SIGNIFICANT C₁₅₊ RATIOS

JOB 9197	L I T H O	DEPTH/ IDENTITY	TOC (%)	mg/g TOC						HYDROCARBONS % TOTAL EXTRACT	SATURATES AROMATICS
				TOTAL EXTRACT	SATURATES	AROMATICS	TOTAL HYDROCARBONS	ELUTED NSO's	ASPHALTENES		
9197-001		OIL								90.18	4.08

WELL:

9197-001

OIL

90.18

4.08

TABLE 5
COMPOSITION (NORMALISED %) OF C₁₅₊ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS

GEOCHEM SAMPLE NUMBER	001
DEPTH	OIL
SAMPLE TYPE	
nC15	8.57
nC16	8.34
nC17	7.20
nC18	7.43
nC19	6.06
nC20	6.51
nC21	5.71
nC22	5.60
nC23	5.49
nC24	5.37
nC25	5.26
nC26	4.91
nC27	3.89
nC28	3.43
nC29	3.54
nC30	2.74
nC31	2.74
nC32	1.83
nC33	2.17
nC34	1.71
nC35	1.49
Paraffin	2.24
Isoprenoid	2.00
Naphthene	95.76
CPI 1 Index	0.98
CPI 2 Index	1.07
CPI 3 Index	0.93
Prist/Phytane	1.59
Prist/nC17	4.00
Phytane/nC18	2.43

Job Number : 9197

$$C.P.I. 1 = \frac{1}{2} \left[\frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{20} + C_{22} + C_{24} + C_{26}} + \frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{22} + C_{24} + C_{26} + C_{28}} \right]$$

$$C.P.I. 2 = \frac{1}{2} \left[\frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{24} + C_{26} + C_{28} + C_{30}} + \frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{26} + C_{28} + C_{30} + C_{32}} \right]$$

$$C.P.I. 3 = \frac{2 \times (C_{27})}{C_{26} + C_{28}}$$

CT - ditch cuttings CO - core SWC - sidewall core

TABLE 6
COMPOSITION (PPM) OF C₁₅₊ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS

GEOCHEM SAMPLE NUMBER	001
DEPTH	OIL
SAMPLE TYPE	
nC15	1920
nC16	1868
nC17	1613
nC18	1664
nC19	1357
nC20	1458
nC21	1279
nC22	1254
nC23	1230
nC24	1203
nC25	1178
nC26	1100
nC27	871
nC28	768
nC29	793
nC30	614
nC31	614
nC32	410
nC33	486
nC34	383
nC35	334
Paraffin	22400
Isoprenoid	20000
Naphthene	957600
CPI 1 Index	0.98
CPI 2 Index	1.07
CPI 3 Index	0.93
Prist/Phytane	1.59
Prist/nC17	4.00
Phytane/nC18	2.43

Job Number : 9197

$$C.P.I. 1 = \frac{1}{2} \left[\frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{20} + C_{22} + C_{24} + C_{26}} + \frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{22} + C_{24} + C_{26} + C_{28}} \right]$$

$$C.P.I. 2 = \frac{1}{2} \left[\frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{24} + C_{26} + C_{28} + C_{30}} + \frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{26} + C_{28} + C_{30} + C_{32}} \right]$$

$$C.P.I. 3 = \frac{2 \times (C_{27})}{C_{26} + C_{28}}$$

CT - ditch cuttings CO - core SWC - sidewall core

TABLE 7
CARBON ISOTOPE COMPOSITIONS (‰, PDB)

JOB 9197								
GEOCHEM SAMPLE NUMBER	DEPTH/ IDENTITY	TOTAL EXTRACT WHOLE OIL	SATURATES	AROMATICS	NSO	ASPHALTENES	DISTILLATE	PYROLYSATE (S2)

WELL:

9197-001	OIL	-28.69	-29.21	-28.30	-28.21	-28.19	-28.28	
----------	-----	--------	--------	--------	--------	--------	--------	--

TABLE 8**HYDROGEN AND SULPHUR ISOTOPE COMPOSITIONS**

GEOCHEM SAMPLE NUMBER	IDENTIFICATION	δD (‰, SMOW)	δS (‰, CDT)
9197-001	HA 607B	-132.5	-6.6

TABLE 9
DETAILED GASOLINE RANGE (C₄-C₇) COMPOSITION

GEOCHEM SAMPLE NUMBER	9197-001
DEPTH	OIL
NORMALISED COMPOSITION	
isobutane	1.25
n-butane	4.82
isopentane	6.38
n-pentane	7.78
2,2-dimethylB	0.42
cyclopentane	1.75
2,3-dimethylB	0.99
2-methylP	4.19
3-methylP	3.54
n-hexane	2.99
methylCP	8.97
2,2-dimethylP	0.76
2,4-dimethylP	0.06
2,2,3-trimethylB	0.01
benzene	0.15
cyclohexane	15.02
3,3-dimethylP	0.00
1,1-dimethylCP	0.00
2-MH	3.49
2,3-dimethylP	0.06
3-MH	2.26
1,c,3-DMCP	1.93
1,t,3-DMCP	1.81
1,t,2-DMCP	3.65
3-ethylP	0.00
n-heptane(nC7)	0.49
methylCH	26.96
1,c,2-DMCP	0.01
toluene	0.26
ABUNDANCE	98750 C ₄ - C ₉ 124600
nC7/C7NAPHTHENES	0.01
total MH/DMCP	0.78
1,t,2-/1,c,2-DMCP	365.01
nC6/methylCP	0.33
C6-C7 FRACTION	
%n-PARAFFINS	4.47
%iso-PARAFFINS	20.23
% NAPHTHENES	74.79
% AROMATICS	0.53

DMCP dimethylcyclopentane MH methylhexane B butane CH cyclohexane CP cyclopentane H hexane P pentane

TABLE 10
DETAILED GASOLINE RANGE (C₄-C₇) COMPOSITION

GEOCHEM SAMPLE NUMBER	9197-001
DEPTH	OIL
PFM COMPOSITION	
isobutane	1234
n-butane	4760
isopentane	6300
n-pentane	7683
2,2-dimethylB	415
cyclopentane	1728
2,3-dimethylB	978
2-methylP	4138
3-methylP	3496
n-hexane	2953
methylCP	8858
2,2-dimethylP	751
2,4-dimethylP	59
2,2,3-trimethylB	10
benzene	148
cyclohexane	14832
3,3-dimethylP	0
1,1-dimethylCP	0
2-MH	3446
2,3-dimethylP	59
3-MH	2232
1,c,3-DMCP	1906
1,t,3-DMCP	1787
1,t,2-DMCP	3604
3-ethylP	0
n-heptane(nC7)	484
methylCH	26623
1,c,2-DMCP	10
toluene	257
ABUNDANCE	98750
nC7/C7NAPHTHENES	0.01
total MH/DMCP	0.78
1,t,2-/1,c,2-DMCP	365.01
nC6/methylCP	0.33
C6-C7 FRACTION	
%n-PARAFFINS	4.47
%iso-PARAFFINS	20.23
% NAPHTHENES	74.79
% AROMATICS	0.53

DMCP dimethylcyclopentane MH methylhexane B butane CH cyclohexane CP cyclopentane H hexane P pentane

TABLE 11
METHYLPHENANTHRENE INDICES (MPI)

JOB 9197	DEPTH/ IDENTITY	SAMPLE TYPE	MPI 1		Rcalc		MPI 2	
GEOCHEM SAMPLE NUMBER			AREA	HEIGHT	AREA	HEIGHT	AREA	HEIGHT

WELL:

9197-001	OIL		0.67	0.66			0.68	0.67
----------	-----	--	------	------	--	--	------	------

$$\text{MPI 1} = \frac{1.5(2\text{-MP} + 3\text{-MP})}{\text{P} + 1\text{-MP} + 9\text{-MP}}$$

$$\text{MPI 2} = \frac{3(2\text{-MP})}{\text{P} + 1\text{-MP} + 9\text{-MP}}$$

$$\begin{aligned} \text{Rcalc} &= 0.60(\text{MPI 1}) + 0.40 \quad (\text{if } R_o < 1.35\%) \\ &= -0.60(\text{MPI 1}) + 2.30 \quad (\text{if } R_o > 1.35\%) \end{aligned}$$

CT - ditch cuttings CO - core SWC - sidewall core

APPENDIX 2

GEOMARK RESEARCH INC.

Table 2. Aromatic Biomarker Parameters: North Sea Crude Oils.

GeoMark ID	Field	Depth	Final Sample #	MPII	TAS	DBT/C4N
GNS006			HA-020	0.84	0.19	0.09
GNS007			HA-024	0.67	0.30	0.02
GNS008			HA-025	0.60	0.18	0.09
GNS009			HA-234	0.57	0.11	0.42
GNS010			HA-551	0.94	0.65	0.26
GNS011			HA-552	0.66	0.53	0.18
GNS012			HA-553	0.59	0.12	0.95
GNS012R			HA-553R	0.60	0.12	1.02
GNS013			HA-554	1.32	0.86	0.02
GNS014			HA-555	1.42	0.89	0.01
GNS015			HA-557	0.94	0.89	0.05
GNS016			HA-559	1.35	1.00	0.04
GNS017			HA-560	1.20	0.76	0.09
GNS018			HA-561	0.98	0.96	0.52
GNS019			HA-564	0.71	0.75	0.21
GNS020			HA-565	0.64	0.45	0.60
GNS021			HA-566	0.71	0.59	0.33
GNS022			HA-567	0.86	0.92	0.01
GNS023			HA-569	0.72	0.17	0.12
GNS024			HA-584	0.74	0.74	0.41
GNS025			HA-607B	0.70	0.31	0.51

MPII = $1.5 \cdot (3+2) / (PH+9+1)$; note: not corrected to FID, based on ion chromatograms m/z 178 and 192.

TAS = $(C20+C21) / (C20-C28)$; Triaromatic Steranes.

DBT/C4N = dibenzothiophene/C4 naphthalene.

Table 3
Sterane and Terpane Peak Identifications

Peak	Formula	MW	Sterane ID*
S1	C27H48	372	13 β , 17 α diacholestane (20S)
S2	C27H48	372	13 β , 17 α diacholestane (20R)
S3	C27H48	372	5 α cholestane (20S) + 5 β cholestane (20R)
S4	C27H48	372	5 α , 14 β , 17 β cholestane (20R) +
	C29H52	400	13 β , 17 α diastigmastane (20S)
S5 + S5B**	C27H48	372	5 α , 14 β , 17 β cholestane (20S)
S6	C27H48	372	5 α cholestane (20R)
S7	C29H52	400	diastigmastane
S8	C28H50	386	5 α ergostane (20S)
S9	C28H50	386	5 α , 14 β , 17 β ergostane (20R) + 5 β ergostane (20R)
S10 + S10B	C28H50	386	5 α , 14 β , 17 β ergostane (20S)
S11	C28H50	386	5 α ergostane (20R)
S12	C29H52	400	5 α stigmastane (20S)
S13	C29H52	400	5 α , 14 β , 17 β stigmastane (20R)
S14 + S14B	C29H52	400	5 α , 14 β , 17 β stigmastane (20S) + 5 β stigmastane (20R)
S15	C29H52	400	5 α stigmastane (20R)

*assumes 8 β ,9 α ,14 α ,17 α unless otherwise stated. dia=rearranged

**based on the 217 and 218 m/z mass chromatograms, respectively

Peak	Formula	MW	Terpane ID
C19	C19H34	262	tricyclic diterpane
C20	C20H36	276	tricyclic diterpane
C21	C21H38	290	tricyclic diterpane
C22	C22H40	304	tricyclic terpane
C23	C23H42	318	tricyclic terpane
C24	C24H44	332	tricyclic terpane
C25	C25H46	346	tricyclic terpane
TET	C24H42	330	teteracyclic terpane
C26	C26H48	360	tricyclic terpane
C28	C28H52	388	extended tricyclic terpane
C29	C29H54	402	extended tricyclic terpane
C30	C30H56	416	extended tricyclic terpane
Ts	C27H46	370	18 α , 21 β -22,29,30-trisnorhopane
C27T	C27H46	370	17 α , 18 α , 21 β -25,28,30-trisnorhopane
Tm	C27H46	370	17 α , 21 β -22,29,30-trisnorhopane
C28H	C28H48	384	17 α , 18 α , 21 β -28,30-bisnorhopane
C29H	C29H50	398	17 α , 21 β -30-norhopane
C29D	C29H50	398	18 α , 17 α methyl-28,30-dinorhopane
C30X	C30H52	412	17 α , 15 α -methyl-27-norhopane (diahopane)
C29M	C29H50	398	17 β , 21 α -30-normortane
OL	C30H52	412	oleanane
C30H	C30H52	412	17 α , 21 β hopane
C30M	C30H52	412	17 β , 21 α moretane
C31H	C31H54	426	17 α , 21 β -30-homohopane (22S+22R)
GA	C30H52	412	gammacerane
C32H	C32H56	440	17 α , 21 β -bishomohopane (22S+22R)
C33H	C33H58	454	17 α , 21 β -trishomohopane (22S+22R)
C34H	C34H60	468	17 α , 21 β extended hopane (22S+22R)
C35H	C35H62	482	17 α , 21 β extended hopane (22S+22R)

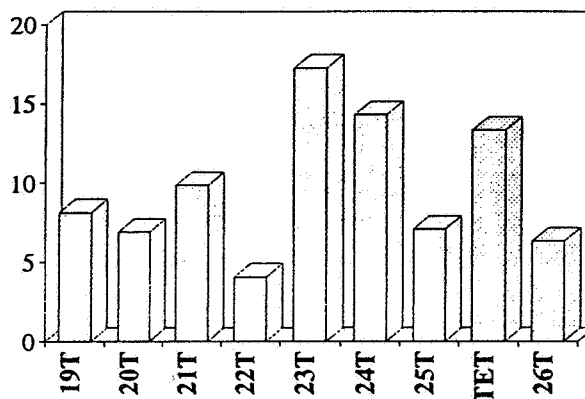
APPENDIX B

C15+ Saturate Biomarker Information, Mass Fragmentograms, and Peak Areas

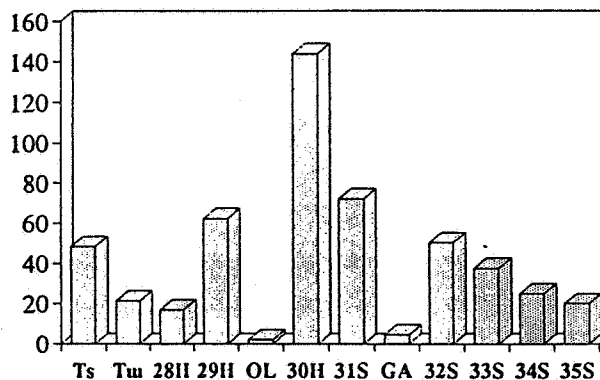
Biomarker Quantitation Report

Data File: 3701008.D
 Date File Acquired: 4 Mar 94 4:42 pm
 Acquisition Method: FAN80393.M
 Sample Name: GNS025
 Miscellaneous Info: 4.76 mg branched/cyclic hydrocarbon fraction

Peak#	m/z	Cpd.	RTmin.	Amount (ppm)	
				area	height
<i>Tricyclic Terpanes</i>					
1	191	C19T	23.83	11	8
2	191	C20T	27.15	11	7
3	191	C21T	30.78	11	10
4	191	C22T	34.24	4	4
5	191	C23T	38.24	17	17
6	191	C24T	40.43	11	14
7	191	C25S	44.87	7	7
8	191	C25R	44.97	6	7
9	191	TET	47.74	12	13
10	191	C26S	48.15	4	6
11	191	C26R	48.41	4	6
TRICYCLICS				97	100



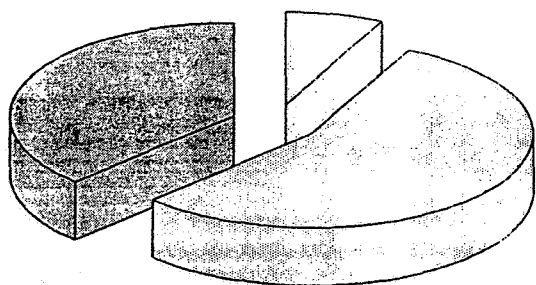
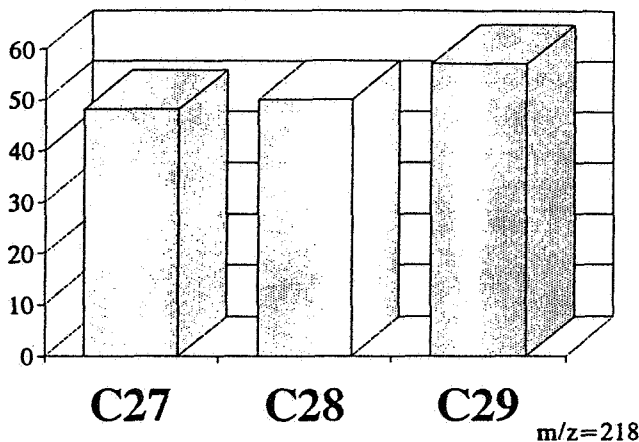
<i>Pentacyclic Terpanes</i>					
21	191	Ts	59.55	41	48
22	177	C27T	59.94	7	4
24	191	Tm	60.87	20	21
29	177	C28DM	61.53	1	2
34	191	C28H	64.04	21	17
37	177	C29DM	64.64	0	1
40	191	C29H	65.43	57	62
41	191	C29D	65.64	42	45
42	191	C30X	66.16	36	37
43	191	OL	67.81	2	2
44	191	C30H	68.16	135	144
45	191	C30M	69.41	10	15
46	191	C31S	71.34	68	72
47	191	C31R	71.72	45	47
48	191	GA	72.08	6	5
49	191	C32S	73.83	45	50
50	191	C32R	74.36	31	35
51	191	C33S	76.71	43	38
52	191	C33R	77.43	21	25
53	191	C34S	79.70	24	25
54	191	C34R	80.57	14	16
55	191	C35S	82.63	19	20
56	191	C35R	83.70	11	14
PENTACYCLICS				700	744



Biomarker Quantitation Report (cont.)

GNS025

Peak#	m/z	Cpd.	RTmin.	Amount (ppm)	
		<i>Steranes</i>		area	height
12	217	S1	51.78	77	87
13	217	S2	53.04	55	55
14	217	S3	57.29	6	6
15	217	S4	57.69	84	74
16	218	S4B	57.69	64	68
17	217	S5	58.01	29	30
18	218	S5B	57.99	43	48
19	217	S6	58.76	16	21
20	217	S7	59.16	84	43
23	217	S8	60.72	2	7
25	217	S9	61.16	23	22
26	218	S9B	61.16	39	41
27	217	S10	61.44	32	33
28	218	S10B	61.44	46	50
30	217	S11	62.43	14	10
31	217	S12	63.37	43	24
32	217	S13	64.01	50	40
33	218	S13B	64.01	53	57
35	217	S14	64.22	33	32
36	218	S14B	34.22	57	57
38	221	ISTD	65.29	21	21
39	217	S15	65.39	23	23
STERANES				571	507



□ TRICYCLICS □ PENTACYCLICS □ STERANES

Key Ratios

	area	ht.		area	ht.
C19/C23	0.65	0.47	Ts/Tm	2.08	2.28
C21/C23	0.69	0.57	29D/29	0.73	0.72
C22/C23	0.23	0.24	C27T/27	0.12	0.06
C24/C23	0.65	0.83	DM/H	0.00	0.00
C26/C25	0.60	0.89	C27/H	0.45	0.48
Tet/C23	0.72	0.77	C28/H	0.16	0.12
			X/H	0.27	0.26
S1/S6	4.85	4.15	C29/H	0.73	0.75
%C27	29	31	M/H	0.08	0.10
%C28	32	32	OL/H	0.02	0.01
%C29	39	37	GA/H	0.04	0.03
20S/20R	1.85	1.07	C31/H	0.50	0.50
S/T	0.82	0.68	C35/C34	0.76	0.80
			C23/H	0.12	0.12

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	59.164	RTE!	0.175	911.00	59.076	59.251
2	59.549	RTE!	0.316	15557	59.392	59.707
3	59.935	RTE!	0.175	1029	59.848	60.023
4	60.497	RTE!	0.246	3673	60.374	60.620
5	60.865	RTE!	0.246	6500	60.760	61.006
6	61.444	RTE!	0.211	1109	61.321	61.532
7	61.830	RTE!	0.246	906.00	61.707	61.953
8	62.093	RTE!	0.316	2527	61.988	62.304
9	62.777	RTE!	0.211	1217	62.654	62.865
10	63.005	RTE!	0.211	1672	62.865	63.076
11	63.216	RTE!	0.246	5070	63.076	63.321
12	63.374	RTE!	0.281	2527	63.321	63.602
13	64.040	RTE!	0.351	8214	63.847	64.198
14	64.356	RTE!	0.351	3499	64.233	64.584
15	64.900	RTE!	0.246	1783	64.724	64.970
16	65.040	RTE!	0.281	4833	64.970	65.251
17	65.426	RTE!	0.281	20912	65.251	65.531
18	65.637	RTE!	0.246	15078	65.531	65.777
19	66.163	RTE!	0.351	14139	65.952	66.303
20	66.514	RTE!	0.175	797.00	66.409	66.584
21	66.654	RTE!	0.140	1698	66.584	66.724
22	66.987	RTE!	0.246	2187	66.865	67.110
23	67.163	RTE!	0.140	893.00	67.110	67.251
24	67.584	RTE!	0.211	1485	67.496	67.707
25	67.812	RTE!	0.211	906.00	67.707	67.917
26	68.163	RTE!	0.351	51949	68.022	68.373
27	68.461	RTE!	0.281	3118	68.373	68.654
28	68.829	RTE!	0.316	4645	68.654	68.970
29	69.110	RTE!	0.316	2826	68.970	69.285
30	69.408	RTE!	0.211	4086	69.285	69.496
31	69.584	RTE!	0.281	2690	69.496	69.777
32	69.864	RTE!	0.281	3424	69.777	70.057
33	70.549	RTE!	0.140	819.00	70.443	70.584
34	70.706	RTE!	0.351	2873	70.619	70.970
35	71.092	RTE!	0.211	936.00	70.970	71.180
36	71.338	RTE!	0.386	24848	71.180	71.566
37	71.724	RTE!	0.421	17228	71.566	71.987
38	72.075	RTE!	0.246	2167	71.987	72.233
39	72.374	RTE!	0.351	7049	72.233	72.584
40	72.777	RTE!	0.351	3101	72.584	72.935
41	73.093	RTE!	0.386	1661	72.935	73.322
42	73.585	RTE!	0.211	885.00	73.462	73.673

45	75.271	RTE!	0.176	1423	75.183	75.358
46	75.516	RTE!	0.246	1827	75.394	75.639
47	75.850	RTE!	0.176	1265	75.780	75.955
48	76.149	RTE!	0.246	1181	76.096	76.342
49	76.710	RTE!	0.562	16142	76.342	76.904
50	77.430	RTE!	0.281	7911	77.290	77.571
51	78.203	RTE!	0.421	3770	78.062	78.484
52	78.642	RTE!	0.246	1466	78.519	78.765
53	79.063	RTE!	0.351	3304	78.870	79.221
54	79.695	RTE!	0.316	9253	79.502	79.818
55	80.573	RTE!	0.492	5727	80.240	80.731
56	82.627	RTE!	0.386	7032	82.417	82.803
57	83.698	RTE!	0.281	4109	83.575	83.856
58	84.295	RTE!	0.421	1692	84.102	84.524

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	23.833	RTE!	0.351	4313	23.693	24.044
2	25.816	RTE!	0.211	793.00	25.728	25.938
3	26.202	RTE!	0.246	923.00	26.114	26.359
4	26.728	RTE!	0.351	960.00	26.535	26.886
5	27.149	RTE!	0.421	4119	26.921	27.342
6	29.710	RTE!	0.175	431.00	29.622	29.798
7	30.780	RTE!	0.421	4183	30.640	31.061
8	31.412	RTE!	0.211	433.00	31.341	31.552
9	31.657	RTE!	0.140	274.00	31.552	31.692
10	31.973	RTE!	0.105	237.00	31.903	32.008
11	32.569	RTE!	0.316	1364	32.464	32.780
12	33.219	RTE!	0.351	1220	33.096	33.446
13	33.499	RTE!	0.246	555.00	33.446	33.692
14	34.078	RTE!	0.140	296.00	33.973	34.113
15	34.236	RTE!	0.316	1454	34.113	34.429
16	35.025	RTE!	0.246	152.00	34.920	35.166
17	35.359	RTE!	0.351	651.00	35.166	35.516
18	35.867	RTE!	0.140	522.00	35.832	35.973
19	36.113	RTE!	0.105	256.00	36.043	36.148
20	36.516	RTE!	0.211	434.00	36.464	36.674
21	36.780	RTE!	0.140	121.00	36.709	36.850
22	36.920	RTE!	0.105	94.00	36.850	36.955
23	37.306	RTE!	0.211	419.00	37.236	37.446
24	37.481	RTE!	0.070	119.00	37.446	37.516
25	37.937	RTE!	0.140	275.00	37.902	38.043
26	38.236	RTE!	0.246	6109	38.113	38.358
27	38.832	RTE!	0.456	1921	38.604	39.060
28	39.148	RTE!	0.140	156.00	39.060	39.200
29	39.323	RTE!	0.175	422.00	39.235	39.411
30	39.551	RTE!	0.105	168.00	39.481	39.586
31	40.428	RTE!	0.281	4088	40.323	40.604
32	41.463	RTE!	0.140	278.00	41.376	41.516
33	41.691	RTE!	0.105	129.00	41.621	41.726
34	42.341	RTE!	0.246	796.00	42.288	42.533
35	42.621	RTE!	0.140	149.00	42.533	42.674
36	43.235	RTE!	0.175	210.00	43.165	43.340
37	44.428	RTE!	0.175	226.00	44.288	44.463
38	44.867	RTE!	0.246	2687	44.674	44.919
39	44.972	RTE!	0.211	2158	44.919	45.130
40	45.498	RTE!	0.105	177.00	45.445	45.551
41	45.937	RTE!	0.211	448.00	45.761	45.972
42	46.410	RTE!	0.105	207.00	46.323	46.428

45	47.744	RTE!	0.246	4530	47.621	47.866
46	48.147	RTE!	0.281	1510	47.972	48.252
47	48.410	RTE!	0.246	1948	48.287	48.533
48	48.954	RTE!	0.105	126.00	48.919	49.024
49	49.129	RTE!	0.211	252.00	49.024	49.235
50	49.726	RTE!	0.105	196.00	49.656	49.761
51	49.866	RTE!	0.175	256.00	49.831	50.006
52	50.603	RTE!	0.175	638.00	50.463	50.638
53	50.726	RTE!	0.246	993.00	50.638	50.884
54	51.761	RTE!	0.246	1719	51.655	51.901
55	52.147	RTE!	0.175	574.00	52.041	52.217
56	52.305	RTE!	0.351	1316	52.252	52.603
57	52.726	RTE!	0.140	157.00	52.603	52.743
58	53.024	RTE!	0.175	830.00	52.919	53.094
59	53.603	RTE!	0.105	357.00	53.515	53.620
60	54.532	RTE!	0.246	375.00	54.357	54.603
61	54.866	RTE!	0.246	156.00	54.743	54.988
62	55.094	RTE!	0.246	1179	54.988	55.234
63	55.445	RTE!	0.386	2577	55.234	55.620
64	55.918	RTE!	0.246	1402	55.830	56.076
65	57.023	RTE!	0.211	936.00	56.918	57.129
66	57.199	RTE!	0.140	342.00	57.129	57.269
67	57.497	RTE!	0.316	5683	57.339	57.655
68	58.094	RTE!	0.211	3059	57.971	58.181

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	59.164	RTE!	0.175	2587	59.076	59.251
2	59.339	RTE!	0.175	457.00	59.251	59.427
3	59.532	RTE!	0.281	1733	59.427	59.707
4	60.865	RTE!	0.105	476.00	60.795	60.900
5	61.146	RTE!	0.281	147.00	61.076	61.356
6	62.146	RTE!	0.246	451.00	62.023	62.269
7	62.374	RTE!	0.211	1019	62.269	62.479
8	63.216	RTE!	0.175	1337	63.111	63.286
9	63.391	RTE!	0.246	1480	63.286	63.532
10	64.023	RTE!	0.281	2192	63.847	64.128
11	65.040	RTE!	0.281	373.00	64.970	65.251
12	65.426	RTE!	0.281	7299	65.251	65.531
13	65.637	RTE!	0.281	9582	65.531	65.812
14	66.145	RTE!	0.175	144.00	66.093	66.268
15	66.987	RTE!	0.246	1382	66.865	67.110
16	67.531	RTE!	0.140	279.00	67.461	67.601
17	67.777	RTE!	0.246	855.00	67.672	67.917
18	68.163	RTE!	0.281	2249	68.022	68.303
19	68.847	RTE!	0.281	1575	68.689	68.970
20	70.566	RTE!	0.105	165.00	70.513	70.619
21	71.338	RTE!	0.351	1907	71.215	71.566
22	71.706	RTE!	0.246	1167	71.601	71.847
23	72.374	RTE!	0.246	534.00	72.268	72.514
24	73.111	RTE!	0.246	252.00	72.971	73.216
25	73.831	RTE!	0.246	750.00	73.708	73.954
26	74.358	RTE!	0.281	472.00	74.200	74.481
27	74.937	RTE!	0.176	198.00	74.797	74.972
28	75.042	RTE!	0.211	251.00	74.972	75.183
29	75.534	RTE!	0.176	354.00	75.464	75.639
30	75.850	RTE!	0.176	188.00	75.780	75.955
31	76.236	RTE!	0.176	201.00	76.201	76.377
32	76.693	RTE!	0.316	485.00	76.552	76.868
33	76.974	RTE!	0.211	254.00	76.868	77.079
34	77.957	RTE!	0.211	222.00	77.852	78.062
35	78.168	RTE!	0.211	410.00	78.062	78.273
36	79.678	RTE!	0.246	887.00	79.572	79.818
37	82.627	RTE!	0.246	506.00	82.522	82.768
38	83.698	RTE!	0.211	225.00	83.540	83.751

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	26.079	RTE!	0.140	3566	25.991	26.131
2	28.903	RTE!	0.246	1403	28.798	29.043
3	30.412	RTE!	0.316	7797	30.306	30.622
4	31.061	RTE!	0.351	2070	31.008	31.359
5	33.183	RTE!	0.316	3230	33.078	33.394
6	34.113	RTE!	0.246	1594	34.025	34.271
7	34.745	RTE!	0.281	2014	34.657	34.938
8	37.411	RTE!	0.351	2784	37.288	37.639
9	38.376	RTE!	0.211	2173	38.271	38.481
10	40.604	RTE!	0.140	2214	40.516	40.656
11	43.130	RTE!	0.281	5063	43.007	43.288
12	45.375	RTE!	0.175	1697	45.288	45.463
13	48.375	RTE!	0.105	1488	48.305	48.410
14	49.287	RTE!	0.105	657.00	49.217	49.322
15	50.480	RTE!	0.281	3930	50.375	50.656
16	50.989	RTE!	0.281	5061	50.831	51.112
17	68.163	RTE!	0.140	755.00	68.093	68.233
18	68.303	RTE!	0.211	1026	68.233	68.443
19	71.917	RTE!	0.176	934.00	71.847	72.022
20	74.691	RTE!	0.351	3226	74.445	74.797
21	76.254	RTE!	0.597	11228	75.991	76.588
22	85.349	RTE!	0.562	3184	85.191	85.753
23	86.174	RTE!	0.667	10968	85.858	86.525
24	86.911	RTE!	0.527	4646	86.666	87.192
25	88.281	RTE!	0.176	449.00	88.140	88.316

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	49.550	RTE!	0.140	497.00	49.498	49.638
2	49.726	RTE!	0.175	1513	49.638	49.814
3	50.498	RTE!	0.351	1895	50.305	50.656
4	50.778	RTE!	0.246	2878	50.656	50.901
5	50.971	RTE!	0.175	418.00	50.901	51.077
6	51.182	RTE!	0.175	601.00	51.077	51.252
7	51.375	RTE!	0.351	932.00	51.252	51.603
8	51.778	RTE!	0.351	20915	51.603	51.954
9	52.024	RTE!	0.175	894.00	51.954	52.129
10	52.375	RTE!	0.316	3401	52.129	52.445
11	52.585	RTE!	0.175	1533	52.480	52.655
12	52.796	RTE!	0.211	1336	52.655	52.866
13	53.041	RTE!	0.421	14914	52.901	53.322
14	53.708	RTE!	0.316	2737	53.462	53.778
15	53.954	RTE!	0.316	6636	53.778	54.094
16	54.322	RTE!	0.175	575.00	54.234	54.410
17	54.620	RTE!	0.351	7797	54.410	54.761
18	54.883	RTE!	0.246	7375	54.761	55.006
19	55.094	RTE!	0.281	10171	55.006	55.287
20	55.427	RTE!	0.246	3106	55.287	55.532
21	55.690	RTE!	0.316	4249	55.532	55.848
22	56.269	RTE!	0.175	4296	56.164	56.339
23	56.409	RTE!	0.140	4630	56.339	56.480
24	56.567	RTE!	0.211	4660	56.480	56.690
25	56.760	RTE!	0.246	1247	56.690	56.936
26	57.181	RTE!	0.281	6612	56.936	57.216
27	57.287	RTE!	0.140	1168	57.216	57.357
28	57.690	RTE!	0.281	22054	57.567	57.848
29	58.006	RTE!	0.246	10426	57.848	58.094
30	58.146	RTE!	0.175	2553	58.094	58.269
31	58.357	RTE!	0.140	1354	58.269	58.409
32	58.550	RTE!	0.175	1699	58.479	58.655
33	58.760	RTE!	0.175	4874	58.655	58.830
34	59.164	RTE!	0.561	22833	58.830	59.392
35	59.549	RTE!	0.281	2440	59.392	59.672
36	59.813	RTE!	0.211	3998	59.672	59.883
37	59.935	RTE!	0.211	4892	59.883	60.093
38	60.163	RTE!	0.175	1236	60.093	60.269
39	60.497	RTE!	0.105	487.00	60.409	60.514
40	60.725	RTE!	0.175	591.00	60.655	60.830
41	60.970	RTE!	0.211	5533	60.830	61.041
42	61.163	RTE!	0.246	6326	61.041	61.286

44	61.799	RTE!	0.351	6815	61.637	61.988
45	62.426	RTE!	0.421	4591	62.233	62.654
46	62.988	RTE!	0.316	2105	62.830	63.146
47	63.374	RTE!	0.561	11885	63.146	63.707
48	64.005	RTE!	0.421	13709	63.707	64.128
49	64.216	RTE!	0.351	8996	64.128	64.479
50	64.812	RTE!	0.211	530.00	64.689	64.900
51	65.391	RTE!	0.281	6793	65.251	65.531
52	65.567	RTE!	0.211	2205	65.531	65.742
53	65.830	RTE!	0.281	1583	65.742	66.023
54	66.198	RTE!	0.211	534.00	66.023	66.233
55	66.356	RTE!	0.211	3359	66.233	66.444
56	66.531	RTE!	0.246	4119	66.444	66.689
57	66.759	RTE!	0.175	894.00	66.689	66.865
58	66.952	RTE!	0.211	463.00	66.865	67.075
59	67.145	RTE!	0.175	539.00	67.075	67.251
60	67.847	RTE!	0.456	2588	67.601	68.058
61	68.145	RTE!	0.211	560.00	68.058	68.268
62	69.215	RTE!	0.211	534.00	69.145	69.356

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	49.726	RTE!	0.175	412.00	49.638	49.814
2	50.515	RTE!	0.211	604.00	50.375	50.585
3	50.778	RTE!	0.281	853.00	50.621	50.901
4	51.340	RTE!	0.246	794.00	51.252	51.498
5	51.778	RTE!	0.351	6227	51.603	51.954
6	52.287	RTE!	0.140	608.00	52.164	52.305
7	52.357	RTE!	0.175	537.00	52.305	52.480
8	53.041	RTE!	0.351	5033	52.936	53.287
9	53.954	RTE!	0.351	1642	53.813	54.164
10	54.304	RTE!	0.175	447.00	54.234	54.410
11	54.638	RTE!	0.386	3165	54.410	54.796
12	54.901	RTE!	0.211	3112	54.796	55.006
13	55.094	RTE!	0.246	3662	55.006	55.252
14	55.427	RTE!	0.281	5671	55.252	55.532
15	55.673	RTE!	0.316	5185	55.532	55.848
16	56.269	RTE!	0.175	1234	56.164	56.339
17	56.409	RTE!	0.140	1316	56.339	56.480
18	56.567	RTE!	0.246	3712	56.480	56.725
19	56.866	RTE!	0.175	1129	56.760	56.936
20	57.076	RTE!	0.246	2799	56.971	57.216
21	57.304	RTE!	0.175	579.00	57.216	57.392
22	57.690	RTE!	0.281	17630	57.532	57.813
23	57.988	RTE!	0.316	11065	57.813	58.129
24	58.199	RTE!	0.175	826.00	58.129	58.304
25	58.479	RTE!	0.351	2290	58.304	58.655
26	58.760	RTE!	0.175	3210	58.655	58.830
27	59.023	RTE!	0.246	5157	58.830	59.076
28	59.549	RTE!	0.281	780.00	59.427	59.707
29	59.830	RTE!	0.281	2988	59.707	59.988
30	60.567	RTE!	0.246	2412	60.409	60.655
31	60.742	RTE!	0.175	771.00	60.655	60.830
32	60.970	RTE!	0.211	723.00	60.830	61.041
33	61.163	RTE!	0.281	10008	61.041	61.321
34	61.444	RTE!	0.281	12565	61.321	61.602
35	61.760	RTE!	0.421	10644	61.602	62.023
36	62.514	RTE!	0.421	3518	62.269	62.690
37	62.970	RTE!	0.316	3337	62.690	63.005
38	63.093	RTE!	0.246	2873	63.005	63.251
39	63.444	RTE!	0.421	5533	63.251	63.672
40	63.830	RTE!	0.140	392.00	63.742	63.882
41	64.005	RTE!	0.246	15507	63.882	64.128
42	64.216	RTE!	0.351	16172	64.128	64.479

45	65.023	RTE!	0.316	1172	64.935	65.251
46	65.391	RTE!	0.246	4083	65.251	65.496
47	65.567	RTE!	0.211	1258	65.496	65.707
48	65.847	RTE!	0.316	1402	65.742	66.058
49	66.163	RTE!	0.175	325.00	66.058	66.233
50	66.356	RTE!	0.211	4039	66.233	66.444
51	66.514	RTE!	0.246	3650	66.444	66.689
52	67.847	RTE!	0.386	1785	67.637	68.022
53	68.163	RTE!	0.281	1674	68.022	68.303

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	49.533	RTE!	0.211	235.00	49.463	49.673
2	50.077	RTE!	0.351	344.00	49.954	50.305
3	50.392	RTE!	0.175	230.00	50.305	50.480
4	50.901	RTE!	0.351	338.00	50.796	51.147
5	51.199	RTE!	0.175	196.00	51.147	51.322
6	51.533	RTE!	0.351	1375	51.322	51.673
7	51.778	RTE!	0.211	418.00	51.673	51.884
8	52.024	RTE!	0.281	219.00	51.884	52.164
9	52.515	RTE!	0.175	135.00	52.445	52.620
10	52.726	RTE!	0.140	183.00	52.620	52.761
11	52.866	RTE!	0.175	332.00	52.761	52.936
12	53.199	RTE!	0.316	956.00	52.936	53.252
13	53.585	RTE!	0.281	251.00	53.427	53.708
14	53.743	RTE!	0.070	154.00	53.708	53.778
15	53.989	RTE!	0.246	883.00	53.848	54.094
16	54.357	RTE!	0.316	250.00	54.094	54.410
17	54.497	RTE!	0.175	824.00	54.410	54.585
18	54.655	RTE!	0.105	165.00	54.585	54.690
19	54.778	RTE!	0.281	623.00	54.690	54.971
20	55.094	RTE!	0.175	337.00	55.006	55.182
21	55.409	RTE!	0.175	241.00	55.357	55.532
22	55.795	RTE!	0.456	2929	55.638	56.094
23	56.234	RTE!	0.211	1079	56.094	56.304
24	56.620	RTE!	0.211	713.00	56.515	56.725
25	57.058	RTE!	0.246	1244	56.901	57.146
26	57.234	RTE!	0.211	1204	57.146	57.357
27	57.444	RTE!	0.246	831.00	57.357	57.602
28	57.725	RTE!	0.211	469.00	57.602	57.813
29	57.988	RTE!	0.246	860.00	57.883	58.129
30	58.427	RTE!	0.211	1007	58.304	58.515
31	58.585	RTE!	0.175	1051	58.515	58.690
32	58.813	RTE!	0.211	2200	58.690	58.900
33	59.023	RTE!	0.211	1547	58.900	59.111
34	59.199	RTE!	0.175	2242	59.111	59.286
35	59.514	RTE!	0.316	2993	59.357	59.672
36	59.935	RTE!	0.246	2999	59.813	60.058
37	60.181	RTE!	0.246	2363	60.058	60.304
38	60.479	RTE!	0.175	1914	60.409	60.585
39	61.128	RTE!	0.211	237.00	61.006	61.216
40	61.304	RTE!	0.211	1848	61.216	61.427
41	61.532	RTE!	0.246	1194	61.427	61.672
42	61.795	RTE!	0.246	423.00	61.672	61.918

45	62.619	RTE!	0.281	142.00	62.514	62.795
46	62.988	RTE!	0.281	2891	62.795	63.076
47	63.233	RTE!	0.246	528.00	63.111	63.356
48	63.461	RTE!	0.140	1326	63.356	63.497
49	63.567	RTE!	0.175	2121	63.497	63.672
50	63.900	RTE!	0.456	3889	63.742	64.198
51	64.777	RTE!	0.211	1414	64.584	64.795
52	65.444	RTE!	0.316	2898	65.251	65.567
53	65.637	RTE!	0.175	1625	65.567	65.742
54	65.830	RTE!	0.246	837.00	65.742	65.988
55	66.163	RTE!	0.281	2328	65.988	66.268
56	66.373	RTE!	0.175	2379	66.268	66.444
57	66.584	RTE!	0.246	4002	66.444	66.689
58	66.759	RTE!	0.175	1929	66.689	66.865
59	66.935	RTE!	0.175	979.00	66.865	67.040
60	67.145	RTE!	0.211	309.00	67.040	67.251
61	67.847	RTE!	0.421	2444	67.637	68.058
62	68.180	RTE!	0.211	1156	68.058	68.268
63	68.426	RTE!	0.246	1164	68.268	68.514
64	69.198	RTE!	0.316	1621	69.040	69.356
65	69.706	RTE!	0.281	454.00	69.601	69.882
66	69.952	RTE!	0.246	540.00	69.882	70.128
67	70.233	RTE!	0.456	617.00	70.128	70.584

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	49.550	RTE!	0.316	1230	49.322	49.638
2	49.726	RTE!	0.175	1096	49.638	49.814
3	49.901	RTE!	0.211	198.00	49.814	50.024
4	50.200	RTE!	0.211	442.00	50.094	50.305
5	50.498	RTE!	0.281	1558	50.340	50.621
6	50.778	RTE!	0.456	2188	50.621	51.077
7	51.778	RTE!	0.316	12341	51.638	51.954
8	52.375	RTE!	0.175	1441	52.270	52.445
9	52.515	RTE!	0.211	725.00	52.445	52.655
10	52.761	RTE!	0.175	399.00	52.655	52.831
11	53.041	RTE!	0.351	9074	52.901	53.252
12	53.445	RTE!	0.246	227.00	53.252	53.497
13	53.708	RTE!	0.246	1246	53.568	53.813
14	53.971	RTE!	0.246	2576	53.813	54.059
15	54.164	RTE!	0.105	186.00	54.094	54.199
16	54.304	RTE!	0.246	851.00	54.199	54.445
17	54.638	RTE!	0.246	2231	54.445	54.690
18	54.778	RTE!	0.105	1721	54.690	54.796
19	54.901	RTE!	0.211	5324	54.796	55.006
20	55.111	RTE!	0.246	5529	55.006	55.252
21	55.462	RTE!	0.246	213.00	55.287	55.532
22	55.690	RTE!	0.246	1557	55.603	55.848
23	56.269	RTE!	0.175	4078	56.164	56.339
24	56.427	RTE!	0.175	2399	56.339	56.515
25	56.585	RTE!	0.175	2509	56.515	56.690
26	56.795	RTE!	0.140	567.00	56.760	56.901
27	57.181	RTE!	0.421	3481	56.901	57.322
28	57.427	RTE!	0.246	1692	57.322	57.567
29	57.725	RTE!	0.281	12009	57.567	57.848
30	58.023	RTE!	0.316	4907	57.883	58.199
31	58.339	RTE!	0.211	2251	58.199	58.409
32	58.567	RTE!	0.246	1923	58.444	58.690
33	58.883	RTE!	0.246	778.00	58.690	58.936
34	59.146	RTE!	0.456	10049	58.936	59.392
35	59.813	RTE!	0.175	2464	59.707	59.883
36	59.988	RTE!	0.281	2661	59.883	60.163
37	60.269	RTE!	0.246	977.00	60.163	60.409
38	60.514	RTE!	0.211	1089	60.409	60.620
39	60.742	RTE!	0.211	1608	60.620	60.830
40	60.970	RTE!	0.316	1943	60.830	61.146
41	61.479	RTE!	0.281	3036	61.356	61.637
42	61.795	RTE!	0.351	2531	61.637	61.988

45	62.549	RTE!	0.175	379.00	62.444	62.619
46	62.760	RTE!	0.246	1225	62.654	62.900
47	62.988	RTE!	0.211	836.00	62.900	63.111
48	63.461	RTE!	0.281	760.00	63.391	63.672
49	63.865	RTE!	0.070	205.00	63.812	63.882
50	64.023	RTE!	0.246	1526	63.882	64.128
51	64.216	RTE!	0.351	1390	64.128	64.479
52	65.058	RTE!	0.316	2591	64.935	65.251
53	65.356	RTE!	0.281	835.00	65.251	65.531
54	66.180	RTE!	0.316	1424	65.952	66.268
55	66.496	RTE!	0.140	204.00	66.444	66.584
56	66.830	RTE!	0.175	415.00	66.724	66.900
57	66.952	RTE!	0.175	1305	66.900	67.075
58	67.268	RTE!	0.421	771.00	67.075	67.496
59	67.794	RTE!	0.211	510.00	67.707	67.917
60	68.163	RTE!	0.175	199.00	68.093	68.268
61	68.373	RTE!	0.175	402.00	68.268	68.443
62	68.531	RTE!	0.281	353.00	68.443	68.724
63	69.233	RTE!	0.281	396.00	69.075	69.356
64	69.970	RTE!	0.246	556.00	69.847	70.092
65	70.461	RTE!	0.246	273.00	70.338	70.584

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	63.426	RTE!	0.140	137.00	63.356	63.497
2	63.882	RTE!	0.105	93.00	63.812	63.918
3	64.707	RTE!	0.281	1011	64.584	64.865
4	65.075	RTE!	0.140	378.00	65.005	65.145
5	65.286	RTE!	0.281	5798	65.145	65.426
6	65.461	RTE!	0.175	129.00	65.426	65.602
7	65.672	RTE!	0.175	255.00	65.602	65.777
8	66.075	RTE!	0.105	319.00	66.058	66.163
9	66.268	RTE!	0.281	865.00	66.163	66.444
10	67.672	RTE!	0.070	89.00	67.637	67.707
11	68.180	RTE!	0.140	251.00	68.093	68.233
12	68.338	RTE!	0.421	3228	68.233	68.654
13	68.759	RTE!	0.246	276.00	68.654	68.900

APPENDIX C

C15+ Aromatic Biomarker Mass Fragmentograms and Peak Areas

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	28.631	RTE!	0.320	833178	28.500	28.820
2	29.300	RTE!	0.262	30187	29.199	29.460

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	32.573	RTE!	0.233	469142	32.442	32.674
2	32.762	RTE!	0.204	497966	32.674	32.878
3	33.431	RTE!	0.262	726539	33.256	33.518
4	33.591	RTE!	0.175	501612	33.518	33.692

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	16.938	RTE!	0.291	33917	16.822	17.113
2	18.000	RTE!	0.145	25337	17.869	18.015
3	18.102	RTE!	0.262	82419	18.044	18.306
4	18.393	RTE!	0.175	33426	18.306	18.480
5	18.538	RTE!	0.116	31047	18.480	18.596
6	18.669	RTE!	0.233	267680	18.596	18.829
7	18.873	RTE!	0.175	88685	18.829	19.004
8	19.091	RTE!	0.233	88429	19.004	19.236
9	19.324	RTE!	0.145	82677	19.236	19.382
10	19.469	RTE!	0.204	523261	19.382	19.585
11	19.658	RTE!	0.262	675058	19.585	19.847
12	19.920	RTE!	0.262	27335	19.847	20.109
13	20.240	RTE!	0.175	479252	20.109	20.283
14	20.342	RTE!	0.407	562297	20.283	20.691
15	20.865	RTE!	0.407	659583	20.691	21.098
16	21.171	RTE!	0.233	12603	21.098	21.331
17	21.491	RTE!	0.291	72675	21.360	21.650
18	21.738	RTE!	0.349	206316	21.650	21.999
19	22.087	RTE!	0.204	11905	21.999	22.203
20	22.392	RTE!	0.349	55847	22.261	22.610
21	22.785	RTE!	0.262	14985	22.610	22.872
22	22.959	RTE!	0.175	20817	22.872	23.047
23	23.105	RTE!	0.116	16298	23.047	23.163
24	23.236	RTE!	0.145	17568	23.163	23.308
25	23.701	RTE!	0.262	24230	23.541	23.803
26	23.977	RTE!	0.175	25737	23.890	24.065
27	24.181	RTE!	0.407	30896	24.065	24.472
28	24.763	RTE!	0.262	40546	24.646	24.908
29	25.344	RTE!	0.291	19869	25.141	25.432
30	25.490	RTE!	0.145	17513	25.432	25.577
31	25.723	RTE!	0.233	14193	25.577	25.810
32	26.072	RTE!	0.233	17359	25.955	26.188
33	26.261	RTE!	0.145	11853	26.188	26.333
34	26.392	RTE!	0.145	15869	26.333	26.479
35	26.770	RTE!	0.262	18962	26.682	26.944
36	27.031	RTE!	0.233	14377	26.944	27.177
37	27.424	RTE!	0.320	18799	27.322	27.642
38	28.006	RTE!	0.204	11239	27.933	28.137

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	20.138	RTE!	0.262	31739	20.065	20.327
2	20.618	RTE!	0.204	6983	20.473	20.676
3	20.778	RTE!	0.175	15923	20.676	20.851
4	20.952	RTE!	0.233	61490	20.851	21.083
5	21.171	RTE!	0.204	16062	21.083	21.287
6	21.345	RTE!	0.145	13493	21.287	21.432
7	21.549	RTE!	0.233	57033	21.432	21.665
8	21.781	RTE!	0.233	14776	21.665	21.898
9	22.130	RTE!	0.407	237884	21.898	22.305
10	22.421	RTE!	0.116	13279	22.363	22.480
11	22.523	RTE!	0.175	40731	22.480	22.654
12	22.785	RTE!	0.233	146739	22.654	22.887
13	22.974	RTE!	0.175	80925	22.887	23.061
14	23.119	RTE!	0.116	53439	23.061	23.178
15	23.236	RTE!	0.145	65973	23.178	23.323
16	23.381	RTE!	0.116	13163	23.323	23.439
17	23.498	RTE!	0.116	19039	23.439	23.556
18	23.628	RTE!	0.087	20806	23.556	23.643
19	23.977	RTE!	0.204	180810	23.876	24.079
20	24.137	RTE!	0.175	31330	24.079	24.254
21	24.312	RTE!	0.204	10327	24.254	24.457
22	24.588	RTE!	0.204	21215	24.457	24.661
23	24.763	RTE!	0.262	253117	24.661	24.923
24	25.054	RTE!	0.175	7636	24.923	25.097
25	25.344	RTE!	0.233	145203	25.214	25.446
26	25.505	RTE!	0.175	72544	25.446	25.621
27	25.708	RTE!	0.204	42482	25.621	25.824
28	26.086	RTE!	0.262	61218	25.912	26.174
29	26.246	RTE!	0.175	25006	26.174	26.348
30	26.450	RTE!	0.204	36148	26.348	26.552
31	27.031	RTE!	0.262	93724	26.901	27.162
32	27.264	RTE!	0.175	4838	27.162	27.337
33	27.657	RTE!	0.349	128731	27.482	27.831
34	27.904	RTE!	0.145	6377	27.831	27.977
35	28.079	RTE!	0.175	6979	27.977	28.151
36	28.530	RTE!	0.233	6519	28.442	28.675
37	28.937	RTE!	0.145	4630	28.849	28.995
38	29.388	RTE!	0.349	10378	29.228	29.577

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	30.304	RTE!	0.204	14966	30.231	30.435
2	30.609	RTE!	0.175	7454	30.522	30.696
3	31.162	RTE!	0.262	247468	31.045	31.307
4	31.453	RTE!	0.291	9629	31.307	31.598
5	31.860	RTE!	0.291	101677	31.714	32.005
6	32.136	RTE!	0.233	14876	32.034	32.267
7	32.645	RTE!	0.233	57736	32.529	32.762

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	48.163	RTE!	0.145	6162	48.119	48.265
2	48.366	RTE!	0.175	9078	48.265	48.439
3	48.497	RTE!	0.145	6747	48.439	48.584
4	48.643	RTE!	0.087	5088	48.584	48.672
5	48.817	RTE!	0.233	39483	48.730	48.963
6	49.035	RTE!	0.145	3549	48.963	49.108
7	49.457	RTE!	0.320	16852	49.283	49.602
8	49.850	RTE!	0.145	1830	49.748	49.893
9	49.937	RTE!	0.204	4758	49.893	50.097
10	50.155	RTE!	0.087	865.00	50.097	50.184
11	50.388	RTE!	0.291	3986	50.184	50.475
12	50.591	RTE!	0.116	1108	50.533	50.650
13	51.115	RTE!	0.175	3677	50.999	51.173
14	51.348	RTE!	0.349	40393	51.173	51.522
15	51.740	RTE!	0.175	5844	51.609	51.784
16	52.089	RTE!	0.145	2008	51.988	52.133
17	52.424	RTE!	0.116	984.00	52.366	52.482
18	52.627	RTE!	0.175	1725	52.540	52.715
19	52.889	RTE!	0.204	2131	52.831	53.035
20	53.137	RTE!	0.175	3091	53.035	53.209
21	53.311	RTE!	0.175	2101	53.209	53.384
22	53.762	RTE!	0.204	6193	53.645	53.849
23	53.980	RTE!	0.204	5310	53.849	54.053
24	54.125	RTE!	0.233	5583	54.053	54.285
25	54.445	RTE!	0.349	4804	54.285	54.634
26	55.362	RTE!	0.175	1694	55.303	55.478
27	55.565	RTE!	0.145	1247	55.478	55.623
28	55.798	RTE!	0.145	1436	55.740	55.885
29	56.336	RTE!	0.116	1237	56.263	56.380
30	56.598	RTE!	0.262	1325	56.525	56.787
31	56.889	RTE!	0.204	1648	56.787	56.990
32	59.288	RTE!	0.349	2145	59.143	59.492
33	59.608	RTE!	0.233	1843	59.492	59.724
34	60.015	RTE!	0.145	835.00	59.928	60.073
35	60.524	RTE!	0.262	3243	60.364	60.626
36	60.713	RTE!	0.291	17077	60.626	60.917
37	60.990	RTE!	0.233	1280	60.917	61.150
38	61.979	RTE!	0.204	2358	61.906	62.109
39	62.328	RTE!	0.291	53803	62.197	62.488
40	62.604	RTE!	0.233	3028	62.517	62.749
41	63.011	RTE!	0.145	1176	62.924	63.069
42	63.418	RTE!	0.175	3458	63.302	63.477

45	64.189	RTE!	0.116	838.00	64.116	64.233
46	64.335	RTE!	0.233	30300	64.233	64.465
47	64.538	RTE!	0.116	5364	64.465	64.582
48	64.655	RTE!	0.204	9805	64.582	64.785
49	64.873	RTE!	0.204	3909	64.785	64.989
50	65.440	RTE!	0.175	3225	65.367	65.542
51	65.774	RTE!	0.204	1629	65.658	65.862
52	65.963	RTE!	0.262	36401	65.862	66.123
53	66.254	RTE!	0.291	5923	66.123	66.414
54	66.545	RTE!	0.262	2434	66.414	66.676
55	66.720	RTE!	0.262	1426	66.676	66.938
56	67.040	RTE!	0.204	3037	66.938	67.141
57	67.287	RTE!	0.349	7788	67.141	67.490
58	67.650	RTE!	0.291	2118	67.490	67.781

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	48.235	RTE!	0.233	1945	48.119	48.352
2	48.454	RTE!	0.175	1927	48.352	48.526
3	48.817	RTE!	0.204	534.00	48.730	48.934
4	49.326	RTE!	0.145	920.00	49.253	49.399
5	49.719	RTE!	0.233	1834	49.573	49.806
6	50.257	RTE!	0.233	2689	50.155	50.388
7	50.548	RTE!	0.320	7691	50.388	50.708
8	50.940	RTE!	0.320	6980	50.708	51.028
9	51.435	RTE!	0.175	503.00	51.289	51.464
10	51.769	RTE!	0.175	556.00	51.697	51.871
11	52.119	RTE!	0.378	4054	51.871	52.249
12	52.511	RTE!	0.145	1045	52.424	52.569
13	52.657	RTE!	0.116	668.00	52.569	52.686
14	52.831	RTE!	0.116	1182	52.773	52.889
15	53.093	RTE!	0.320	3503	52.889	53.209
16	53.282	RTE!	0.116	3214	53.209	53.326
17	53.413	RTE!	0.145	14713	53.326	53.471
18	53.515	RTE!	0.262	7329	53.471	53.733
19	53.893	RTE!	0.233	6866	53.733	53.965
20	54.067	RTE!	0.175	2427	53.965	54.140
21	54.227	RTE!	0.175	1366	54.140	54.314
22	54.373	RTE!	0.116	730.00	54.314	54.431
23	54.504	RTE!	0.145	2546	54.431	54.576
24	54.678	RTE!	0.175	1513	54.576	54.751
25	54.911	RTE!	0.233	10326	54.809	55.042
26	55.216	RTE!	0.145	1808	55.129	55.274
27	55.405	RTE!	0.175	18164	55.303	55.478
28	55.551	RTE!	0.262	4421	55.478	55.740
29	55.827	RTE!	0.145	3181	55.740	55.885
30	55.972	RTE!	0.175	4063	55.885	56.060
31	56.147	RTE!	0.145	1265	56.060	56.205
32	56.569	RTE!	0.262	1759	56.467	56.729
33	56.903	RTE!	0.233	6312	56.729	56.961
34	57.092	RTE!	0.320	28038	56.961	57.281
35	57.339	RTE!	0.175	6960	57.281	57.456
36	57.587	RTE!	0.145	4470	57.514	57.659
37	57.747	RTE!	0.175	2504	57.659	57.834
38	57.965	RTE!	0.262	4073	57.892	58.154
39	58.299	RTE!	0.116	1287	58.241	58.357
40	58.605	RTE!	0.175	1647	58.503	58.677
41	58.954	RTE!	0.233	12415	58.823	59.055
42	59.128	RTE!	0.233	8220	59.055	59.288

45	60.015	RTE!	0.262	3539	59.837	59.870
46	60.234	RTE!	0.145	623.00	59.870	60.132
47	60.742	RTE!	0.175	1658	60.161	60.306
48	61.353	RTE!	0.378	3913	60.655	60.830
49	61.731	RTE!	0.204	2180	61.179	61.557
50	62.037	RTE!	0.233	2468	61.644	61.848
51	67.767	RTE!	0.145	427.00	61.877	62.109
					67.636	67.781

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	35.670	RTE!	0.233	42251	35.554	35.787
2	36.267	RTE!	0.320	195281	36.107	36.426
3	36.543	RTE!	0.204	177761	36.426	36.630
4	36.688	RTE!	0.175	97283	36.630	36.805
5	36.921	RTE!	0.204	20406	36.805	37.008
6	37.168	RTE!	0.262	838784	37.008	37.270
7	37.357	RTE!	0.175	416925	37.270	37.444
8	37.546	RTE!	0.204	306868	37.444	37.648
9	37.735	RTE!	0.175	110770	37.648	37.823
10	37.895	RTE!	0.204	203675	37.823	38.026
11	38.303	RTE!	0.349	92733	38.172	38.521
12	38.797	RTE!	0.291	41885	38.666	38.957
13	39.480	RTE!	0.291	13470	39.364	39.655
14	39.990	RTE!	0.233	13097	39.800	40.033
15	40.077	RTE!	0.204	14565	40.033	40.237
16	40.877	RTE!	0.320	28207	40.760	41.080
17	41.400	RTE!	0.262	15197	41.313	41.575

Peak#	Ret Time	Type	Width	Area	Start Time	End Time
1	32.194	RTE!	0.145	600.00	32.122	32.267
2	32.660	RTE!	0.175	905.00	32.558	32.732
3	33.576	RTE!	0.145	1009	33.489	33.634
4	33.765	RTE!	0.233	1777	33.634	33.867
5	34.012	RTE!	0.175	1535	33.867	34.041
6	34.972	RTE!	0.175	1061	34.827	35.001
7	35.292	RTE!	0.175	760.00	35.205	35.379
8	35.438	RTE!	0.116	1317	35.379	35.496
9	36.921	RTE!	0.204	4793	36.775	36.979
10	37.314	RTE!	0.320	6832	37.183	37.503
11	37.764	RTE!	0.145	945.00	37.706	37.852
12	38.215	RTE!	0.145	1428	38.113	38.259
13	38.608	RTE!	0.116	2470	38.550	38.666
14	38.942	RTE!	0.145	4248	38.870	39.015
15	39.131	RTE!	0.233	9016	39.015	39.248
16	39.597	RTE!	0.145	882.00	39.539	39.684
17	39.771	RTE!	0.175	5832	39.684	39.859
18	39.960	RTE!	0.204	8834	39.859	40.062
19	40.164	RTE!	0.175	5086	40.062	40.237
20	40.484	RTE!	0.145	4825	40.411	40.557
21	40.615	RTE!	0.116	1905	40.557	40.673
22	40.818	RTE!	0.087	1502	40.789	40.877
23	41.429	RTE!	0.145	5346	41.342	41.487
24	41.560	RTE!	0.204	7699	41.487	41.691
25	41.778	RTE!	0.145	1465	41.691	41.836
26	41.997	RTE!	0.116	1053	41.953	42.069
27	42.142	RTE!	0.145	4710	42.069	42.215
28	42.433	RTE!	0.233	9939	42.360	42.593
29	42.651	RTE!	0.145	4797	42.593	42.738
30	42.825	RTE!	0.175	8260	42.738	42.913
31	42.971	RTE!	0.145	2756	42.913	43.058
32	43.218	RTE!	0.087	2057	43.174	43.262
33	43.320	RTE!	0.116	4495	43.262	43.378
34	43.451	RTE!	0.204	4381	43.378	43.582
35	43.640	RTE!	0.175	5497	43.582	43.756
36	43.872	RTE!	0.175	646.00	43.785	43.960
37	44.105	RTE!	0.233	5085	44.047	44.280
38	44.353	RTE!	0.233	1915	44.280	44.512
39	44.731	RTE!	0.175	1826	44.658	44.832
40	44.905	RTE!	0.175	4688	44.832	45.007
41	45.632	RTE!	0.116	620.00	45.589	45.705
42	45.981	RTE!	0.175	2152	45.879	46.054

45	46.679	RTE!	0.175	1982	46.432	46.607
46	46.868	RTE!	0.145	1052	46.607	46.781
47	47.305	RTE!	0.291	4052	46.781	46.927
48	47.712	RTE!	0.175	1201	47.159	47.450
49	48.163	RTE!	0.233	1848	47.625	47.799
50	48.468	RTE!	0.204	795.00	48.061	48.294
51	48.570	RTE!	0.175	724.00	48.323	48.526
52	48.817	RTE!	0.262	3523	48.526	48.701
53	49.268	RTE!	0.233	1929	48.701	48.963
54	49.704	RTE!	0.233	3485	49.166	49.399
55	50.257	RTE!	0.262	4301	49.602	49.835
56	50.548	RTE!	0.349	7069	50.097	50.359
57	50.810	RTE!	0.145	1216	50.359	50.708
58	50.940	RTE!	0.145	3500	50.708	50.853
59	51.071	RTE!	0.175	1376	50.853	50.999
60	52.657	RTE!	0.145	1008	50.999	51.173
61	53.107	RTE!	0.291	2979	52.569	52.715
62	53.515	RTE!	0.233	3788	52.947	53.238
63	54.067	RTE!	0.204	2824	53.326	53.558
64	54.213	RTE!	0.262	998.00	53.936	54.140
65	54.504	RTE!	0.204	2939	54.140	54.402
66	55.303	RTE!	0.233	2258	54.402	54.605
67	55.565	RTE!	0.145	2737	55.216	55.449
68	55.987	RTE!	0.116	1112	55.478	55.623
69	56.511	RTE!	0.204	2612	55.885	56.001
70	56.830	RTE!	0.204	4011	56.438	56.641
71	57.209	RTE!	0.145	1087	56.758	56.961
72	57.354	RTE!	0.436	32339	57.107	57.252
73	58.023	RTE!	0.175	691.00	57.252	57.688
74	59.128	RTE!	0.320	38630	57.979	58.154
75	59.448	RTE!	0.262	4114	58.997	59.317
76	60.015	RTE!	0.233	13962	59.346	59.608
					59.899	60.132