Geochemistry Data Report – Oils and Gas Analyses Well 16/2-4

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Table 1. Number of analyses performed

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GC of Aromatic hydrocarbons	4		4
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Table 2. GC of Whole Oil (parameters)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	A	B	X	W	C	I	F	H	U	R	S
16/2-4	Oil		1727.50	1727.50 m		46584	0.32	1.15	0.92	3.95	0.83	1.36	0.63	22.08	1.38	3.26	50.78
16/2-4	Oil		1898.10	1898.10 m		46585	0.18	0.77	0.77	2.06	0.73	1.24	0.54	20.49	1.37	3.19	56.19
16/2-4	Oil		1904.20	1904.20 m		46586	0.18	0.79	0.77	2.14	0.74	1.23	0.54	20.26	1.34	3.20	55.11
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	0.13	0.56	0.53	1.68	0.86	1.49	0.72	26.01	1.43	3.49	83.29

A: Benz/n-C_6
B: Tol/n-C_7
X: m+p-Xyl/n-C_8
W: Benz*10/CyC_6
C: (n-C_6+n-C_7)/(CyC_6+$MCyC_6$)
I: (2-MC_6+3-MC_6)/(c1,3-$DMCyC_5$+t1,3-$DMCyC_5$+t1,2-$DMCyC_5$)
F: n-C_7/$MCyC_6$
H: n-C_7*100/(CyC_6+2-MC_6+3-MC_6+c1,3-$DMCyC_5$+t1,3-$DMCyC_5$+t1,2-$DMCyC_5$+n-C_7+$MCyC_6$)
U: CyC_6/$MCyC_5$
R: n-C_7/2-MC_6
S: n-C_6/2,2-DMC_4

Table 3. GC of saturated compounds (parameters)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	CPI 1	Pr/n-C17	Ph/n-C18	(Pr/n-C17)/(Ph/n-C18))	Pr/Ph	n-C17/(n-C17+C27)
16/2-4	Oil		1727.50	1727.50 m		46584T	1.05	0.58	0.50	1.16	1.29	0.72
16/2-4	Oil		1898.10	1898.10 m		46585T	1.03	0.79	0.78	1.01	1.12	0.72
16/2-4	Oil		1904.20	1904.20 m		46586T	1.03	0.74	0.78	0.95	1.10	0.72
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.20	0.86	0.80	1.07	1.55	0.97

Table 4. GCMS SIR of saturated compounds (parameters)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	%23:3	%28αβ	%30D	%27Ts	%22S	%29Ts	%20S	%ββ	%27dβS	%C27	%C29	28/29	24:4/23:3
16/2-4	Oil		1727.50	1727.50 m		46584T	4.74	22.03	8.21	48.82	58.50	13.99	55.47	56.94	49.71	35.09	37.43	0.66	0.87
16/2-4	Oil		1898.10	1898.10 m		46585T	4.10	22.45	6.66	40.07	59.03	12.89	52.99	54.04	43.94	35.33	36.88	0.66	0.92
16/2-4	Oil		1904.20	1904.20 m		46586T	4.26	23.70	6.99	40.70	59.45	12.90	53.70	54.34	42.80	35.25	37.01	0.66	0.91
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	21.45	22.49	7.97	45.30	58.65	15.27	57.40	57.85	56.51	42.02	30.99	0.76	0.50

%23:3	23:3/(23:3+30αβ)*100
%28αβ	28αβ/(28αβ+30αβ)*100
%30D	30D/(30D+30αβ)*100
%27Ts	27Ts/(27Ts+27Tm)*100
%22S	(32αβS/(32αβS+32αβR)*100
%29Ts	(29Ts/29Ts+30αβ)*100
%20S	(29ααS/29ααS+29ααR)*100

%ββ	(29ββ(R+S)/(29ββ(R+S)+29αα(R+S)*100
%27dβS	27dβS/(27dβS+27αα(R+S))*100
%C27	(27ββ(R+S)/(27ββ(R+S)+28ββ(R+S)+29ββ(R+S))*100
%C29	(29ββ(R+S)/(27ββ(R+S)+28ββ(R+S)+29ββ(R+S))*100
28/29	(28αα(R+S)+28ββ(R+S))/(29αα(R+S)+29ββ(R+S))
24:4/23:3	24:4/23:3

Table 5. GCMS SIR of aromatic compounds (parameters)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	AROM2	Crack1	Crack2	MSAro1	MSAro2	MSAro3	MSAro4	MSAro5	MSAro6	MSAro7	MSAro8	MSAro9
16/2-4	Oil		1727.50	1727.50 m		46584T	0.69	0.36	0.16	0.18	2.56	0.43	1.67	4.54	1.50	0.23	2.81	0.68
16/2-4	Oil		1898.10	1898.10 m		46585T	0.78	0.29	0.11	0.17	1.82	0.39	1.72	3.53	1.23	0.37	2.06	0.74
16/2-4	Oil		1904.20	1904.20 m		46586T	0.78	0.29	0.11	0.17	1.90	0.39	1.65	3.43	1.31	0.37	1.92	0.74
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	0.51	0.72	0.35	0.44	2.14	0.40	1.85	4.29	1.03	0.35	3.72	0.51

AROM2: $(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA/(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA+C_{21}MA+C_{22}MA+\beta SC_{27}MA+\beta RC_{27}MA+\beta RC_{27}DMA+\alpha SC_{27}MA+\beta SC_{28}MA+\beta SC_{28}DMA+\alpha RC_{27}DMA+\alpha SC_{27}DMA+\alpha RC_{27}MA+\alpha SC_{28}MA+\alpha SC_{29}MA+\alpha RC_{29}MA)$

Crack1: $(C_{20}TA)/(C_{20}TA+RC_{28}TA)$

Crack2: $(C_{20}TA+C_{21}TA)/(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA)$

MSAro1: $(C_{21}MA+C_{22}MA)/(C_{21}MA+C_{22}MA+\beta SC_{27}MA+\beta RC_{27}MA+\beta RC_{27}DMA+\alpha SC_{27}MA+\beta SC_{28}MA+\beta SC_{28}DMA+\alpha RC_{27}DMA+\alpha SC_{27}DMA+\alpha RC_{27}MA+\alpha SC_{28}MA+\alpha SC_{29}MA+\alpha RC_{29}MA)$

MSAro2: 4-MDBT/1-MDBT

MSAro3: (2-MP+3-MP)/(1-MP+2-MP+3-MP+9-MP)

MSAro4: 2-MN/1-MN

MSAro5: (2,6-DMN+2,7-DMN)/1,5-DMN

MSAro6: 4-MDBT/DBT

MSAro7: DBT/P

MSAro8: 3-MP/Retene

MSAro9: $RC_{28}TA/(RC_{28}TA+\alpha RC_{28}MA+\beta RC_{29}MA+\beta RC_{29}DMA)$

Table 6. Gas Composition (volume-%)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	C1%	C2%	C3%	iC4%	nC4%	iC5%	nC5%	C6+%	CO2%	Sum C1-C5	Wetness	iC4/nC4	ppm
16/2-4	Gas		1889.10	1898.10 m		46582	55.8	15.7	15.9	3.0	5.7	1.8	1.7	0.41	0.08	99.5	41.9	0.52	868231
16/2-4	Gas		1904.20	1904.20 m		46583	51.2	17.3	17.9	3.3	6.2	1.8	1.9	0.40	0.10	99.5	46.6	0.52	866923
16/2-4	Gas	2a-2b	1886.70	1886.70 m		46737	77.3	10.5	7.5	1.2	2.1	0.64	0.61	0.20	0.00	99.8	21.6	0.56	926095

Table 7. Gas Isotopes (δ13C (‰ PDB) & δD (‰ SMOW))

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	C1 δ13C	C2 δ13C	C3 δ13C	i-C4 δ13C	n-C4 δ13C	CO2 δ13C	C1 δD	C2 δD	C3 δD	i-C4 δD	n-C4 δD
16/2-4	Gas		1889.10	1898.10 m		46582	-45.0	-28.9	-26.8	-27.1	-28.0		-214.0				
16/2-4	Gas		1904.20	1904.20 m		46583	-45.0	-28.7	-26.8	-27.0	-27.9		-214.0				
16/2-4	Gas	2a-2b	1886.70	1886.70 m		46737	-45.0	-29.0	-27.0	-27.1	-28.3		-210.0				

Table 8. Isotopes of fractions, δ13C (‰ PDB)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	δ13C-Oil/EOM	δ13C-Sat	δ13C-Aro	δ13C-Pol	δ13C-Asp	δ13C-Ker
16/2-4	Oil		1727.50	1727.50 m		46584	-28.0	-28.7	-27.6	-27.8	-28.0	
16/2-4	Oil		1898.10	1898.10 m		46585	-28.4	-29.0	-28.0	-28.1	-28.3	
16/2-4	Oil		1904.20	1904.20 m		46586	-28.3	-29.0	-28.1	-28.2	-28.3	
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	-28.9	-29.2	-27.2	-30.7		

Table 9. Extraction, Asphaltene precipitation and Iatroscan data

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	Rock weight (g)	EOM (mg)	EOM (mg/kg Rock)	SAT (wt% of EOM(Oil))	ARO (wt% of EOM(Oil))	POL (wt% of EOM(Oil))	ASP (wt% of EOM(Oil))	HC (wt% of EOM(Oil))
16/2-4	Oil		1727.50	1727.50 m		46584				49.7	40.0	4.4	5.9	89.7
16/2-4	Oil		1898.10	1898.10 m		46585				40.0	50.1	4.3	5.6	90.1
16/2-4	Oil		1904.20	1904.20 m		46586				41.1	46.7	5.8	6.5	87.7
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736				58.7	13.8	27.6	0.0	72.4

Table 10. Density and topping

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	Density (g/cm3)	°API	Topped oil
16/2-4	Oil		1727.50	1727.50 m		46584	0.879	29.4	77.2
16/2-4	Oil		1898.10	1898.10 m		46585	0.869	31.3	79.3
16/2-4	Oil		1904.20	1904.20 m		46586	0.869	31.3	77.9
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736			45.5

Table 11. GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	IS 2,2,4-TMC5	n-C3	i-C4	n-C4	i-C5	n-C5	2,2-DMC4	CyC5	2,3-DMC4	2-MC5	3-MC5	n-C6	2,2-DMC5	MCyC5
16/2-4	Oil		1727.50	1727.50 m		46584	1.85e5	7.91e4	5.84e4	1.84e5	1.69e5	2.37e5	4.84e3	3.14e4	1.98e4	1.40e5	8.11e4	2.46e5	4.45e3	1.45e5
16/2-4	Oil		1898.10	1898.10 m		46585	1.92e5	3.87e4	3.38e4	1.12e5	1.33e5	1.91e5	4.23e3	2.83e4	2.14e4	1.48e5	8.12e4	2.38e5	4.37e3	1.53e5
16/2-4	Oil		1904.20	1904.20 m		46586	1.71e5	5.85e4	4.63e4	1.48e5	1.61e5	2.23e5	4.43e3	3.06e4	2.27e4	1.56e5	8.51e4	2.44e5	4.26e3	1.56e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	1.86e5	2.04e4	2.79e4	9.96e4	1.61e5	2.58e5	6.48e3	3.71e4	3.52e4	2.89e5	1.60e5	5.40e5	1.18e4	2.88e5

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2,4-DMC5	2,2,3-TMC4	Benz	3,3-DMC5	CyC6	2-MC6	2,3-DMC5	1,1-DMCyC5	3-MC6	c-1,3-DMCyC5	t-1,3-DMCyC5	3-EC5	t-1,2-DMCyC5	n-C7
16/2-4	Oil		1727.50	1727.50 m		46584	1.19e4	1.38e3	7.91e4	2.87e3	2.00e5	7.60e4	2.79e4	1.70e4	8.64e4	3.25e4	3.03e4	5.74e3	5.63e4	2.48e5
16/2-4	Oil		1898.10	1898.10 m		46585	1.19e4	1.39e3	4.30e4	2.80e3	2.09e5	7.81e4	3.06e4	1.56e4	8.49e4	3.59e4	3.35e4	5.81e3	6.26e4	2.49e5
16/2-4	Oil		1904.20	1904.20 m		46586	1.22e4	1.58e3	4.49e4	2.85e3	2.10e5	7.48e4	2.86e4	1.52e4	8.23e4	3.49e4	3.23e4	6.04e3	6.09e4	2.39e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	3.24e4	3.28e3	6.90e4	7.91e3	4.11e5	2.58e5	8.76e4	3.82e4	2.74e5	9.65e4	9.02e4	1.80e4	1.71e5	8.98e5

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	c-1,2-DMCyC5	MCyC6	1,1,3-TMCyC5	ECyC5	2,5-DMC6	2,2,3-TMC5/ 2,4-DMC6	c,t-1,2,4-TMCyC5	3,3-DMC6	t,c-1,2,3-TMCyC5	2,3,4-TMC5	Tol	2,3-DMC6	2-MC7	4-MC7
16/2-4	Oil		1727.50	1727.50 m		46584	0.00e0	3.93e5	1.88e4	2.46e4	1.12e4	1.46e4	1.74e4	3.50e3	1.89e4	4.25e3	2.84e5	1.92e4	8.50e4	2.71e4
16/2-4	Oil		1898.10	1898.10 m		46585	0.00e0	4.62e5	1.93e4	3.03e4	1.19e4	1.45e4	1.94e4	3.79e3	2.16e4	3.94e3	1.93e5	2.17e4	8.33e4	2.54e4
16/2-4	Oil		1904.20	1904.20 m		46586	0.00e0	4.47e5	1.96e4	2.94e4	1.14e4	1.39e4	1.84e4	3.72e3	2.06e4	3.70e3	1.90e5	2.02e4	7.88e4	2.41e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	0.00e0	1.26e6	6.29e4	8.85e4	4.79e4	5.77e4	6.64e4	1.43e4	7.38e4	1.44e4	5.01e5	7.98e4	3.62e5	1.04e5

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	3-MC7	c-1,3-DMCyC6	t-1,4-DMCyC6	1,1-DMCyC6	t-1,2-DMCyC6	n-C8	E-CyC6	i-C9	E-Benz	m-Xyl	p-Xyl	4-MC8	2-MC8	3-MC8
16/2-4	Oil		1727.50	1727.50 m		46584	6.18e4	7.87e4	3.35e4	2.13e4	3.71e4	2.54e5	1.06e5	3.33e4	5.96e4	1.78e5	5.63e4	2.95e4	3.86e4	4.31e4
16/2-4	Oil		1898.10	1898.10 m		46585	5.09e4	9.23e4	4.01e4	2.53e4	4.39e4	2.46e5	1.10e5	3.65e4	4.80e4	1.43e5	4.61e4	2.59e4	3.59e4	3.87e4
16/2-4	Oil		1904.20	1904.20 m		46586	4.61e4	8.90e4	3.83e4	2.42e4	4.16e4	2.32e5	1.04e5	3.49e4	4.45e4	1.34e5	4.39e4	2.34e4	3.39e4	3.60e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	3.30e5	2.48e5	1.32e5	8.51e4	1.40e5	1.04e6	3.59e5	1.28e5	1.41e5	4.18e5	1.31e5	1.05e5	1.53e5	1.60e5

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	o-Xyl	n-C9	i-C10	n-C10	i-C11	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15
16/2-4	Oil		1727.50	1727.50 m		46584	9.11e4	2.21e5	4.23e4	2.04e5	4.28e4	1.82e5	1.78e5	3.19e4	8.44e4	1.72e5	4.05e4	1.58e5	7.30e4	1.65e5
16/2-4	Oil		1898.10	1898.10 m		46585	6.71e4	1.97e5	3.83e4	1.68e5	3.83e4	1.44e5	1.30e5	2.78e4	4.88e4	1.27e5	4.12e4	1.14e5	7.01e4	1.27e5
16/2-4	Oil		1904.20	1904.20 m		46586	6.54e4	1.84e5	3.59e4	1.57e5	3.69e4	1.31e5	1.22e5	2.59e4	4.43e4	1.18e5	3.97e4	1.08e5	6.52e4	1.17e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	1.95e5	8.05e5	1.43e5	5.35e5	1.13e5	3.57e5	2.58e5	5.30e4	3.85e4	1.99e5	4.78e4	1.41e5	6.59e4	1.10e5

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C16	i-C18	n-C17	i-C19	n-C18	i-C20	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26
16/2-4	Oil		1727.50	1727.50 m		46584	1.43e5	4.04e4	1.33e5	7.82e4	1.15e5	5.58e4	1.11e5	9.74e4	8.34e4	7.96e4	7.51e4	6.66e4	5.89e4	5.49e4
16/2-4	Oil		1898.10	1898.10 m		46585	1.11e5	4.17e4	1.02e5	7.90e4	9.02e4	6.80e4	9.28e4	7.99e4	6.47e4	6.00e4	5.73e4	5.36e4	4.58e4	4.38e4
16/2-4	Oil		1904.20	1904.20 m		46586	1.07e5	3.88e4	9.71e4	7.34e4	8.65e4	6.52e4	8.35e4	7.68e4	6.36e4	6.05e4	5.55e4	5.26e4	4.40e4	4.25e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	7.48e4	2.60e4	5.23e4	4.20e4	3.44e4	2.75e4	2.83e4	1.82e4	1.19e4	9.25e3	6.42e3	4.84e3	3.48e3	2.36e3

Table 11. continued, GC of Whole Oil (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34	n-C35	n-C36
16/2-4	Oil		1727.50	1727.50 m		46584	4.69e4	3.98e4	3.87e4	3.01e4	2.83e4	2.19e4	1.53e4	1.27e4	1.09e4	1.04e4
16/2-4	Oil		1898.10	1898.10 m		46585	3.79e4	3.18e4	3.35e4	2.71e4	2.23e4	1.82e4	1.30e4	1.17e4	8.30e3	9.69e3
16/2-4	Oil		1904.20	1904.20 m		46586	3.63e4	3.08e4	3.11e4	2.61e4	2.21e4	1.82e4	1.31e4	1.15e4	8.01e3	9.08e3
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	1.93e3	1.21e3	1.18e3	1.06e3	6.40e2	5.26e2	0.00e0	0.00e0	0.00e0	0.00e0

Table 12. GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	IS 2,2,4-TMC5	n-C3	i-C4	n-C4	i-C5	n-C5	2,2-DMC4	CyC5	2,3-DMC4	2-MC5	3-MC5	n-C6	2,2-DMC5	MCyC5
16/2-4	Oil		1727.50	1727.50 m		46584	7.29e6	3.21e6	2.34e6	7.36e6	6.72e6	9.44e6	1.92e5	1.21e6	7.84e5	5.55e6	3.21e6	9.73e6	1.75e5	5.60e6
16/2-4	Oil		1898.10	1898.10 m		46585	7.33e6	1.52e6	1.31e6	4.33e6	5.13e6	7.37e6	1.62e5	1.06e6	8.21e5	5.66e6	3.11e6	9.12e6	1.67e5	5.72e6
16/2-4	Oil		1904.20	1904.20 m		46586	6.73e6	2.37e6	1.85e6	5.92e6	6.40e6	8.85e6	1.75e5	1.18e6	9.01e5	6.19e6	3.37e6	9.66e6	1.68e5	6.03e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	6.84e6	7.73e5	1.05e6	3.73e6	5.99e6	9.62e6	2.40e5	1.34e6	1.30e6	1.07e7	5.91e6	2.00e7	4.35e5	1.04e7

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2,4-DMC5	2,2,3-TMC4	Benz	3,3-DMC5	CyC6	2-MC6	2,3-DMC5	1,1-DMCyC5	3-MC6	c-1,3-DMCyC5	t-1,3-DMCyC5	3-EC5	t-1,2-DMCyC5	n-C7
16/2-4	Oil		1727.50	1727.50 m		46584	4.68e5	5.46e4	2.84e6	1.13e5	7.76e6	3.00e6	1.10e6	6.56e5	3.41e6	1.26e6	1.17e6	2.27e5	2.18e6	9.78e6
16/2-4	Oil		1898.10	1898.10 m		46585	4.54e5	5.31e4	1.50e6	1.07e5	7.83e6	2.98e6	1.17e6	5.83e5	3.24e6	1.34e6	1.25e6	2.22e5	2.34e6	9.51e6
16/2-4	Oil		1904.20	1904.20 m		46586	4.82e5	6.22e4	1.61e6	1.12e5	8.10e6	2.95e6	1.13e6	5.88e5	3.24e6	1.35e6	1.25e6	2.38e5	2.35e6	9.44e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	1.20e6	1.21e5	2.32e6	2.92e5	1.49e7	9.51e6	3.23e6	1.38e6	1.01e7	3.49e6	3.26e6	6.66e5	6.18e6	3.32e7

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	c-1,2-DMCyC5	MCyC6	1,1,3-TMCyC5	ECyC5	2,5-DMC6	2,2,3-TMC5/ 2,4-DMC6	c,t-1,2,4-TMCyC5	3,3-DMC6	t,c-1,2,3-TMCyC5	2,3,4-TMC5	Tol	2,3-DMC6	2-MC7	4-MC7
16/2-4	Oil		1727.50	1727.50 m		46584	0.00e0	1.52e7	7.27e5	9.51e5	4.41e5	5.74e5	6.73e5	1.38e5	7.30e5	1.67e5	1.03e7	7.56e5	3.35e6	1.07e6
16/2-4	Oil		1898.10	1898.10 m		46585	0.00e0	1.73e7	7.21e5	1.13e6	4.53e5	5.52e5	7.24e5	1.44e5	8.08e5	1.50e5	6.78e6	8.26e5	3.18e6	9.66e5
16/2-4	Oil		1904.20	1904.20 m		46586	0.00e0	1.73e7	7.58e5	1.14e6	4.50e5	5.46e5	7.10e5	1.47e5	7.95e5	1.46e5	6.88e6	7.96e5	3.10e6	9.50e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	0.00e0	4.55e7	2.28e6	3.20e6	1.76e6	2.13e6	2.40e6	5.26e5	2.67e6	5.32e5	1.70e7	2.94e6	1.34e7	3.82e6

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	3-MC7	c-1,3-DMCyC6	t-1,4-DMCyC6	1,1-DMCyC6	t-1,2-DMCyC6	n-C8	E-CyC6	i-C9	E-Benz	m-Xyl	p-Xyl	4-MC8	2-MC8	3-MC8
16/2-4	Oil		1727.50	1727.50 m		46584	2.43e6	3.04e6	1.30e6	8.26e5	1.44e6	9.99e6	4.09e6	1.31e6	2.18e6	6.53e6	2.06e6	1.16e6	1.52e6	1.70e6
16/2-4	Oil		1898.10	1898.10 m		46585	1.94e6	3.46e6	1.50e6	9.48e5	1.64e6	9.38e6	4.10e6	1.39e6	1.70e6	5.06e6	1.63e6	9.84e5	1.37e6	1.47e6
16/2-4	Oil		1904.20	1904.20 m		46586	1.82e6	3.44e6	1.48e6	9.35e5	1.61e6	9.14e6	4.02e6	1.37e6	1.63e6	4.92e6	1.61e6	9.19e5	1.33e6	1.42e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	1.21e7	8.97e6	4.77e6	3.08e6	5.08e6	3.82e7	1.30e7	4.70e6	4.83e6	1.43e7	4.49e6	3.87e6	5.64e6	5.90e6

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	o-Xyl	n-C9	i-C10	n-C10	i-C11	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15
16/2-4	Oil		1727.50	1727.50 m		46584	3.34e6	8.70e6	1.66e6	8.01e6	1.68e6	7.14e6	6.96e6	1.25e6	3.30e6	6.71e6	1.58e6	6.19e6	2.85e6	6.47e6
16/2-4	Oil		1898.10	1898.10 m		46585	2.38e6	7.49e6	1.46e6	6.39e6	1.45e6	5.45e6	4.93e6	1.05e6	1.85e6	4.81e6	1.56e6	4.32e6	2.65e6	4.78e6
16/2-4	Oil		1904.20	1904.20 m		46586	2.39e6	7.24e6	1.41e6	6.17e6	1.44e6	5.14e6	4.77e6	1.01e6	1.73e6	4.60e6	1.55e6	4.22e6	2.54e6	4.58e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	6.69e6	2.96e7	5.23e6	1.96e7	4.15e6	1.31e7	9.47e6	1.94e6	1.41e6	7.27e6	1.75e6	5.15e6	2.41e6	4.03e6

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C16	i-C18	n-C17	i-C19	n-C18	i-C20	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26
16/2-4	Oil		1727.50	1727.50 m		46584	5.60e6	1.57e6	5.18e6	3.05e6	4.47e6	2.18e6	4.32e6	3.79e6	3.25e6	3.10e6	2.92e6	2.59e6	2.29e6	2.13e6
16/2-4	Oil		1898.10	1898.10 m		46585	4.20e6	1.57e6	3.84e6	2.98e6	3.40e6	2.56e6	3.50e6	3.01e6	2.44e6	2.26e6	2.16e6	2.02e6	1.73e6	1.65e6
16/2-4	Oil		1904.20	1904.20 m		46586	4.16e6	1.51e6	3.79e6	2.86e6	3.37e6	2.54e6	3.25e6	2.99e6	2.47e6	2.35e6	2.16e6	2.04e6	1.71e6	1.65e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	2.73e6	9.47e5	1.91e6	1.53e6	1.25e6	1.00e6	1.03e6	6.62e5	4.32e5	3.37e5	2.34e5	1.76e5	1.27e5	8.59e4

Table 12. continued, GC of Whole Oil (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34	n-C35	n-C36
16/2-4	Oil		1727.50	1727.50 m		46584	1.83e6	1.55e6	1.51e6	1.17e6	1.10e6	8.52e5	5.94e5	4.94e5	4.25e5	4.04e5
16/2-4	Oil		1898.10	1898.10 m		46585	1.43e6	1.20e6	1.26e6	1.02e6	8.38e5	6.83e5	4.87e5	4.39e5	3.12e5	3.64e5
16/2-4	Oil		1904.20	1904.20 m		46586	1.41e6	1.20e6	1.21e6	1.01e6	8.57e5	7.05e5	5.07e5	4.48e5	3.11e5	3.52e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736	7.02e4	4.39e4	4.30e4	3.85e4	2.33e4	1.91e4	0.00e0	0.00e0	0.00e0	0.00e0

Table 13. GC of saturated compounds (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C10	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15	n-C16	i-C18	n-C17	Pr
16/2-4	Oil		1727.50	1727.50 m		46584T	1.05e7	1.41e7	1.55e7	2.78e6	3.08e6	1.67e7	3.62e6	1.79e7	5.74e6	1.95e7	1.91e7	5.21e6	1.82e7	1.06e7
16/2-4	Oil		1898.10	1898.10 m		46585T	7.25e6	9.52e6	1.01e7	2.33e6	2.43e6	1.09e7	3.46e6	1.18e7	5.10e6	1.22e7	1.25e7	4.37e6	1.08e7	8.51e6
16/2-4	Oil		1904.20	1904.20 m		46586T	3.28e6	5.99e6	6.85e6	1.51e6	1.67e6	7.47e6	2.38e6	8.82e6	4.02e6	9.89e6	1.00e7	3.85e6	9.62e6	7.14e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	3.98e7	3.80e7	2.83e7	6.16e6	6.13e6	2.24e7	5.08e6	1.71e7	6.14e6	1.30e7	9.16e6	3.19e6	6.90e6	5.93e6

Table 13. continued, GC of saturated compounds (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C18	Ph	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30
16/2-4	Oil		1727.50	1727.50 m		46584T	1.63e7	8.18e6	1.68e7	1.37e7	1.26e7	1.17e7	1.07e7	9.99e6	8.95e6	8.32e6	7.19e6	5.86e6	5.66e6	4.55e6
16/2-4	Oil		1898.10	1898.10 m		46585T	9.71e6	7.58e6	1.04e7	8.09e6	7.39e6	6.82e6	6.26e6	5.87e6	5.23e6	4.94e6	4.26e6	3.55e6	3.43e6	2.83e6
16/2-4	Oil		1904.20	1904.20 m		46586T	8.31e6	6.47e6	8.90e6	6.94e6	6.35e6	5.88e6	5.42e6	5.09e6	4.55e6	4.30e6	3.70e6	3.09e6	2.97e6	2.45e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4.77e6	3.82e6	3.97e6	2.39e6	1.56e6	1.14e6	7.98e5	5.56e5	4.02e5	2.75e5	2.02e5	1.48e5	1.62e5	4.73e4

Table 13. continued, GC of saturated compounds (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C31	n-C32	n-C33	n-C34	n-C35	n-C36
16/2-4	Oil		1727.50	1727.50 m		46584T	4.23e6	3.19e6	2.95e6	2.03e6	1.80e6	1.29e6
16/2-4	Oil		1898.10	1898.10 m		46585T	2.68e6	2.10e6	1.77e6	1.32e6	1.25e6	7.94e5
16/2-4	Oil		1904.20	1904.20 m		46586T	2.30e6	1.77e6	1.61e6	1.16e6	1.05e6	7.11e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4.55e4	3.70e4	3.57e4	0.00e0	0.00e0	0.00e0

Table 14. GC of saturated compounds (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C10	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15	n-C16	i-C18	n-C17	Pr
16/2-4	Oil		1727.50	1727.50 m		46584T	3.77e6	5.05e6	5.55e6	9.97e5	1.10e6	5.97e6	1.30e6	6.42e6	2.06e6	6.99e6	6.85e6	1.87e6	6.52e6	3.80e6
16/2-4	Oil		1898.10	1898.10 m		46585T	3.38e6	4.44e6	4.69e6	1.08e6	1.13e6	5.07e6	1.61e6	5.51e6	2.38e6	5.69e6	5.81e6	2.04e6	5.04e6	3.96e6
16/2-4	Oil		1904.20	1904.20 m		46586T	1.79e6	3.26e6	3.73e6	8.21e5	9.07e5	4.07e6	1.29e6	4.80e6	2.19e6	5.39e6	5.47e6	2.10e6	5.24e6	3.89e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.43e7	2.31e7	1.72e7	3.75e6	3.73e6	1.36e7	3.09e6	1.04e7	3.74e6	7.94e6	5.58e6	1.95e6	4.20e6	3.61e6

Table 14. continued, GC of saturated compounds (amounts in ng/)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C18	Ph	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30
16/2-4	Oil		1727.50	1727.50 m		46584T	5.84e6	2.93e6	6.02e6	4.90e6	4.52e6	4.18e6	3.85e6	3.58e6	3.21e6	2.98e6	2.57e6	2.10e6	2.03e6	1.63e6
16/2-4	Oil		1898.10	1898.10 m		46585T	4.52e6	3.53e6	4.84e6	3.77e6	3.44e6	3.18e6	2.92e6	2.73e6	2.44e6	2.30e6	1.98e6	1.66e6	1.60e6	1.32e6
16/2-4	Oil		1904.20	1904.20 m		46586T	4.52e6	3.53e6	4.84e6	3.78e6	3.46e6	3.20e6	2.95e6	2.77e6	2.48e6	2.34e6	2.01e6	1.68e6	1.62e6	1.33e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.91e6	2.33e6	2.42e6	1.46e6	9.52e5	6.94e5	4.86e5	3.39e5	2.45e5	1.67e5	1.23e5	9.04e4	9.90e4	2.88e4

Table 14. continued, GC of saturated compounds (amounts in ng/)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	n-C31	n-C32	n-C33	n-C34	n-C35	n-C36
16/2-4	Oil		1727.50	1727.50 m		46584T	1.51e6	1.14e6	1.06e6	7.27e5	6.45e5	4.63e5
16/2-4	Oil		1898.10	1898.10 m		46585T	1.25e6	9.80e5	8.23e5	6.16e5	5.81e5	3.70e5
16/2-4	Oil		1904.20	1904.20 m		46586T	1.25e6	9.65e5	8.76e5	6.30e5	5.74e5	3.87e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.77e4	2.26e4	2.17e4	0.00e0	0.00e0	0.00e0

Table 15. GC of aromatic compounds (peak area)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2-MN	1-MN	P	3-MP	2-MP	9-MP	1-MP
16/2-4	Oil		1727.50	1727.50 m		46584T	6398805	4420908	1162040	790359	840926	1009837	894246
16/2-4	Oil		1898.10	1898.10 m		46585T	2865021	1862608	722449	439588	395982	596186	470821
16/2-4	Oil		1904.20	1904.20 m		46586T	2427256	1653261	663013	435211	383733	550159	427503
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4874295	2840742	229983	73825	0	81096	76983

Table 16. GC of aromatic compounds (amounts in ng/g)

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2-MN	1-MN	P	3-MP	2-MP	9-MP	1-MP
16/2-4	Oil		1727.50	1727.50 m		46584T	1163854	804102	211359	143755	152953	183675	162651
16/2-4	Oil		1898.10	1898.10 m		46585T	666164	433087	167981	102211	92072	138623	109474
16/2-4	Oil		1904.20	1904.20 m		46586T	782663	533090	213787	140333	123734	177398	137847
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4597353	2679340	216916	69630	0	76488	72609

Table 17. GCMS SIR of saturated compounds (peak height)

m/e							177				191									
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	25nor28αβ	25nor29αβ	25nor30αβ	25nor31αβ	19/3	20/3	21/3	23/3	24/3	25/3R	25/3S	24/4	26/3R	26/3S
16/2-4	Oil		1727.50	1727.50 m		46584T	1.64e6	5.24e5	0.00e0	3.71e6	1.01e6	1.22e6	1.84e6	2.47e6	2.11e6	1.02e6	1.02e6	2.14e6	8.42e5	8.03e5
16/2-4	Oil		1898.10	1898.10 m		46585T	1.70e6	3.87e5	0.00e0	3.87e6	8.66e5	1.11e6	1.67e6	2.26e6	1.87e6	8.62e5	9.13e5	2.08e6	7.38e5	7.05e5
16/2-4	Oil		1904.20	1904.20 m		46586T	1.53e6	3.45e5	2.07e5	3.20e6	7.41e5	9.99e5	1.45e6	1.95e6	1.60e6	7.70e5	8.00e5	1.78e6	6.27e5	5.88e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	6.23e4	4.15e4	2.50e4	7.70e4	2.26e5	2.51e5	3.06e5	2.88e5	2.24e5	7.51e4	8.20e4	1.44e5	5.13e4	4.95e4

Table 17. continued, GCMS SIR of saturated compounds (peak height)

m/e							191													
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	28/3R	28/3S	29/3R	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα
16/2-4	Oil		1727.50	1727.50 m		46584T	8.89e5	6.89e5	1.30e6	1.39e6	7.35e6	7.71e6	1.15e6	8.42e5	1.40e7	0.00e0	1.93e7	8.06e6	4.43e6	1.72e6
16/2-4	Oil		1898.10	1898.10 m		46585T	7.31e5	5.82e5	1.11e6	1.20e6	6.19e6	9.25e6	1.05e6	7.05e5	1.53e7	0.00e0	2.11e7	7.82e6	3.77e6	1.81e6
16/2-4	Oil		1904.20	1904.20 m		46586T	6.33e5	4.91e5	9.49e5	9.99e5	5.13e6	7.47e6	8.73e5	6.31e5	1.36e7	0.00e0	1.77e7	6.48e6	3.29e6	1.51e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	3.67e4	2.81e4	4.16e4	4.41e4	2.13e5	2.57e5	3.49e4	3.23e4	3.06e5	3.45e4	5.46e5	1.90e5	9.14e4	4.97e4

Table 17. continued, GCMS SIR of saturated compounds (peak height)

m/e							191													
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	30O	30αβ	30βα	31αβS	31αβR	30G	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS
16/2-4	Oil		1727.50	1727.50 m		46584T	0.00e0	4.95e7	4.22e6	2.52e7	1.76e7	2.76e6	2.25e6	1.71e7	1.21e7	1.41e7	9.22e6	8.04e6	5.02e6	7.72e6
16/2-4	Oil		1898.10	1898.10 m		46585T	0.00e0	5.28e7	4.18e6	2.70e7	1.85e7	2.69e6	2.31e6	1.77e7	1.23e7	1.51e7	1.02e7	8.16e6	5.28e6	8.43e6
16/2-4	Oil		1904.20	1904.20 m		46586T	0.00e0	4.38e7	3.72e6	2.29e7	1.59e7	2.25e6	1.98e6	1.53e7	1.05e7	1.29e7	8.39e6	6.81e6	4.61e6	7.09e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	0.00e0	1.05e6	9.38e4	4.53e5	3.18e5	5.23e4	4.09e4	2.71e5	1.91e5	1.88e5	1.19e5	1.04e5	7.52e4	1.02e5

Table 17. continued, GCMS SIR of saturated compounds (peak height)

m/e							191	217												
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	35αβR	21αα	21ββ	22αα	22ββ	27dβS	27dβR	27dαR	27dαS	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR
16/2-4	Oil		1727.50	1727.50 m		46584T	5.09e6	4.67e6	4.50e6	2.82e6	2.55e6	1.43e7	8.58e6	3.12e6	4.32e6	6.15e6	5.93e6	3.61e6	4.40e6	2.87e6
16/2-4	Oil		1898.10	1898.10 m		46585T	5.34e6	4.80e6	4.38e6	2.59e6	2.62e6	1.49e7	8.46e6	3.29e6	4.45e6	6.24e6	5.99e6	3.53e6	4.49e6	2.90e6
16/2-4	Oil		1904.20	1904.20 m		46586T	4.47e6	4.18e6	3.86e6	2.19e6	2.21e6	1.22e7	7.46e6	2.77e6	3.83e6	5.17e6	5.24e6	3.04e6	3.83e6	2.52e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	6.61e4	8.27e5	5.36e5	3.60e5	2.42e5	6.75e5	3.60e5	1.23e5	1.70e5	2.31e5	2.21e5	1.17e5	1.55e5	9.04e4

Table 17. continued, GCMS SIR of saturated compounds (peak height)

m/e							217													
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	27ααS	27ββR+29dββS	27ββS	28dααS	27ααR	29dββR	29dααR	28ααS	29dααS	28ββR	28ββS	28ααR	29ααS	29ββR
16/2-4	Oil		1727.50	1727.50 m		46584T	7.15e6	9.54e6	8.89e6	2.09e6	7.32e6	7.24e6	3.92e6	2.95e6	3.84e6	7.51e6	8.74e6	4.86e6	8.67e6	1.01e7
16/2-4	Oil		1898.10	1898.10 m		46585T	9.31e6	9.55e6	1.02e7	2.25e6	9.72e6	7.65e6	4.00e6	3.70e6	3.81e6	8.91e6	9.72e6	6.07e6	1.05e7	1.15e7
16/2-4	Oil		1904.20	1904.20 m		46586T	7.94e6	8.06e6	8.76e6	1.86e6	8.33e6	6.58e6	3.45e6	3.19e6	3.42e6	7.44e6	8.63e6	5.31e6	9.08e6	9.93e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.63e5	3.08e5	2.91e5	7.02e4	2.56e5	2.24e5	1.09e5	7.64e4	1.04e5	2.05e5	2.24e5	1.31e5	2.02e5	2.40e5

Table 17. continued, GCMS SIR of saturated compounds (peak height)

m/e							217						218							
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
16/2-4	Oil		1727.50	1727.50 m		46584T	1.05e7	6.96e6	4.13e6	3.84e6	2.65e6	2.30e6	1.77e7	1.54e7	1.23e7	1.36e7	1.78e7	1.75e7	4.77e6	4.42e6
16/2-4	Oil		1898.10	1898.10 m		46585T	1.18e7	9.30e6	4.98e6	4.21e6	2.88e6	3.09e6	2.03e7	1.80e7	1.45e7	1.56e7	1.99e7	2.00e7	5.20e6	4.89e6
16/2-4	Oil		1904.20	1904.20 m		46586T	1.02e7	7.83e6	4.33e6	3.52e6	2.50e6	2.61e6	1.79e7	1.53e7	1.21e7	1.40e7	1.75e7	1.73e7	4.40e6	4.13e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.42e5	1.50e5	9.19e4	6.82e4	4.40e4	4.05e4	5.93e5	4.90e5	3.32e5	3.63e5	4.11e5	3.88e5	7.75e4	7.18e4

Abbreviations of saturated biomarkers

17α(H), 21β(H)-25,28,30-trisnorhopane	25nor28αβ
17α, 21β-25,30-bisnorhopane	25nor29αβ
17α(H), 21β(H)-25-norhopane	25nor30αβ
17α, 21β, 22(R/S)-25-norhomohopane	25nor31αβ
$C_{19}H_{34}$ tricyclic terpane	19/3
$C_{20}H_{36}$ tricyclic terpane	20/3
$C_{21}H_{38}$ tricyclic terpane	21/3
$C_{23}H_{42}$ tricyclic terpane	23/3
$C_{24}H_{44}$ tricyclic terpane	24/3
$C_{25}H_{46}$ tricyclic terpane	25/3R
$C_{25}H_{46}$ tricyclic terpane	25/3S
$C_{24}H_{42}$ tetracyclic terpane	24/4
$C_{26}H_{48}$ tricyclic terpane	26/3R
$C_{26}H_{48}$ tricyclic terpane	26/3S
$C_{28}H_{52}$ tricyclic terpane	28/3R
$C_{28}H_{52}$ tricyclic terpane	28/3S
$C_{29}H_{54}$ tricyclic terpane	29/3R
$C_{29}H_{54}$ tricyclic terpane	29/3S
18α(H)-22,29,30-trisnorneohopane	27Ts
17α(H)-22,29,30-trisnorhopane	27Tm
$C_{30}H_{56}$ tricyclic terpane	30/3R
$C_{30}H_{56}$ tricyclic terpane	30/3S
17α(H), 21β(H)-28,30-bisnorhopane	28αβ
17α(H), 21β(H)-30-norhopane	29αβ
18α(H)-30-norneohopane	29Ts
15α-methyl-17α(H)-27-norhopane (diahopane)	30d
17β(H), 21α(H)-30-norhopane (normoretane)	29βα
18α(H)-oleanane	30O
17α(H), 21β(H)-hopane	30αβ
17β(H), 21α(H)-hopane (moretane)	30βα
17α(H), 21β(H), 22(S)-homohopane	31αβS
17α(H), 21β(H), 22(R)-homohopane	31αβR
Gammacerane	30G
17β(H), 21α(H)-homohopane	31βα
17α(H), 21β(H), 22(S)-bishomohopane	32αβS
17α(H), 21β(H), 22(R)-bishomohopane	32αβR
17α(H), 21β(H), 22(S)-trishomohopane	33αβS
17α(H), 21β(H), 22(R)-trishomohopane	33αβR
17α(H), 21β(H), 22(S)-tetrakishomohopane	34αβS
17α(H), 21β(H), 22(R)-tetrakishomohopane	34αβR
17α(H), 21β(H), 22(S)-pentakishomohopane	35αβS
17α(H), 21β(H), 22(R)-pentakishomohopane	35αβR
C21-5α(H), 14α(H), 17α(H)-pregnane	21αα
C21-5α(H), 14β(H), 17β(H)-pregnane	21ββ
C22-5α(H), 14α(H), 17α(H)-pregnane	22αα
C22-5α(H), 14β(H), 17β(H)-pregnane	22ββ
13β(H), 17α(H), 20(S)-cholestane (diasterane)	27dβS
13β(H), 17α(H), 20(R)-cholestane (diasterane)	27dβR
13α(H), 17β(H), 20(R)-cholestane (diasterane)	27dαR
13α(H), 17β(H), 20(S)-cholestane (diasterane)	27dαS
24-methyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	28dβS
24-methyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	28dβR
24-methyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	28dαR
5α(H), 14α(H), 17α(H), 20(S)-cholestane	27ααS
5α(H), 14β(H), 17β(H), 20(R)-cholestane	27ββR
24-ethyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	29dβS
5α(H), 14β(H), 17β(H), 20(S)-cholestane	27ββS
24-methyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	28dαS
5α(H), 14α(H), 17α(H), 20(R)-cholestane	27ααR
24-ethyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	29dβR
24-ethyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	29dαR
24-methyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	28ααS
24-ethyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	29dαS
24-methyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	28ββR
24-methyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	28ββS
24-methyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	28ααR
24-ethyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	29ααS
24-ethyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	29ββR
24-ethyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	29ββS
24-ethyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	29ααR
24-propyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	30ααS
24-propyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	30ββR
24-propyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	30ββS
24-propyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	30ααR

Table 18. GCMS SIR of saturated compounds (amounts in ng/g)

m/e							177				191									
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	25nor28αβ	25nor29αβ	25nor30αβ	25nor31αβ	19/3	20/3	21/3	23/3	24/3	25/3R	25/3S	24/4	26/3R	26/3S
16/2-4	Oil		1727.50	1727.50 m		46584T	1.08e4	3.44e3	0.00e0	2.44e4	6.62e3	8.01e3	1.21e4	1.62e4	1.39e4	6.67e3	6.71e3	1.40e4	5.53e3	5.27e3
16/2-4	Oil		1898.10	1898.10 m		46585T	1.49e4	3.39e3	0.00e0	3.39e4	7.60e3	9.75e3	1.47e4	1.98e4	1.64e4	7.56e3	8.00e3	1.82e4	6.48e3	6.19e3
16/2-4	Oil		1904.20	1904.20 m		46586T	1.60e4	3.62e3	2.17e3	3.35e4	7.77e3	1.05e4	1.53e4	2.04e4	1.68e4	8.08e3	8.40e3	1.87e4	6.58e3	6.17e3
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.03e3	6.89e2	4.14e2	1.28e3	3.74e3	4.17e3	5.08e3	4.78e3	3.72e3	1.25e3	1.36e3	2.39e3	8.52e2	8.22e2

Table 18. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e							191													
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	28/3R	28/3S	29/3R	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα
16/2-4	Oil		1727.50	1727.50 m		46584T	5.84e3	4.52e3	8.52e3	9.11e3	4.83e4	5.06e4	7.54e3	5.53e3	9.20e4	0.00e0	1.27e5	5.30e4	2.91e4	1.13e4
16/2-4	Oil		1898.10	1898.10 m		46585T	6.41e3	5.11e3	9.74e3	1.05e4	5.42e4	8.11e4	9.22e3	6.18e3	1.34e5	0.00e0	1.85e5	6.86e4	3.31e4	1.59e4
16/2-4	Oil		1904.20	1904.20 m		46586T	6.64e3	5.15e3	9.95e3	1.05e4	5.38e4	7.84e4	9.16e3	6.62e3	1.43e5	0.00e0	1.86e5	6.80e4	3.45e4	1.58e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	6.09e2	4.66e2	6.90e2	7.32e2	3.54e3	4.27e3	5.80e2	5.37e2	5.08e3	5.73e2	9.07e3	3.16e3	1.52e3	8.25e2

Table 18. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e							191													
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	30O	30αβ	30βα	31αβS	31αβR	30G	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS
16/2-4	Oil		1727.50	1727.50 m		46584T	0.00e0	3.26e5	2.77e4	1.66e5	1.16e5	1.82e4	1.48e4	1.12e5	7.95e4	9.30e4	6.06e4	5.28e4	3.30e4	5.07e4
16/2-4	Oil		1898.10	1898.10 m		46585T	0.00e0	4.63e5	3.67e4	2.37e5	1.62e5	2.36e4	2.02e4	1.55e5	1.08e5	1.33e5	8.96e4	7.15e4	4.63e4	7.39e4
16/2-4	Oil		1904.20	1904.20 m		46586T	0.00e0	4.59e5	3.91e4	2.40e5	1.67e5	2.37e4	2.07e4	1.61e5	1.10e5	1.35e5	8.80e4	7.14e4	4.83e4	7.43e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	0.00e0	1.75e4	1.56e3	7.52e3	5.27e3	8.68e2	6.79e2	4.50e3	3.17e3	3.12e3	1.98e3	1.73e3	1.25e3	1.69e3

Table 18. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e							191	217												
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	35αβR	21αα	21ββ	22αα	22ββ	27dβS	27dβR	27dαR	27dαS	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR
16/2-4	Oil		1727.50	1727.50 m		46584T	3.35e4	3.07e4	2.96e4	1.85e4	1.68e4	9.40e4	5.64e4	2.05e4	2.84e4	4.04e4	3.90e4	2.37e4	2.89e4	1.89e4
16/2-4	Oil		1898.10	1898.10 m		46585T	4.68e4	4.21e4	3.84e4	2.27e4	2.29e4	1.31e5	7.42e4	2.88e4	3.90e4	5.47e4	5.25e4	3.10e4	3.94e4	2.55e4
16/2-4	Oil		1904.20	1904.20 m		46586T	4.69e4	4.39e4	4.05e4	2.29e4	2.32e4	1.28e5	7.82e4	2.91e4	4.01e4	5.43e4	5.50e4	3.19e4	4.01e4	2.64e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.10e3	1.37e4	8.90e3	5.98e3	4.02e3	1.12e4	5.97e3	2.03e3	2.82e3	3.83e3	3.67e3	1.95e3	2.57e3	1.50e3

Table 18. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e							217												
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	27ααS	27ββR+29dββS	27ββS	28dααS	27ααR	29dββR	29dααR	28ααS	29dααS	28ββR	28ββS	28ααR	29ααS	29ββR
16/2-4	Oil		1727.50	1727.50 m		46584T	4.70e4	6.27e4	5.84e4	1.37e4	4.81e4	4.76e4	2.57e4	1.94e4	2.52e4	4.94e4	5.74e4	3.19e4	5.70e4	6.67e4
16/2-4	Oil		1898.10	1898.10 m		46585T	8.16e4	8.37e4	8.94e4	1.97e4	8.52e4	6.71e4	3.51e4	3.25e4	3.34e4	7.81e4	8.52e4	5.32e4	9.20e4	1.00e5
16/2-4	Oil		1904.20	1904.20 m		46586T	8.33e4	8.46e4	9.19e4	1.95e4	8.74e4	6.91e4	3.62e4	3.35e4	3.59e4	7.81e4	9.06e4	5.57e4	9.53e4	1.04e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4.37e3	5.11e3	4.83e3	1.17e3	4.25e3	3.73e3	1.81e3	1.27e3	1.73e3	3.40e3	3.72e3	2.17e3	3.35e3	3.99e3

Table 18. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e							217						218						
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
16/2-4	Oil		1727.50	1727.50 m		46584T	6.91e4	4.57e4	2.71e4	2.52e4	1.74e4	1.51e4	1.16e5	1.01e5	8.11e4	8.90e4	1.17e5	1.15e5	3.13e4	2.91e4
16/2-4	Oil		1898.10	1898.10 m		46585T	1.04e5	8.16e4	4.36e4	3.69e4	2.53e4	2.71e4	1.78e5	1.58e5	1.27e5	1.37e5	1.75e5	1.76e5	4.56e4	4.29e4
16/2-4	Oil		1904.20	1904.20 m		46586T	1.07e5	8.21e4	4.55e4	3.69e4	2.62e4	2.74e4	1.88e5	1.60e5	1.27e5	1.47e5	1.84e5	1.81e5	4.61e4	4.34e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	4.02e3	2.48e3	1.53e3	1.13e3	7.31e2	6.72e2	9.84e3	8.13e3	5.51e3	6.02e3	6.82e3	6.44e3	1.29e3	1.19e3

Table 19. GCMS SIR of aromatic compounds (peak height)

m/e							142		156										170	
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2-MN	1-MN	2-EN	1-EN	2,6-DMN	2,7-DMN	1,3- + 1,7-DMN	1,6-DMN	2,3- + 1,4-DMN	1,5-DMN	1,2-DMN	1,8-DMN	1,3,7-TMN	1,3,6-TMN
16/2-4	Oil		1727.50	1727.50 m		46584T	5.80e8	3.47e8	4.98e7	2.29e7	1.35e8	1.38e8	2.83e8	2.22e8	9.02e7	6.00e7	4.50e7	1.07e6	7.81e7	1.03e8
16/2-4	Oil		1898.10	1898.10 m		46585T	2.63e8	1.53e8	2.68e7	1.90e7	6.20e7	6.31e7	1.49e8	1.08e8	5.05e7	3.55e7	3.15e7	2.08e6	3.99e7	5.27e7
16/2-4	Oil		1904.20	1904.20 m		46586T	2.21e8	1.34e8	2.38e7	1.63e7	5.37e7	5.49e7	1.33e8	9.64e7	4.37e7	3.16e7	2.79e7	1.86e6	3.55e7	4.69e7
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	3.01e8	1.63e8	2.33e7	1.57e7	5.19e7	5.45e7	1.18e8	8.54e7	3.50e7	2.48e7	2.07e7	1.19e6	2.37e7	3.11e7

Table 19. continued, GCMS SIR of aromatic compounds (peak height)

m/e							170						178	192				206		
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN	1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	P	3-MP	2-MP	9-MP	1-MP	2-EP+9-EP+ 3,6-DMP	1-EP	2,6- + 2,7- + 3,5-DMP
16/2-4	Oil		1727.50	1727.50 m		46584T	9.23e7	6.13e7	2.07e7	6.11e7	1.17e7	4.46e7	2.18e8	1.02e8	1.20e8	1.65e8	1.30e8	1.82e7	2.99e7	1.75e7
16/2-4	Oil		1898.10	1898.10 m		46585T	5.26e7	3.03e7	1.39e7	3.66e7	9.28e6	3.34e7	1.15e8	5.03e7	5.70e7	9.41e7	7.27e7	1.01e7	1.26e7	7.21e6
16/2-4	Oil		1904.20	1904.20 m		46586T	4.65e7	2.70e7	1.25e7	3.31e7	8.26e6	3.04e7	1.06e8	4.65e7	5.15e7	8.50e7	6.63e7	9.34e6	1.14e7	6.56e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.92e7	1.64e7	7.14e6	1.87e7	4.25e6	1.51e7	2.26e7	7.28e6	7.90e6	1.31e7	9.26e6	1.18e6	1.44e6	8.46e5

Table 19. continued, GCMS SIR of aromatic compounds (peak height)

m/e							206							219	184	198			253	
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	1,3- + 2,10- + 3,9- + 3,10-DMP	1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP	1,9- + 4,9- + 4,10-DMP	1,8-DMP	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA
16/2-4	Oil		1727.50	1727.50 m		46584T	1.24e8	5.88e7	6.77e7	1.74e7	3.91e7	1.65e7	1.11e7	3.64e7	5.09e7	7.62e7	4.26e7	2.98e7	4.37e6	2.77e6
16/2-4	Oil		1898.10	1898.10 m		46585T	6.20e7	2.82e7	3.39e7	8.62e6	2.10e7	9.20e6	7.50e6	2.44e7	4.30e7	5.28e7	3.25e7	2.90e7	3.78e6	2.30e6
16/2-4	Oil		1904.20	1904.20 m		46586T	5.91e7	2.62e7	3.15e7	8.24e6	1.97e7	8.51e6	6.92e6	2.41e7	3.90e7	5.09e7	3.01e7	2.68e7	3.58e6	2.17e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	6.83e6	3.19e6	3.38e6	9.12e5	2.16e6	8.56e5	5.77e5	1.96e6	7.83e6	8.10e6	4.46e6	3.78e6	4.45e5	2.27e5

Table 19. continued, GCMS SIR of aromatic compounds (peak height)

m/e							253												231
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA
16/2-4	Oil		1727.50	1727.50 m		46584T	2.00e6	7.70e6	6.86e6	1.35e6	1.52e7	1.59e6	1.23e6	2.72e6	1.05e7	9.11e6	1.14e6	6.36e6	1.04e6	7.61e6
16/2-4	Oil		1898.10	1898.10 m		46585T	1.02e6	8.53e6	6.98e6	8.82e5	1.59e7	1.67e6	8.60e5	1.91e6	1.17e7	9.65e6	7.57e5	6.59e6	5.85e5	7.61e6
16/2-4	Oil		1904.20	1904.20 m		46586T	1.04e6	7.96e6	6.75e6	8.76e5	1.47e7	1.60e6	8.24e5	1.89e6	1.09e7	9.19e6	7.74e5	6.28e6	5.95e5	7.33e6
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	3.53e4	2.90e5	1.94e5	2.46e4	4.62e5	4.06e4	1.84e4	4.26e4	2.54e5	2.41e5	1.47e4	1.18e5	9.52e3	3.10e5

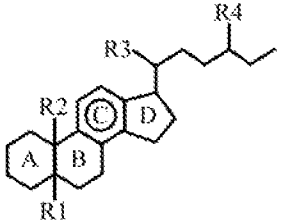
Table 19. continued, GCMS SIR of aromatic compounds (peak height)

m/e 231

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA	
16/2-4	Oil		1727.50	1727.50 m		46584T	7.10e6	6.98e6	2.95e7	1.20e7	1.51e7	1.34e7	
16/2-4	Oil		1898.10	1898.10 m		46585T	6.73e6	1.31e7	4.68e7	1.71e7	2.24e7	1.86e7	
16/2-4	Oil		1904.20	1904.20 m		46586T	6.68e6	1.22e7	4.37e7	1.61e7	2.07e7	1.77e7	
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.31e5	1.31e5	4.49e5	1.44e5	1.72e5	1.20e5	

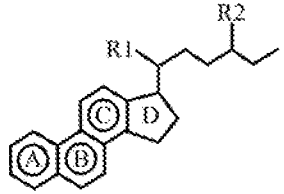
Abbreviation of aromatic biomarkers

C-ring monoaromatic steroid



Substituents				
R_1	R_2	R_3	R_4	Label
				C_{21}MA
				C_{22}MA
β(H)	CH_3	S(CH_3)	H	βSC_{27}MA
β(CH_3)	H	S(CH_3)	H	βSC_{27}DMA
β(CH_3)	H	RCH$_3$)	H	βRC_{27}DMA+
β(H)	CH_3	R(CH_3)	H	βRC_{27}MA
α(H)	CH_3	S(CH_3)	H	αSC_{27}MA
β(H)	CH_3	S(CH_3)	CH_3	βSC_{28}MA+
α(CH_3)	H	R(CH_3)	H	αRC_{27}DMA+
β(CH_3)	H	S(CH_3)	CH_3	βSC_{28}DMA
α(CH_3)	H	S(CH_3)	CH_3	αSC_{27}DMA
α(H)	CH_3	R(CH_3)	H	αRC_{27}MA
α(H)	CH_3	S(CH_3)	CH_3	αSC_{28}MA
β(H)	CH_3	R(CH_3)	CH_3	βRC_{28}MA+
β(CH_3)	H	R(CH_3)	CH_3	βRC_{28}DMA
β(H)	CH_3	S(CH_3)	C_2H_5	βSC_{29}MA+
β(CH_3)	H	S(CH_3)	C_2H_5	βSC_{29}DMA
α(H)	CH_3	S(CH_3)	C_2H_5	αSC_{29}MA
α(H)	CH_3	R(CH_3)	CH_3	αRC_{28}MA+
β(H)	CH_3	R(CH_3)	C_2H_5	βRC_{29}MA+
β(CH_3)	H	R(CH_3)	C_2H_5	βRC_{29}DMA
α(H)	CH_3	R(CH_3)	C_2H_5	αRC_{29}MA

ABC-ring triaromatic steroids



Substituents		
R_1	R_2	Label
CH_3	H	C_{20}TA
CH_3	CH_3	C_{21}TA
S(CH_3)	C_6H_{13}	SC_{26}TA
R(CH_3)	C_6H_{13}	RC_{26}TA+
S(CH3)	C_7H_{15}	SC_{27}TA
S(CH_3)	C_8H_{17}	SC_{28}TA
R(CH_3)	C_7H_{15}	RC_{27}TA
R(CH_3)	C_8H_{17}	RC_{28}TA

Polycyclic aromatic hydrocarbons and sulphur compounds

MN	Methylnaphthalene
EN	Ethylnaphthalene
DMN	Dimethylnaphthalene
TMN	Trimethylnaphthalene
P	Phenanthrene
MP	Methylphenanthrene
EP	Ethylphenanthrene
DMP	Dimethylphenanthrene
DBT	Dibenzothiophene
MDBT	Methyldibenzothiophene

Table 20. GCMS SIR of aromatic compounds (amounts in ng/g)

m/e							142		156										170	
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	2-MN	1-MN	2-EN	1-EN	2,6-DMN	2,7-DMN	1,3- + 1,7-DMN	1,6-DMN	2,3- + 1,4-DMN	1,5-DMN	1,2-DMN	1,8-DMN	1,3,7-TMN	1,3,6-TMN
16/2-4	Oil		1727.50	1727.50 m		46584T	1.69e6	1.01e6	1.45e5	6.66e4	3.91e5	4.00e5	8.20e5	6.45e5	2.62e5	1.74e5	1.31e5	3.10e3	2.27e5	2.99e5
16/2-4	Oil		1898.10	1898.10 m		46585T	1.12e6	6.50e5	1.14e5	8.05e4	2.63e5	2.68e5	6.32e5	4.57e5	2.14e5	1.50e5	1.34e5	8.84e3	1.69e5	2.24e5
16/2-4	Oil		1904.20	1904.20 m		46586T	1.03e6	6.22e5	1.11e5	7.60e4	2.50e5	2.55e5	6.17e5	4.49e5	2.03e5	1.47e5	1.30e5	8.68e3	1.65e5	2.18e5
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.81e6	9.79e5	1.40e5	9.45e4	3.13e5	3.28e5	7.10e5	5.14e5	2.11e5	1.49e5	1.24e5	7.17e3	1.43e5	1.87e5

Table 20. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e							170						178	192				206		
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN	1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	P	3-MP	2-MP	9-MP	1-MP	2-EP+9-EP+ 3,6-DMP	1-EP	2,6- + 2,7- + 3,5-DMP
16/2-4	Oil		1727.50	1727.50 m		46584T	2.68e5	1.78e5	6.02e4	1.77e5	3.41e4	1.29e5	3.44e5	1.61e5	1.89e5	2.61e5	2.05e5	2.88e4	4.72e4	2.75e4
16/2-4	Oil		1898.10	1898.10 m		46585T	2.23e5	1.29e5	5.91e4	1.55e5	3.94e4	1.41e5	2.37e5	1.04e5	1.17e5	1.94e5	1.50e5	2.07e4	2.59e4	1.49e4
16/2-4	Oil		1904.20	1904.20 m		46586T	2.16e5	1.25e5	5.81e4	1.54e5	3.85e4	1.41e5	2.41e5	1.05e5	1.17e5	1.92e5	1.50e5	2.11e4	2.58e4	1.49e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.75e5	9.86e4	4.29e4	1.12e5	2.56e4	9.08e4	7.93e4	2.55e4	2.77e4	4.58e4	3.25e4	4.14e3	5.04e3	2.97e3

Table 20. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e							206							219	184	198			253	
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	1,3- + 2,10- + 3,9- + 3,10-DMP	1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP	1,9- + 4,9- + 4,10-DMP	1,8-DMP	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA
16/2-4	Oil		1727.50	1727.50 m		46584T	1.96e5	9.28e4	1.07e5	2.75e4	6.17e4	2.60e4	1.75e4	5.74e4	8.04e4	1.20e5	6.72e4	4.70e4	8.21e3	5.21e3
16/2-4	Oil		1898.10	1898.10 m		46585T	1.28e5	5.82e4	6.98e4	1.78e4	4.32e4	1.90e4	1.55e4	5.04e4	8.86e4	1.09e5	6.70e4	5.97e4	9.68e3	5.89e3
16/2-4	Oil		1904.20	1904.20 m		46586T	1.34e5	5.92e4	7.14e4	1.86e4	4.47e4	1.92e4	1.57e4	5.46e4	8.82e4	1.15e5	6.82e4	6.08e4	9.78e3	5.92e3
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.39e4	1.12e4	1.19e4	3.20e3	7.57e3	3.00e3	2.02e3	6.86e3	2.75e4	2.84e4	1.56e4	1.33e4	2.55e3	1.31e3

Table 20. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

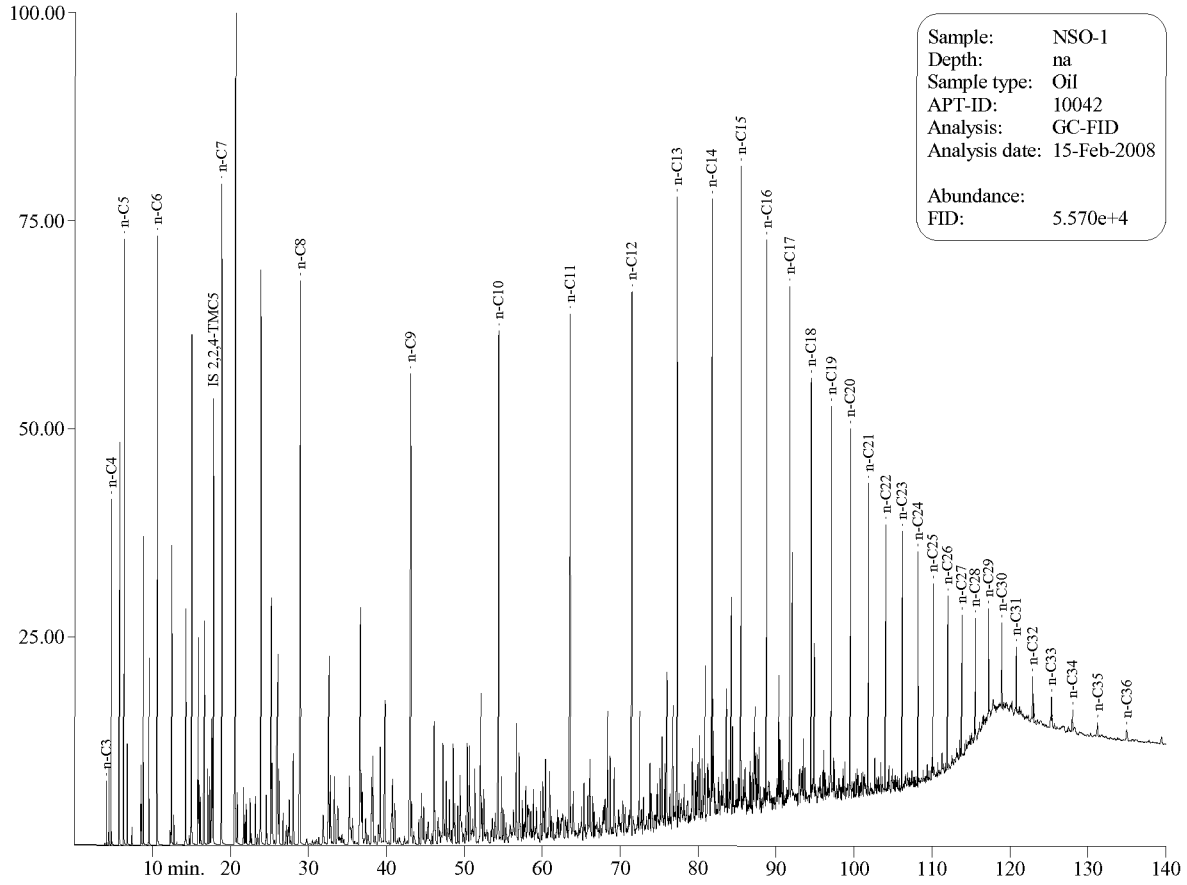
m/e							253													231
Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA
16/2-4	Oil		1727.50	1727.50 m		46584T	3.77e3	1.45e4	1.29e4	2.53e3	2.86e4	2.99e3	2.32e3	5.10e3	1.97e4	1.71e4	2.14e3	1.20e4	1.95e3	1.43e4
16/2-4	Oil		1898.10	1898.10 m		46585T	2.62e3	2.18e4	1.79e4	2.26e3	4.07e4	4.28e3	2.20e3	4.88e3	2.99e4	2.47e4	1.94e3	1.69e4	1.50e3	1.95e4
16/2-4	Oil		1904.20	1904.20 m		46586T	2.83e3	2.17e4	1.84e4	2.39e3	4.02e4	4.37e3	2.25e3	5.14e3	2.97e4	2.51e4	2.11e3	1.71e4	1.62e3	2.00e4
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	2.03e2	1.66e3	1.11e3	1.41e2	2.65e3	2.33e2	1.06e2	2.45e2	1.46e3	1.38e3	8.44e1	6.76e2	5.46e1	1.78e3

Table 20. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e 231

Well	Sample type	Sample name	Upper Depth (m)	Lower Depth (m)	Depth units	APT ID	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA	
16/2-4	Oil		1727.50	1727.50 m		46584T	1.34e4	1.31e4	5.55e4	2.25e4	2.84e4	2.52e4	
16/2-4	Oil		1898.10	1898.10 m		46585T	1.72e4	3.36e4	1.20e5	4.39e4	5.73e4	4.77e4	
16/2-4	Oil		1904.20	1904.20 m		46586T	1.82e4	3.33e4	1.19e5	4.39e4	5.65e4	4.83e4	
16/2-4	Oil	2a-2b	1886.70	1886.70 m		46736T	1.33e3	7.53e2	2.58e3	8.29e2	9.85e2	6.90e2	

GC Chromatograms of Whole Oil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Depth: na
Sample type: Oil
APT-ID: 10042
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
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100.00
75.00
50.00
25.00
n-C3
n-C4
n-C5
n-C6
n-C7
IS 2,2,4-TMC5
n-C8
n-C9
n-C10
n-C11
n-C12
n-C13
n-C14
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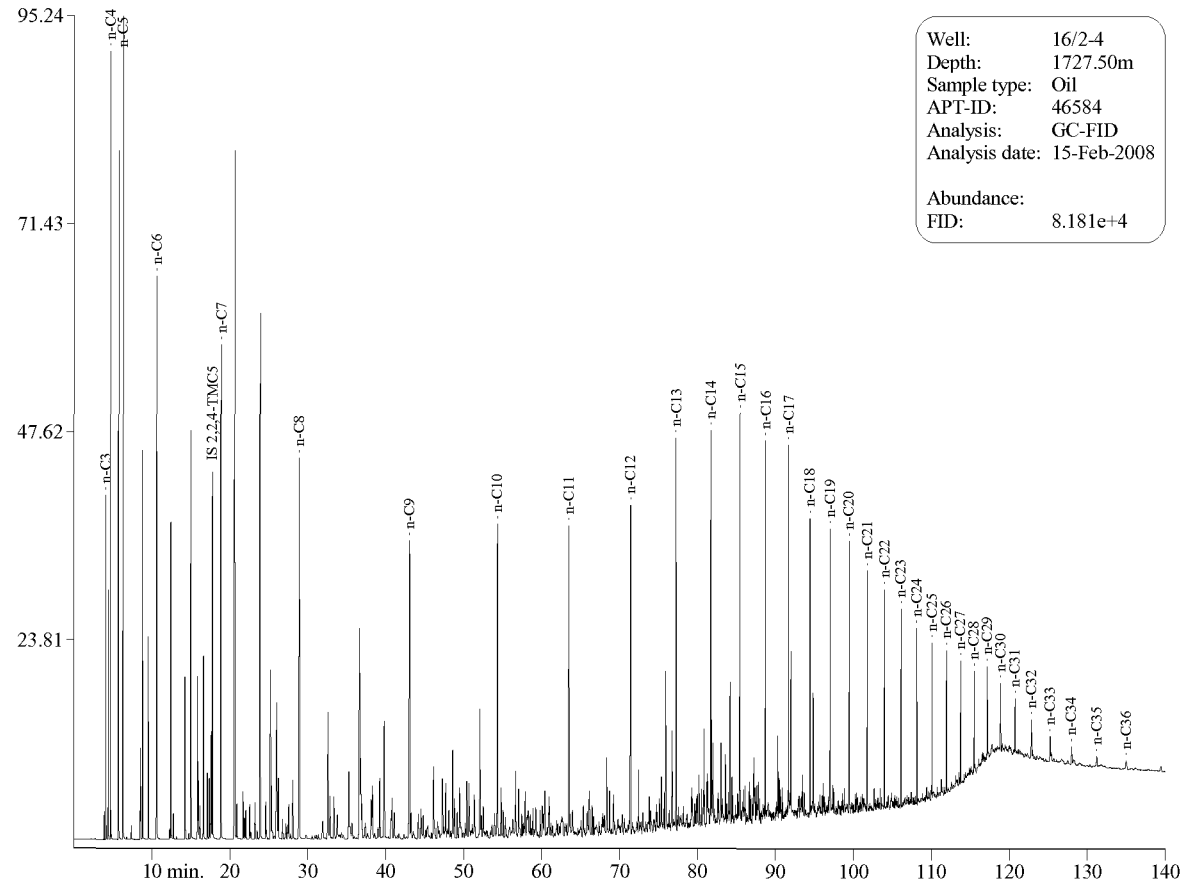
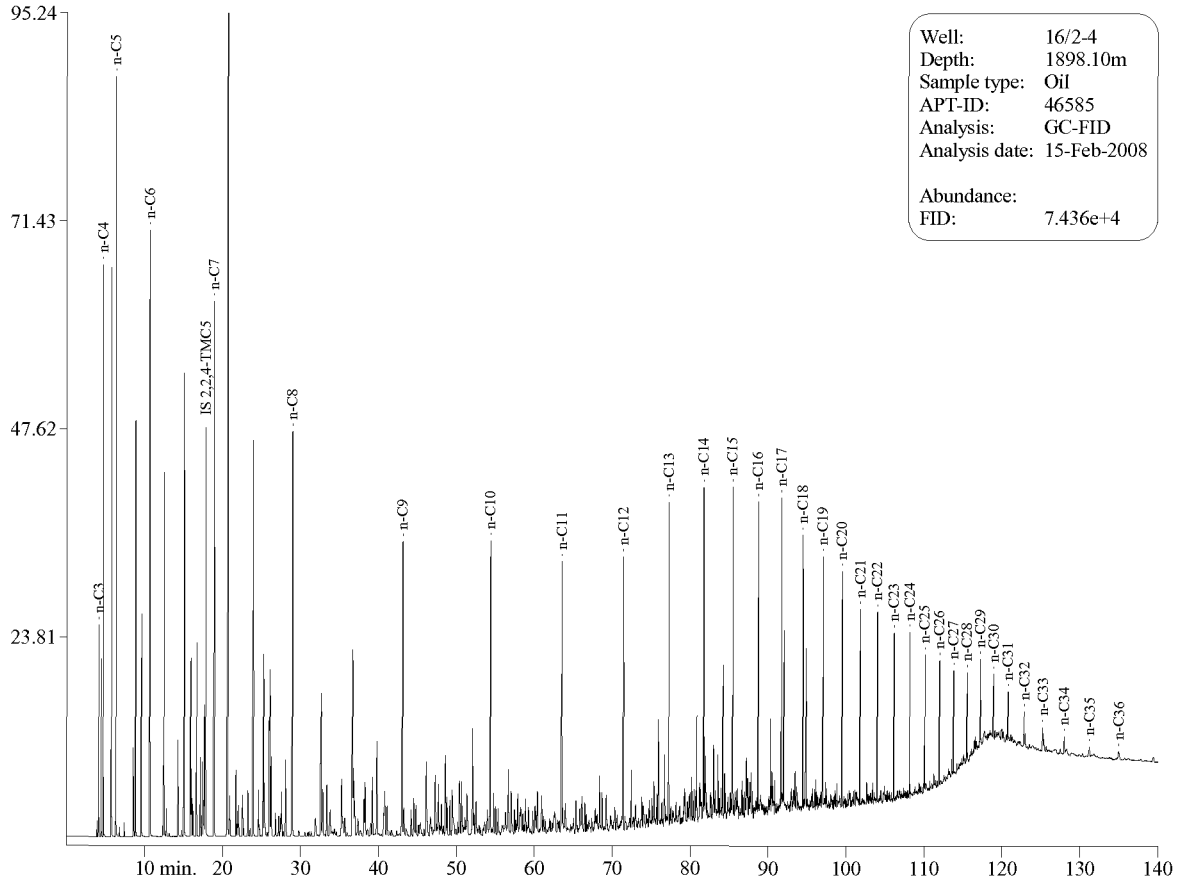
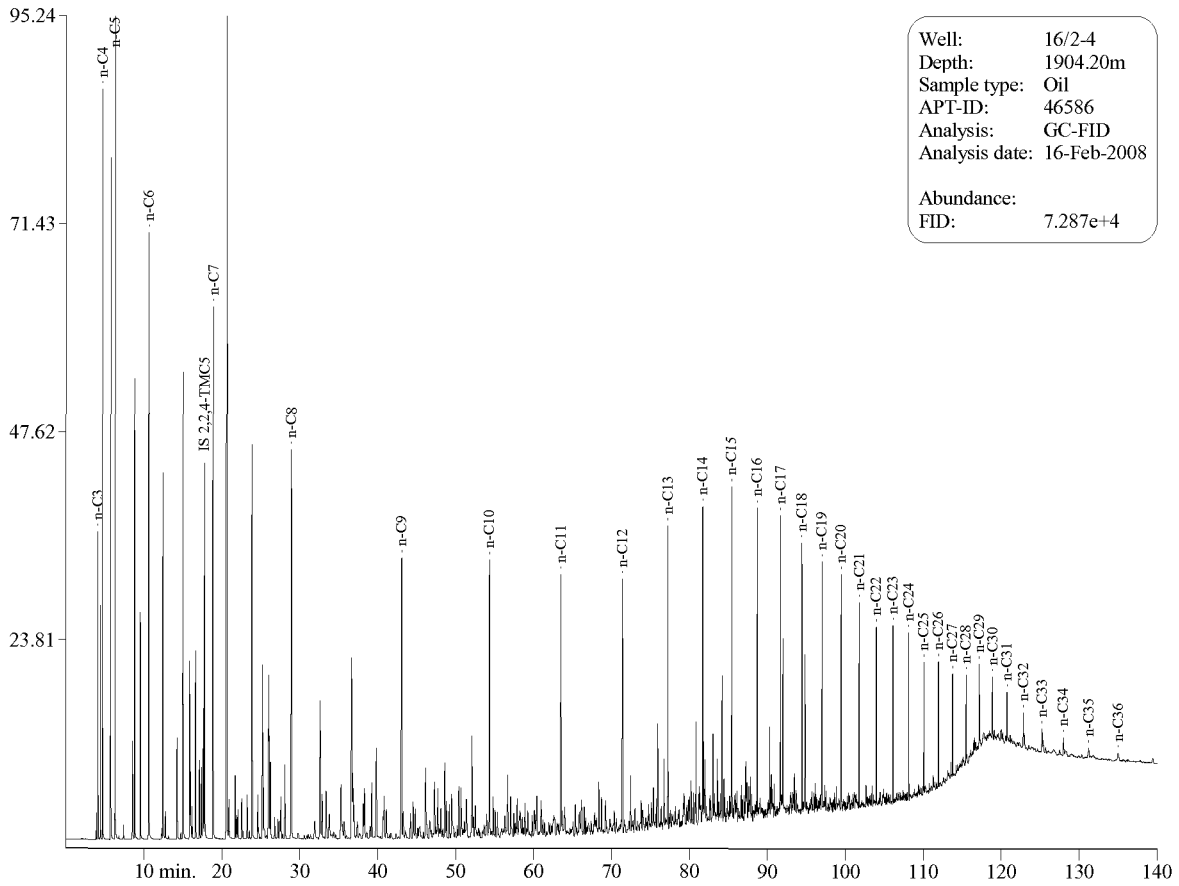
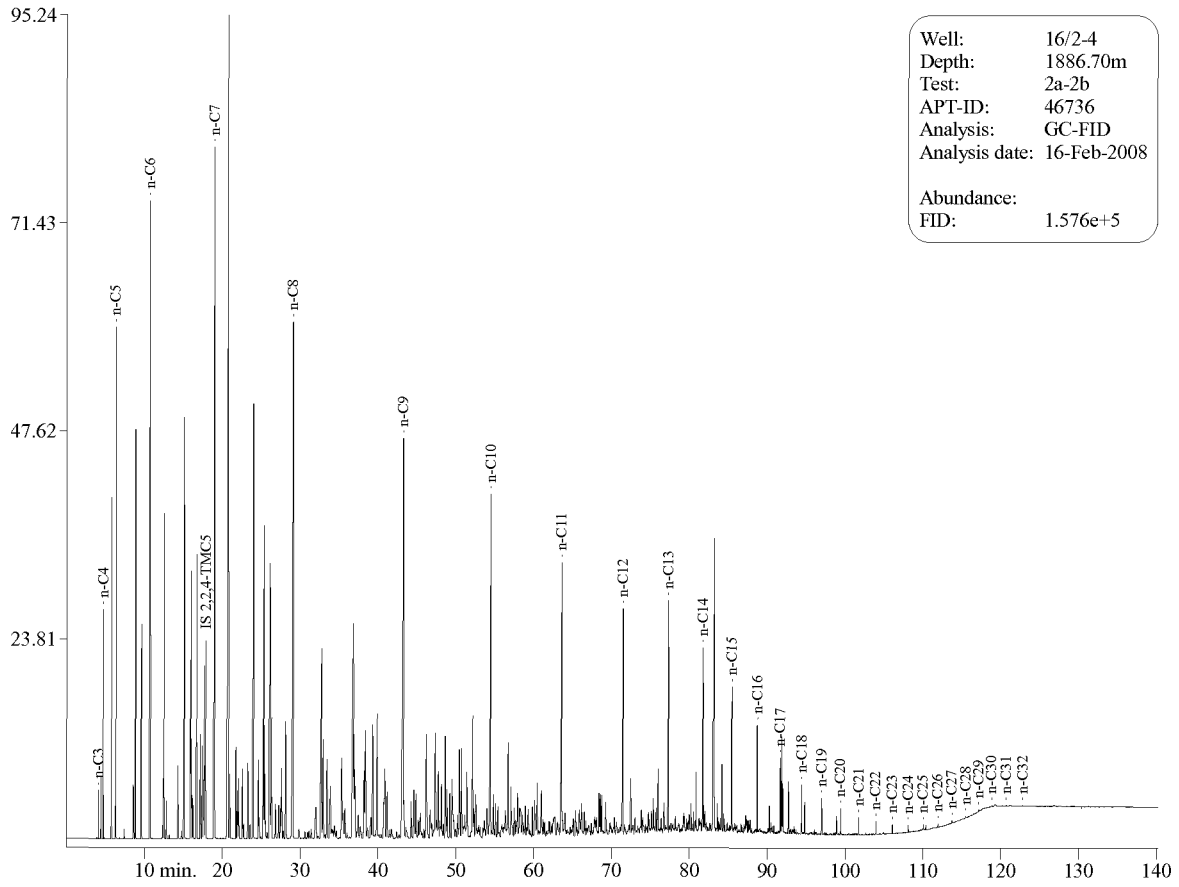
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
10 min. 20 30 40 50 60 70 80 90 100 110 120 130 140

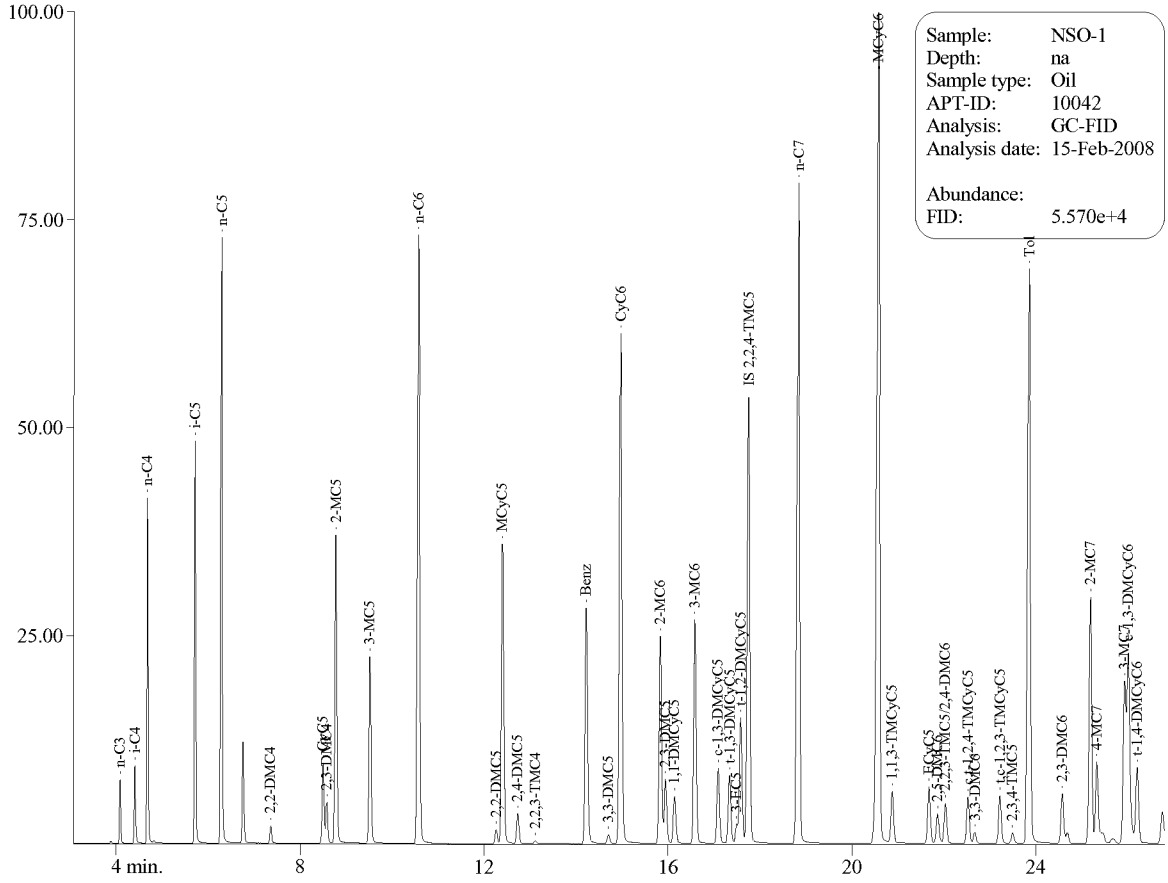

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
APT-ID: 46584
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 8.181e+4
95.24
71.43
47.62
23.81
n-C3
n-C4
n-C5
n-C6
n-C7
IS 2,2,4-TMC5
n-C8
n-C9
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
10 min. 20 30 40 50 60 70 80 90 100 110 120 130 140

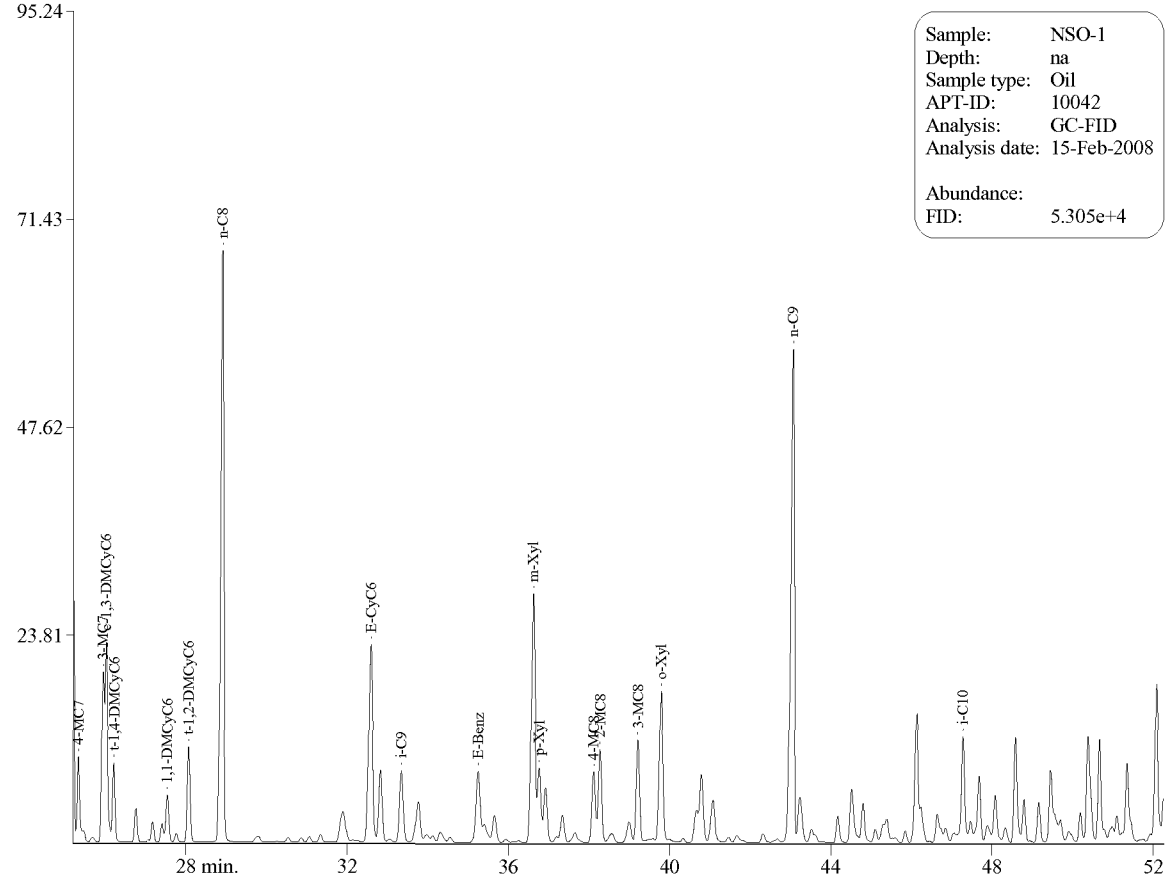

95.24
71.43
47.62
23.81
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
APT-ID: 46585
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 7.436e+4
n-C3
n-C4
n-C5
n-C6
n-C7
IS 2,2,4-TMC5
n-C8
n-C9
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
10 min. 20 30 40 50 60 70 80 90 100 110 120 130 140

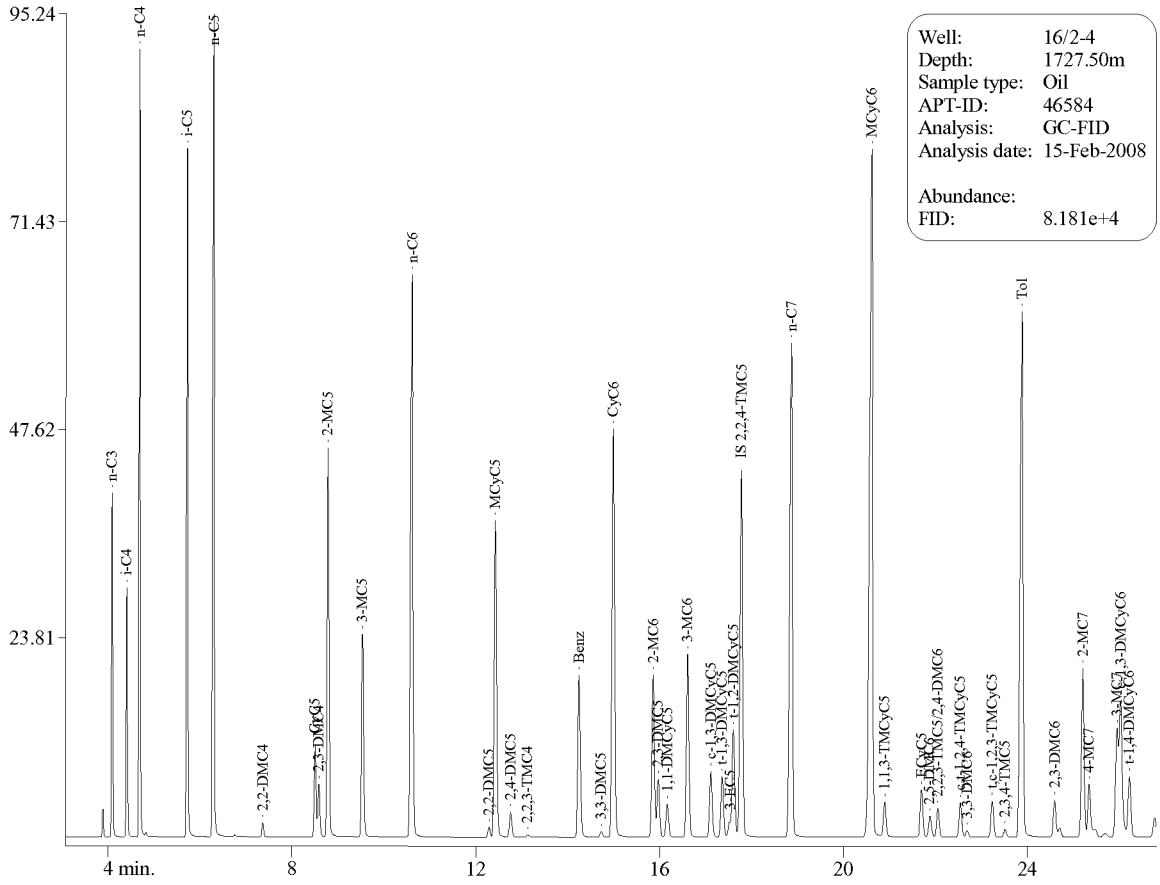

95.24
71.43
47.62
23.81
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
APT-ID: 46586
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 7.287e+4
n-C3
n-C4
n-C5
n-C6
n-C7
IS 2,2,4-TMC5
n-C8
n-C9
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
10 min. 20 30 40 50 60 70 80 90 100 110 120 130 140

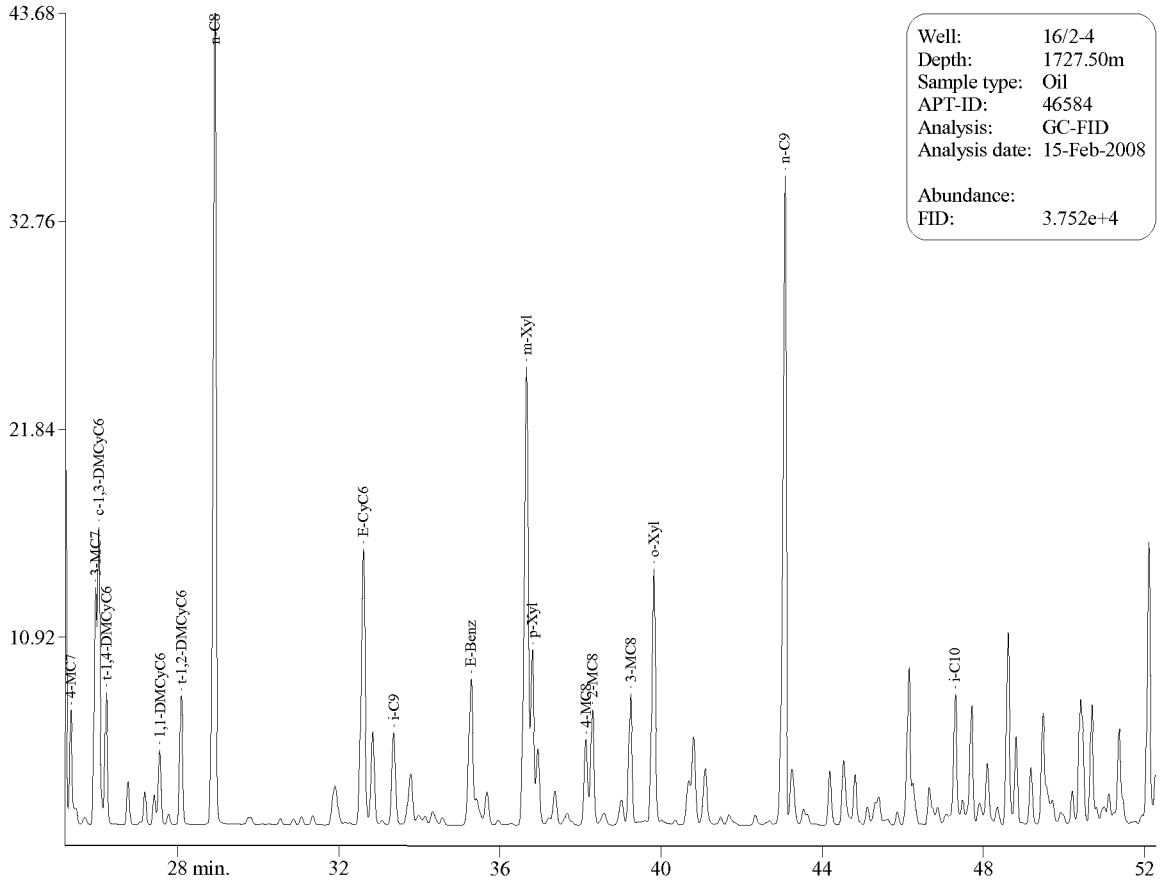

95.24
71.43
47.62
23.81
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
APT-ID: 46736
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 1.576e+5
n-C3
n-C4
n-C5
n-C6
n-C7
IS 2,2,4-TMC5
n-C8
n-C9
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
10 min.
20
30
40
50
60
70
80
90
100
110
120
130
140

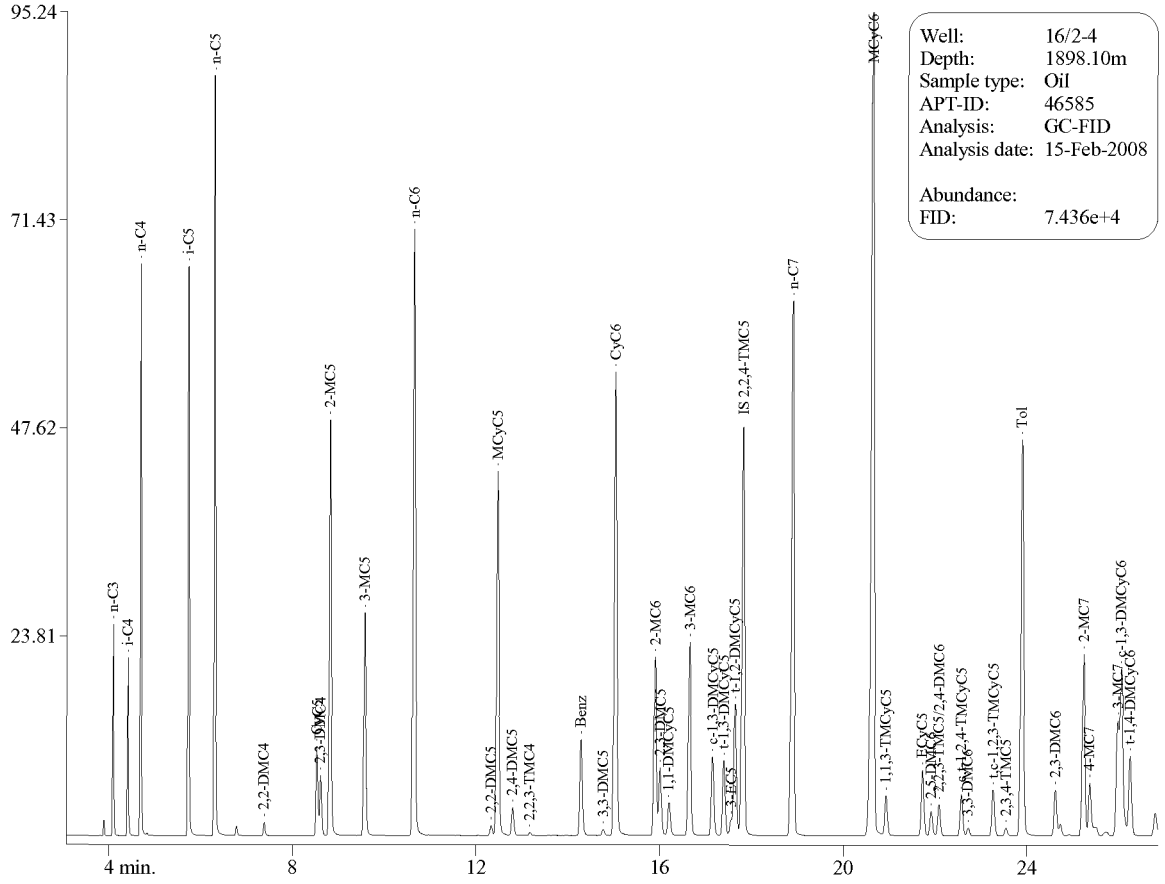
GC Chromatograms of Whole Oil - detailed

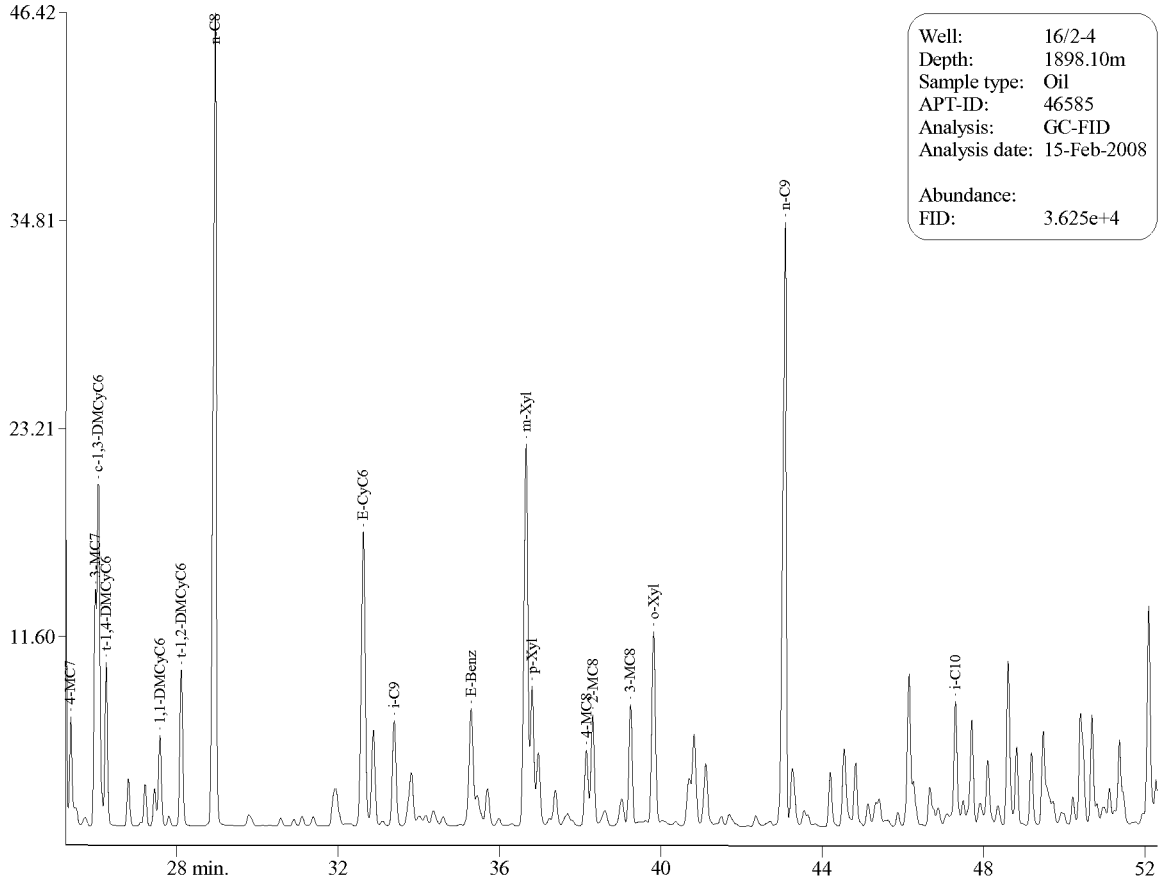

Sample: NSO-1
Depth: na
Sample type: Oil
APT-ID: 10042
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 5.570e+4
100.00
75.00
50.00
25.00
4 min.
8
12
16
20
24
n-C3
i-C4
n-C4
i-C5
n-C5
2,2-DMC4
2,3-DMC4
2-MC5
3-MC5
n-C6
2,2-DMC5
MCyC5
2,4-DMC5
2,2,3-TMC4
Benz
3,3-DMC5
CyC6
2-MC6
2,3-DMC5
1,1-DMCyC5
3-MC6
c-1,3-DMCyC5
t-1,3-DMCyC5
3-EC5
t-1,2-DMCyC5
IS 2,2,4-TMC5
n-C7
MCyC6
1,1,3-TMCyC5
ECyC5
2,5-DMC6/2,4-DMC6
3,3-DMC6
t-1,2,4-TMCyC5
tc-1,2,3-TMCyC5
2,3,4-TMC5
Tol
2,3-DMC6
2-MC7
4-MC7
3-MC7
1,3-DMCyC6
t-1,4-DMCyC6

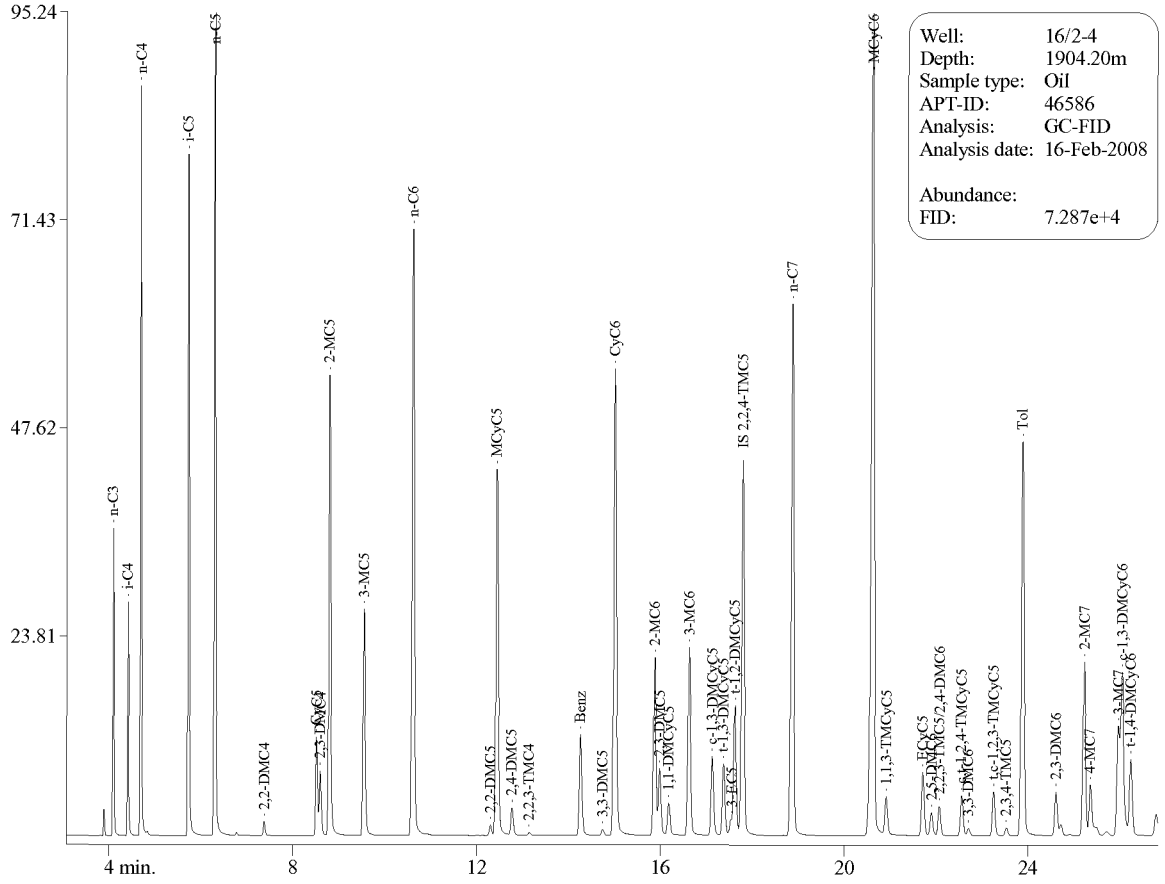

Sample: NSO-1
Depth: na
Sample type: Oil
APT-ID: 10042
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 5.305e+4
95.24
71.43
47.62
23.81
28 min.
32
36
40
44
48
52
4-MC7
3-MC7
1,3-DMCyC6
t-1,4-DMCyC6
1,1-DMCyC6
t-1,2-DMCyC6
n-C8
E-CyC6
i-C9
E-Benz
m-Xyl
p-Xyl
4-MC8
2-MC8
3-MC8
o-Xyl
n-C9
i-C10

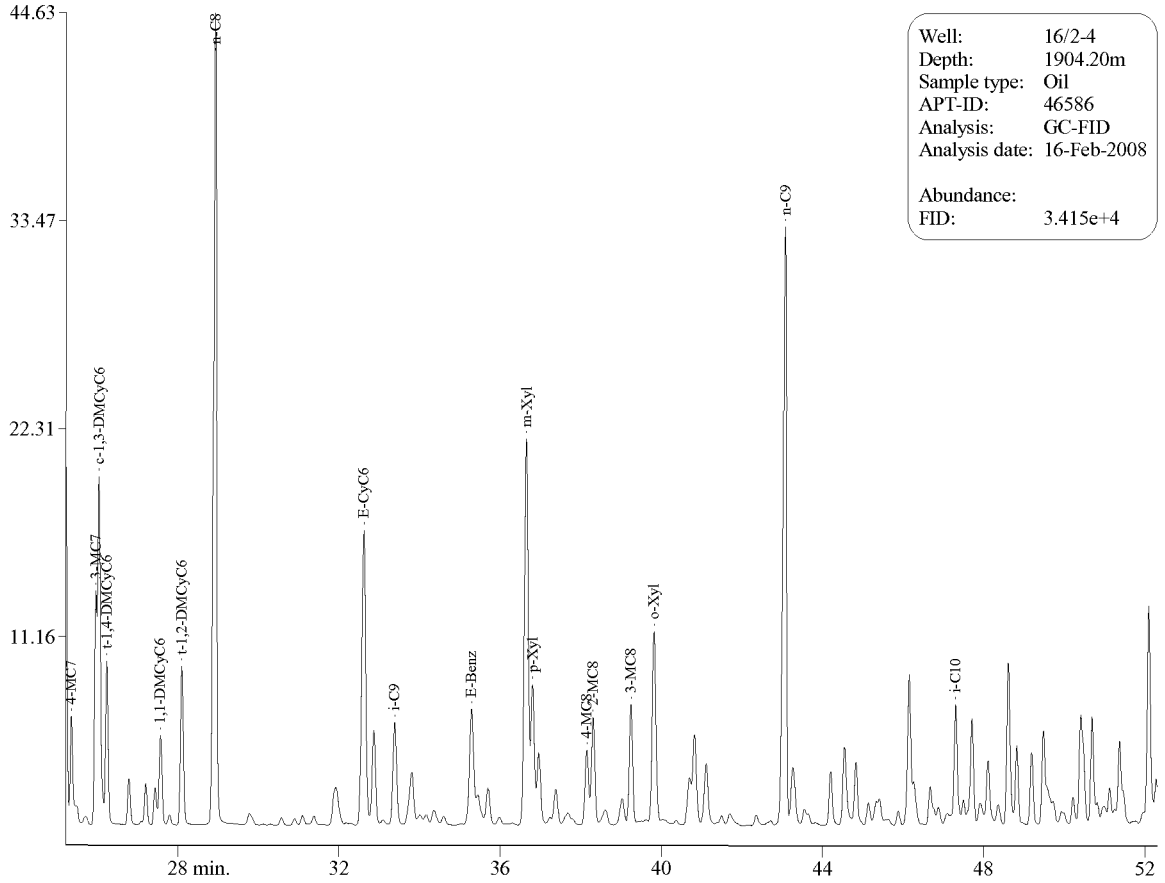

95.24
71.43
47.62
23.81
4 min.
8
12
16
20
24
n-C4
i-C5
n-C5
MCyC6
n-C3
i-C4
2-MC5
n-C6
MCyC5
3-MC5
CyC6
IS 2,2,4-TMC5
n-C7
Tol
Benz
3-MC6
2-MC6
2,2-DMC4
2,3-DMC5
2,2-DMC5
2,4-DMC5
2,2,3-TMC4
3,3-DMC5
1,1-DMCyC5
c-1,3-DMCyC5
t-1,2-DMCyC5
1,1,3-TMCyC5
2,3-DMC6
2-MC7
4-MC7
t-1,4-DMCyC6
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
APT-ID: 46584
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 8.181e+4

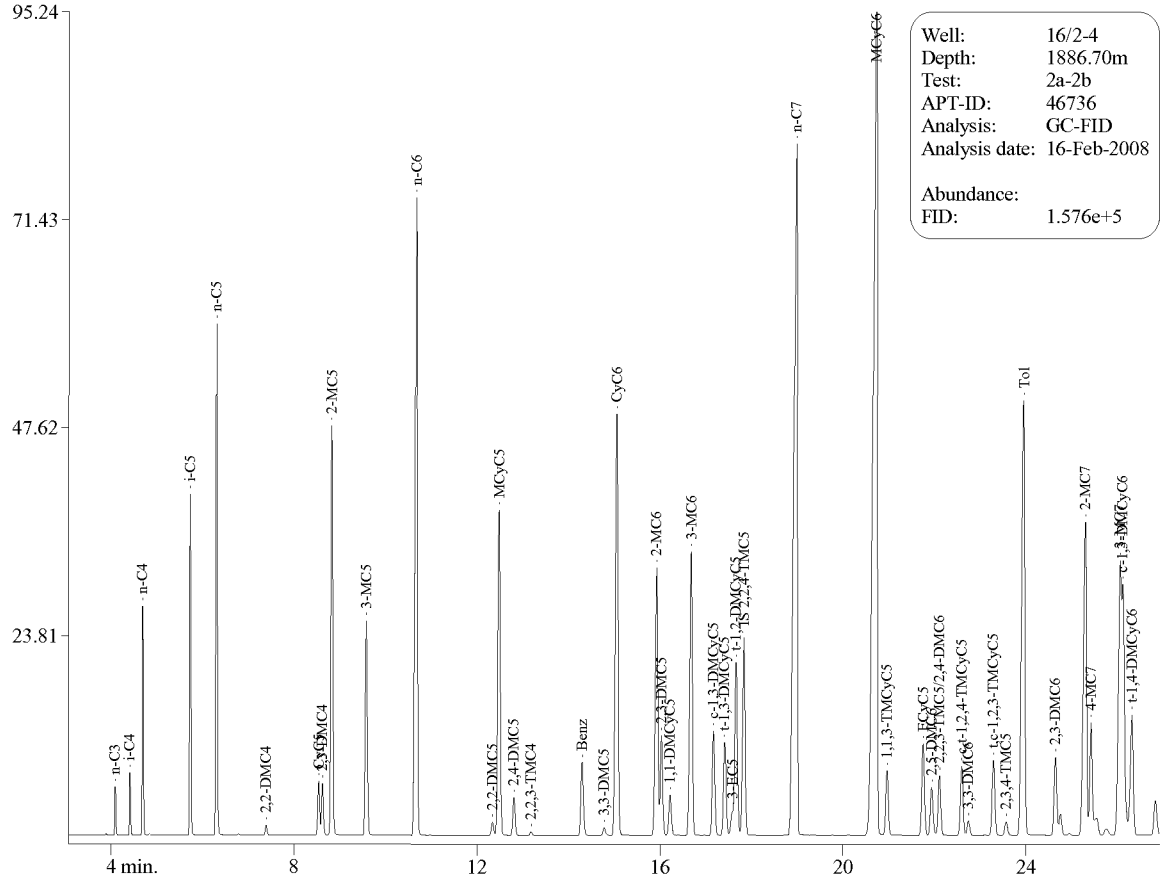

43.68
32.76
21.84
10.92
28 min.
32
36
40
44
48
52
n-C8
n-C9
c-1,3-DMCyC6
3-MC7
4-MC7
t-1,4-DMCyC6
1,1-DMCyC6
t-1,2-DMCyC6
E-CyC6
i-C9
E-Benz
m-Xyl
p-Xyl
4-MC8
2-MC8
3-MC8
o-Xyl
i-C10
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
APT-ID: 46584
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 3.752e+4

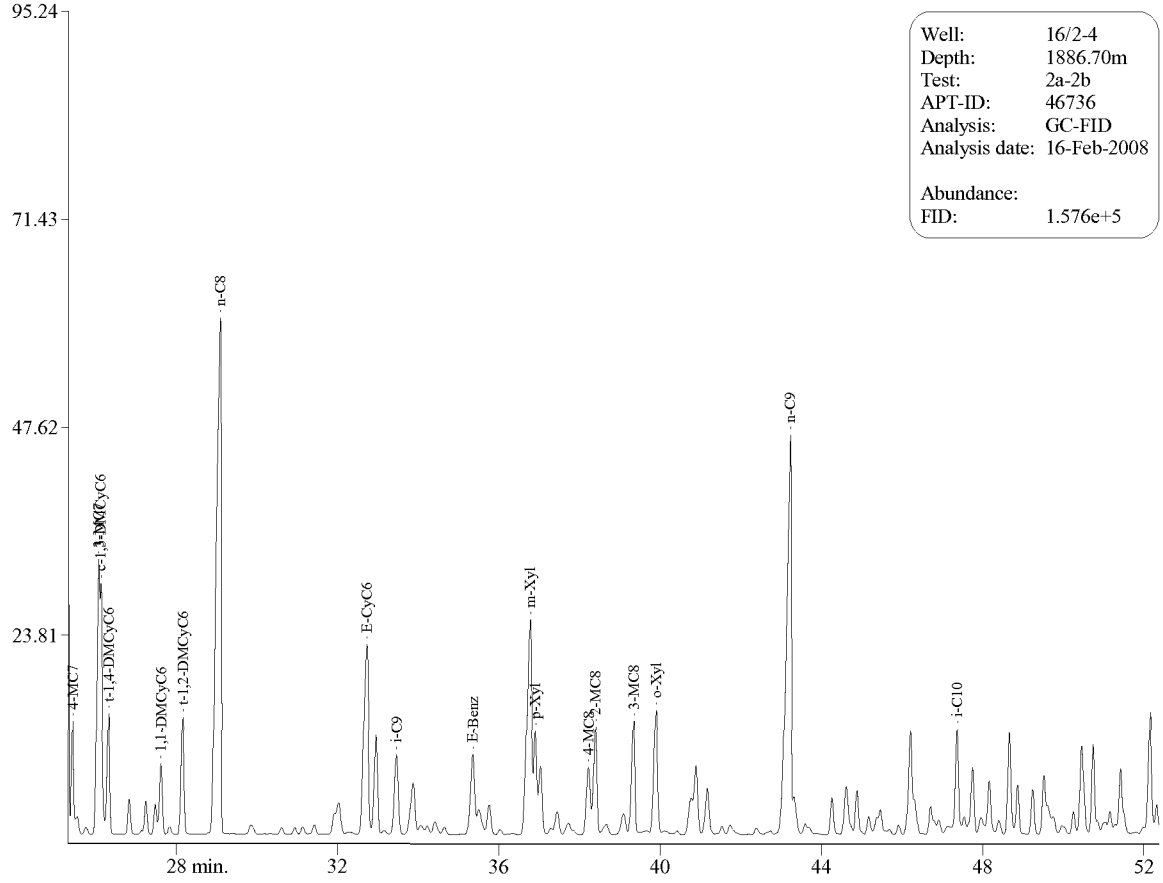

95.24
71.43
47.62
23.81
4 min.
8
12
16
20
24
n-C3
i-C4
n-C4
i-C5
n-C5
2,2-DMC4
2-MC5
3-MC5
n-C6
2,2-DMC5
MCyC5
2,4-DMC5
2,2,3-TMC4
Benz
3,3-DMC5
CyC6
2-MC6
2,3-DMC5
1,1-DMCyC5
3-MC6
c-1,3-DMCyC5
t-1,3-DMCyC5
3-EC5
t-1,2-DMCyC5
IS 2,2,4-TMC5
n-C7
MCyC6
1,1,3-TMCyC5
ECyC5
2,5-DMC6/2,4-DMC6
2,3-DMC6
2,4-TMCyC5
t-c-1,2,3-TMCyC5
2,3,4-TMC5
Tol
2,3-DMC6
2-MC7
4-MC7
3-MC7
c-1,3-DMCyC6
t-1,4-DMCyC6
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
APT-ID: 46585
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 7.436e+4


46.42
34.81
23.21
11.60
28 min.
32
36
40
44
48
52
4-MC7
c-1,3-DMCyC6
3-MC7
t-1,4-DMCyC6
1,1-DMCyC6
t-1,2-DMCyC6
n-C8
E-CyC6
i-C9
E-Benz
m-Xyl
p-Xyl
4-MC8
2-MC8
3-MC8
o-Xyl
n-C9
i-C10
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
APT-ID: 46585
Analysis: GC-FID
Analysis date: 15-Feb-2008
Abundance:
FID: 3.625e+4

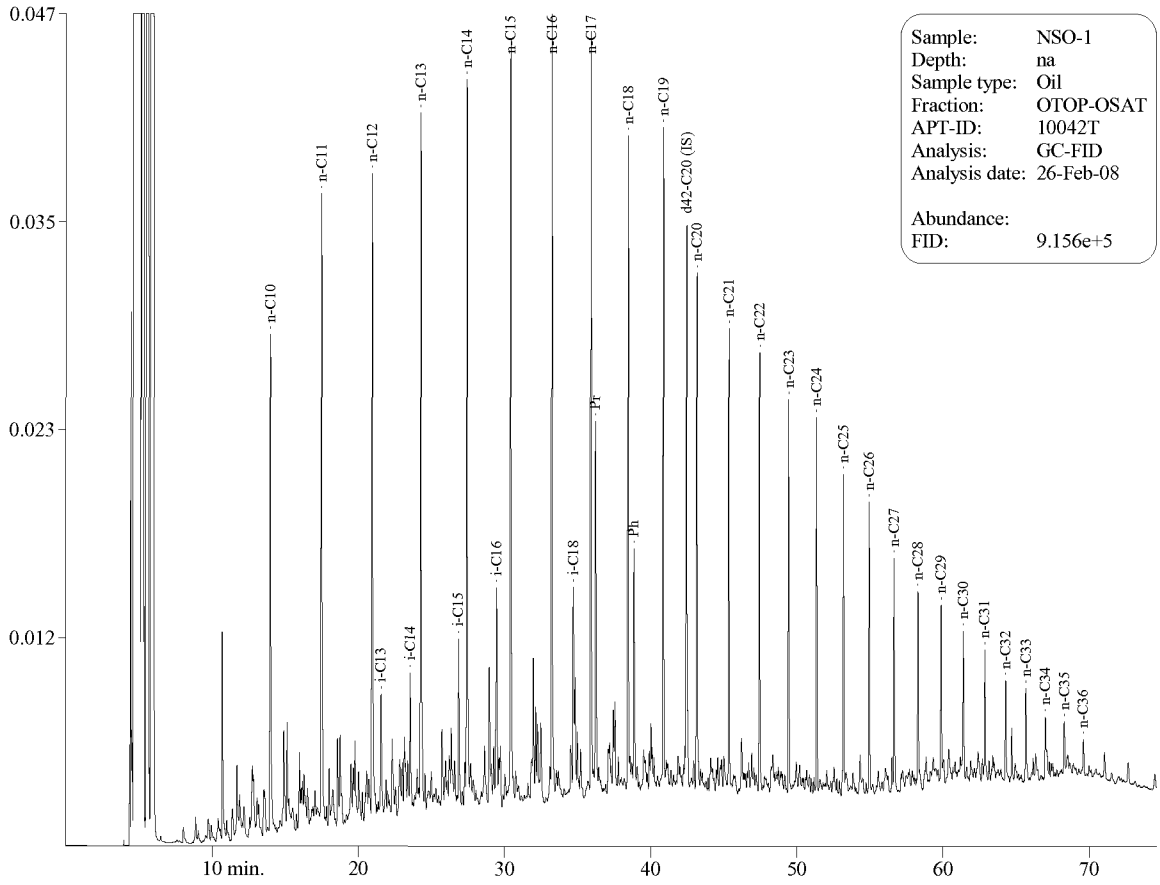

95.24
71.43
47.62
23.81
4 min.
8
12
16
20
24
n-C3
i-C4
n-C4
i-C5
n-C5
2,2-DMC4
2,3-DMC5
2-MC5
3-MC5
n-C6
2,2-DMC5
2,4-DMC5
2,2,3-TMC4
MCyC5
Benz
3,3-DMC5
CyC6
2-MC6
2,3-DMC5
1,1-DMCyC5
3-MC6
c-1,3-DMCyC5
t-1,3-DMCyC5
3-EC5
t-1,2-DMCyC5
IS 2,2,4-TMC5
n-C7
MCyC6
1,1,3-TMCyC5
ECyC5
2,5-DMC6
2,2,4-DMC6
3,3-DMC6
2,4-TMCyC5
t,c-1,2,3-TMCyC5
2,3,4-TMC5
Tol
2,3-DMC6
2-MC7
4-MC7
3-MC7
t-1,4-DMCyC6
c-1,3-DMCyC6
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
APT-ID: 46586
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 7.287e+4

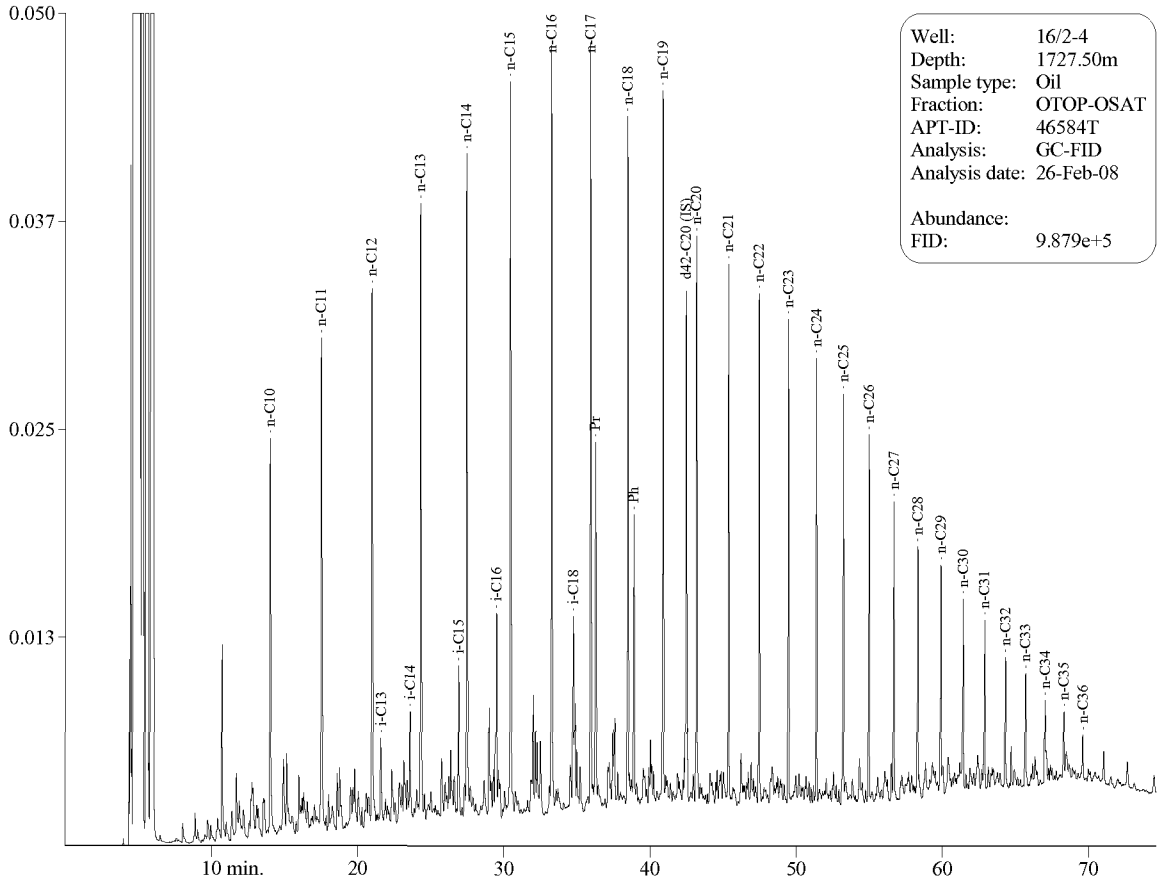

44.63
33.47
22.31
11.16
28 min.
32
36
40
44
48
52
4-MC7
3-MC7
t-1,4-DMCyC6
c-1,3-DMCyC6
1,1-DMCyC6
t-1,2-DMCyC6
n-C8
E-CyC6
i-C9
E-Benz
m-Xyl
p-Xyl
4-MC8
2-MC8
3-MC8
o-Xyl
n-C9
i-C10
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
APT-ID: 46586
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 3.415e+4

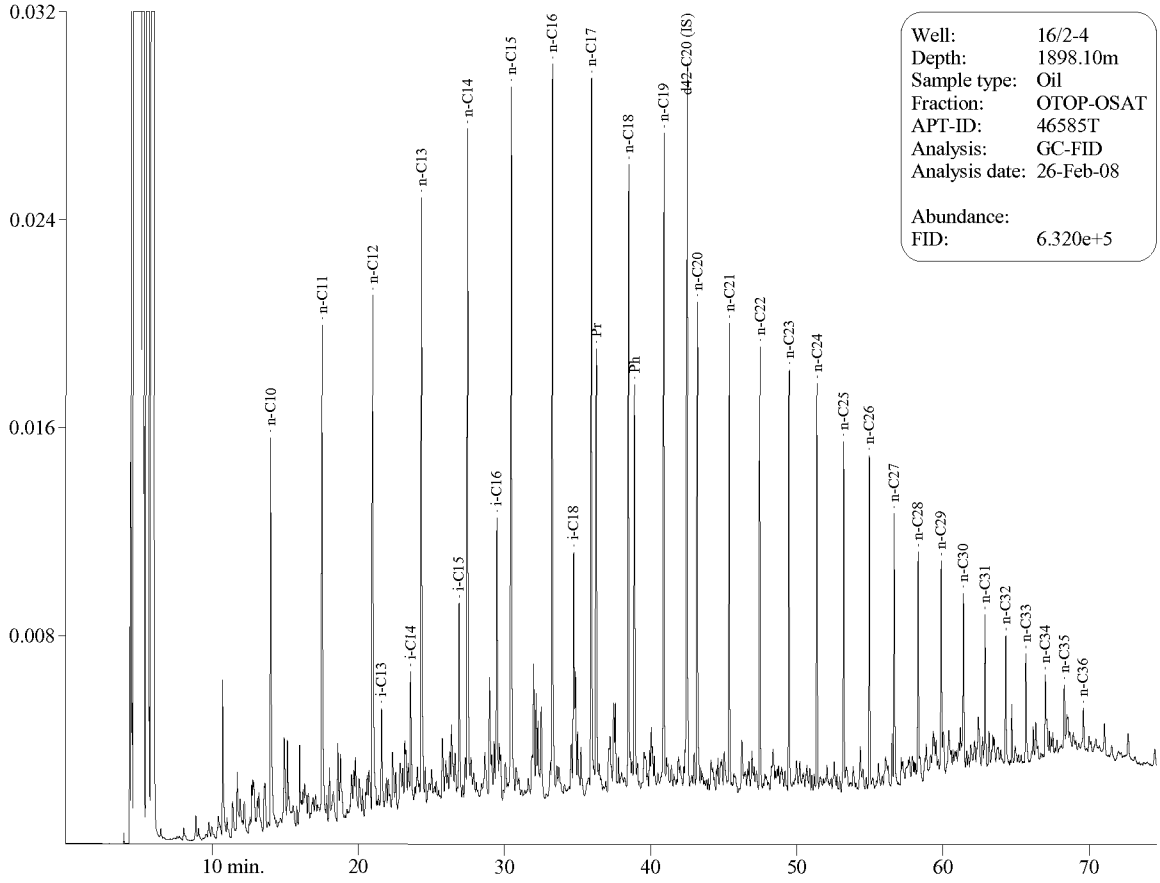

95.24
71.43
47.62
23.81
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
APT-ID: 46736
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 1.576e+5
n-C3
i-C4
n-C4
i-C5
n-C5
2,2-DMC4
2-MC5
3-MC5
n-C6
2,2-DMC5
MCyC5
2,4-DMC5
2,2,3-TMC4
Benz
3,3-DMC5
CyC6
2-MC6
2,3-DMC5
1,1-DMCyC5
3-MC6
t-1,3-DMCyC5
t-1,2-DMCyC5
3-EC5
2,4,4-TMC5
n-C7
MCyC6
1,1,3-TMCyC5
ECyC5
2,5-DMC6/2,4-DMC6
2,3,3-TMC5
t-1,2,4-TMCyC5
3,3-DMC6
t-c-1,2,3-TMCyC5
2,3,4-TMC5
Tol
2,3-DMC6
2-MC7
4-MC7
t-1,4-DMCyC6
4 min.
8
12
16
20
24

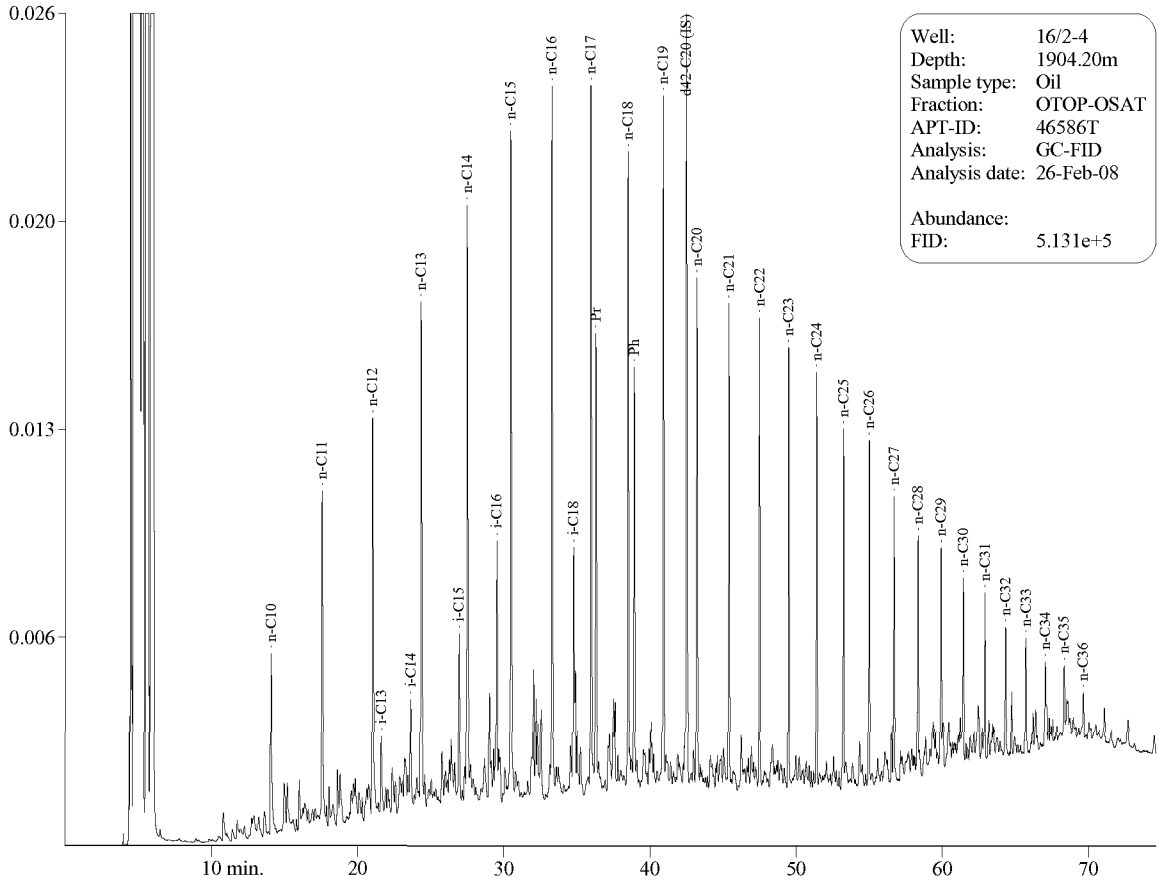

95.24
71.43
47.62
23.81
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
APT-ID: 46736
Analysis: GC-FID
Analysis date: 16-Feb-2008
Abundance:
FID: 1.576e+5
n-C8
4-MC7
t-1,4-DMCyC6
1,1-DMCyC6
t-1,2-DMCyC6
E-CyC6
i-C9
E-Benz
m-Xyl
p-Xyl
4-MC8
2-MC8
3-MC8
o-Xyl
n-C9
i-C10
28 min.
32
36
40
44
48
52

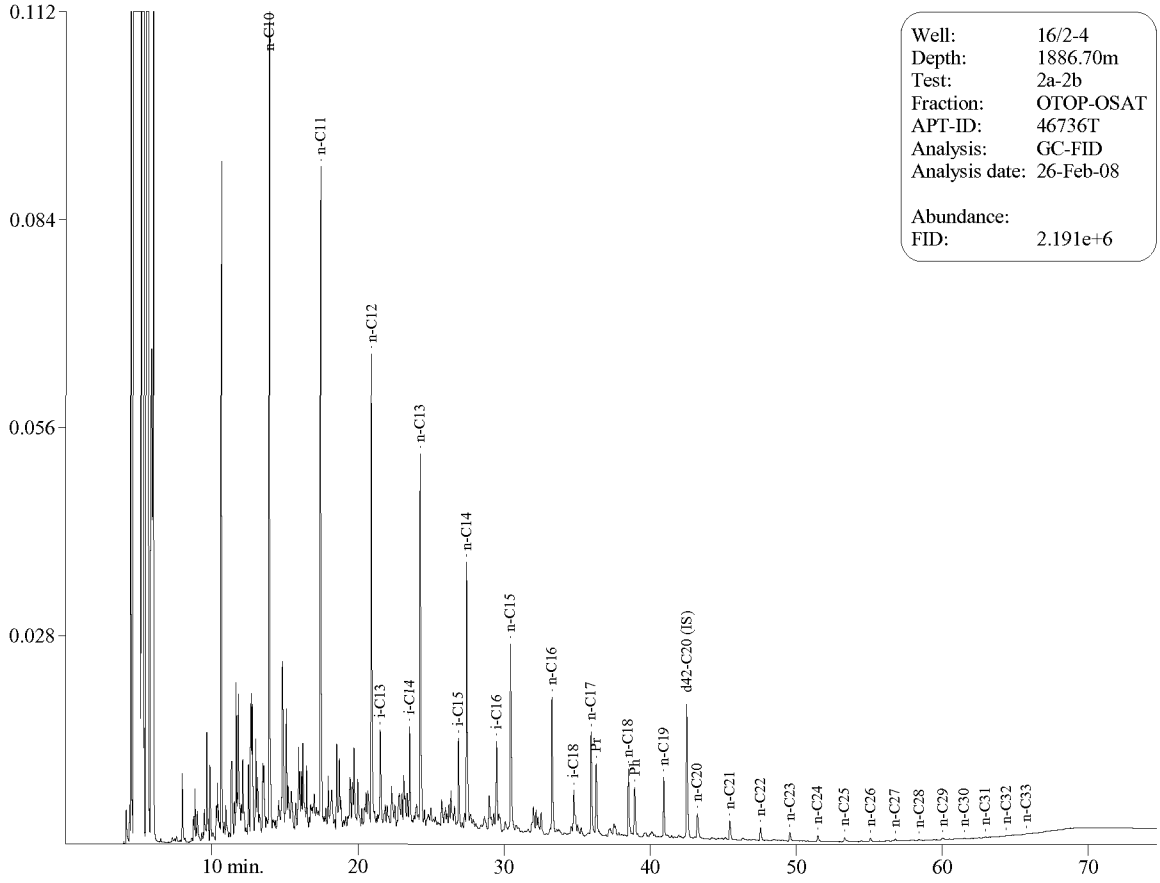
GC Chromatograms of Saturated Hydrocarbons


0.047
0.035
0.023
0.012
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
d42-C20 (IS)
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
i-C13
i-C14
i-C15
i-C16
i-C18
Pr
Ph
10 min.
20
30
40
50
60
70
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 9.156e+5

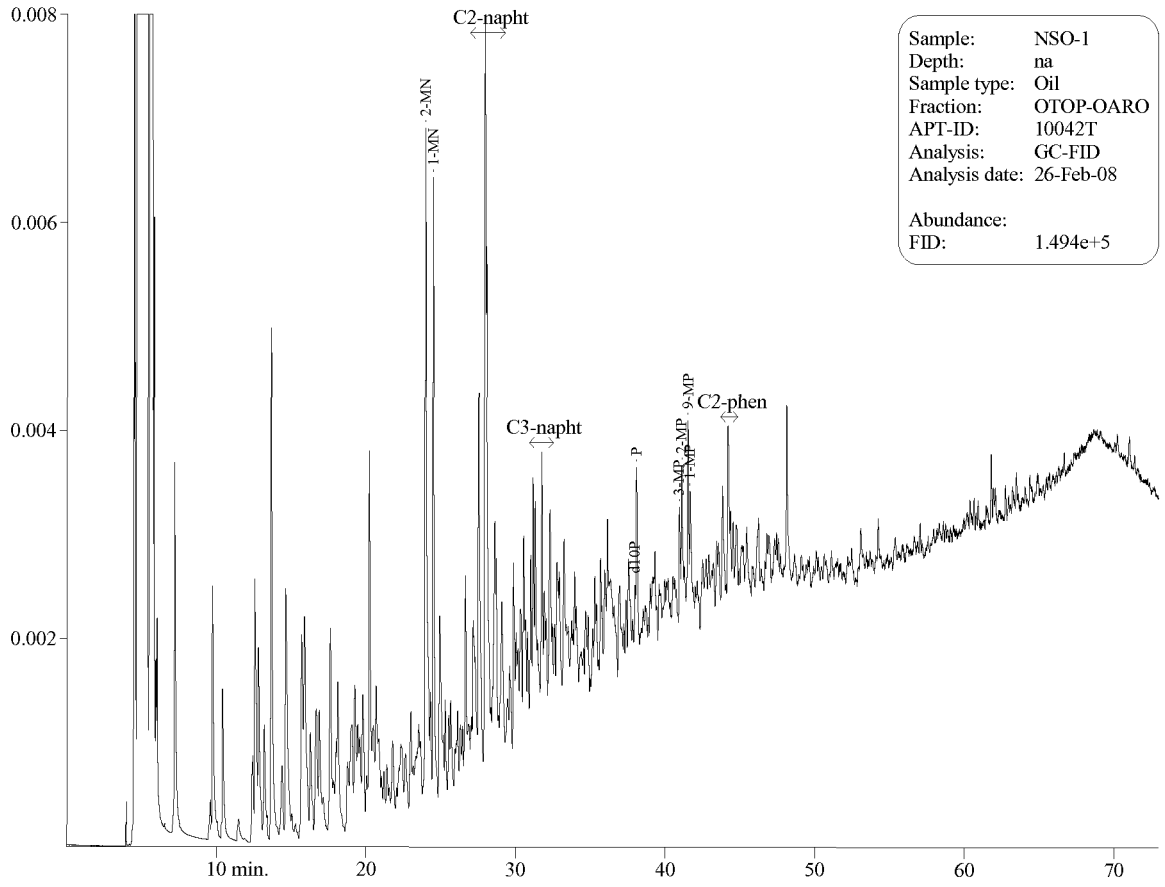

0.050
0.037
0.025
0.013
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
d42-C20 (IS)
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
i-C13
i-C14
i-C15
i-C16
i-C18
Pr
Ph
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 46584T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 9.879e+5

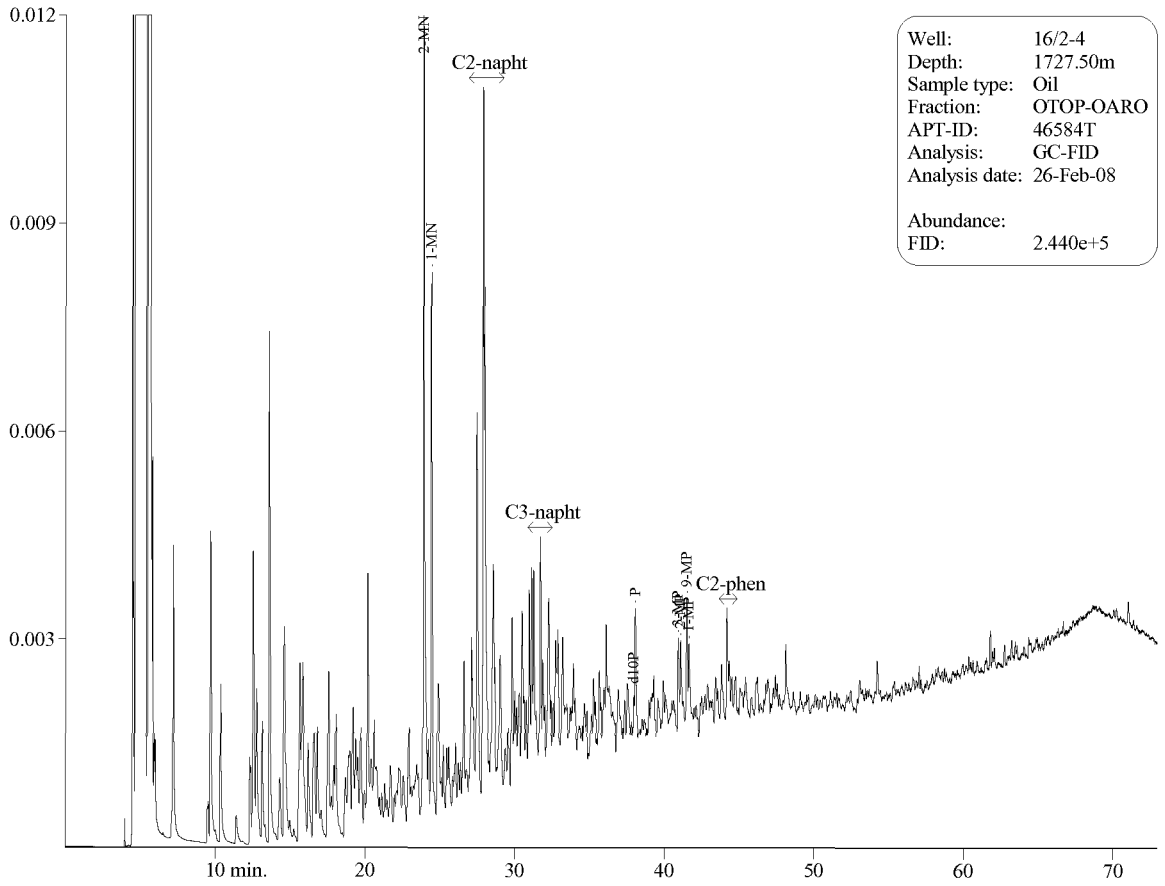

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 46585T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 6.320e+5
0.032
0.024
0.016
0.008
10 min.
20
30
40
50
60
70
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
d42-C20 (IS)
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
i-C13
i-C14
i-C15
i-C16
i-C18
Pr
Ph

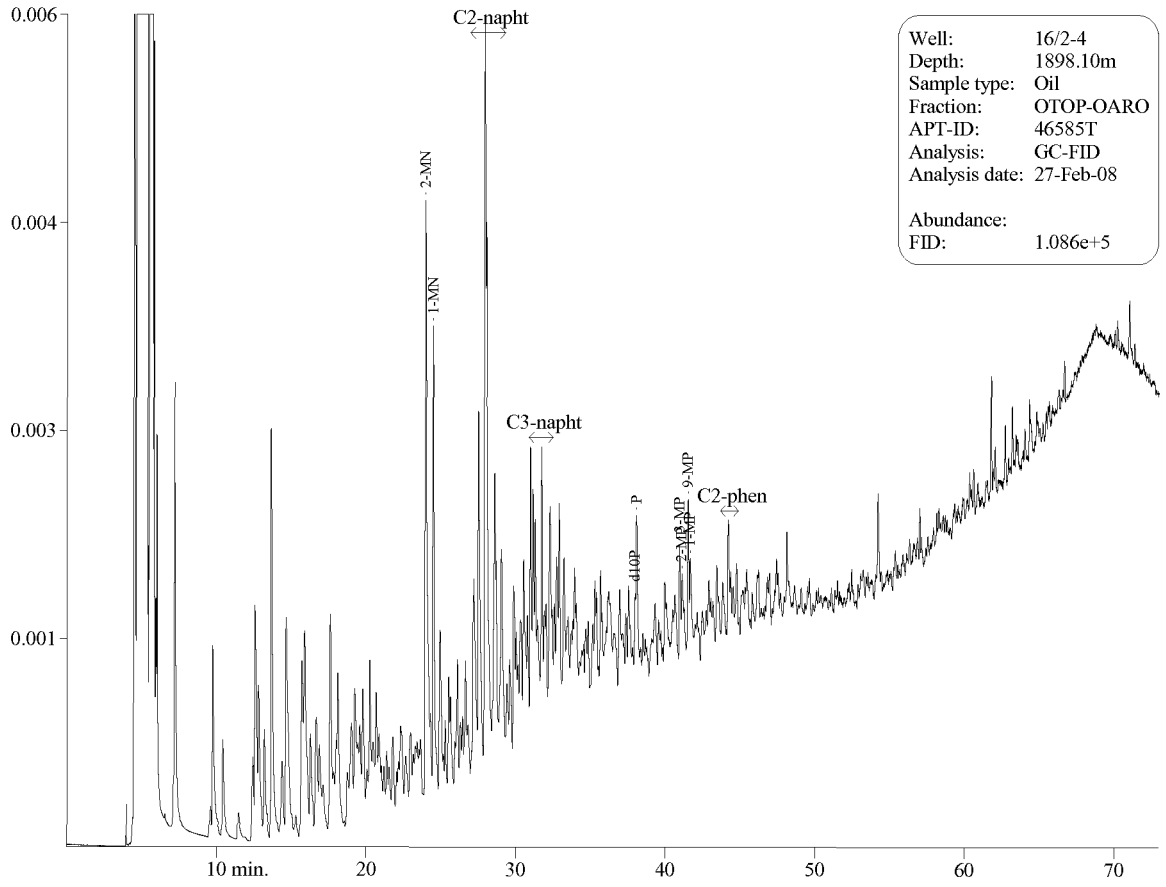

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 46586T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 5.131e+5
0.026
0.020
0.013
0.006
10 min.
20
30
40
50
60
70
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
d42-C20 (IS)
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
i-C13
i-C14
i-C15
i-C16
i-C18
Pr
Ph

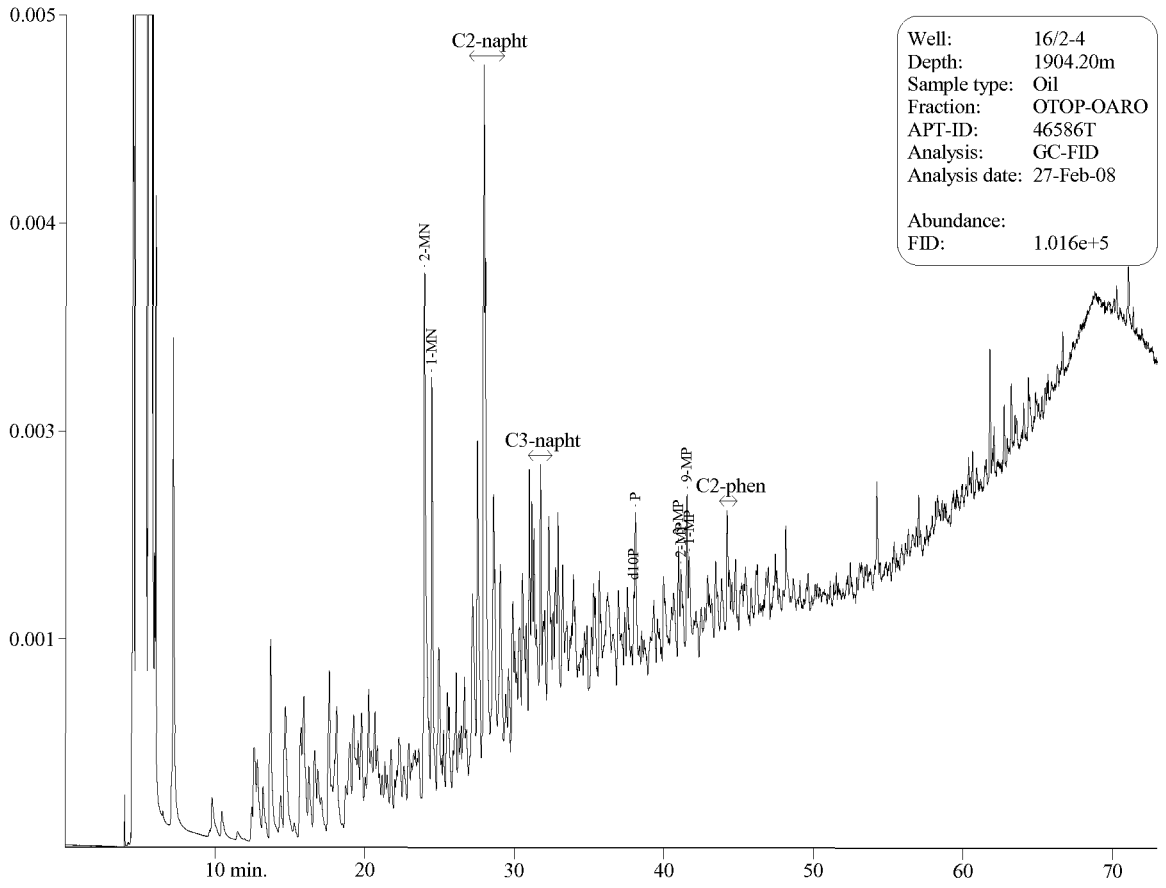

0.112
0.084
0.056
0.028
n-C10
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
i-C13
i-C14
i-C15
i-C16
i-C18
Pr
Ph
d42-C20 (IS)
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OSAT
APT-ID: 46736T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 2.191e+6

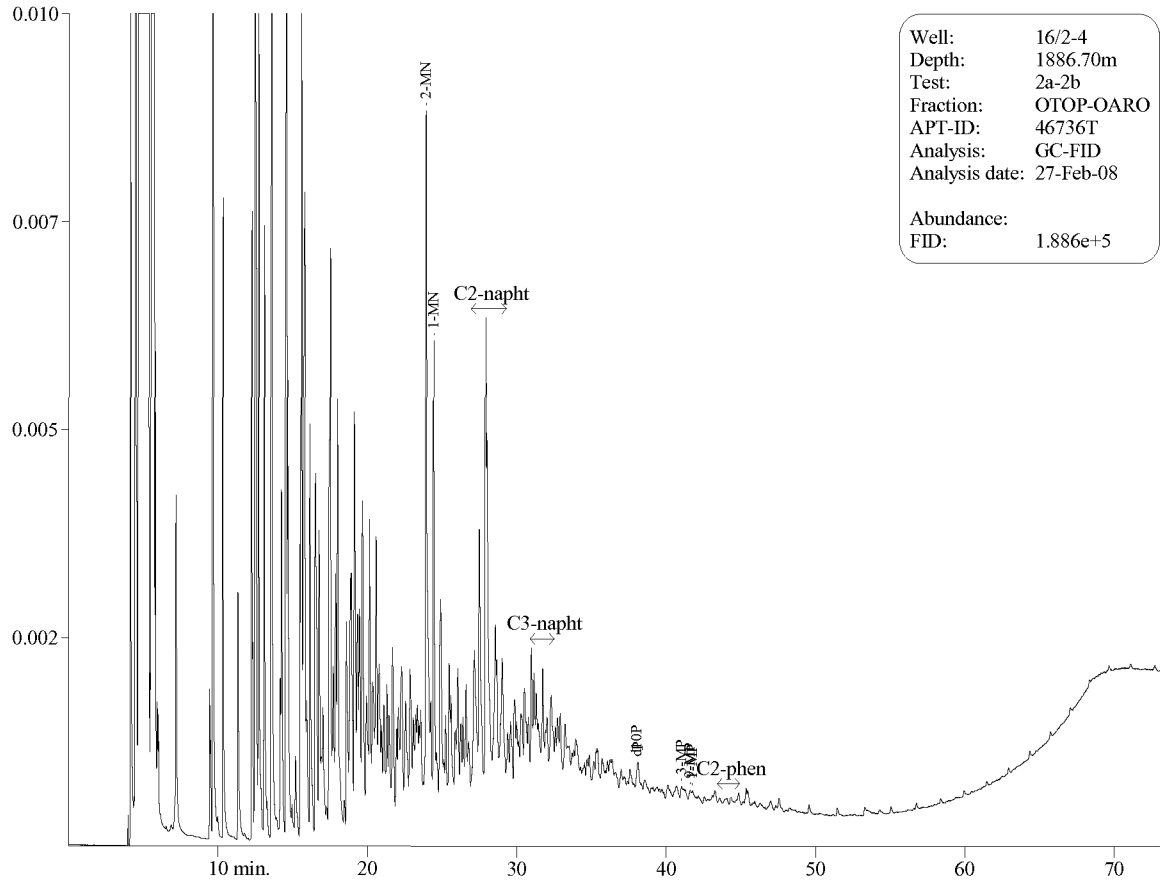
GC Chromatograms of Aromatic Hydrocarbons


0.008
0.006
0.004
0.002
C2-napht
2-MN
1-MN
C3-napht
dt0P
P
3-MP
2-MP
1-MP
9-MP
C2-phen
10 min.
20
30
40
50
60
70
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 1.494e+5

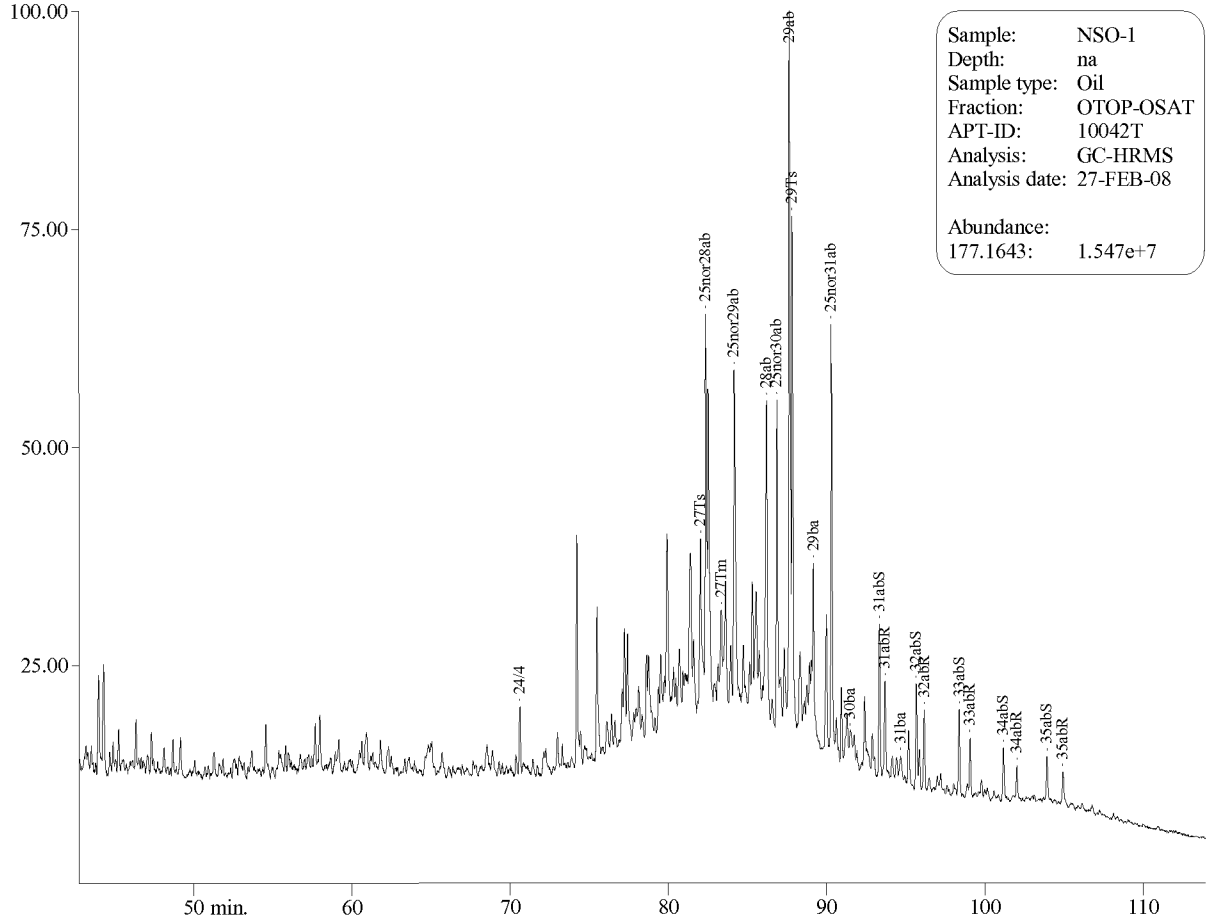

0.012
0.009
0.006
0.003
2-MN
C2-napht
1-MN
C3-napht
dt0P
P
3-MP
2-MP
1-MP
9-MP
C2-phen
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-FID
Analysis date: 26-Feb-08
Abundance:
FID: 2.440e+5

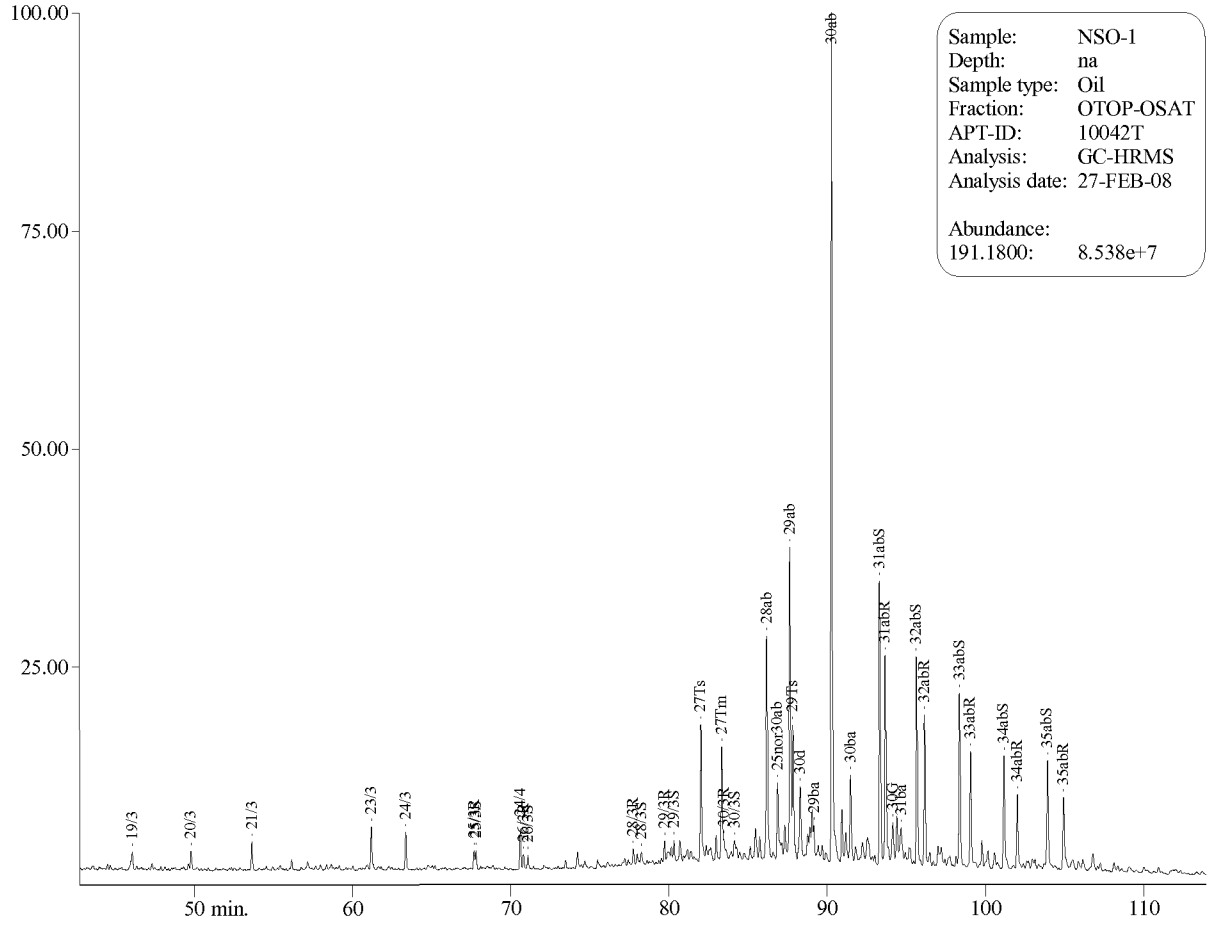

0.006
0.004
0.003
0.001
C2-napht
2-MN
1-MN
C3-napht
dtP
P
2-MP
1-MP
9-MP
C2-phen
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-FID
Analysis date: 27-Feb-08
Abundance:
FID: 1.086e+5

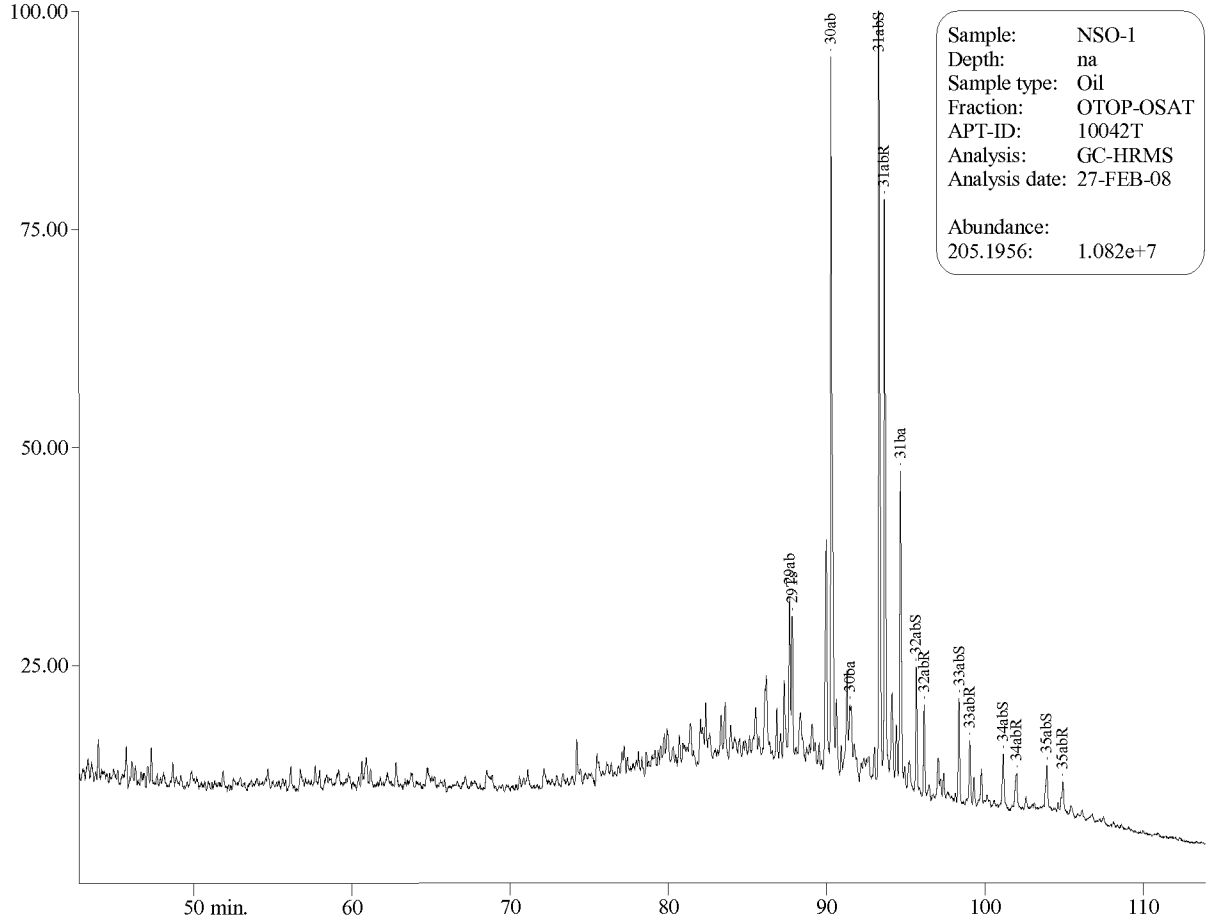

0.005
0.004
0.003
0.001
C2-napht
2-MN
1-MN
C3-napht
dtP
P
2-MP
1-MP
9-MP
C2-phen
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-FID
Analysis date: 27-Feb-08
Abundance:
FID: 1.016e+5

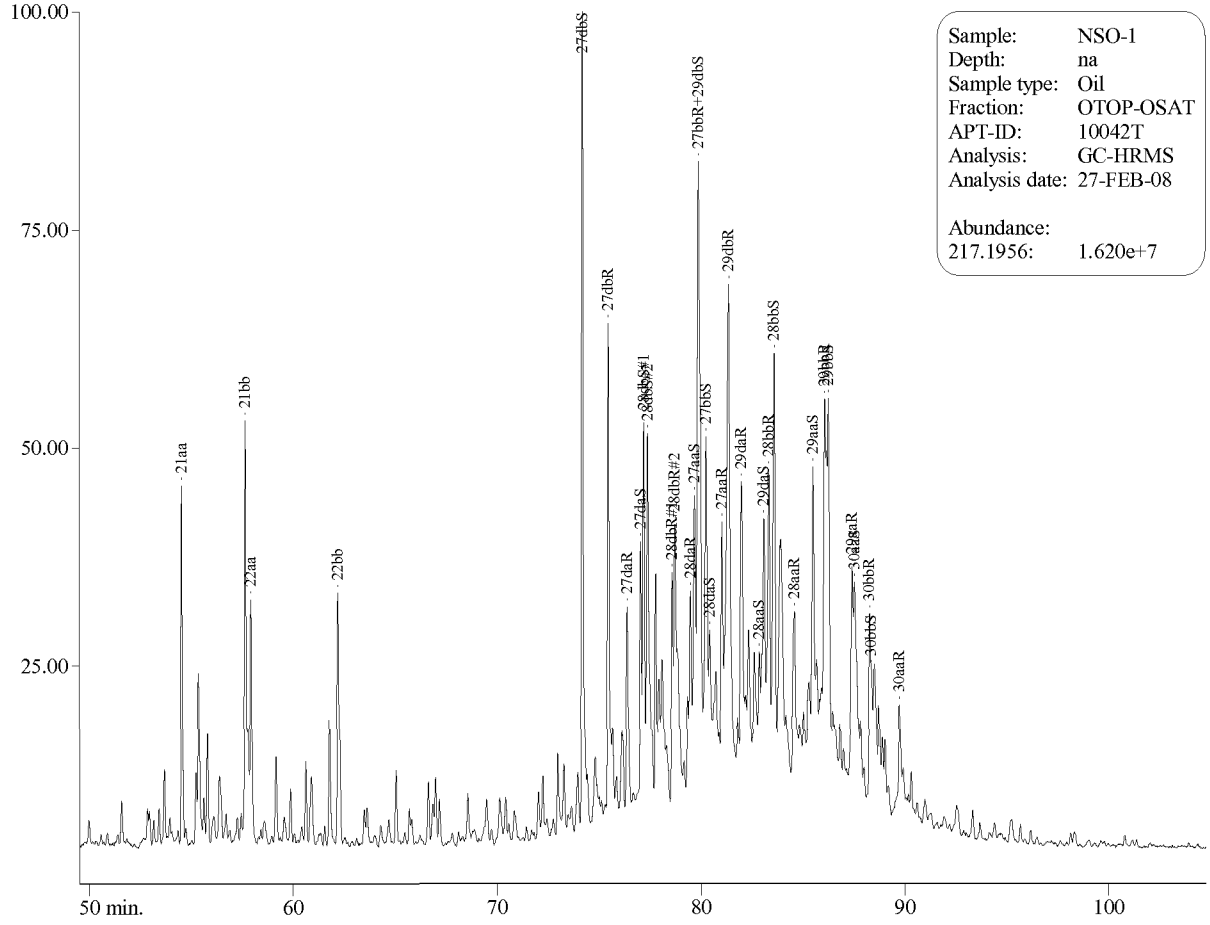

0.010
0.007
0.005
0.002
2-MN
1-MN
C2-napht
C3-napht
dBOP
2-MP
1-MP
C2-phen
10 min.
20
30
40
50
60
70
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-FID
Analysis date: 27-Feb-08
Abundance:
FID: 1.886e+5

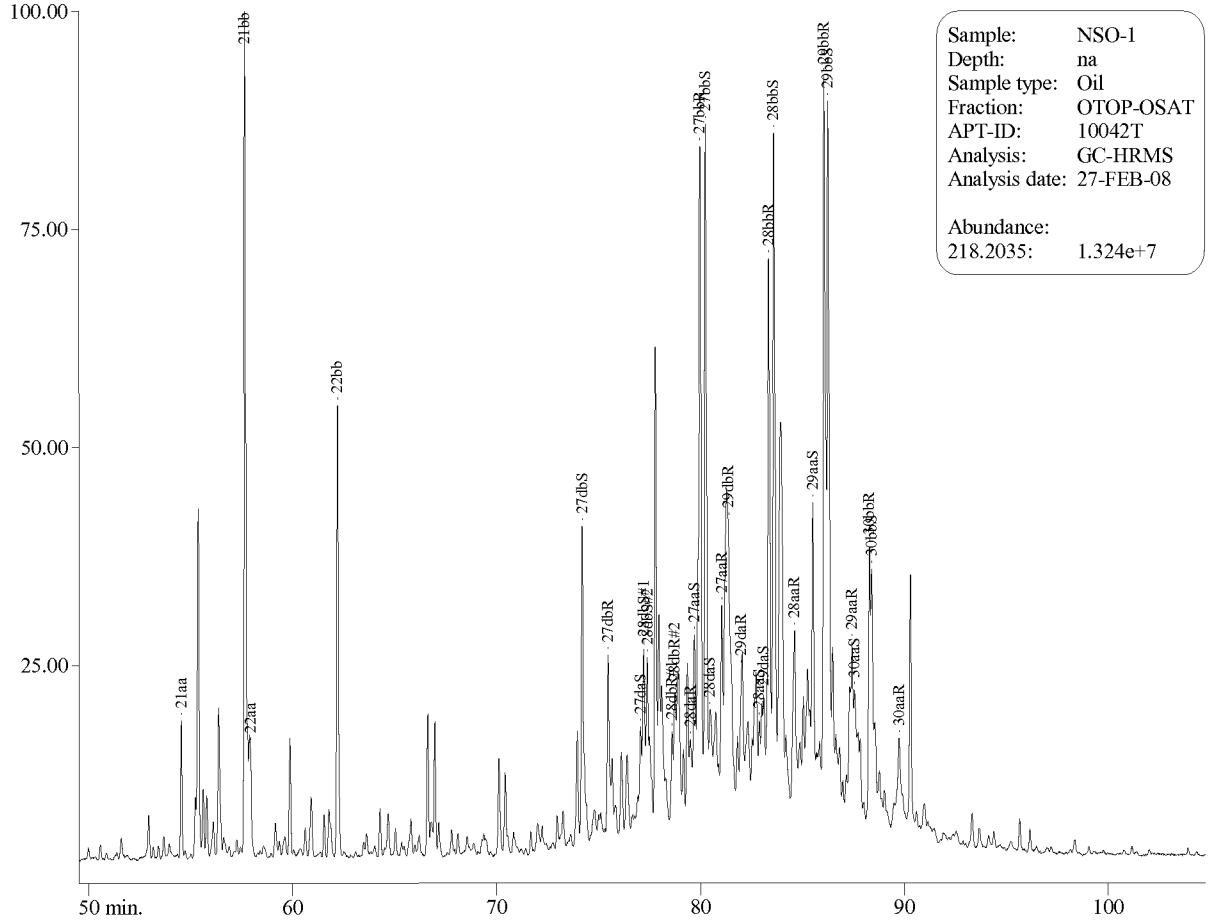
GC-MS Chromatograms of Saturated Hydrocarbons

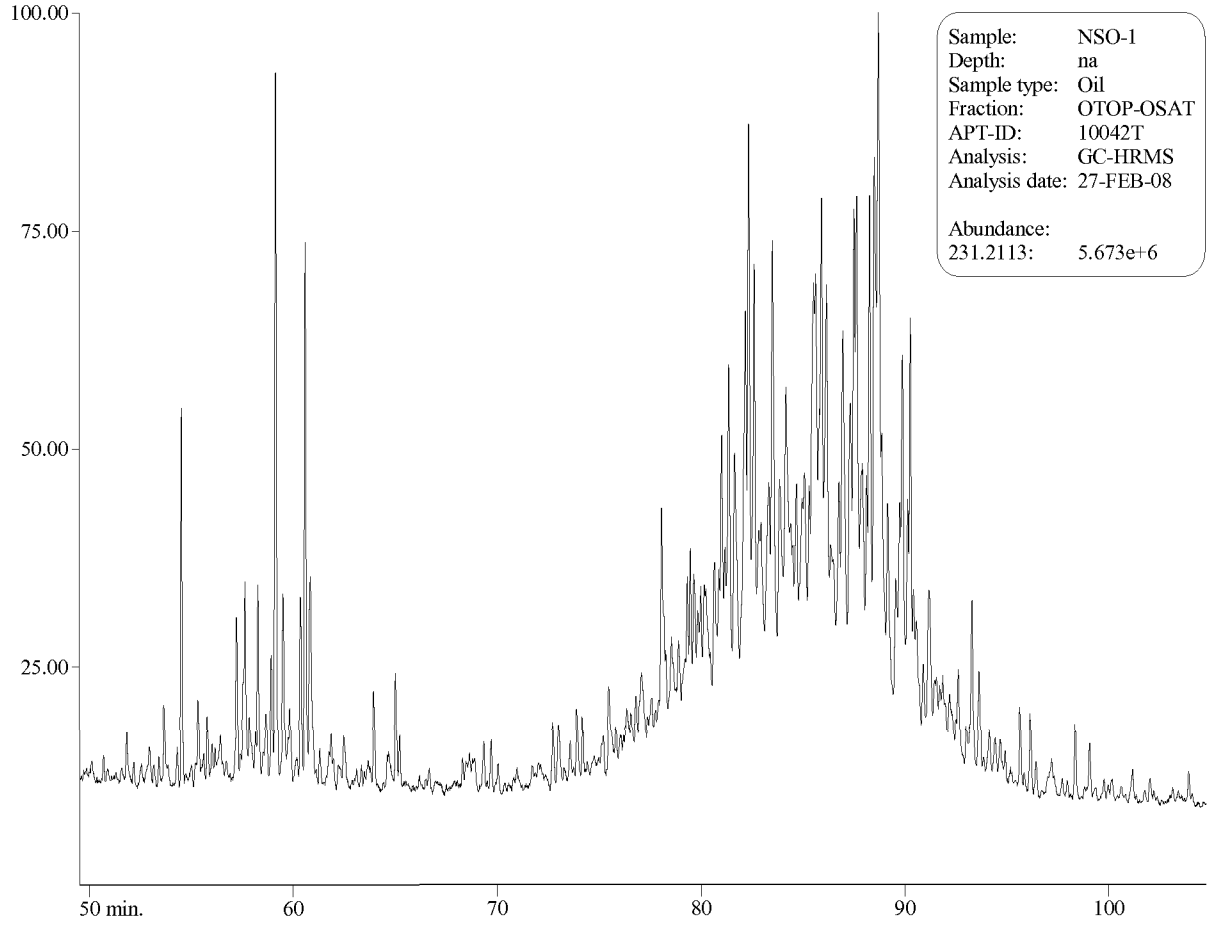

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
177.1643: 1.547e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
24/4
25nor28ab
27Ts
27Tm
25nor29ab
28ab
25nor30ab
29ab
29Ts
25nor31ab
29ba
30ba
31labS
31labR
31ba
32labS
32labR
33labS
33labR
34labS
34labR
35labS
35labR

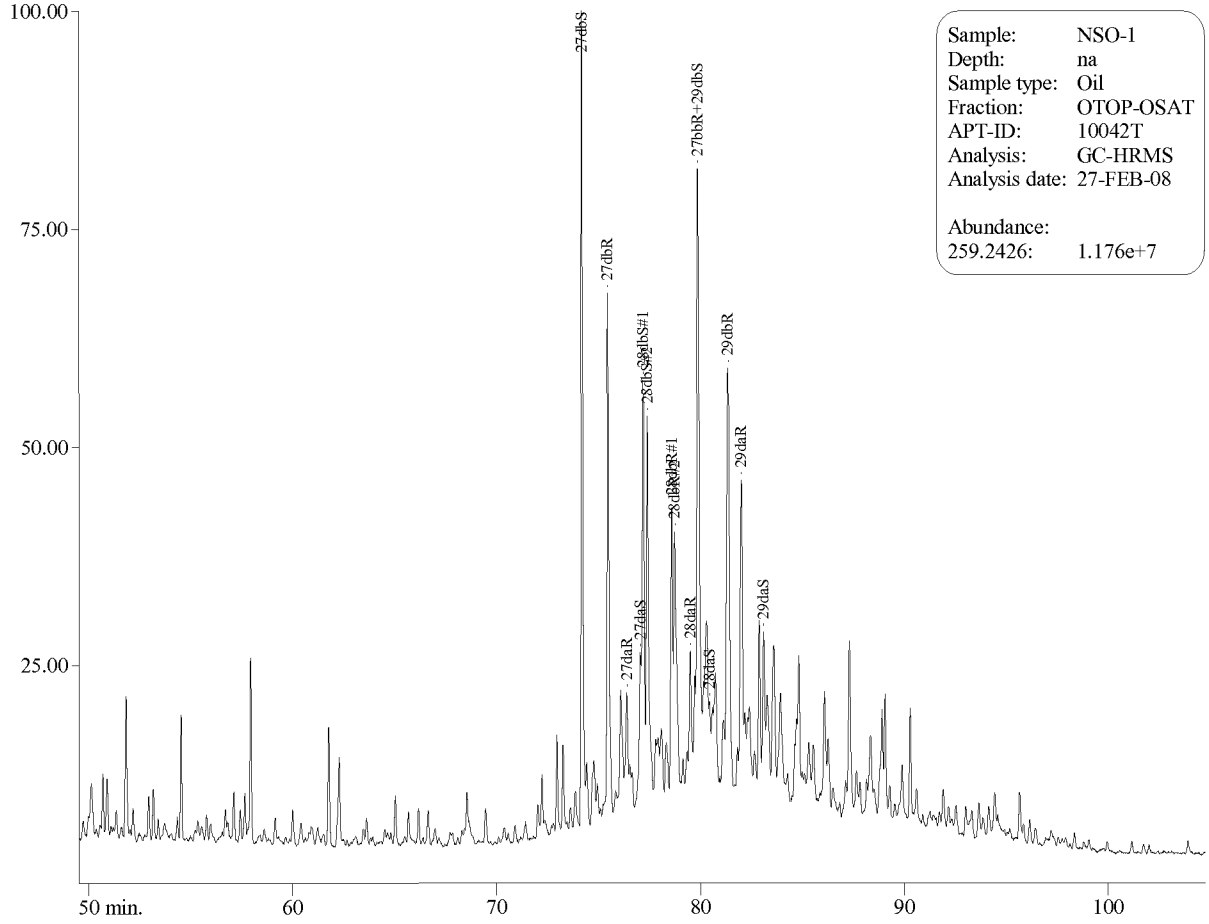

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
191.1800: 8.538e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
19/3
20/3
21/3
23/3
24/3
28/3S
29/3S
27Ts
27Tm
30/3S
28ab
29ab
25nor30ab
29Ts
30d
29ba
30ab
30ba
31labS
31labR
31ba
32labS
32labR
33labS
33labR
34labS
34labR
35labS
35labR

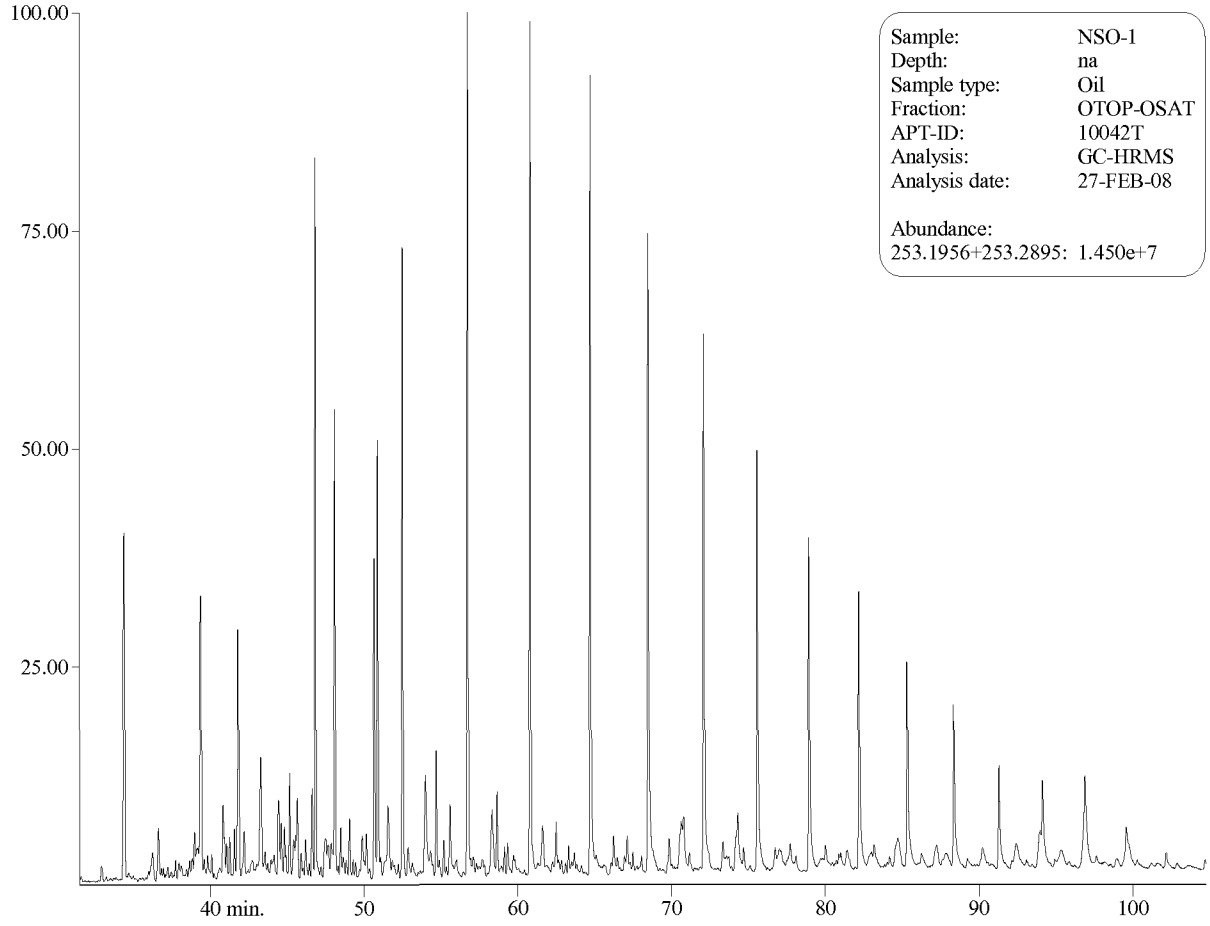

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
205.1956: 1.082e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
30ab
31abS
31abR
31ba
30ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

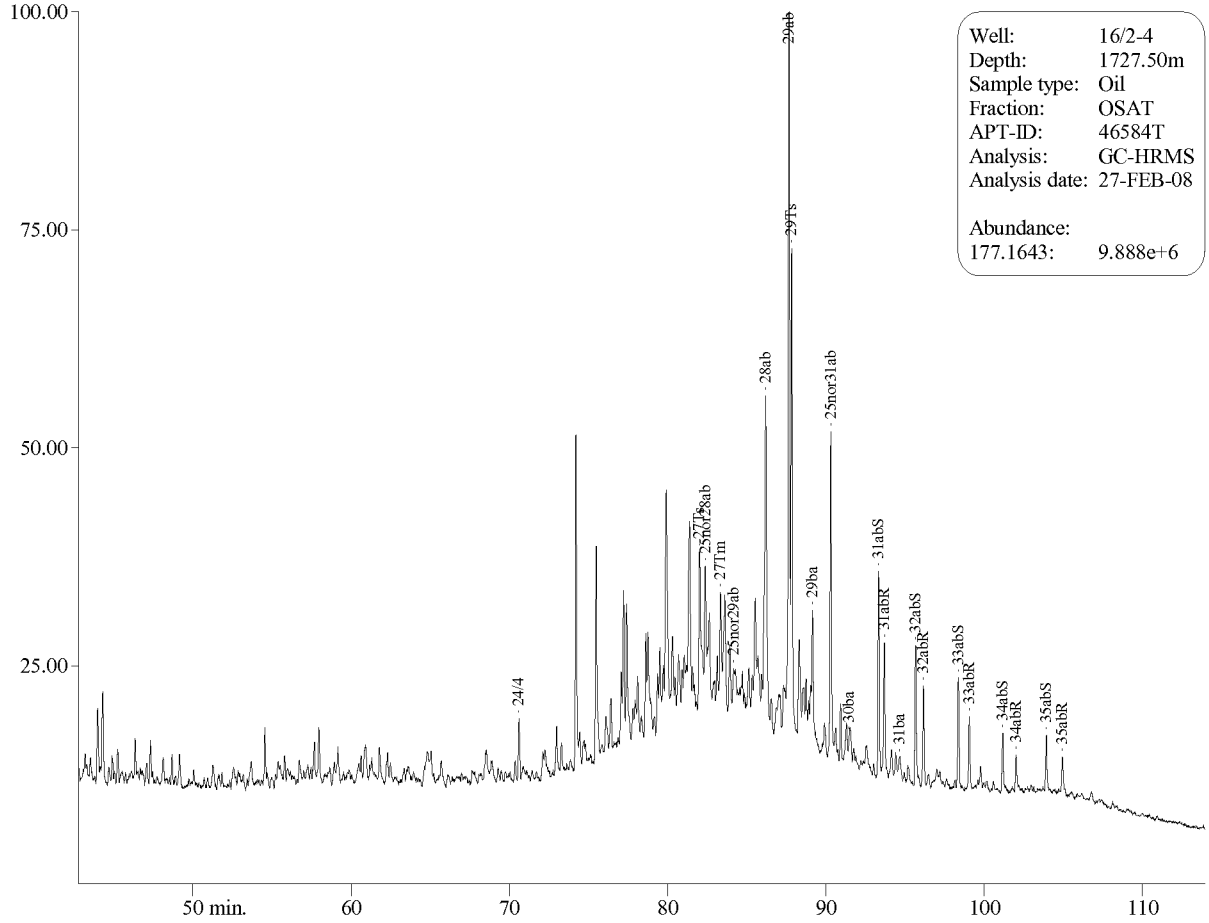

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
217.1956: 1.620e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27dbS
27dbR
27bbR+29dbS
29dbR
28bbS
27daR
27daS
28dbR#2
28daR
27aaS
27aaR
27bbS
29daR
29daS
28bbR
28aaR
28daS
28aaS
29aaS
30bbR
30aaR

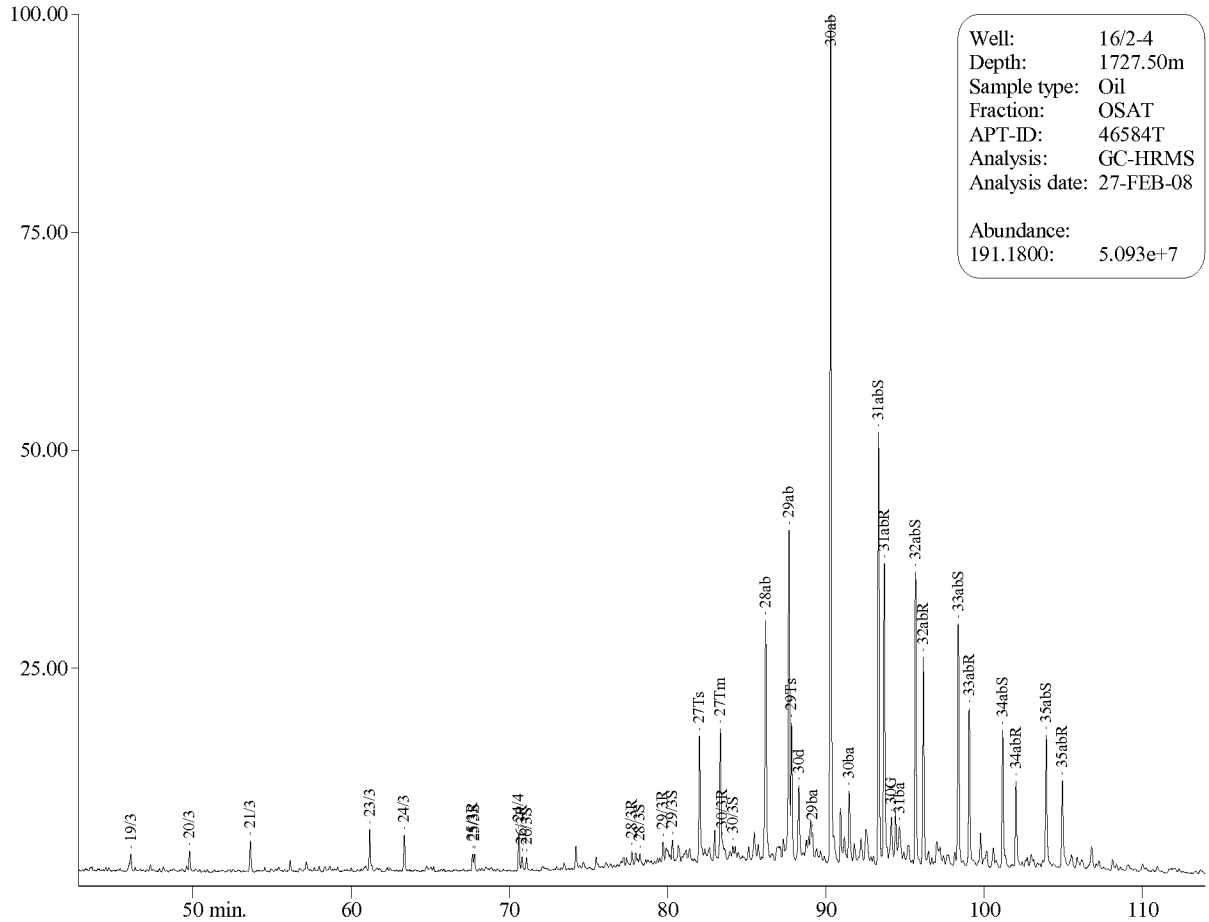

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
218.2035: 1.324e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27dbS
27dbR
27aaS
27aaR
28bbS
28bbR
29aaS
29aaR
30aaR

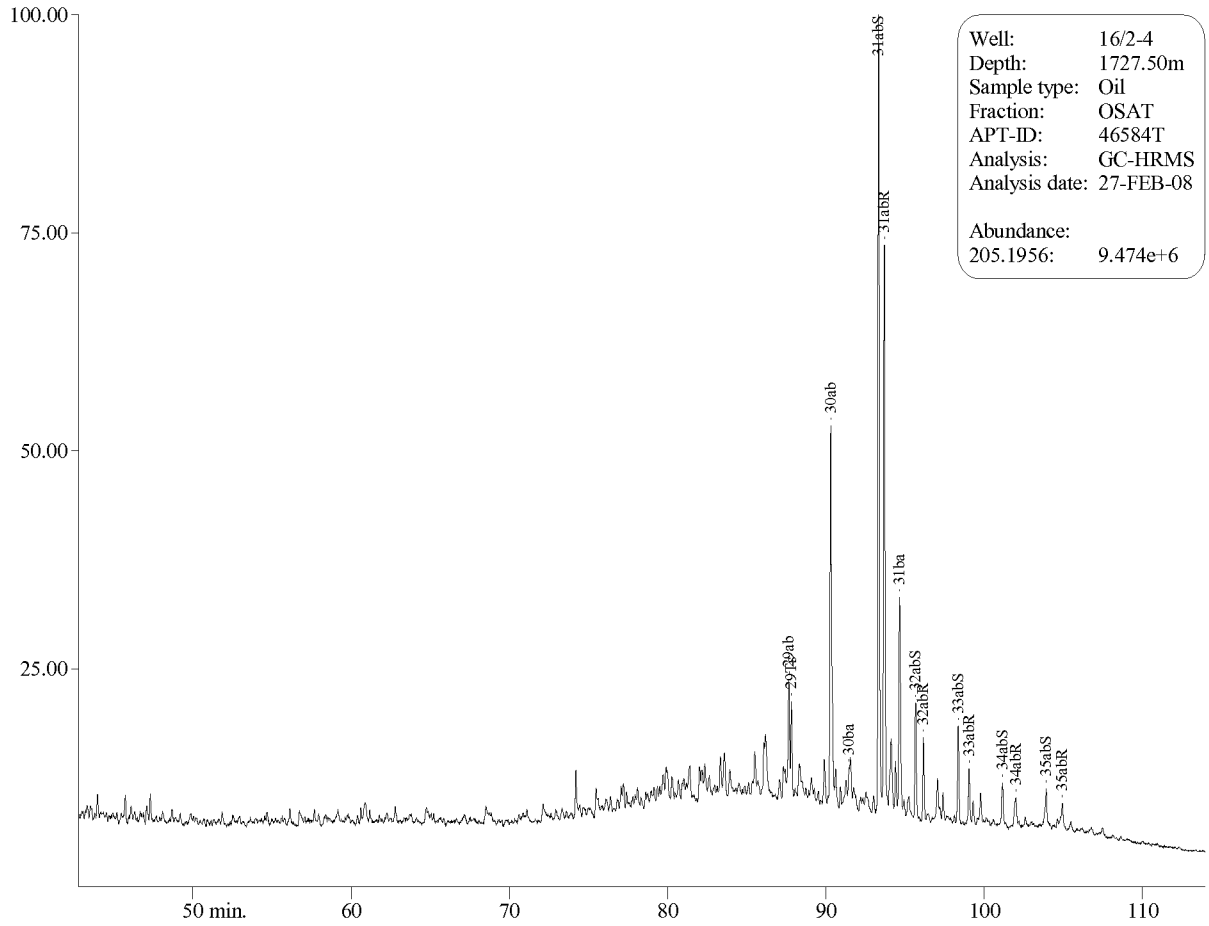

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
231.2113: 5.673e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100

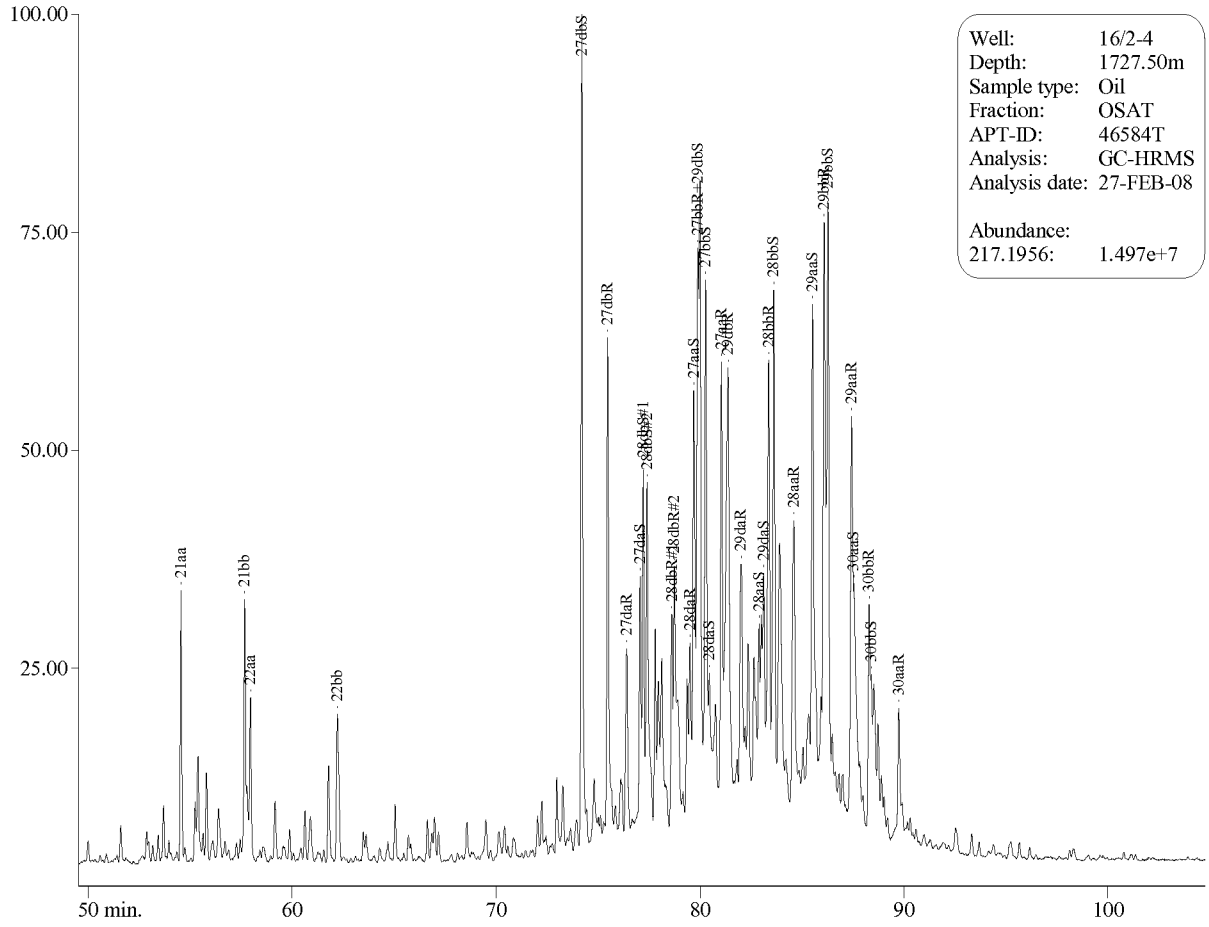

100.00
75.00
50.00
25.00
27dbS
27dbR
27bbR+29dbS
29dbR
29daR
29daS
28daR
27daR
27daS
28daS
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
259.2426: 1.176e+7
50 min.
60
70
80
90
100

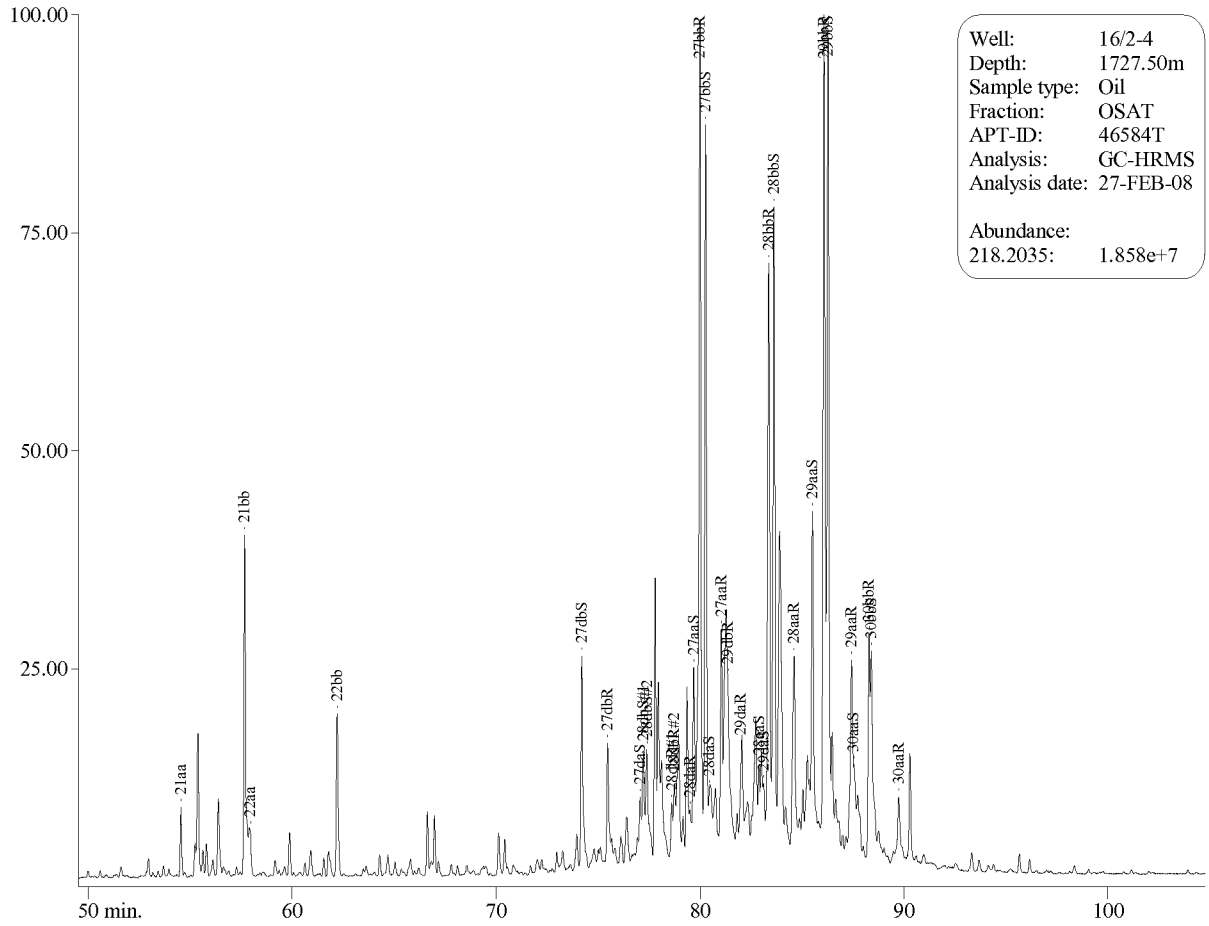

100.00
75.00
50.00
25.00
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
253.1956+253.2895: 1.450e+7
40 min.
50
60
70
80
90
100

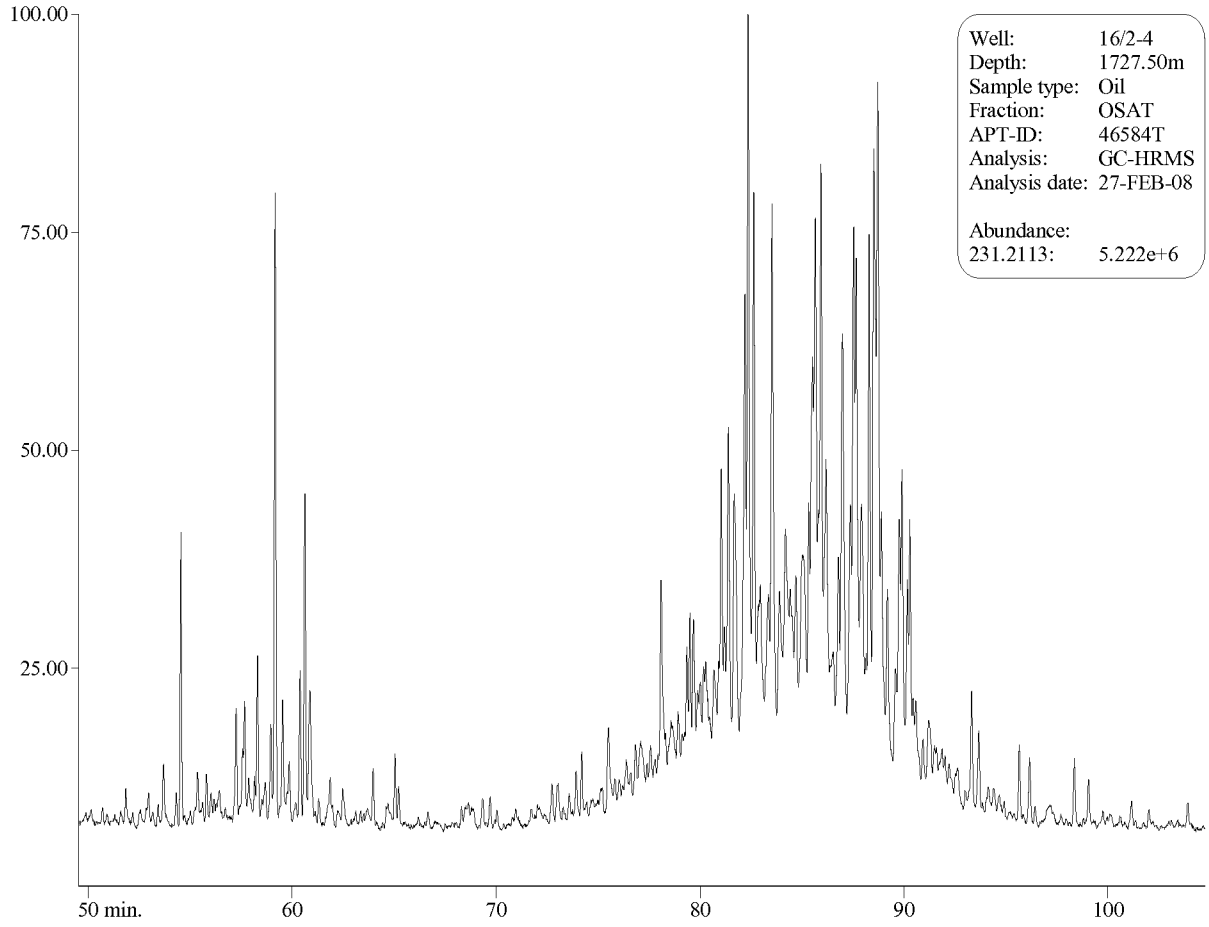

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
177.1643: 9.888e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
29ab
29Ts
28ab
25nor31ab
31abS
29ba
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
30ba
31ba
24/4
27Ts
25nor28ab
27Tm
25nor29ab

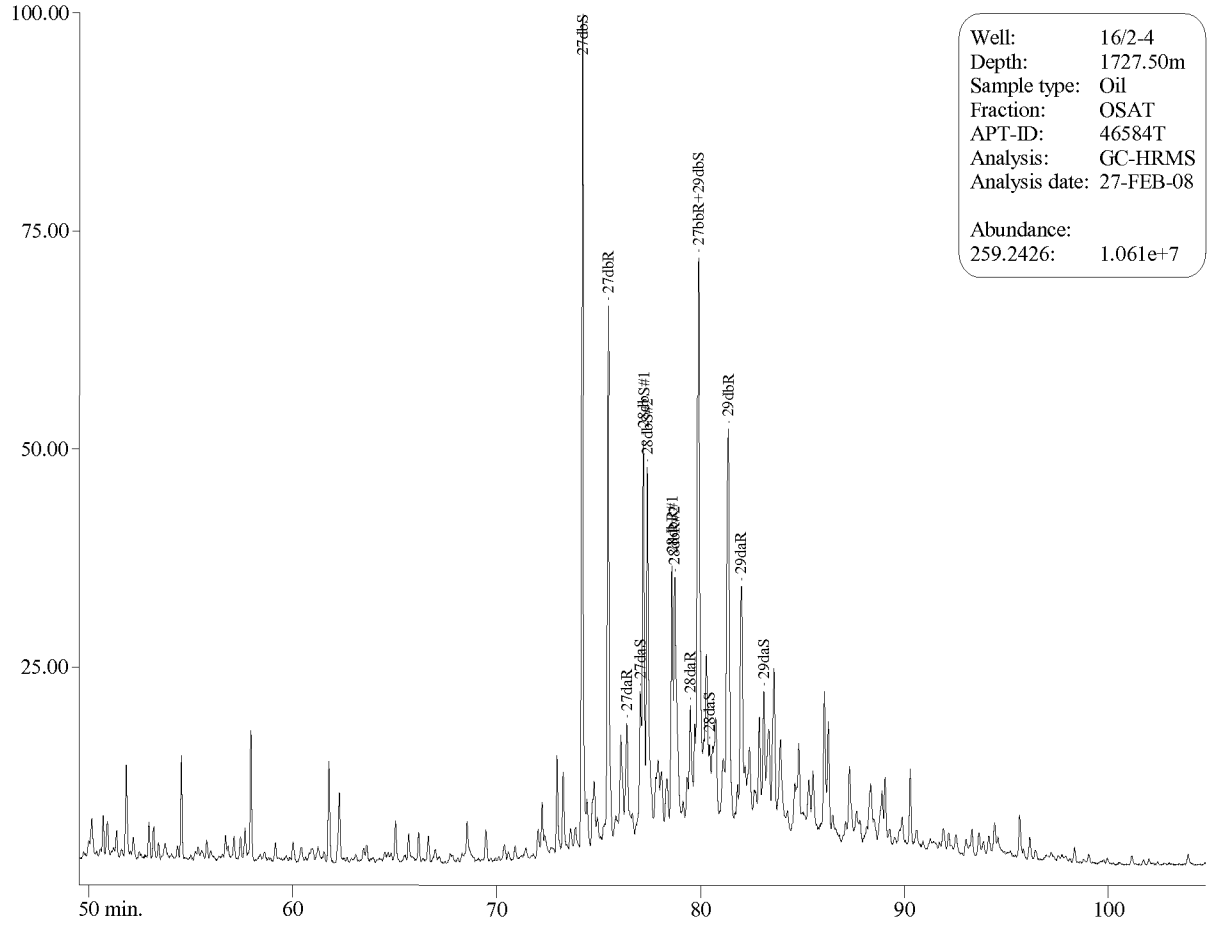

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
191.1800: 5.093e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
30ab
31abS
31abR
29ab
32abS
32abR
28ab
33abS
33abR
29Ts
34abS
34abR
35abS
35abR
27Ts
27Tm
30d
30ba
29ba
31ba
19/3
20/3
21/3
23/3
24/3

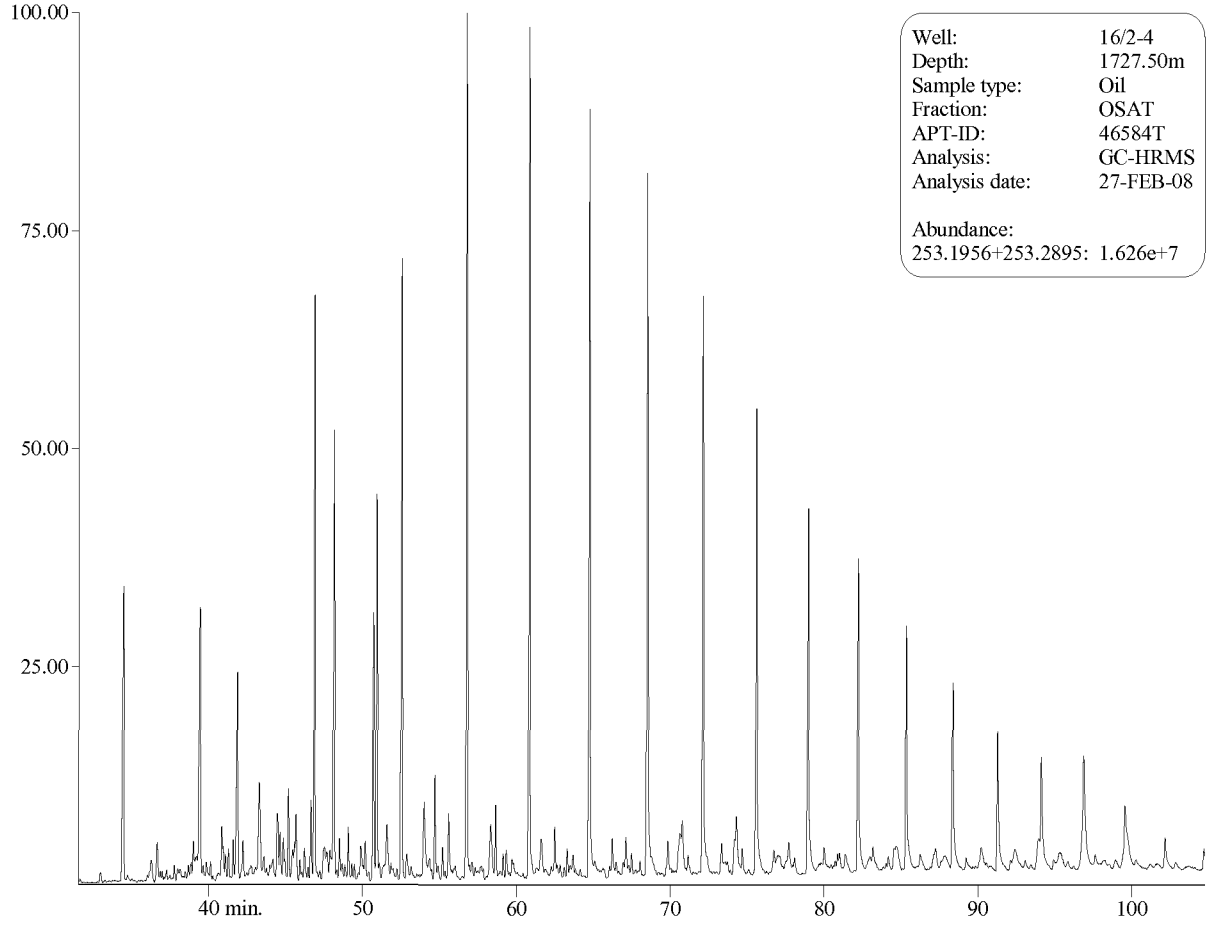

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
205.1956: 9.474e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
31abS
31abR
30ab
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
30ba

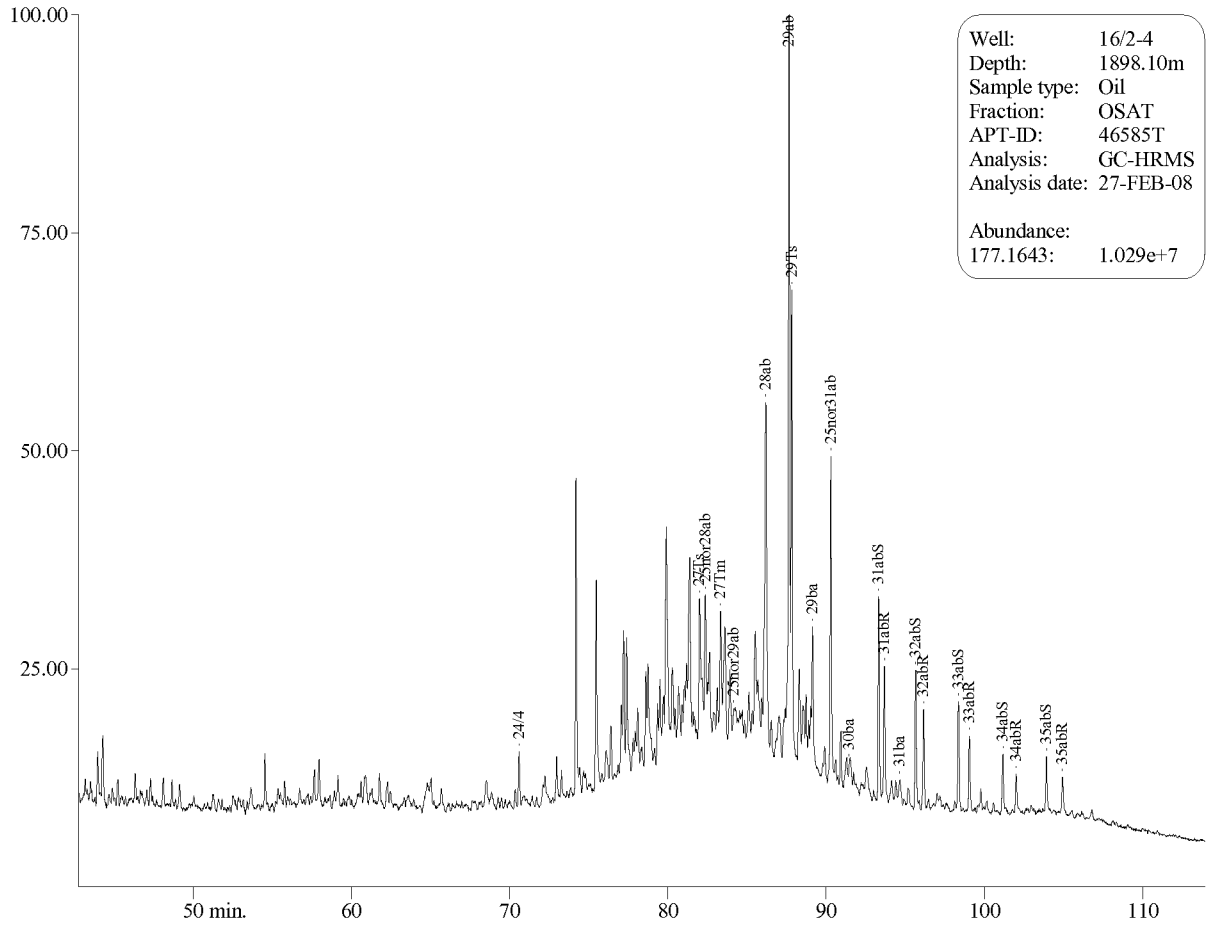

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
217.1956: 1.497e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27aaS
27daR
27daS
28bbS
28bbR
29aaS
29aaR
29daR
29daS
28aaS
28aaR
30aaS
30bbR
30bbS
30aaR
21aa
21bb
22aa
22bb

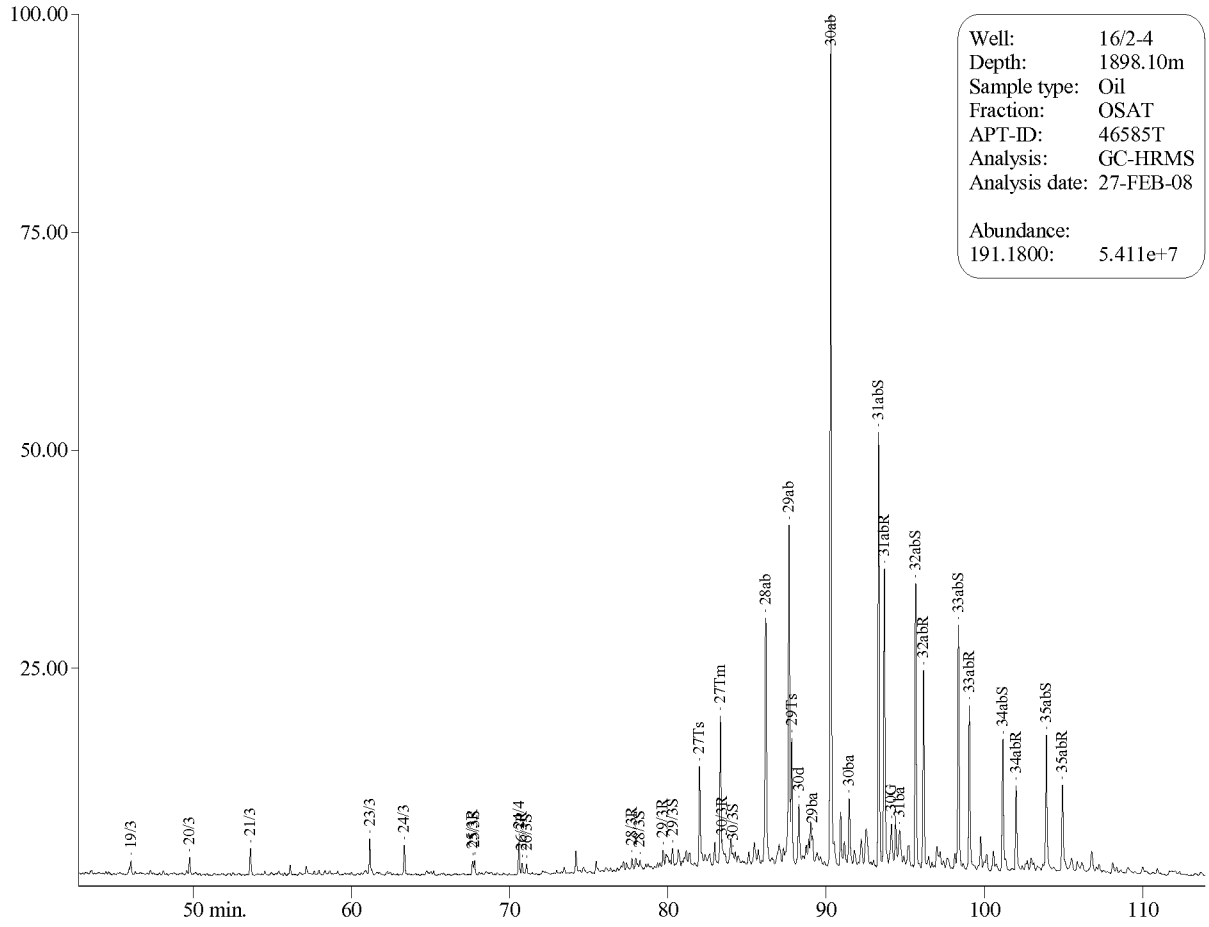

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
218.2035: 1.858e+7
21aa
21bb
22aa
22bb
27dbS
27dbR
27daS
27aaS
27aaR
28bbR
28aaR
29aaS
29aaR
30aaS
30aaR

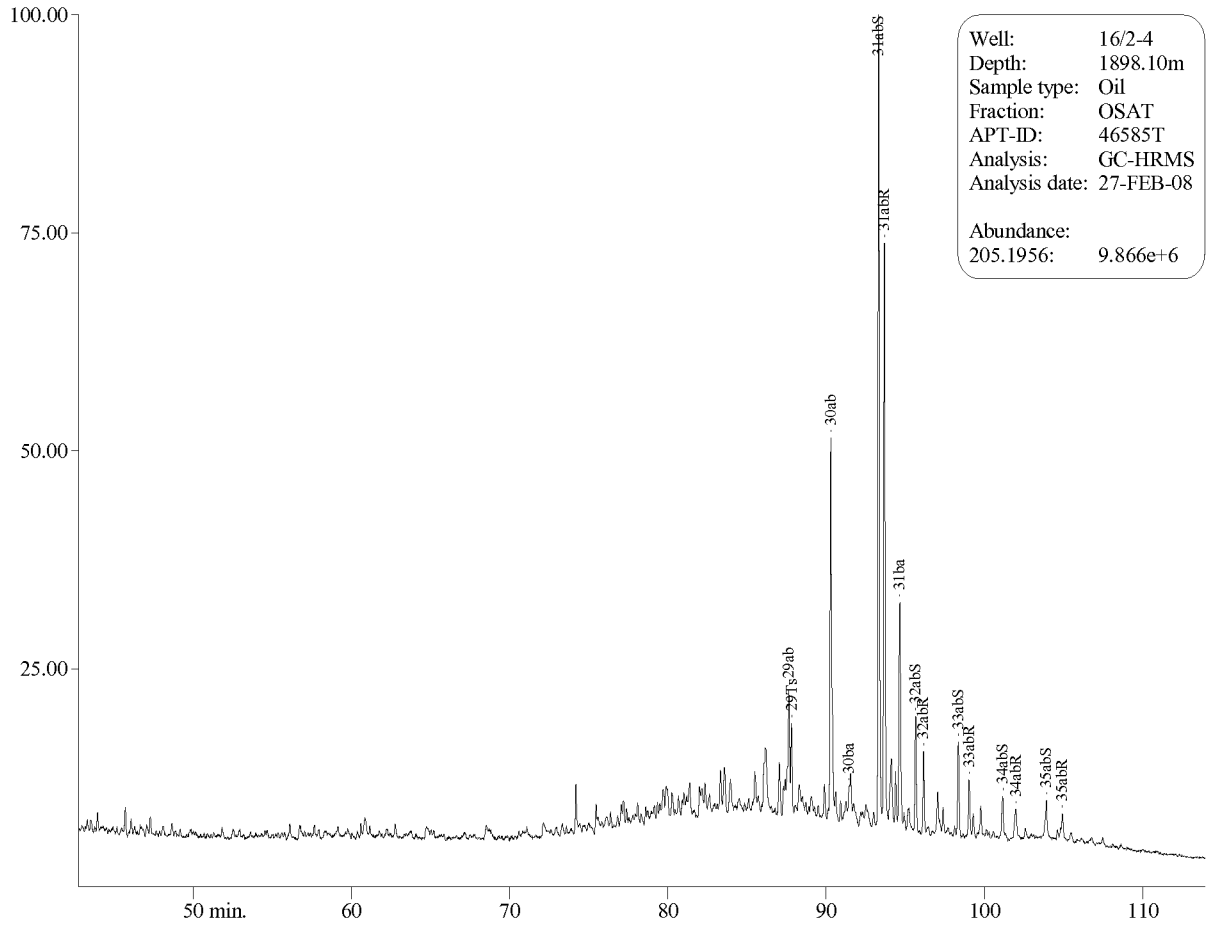

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
231.2113: 5.222e+6

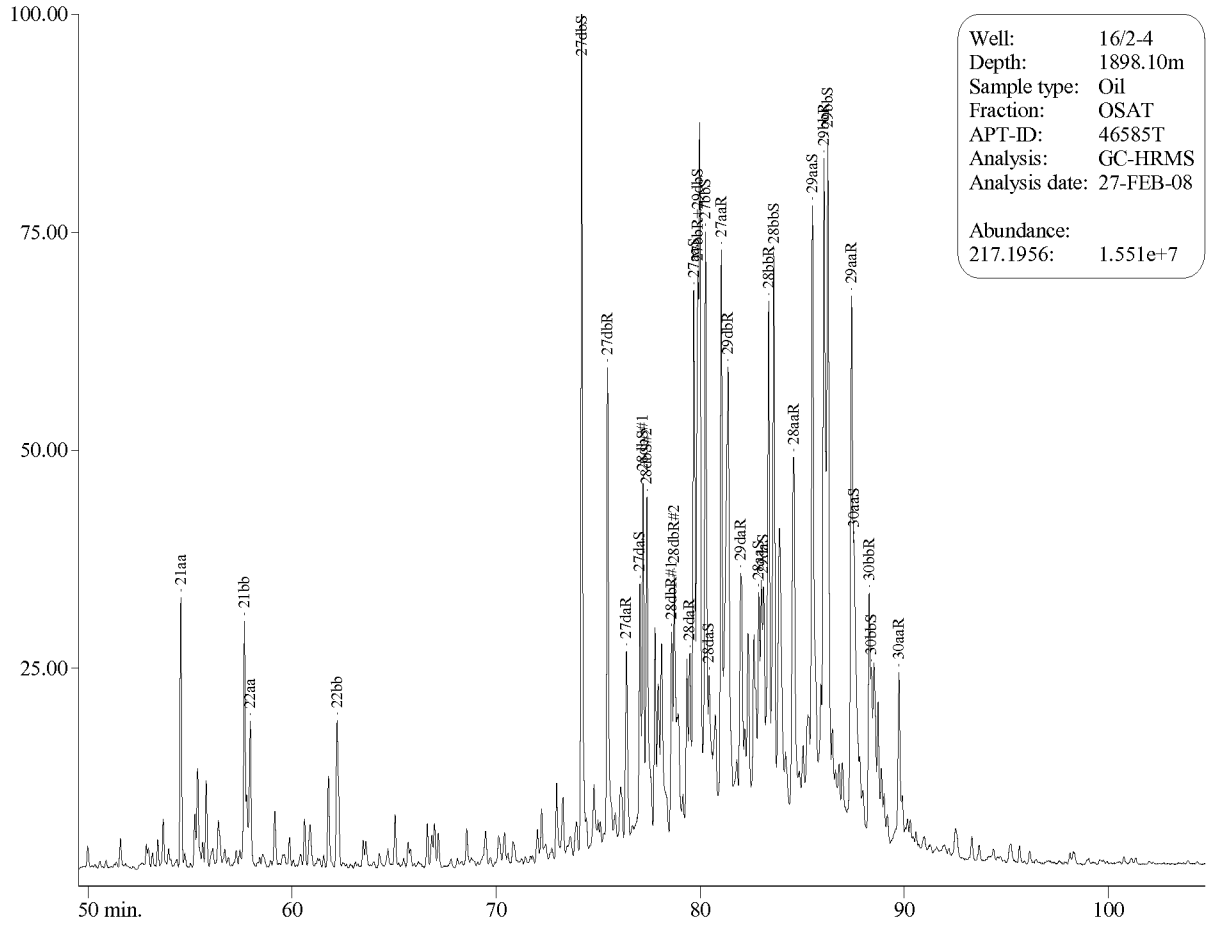

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
259.2426: 1.061e+7
27dbS
27dbR
27dbR+29dbS
29dbR
28dbS#1
27daR
27daS
28daR
28daS
29daR
29daS
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100

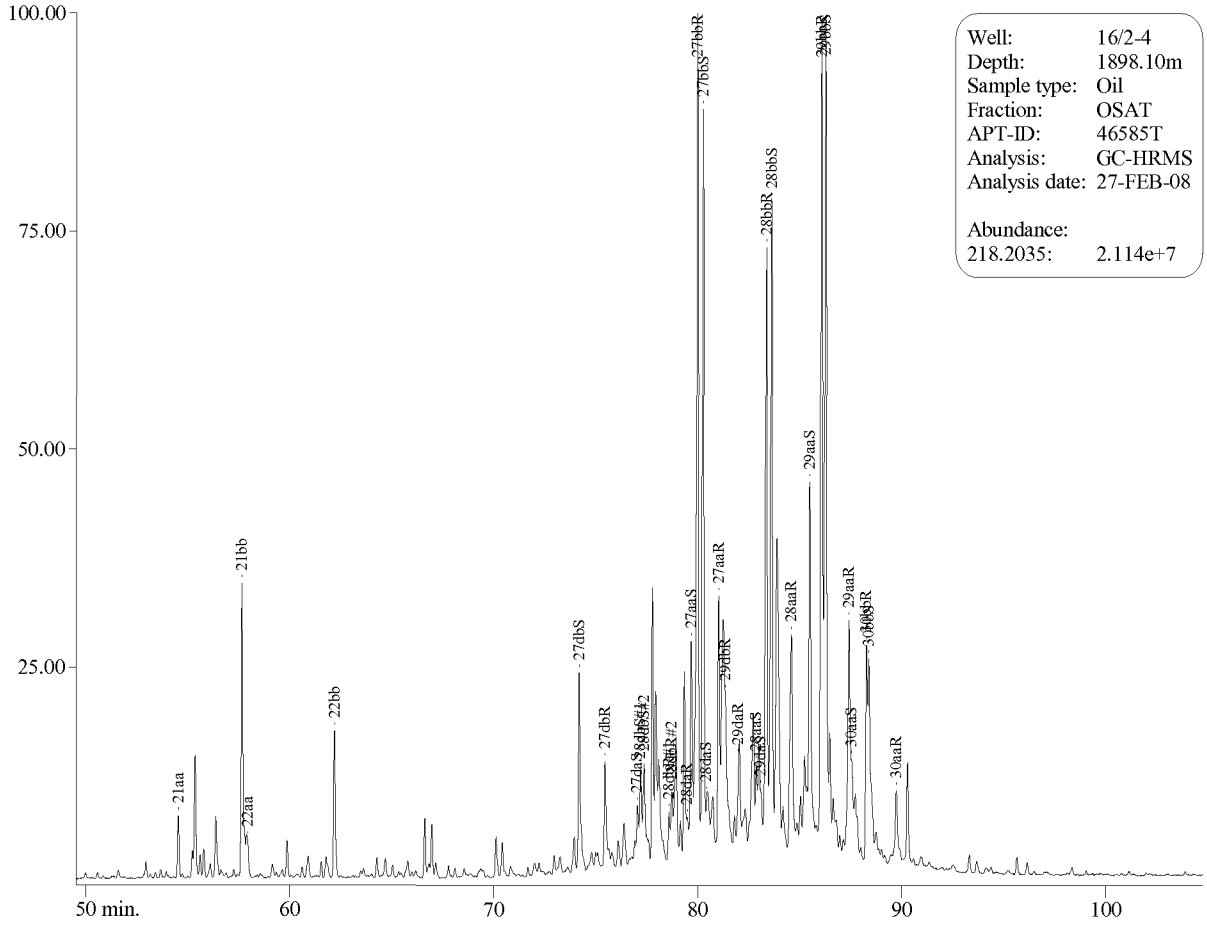

Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OSAT
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
253.1956+253.2895: 1.626e+7
100.00
75.00
50.00
25.00
40 min.
50
60
70
80
90
100

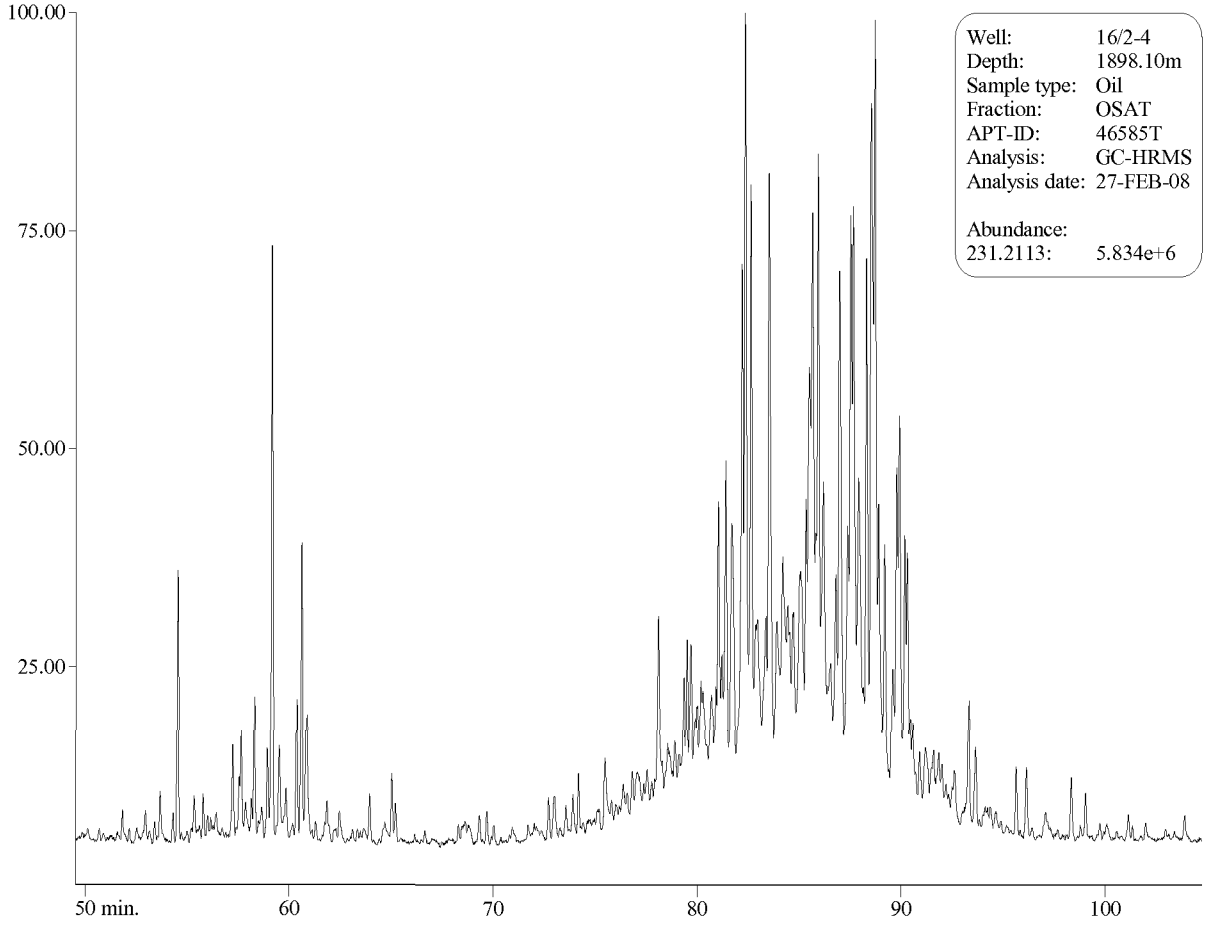

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
177.1643: 1.029e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
24/4
25Ts
25nor28ab
27Tm
25nor29ab
28ab
29Ts
29ba
25nor31ab
30ba
31ba
31abS
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

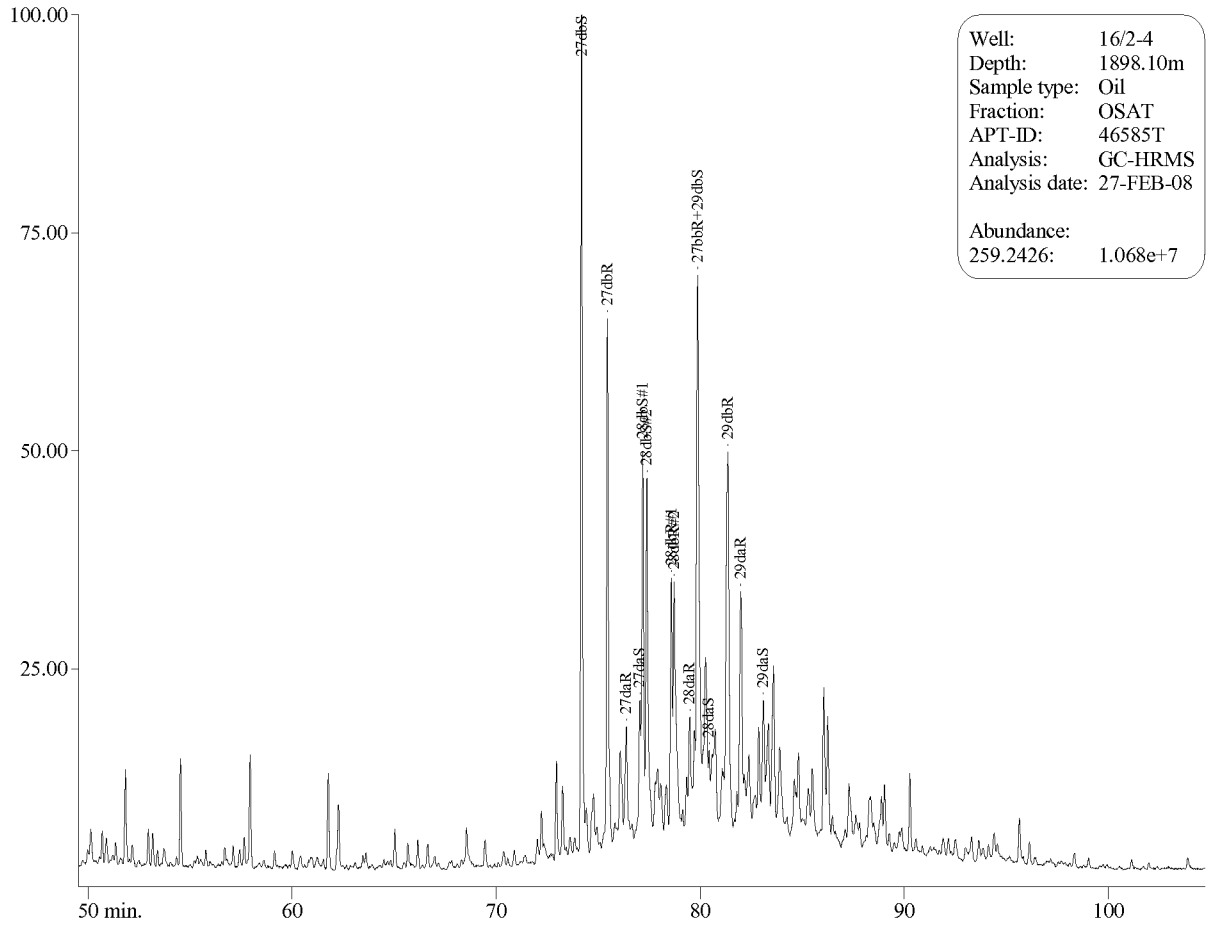

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
191.1800: 5.411e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
19/3
20/3
21/3
23/3
24/3
27Ts
27Tm
28ab
29ab
29Ts
30d
29ba
30ab
30ba
31abS
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

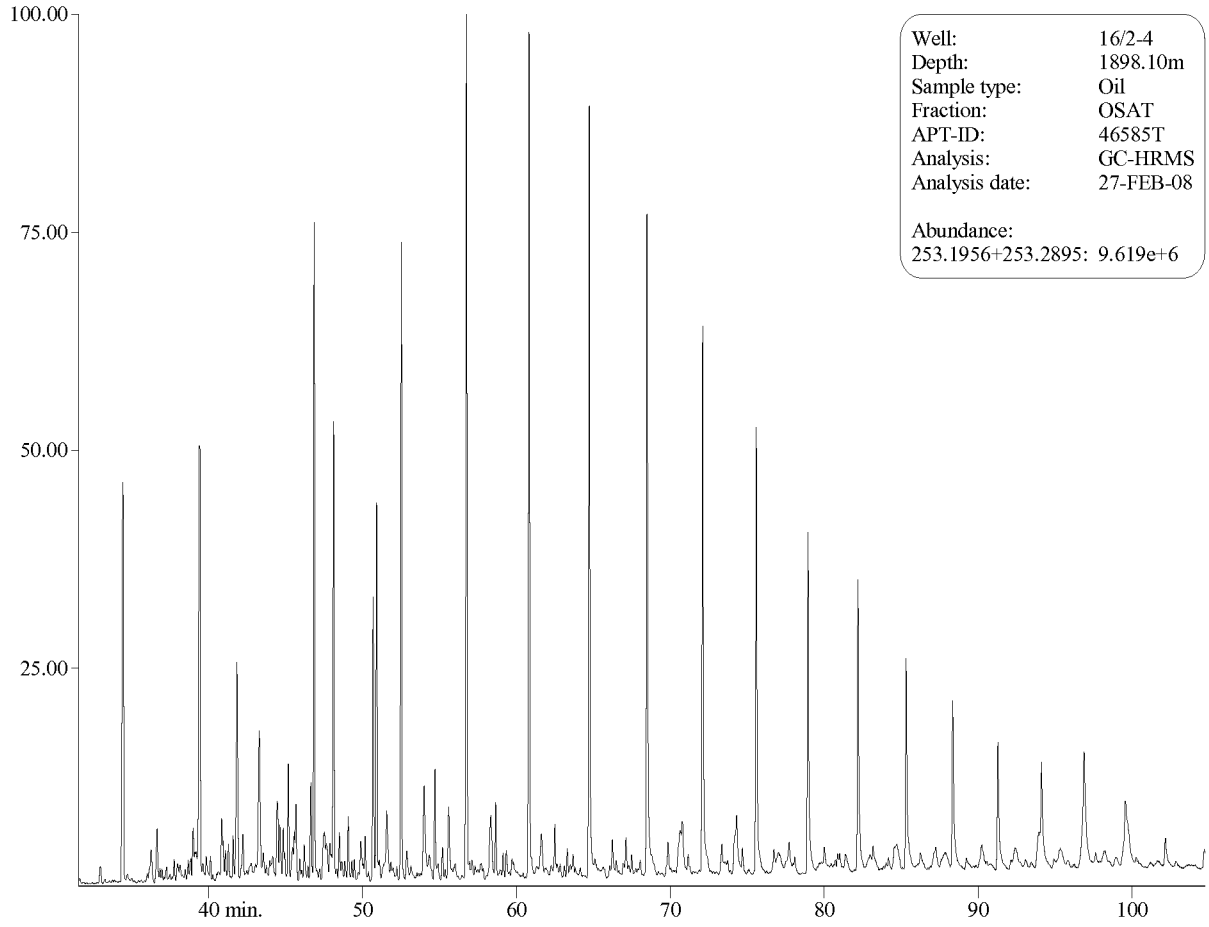

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
205.1956: 9.866e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
29Ts
29ab
30ab
30ba
31abS
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

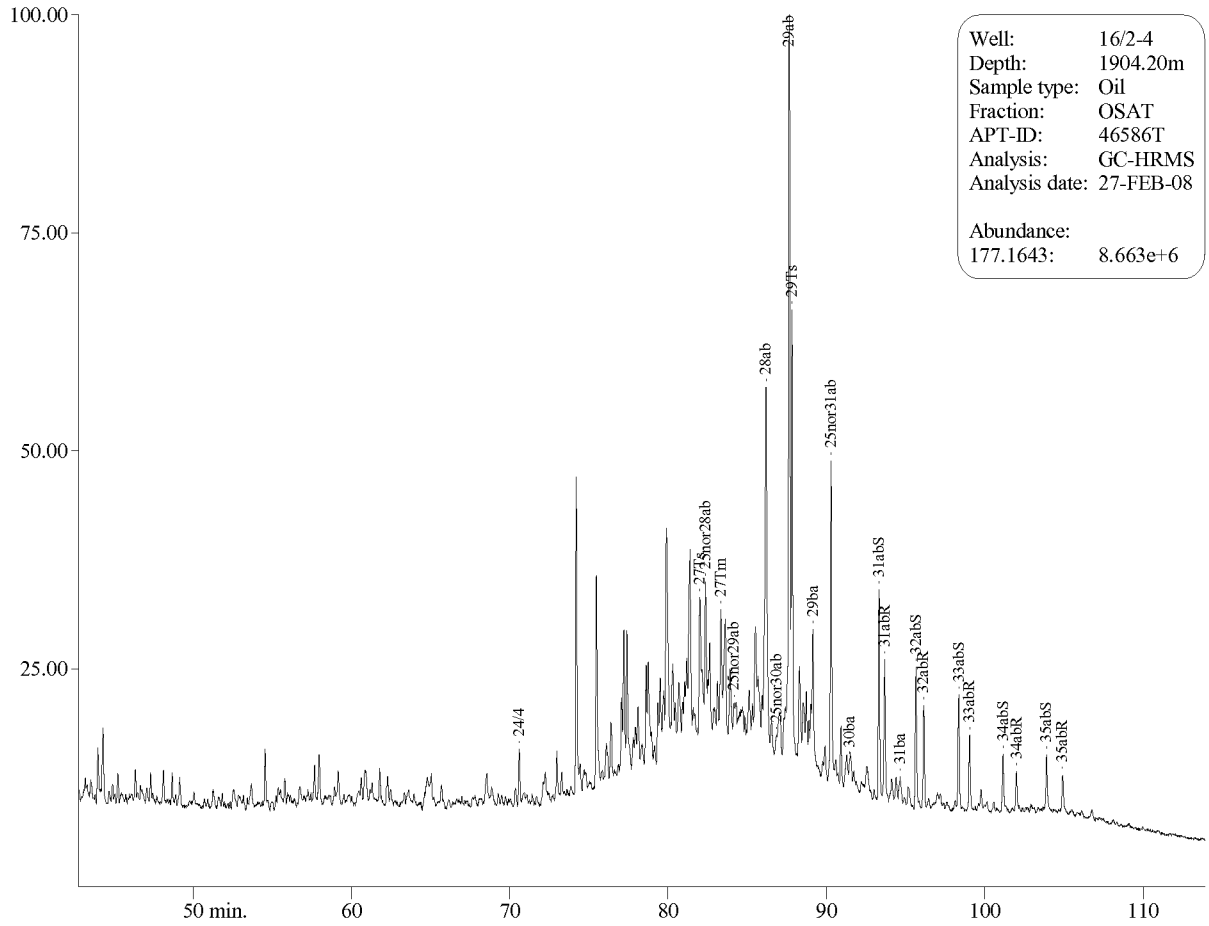

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
217.1956: 1.551e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27daR
27dbR
27daS
28dbR#2
28daR
28daS
29daR
29dbR
28aaR
28bbR
28bbS
27aaR
29aaS
29aaR
30aaS
30bbR
30bbS
30aaR

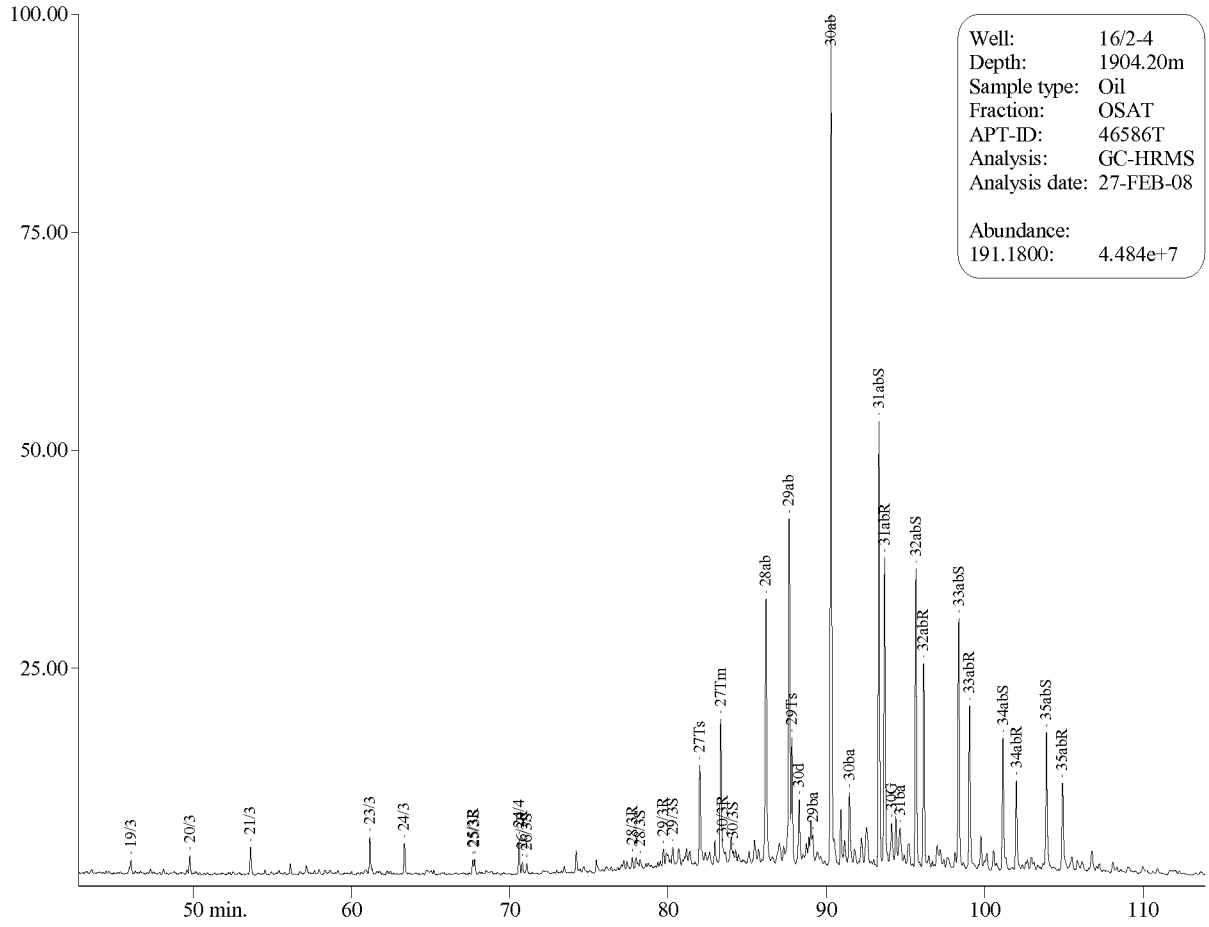

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
218.2035: 2.114e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27dbS
27dbR
27aaS
27aaR
28aaR
29aaS
29aaR
30aaR

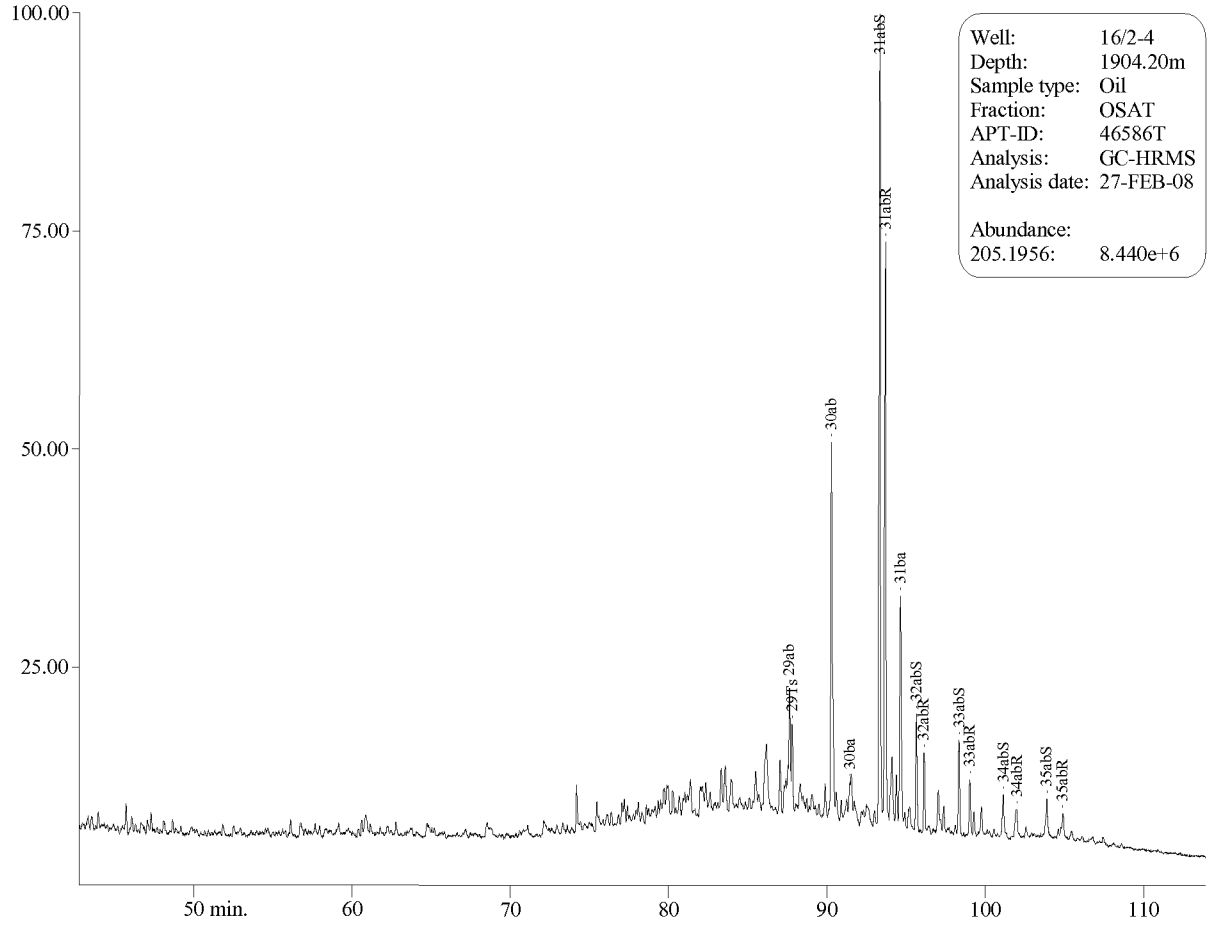

Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
231.2113: 5.834e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100

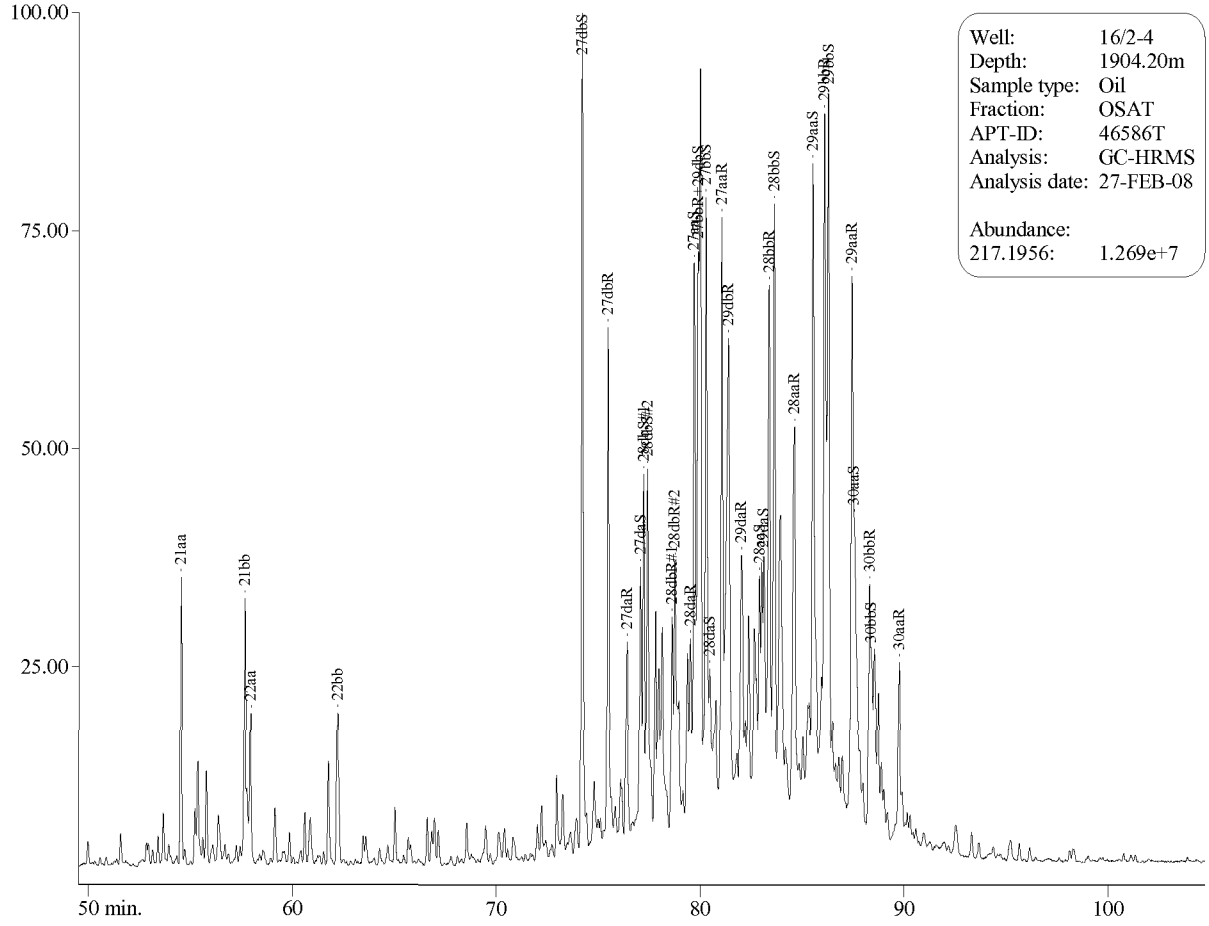

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
27daS
28daR
28daS
27bbR+29dbS
29dbR
29daR
29daS
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
259.2426: 1.068e+7

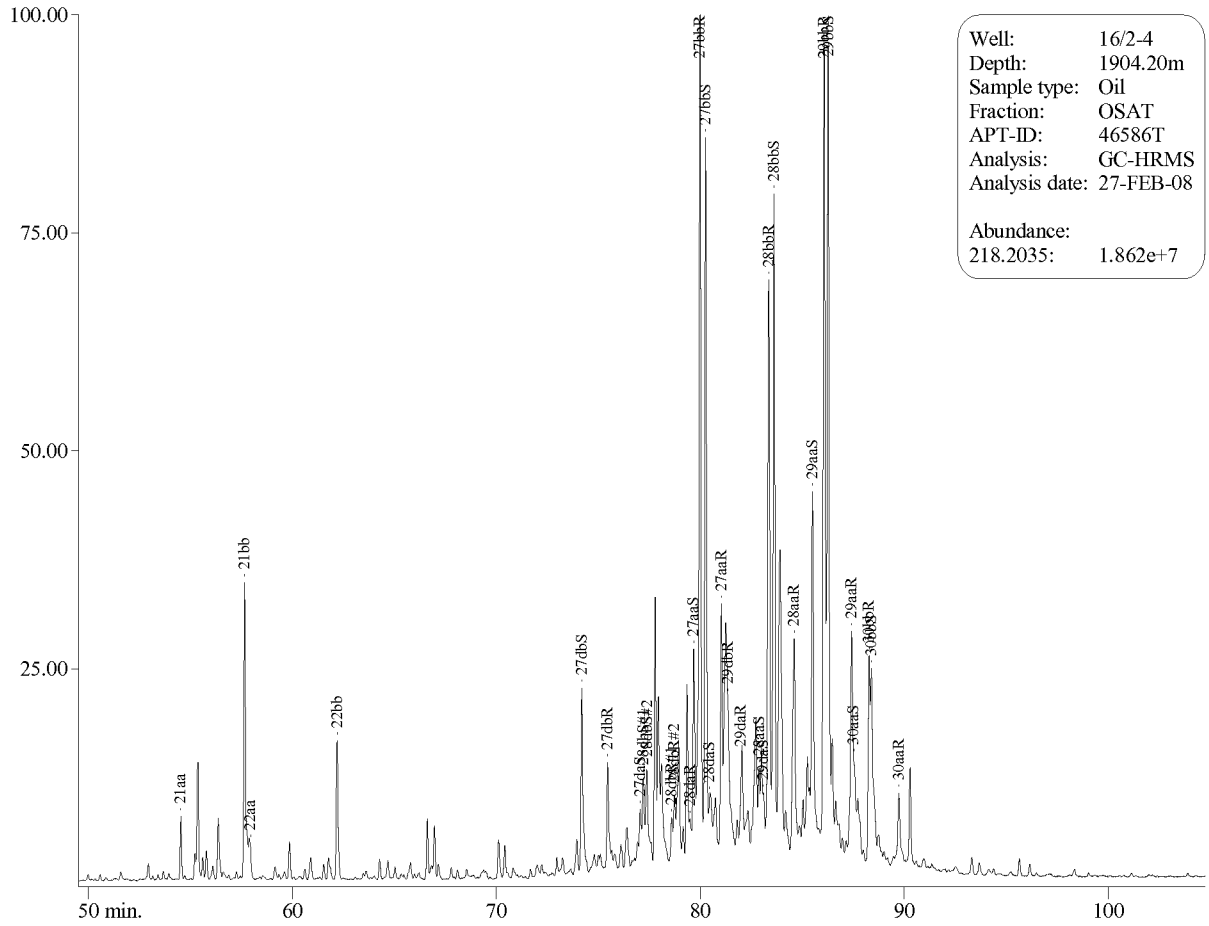

100.00
75.00
50.00
25.00
40 min.
50
60
70
80
90
100
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OSAT
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
253.1956+253.2895: 9.619e+6

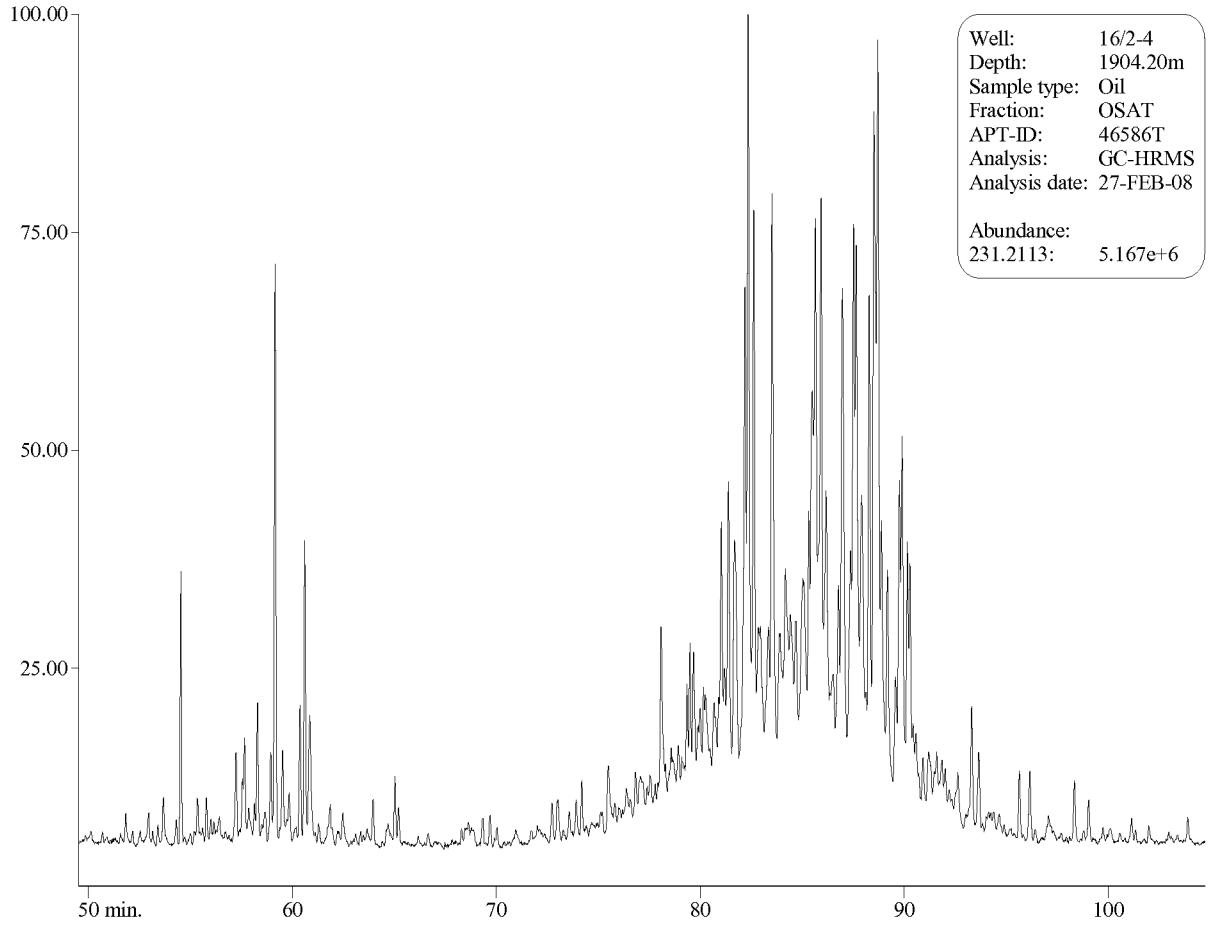

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
177.1643: 8.663e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
29ab
29Ts
28ab
25nor31ab
31abS
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
30ba
31ba
29ba
27Ts
27Tm
25nor28ab
25nor29ab
25nor30ab
24/4

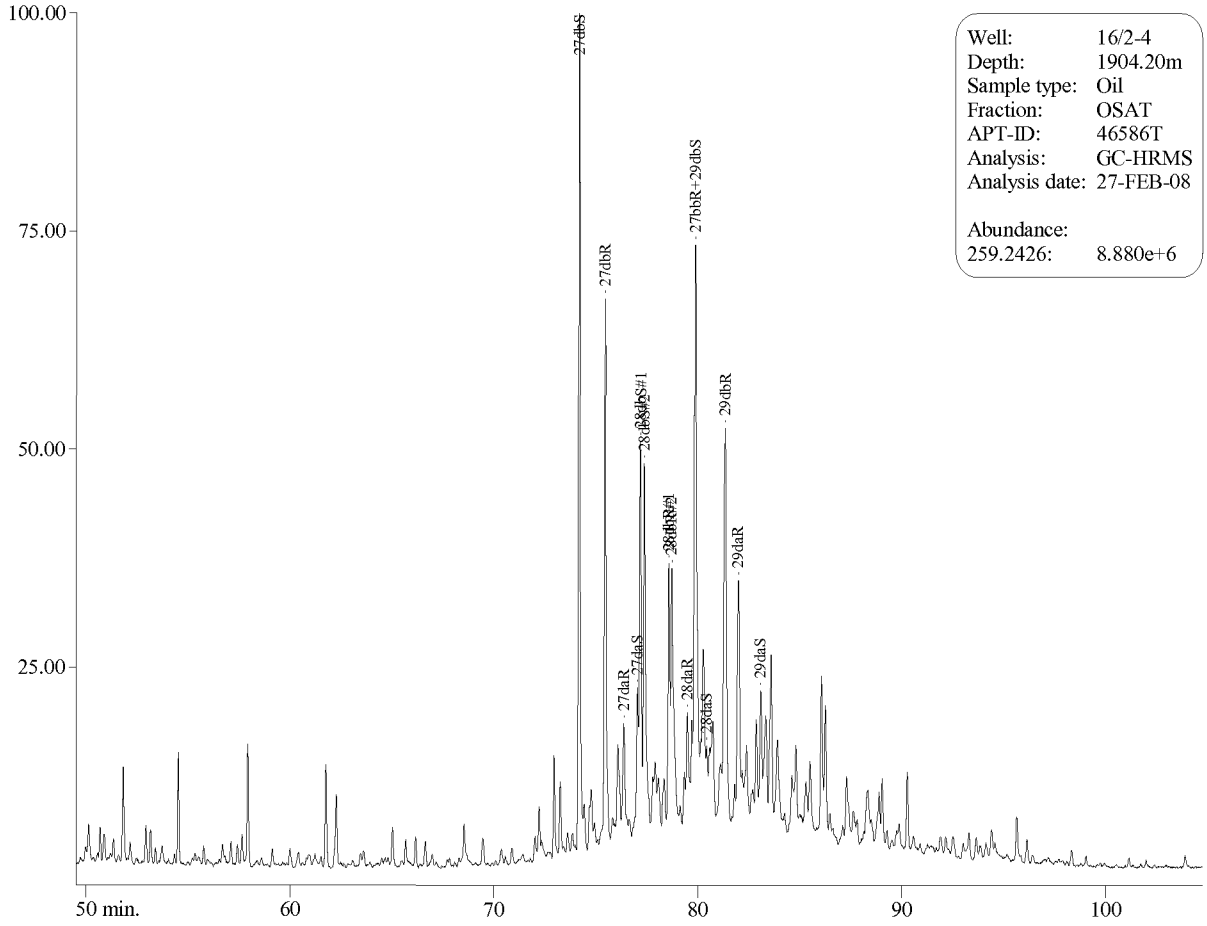

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
191.1800: 4.484e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
30ab
31abS
31abR
29ab
32abS
32abR
28ab
33abS
33abR
34abS
34abR
35abS
35abR
29Ts
27Tm
27Ts
30ba
30d
29ba
31ba
19/3
20/3
21/3
23/3
24/3

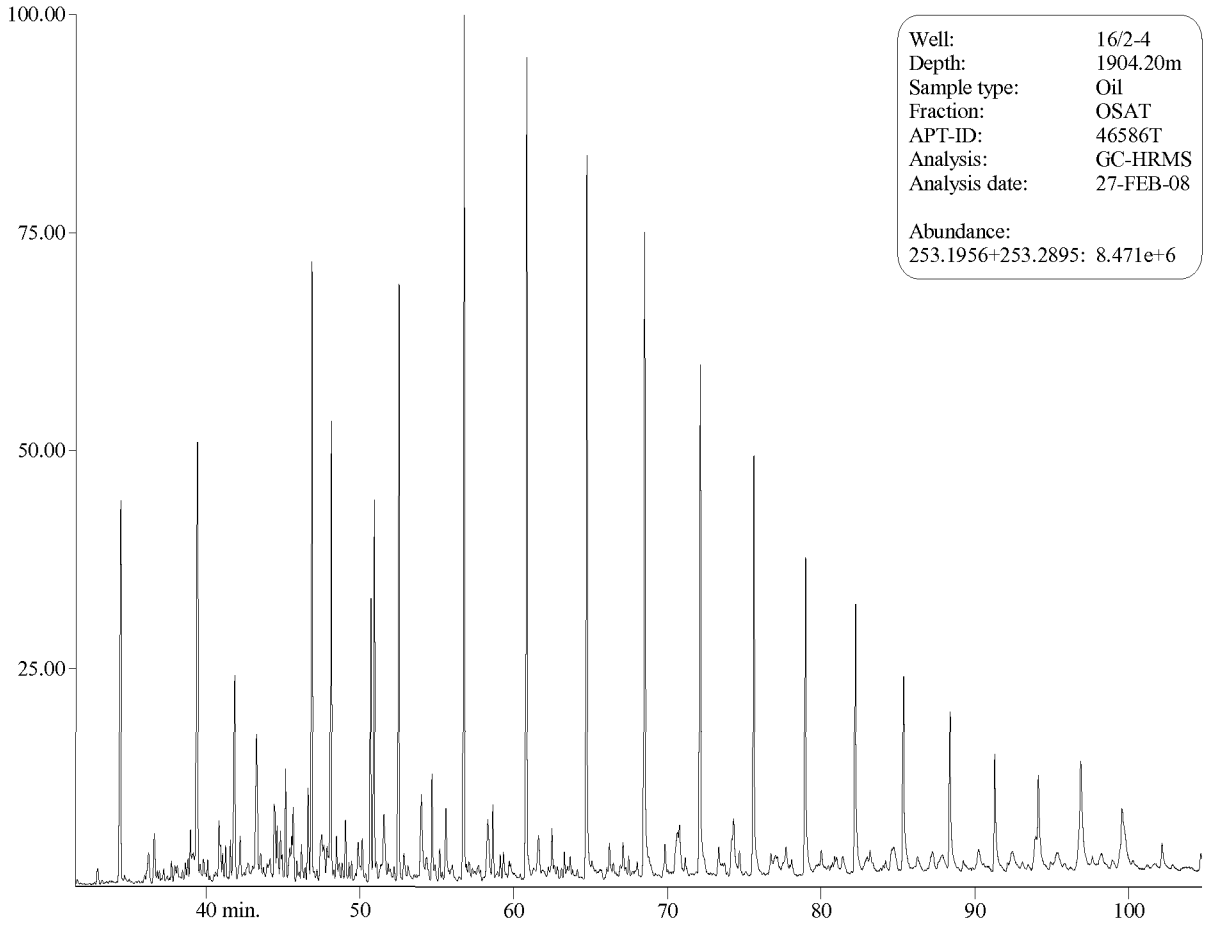

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
205.1956: 8.440e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
31abS
31abR
30ab
31ba
29ab
30ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

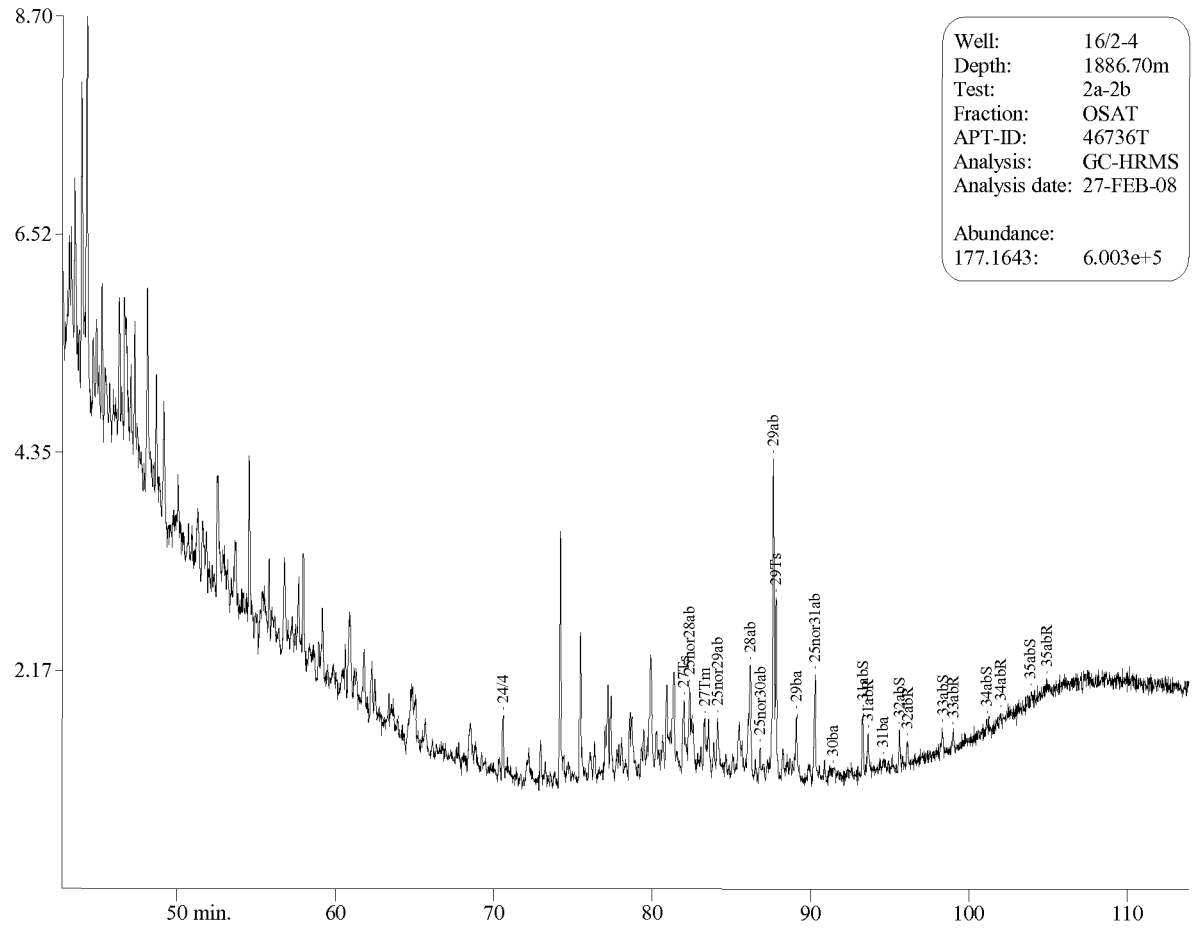

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
217.1956: 1.269e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
28bbS
28aaR
29aaS
29aaR
30bbR
30aaR
21aa
21bb
22aa
22bb

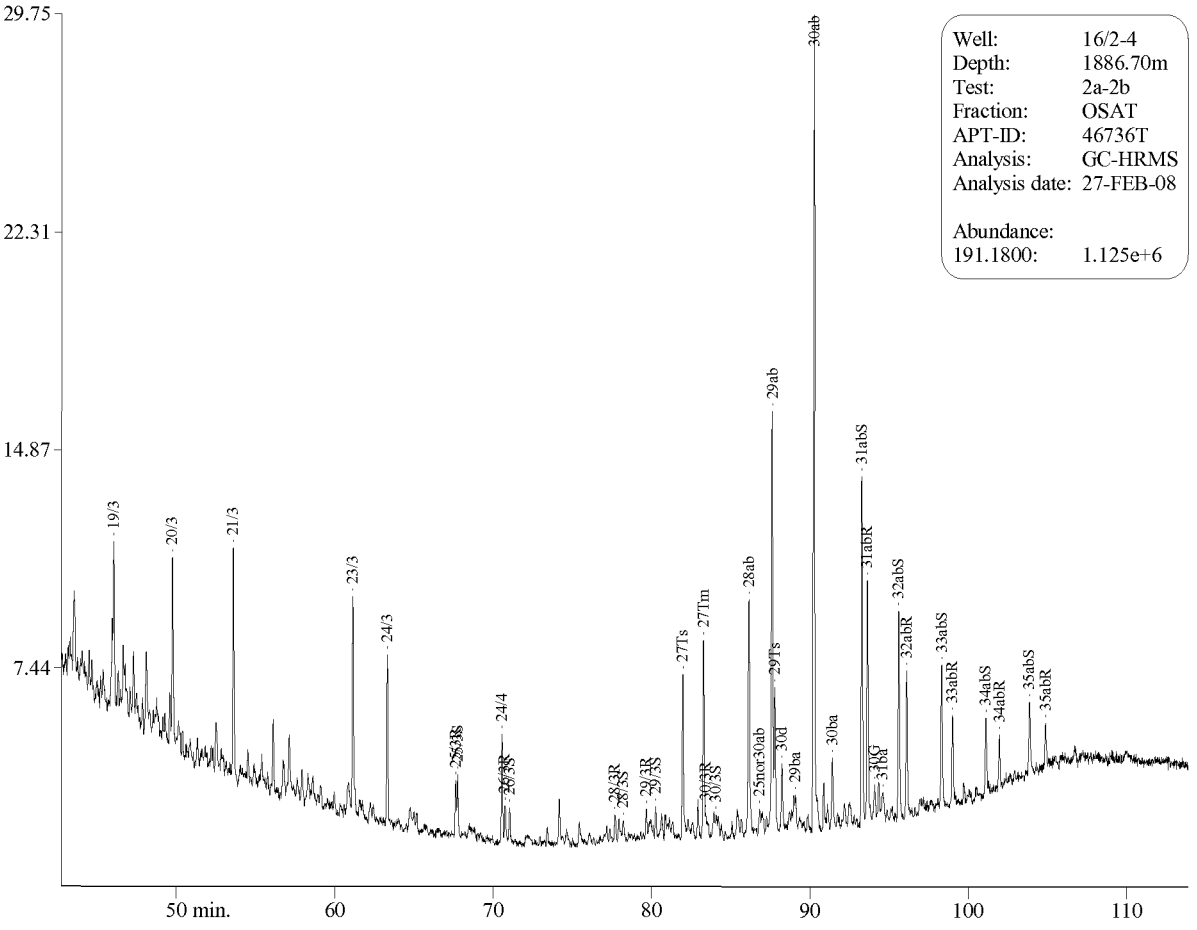

100.00
75.00
50.00
25.00
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
218.2035: 1.862e+7
21aa
21bb
22aa
22bb
27dbS
27dbR
27aaS
27aaR
28aaR
29aaS
29aaR
30aaR
50 min.
60
70
80
90
100

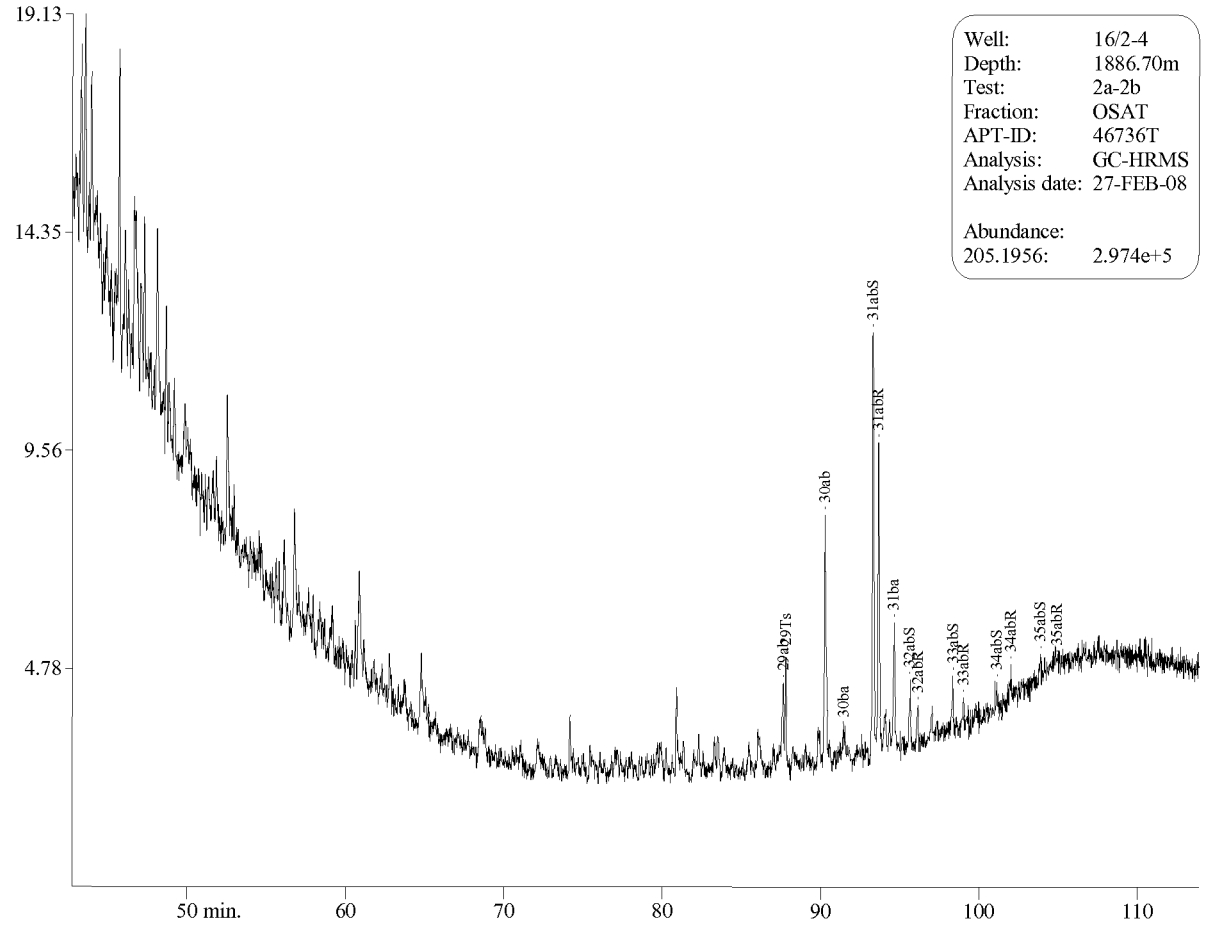

100.00
75.00
50.00
25.00
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
231.2113: 5.167e+6
50 min.
60
70
80
90
100

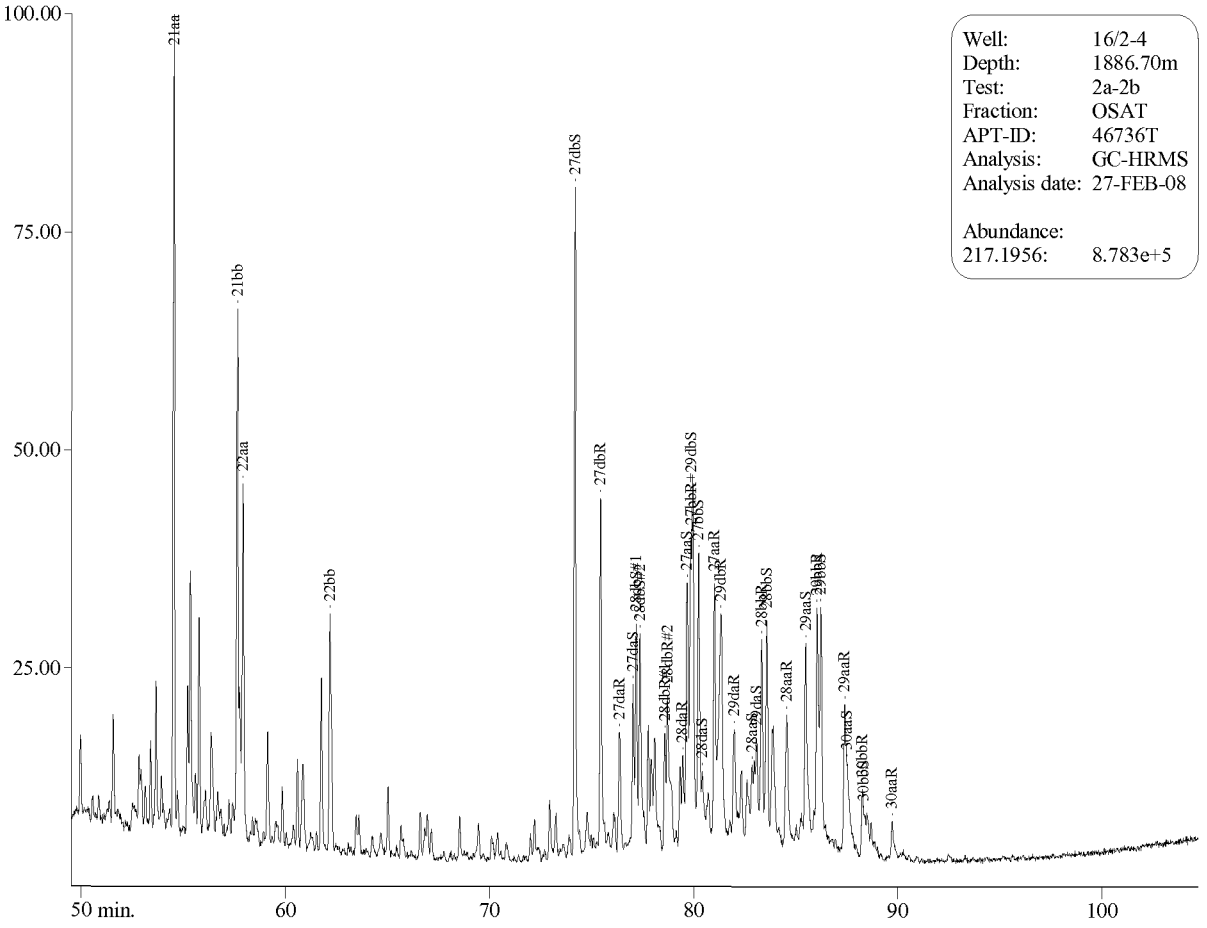

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
27daS
28daR
28daS
27bbR+29dbS
29dbR
29daR
29daS
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
259.2426: 8.880e+6

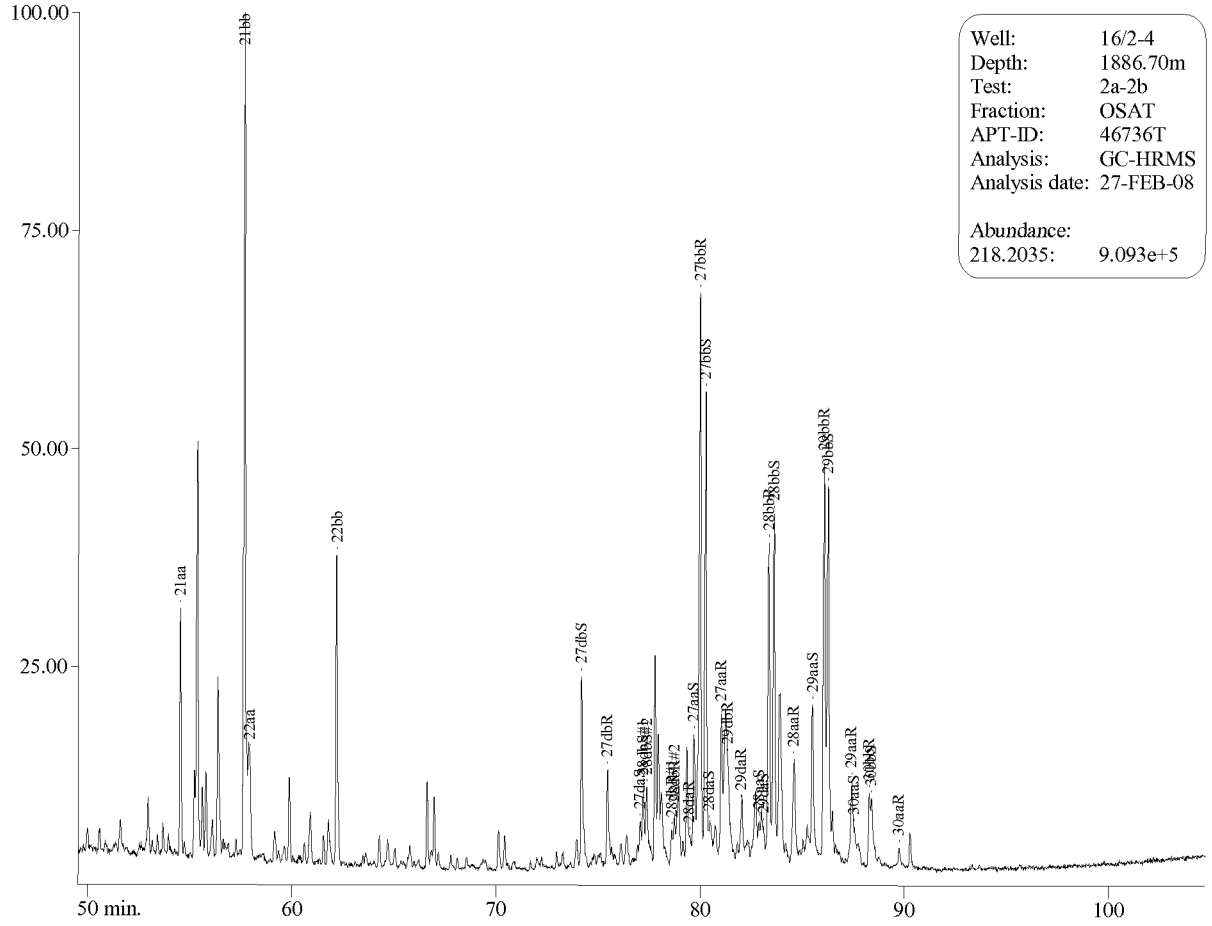

100.00
75.00
50.00
25.00
40 min.
50
60
70
80
90
100
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OSAT
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
253.1956+253.2895: 8.471e+6

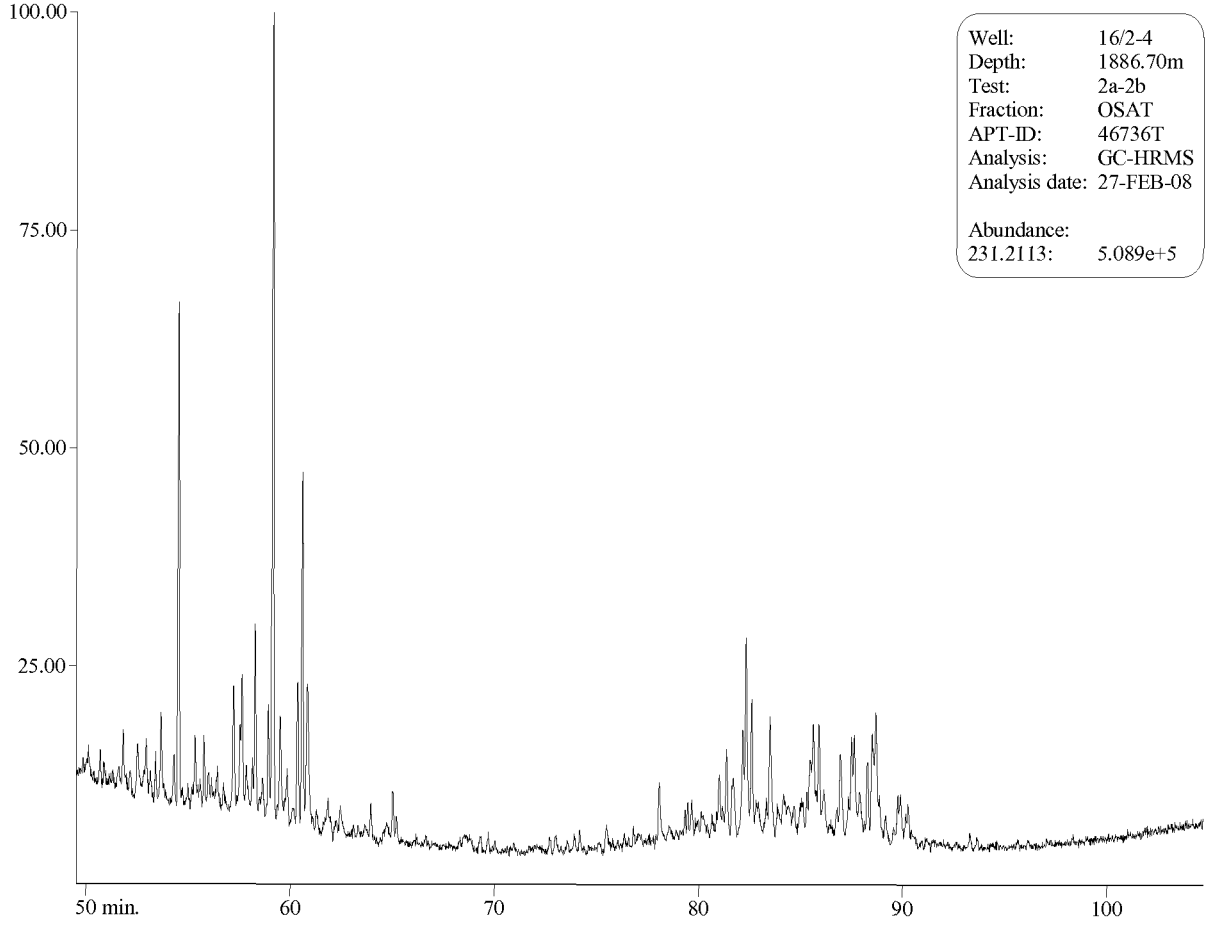

8.70
6.52
4.35
2.17
50 min.
60
70
80
90
100
110
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
177.1643: 6.003e+5
24/4
25nor28ab
27Ts
27Tm
25nor29ab
28ab
25nor30ab
29ab
29Ts
25nor31ab
29ba
30ba
31abS
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

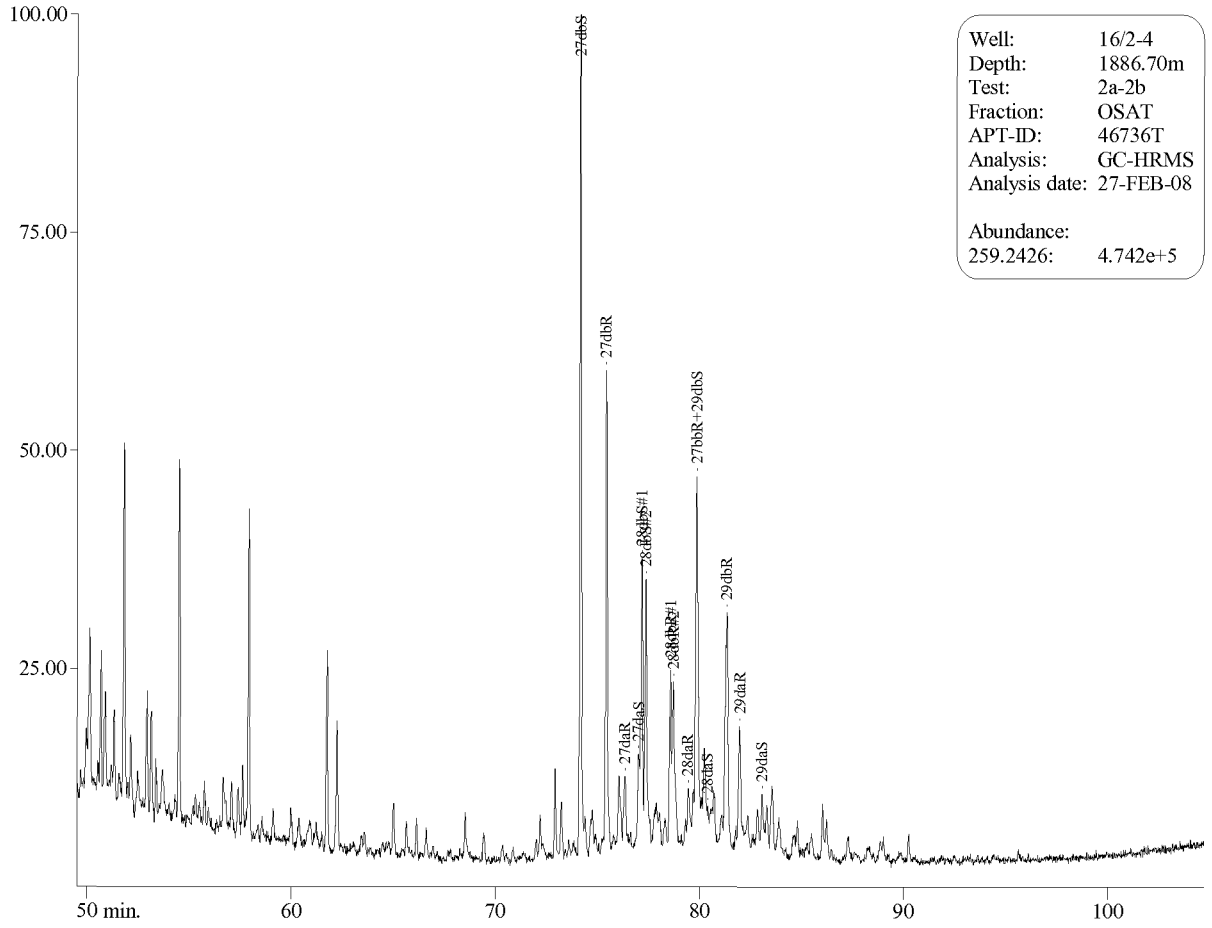

29.75
22.31
14.87
7.44
50 min.
60
70
80
90
100
110
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
191.1800: 1.125e+6
19/3
20/3
21/3
23/3
24/3
24/4
28/3R
28/3S
29/3R
29/3S
27Ts
27Tm
28ab
25nor30ab
29ab
29Ts
30d
29ba
30ab
30ba
31abS
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

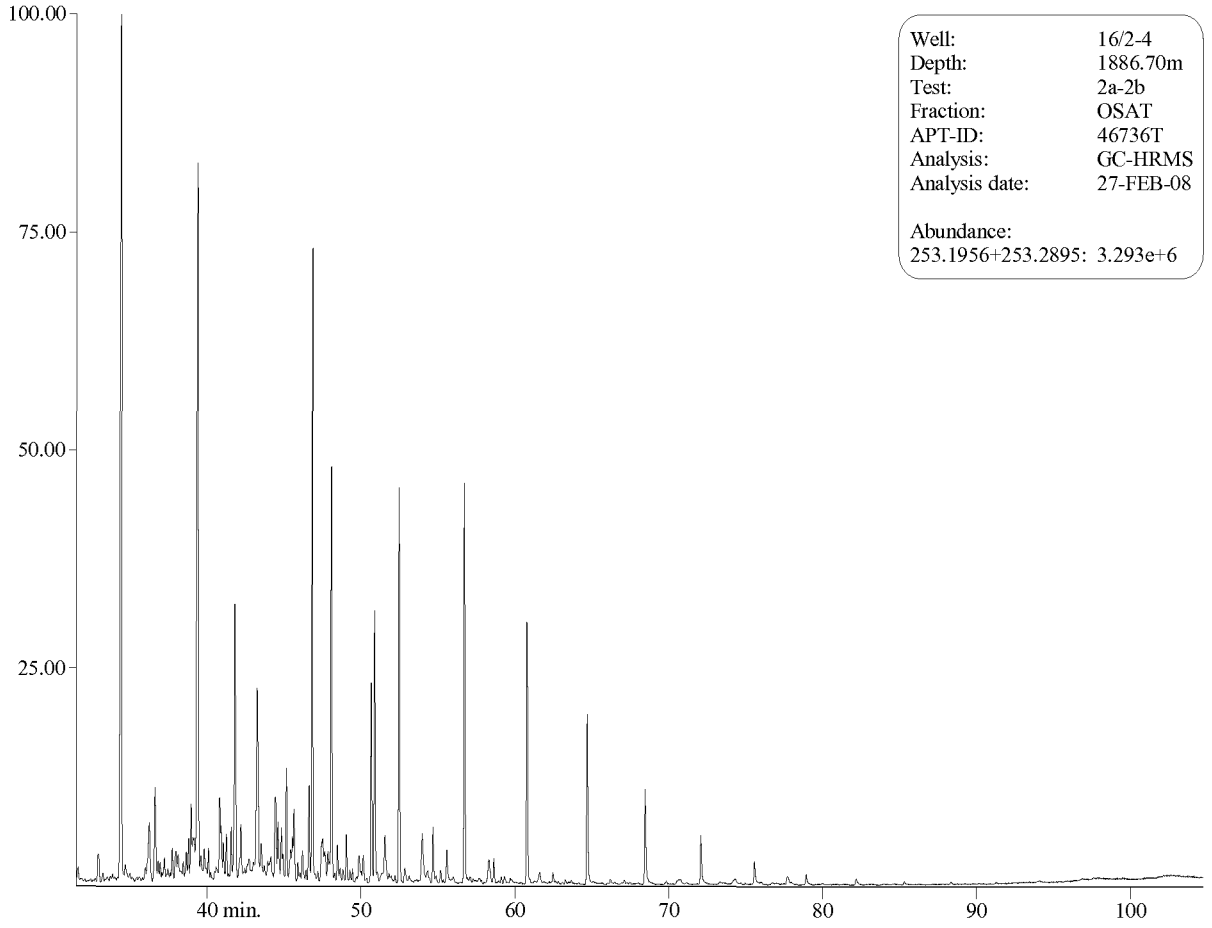

19.13
14.35
9.56
4.78
50 min.
60
70
80
90
100
110
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
205.1956: 2.974e+5
29ab/Ts
30ab
30ba
31abS
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR


100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
217.1956: 8.783e+5
21aa
21bb
22aa
22bb
27dbS
27dbR
27daR
28daR
28daS
29daR
28aaR
29aaS
29aaR
30aaR

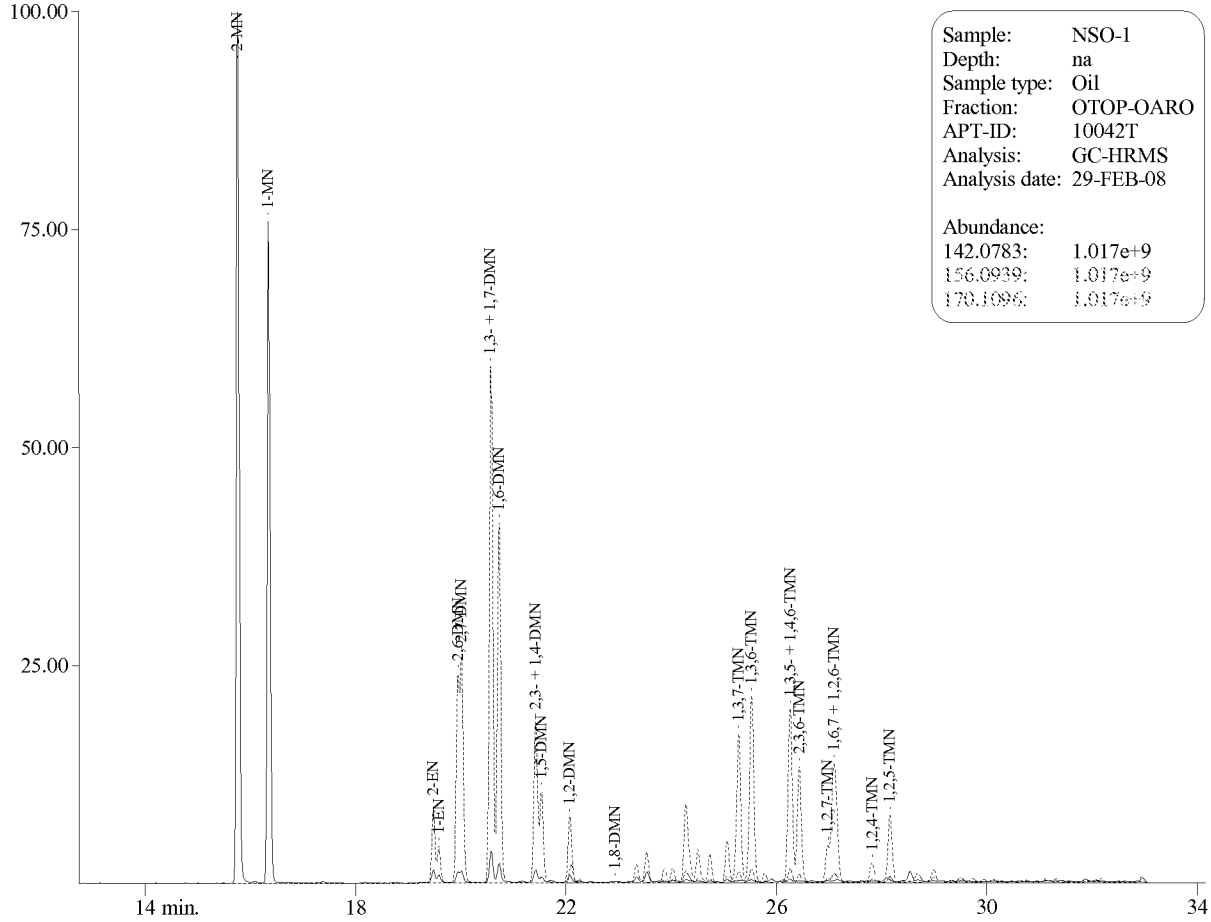

Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
218.2035: 9.093e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21bb
21aa
22bb
22aa
27dbS
27dbR
27aaS
27aaR
27bbR
27bbS
28bbR
28bbS
29aaS
29aaR
30aaS
30aaR
30aaR

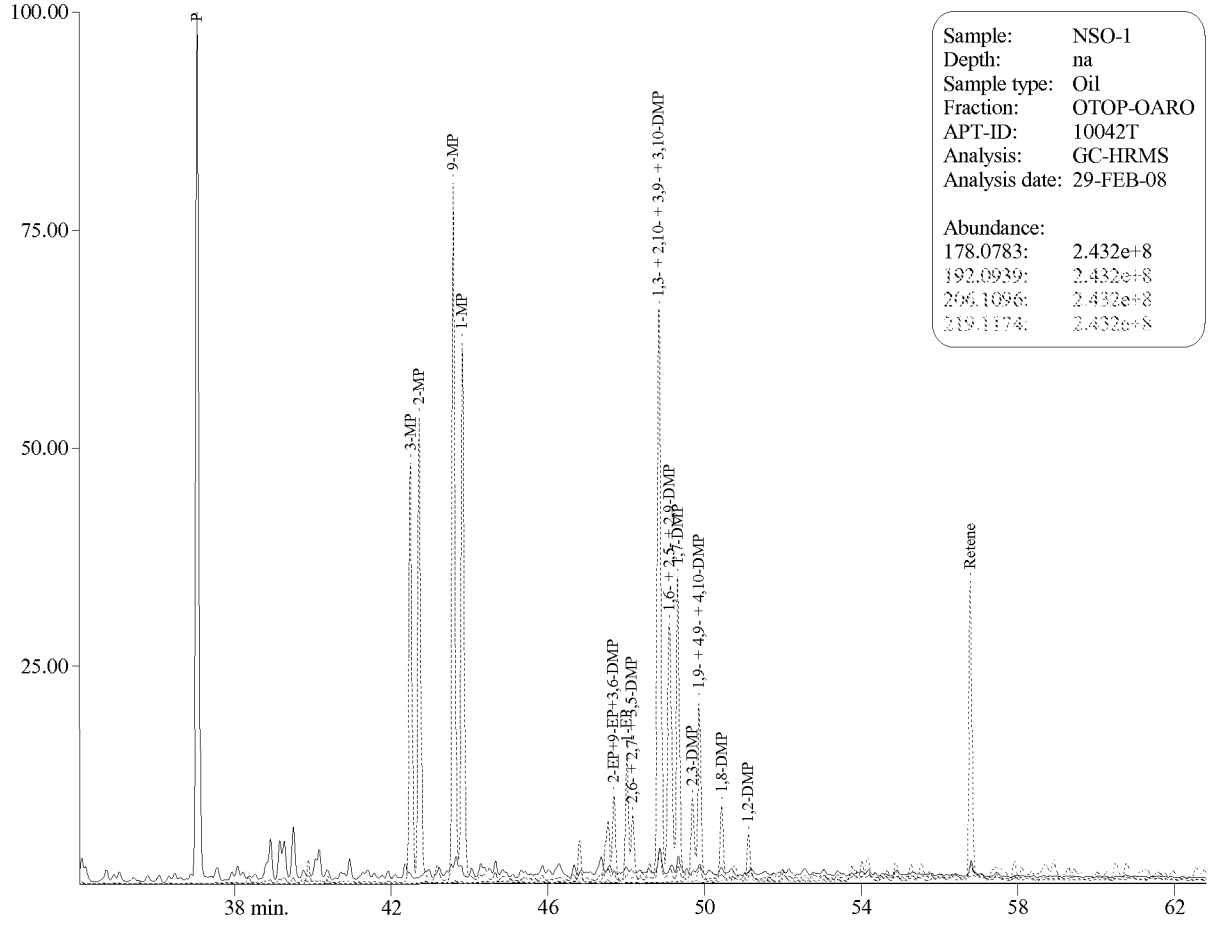

Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
231.2113: 5.089e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100

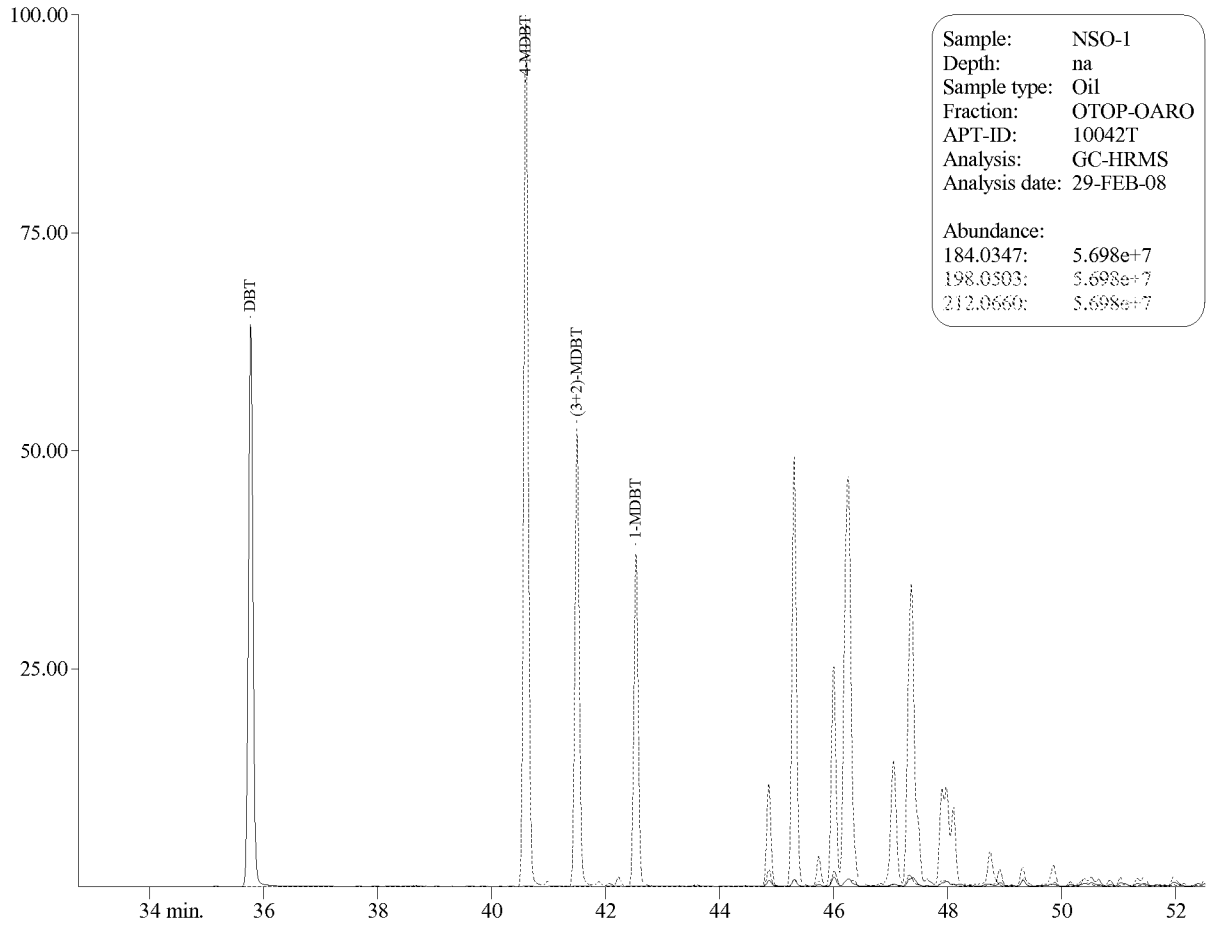

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
27daS
27bbR+29dbS
29dbR
29daR
28daR
28daS
29daS
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
259.2426: 4.742e+5

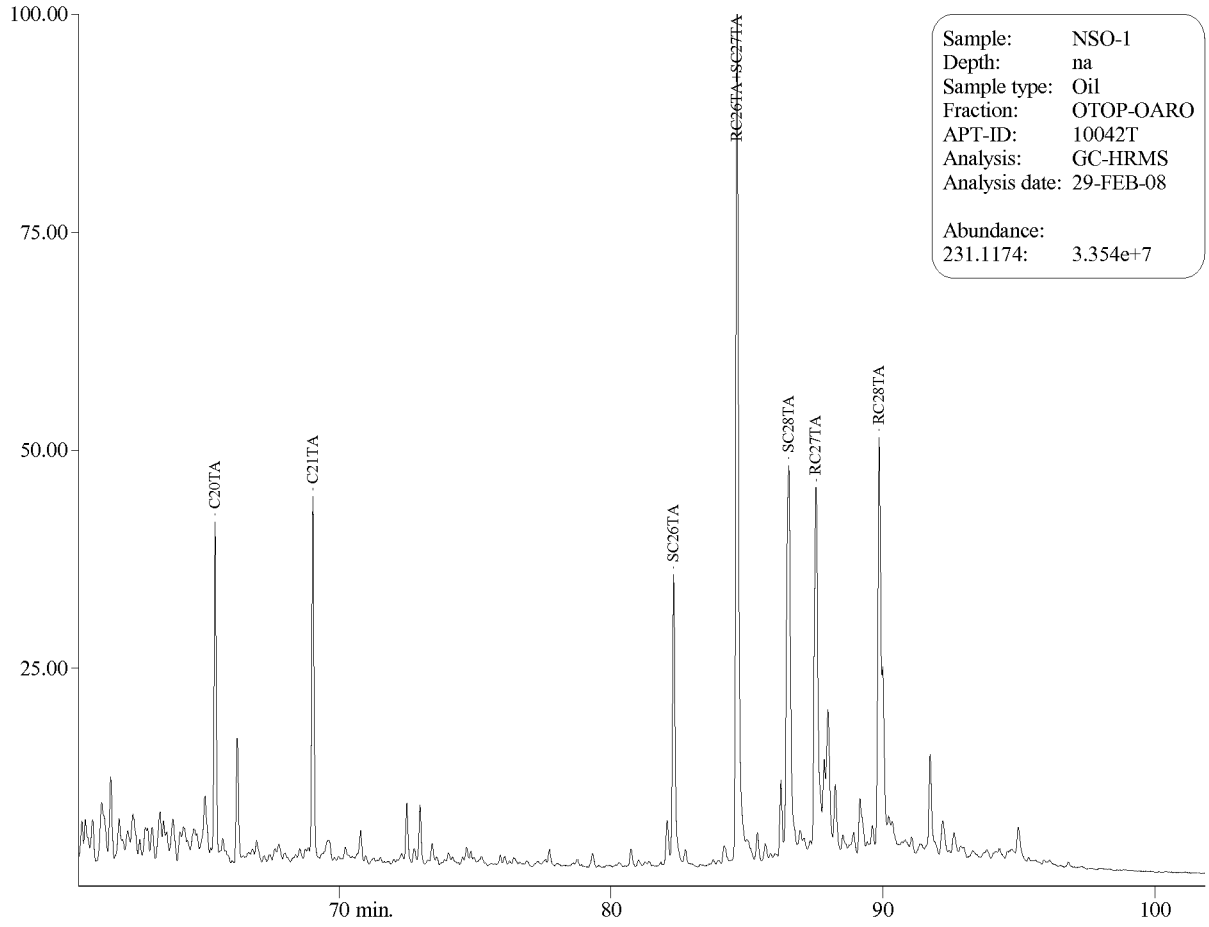

100.00
75.00
50.00
25.00
40 min.
50
60
70
80
90
100
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OSAT
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 27-FEB-08
Abundance:
253.1956+253.2895: 3.293e+6

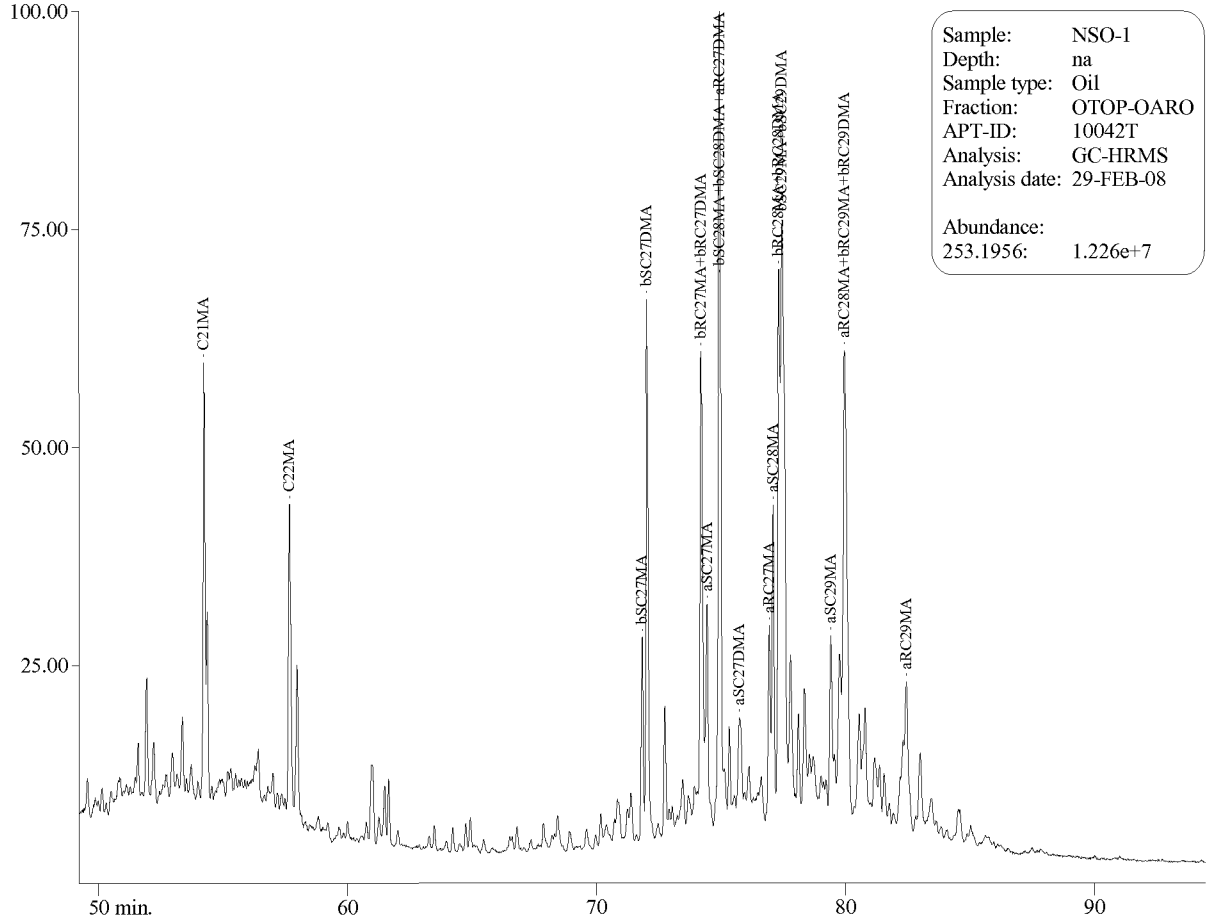
GC-MS Chromatograms of Aromatic Hydrocarbons

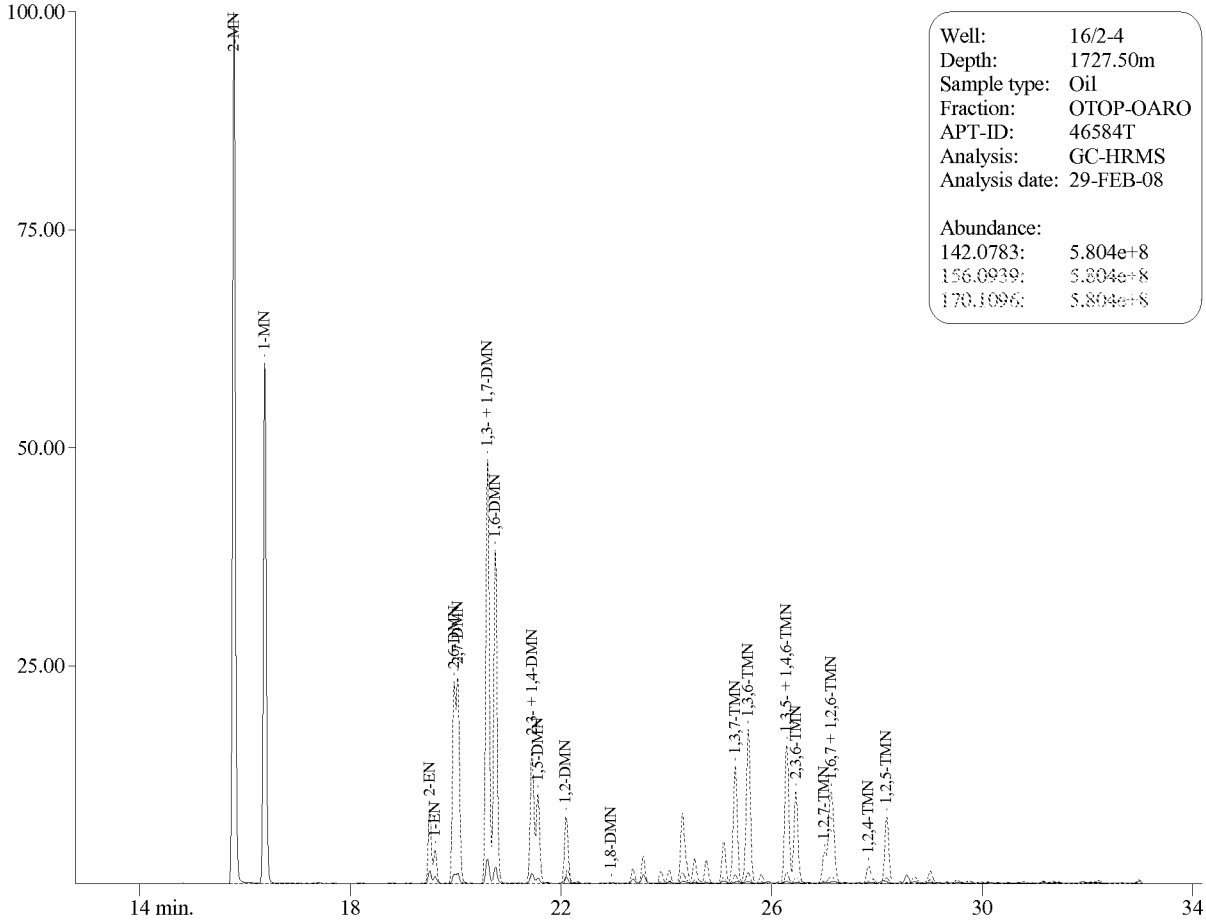

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
142.0783: 1.017e+9
156.0939: 1.017e+9
170.1096: 1.017e+9
100.00
75.00
50.00
25.00
2-MN
1-MN
1,3- + 1,7-DMN
1,6-DMN
2,3- + 1,4-DMN
1,5-DMN
1,2-DMN
1,8-DMN
2-EN
1-EN
1,3,7-TMN
1,3,6-TMN
2,3,6-TMN
1,4,6-TMN
1,6,7 + 1,2,6-TMN
1,2,7-TMN
1,2,4-TMN
1,2,5-TMN
14 min.
18
22
26
30
34

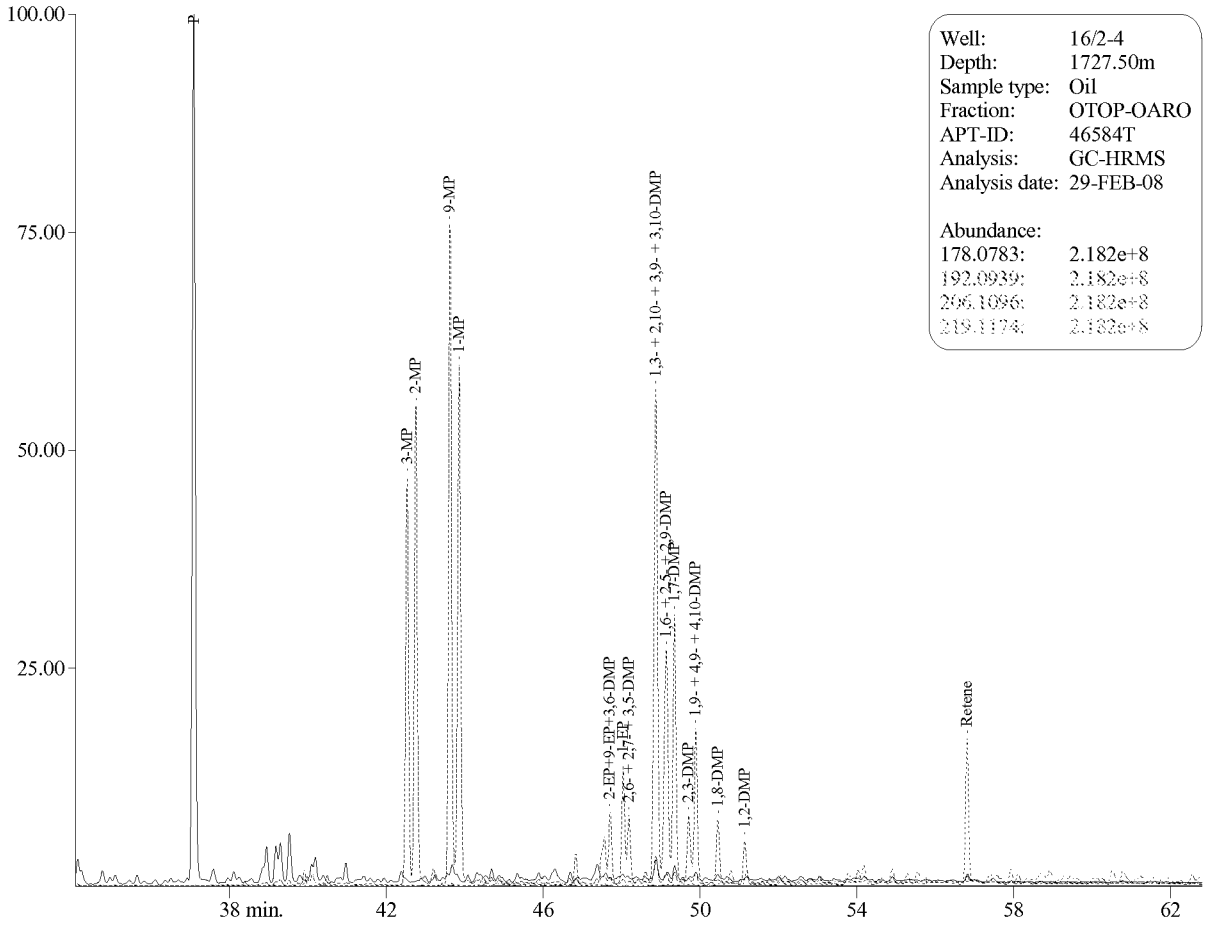

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
178.0783: 2.432e+8
192.0939: 2.432e+8
206.1096: 2.432e+8
219.1174: 2.432e+8
100.00
75.00
50.00
25.00
P
9-MP
1-MP
3-MP
2-MP
1,3- + 2,10- + 3,9- + 3,10-DMP
1,6- + 2,9- + 3,5- + 3,8-DMP
1,7-DMP
1,9- + 4,9- + 4,10-DMP
2-EP+9-EP+3,6-DMP
2,6- + 2,7-DMP
1-EP+3,5-DMP
2,3-DMP
1,8-DMP
1,2-DMP
Retene
38 min.
42
46
50
54
58
62

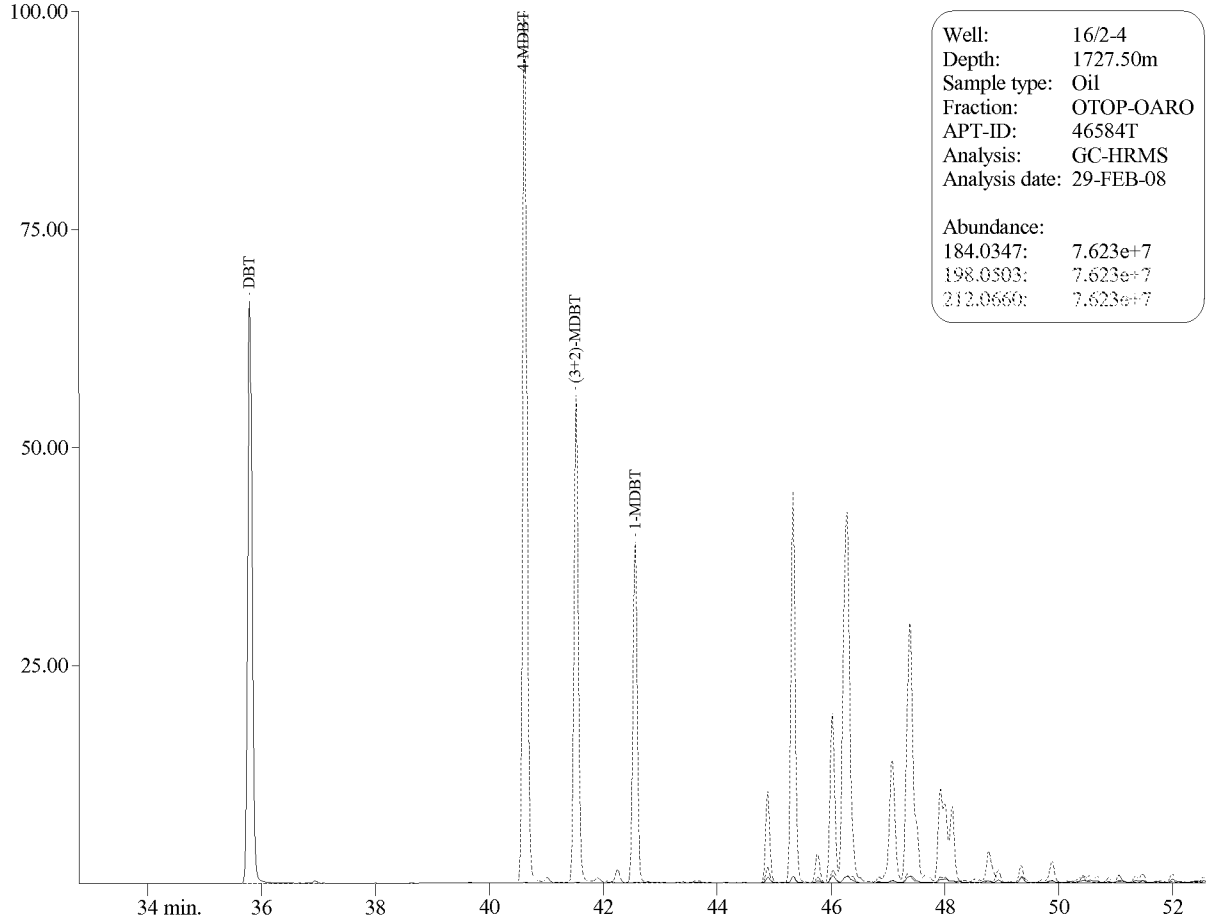

100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
34 min.
36
38
40
42
44
46
48
50
52
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
184.0347: 5.698e+7
198.0503: 5.698e+7
212.0660: 5.698e+7

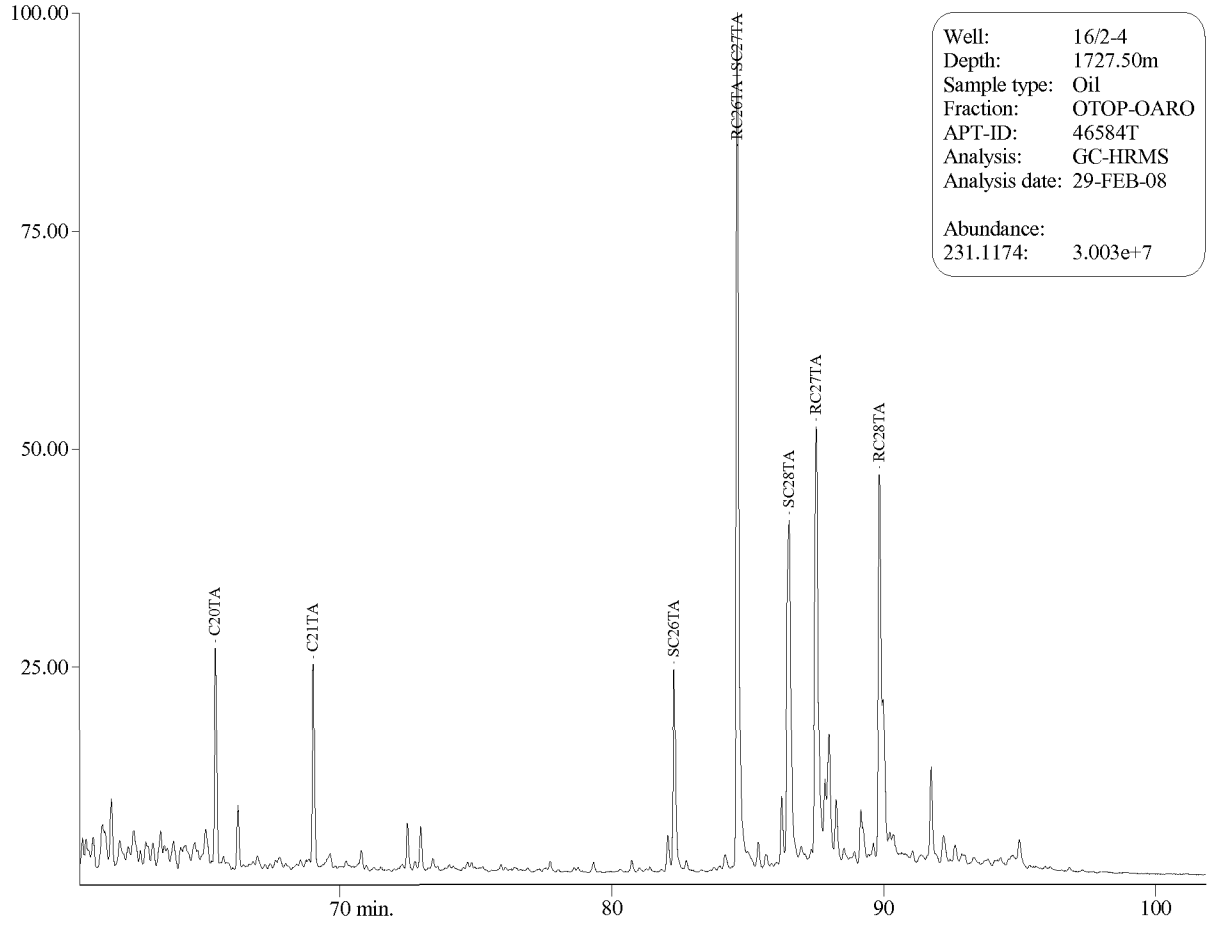

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
70 min.
80
90
100
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
231.1174: 3.354e+7

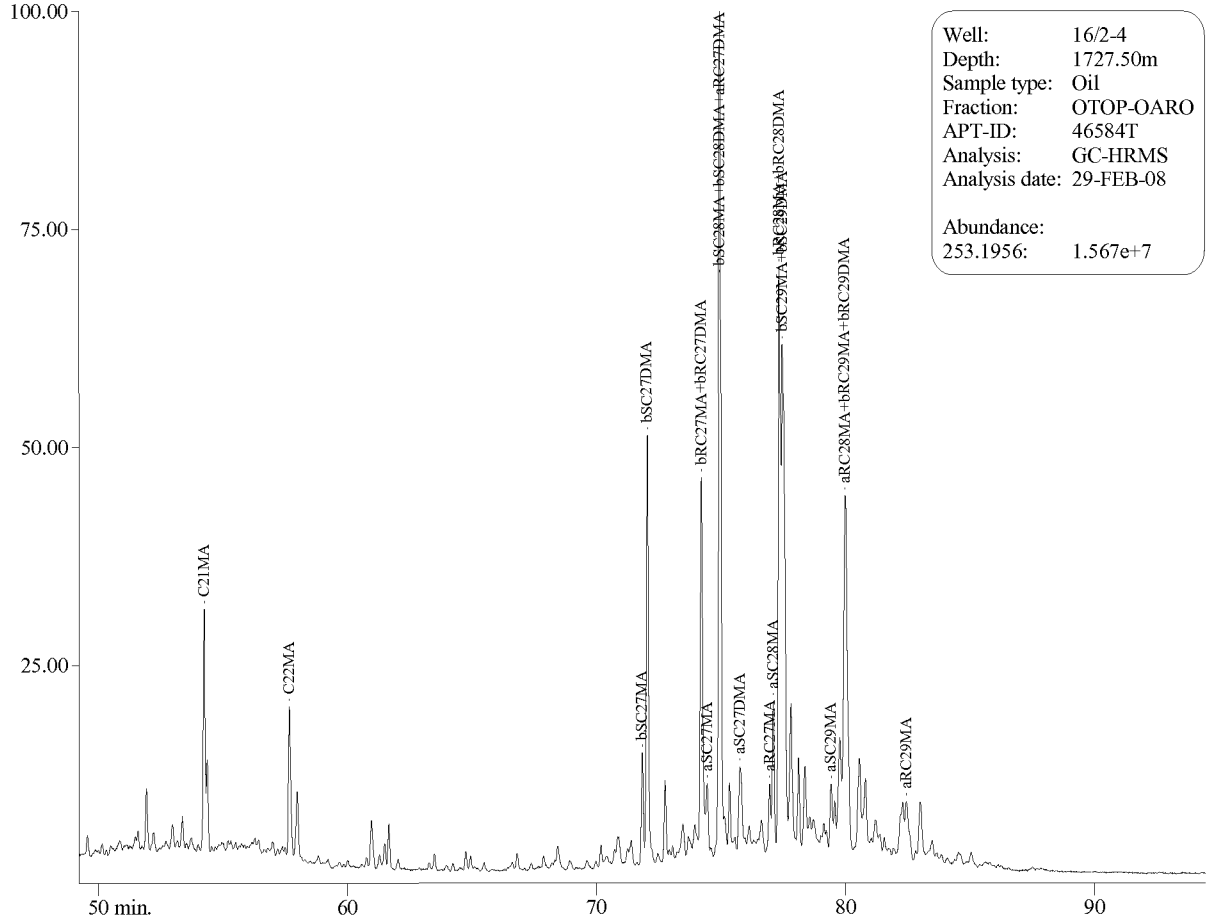

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27DMA
bSC27MA
bRC27MA+bRC27DMA
aSC27MA
aSC27DMA
aRC27MA
aSC28MA
aSC29MA
aRC28MA+bRC29MA+bRC29DMA
aRC29MA
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
253.1956: 1.226e+7

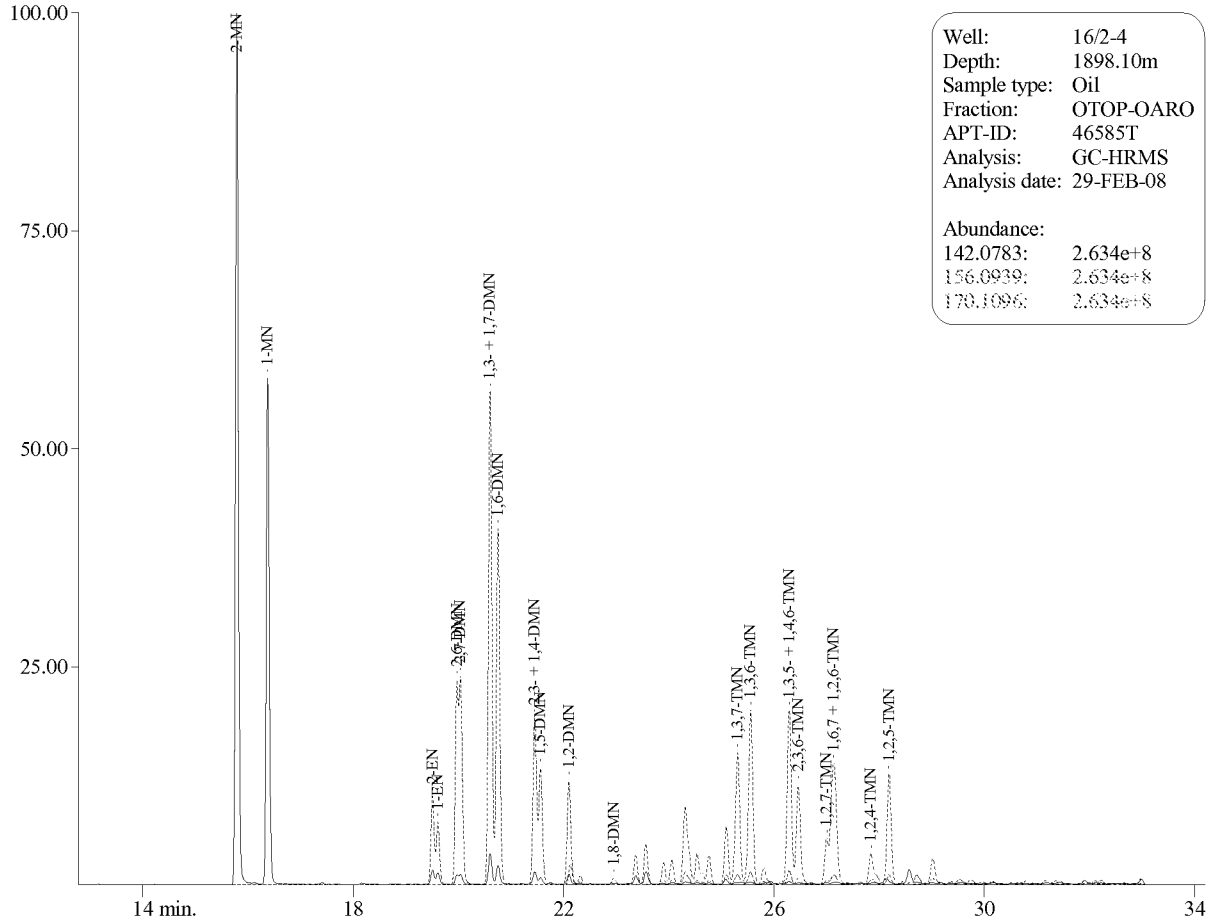

100.00
75.00
50.00
25.00
2-MN
1-MN
1-EN
2-EN
2,6-DMN
2,7-DMN
1,3- + 1,7-DMN
1,6-DMN
1,5-DMN
2,3- + 1,4-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
2,3,6-TMN
1,3,5- + 1,4,6-TMN
1,2,7-TMN
1,6,7- + 1,2,6-TMN
1,2,4-TMN
1,2,5-TMN
14 min.
18
22
26
30
34
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
142.0783: 5.804e+8
156.0939: 5.804e+8
170.1096: 5.804e+8

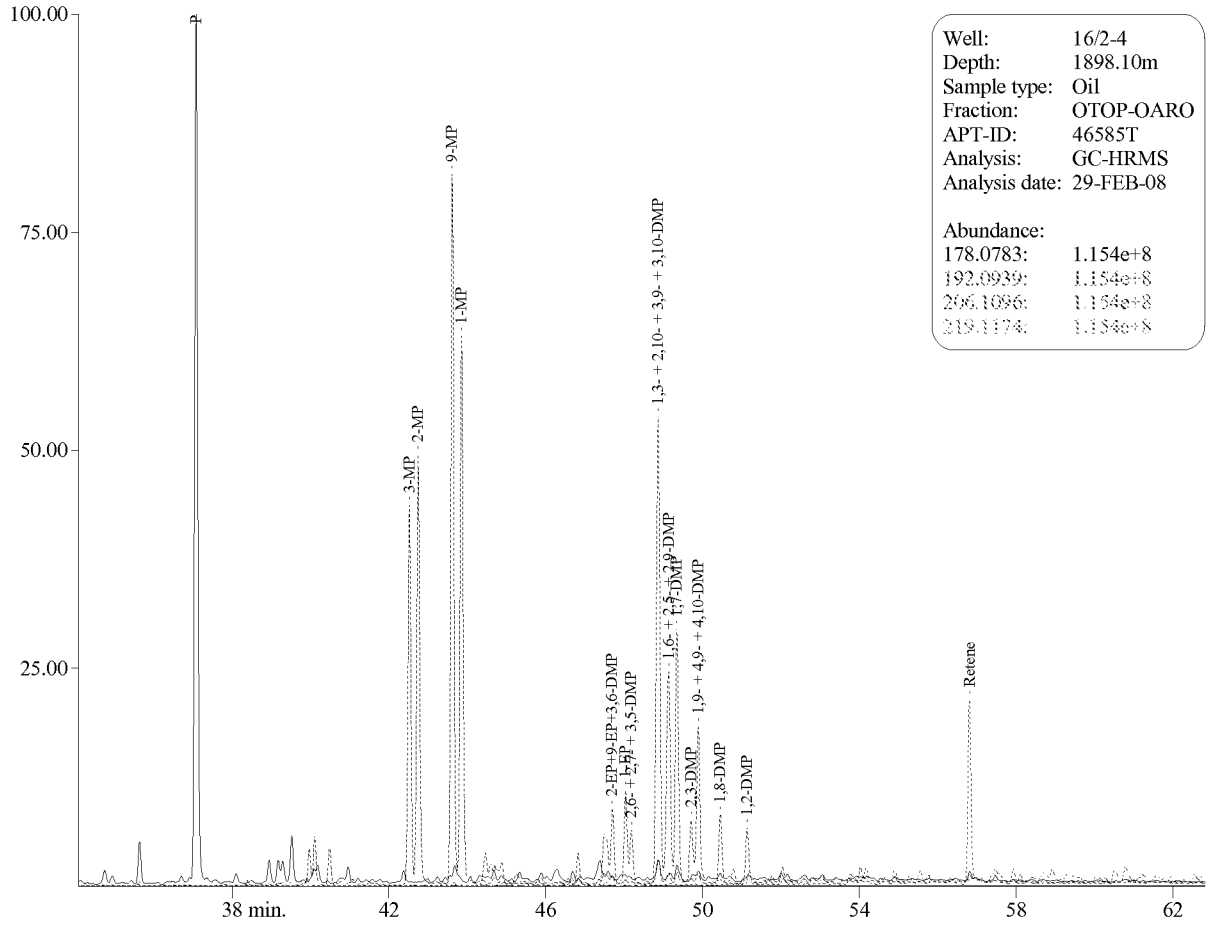

100.00
75.00
50.00
25.00
3-MP
2-MP
9-MP
1-MP
1,3- + 2,10- + 3,9- + 3,10-DMP
2,9-DMP
1,7-DMP
1,9- + 4,9- + 4,10-DMP
2-EP+9-EP+3,6-DMP
3,5-DMP
2,3-DMP
1,8-DMP
1,2-DMP
Retene
38 min.
42
46
50
54
58
62
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
178.0783: 2.182e+8
192.0939: 2.182e+8
206.1096: 2.182e+8
219.1174: 2.182e+8

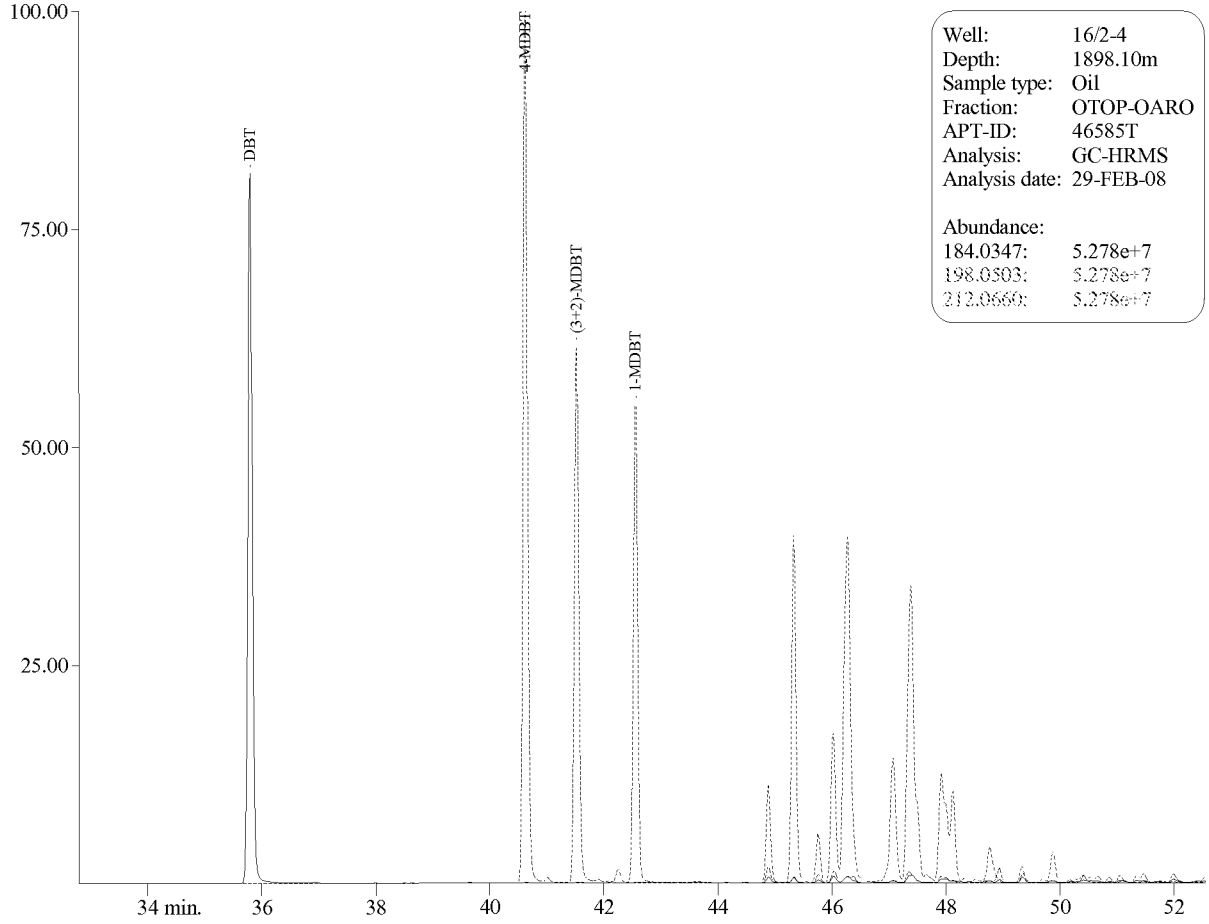

100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
34 min.
36
38
40
42
44
46
48
50
52
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
184.0347: 7.623e+7
198.0503: 7.623e+7
212.0660: 7.623e+7

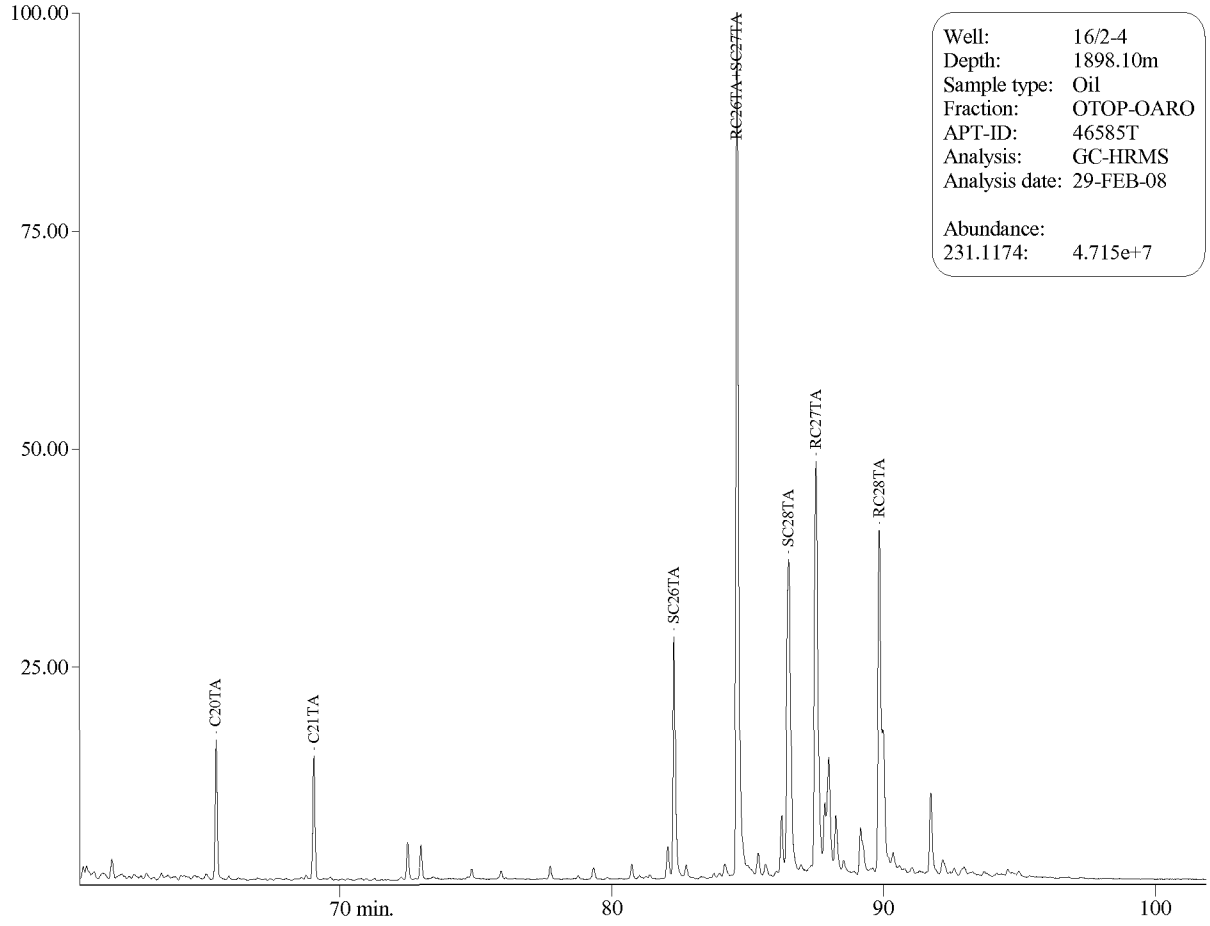

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
70 min.
80
90
100
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
231.1174: 3.003e+7

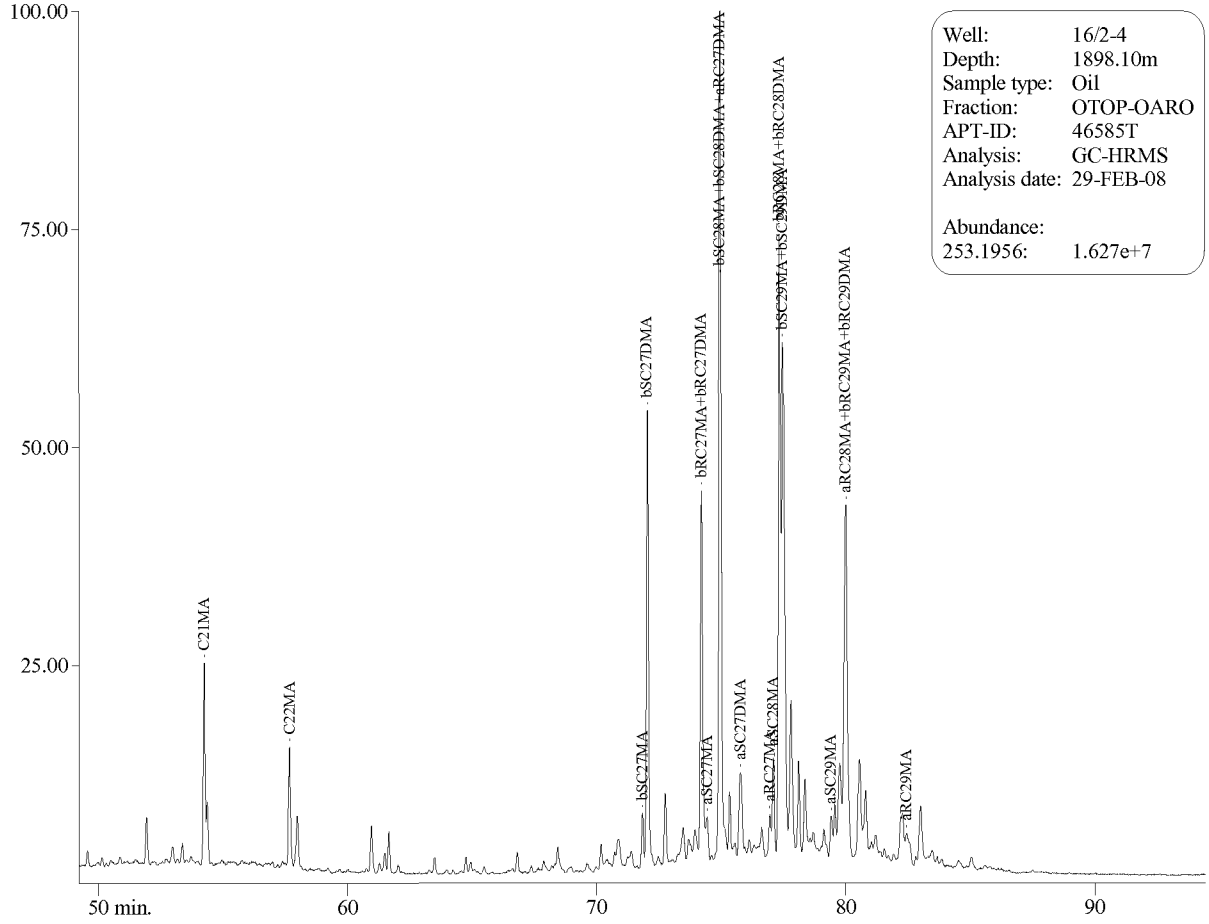

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27DMA
bSC27MA
bRC27MA+bRC27DMA
aSC27MA
aSC27DMA
aRC27MA
aSC28MA
bSC28MA+bSC28DMA+aRC27DMA
bSC29MA+bRC28DMA
aRC28MA+bRC29MA+bRC29DMA
aSC29MA
aRC29MA
Well: 16/2-4
Depth: 1727.50m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46584T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
253.1956: 1.567e+7

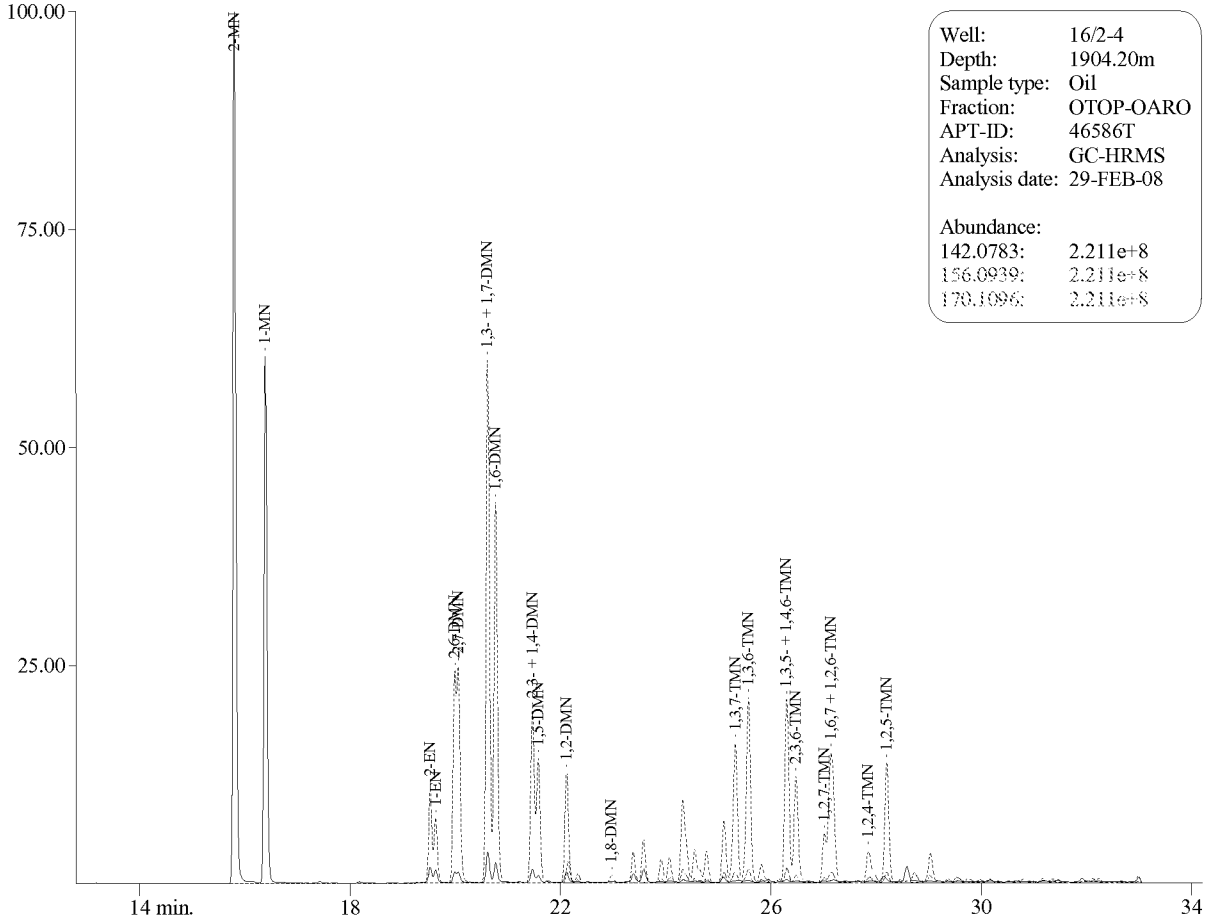

100.00
75.00
50.00
25.00
2-MN
1-MN
2-EN
1-EN
2,6-DMN
2,7-DMN
1,6-DMN
1,3- + 1,7-DMN
1,5-DMN
2,3- + 1,4-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
1,3,5- + 1,4,6-TMN
2,3,6-TMN
1,2,7-TMN
1,6,7 + 1,2,6-TMN
1,2,4-TMN
1,2,5-TMN
14 min.
18
22
26
30
34
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
142.0783: 2.634e+8
156.0939: 2.634e+8
170.1096: 2.634e+8

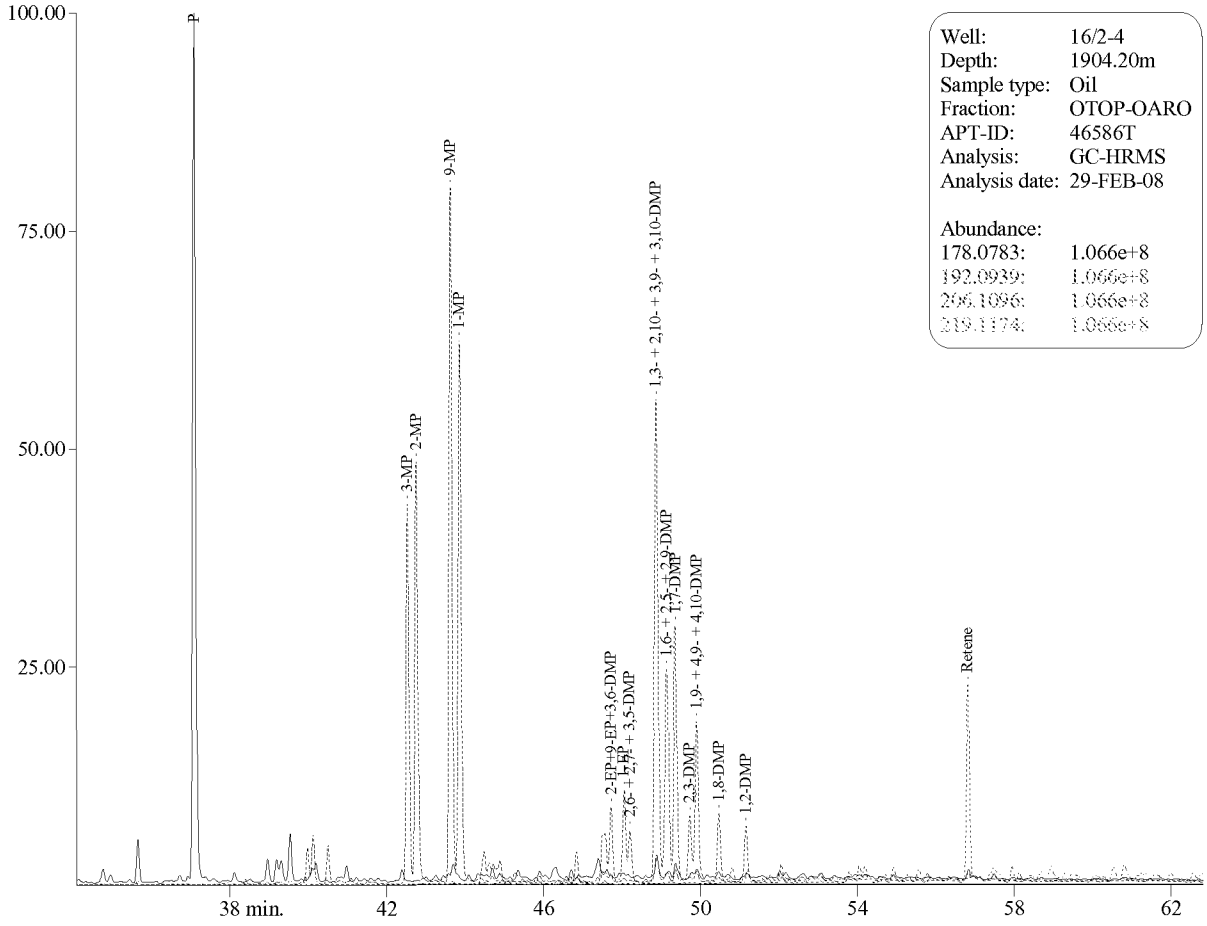

100.00
75.00
50.00
25.00
P
9-MP
1-MP
3-MP
2-MP
1,3- + 2,10- + 3,9- + 3,10-DMP
1,6- + 2,9-DMP
1,7-DMP
1,9- + 4,9- + 4,10-DMP
2,3-DMP
1,8-DMP
1,2-DMP
2-EP+9-EP+3,6-DMP
2,6- + 1,9- + 3,5-DMP
Retene
38 min.
42
46
50
54
58
62
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
178.0783: 1.154e+8
192.0939: 1.154e+8
206.1096: 1.154e+8
219.1174: 1.154e+8

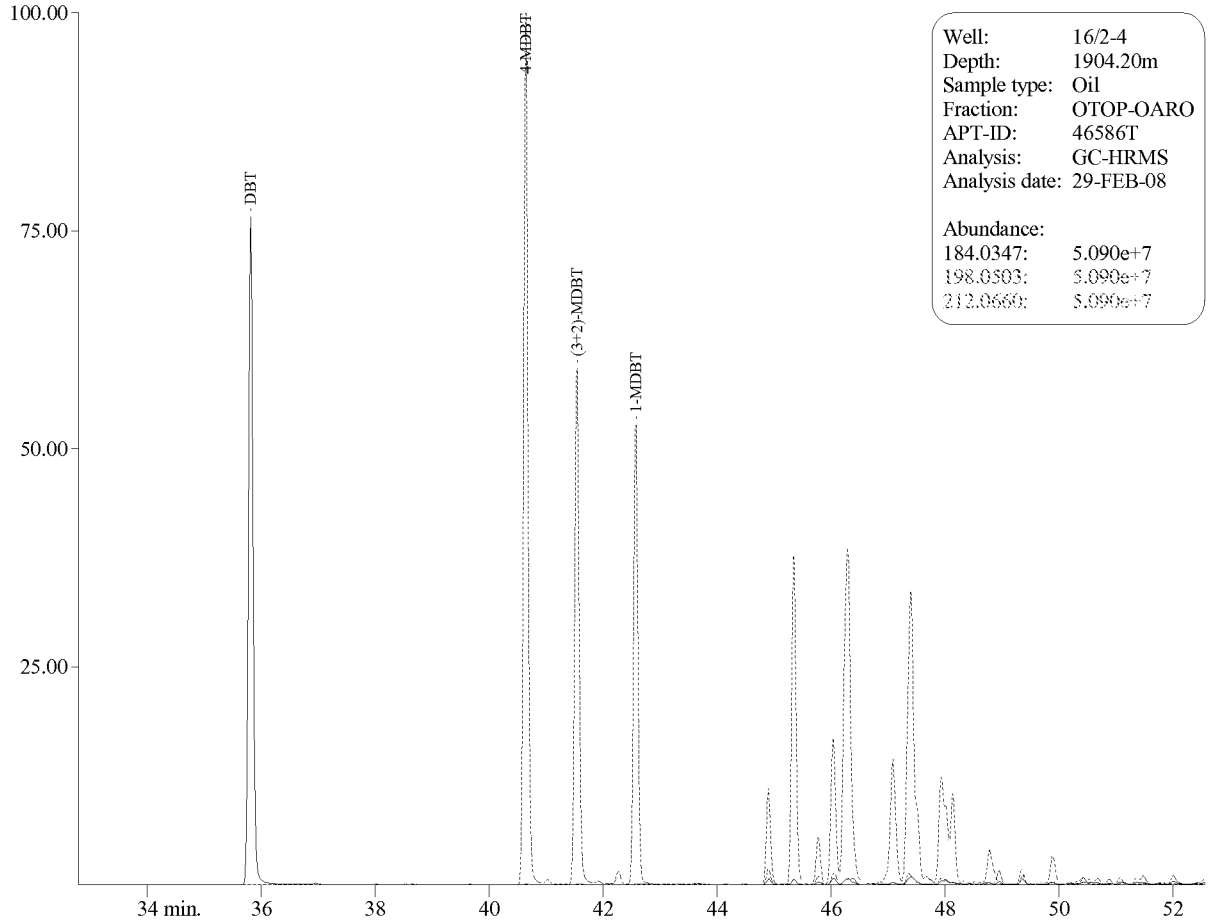

100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
184.0347: 5.278e+7
198.0503: 5.278e+7
212.0660: 5.278e+7
34 min.
36
38
40
42
44
46
48
50
52

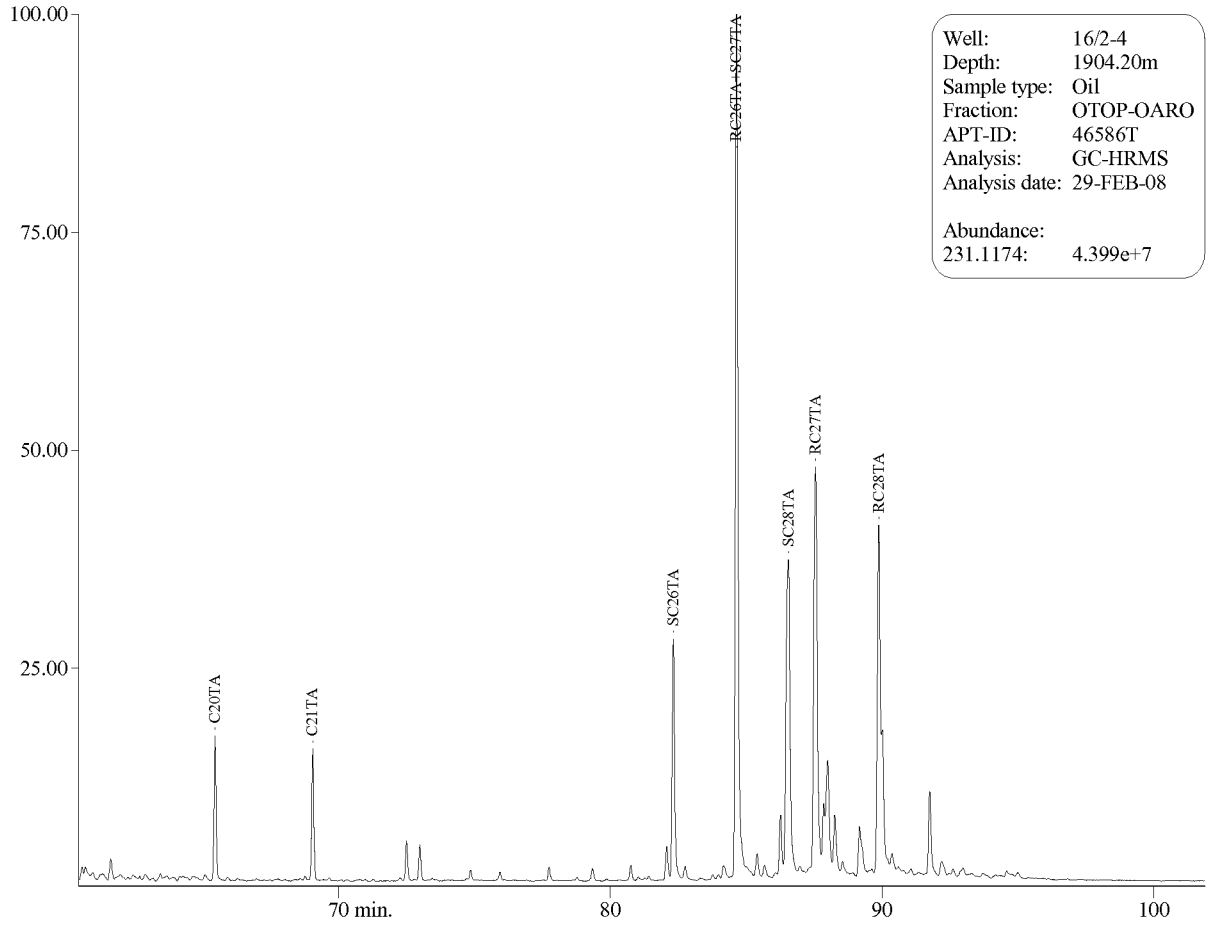

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
231.1174: 4.715e+7
70 min.
80
90
100

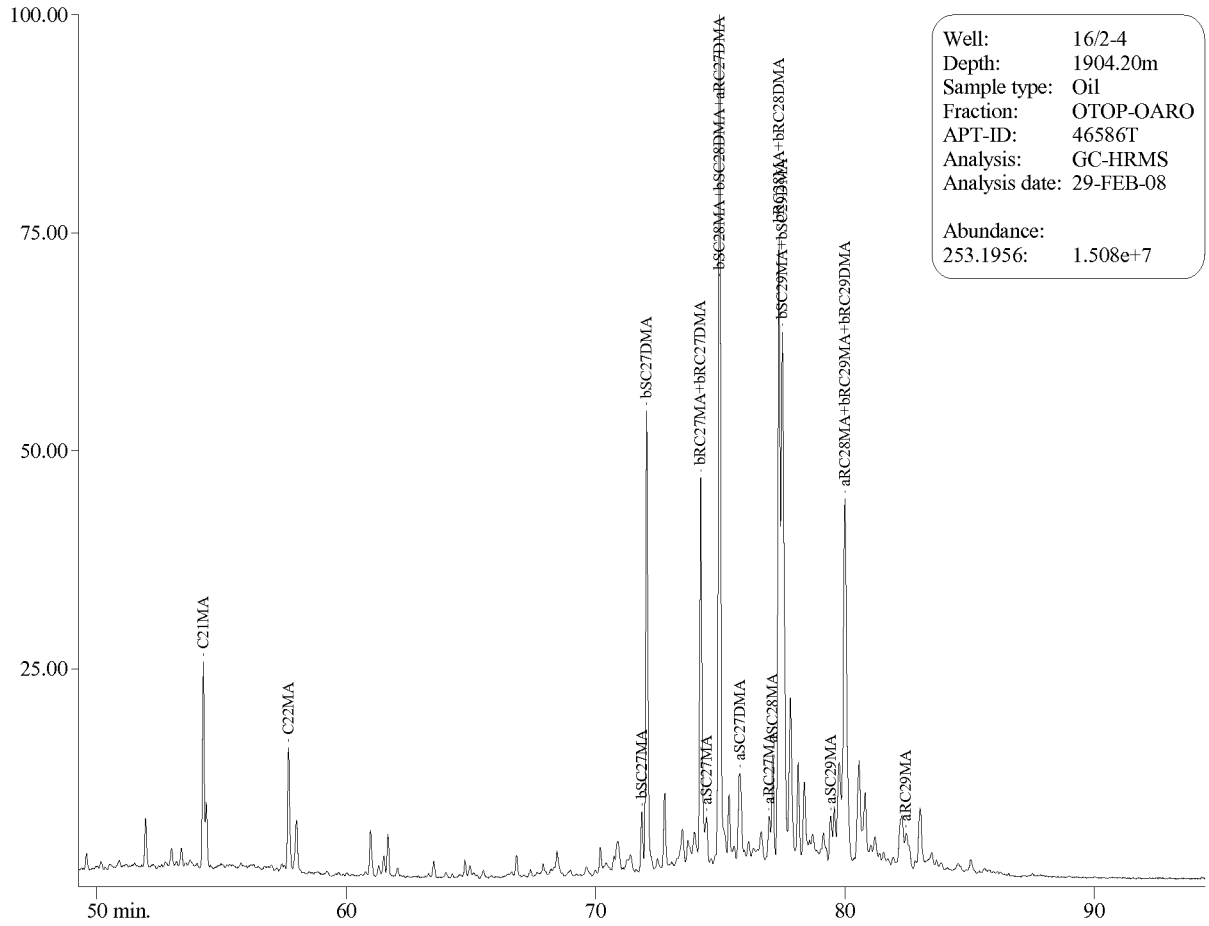

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27MA
bSC27DMA
aSC27MA
bRC27MA+bRC27DMA
aSC27DMA
aRC27MA
aRC28MA
bSC28MA+bSC28DMA+aRC27DMA
bSC29MA+bSC29DMA+bRC28DMA
aSC29MA
aRC28MA+bRC29MA+bRC29DMA
aRC29MA
Well: 16/2-4
Depth: 1898.10m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46585T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
253.1956: 1.627e+7

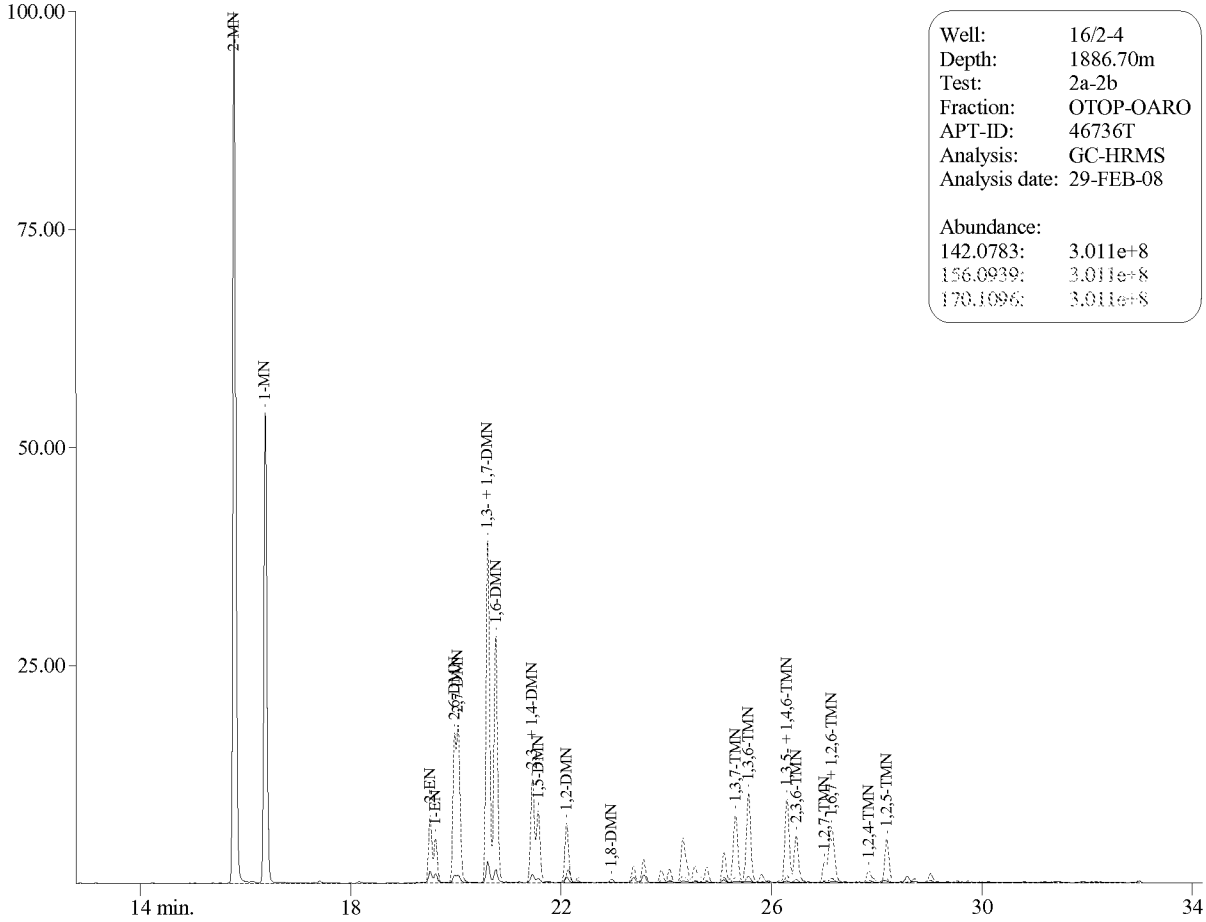

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
142.0783: 2.211e+8
156.0939: 2.211e+8
170.1096: 2.211e+8
100.00
75.00
50.00
25.00
14 min.
18
22
26
30
34
2-MN
1-MN
1,3- + 1,7-DMN
1,6-DMN
2,6-DMN
2,7-DMN
1,4-DMN
1,3-DMN
1,2-DMN
1,8-DMN
2-EN
1-EN
1,3,7-TMN
1,3,6-TMN
1,3,5- + 1,4,6-TMN
2,3,6-TMN
1,6,7 + 1,2,6-TMN
1,2,7-TMN
1,2,4-TMN
1,2,5-TMN

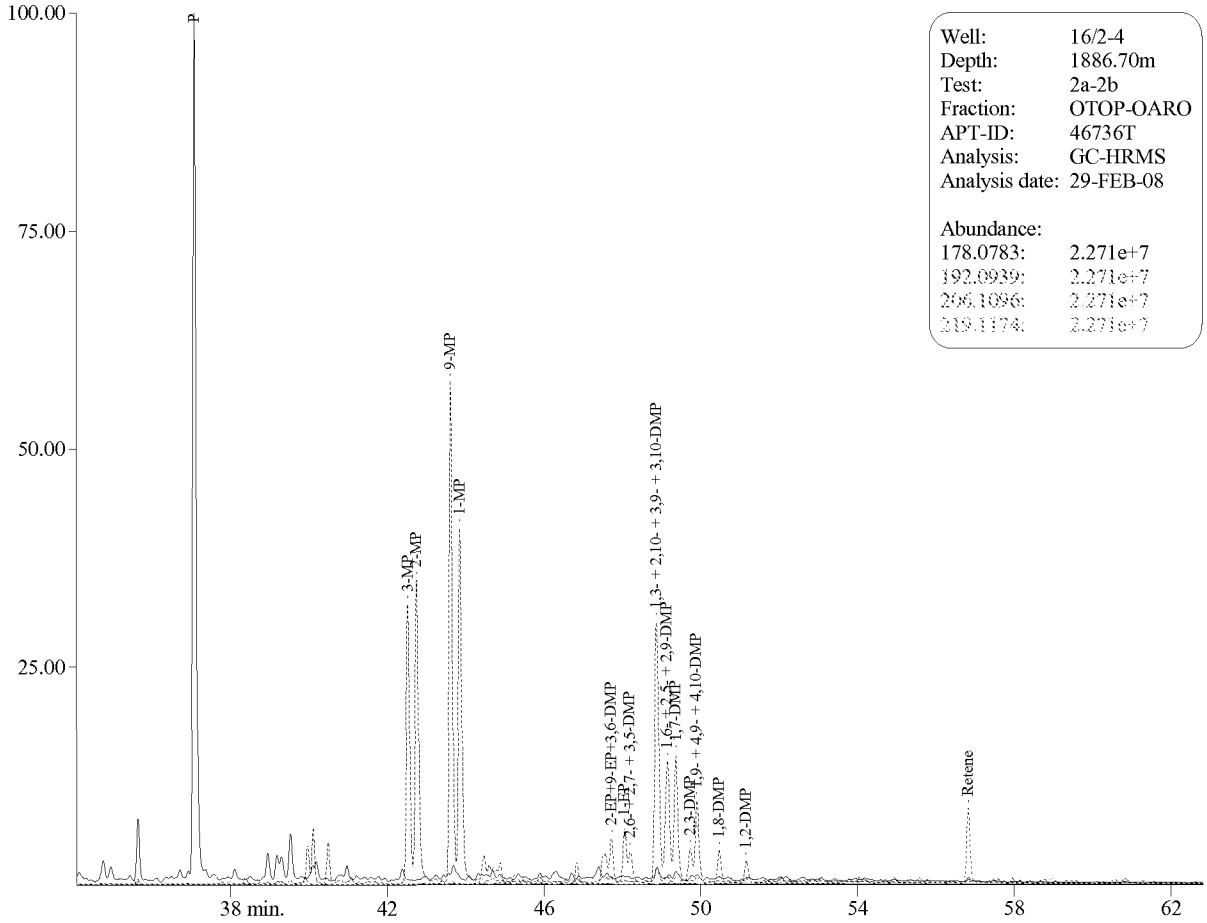

Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
178.0783: 1.066e+8
192.0939: 1.066e+8
206.1096: 1.066e+8
219.1174: 1.066e+8
100.00
75.00
50.00
25.00
38 min.
42
46
50
54
58
62
P
9-MP
1-MP
2-MP
3-MP
1,3- + 2,10- + 3,9- + 3,10-DMP
1,6- + 2,5- + 2,9-DMP
1,7-DMP
1,9- + 4,9- + 4,10-DMP
2-EP+9-EP+3,6-DMP
2,6- + 1,5-DMP
2,7- + 3,5-DMP
2,3-DMP
1,8-DMP
1,2-DMP
Retene

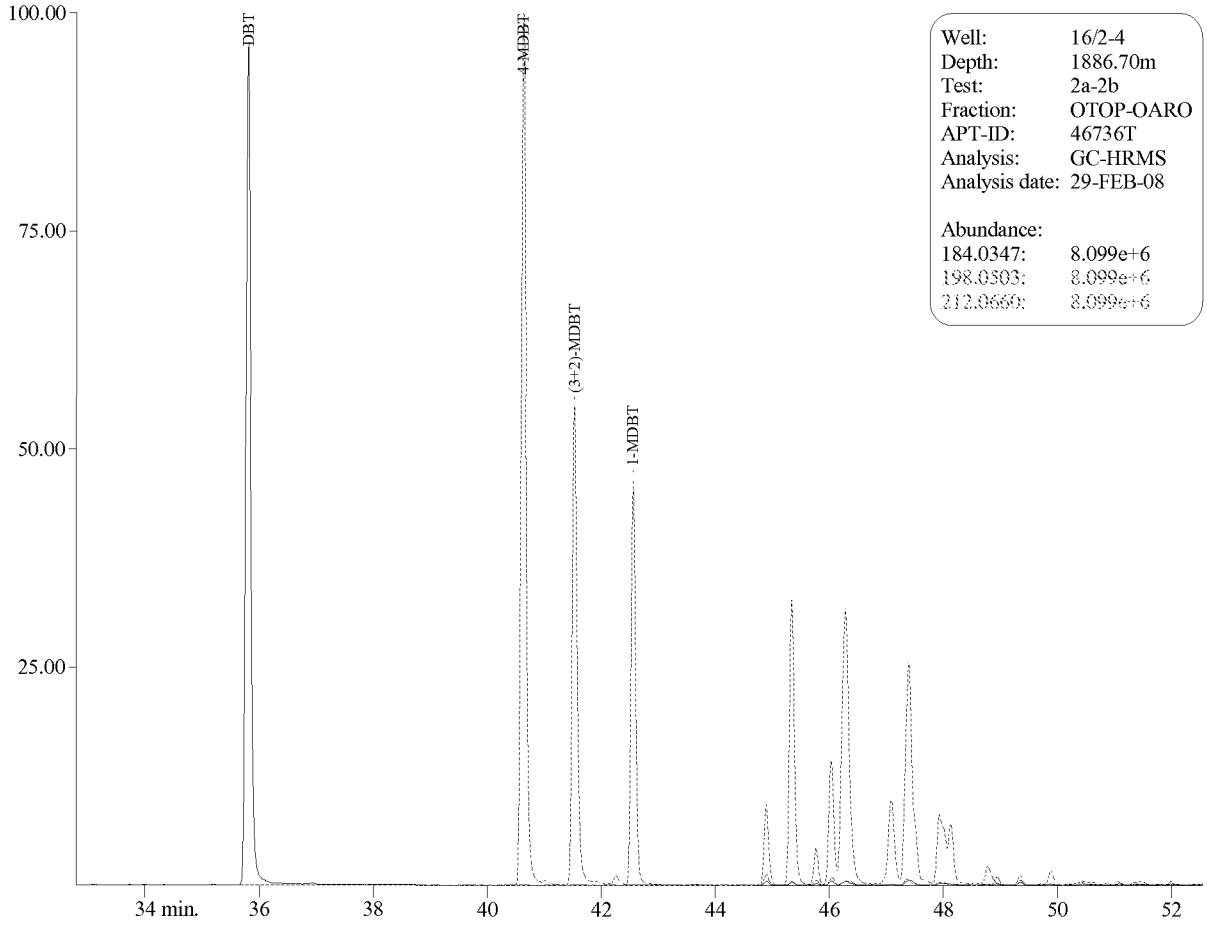

100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
184.0347: 5.090e+7
198.0503: 5.090e+7
212.0660: 5.090e+7
34 min.
36
38
40
42
44
46
48
50
52

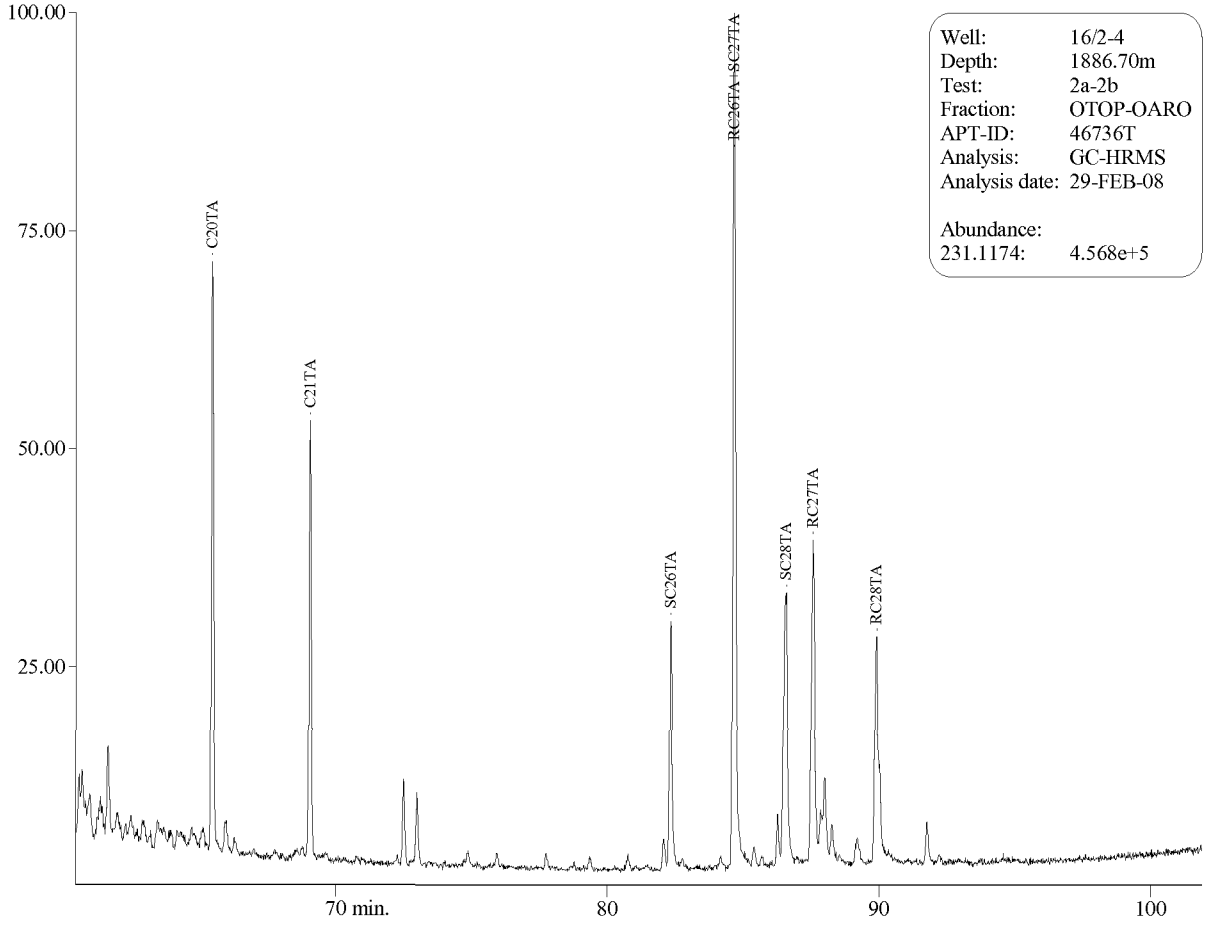

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
231.1174: 4.399e+7
70 min.
80
90
100


100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27MA
bSC27DMA
aSC27MA
bRC27MA+bRC27DMA
aRC27MA
aSC27DMA
aRC28MA
bSC28MA+bSC28DMA+aRC27DMA
bSC29MA+bSC29DMA+bRC28DMA
aSC29MA
aRC28MA+bRC29MA+bRC29DMA
aRC29MA
Well: 16/2-4
Depth: 1904.20m
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 46586T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
253.1956: 1.508e+7


100.00
75.00
50.00
25.00
2-MN
1-MN
1-EN
2,6-DMN
2,7-DMN
1,3- + 1,7-DMN
1,6-DMN
1,4-DMN
2,3-
1,5-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
1,3,5- + 1,4,6-TMN
2,3,6-TMN
1,2,7-TMN
1,2,6-TMN
1,2,4-TMN
1,2,5-TMN
14 min.
18
22
26
30
34
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
142.0783: 3.011e+8
156.0939: 3.011e+8
170.1096: 3.011e+8


100.00
75.00
50.00
25.00
P
9-MP
1-MP
3-MP
2-MP
2-EP+9-EP+3,6-DMP
2,6-DMP
2,7- + 3,5-DMP
1,3- + 2,10- + 3,9- + 3,10-DMP
2,9-DMP
1,7-DMP
1,6-
2,3-DMP
4,9- + 4,10-DMP
1,8-DMP
1,2-DMP
Retene
38 min.
42
46
50
54
58
62
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
178.0783: 2.271e+7
192.0939: 2.271e+7
206.1096: 2.271e+7
219.1174: 2.271e+7


100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
34 min.
36
38
40
42
44
46
48
50
52
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
184.0347: 8.099e+6
198.0503: 8.099e+6
212.0660: 8.099e+6


100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
70 min.
80
90
100
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
231.1174: 4.568e+5

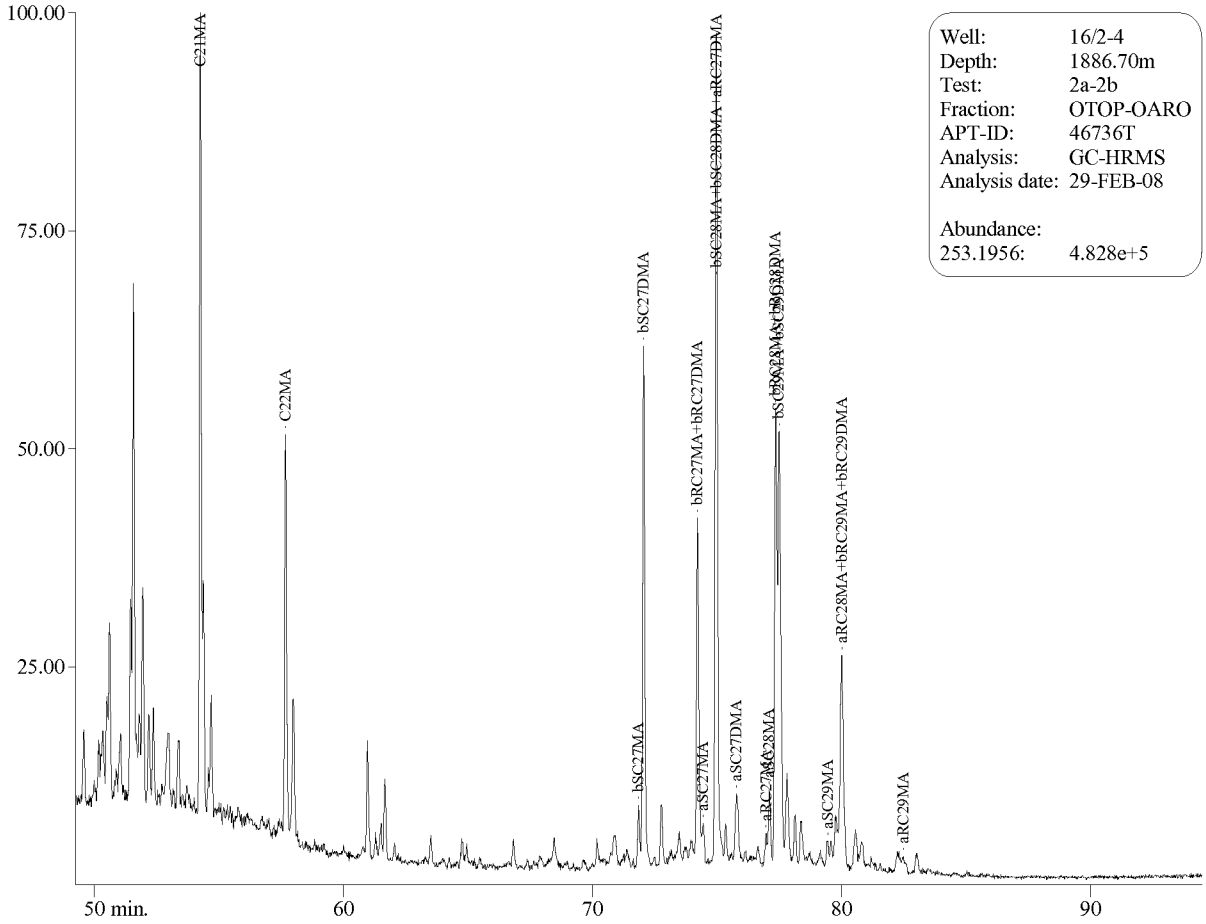

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27DMA
bRC27MA+bRC27DMA
bSC28MA+bSC28DMA+aRC27DMA
aRC28MA+bRC29MA+bRC29DMA
bSC27MA
aSC27MA
aSC27DMA
aSC29MA
aRC29MA
Well: 16/2-4
Depth: 1886.70m
Test: 2a-2b
Fraction: OTOP-OARO
APT-ID: 46736T
Analysis: GC-HRMS
Analysis date: 29-FEB-08
Abundance:
253.1956: 4.828e+5

Table 21. Reference data for GC Whole Oil measured on NSO-1

Variable	Permissible range	Most likely value	15.02.08	15.02.08	
Pristane/n-C17	0.55-0.64	0.60	0.64	0.64	
Benzene/Hexane	0.38-0.42	0.41	0.43	0.43	

Table 22. Reference data for GC of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	26.02.08	
Pr/n-C17	0.55-0.66	0.60	0.60	
n-C15/n-C20	1.4-2.0	1.8	1.7	
n-C30/n-C20	0.20-0.32	0.29	0.32	
n-C17/(n-C17+n-C27)	0.75-0.82	0.79	0.76	

Table 23. Reference data for GC-MS of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	27.02.08	
[23/3]/30ab	0.04-0.09	0.07	0.05	
35abR/30ab	0.06-0.13	0.08	0.08	
25nor30ab/25nor28ab	0.3-0.8	0.5	0.83	
29aaR/27dbS	0.2-0.6	0.3	0.27	
29bbS/27bbR	0.7-1.2	0.9	1.03	

Our column resolves the 25nor28αβ doublet, thus giving a value in the high-end region of the acceptable range specified by NIGOGA.

Table 24. Reference data for GC-MS of Aromatic Compounds measured on NSO-1

Variable	Permissible range	Most likely value	29.02.08	29.02.08	
1-MP/P	0.53-0.70	0.59	0.62	0.62	
A1/E1	0.3-0.7	0.5	0.54	0.52	
a1/d1	0.2-0.4	0.31	0.40	0.40	

Experimental Procedures

All procedures follow NIGOGA, 4th Edition. Below are brief descriptions of procedures/analytical conditions.

Deasphaltening

Pentane is added in access (40 times the volume of oil). The solution is stored for at least 12 hours in a dark place before the solution is filtered or centrifuged and the weight of the asphaltenes measured.

Iatroscan

An Iatroscan MK-5 (TLC/FID Analyser) instrument is used. 2 µl of extract or diluted oil is spotted on Chromarod S-III rods before elution in hexane (25 min), toluene (8 min) and dichloromethane with 7 % methanol (vol/vol). The solvent is allowed to evaporate before the rods are placed into the next eluation chamber. Before running the rods in the analyser, the rods are heated for 90 sec. in a heating chamber at 60 °C.

Density

An Anton Parr instrument is used. Air and distilled water is used to calibrate the instrument. All measurements are done at 15°C. NSO-1 is used as a reference sample, and is run in each series of density measurements. If the viscosity of the oil is very high at 15°C, a gravimetric method is used.
API gravity is calculated from the density.

API Gravity (°) = 141.5/Density (g/cm^3) – 131.5

Topping

A rotavapor is used and ~ 1ml of oil is weighted accurately into a small round bottum flask. The oil is evaporated for 15 min at 90°C with the water pump turned to maximum. After the evaporation the oil is weighted again.
One aliquot of NSO-1 is run as a reference sample together with the topping series.

GC analysis of gas components

Aliquots of the samples were transferred to exetainers. 0.1-1ml were sampled using a Gerstel MPS2 autosampler and injected into a Hewlett Packard 5890 Series II GC equipped with Porabond Q column, a flame ionisation detector (FID), a thermal conductivity detector (TCD) and a methylization unit. Hydrocarbons were measured by FID, CO_2 by metylization (to CH_4) and then FID and N_2 and O_2 by TCD.

Carbon isotope analysis of hydrocarbon compounds and CO2

The carbon isotopic composition of the hydrocarbon gas components was determined by a GC-C-IRMS system. Aliquots were sampled with a syringe and analysed on a Trace GC2000, equipped with a Poraplot Q column, connected to a Delta plus XP IRMS. The components were burnt to CO_2 and water in a 1000 °C furnace over Cu/Ni/Pt. The water was removed by Nafion membrane separation. Repeated analyses of standards indicate that the reproducibility of $\delta^{13}C$ values is better than 1 ‰ PDB (2 sigma).

Carbon isotope analysis of low concentration methane using the Precon.

The carbon isotopic composition of methane was determined by a Precon-IRMS system. Aliquots were sampled with a GCPal autosampler. CO_2, CO and water were removed on

chemical traps. Other hydrocarbons than CH_4 and remaining traces of CO_2 were removed by cryotrapping. The methane was burnt to CO_2 and water in a 1000 °C furnace over Cu/Ni/Pt. The water was removed by Nafion membrane separation. The sample preparation system described (Precon) was connected to a Delta plus XP IRMS for $\delta^{13}C$ analysis. Repeated analyses of standards indicate that the reproducibility of $\delta^{13}C$ values is better than 1 ‰ PDB (2 sigma).

Hydrogen isotope analysis of methane

The hydrogen isotopic composition of methane was determined by a GC-C-IRMS system. Aliquots were sampled with a GCPal and analysed on a Trace GC2000, equipped with a Poraplot Q column, connected to a Delta plus XP IRMS. The components were decomposed to H_2 and coke in a 1400 °C furnace. The international standard NGS-2 and an in-house standard (Std A) were used for testing accuracy and precision. The "true" value of NGS-2 is given to –172.5 ‰ V-SMOW (http://deuterium.nist.gov/standards.html). Repeated analyses of standards indicate that the reproducibility of δD values is better than 10 ‰ PDB (2 sigma).

Stable carbon and hydrogen isotope analysis of fractions

The samples were dissolved in a known amount of dichloromethane, and 4-5 mg of the sample (or as much as possible) was transferred to a glass container. The solvent was evaporated in an oven at 50 °C. CuO and some silver wires were added to the containers, which were then sealed by melting in a vacuum. The samples were then combusted in an oven at 550 °C for 1 hour (Sofer, 1980). The combustion products CO_2 and H_2O were separated at –80°C.

Carbon isotopic composition of the CO_2 aliquot was determined on a Finnigan MAT 251 mass spectrometer. A standard (NGS NSO-1, topped oil) is analysed for each 10th sample. The $\delta^{13}C$ value obtained for this standard is –28.77 ‰ PDB. The variation in the isotopic values for the standard by repeated analysis over a period of five years is ± 0.13 ‰.

$H_2O_{(g)}$ aliquot was reduced with $Zn_{(s)}$ to $H_{2(g)}$ and $ZnO_{(s)}$ in sealed, evacuated quartz vessels at 900 °C. The δD composition was determined by a Finnigan MAT 251 mass spectrometer. Average analysed value for GISP from IAEA is δD_{VSMOW}= -189.71 ± 0.89 ‰ (one standard deviation). Given value from IAEA is -189.73 ± 0.9 ‰.

Stable carbon isotope analysis of kerogens

The samples were weighed and transferred to a 9x15 mm tin capsule. Approximately 3 mg of the samples were used. The combustion of the samples in the presence of O_2 and Cr_2O_3 at 1700 °C was done in a Carlo Erba NCS 2500 element analyser. Reduction of NO_x to N_2 was done in a Cu oven at 650 °C. H_2O was removed in a chemical trap of $KMnO_4$ before separation of N_2, CO_2 and SO_2 on a 2 m Poraplot Q GC column. CO_2 is flushed on-line in a He flow to a Micromass Optima, Isotope Ratio Mass Spectrometer for determination of $\delta^{13}C$. A standard (USGS-24) is analysed for each 10th sample. The $\delta^{13}C$ value obtained for this standard is -16.01 ± 0.06 ‰ PDB (one standard deviation). Given value from IAEA is -15.99 ± 0.11 ‰ PDB (one standard deviation).

GC of whole oil

A HP5890 II instrument is used. The column is a HP PONA, length 50 m, i.d. 0.2 mm, film thickness 0.5 μm. 2,2,4-tri-methyl-pentane is used as an internal standard.

Temperature programme

30 °C (10 min.) - 2 °C/min. - 60 °C (10 min.)- 2 °C/min - 130 °C (0 min.)-4 °C/min. - 320 °C (25 min.)

GC of saturated fraction

A HP5890 II instrument is used. The column is a CP-Sil-5 CB-MS, length 60 m, i.d. 0.25 mm, film thickness 0.25 μm. C20D42 is used as an internal standards.

Temperature programme

50 °C (1 min.) - 4 °C/min. - 320 °C (25 min.)

GC of aromatic fraction

A HP5890 instrument is used. The column is a CP-Sil-5 CB-MS, length 60 m, i.d. 0.25 mm, film thickness 0.25 μm.

Temperature programme

50 °C (1 min.) - 4 °C/min. - 320 °C (25 min.)

GCMS of saturated and aromatic fractions

A Micromass ProSpec high resolution instrument is used. The instrument is tuned to a resolution of 3000 and data is acquired in Selected Ion Recording (SIR) mode. The column used is a 60 m CP-Sil-5 CB-MS with an i.d. of 0.25 mm and a film thickness 0.25 μm. D_4-27ααR is used as internal standard when quantitative results are requested for the saturated compounds. D_8-naphthalene and D_{10}-phenanthrene are used as internal standards when quantitative results are required for the aromatic compounds. The aromatic and aliphatic fractions may be analysed together or separately.

Temperature programme

50 °C (1 min.) - 20 °C/min. - 120 °C - 2 °C/min - 320 °C (20 min.)