Geochemistry Report – Well 31/8-1 (Breiflabb)

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1 Introduction

Well 31/8-1 was drilled as an exploration well in the Breiflabb prospect in the northern Norwegian North Sea, some 70 km west of the Norwegian main-land and some 16 km south-southwest of the Troll Field (*Figure 1.1*).

The well was drilled with water based KCl/glycol mud throughout.

This routine geochemical study of well 31/8-1 was commissioned by Trond H. Wierod at E.ON Ruhrgas Norge AS.

Sixty-one samples were received in October 2011for analysis according to the program specified by E.ON Ruhrgas Norge AS, and as modified after the screening program.

The samples analysed are 18 mud gas samples in Isotubes from the reservoir section and 40 ditch cuttings samples for source rock characterisation, maturity profiling and reservoir analyses. In addition, two mud samples were analysed, one of unused mud and one from right above the main reservoir sections of the well.

Table 1.1: Analyses applied to the study.

Analysis	Cuttings	Gas	Mud	Total
TOC/Rock-Eval	14			14
Vitrinite reflectance	14			14
Gas composition		18		18
Iatroscan	15		2	17
Extraction	15		2	17
Asphaltenes	15		2	17
MPLC	5		1	6
GC of Saturated hydrocarbons	5		1	6
GC-MS of Saturated hydrocarbons	5		1	6
GC-MS of Aromatic hydrocarbons	5		1	6
Stable isotopes of fractions	5		1	6

Table 1. Number of analyses performed

Analysis	Cuttings	Gas	Mud	Total
TOC/Rock-Eval	14			14
Vitrinite reflectance	14			14
Gas composition		18		18
Iatroscan	15		2	17
Extraction	15		2	17
Asphaltenes	15		2	17
MPLC	5		1	6
GC of Saturated hydrocarbons	5		1	6
GC-MS of Saturated hydrocarbons	5		1	6
GC-MS of Aromatic hydrocarbons	5		1	6
Stable isotopes of fractions	5		1	6

Table 2. GC of saturated compounds (parameters)

Well	Sample type	Lower Depth (m)	APT ID	CPI 1	Pr/n-C17	Ph/n-C18	(Pr/n-C17)/ (Ph/n-C18))	Pr/Ph	n-C17/ (n-C17+C27)
31/8-1	DC	2128	91419	1.35	0.60	0.66	0.92	1.30	0.93
31/8-1	DC	2179	91421	1.28	0.58	0.62	0.94	1.23	0.98
31/8-1	DC	2221	91422	1.08	0.56	0.57	0.98	1.27	0.80
31/8-1	DC	2251	91423	1.24	0.61	0.63	0.96	1.13	0.97
31/8-1	DC	2434	91429	1.31	0.59	0.52	1.14	1.66	0.95
31/8-1	Mud	2057	91439	1.72	0.40	0.44	0.91	1.98	1.00

Table 3. GCMS SIR of saturated compounds (parameters)

Well	Sample type	Lower Depth (m)	APT ID	%23:3	%28αβ	%30D	%27Ts	%22S	%29Ts	%20S	%ββ	%27dβS	%C27	%C29	28/29	24:4/23:3
31/8-1	DC	2128	91419	8.06	11.10	6.81	34.61	37.02	15.23	13.29	33.82	32.98	32.70	31.51	0.96	0.67
31/8-1	DC	2179	91421	12.45	16.52	6.34	37.05	44.22	14.21	23.51	44.17	38.94	35.10	35.82	0.72	0.71
31/8-1	DC	2221	91422	28.07	23.10	6.53	40.51	48.77	14.59	28.33	53.27	45.14	37.17	35.07	0.75	0.40
31/8-1	DC	2251	91423	17.71	32.34	9.07	33.07	45.36	14.37	24.25	48.30	45.87	31.56	41.87	0.50	0.63
31/8-1	DC	2434	91429	12.81	15.49	7.07	30.83	45.54	16.21	26.21	45.77	43.63	33.96	39.82	0.47	1.10
31/8-1	Mud	2057	91439	13.27	16.82	9.46	50.40	56.48	17.65	47.71	62.39	47.07	34.43	38.08	0.67	0.81

%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 4. GCMS SIR of aromatic compounds (parameters)

Well	Sample type	Lower Depth (m)	APT ID	AROM2	Crack1	Crack2	MSAro1	MSAro2	MSAro3	MSAro4	MSAro5	MSAro6	MSAro7	MSAro8	MSAro9
31/8-1	DC	2128	91419	0.09	0.42	0.16	0.10	0.56	0.36	1.10	2.07	0.82	0.09	0.93	0.06
31/8-1	DC	2179	91421	0.14	0.50	0.29	0.13	1.41	0.34	1.26	1.80	0.69	0.04	0.43	0.08
31/8-1	DC	2221	91422	0.22	0.48	0.32	0.19	2.09	0.34	1.35	1.71	0.61	0.03	0.59	0.14
31/8-1	DC	2251	91423	0.21	0.45	0.40	0.20	2.13	0.33	1.43	1.98	0.71	0.04	0.43	0.11
31/8-1	DC	2434	91429	0.24	0.45	0.40	0.24	3.07	0.36	1.40	2.33	0.53	0.03	1.69	0.17
31/8-1	Mud	2057	91439	0.64	0.46	0.28		2.33	0.43	1.75	2.77	1.54	0.09	1.35	1.00

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 5. TOC and Rock-Eval data

Well	Sample type	Lower Depth (m)	APT ID	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	PP (mg/g)	PI (wt ratio)	HI (mg HC/ g TOC)	OI (mg CO2/ g TOC)	TOC (%)*
31/8-1	DC	2000	91405WM	0.06	1.42	1.57	428	1.48	0.04	119	131	1.19
31/8-1	DC	2000	91405XWM	0.03	1.37	1.05	429	1.40	0.02	115	88	1.19
31/8-1	DC	2010	91406WM	0.12	19.67	1.02	422	19.79	0.01	419	22	4.70
31/8-1	DC	2010	91406XWM	0.05	19.38	0.89	424	19.43	0.00	427	20	4.54
31/8-1	DC	2020	91407WM	0.13	25.50	0.81	421	25.63	0.01	477	15	5.34
31/8-1	DC	2020	91407XWM	0.05	22.91	1.05	422	22.96	0.00	441	20	5.20
31/8-1	DC	2020	91407	1.59	26.88	2.03	424	28.47	0.06	521	39	5.16
31/8-1	DC	2030	91408WM	0.17	22.00	1.53	422	22.17	0.01	430	30	5.12
31/8-1	DC	2030	91408XWM	0.05	19.55	0.82	423	19.60	0.00	396	17	4.94
31/8-1	DC	2040	91409WM	0.09	16.17	0.68	425	16.26	0.01	391	16	4.13
31/8-1	DC	2040	91409XWM	0.04	15.17	0.78	426	15.21	0.00	374	19	4.06
31/8-1	DC	2050	91410WM	0.07	12.55	0.79	427	12.62	0.01	329	21	3.81
31/8-1	DC	2050	91410XWM	0.05	13.28	0.81	426	13.33	0.00	358	22	3.71
31/8-1	DC	2060	91411WM	0.08	9.86	0.92	428	9.94	0.01	309	29	3.19
31/8-1	DC	2060	91411XWM	0.05	9.70	0.97	427	9.75	0.01	312	31	3.11
31/8-1	DC	2070	91412WM	0.06	8.38	0.75	427	8.44	0.01	309	28	2.71
31/8-1	DC	2070	91412XWM	0.03	7.42	0.69	428	7.45	0.00	284	26	2.61
31/8-1	DC	2077	91413WM	0.07	10.00	0.61	426	10.07	0.01	334	20	2.99
31/8-1	DC	2077	91413XWM	0.04	8.67	0.78	426	8.71	0.00	296	27	2.93
31/8-1	DC	2086	91414WM	0.08	10.23	0.88	426	10.31	0.01	323	28	3.17
31/8-1	DC	2086	91414XWM	0.04	8.65	0.79	426	8.69	0.00	283	26	3.05
31/8-1	DC	2095	91415WM	0.15	21.15	0.63	421	21.30	0.01	417	12	5.07
31/8-1	DC	2095	91415XWM	0.05	18.27	0.85	423	18.32	0.00	371	17	4.93
31/8-1	DC	2104	91416WM	0.48	41.50	1.69	422	41.98	0.01	480	20	8.64
31/8-1	DC	2104	91416XWM	0.08	42.23	0.88	422	42.31	0.00	504	11	8.38
31/8-1	DC	2110	91417WM	0.35	34.74	1.52	420	35.09	0.01	449	20	7.74
31/8-1	DC	2110	91417XWM	0.08	36.38	0.89	422	36.46	0.00	482	12	7.55
31/8-1	DC	2119	91418WM	0.26	23.19	0.91	421	23.45	0.01	450	18	5.15
31/8-1	DC	2119	91418XWM	0.06	22.45	0.86	422	22.51	0.00	451	17	4.98

*: Leco TOC

Table 6. Vitrinite Reflectance

Well	Sample type	Lower Depth (m)	APT ID	Sample prep.	%Lithology	%Ro	Std. dev.	No. of measurements	Quality rating	Overall quality	Comment
31/8-1	DC	980	91398	Bulk	Clyst	0.25	0.05	19	oooooo	M	See data sheet
31/8-1	DC	1100	91399	Bulk	Clyst	0.28	0.04	12	oooooo	G	Organic matter is sparse.
31/8-1	DC	1270	91400	Bulk	Clyst	0.28	0.04	18	oooooo	G	See data sheet
31/8-1	DC	1400	91401	Bulk	Clyst	0.32	0.04	11	oooooo	G	See data sheet
31/8-1	DC	1550	91402	Bulk	Clyst	0.36	0.05	5	-ooooo	M	See data sheet
31/8-1	DC	1700	91403	Bulk	Clyst	barren					See data sheet
31/8-1	DC	1850	91404	Bulk	Clyst	barren					See data sheet
31/8-1	DC	2010	91406	Bulk	Clyst	0.38	0.04	8	oooooo	G	See data sheet
31/8-1	DC	2060	91411	Bulk	Clyst	0.36	0.07	8	oooooo	M	See data sheet
31/8-1	DC	2104	91416	Bulk	Clyst	0.33	0.04	16	oooooo	M	See data sheet
31/8-1	DC	2260	91424	Bulk	Clyst	0.32	0.05	33	oooooo	G	See data sheet
31/8-1	DC	2431	91428	Bulk	Lst	0.35	0.04	12	oooooo	G	See data sheet
31/8-1	DC	2551	91435	Bulk	Clyst	0.40	0.06	9	oooooo	M	See data sheet
31/8-1	DC	2620	91437	Bulk	Clyst	0.39	0.05	13	oooooo	G	See data sheet

Legend to Vitrinite reflectance data

Lithology code		**Sample quality**		**Sample preparation**	
sst	Sandstone	G	Good	HF	Sample treatment with hydrofluoric acid prior to analysis
slst	Siltstone	M	Moderate		
clyst	Claystone	P	Poor	Bulk	Sample treated as bulk rock
sh	Shale	st	Hydrocarbon staining		
lst	Limestone				
coal	Coal				

Sample description and measurement evaluation (perfect sample characterised as: oooooo)

Sign order	**Parameter**	**Sign**	**Sign legend:**
1	Abundance of vitrinite	-o	- May give too low vitrinite reflectance sample value
2	Identification of vitrinite	-o+	o Reliable vitrinite reflectance sample value
3	Type of vitrinite	-o+	+ May give too high vitrinite reflectance sample value
4	Vitrinite fragment size	-o	
5	Vitrinite surface quality	-o	
6	Abundance of pyrite	o+	

Table 7. Gas Composition (volume-%)

Well	Sample type	Lower Depth (m)	APT ID	C1 (%THCG)	C2 (%THCG)	C2= (%THCG)	C3 (%THCG)	C3= (%THCG)	iC4 (%THCG)	nC4 (%THCG)	C4= (%THCG)	neoC5 (%THCG)	iC5 (%THCG)	nC5 (%THCG)	C6+ (%THCG)	C02 (%THCG)	ppm THCG	H2 (%Total)	N2 (%Total)	O2+Ar (%Total)
31/8-1	Isotube	2140	90724	4.85	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	95.2	1011	0.0000	78.1	21.8
31/8-1	Isotube	2157.80	90725	52.8	1.24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	46.0	631	0.0000	78.1	21.8
31/8-1	Isotube	2170	90726	81.3	1.47	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	17.2	536	0.0000	78.2	21.8
31/8-1	Isotube	2200	90727	80.2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	19.8	268	0.0000	78.1	21.9
31/8-1	Isotube	2230	90728	74.5	1.70	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	23.8	580	0.0000	78.1	21.8
31/8-1	Isotube	2260	90729	48.3	1.51	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	50.2	713	0.0000	78.1	21.8
31/8-1	Isotube	2290	90730	55.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	45.0	335	0.0000	78.2	21.8
31/8-1	Isotube	2320	90731	24.2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	75.8	512	0.0000	78.1	21.9
31/8-1	Isotube	2350	90732	74.9	2.79	0.0000	1.68	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	20.7	351	0.0000	78.2	21.8
31/8-1	Isotube	2368	90733	71.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	28.5	155	0.0000	78.1	21.9
31/8-1	Isotube	2380	90734	68.7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	31.3	132	0.0000	78.1	21.9
31/8-1	Isotube	2410	90735	34.6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	65.4	384	0.0000	78.1	21.8
31/8-1	Isotube	2440	90736	85.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	14.5	307	0.0000	78.2	21.8
31/8-1	Isotube	2470	90737	76.2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	23.8	325	0.0000	78.2	21.8
31/8-1	Isotube	2500	90738	64.6	1.42	0.0000	0.85	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	33.1	697	0.0000	78.2	21.7
31/8-1	Isotube	2530	90739	12.2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	87.8	1305	0.0000	78.1	21.7
31/8-1	Isotube	2560	90740	88.3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	11.7	323	0.0000	78.2	21.8
31/8-1	Isotube	2620	90741	45.1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	54.9	193	0.0000	78.1	21.9

Table 7. continued, Gas Composition (volume-%)

Well	Sample type	Lower Depth (m)	APT ID	ppm Total	C1-nC4 (%THCG)	C2-nC4 (%THCG)	C5+ (%THCG)	Wetness	iC4/nC4
31/8-1	Isotube	2140	90724	980193	4.85	0.0000	0.0000	0.0000	
31/8-1	Isotube	2157.80	90725	979455	54.0	1.24	0.0000	2.30	
31/8-1	Isotube	2170	90726	984310	82.8	1.47	0.0000	1.77	
31/8-1	Isotube	2200	90727	980531	80.2	0.0000	0.0000	0.0000	
31/8-1	Isotube	2230	90728	984073	76.2	1.70	0.0000	2.23	
31/8-1	Isotube	2260	90729	980934	49.8	1.51	0.0000	3.04	
31/8-1	Isotube	2290	90730	980667	55.0	0.0000	0.0000	0.0000	
31/8-1	Isotube	2320	90731	984749	24.2	0.0000	0.0000	0.0000	
31/8-1	Isotube	2350	90732	980981	79.3	4.47	0.0000	5.63	
31/8-1	Isotube	2368	90733	983769	71.5	0.0000	0.0000	0.0000	
31/8-1	Isotube	2380	90734	983971	68.7	0.0000	0.0000	0.0000	
31/8-1	Isotube	2410	90735	985385	34.6	0.0000	0.0000	0.0000	
31/8-1	Isotube	2440	90736	986152	85.5	0.0000	0.0000	0.0000	
31/8-1	Isotube	2470	90737	989659	76.2	0.0000	0.0000	0.0000	
31/8-1	Isotube	2500	90738	991390	66.9	2.28	0.0000	3.40	
31/8-1	Isotube	2530	90739	989777	12.2	0.0000	0.0000	0.0000	
31/8-1	Isotube	2560	90740	990897	88.3	0.0000	0.0000	0.0000	
31/8-1	Isotube	2620	90741	991152	45.1	0.0000	0.0000	0.0000	

Table 8. Extraction, Asphaltene precipitation and latroscan data

Well	Sample type	Lower Depth (m)	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)
31/8-1	DC	2128	91419	18.824	48	2523	9.1	11.3	71.0	8.6	20.4
31/8-1	DC	2149	91420	19.438	24	1260	7.8	4.3	72.3	15.6	12.1
31/8-1	DC	2179	91421	19.636	26	1329	10.4	8.8	52.0	28.7	19.3
31/8-1	DC	2221	91422	15.582	27	1758	9.9	14.7	58.3	17.2	24.6
31/8-1	DC	2251	91423	19.754	37	1888	8.3	9.8	61.6	20.3	18.1
31/8-1	DC	2305	91425	7.525	52	6883	5.7	11.0	54.9	28.4	16.7
31/8-1	DC	2380	91426	17.385	16	938	5.1	10.8	58.6	25.4	15.9
31/8-1	DC	2401	91427	15.512	33	2147	3.7	5.6	71.6	19.1	9.3
31/8-1	DC	2434	91429	11.390	29	2502	6.3	5.3	66.4	22.0	11.6
31/8-1	DC	2464	91430	17.973	26	1469	6.5	14.8	57.2	21.6	21.2
31/8-1	DC	2479	91431	18.011	13	738	6.6	13.1	49.3	31.0	19.7
31/8-1	DC	2506	91432	20.211	24	1207	6.1	11.7	40.0	42.3	17.8
31/8-1	DC	2521	91433	19.933	18	898	5.9	7.6	69.4	17.1	13.5
31/8-1	DC	2542	91434	9.273	17	1844	1.1	2.0	8.9	88.0	3.1
31/8-1	DC	2605	91436	15.473	14	924	4.9	10.8	63.8	20.4	15.8
31/8-1	Mud	970	91438	12.074	129	10709	20.2	5.8	73.3	0.7	26.0
31/8-1	Mud	2057	91439	10.719	233	21738	7.2	5.0	86.9	0.9	12.2

Table 9. GC of saturated compounds (peak area)

Well	Sample type	Lower Depth (m)	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	n-C18	Ph	n-C19
31/8-1	DC	2128	91419	0.00e0	5.46e4	6.45e5	2.51e4	4.07e4	4.02e6	1.69e5	2.50e6	7.05e5	2.24e6	2.19e6	7.93e5	2.30e6	1.39e6	1.62e6	1.07e6	7.77e5
31/8-1	DC	2179	91421	0.00e0	0.00e0	7.97e4	2.25e4	8.79e3	1.25e6	6.96e4	1.23e6	4.53e5	1.74e6	3.34e6	1.69e6	5.11e6	2.97e6	3.91e6	2.41e6	1.25e6
31/8-1	DC	2221	91422	0.00e0	0.00e0	8.89e4	1.69e4	1.17e4	1.69e6	8.64e4	1.52e6	3.84e5	1.34e6	1.51e6	5.84e5	1.82e6	1.02e6	1.41e6	8.04e5	7.27e5
31/8-1	DC	2251	91423	0.00e0	0.00e0	1.48e5	1.60e4	2.15e4	2.85e6	1.29e5	2.50e6	6.24e5	2.11e6	2.51e6	1.19e6	3.53e6	2.14e6	3.01e6	1.90e6	1.14e6
31/8-1	DC	2434	91429	0.00e0	0.00e0	1.92e5	1.90e4	2.00e4	2.76e6	9.75e4	2.00e6	4.72e5	1.37e6	9.88e5	3.16e5	9.15e5	5.40e5	6.28e5	3.25e5	2.88e5
31/8-1	Mud	2057	91439	9.16e4	6.00e5	1.89e6	1.81e5	1.30e6	1.19e7	3.27e6	1.62e7	3.59e6	9.87e6	7.44e6	1.98e6	5.61e6	2.25e6	2.59e6	1.14e6	7.36e5

Table 9. continued, GC of saturated compounds (peak area)

Well	Sample type	Lower Depth (m)	APT ID	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
31/8-1	DC	2128	91419	4.37e5	3.10e5	3.19e5	3.47e5	3.01e5	2.80e5	1.93e5	1.82e5	1.21e5	1.97e5	1.00e5	1.22e5	7.16e4	7.42e4	4.41e4	5.67e4	2.56e4
31/8-1	DC	2179	91421	3.80e5	1.93e5	1.78e5	1.51e5	1.30e5	1.29e5	9.77e4	9.73e4	7.82e4	1.05e5	6.06e4	7.22e4	4.15e4	3.65e4	3.39e4	2.51e4	8.60e3
31/8-1	DC	2221	91422	4.15e5	2.52e5	2.80e5	3.25e5	3.72e5	4.23e5	4.61e5	4.67e5	4.27e5	4.14e5	2.94e5	2.63e5	1.73e5	1.31e5	1.00e5	6.07e4	3.57e4
31/8-1	DC	2251	91423	3.80e5	1.89e5	1.73e5	1.55e5	1.30e5	1.26e5	9.63e4	9.11e4	7.50e4	1.00e5	6.11e4	7.05e4	4.17e4	4.07e4	2.56e4	2.37e4	7.37e3
31/8-1	DC	2434	91429	1.55e5	8.76e4	8.38e4	8.26e4	6.84e4	7.39e4	5.57e4	5.17e4	4.21e4	6.42e4	3.13e4	3.44e4	2.10e4	1.67e4	1.37e4	5.71e3	3.06e3
31/8-1	Mud	2057	91439	2.62e5	1.07e5	6.67e4	4.14e4	3.04e4	3.41e4	2.29e4	2.05e4	1.70e4	5.63e4	1.40e4	1.40e4	9.74e3	8.40e3	1.50e4	3.62e3	0.00e0

Table 10. GC of saturated compounds (amounts in ng/g)

Well	Sample type	Lower Depth (m)	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	n-C18	Ph	n-C19
31/8-1	DC	2128	91419	0.00e0	2.62e4	3.09e5	1.20e4	1.95e4	1.93e6	8.12e4	1.20e6	3.38e5	1.07e6	1.05e6	3.81e5	1.10e6	6.67e5	7.78e5	5.13e5	3.72e5
31/8-1	DC	2179	91421	0.00e0	0.00e0	4.32e4	1.22e4	4.76e3	6.76e5	3.77e4	6.66e5	2.45e5	9.42e5	1.81e6	9.17e5	2.77e6	1.61e6	2.12e6	1.31e6	6.75e5
31/8-1	DC	2221	91422	0.00e0	0.00e0	5.02e4	9.54e3	6.58e3	9.55e5	4.87e4	8.56e5	2.17e5	7.58e5	8.51e5	3.30e5	1.03e6	5.75e5	7.97e5	4.54e5	4.10e5
31/8-1	DC	2251	91423	0.00e0	0.00e0	6.00e4	6.50e3	8.70e3	1.16e6	5.23e4	1.01e6	2.53e5	8.55e5	1.02e6	4.81e5	1.43e6	8.65e5	1.22e6	7.68e5	4.61e5
31/8-1	DC	2434	91429	0.00e0	0.00e0	1.17e5	1.16e4	1.22e4	1.68e6	5.94e4	1.22e6	2.87e5	8.33e5	6.01e5	1.92e5	5.57e5	3.29e5	3.82e5	1.98e5	1.75e5
31/8-1	Mud	2057	91439	2.98e4	1.95e5	6.16e5	5.88e4	4.22e5	3.87e6	1.06e6	5.26e6	1.17e6	3.21e6	2.42e6	6.43e5	1.82e6	7.30e5	8.42e5	3.69e5	2.39e5

Table 10. continued, GC of saturated compounds (amounts in ng/g)

Well	Sample type	Lower Depth (m)	APT ID	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
31/8-1	DC	2128	91419	2.10e5	1.49e5	1.53e5	1.66e5	1.45e5	1.34e5	9.27e4	8.72e4	5.81e4	9.45e4	4.80e4	5.85e4	3.43e4	3.56e4	2.11e4	2.72e4	1.23e4
31/8-1	DC	2179	91421	2.06e5	1.04e5	9.63e4	8.17e4	7.05e4	7.00e4	5.29e4	5.27e4	4.23e4	5.67e4	3.28e4	3.91e4	2.25e4	1.98e4	1.84e4	1.36e4	4.65e3
31/8-1	DC	2221	91422	2.34e5	1.42e5	1.58e5	1.84e5	2.10e5	2.39e5	2.60e5	2.64e5	2.41e5	2.34e5	1.66e5	1.49e5	9.78e4	7.39e4	5.65e4	3.42e4	2.01e4
31/8-1	DC	2251	91423	1.54e5	7.66e4	7.03e4	6.29e4	5.25e4	5.10e4	3.90e4	3.69e4	3.04e4	4.06e4	2.48e4	2.86e4	1.69e4	1.65e4	1.04e4	9.62e3	2.99e3
31/8-1	DC	2434	91429	9.43e4	5.34e4	5.10e4	5.03e4	4.16e4	4.50e4	3.39e4	3.15e4	2.57e4	3.91e4	1.91e4	2.09e4	1.28e4	1.02e4	8.32e3	3.48e3	1.87e3
31/8-1	Mud	2057	91439	8.53e4	3.46e4	2.17e4	1.35e4	9.87e3	1.11e4	7.44e3	6.66e3	5.54e3	1.83e4	4.56e3	4.54e3	3.17e3	2.73e3	4.86e3	1.18e3	0.00e0

Table 11. GCMS SIR of saturated compounds (peak height)

m/e				177				191												
Well	Sample type	Lower Depth (m)	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	28/3R	28/3S	29/3R
31/8-1	DC	2128	91419	8.61e3	1.07e4	7.39e3	2.53e4	7.10e3	1.33e4	1.39e4	3.64e4	1.71e4	6.97e3	7.59e3	2.44e4	6.22e3	7.30e3	1.05e4	7.53e3	6.06e3
31/8-1	DC	2179	91421	0.00e0	9.60e3	5.81e3	1.35e4	1.61e4	9.57e3	1.05e4	2.45e4	1.13e4	7.76e3	5.13e3	1.74e4	6.14e3	6.85e3	5.74e3	4.95e3	3.98e3
31/8-1	DC	2221	91422	8.92e3	9.38e3	6.61e3	9.91e3	1.41e4	1.70e4	2.16e4	5.26e4	2.37e4	9.59e3	1.10e4	2.09e4	8.39e3	7.17e3	7.76e3	5.94e3	7.32e3
31/8-1	DC	2251	91423	9.54e3	8.52e3	6.26e3	8.39e3	2.62e4	1.42e4	1.16e4	2.72e4	1.27e4	5.45e3	6.17e3	1.71e4	5.14e3	5.94e3	7.02e3	3.02e3	5.17e3
31/8-1	DC	2434	91429	2.68e3	5.96e3	2.50e3	7.11e3	9.75e3	9.14e3	9.98e3	1.74e4	8.45e3	4.84e3	5.18e3	1.92e4	4.13e3	4.91e3	5.82e3	3.76e3	3.59e3
31/8-1	Mud	2057	91439	3.48e3	4.41e3	3.84e3	3.41e3	4.28e3	4.05e3	4.91e3	7.96e3	4.65e3	0.00e0	0.00e0	6.42e3	0.00e0	0.00e0	0.00e0	0.00e0	3.31e3

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e				191																
Well	Sample type	Lower Depth (m)	APT ID	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30O	30αβ	30βα	31αβS	31αβR	30G
31/8-1	DC	2128	91419	1.43e4	5.64e4	1.07e5	1.02e4	1.12e4	5.18e4	7.58e3	1.71e5	7.46e4	3.04e4	8.15e4	0.00e0	4.15e5	7.68e4	1.37e5	2.21e5	1.55e4
31/8-1	DC	2179	91421	6.10e3	2.97e4	5.05e4	5.46e3	8.04e3	3.41e4	8.00e3	9.39e4	2.85e4	1.17e4	2.79e4	0.00e0	1.72e5	2.58e4	5.38e4	6.63e4	7.30e3
31/8-1	DC	2221	91422	5.83e3	2.99e4	4.38e4	4.28e3	8.37e3	4.05e4	8.41e3	8.34e4	2.30e4	9.41e3	1.89e4	0.00e0	1.35e5	2.06e4	4.22e4	4.31e4	5.94e3
31/8-1	DC	2251	91423	5.72e3	2.48e4	5.02e4	5.95e3	6.66e3	6.04e4	7.87e3	8.10e4	2.12e4	1.26e4	2.20e4	0.00e0	1.26e5	2.61e4	4.53e4	4.90e4	5.92e3
31/8-1	DC	2434	91429	4.15e3	2.25e4	5.04e4	3.58e3	5.01e3	2.17e4	4.71e3	8.91e4	2.29e4	9.03e3	2.20e4	0.00e0	1.19e5	2.55e4	4.81e4	4.42e4	3.95e3
31/8-1	Mud	2057	91439	0.00e0	1.28e4	1.26e4	0.00e0	3.07e3	1.05e4	3.68e3	3.30e4	1.11e4	5.44e3	3.87e3	0.00e0	5.20e4	6.10e3	1.98e4	1.44e4	0.00e0

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e				191									217						
Well	Sample type	Lower Depth (m)	APT ID	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	21αα	21ββ	22αα	22ββ	27dβS	27dβR	27dαR	27dαS
31/8-1	DC	2128	91419	6.73e4	3.67e4	6.25e4	2.74e4	5.25e4	1.77e4	2.87e4	2.47e4	4.44e4	5.32e4	4.06e4	2.33e4	2.05e4	1.19e5	9.51e4	3.65e4	3.89e4
31/8-1	DC	2179	91421	2.09e4	2.25e4	2.83e4	1.46e4	2.08e4	1.03e4	1.16e4	1.10e4	1.48e4	1.83e4	1.80e4	9.61e3	9.17e3	3.93e4	2.62e4	1.24e4	1.15e4
31/8-1	DC	2221	91422	1.42e4	1.93e4	2.03e4	1.27e4	1.35e4	7.56e3	8.02e3	8.86e3	6.49e3	1.60e4	2.02e4	1.18e4	1.24e4	2.89e4	1.93e4	8.82e3	8.36e3
31/8-1	DC	2251	91423	1.72e4	2.15e4	2.59e4	1.25e4	1.56e4	7.15e3	9.23e3	7.89e3	8.73e3	1.38e4	1.56e4	9.44e3	8.58e3	2.35e4	1.45e4	6.32e3	8.84e3
31/8-1	DC	2434	91429	1.64e4	2.02e4	2.41e4	9.95e3	1.12e4	6.54e3	7.76e3	5.15e3	3.64e3	1.06e4	1.25e4	6.66e3	6.72e3	1.94e4	1.21e4	7.03e3	7.40e3
31/8-1	Mud	2057	91439	0.00e0	1.07e4	8.26e3	9.60e3	6.43e3	5.26e3	4.46e3	5.72e3	3.58e3	6.49e3	6.69e3	6.39e3	4.32e3	9.08e3	6.16e3	2.95e3	3.72e3

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e				217															
Well	Sample type	Lower Depth (m)	APT ID	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR	27ααS	27ββR+29dβS	27ββS	28dαS	27ααR	29dβR	29dαR	28ααS	29dαS	28ββR	28ββS	28ααR
31/8-1	DC	2128	91419	5.96e4	5.90e4	4.60e4	5.50e4	3.61e4	4.62e4	9.08e4	2.95e4	2.37e4	1.95e5	9.13e4	4.04e4	1.29e4	2.84e4	5.16e4	4.85e4	1.07e5
31/8-1	DC	2179	91421	2.04e4	2.02e4	1.49e4	1.61e4	1.10e4	1.62e4	3.72e4	1.62e4	7.79e3	4.55e4	3.12e4	1.31e4	4.52e3	1.19e4	1.69e4	1.71e4	2.27e4
31/8-1	DC	2221	91422	1.33e4	1.14e4	6.30e3	8.05e3	7.68e3	1.29e4	2.64e4	1.18e4	5.96e3	2.23e4	2.03e4	8.60e3	4.13e3	9.19e3	1.26e4	1.35e4	1.15e4
31/8-1	DC	2251	91423	1.27e4	1.12e4	7.10e3	8.18e3	6.43e3	9.54e3	3.33e4	9.98e3	4.43e3	1.82e4	2.42e4	1.14e4	2.43e3	1.35e4	1.18e4	1.15e4	1.04e4
31/8-1	DC	2434	91429	8.56e3	1.01e4	5.67e3	7.02e3	5.30e3	7.65e3	2.52e4	8.68e3	0.00e0	1.74e4	1.91e4	8.14e3	0.00e0	8.25e3	8.50e3	7.75e3	7.73e3
31/8-1	Mud	2057	91439	4.55e3	5.21e3	4.06e3	4.03e3	3.05e3	4.03e3	8.94e3	5.00e3	0.00e0	6.17e3	5.06e3	3.06e3	0.00e0	2.82e3	3.80e3	5.57e3	3.72e3

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e				217								218						
Well	Sample type	Lower Depth (m)	APT ID	29ααS	29ββR	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
31/8-1	DC	2128	91419	2.01e4	4.05e4	3.68e4	1.31e5	3.16e4	1.46e4	0.00e0	3.85e4	6.71e4	3.98e4	5.82e4	5.87e4	5.27e4	5.03e4	9.99e3	8.68e3
31/8-1	DC	2179	91421	1.12e4	1.98e4	1.77e4	3.63e4	9.78e3	5.47e3	4.08e3	8.84e3	2.80e4	2.07e4	1.92e4	2.12e4	2.64e4	2.33e4	4.47e3	3.82e3
31/8-1	DC	2221	91422	7.35e3	1.70e4	1.25e4	1.86e4	7.42e3	3.37e3	0.00e0	3.62e3	2.53e4	1.83e4	1.59e4	1.66e4	2.32e4	1.79e4	2.64e3	2.62e3
31/8-1	DC	2251	91423	9.04e3	2.01e4	1.48e4	2.83e4	0.00e0	3.80e3	0.00e0	3.09e3	2.12e4	1.38e4	1.42e4	1.52e4	2.54e4	2.11e4	2.61e3	2.17e3
31/8-1	DC	2434	91429	7.22e3	1.31e4	1.02e4	2.03e4	5.72e3	0.00e0	0.00e0	2.26e3	1.65e4	1.14e4	9.98e3	1.15e4	1.77e4	1.49e4	0.00e0	0.00e0
31/8-1	Mud	2057	91439	3.50e3	6.75e3	5.41e3	3.83e3	3.33e3	0.00e0	0.00e0	0.00e0	7.94e3	6.29e3	5.82e3	5.54e3	8.44e3	7.29e3	0.00e0	0.00e0

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	21ααα
C21-5α(H), 14β(H), 17β(H)-pregnane	21βββ
C22-5α(H), 14α(H), 17α(H)-pregnane	22ααα
C22-5α(H), 14β(H), 17β(H)-pregnane	22βββ
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	27βββR
24-ethyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	29dβS
5α(H), 14β(H), 17β(H), 20(S)-cholestane	27βββS
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	28βββR
24-methyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	28βββS
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	29βββR
24-ethyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	29βββS
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	30βββR
24-propyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	30βββS
24-propyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	30ααR

Table 12. GCMS SIR of saturated compounds (amounts in ng/g)

m/e				177				191												
Well	Sample type	Lower Depth (m)	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	28/3R	28/3S	29/3R
31/8-1	DC	2128	91419	7.11e2	8.80e2	6.11e2	2.09e3	5.87e2	1.10e3	1.15e3	3.01e3	1.41e3	5.76e2	6.27e2	2.02e3	5.14e2	6.03e2	8.71e2	6.22e2	5.01e2
31/8-1	DC	2179	91421	0.00e0	9.21e2	5.58e2	1.30e3	1.55e3	9.19e2	1.01e3	2.35e3	1.09e3	7.46e2	4.92e2	1.68e3	5.90e2	6.58e2	5.52e2	4.75e2	3.82e2
31/8-1	DC	2221	91422	8.08e2	8.50e2	5.99e2	8.98e2	1.28e3	1.54e3	1.96e3	4.77e3	2.15e3	8.68e2	9.99e2	1.90e3	7.60e2	6.50e2	7.03e2	5.38e2	6.63e2
31/8-1	DC	2251	91423	7.43e2	6.64e2	4.87e2	6.54e2	2.04e3	1.10e3	9.05e2	2.12e3	9.88e2	4.24e2	4.81e2	1.33e3	4.00e2	4.62e2	5.47e2	2.35e2	4.03e2
31/8-1	DC	2434	91429	3.60e2	8.01e2	3.35e2	9.56e2	1.31e3	1.23e3	1.34e3	2.34e3	1.14e3	6.51e2	6.96e2	2.58e3	5.55e2	6.59e2	7.83e2	5.06e2	4.83e2
31/8-1	Mud	2057	91439	2.90e2	3.68e2	3.20e2	2.84e2	3.57e2	3.38e2	4.09e2	6.64e2	3.88e2	0.00e0	0.00e0	5.36e2	0.00e0	0.00e0	0.00e0	0.00e0	2.76e2

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e				191																
Well	Sample type	Lower Depth (m)	APT ID	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30O	30αβ	30βα	31αβS	31αβR	30G
31/8-1	DC	2128	91419	1.19e3	4.66e3	8.80e3	8.40e2	9.23e2	4.28e3	6.26e2	1.41e4	6.16e3	2.51e3	6.73e3	0.00e0	3.43e4	6.35e3	1.13e4	1.83e4	1.28e3
31/8-1	DC	2179	91421	5.85e2	2.85e3	4.85e3	5.24e2	7.72e2	3.27e3	7.68e2	9.02e3	2.74e3	1.12e3	2.68e3	0.00e0	1.65e4	2.48e3	5.17e3	6.37e3	7.01e2
31/8-1	DC	2221	91422	5.28e2	2.71e3	3.97e3	3.88e2	7.58e2	3.67e3	7.62e2	7.56e3	2.09e3	8.53e2	1.71e3	0.00e0	1.22e4	1.86e3	3.82e3	3.91e3	5.38e2
31/8-1	DC	2251	91423	4.46e2	1.93e3	3.91e3	4.64e2	5.19e2	4.71e3	6.13e2	6.31e3	1.65e3	9.82e2	1.71e3	0.00e0	9.84e3	2.03e3	3.53e3	3.82e3	4.61e2
31/8-1	DC	2434	91429	5.58e2	3.02e3	6.78e3	4.81e2	6.73e2	2.92e3	6.33e2	1.20e4	3.08e3	1.21e3	2.95e3	0.00e0	1.59e4	3.42e3	6.47e3	5.94e3	5.31e2
31/8-1	Mud	2057	91439	0.00e0	1.07e3	1.05e3	0.00e0	2.56e2	8.77e2	3.07e2	2.76e3	9.30e2	4.53e2	3.23e2	0.00e0	4.34e3	5.09e2	1.65e3	1.20e3	0.00e0

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e				191									217						
Well	Sample type	Lower Depth (m)	APT ID	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	21ααα	21βββ	22ααα	22βββ	27dβS	27dβR	27dαR	27dαS
31/8-1	DC	2128	91419	5.56e3	3.03e3	5.16e3	2.27e3	4.34e3	1.47e3	2.37e3	2.04e3	3.67e3	4.39e3	3.35e3	1.93e3	1.70e3	9.81e3	7.86e3	3.02e3	3.21e3
31/8-1	DC	2179	91421	2.01e3	2.16e3	2.72e3	1.40e3	2.00e3	9.89e2	1.12e3	1.05e3	1.42e3	1.76e3	1.73e3	9.23e2	8.81e2	3.78e3	2.51e3	1.19e3	1.10e3
31/8-1	DC	2221	91422	1.29e3	1.75e3	1.84e3	1.15e3	1.22e3	6.85e2	7.27e2	8.03e2	5.88e2	1.45e3	1.83e3	1.07e3	1.12e3	2.62e3	1.75e3	7.99e2	7.58e2
31/8-1	DC	2251	91423	1.34e3	1.67e3	2.02e3	9.72e2	1.22e3	5.57e2	7.19e2	6.14e2	6.80e2	1.07e3	1.22e3	7.35e2	6.68e2	1.83e3	1.13e3	4.92e2	6.89e2
31/8-1	DC	2434	91429	2.20e3	2.71e3	3.24e3	1.34e3	1.51e3	8.80e2	1.04e3	6.92e2	4.89e2	1.42e3	1.68e3	8.96e2	9.04e2	2.60e3	1.62e3	9.45e2	9.94e2
31/8-1	Mud	2057	91439	0.00e0	8.95e2	6.89e2	8.01e2	5.37e2	4.39e2	3.72e2	4.77e2	2.99e2	5.42e2	5.58e2	5.33e2	3.60e2	7.57e2	5.14e2	2.46e2	3.10e2

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e				217															
Well	Sample type	Lower Depth (m)	APT ID	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR	27ααS	27ββR+29dβS	27ββS	28dαS	27ααR	29dβR	29dαR	28ααS	29dαS	28ββR	28ββS	28ααR
31/8-1	DC	2128	91419	4.92e3	4.87e3	3.80e3	4.55e3	2.99e3	3.81e3	7.50e3	2.43e3	1.96e3	1.61e4	7.55e3	3.34e3	1.07e3	2.35e3	4.26e3	4.01e3	8.87e3
31/8-1	DC	2179	91421	1.96e3	1.94e3	1.44e3	1.55e3	1.06e3	1.56e3	3.57e3	1.55e3	7.48e2	4.37e3	2.99e3	1.26e3	4.34e2	1.15e3	1.62e3	1.64e3	2.18e3
31/8-1	DC	2221	91422	1.20e3	1.03e3	5.71e2	7.30e2	6.95e2	1.17e3	2.39e3	1.07e3	5.40e2	2.02e3	1.84e3	7.79e2	3.74e2	8.33e2	1.14e3	1.23e3	1.05e3
31/8-1	DC	2251	91423	9.90e2	8.73e2	5.53e2	6.37e2	5.01e2	7.43e2	2.60e3	7.77e2	3.45e2	1.42e3	1.89e3	8.92e2	1.89e2	1.05e3	9.19e2	8.99e2	8.06e2
31/8-1	DC	2434	91429	1.15e3	1.36e3	7.62e2	9.43e2	7.13e2	1.03e3	3.38e3	1.17e3	0.00e0	2.34e3	2.56e3	1.09e3	0.00e0	1.11e3	1.14e3	1.04e3	1.04e3
31/8-1	Mud	2057	91439	3.79e2	4.35e2	3.38e2	3.36e2	2.55e2	3.37e2	7.46e2	4.17e2	0.00e0	5.15e2	4.22e2	2.55e2	0.00e0	2.35e2	3.17e2	4.65e2	3.11e2

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e				217								218						
Well	Sample type	Lower Depth (m)	APT ID	29ααS	29ββR	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
31/8-1	DC	2128	91419	1.66e3	3.34e3	3.04e3	1.08e4	2.61e3	1.21e3	0.00e0	3.18e3	5.54e3	3.29e3	4.81e3	4.85e3	4.35e3	4.16e3	8.26e2	7.17e2
31/8-1	DC	2179	91421	1.07e3	1.91e3	1.70e3	3.49e3	9.40e2	5.25e2	3.92e2	8.49e2	2.69e3	1.99e3	1.85e3	2.03e3	2.54e3	2.24e3	4.29e2	3.67e2
31/8-1	DC	2221	91422	6.66e2	1.54e3	1.13e3	1.68e3	6.72e2	3.05e2	0.00e0	3.28e2	2.29e3	1.66e3	1.44e3	1.51e3	2.10e3	1.62e3	2.39e2	2.38e2
31/8-1	DC	2251	91423	7.04e2	1.56e3	1.15e3	2.20e3	0.00e0	2.96e2	0.00e0	2.40e2	1.65e3	1.07e3	1.11e3	1.19e3	1.98e3	1.64e3	2.03e2	1.69e2
31/8-1	DC	2434	91429	9.71e2	1.76e3	1.37e3	2.73e3	7.69e2	0.00e0	0.00e0	3.04e2	2.22e3	1.53e3	1.34e3	1.55e3	2.38e3	2.01e3	0.00e0	0.00e0
31/8-1	Mud	2057	91439	2.92e2	5.63e2	4.51e2	3.20e2	2.78e2	0.00e0	0.00e0	0.00e0	6.62e2	5.25e2	4.86e2	4.62e2	7.04e2	6.08e2	0.00e0	0.00e0

Table 13. GCMS SIR of aromatic compounds (peak height)

m/e				142		156										170				
Well	Sample type	Lower Depth (m)	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	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN
31/8-1	DC	2128	91419	4.83e6	4.38e6	5.54e5	6.38e5	7.08e5	9.82e5	2.34e6	1.95e6	1.14e6	8.18e5	6.57e5	5.82e4	4.79e5	7.72e5	7.04e5	4.08e5	2.39e5
31/8-1	DC	2179	91421	3.23e6	2.56e6	3.70e5	4.08e5	4.71e5	6.79e5	1.62e6	1.36e6	1.04e6	6.38e5	4.76e5	2.94e4	3.51e5	5.45e5	5.40e5	3.46e5	1.69e5
31/8-1	DC	2221	91422	3.45e6	2.55e6	3.60e5	3.65e5	3.93e5	5.71e5	1.38e6	1.19e6	9.12e5	5.62e5	4.12e5	3.60e4	2.85e5	4.42e5	4.37e5	2.86e5	1.34e5
31/8-1	DC	2251	91423	7.18e6	5.02e6	7.04e5	6.86e5	7.51e5	1.05e6	2.55e6	2.01e6	1.75e6	9.08e5	7.34e5	6.30e4	4.88e5	7.75e5	8.33e5	4.96e5	2.41e5
31/8-1	DC	2434	91429	1.25e7	8.92e6	1.27e6	1.29e6	1.26e6	1.81e6	4.62e6	3.23e6	2.62e6	1.32e6	1.40e6	7.75e4	8.13e5	1.23e6	1.44e6	7.98e5	4.44e5
31/8-1	Mud	2057	91439	1.01e6	5.77e5	7.88e4	7.66e4	1.84e5	2.86e5	4.76e5	4.19e5	1.77e5	1.70e5	6.29e4	0.00e0	1.27e5	1.71e5	1.56e5	1.20e5	4.23e4

Table 13. continued, GCMS SIR of aromatic compounds (peak height)

m/e				170			178	192				206								
Well	Sample type	Lower Depth (m)	APT ID	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	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
31/8-1	DC	2128	91419	5.41e5	1.77e5	3.72e5	1.91e6	5.07e5	5.77e5	1.21e6	7.46e5	1.29e5	1.38e5	7.42e4	5.78e5	2.59e5	2.33e5	1.02e5	1.95e5	8.60e4
31/8-1	DC	2179	91421	4.65e5	1.62e5	2.97e5	6.60e6	1.11e6	1.57e6	3.62e6	1.54e6	2.48e5	2.51e5	1.37e5	1.11e6	5.74e5	3.54e5	2.76e5	5.39e5	1.47e5
31/8-1	DC	2221	91422	3.85e5	1.34e5	2.59e5	6.73e6	1.03e6	1.47e6	3.35e6	1.46e6	2.19e5	2.38e5	1.26e5	1.03e6	5.54e5	3.43e5	2.67e5	5.35e5	1.51e5
31/8-1	DC	2251	91423	6.81e5	2.57e5	5.17e5	1.20e7	2.01e6	2.86e6	6.96e6	2.96e6	4.20e5	4.86e5	2.21e5	2.04e6	1.02e6	6.31e5	4.90e5	9.89e5	2.79e5
31/8-1	DC	2434	91429	1.14e6	4.41e5	1.04e6	2.08e7	3.47e6	5.68e6	1.14e7	5.07e6	6.55e5	6.89e5	4.00e5	3.12e6	1.54e6	1.00e6	6.91e5	1.69e6	3.94e5
31/8-1	Mud	2057	91439	1.19e5	2.35e4	6.21e4	1.79e5	8.36e4	9.94e4	1.35e5	1.04e5	2.28e4	3.23e4	2.23e4	1.33e5	6.44e4	6.32e4	2.72e4	4.18e4	1.79e4

Table 13. continued, GCMS SIR of aromatic compounds (peak height)

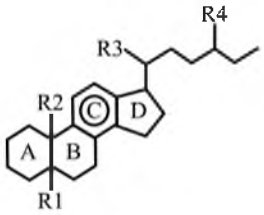
m/e				206	219	184	198			253									
Well	Sample type	Lower Depth (m)	APT ID	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA
31/8-1	DC	2128	91419	7.99e4	5.45e5	1.74e5	1.42e5	9.73e4	2.53e5	1.35e5	2.29e5	1.53e5	2.05e5	2.61e5	3.13e5	7.27e5	5.34e4	2.95e5	8.81e5	5.40e5
31/8-1	DC	2179	91421	1.82e5	2.58e6	2.60e5	1.78e5	1.36e5	1.26e5	5.19e4	6.12e4	3.43e4	5.63e4	7.09e4	6.88e4	1.81e5	2.09e4	6.36e4	1.79e5	1.20e5
31/8-1	DC	2221	91422	1.68e5	1.74e6	2.09e5	1.27e5	9.70e4	6.10e4	4.01e4	2.96e4	1.56e4	2.66e4	2.95e4	2.39e4	7.15e4	1.19e4	2.25e4	5.51e4	5.49e4
31/8-1	DC	2251	91423	3.26e5	4.66e6	5.17e5	3.67e5	2.80e5	1.72e5	6.94e4	5.14e4	1.93e4	4.45e4	5.49e4	2.79e4	1.38e5	2.45e4	3.02e4	7.62e4	9.06e4
31/8-1	DC	2434	91429	4.79e5	2.06e6	6.37e5	3.37e5	3.53e5	1.10e5	7.14e4	4.75e4	1.72e4	4.92e4	5.57e4	2.41e4	1.04e5	1.67e4	2.03e4	4.84e4	7.30e4
31/8-1	Mud	2057	91439	1.15e4	6.19e4	1.54e4	2.37e4	1.24e4	1.02e4	0.00e0	0.00e0	0.00e0	8.87e3	9.10e3	0.00e0	1.67e4	0.00e0	0.00e0	7.64e3	1.03e4

Table 13. continued, GCMS SIR of aromatic compounds (peak height)

m/e				253				231							
Well	Sample type	Lower Depth (m)	APT ID	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
31/8-1	DC	2128	91419	3.86e5	3.24e5	6.44e5	2.71e5	3.18e4	2.77e4	4.47e4	1.33e5	3.98e4	5.83e4	4.34e4
31/8-1	DC	2179	91421	1.32e5	8.36e4	1.62e5	6.29e4	1.47e4	2.54e4	1.18e4	4.13e4	1.38e4	1.79e4	1.47e4
31/8-1	DC	2221	91422	7.37e4	3.55e4	7.23e4	3.09e4	1.13e4	2.17e4	9.31e3	2.42e4	1.19e4	1.09e4	1.21e4
31/8-1	DC	2251	91423	1.60e5	7.83e4	1.37e5	4.67e4	1.37e4	5.14e4	9.94e3	3.52e4	1.75e4	1.62e4	1.68e4
31/8-1	DC	2434	91429	1.09e5	5.00e4	8.62e4	3.42e4	1.42e4	4.74e4	1.33e4	3.34e4	1.56e4	1.41e4	1.76e4
31/8-1	Mud	2057	91439	1.04e4	0.00e0	0.00e0	0.00e0	7.19e3	9.67e3	5.92e3	1.34e4	8.44e3	6.83e3	8.53e3

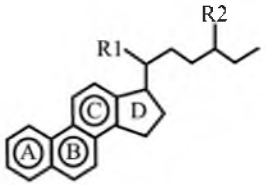
Abbreviation of aromatic biomarkers

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

m/e				142		156										170				
Well	Sample type	Lower Depth (m)	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	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN
31/8-1	DC	2128	91419	3.10e4	2.81e4	3.55e3	4.09e3	4.54e3	6.29e3	1.50e4	1.25e4	7.31e3	5.24e3	4.21e3	3.73e2	3.07e3	4.94e3	4.51e3	2.61e3	1.53e3
31/8-1	DC	2179	91421	2.83e4	2.25e4	3.24e3	3.58e3	4.13e3	5.96e3	1.42e4	1.19e4	9.13e3	5.60e3	4.18e3	2.58e2	3.08e3	4.78e3	4.74e3	3.04e3	1.48e3
31/8-1	DC	2221	91422	2.89e4	2.14e4	3.02e3	3.06e3	3.29e3	4.78e3	1.16e4	9.96e3	7.64e3	4.71e3	3.45e3	3.02e2	2.39e3	3.70e3	3.66e3	2.40e3	1.12e3
31/8-1	DC	2251	91423	3.95e4	2.76e4	3.88e3	3.78e3	4.13e3	5.77e3	1.40e4	1.11e4	9.62e3	5.00e3	4.04e3	3.47e2	2.69e3	4.27e3	4.58e3	2.73e3	1.33e3
31/8-1	DC	2434	91429	8.54e4	6.11e4	8.73e3	8.82e3	8.60e3	1.24e4	3.17e4	2.21e4	1.80e4	9.02e3	9.59e3	5.31e2	5.57e3	8.40e3	9.86e3	5.47e3	3.04e3
31/8-1	Mud	2057	91439	6.68e3	3.83e3	5.23e2	5.09e2	1.22e3	1.90e3	3.16e3	2.78e3	1.18e3	1.13e3	4.18e2	0.00e0	8.43e2	1.14e3	1.03e3	7.98e2	2.81e2

Table 14. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e				170			178	192				206								
Well	Sample type	Lower Depth (m)	APT ID	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	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
31/8-1	DC	2128	91419	3.46e3	1.13e3	2.39e3	2.81e4	7.45e3	8.48e3	1.78e4	1.10e4	1.90e3	2.03e3	1.09e3	8.49e3	3.81e3	3.42e3	1.50e3	2.87e3	1.26e3
31/8-1	DC	2179	91421	4.08e3	1.43e3	2.60e3	9.79e4	1.65e4	2.33e4	5.37e4	2.29e4	3.68e3	3.72e3	2.04e3	1.65e4	8.51e3	5.25e3	4.09e3	7.99e3	2.19e3
31/8-1	DC	2221	91422	3.23e3	1.13e3	2.17e3	1.06e5	1.62e4	2.32e4	5.28e4	2.29e4	3.44e3	3.74e3	1.98e3	1.63e4	8.72e3	5.39e3	4.21e3	8.42e3	2.37e3
31/8-1	DC	2251	91423	3.75e3	1.41e3	2.85e3	1.14e5	1.91e4	2.72e4	6.62e4	2.81e4	4.00e3	4.62e3	2.10e3	1.94e4	9.72e3	6.01e3	4.66e3	9.41e3	2.65e3
31/8-1	DC	2434	91429	7.83e3	3.02e3	7.16e3	2.76e5	4.60e4	7.53e4	1.51e5	6.72e4	8.68e3	9.13e3	5.31e3	4.13e4	2.04e4	1.33e4	9.17e3	2.24e4	5.23e3
31/8-1	Mud	2057	91439	7.91e2	1.56e2	4.12e2	4.06e3	1.90e3	2.25e3	3.05e3	2.35e3	5.16e2	7.32e2	5.05e2	3.01e3	1.46e3	1.43e3	6.16e2	9.48e2	4.07e2

Table 14. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e				206	219	184	198			253									
Well	Sample type	Lower Depth (m)	APT ID	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA
31/8-1	DC	2128	91419	1.17e3	8.00e3	2.55e3	2.09e3	1.43e3	3.71e3	1.71e3	2.91e3	1.94e3	2.60e3	3.32e3	3.97e3	9.22e3	6.78e2	3.74e3	1.12e4	6.86e3
31/8-1	DC	2179	91421	2.70e3	3.82e4	3.85e3	2.64e3	2.02e3	1.87e3	6.59e2	7.78e2	4.36e2	7.15e2	9.01e2	8.74e2	2.30e3	2.66e2	8.09e2	2.27e3	1.53e3
31/8-1	DC	2221	91422	2.65e3	2.75e4	3.29e3	2.00e3	1.53e3	9.60e2	4.51e2	3.33e2	1.76e2	2.99e2	3.33e2	2.69e2	8.05e2	1.34e2	2.54e2	6.20e2	6.18e2
31/8-1	DC	2251	91423	3.10e3	4.44e4	4.92e3	3.49e3	2.66e3	1.64e3	4.93e2	3.65e2	1.37e2	3.16e2	3.90e2	1.98e2	9.81e2	1.74e2	2.15e2	5.41e2	6.43e2
31/8-1	DC	2434	91429	6.35e3	2.73e4	8.44e3	4.47e3	4.68e3	1.46e3	7.42e2	4.93e2	1.79e2	5.11e2	5.78e2	2.50e2	1.08e3	1.73e2	2.11e2	5.02e2	7.58e2
31/8-1	Mud	2057	91439	2.61e2	1.40e3	3.49e2	5.37e2	2.82e2	2.31e2	0.00e0	0.00e0	0.00e0	1.87e2	1.92e2	0.00e0	3.52e2	0.00e0	0.00e0	1.61e2	2.17e2

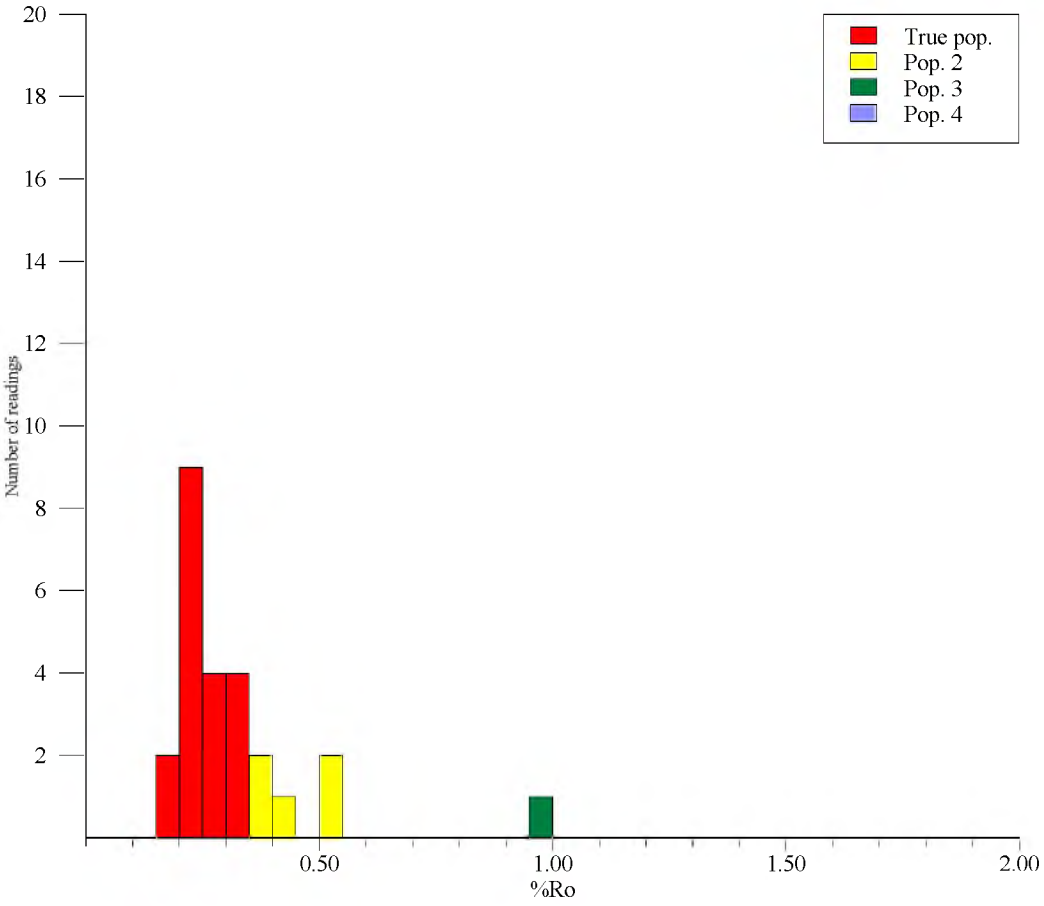
Table 14. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e				253				231							
Well	Sample type	Lower Depth (m)	APT ID	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
31/8-1	DC	2128	91419	4.90e3	4.12e3	8.17e3	3.44e3	4.03e2	3.51e2	5.68e2	1.69e3	5.05e2	7.40e2	5.51e2
31/8-1	DC	2179	91421	1.68e3	1.06e3	2.06e3	8.00e2	1.87e2	3.22e2	1.50e2	5.25e2	1.75e2	2.27e2	1.87e2
31/8-1	DC	2221	91422	8.29e2	4.00e2	8.14e2	3.47e2	1.27e2	2.44e2	1.05e2	2.72e2	1.34e2	1.23e2	1.36e2
31/8-1	DC	2251	91423	1.13e3	5.56e2	9.72e2	3.32e2	9.70e1	3.65e2	7.10e1	2.50e2	1.24e2	1.15e2	1.20e2
31/8-1	DC	2434	91429	1.13e3	5.19e2	8.95e2	3.55e2	1.47e2	4.92e2	1.38e2	3.46e2	1.62e2	1.47e2	1.83e2
31/8-1	Mud	2057	91439	2.20e2	0.00e0	0.00e0	0.00e0	1.52e2	2.04e2	1.25e2	2.82e2	1.78e2	1.44e2	1.80e2

Table 15. Isotopes of fractions, δ13C (‰ PDB)

Well	Sample type	Lower Depth (m)	APT ID	δ13C-Oil/EOM	δ13C-Sat	δ13C-Aro
31/8-1	DC	2128	91419		-30.6	-29.9
31/8-1	DC	2179	91421		-30.9	-27.0
31/8-1	DC	2221	91422		-30.0	-26.5
31/8-1	DC	2251	91423		-30.1	-25.1
31/8-1	DC	2434	91429		-29.7	-25.8
31/8-1	Mud	2057	91439		-30.6	-28.5

Vitrinite Reflectance Sample Data Sheets



Sample info:

Well	31/8-1
Lower depth	980
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	16.11.2011
APT ID	91398

Quality rating:

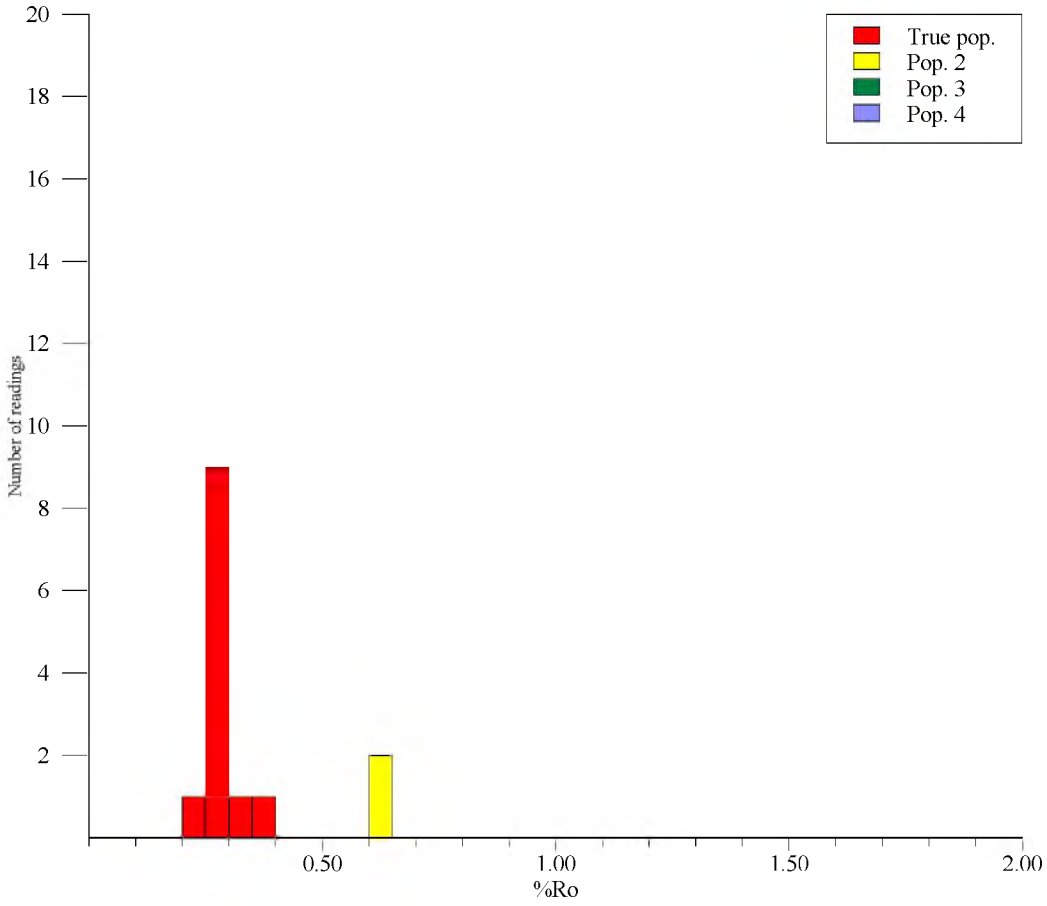
Average sample quality	M
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	**True pop.**	**Pop. 2**	**Pop. 3**	**Pop. 4**
%Mean±sd.	0.25±0.05	0.43±0.08	0.96±0.00	
Individual	0.180	0.360	0.960	
measurements	0.190	0.380		
3	0.200	0.400		
4	0.200	0.510		
5	0.210	0.520		
6	0.220			
7	0.220			
8	0.230			
9	0.230			
10	0.230			
11	0.240			
12	0.250			
13	0.250			
14	0.260			
15	0.260			
16	0.310			
17	0.320			
18	0.330			
19	0.340			
20				
21				
22				
23				
24				
25				
26				

Comments:
Vitrinite rare, particles generally small.



Sample info:

Well	31/8-1
Lower depth	1100
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	16.11.2011
APT ID	91399

Quality rating:

Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.28±0.04	0.62±0.01		
Individual	0.240	0.610		
measurements	0.250	0.630		
3	0.260			
4	0.260			
5	0.260			
6	0.270			
7	0.270			
8	0.270			
9	0.280			
10	0.290			
11	0.340			
12	0.370			
13				
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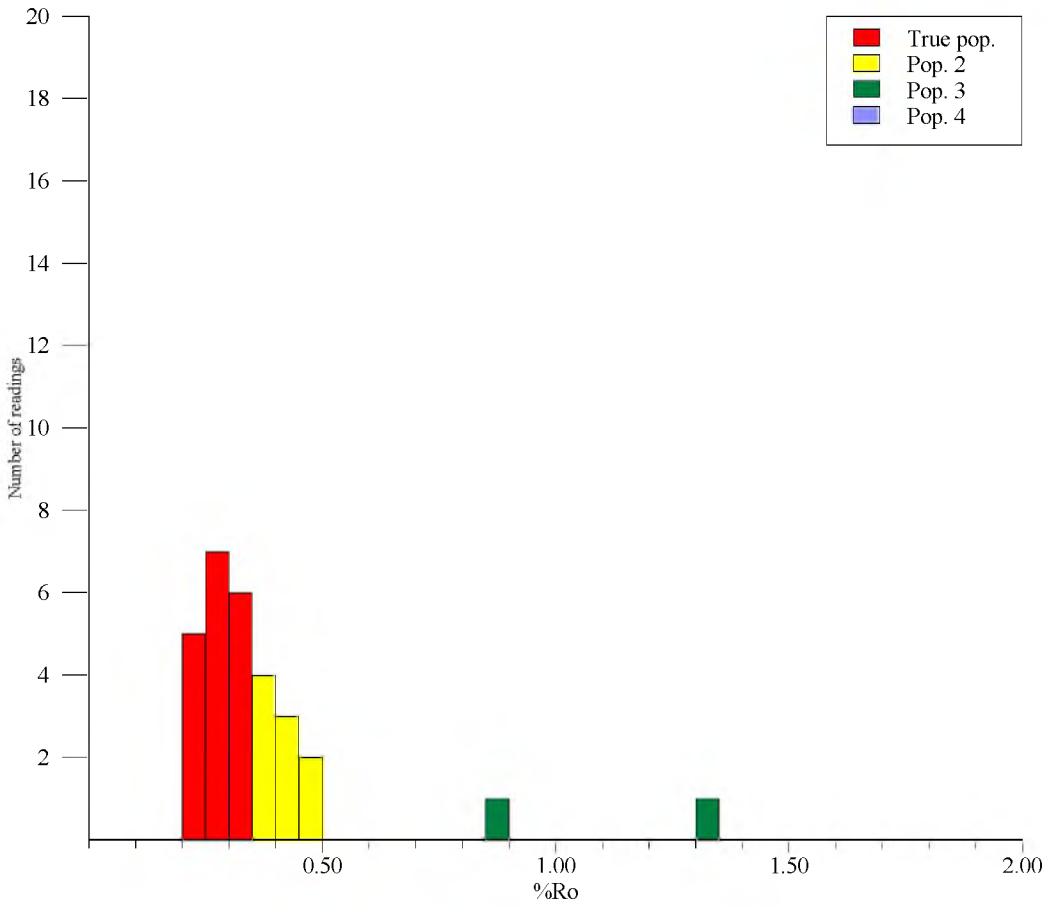
Comments:
Organic matter is sparse.



Sample info:

Well	31/8-1
Lower depth	1270
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	16.11.2011
APT ID	91400

Quality rating:

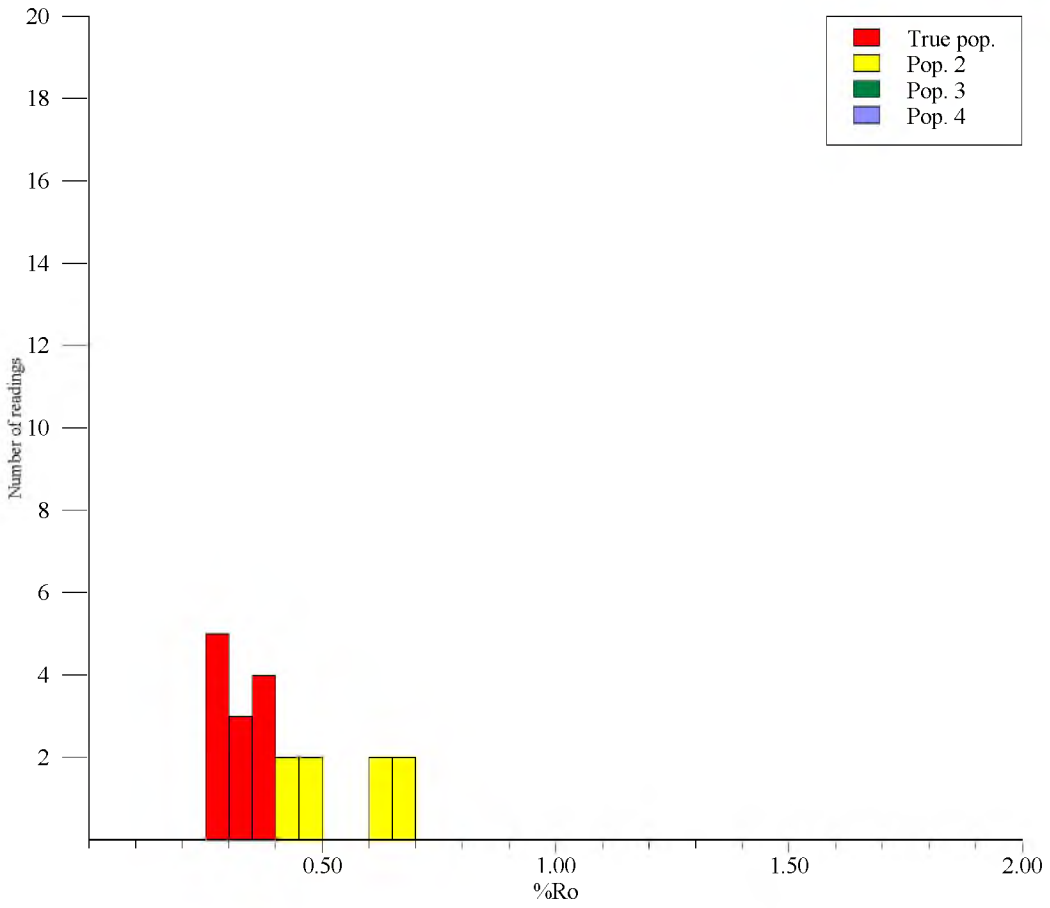
Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.28±0.04	0.41±0.04	1.11±0.33	
Individual	0.210	0.370	0.880	
measurements	0.210	0.370	1.340	
3	0.230	0.380		
4	0.230	0.390		
5	0.240	0.400		
6	0.260	0.410		
7	0.260	0.410		
8	0.270	0.460		
9	0.270	0.480		
10	0.270			
11	0.280			
12	0.300			
13	0.310			
14	0.320			
15	0.330			
16	0.330			
17	0.340			
18	0.340			
19				
20				
21				
22				
23				
24				
25				
26				

Comments:
Organic matter is slightly more abundant than in samples 91398 and 91399.



Sample info:

Well	31/8-1
Lower depth	1400
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	16.11.2011
APT ID	91401

Quality rating:

Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.32±0.04	0.53±0.13		
Individual	0.270	0.390		
measurements	0.280	0.400		
3	0.290	0.410		
4	0.290	0.450		
5	0.300	0.490		
6	0.330	0.630		
7	0.340	0.630		
8	0.340	0.680		
9	0.360	0.690		
10	0.360			
11	0.370			
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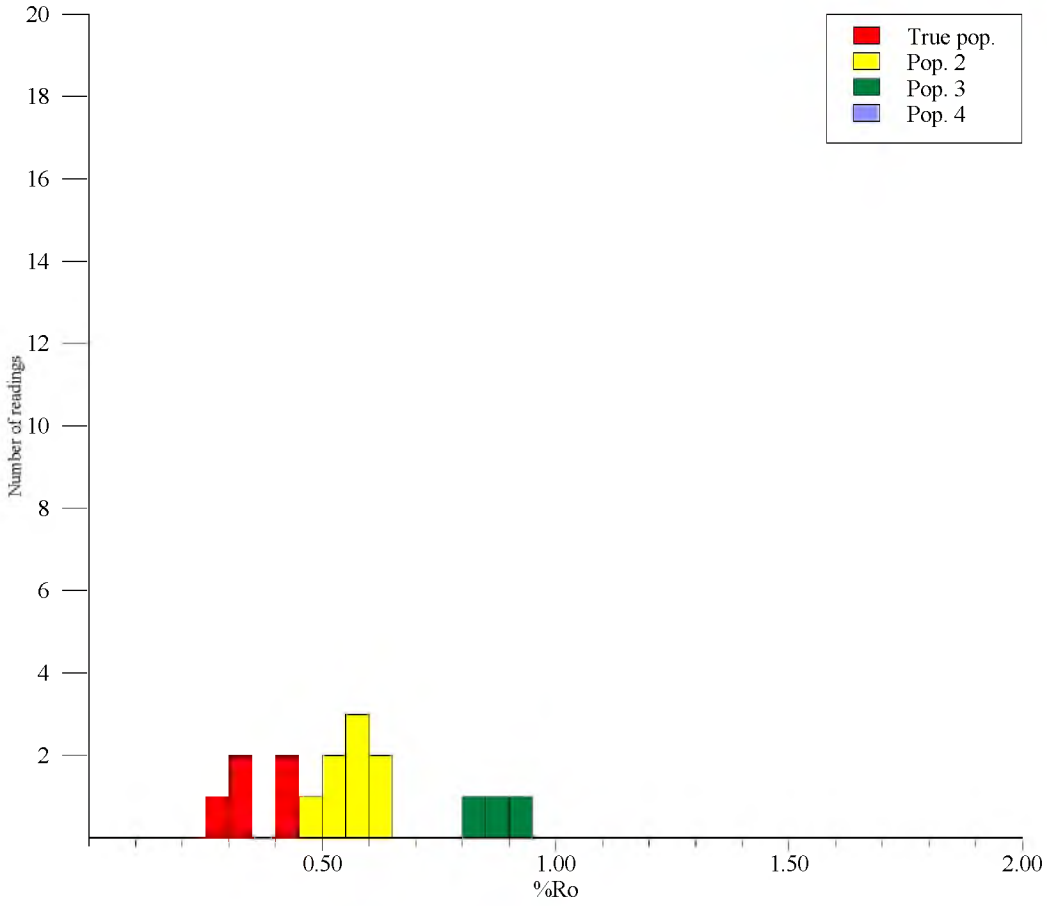
Comments:
Organic matter is dominated by reworked material.



Sample info:

Well	31/8-1
Lower depth	1550
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	16.11.2011
APT ID	91402

Quality rating:

Average sample quality	M
Abundance of vitrinite	-
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.36±0.05	0.56±0.05	0.88±0.07	
Individual	0.280	0.470	0.810	
measurements	0.340	0.540	0.870	
3	0.350	0.540	0.950	
4	0.410	0.560		
5	0.410	0.560		
6		0.570		
7		0.620		
8		0.620		
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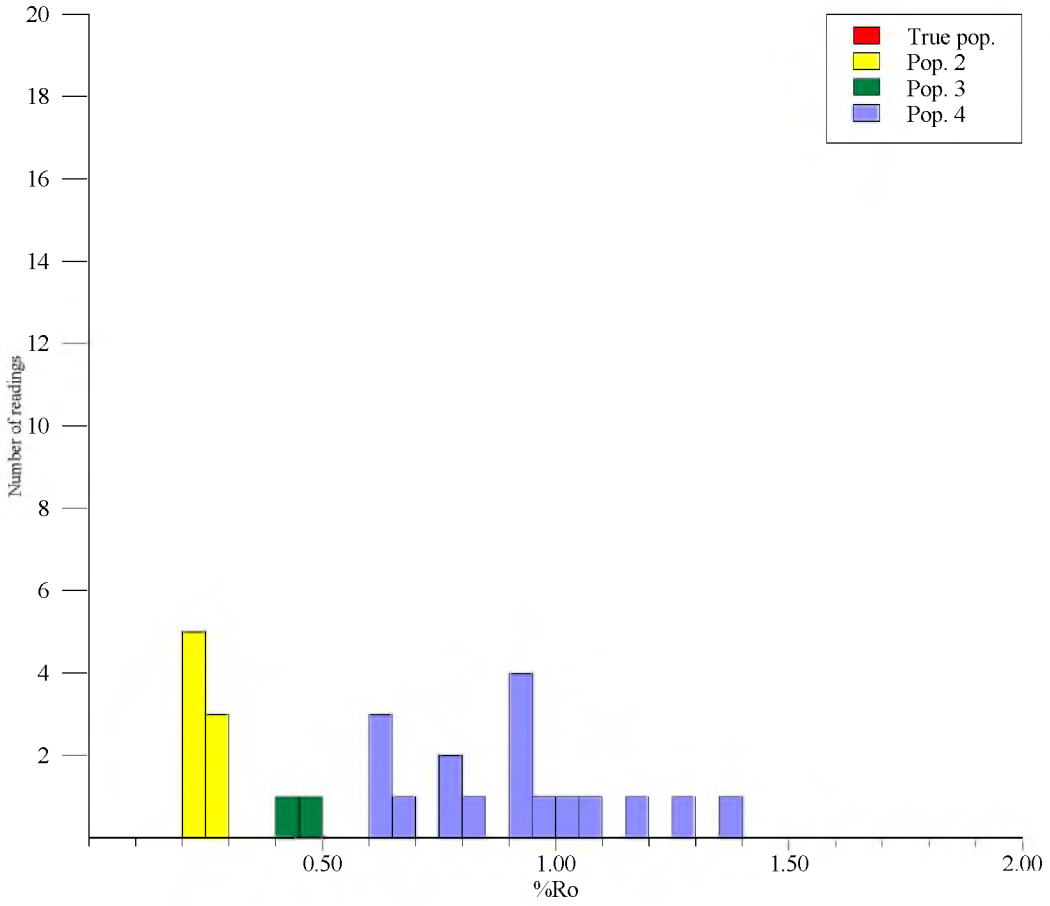
Comments:
Organic matter is mostly reworked material.



Sample info:

Well	31/8-1
Lower depth	1700
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91403

Quality rating:

Average sample quality	M
Abundance of vitrinite	-
Identification of vitrinite	o
Type of vitrinite	-
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	**True pop.**	**Pop. 2**	**Pop. 3**	**Pop. 4**
%Mean±sd.		0.24±0.03	0.45±0.01	0.91±0.22
Individual		0.200	0.440	0.610
measurements		0.210	0.450	0.630
3		0.210		0.640
4		0.240		0.690
5		0.240		0.760
6		0.260		0.770
7		0.270		0.830
8		0.280		0.900
9				0.920
10				0.940
11				0.950
12				0.990
13				1.030
14				1.070
15				1.160
16				1.280
17				1.350
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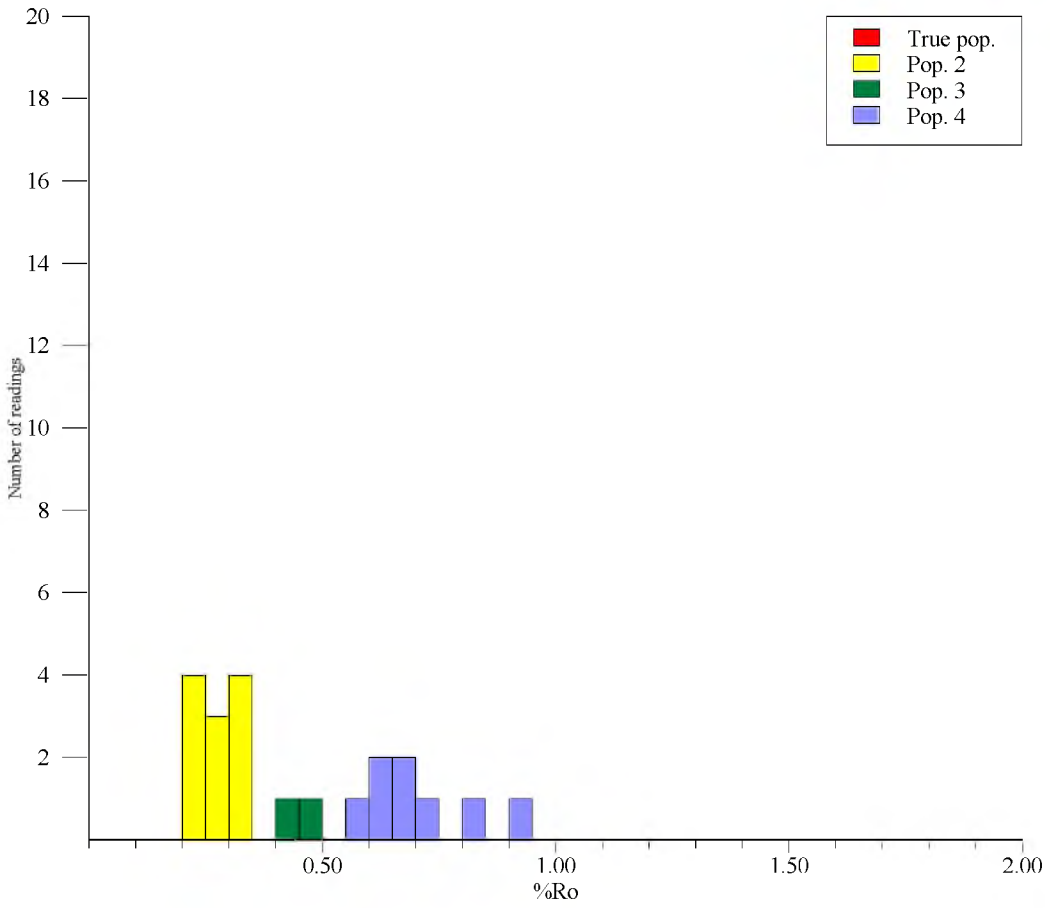
Comments:
Organic matter is common but measurable material is probably reworked or oxidised.



Sample info:

Well	31/8-1
Lower depth	1850
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91404

Quality rating:

Average sample quality	M
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	-
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	**True pop.**	**Pop. 2**	**Pop. 3**	**Pop. 4**
%Mean±sd.		0.27±0.04	0.45±0.04	0.71±0.11
Individual		0.210	0.420	0.580
measurements		0.220	0.470	0.610
3		0.230		0.640
4		0.240		0.680
5		0.250		0.700
6		0.260		0.720
7		0.270		0.800
8		0.310		0.920
9		0.310		
10		0.310		
11		0.320		
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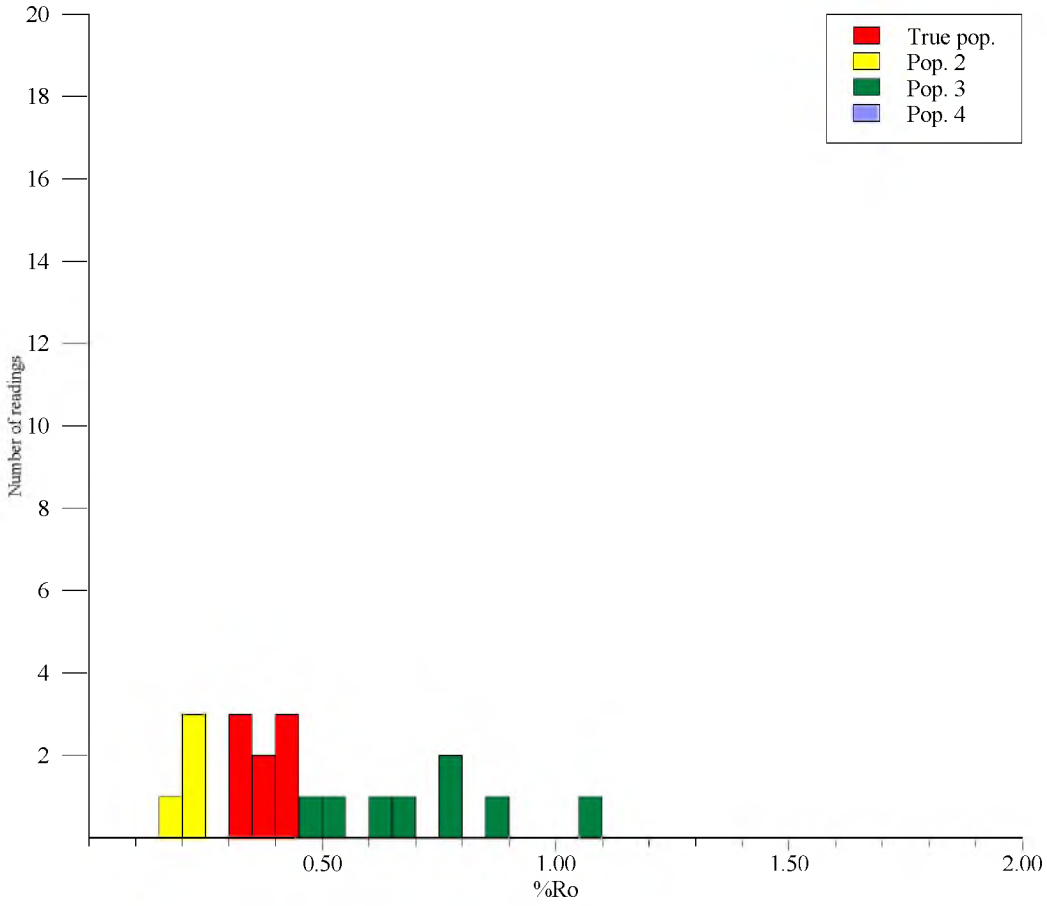
Comments:
Organic matter is fairly common, but probably most is reworked or oxidised. Sediments often look reddened.



Sample info:

Well	31/8-1
Lower depth	2010
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91406

Quality rating:

Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.38±0.04	0.21±0.02	0.72±0.19	
Individual	0.340	0.190	0.490	
measurements	0.340	0.200	0.540	
3	0.350	0.210	0.610	
4	0.360	0.230	0.660	
5	0.390		0.760	
6	0.410		0.780	
7	0.430		0.880	
8	0.430		1.060	
9				
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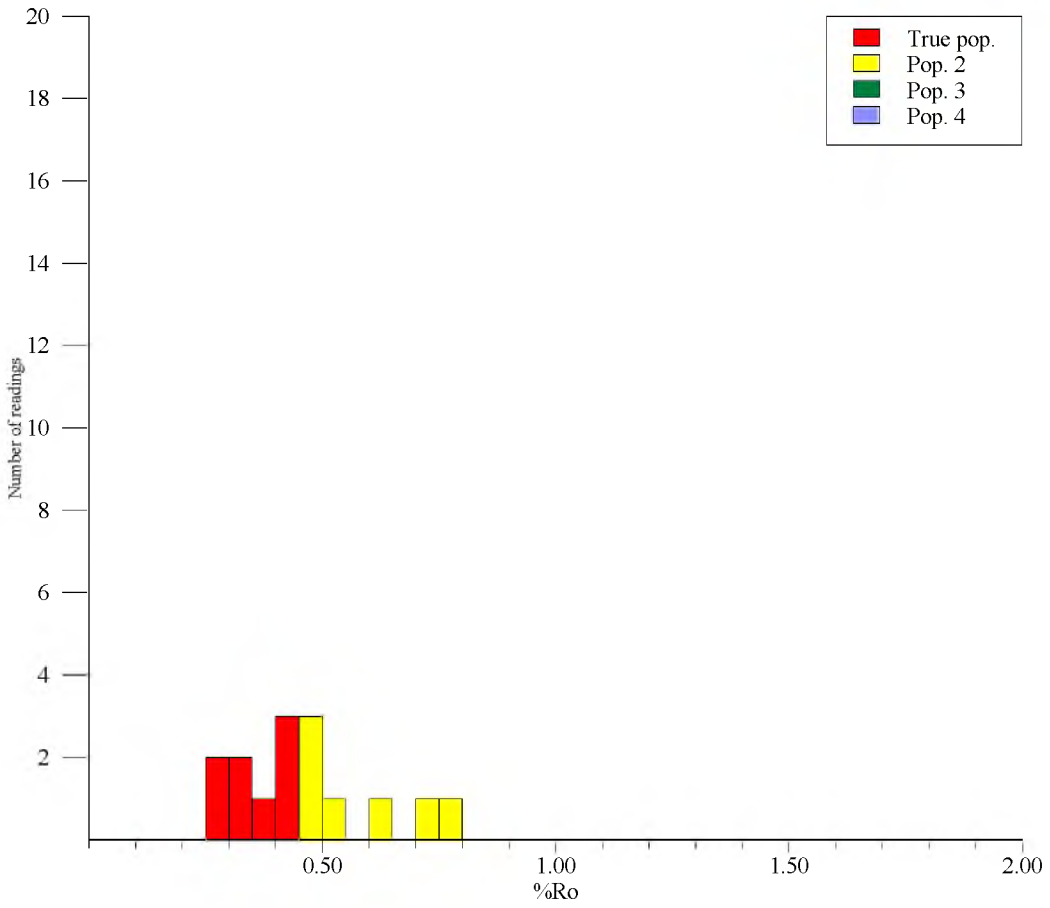
Comments:
Organic matter common as streaky stain and semi-amorphous, possibly exinitic material.



Sample info:

Well	31/8-1
Lower depth	2060
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91411

Quality rating:

Average sample quality	M
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.36±0.07	0.57±0.13		
Individual	0.260	0.450		
measurements	0.270	0.470		
3	0.330	0.480		
4	0.340	0.500		
5	0.390	0.620		
6	0.420	0.730		
7	0.420	0.760		
8	0.430			
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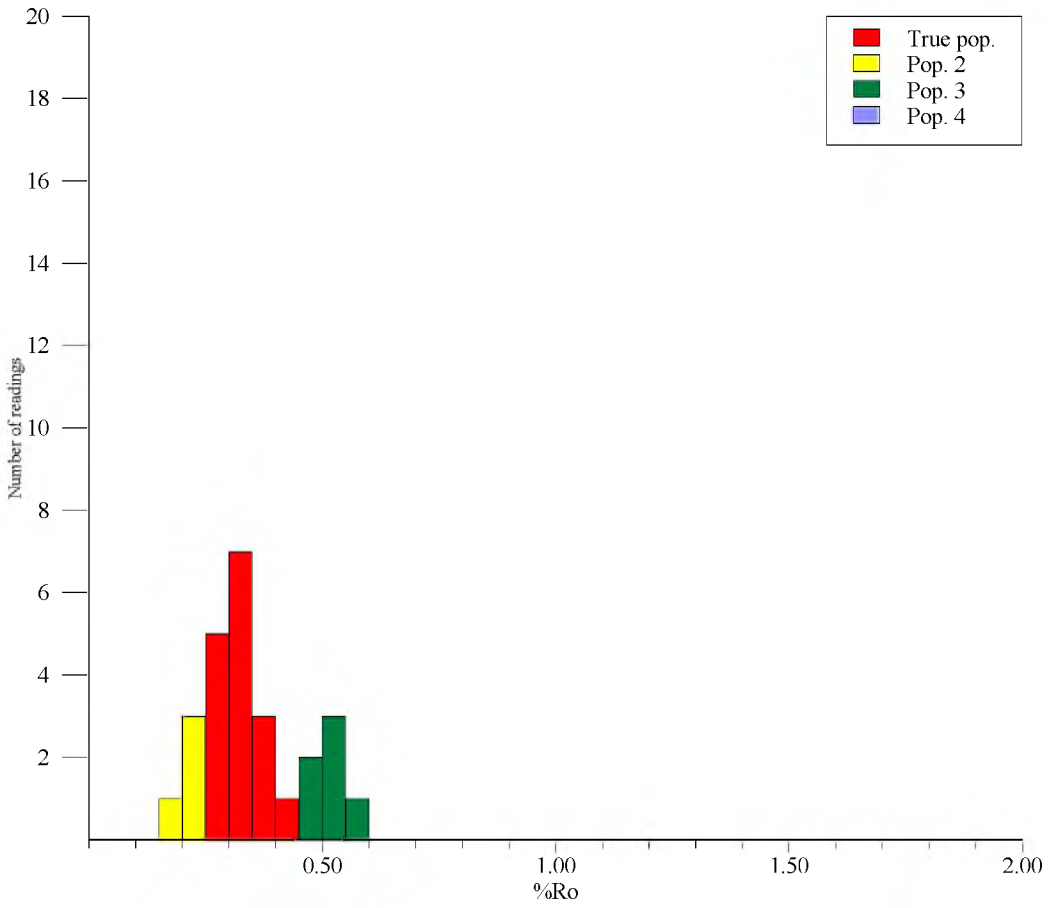
Comments:
Organic matter is present mainly as stain and reworked/oxidised material, but there are some possible vitrinite laths.



Sample info:

Well	31/8-1
Lower depth	2104
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91416

Quality rating:

Average sample quality	M
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.33±0.04	0.21±0.03	0.51±0.05	
Individual	0.260	0.170	0.450	
measurements	0.270	0.220	0.480	
3	0.270	0.220	0.500	
4	0.280	0.230	0.510	
5	0.300		0.530	
6	0.320		0.600	
7	0.320			
8	0.330			
9	0.330			
10	0.340			
11	0.340			
12	0.340			
13	0.370			
14	0.370			
15	0.370			
16	0.420			
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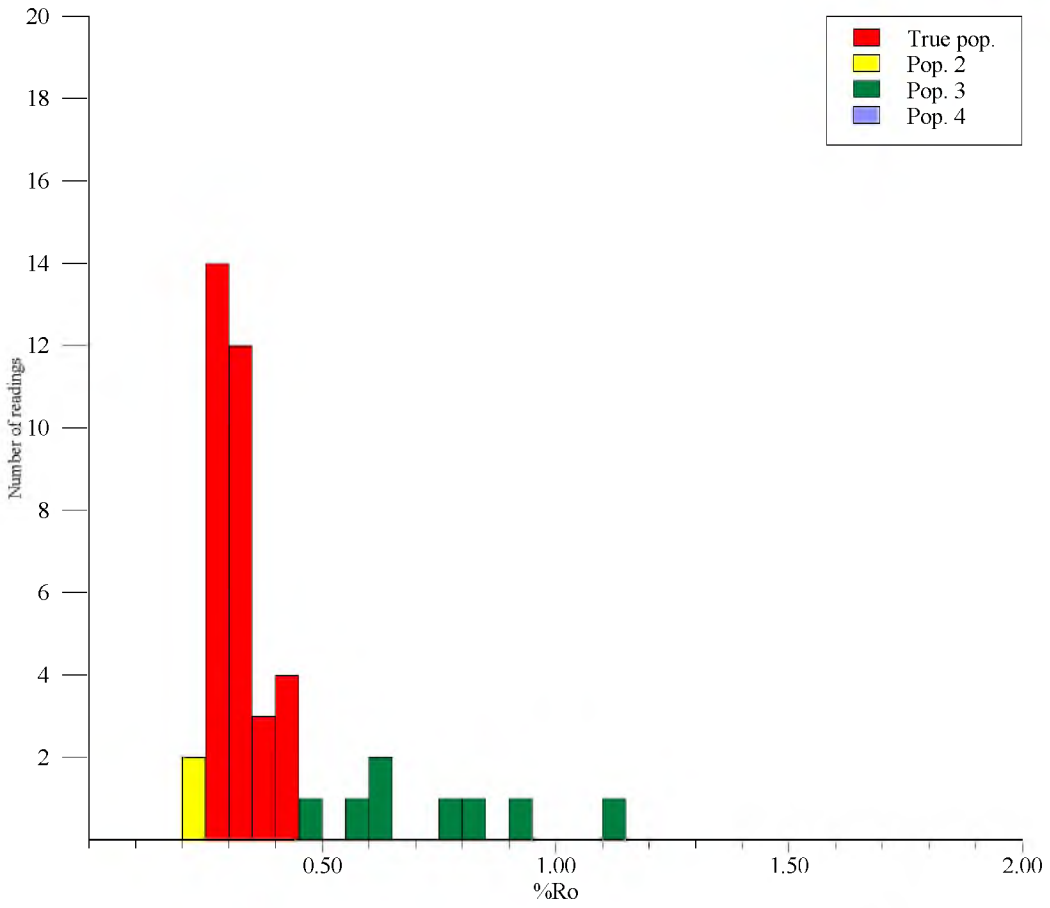
Comments:
Most measurable organic matter is probably reworked or oxidised, and often degraded.



Sample info:

Well	31/8-1
Lower depth	2260
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91424

Quality rating:

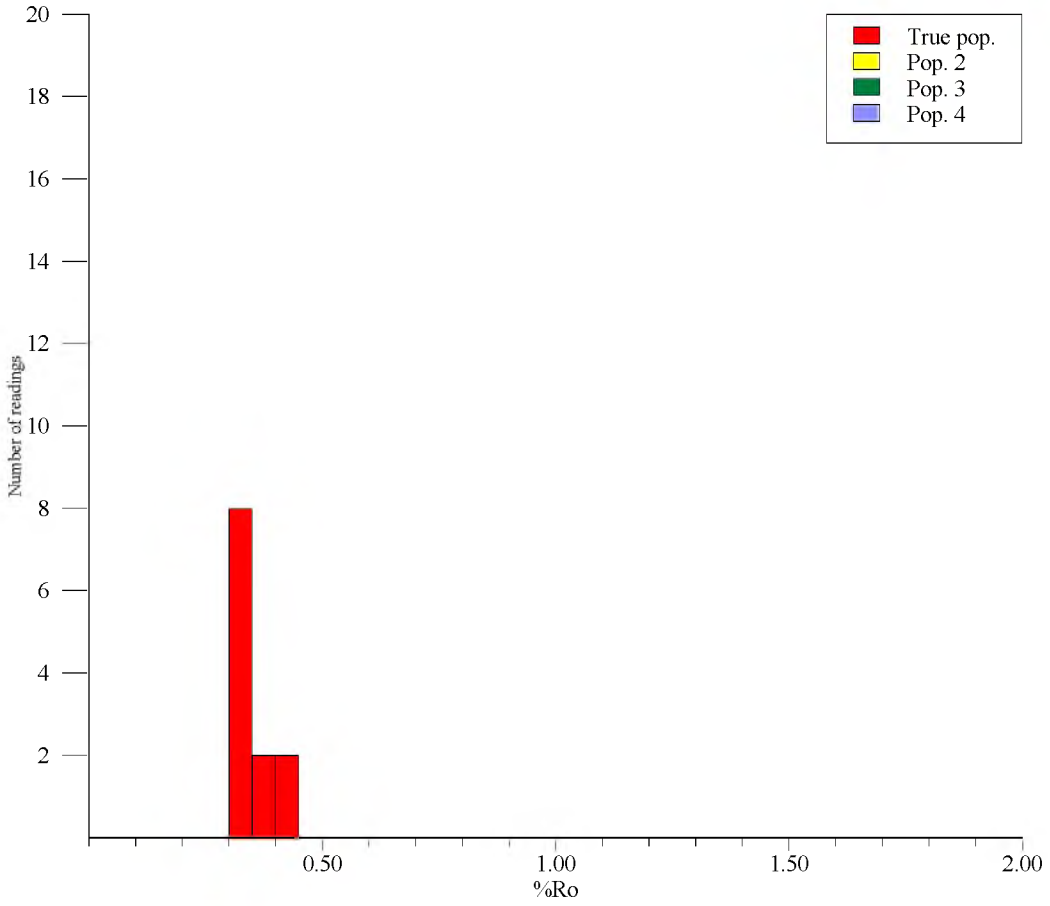
Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.32±0.05	0.21±0.01	0.75±0.20	
Individual	0.250 0.360	0.200	0.490	
measurements	0.250 0.360	0.220	0.600	
3	0.260 0.380		0.630	
4	0.270 0.400		0.640	
5	0.280 0.410		0.780	
6	0.280 0.420		0.830	
7	0.280 0.420		0.920	
8	0.290		1.110	
9	0.290			
10	0.290			
11	0.290			
12	0.290			
13	0.300			
14	0.300			
15	0.310			
16	0.310			
17	0.310			
18	0.320			
19	0.320			
20	0.330			
21	0.330			
22	0.340			
23	0.340			
24	0.350			
25	0.350			
26	0.350			

Comments:
Organic matter is plentiful in argillaceous fragments.



Sample info:

Well	31/8-1
Lower depth	2431
Sample type	DC
Lithology	Lst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91428

Quality rating:

Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.35±0.04			
Individual measurements	0.310			
	0.310			
3	0.320			
4	0.330			
5	0.340			
6	0.340			
7	0.340			
8	0.350			
9	0.370			
10	0.390			
11	0.410			
12	0.430			
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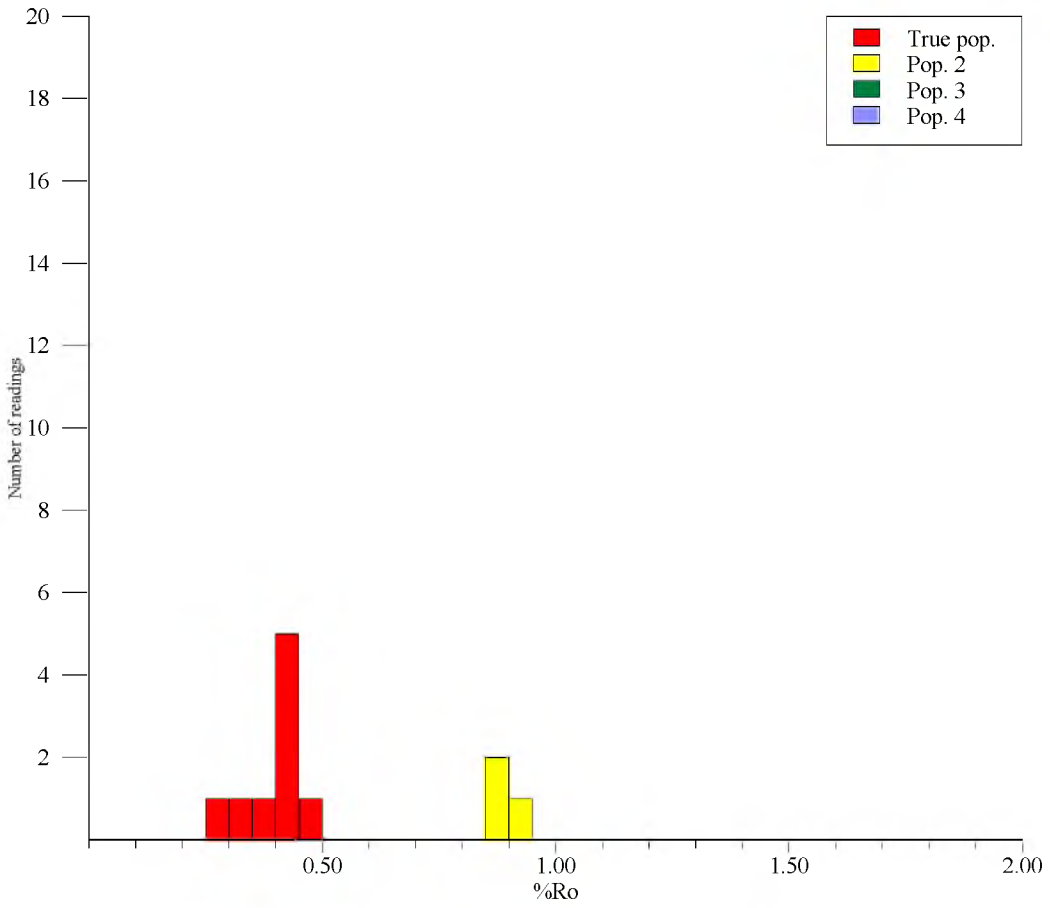
Comments:
Organic rich litholgy is less abundant but vitrinite particles are large.



Sample info:

Well	31/8-1
Lower depth	2551
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91435

Quality rating:

Average sample quality	M
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.40±0.06	0.91±0.03		
Individual	0.280	0.890		
measurements	0.340	0.890		
3	0.390	0.950		
4	0.400			
5	0.400			
6	0.420			
7	0.420			
8	0.430			
9	0.480			
10				
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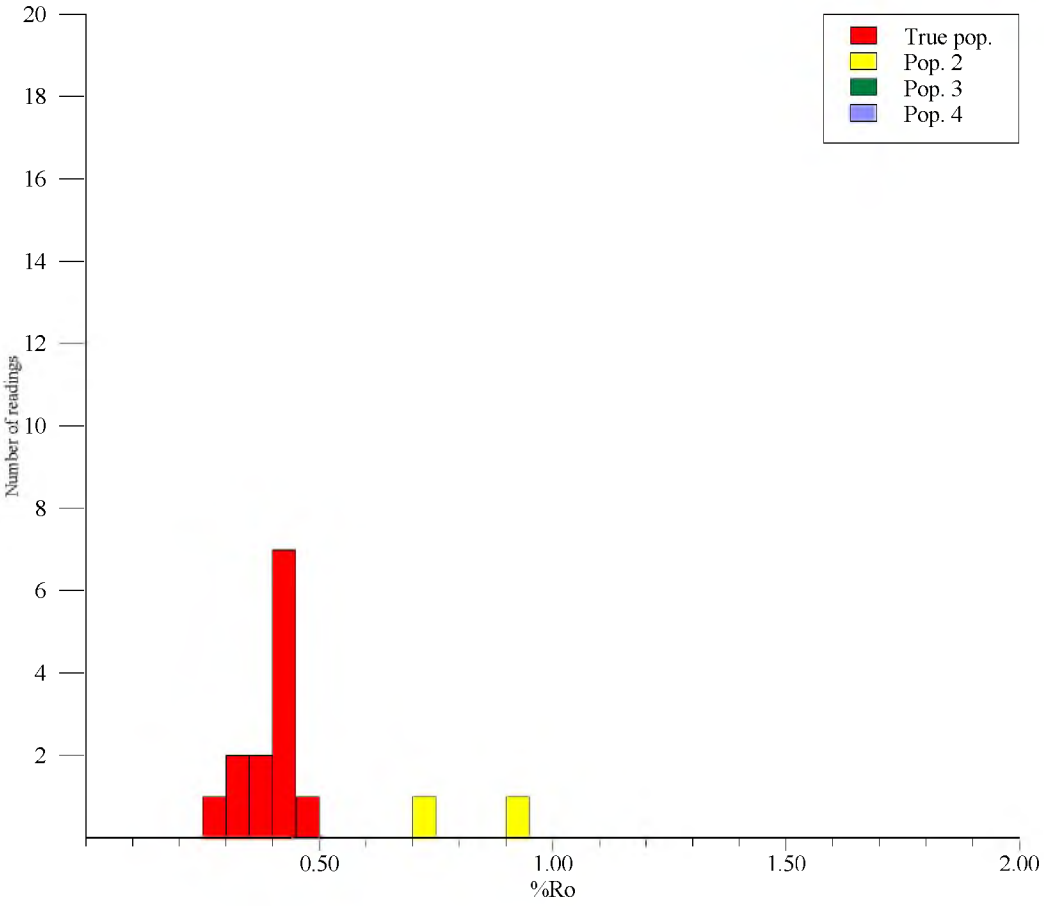
Comments:
Organic matter is less plentiful. Most is reworked/oxidised, but some vitrinite is present.



Sample info:

Well	31/8-1
Lower depth	2620
Sample type	DC
Lithology	Clyst
Preparation	Bulk
Date of analysis	22.11.2011
APT ID	91437

Quality rating:

Average sample quality	G
Abundance of vitrinite	o
Identification of vitrinite	o
Type of vitrinite	o
Particle size	o
Particle surface quality	o
Abundance of pyrite	o

Legend to quality rating:

No effect on the readings	o
Possibly too low readings	-
Possibly too high readings	+
Good quality	G
Moderate quality	M
Poor quality	P
Not vitrinite	X
Hydrocarbon staining	St

%Ro readings	True pop.	Pop. 2	Pop. 3	Pop. 4
%Mean±sd.	0.39±0.05	0.83±0.13		
Individual	0.290	0.740		
measurements	0.320	0.920		
3	0.350			
4	0.360			
5	0.390			
6	0.400			
7	0.400			
8	0.410			
9	0.410			
10	0.410			
11	0.410			
12	0.440			
13	0.450			
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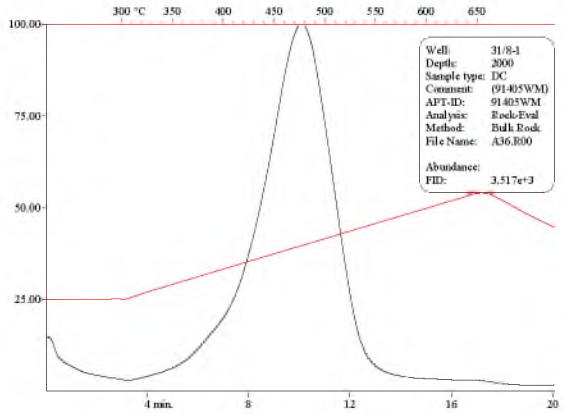
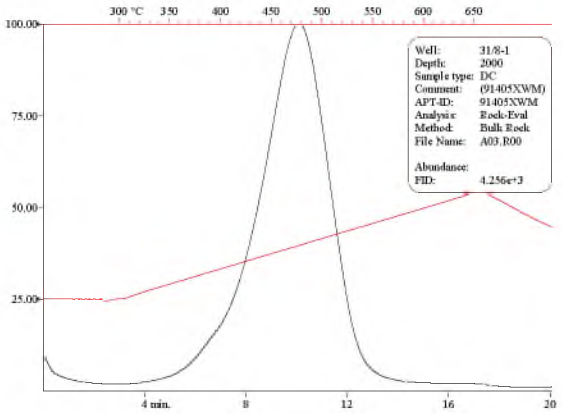
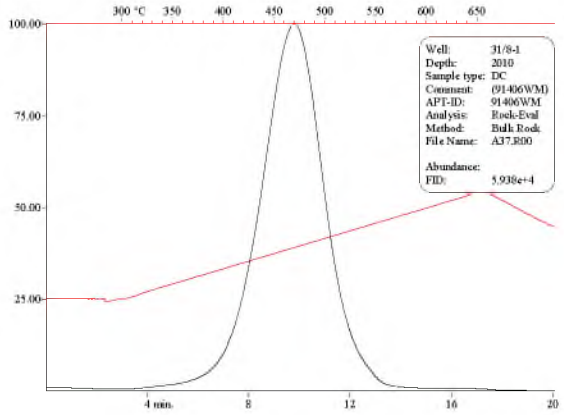
Comments:
There is at least one large fragment of coal present.

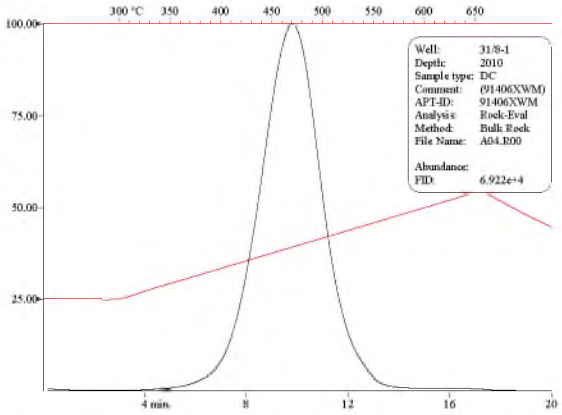
Rock-Eval pyrograms

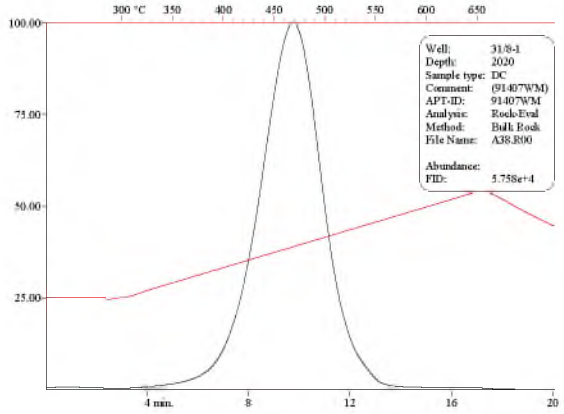
The temperature scale for the pyrograms is for the RockEval 6 instrument. The corresponding temperature for the TMax temperature is about 39°C (±1 °C) lower.

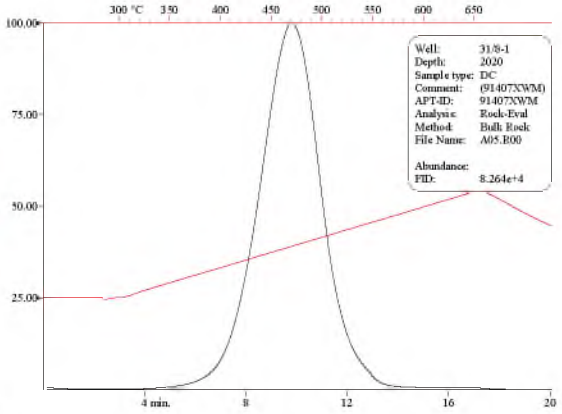

Well: 31/8-1
Depth: 2000
Sample type: DC
Comment: (91405WM)
APT-ID: 91405WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A36.R00
Abundance:
FID: 3.517e+3

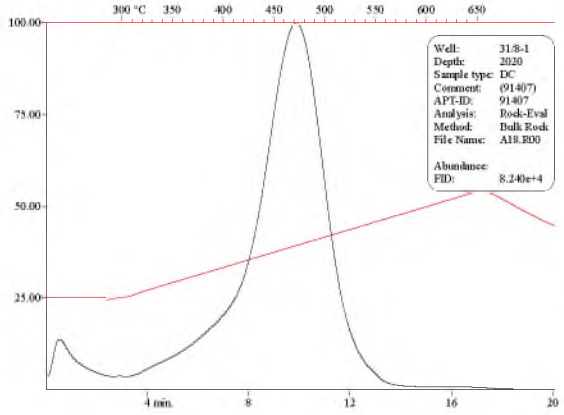

Well: 31/8-1
Depth: 2000
Sample type: DC
Comment: (91405XWM)
APT-ID: 91405XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A03.R00
Abundance:
FID: 4.256e+3

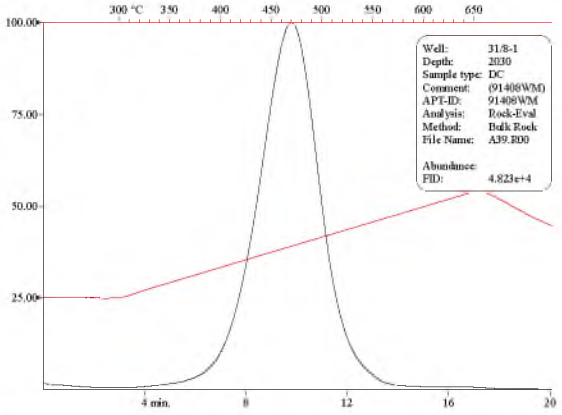

Well: 31/8-1
Depth: 2010
Sample type: DC
Comment: (91406WM)
APT-ID: 91406WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A37.R00
Abundance:
FID: 5.938e+4

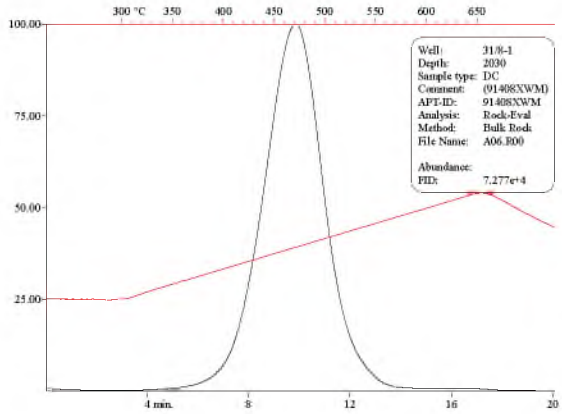

Well: 31/8-1
Depth: 2010
Sample type: DC
Comment: (91406XWM)
APT-ID: 91406XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A04.R00
Abundance:
FID: 6.922e+4

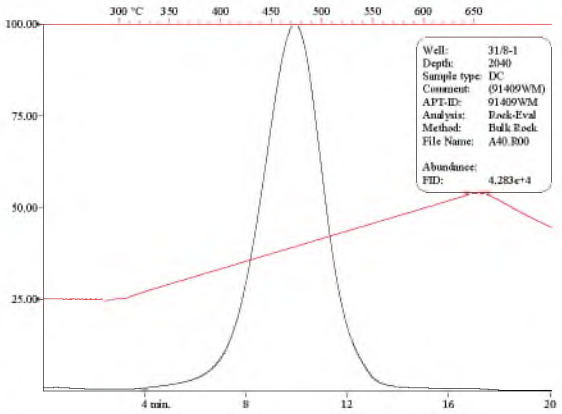

Well: 31/8-1
Depth: 2020
Sample type: DC
Comment: (91407WM)
APT-ID: 91407WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A38.R00
Abundance:
FID: 5.758e+4

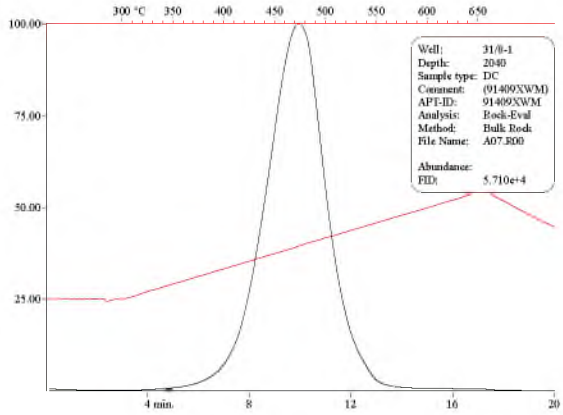

Well: 31/8-1
Depth: 2020
Sample type: DC
Comment: (91407XWM)
APT-ID: 91407XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A05.R00
Abundance:
FID: 8.264e+4

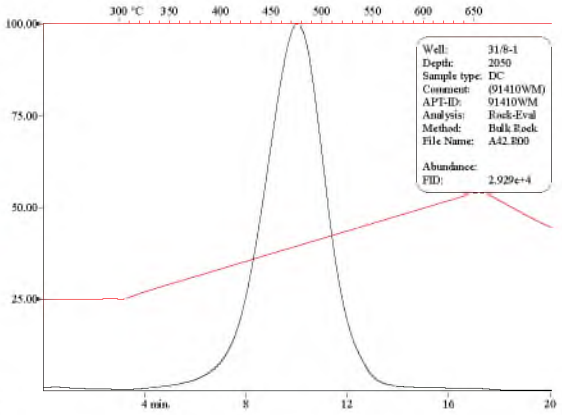

Well: 31/8-1
Depth: 2020
Sample type: DC
Comment: (91407)
APT-ID: 91407
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A18.R00
Abundance:
FID: 8.240e+4

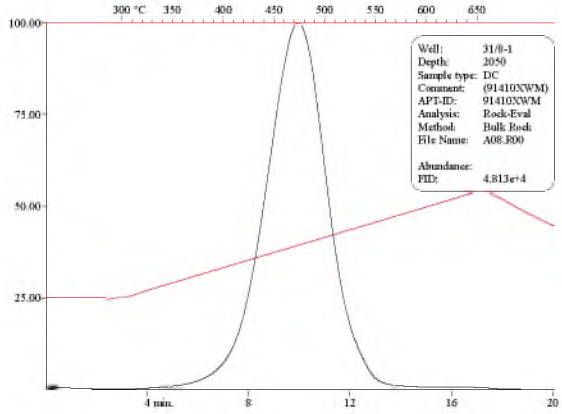

Well: 31/8-1
Depth: 2030
Sample type: DC
Comment: (91408WM)
APT-ID: 91408WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A39.R00
Abundance:
FID: 4.823e+4

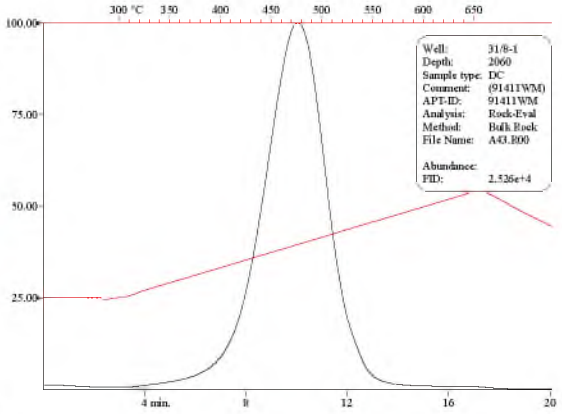

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2030
Sample type: DC
Comment: (91408XWM)
APT-ID: 91408XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A06.R00
Abundance:
FID: 7.277e+4

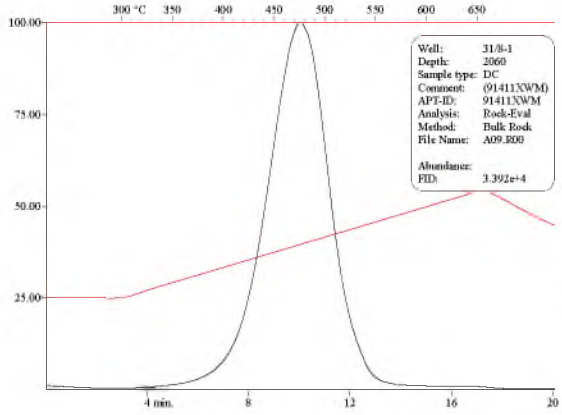

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2040
Sample type: DC
Comment: (91409WM)
APT-ID: 91409WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A40.R00
Abundance:
FID: 4.283e+4

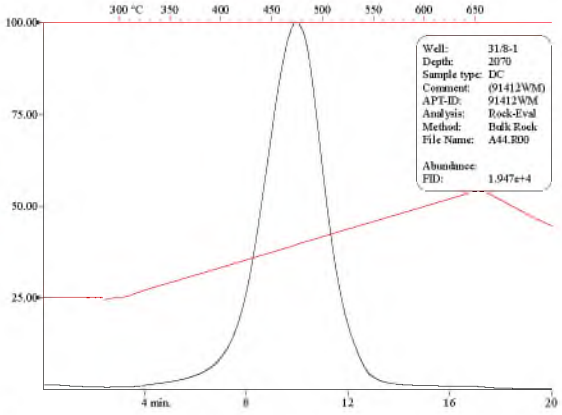

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2040
Sample type: DC
Comment: (91409XWM)
APT-ID: 91409XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A07.R00
Abundance:
FID: 5.710e+4

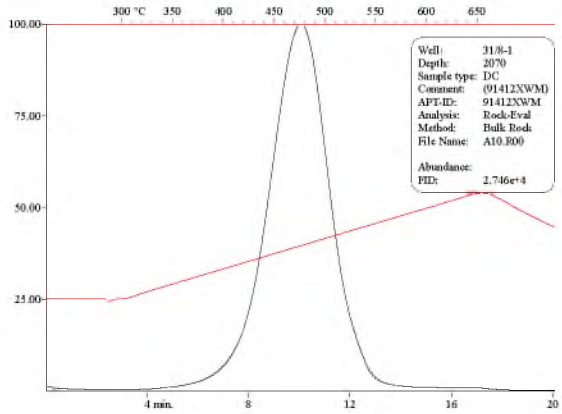

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2050
Sample type: DC
Comment: (91410WM)
APT-ID: 91410WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A42.R00
Abundance:
FID: 2.929e+4

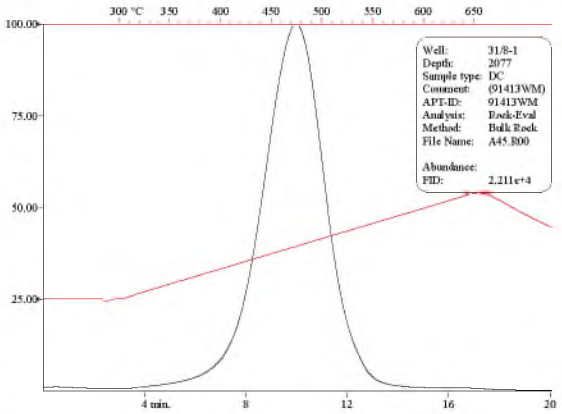

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2050
Sample type: DC
Comment: (91410XWM)
APT-ID: 91410XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A08.R00
Abundance:
FID: 4.813e+4

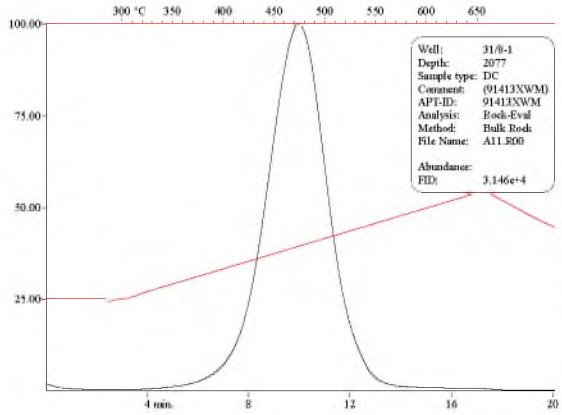

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2060
Sample type: DC
Comment: (91411WM)
APT-ID: 91411WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A43.R00
Abundance:
FID: 2.526e+4

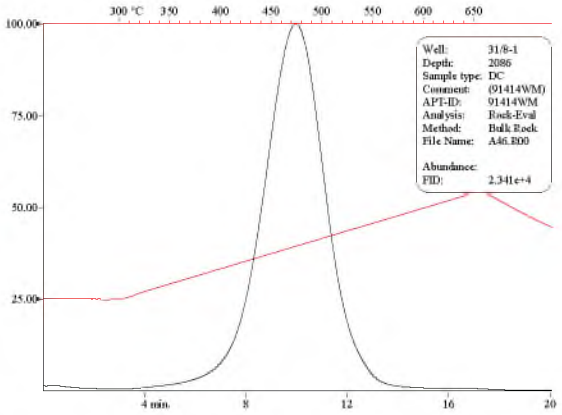

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2060
Sample type: DC
Comment: (91411XWM)
APT-ID: 91411XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A09.R00
Abundance:
FID: 3.392e+4

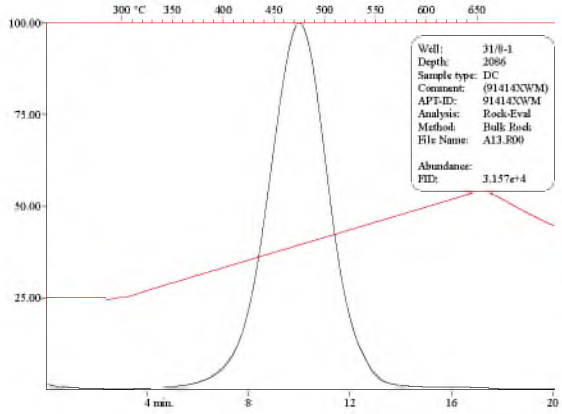

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2070
Sample type: DC
Comment: (91412WM)
APT-ID: 91412WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A44.R00
Abundance:
FID: 1.947e+4

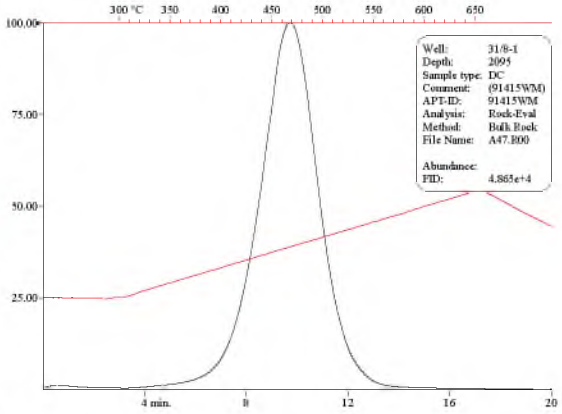

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2070
Sample type: DC
Comment: (91412XWM)
APT-ID: 91412XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A10.R00
Abundance:
FID: 2.746e+4

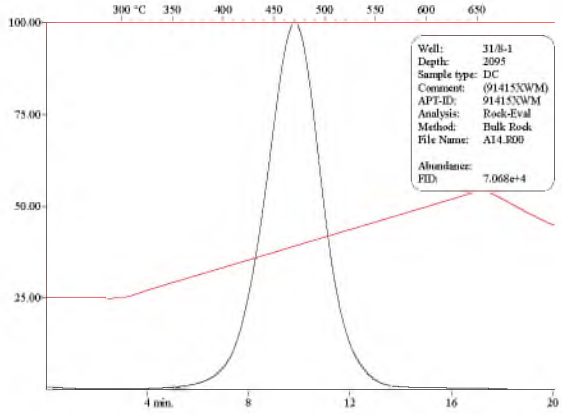

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2077
Sample type: DC
Comment: (91413WM)
APT-ID: 91413WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A45.R00
Abundance:
FID: 2.211e+4

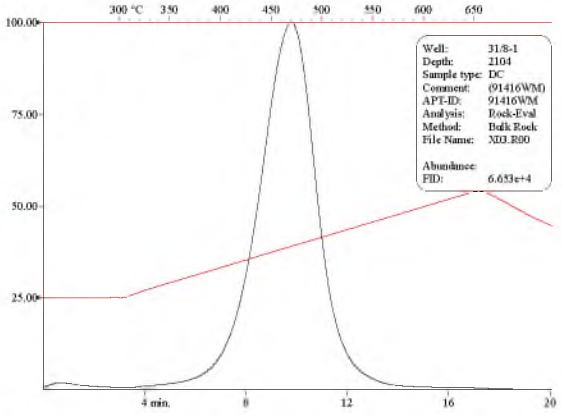

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2077
Sample type: DC
Comment: (91413XWM)
APT-ID: 91413XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A11.R00
Abundance:
FID: 3.146e+4

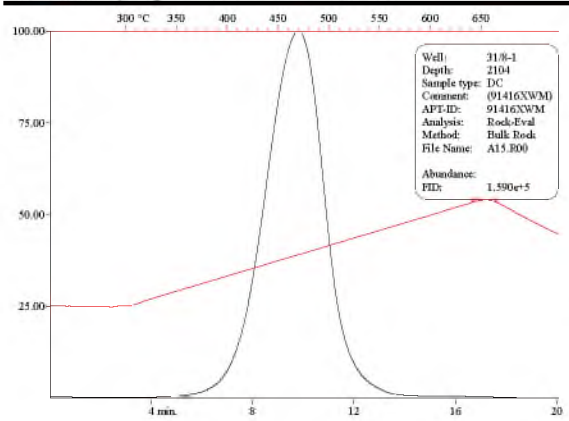

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2086
Sample type: DC
Comment: (91414WM)
APT-ID: 91414WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A46.R00
Abundance:
FID: 2.341e+4

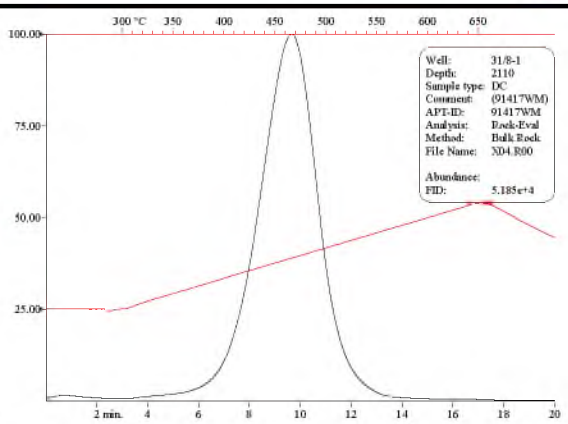

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2086
Sample type: DC
Comment: (91414XWM)
APT-ID: 91414XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A13.R00
Abundance:
FID: 3.157e+4

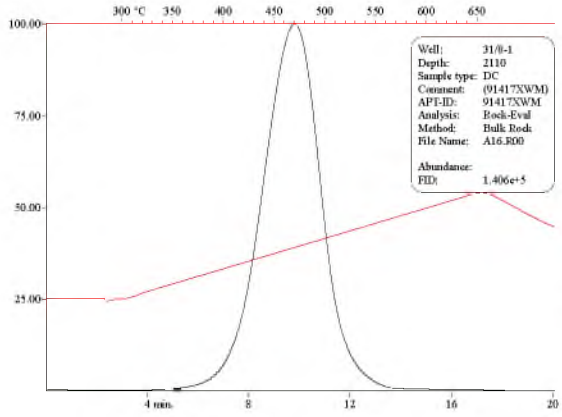

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2095
Sample type: DC
Comment: (91415WM)
APT-ID: 91415WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A47.R00
Abundance:
FID: 4.865e+4

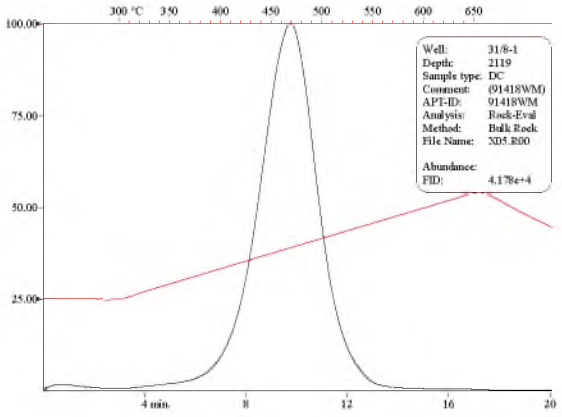

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2095
Sample type: DC
Comment: (91415XWM)
APT-ID: 91415XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A14.R00
Abundance:
FID: 7.068e+4

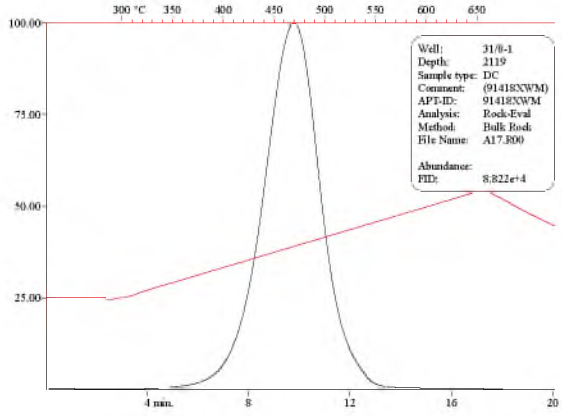

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2104
Sample type: DC
Comment: (91416WM)
APT-ID: 91416WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: XD3.R00
Abundance:
FID: 6.653e+4


300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2104
Sample type: DC
Comment: (91416XWM)
APT-ID: 91416XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A15.R00
Abundance:
FID: 1.590e+5


300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
2 min. 4 6 8 10 12 14 16 18 20
Well: 31/8-1
Depth: 2110
Sample type: DC
Comment: (91417WM)
APT-ID: 91417WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: XD4.R00
Abundance:
FID: 5.185e+4


300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2110
Sample type: DC
Comment: (91417XWM)
APT-ID: 91417XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A16.R00
Abundance:
FID: 1.406e+5


300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2119
Sample type: DC
Comment: (91418WM)
APT-ID: 91418WM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: XD5.R00
Abundance:
FID: 4.178e+4

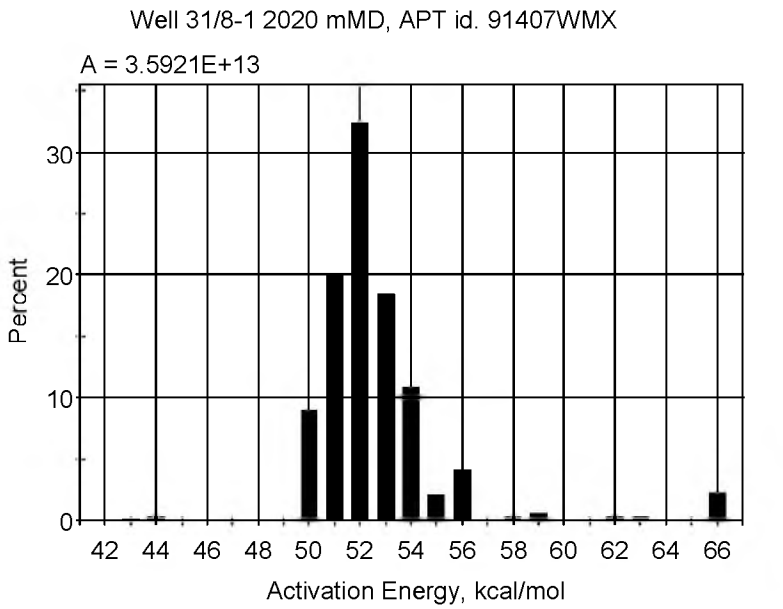

300 °C 350 400 450 500 550 600 650
100.00
75.00
50.00
25.00
4 min. 8 12 16 20
Well: 31/8-1
Depth: 2119
Sample type: DC
Comment: (91418XWM)
APT-ID: 91418XWM
Analysis: Rock-Eval
Method: Bulk Rock
File Name: A17.R00
Abundance:
FID: 8.822e+4

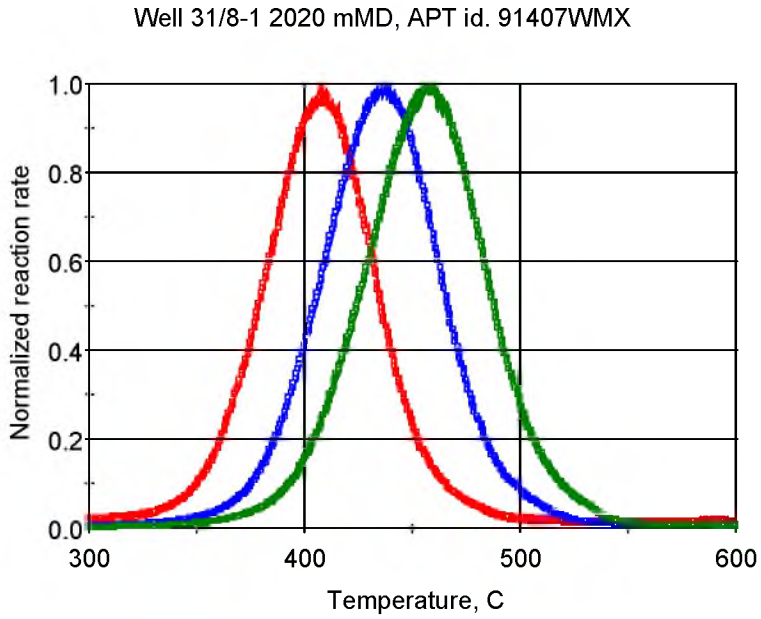
Open Pyroiysis Kinetics – Rock-Eval 6

Well 31/8-1 2020 mMD, APT id. 91407WMX

Arrhenius constant = 3.5921E+13/s
TOC, %= 5.20
HI, mg HC/g TOC = 441
Tmax, °C = 422

Activation energy kcal/mole	%
40	
41	
42	0.03
43	0.09
44	0.21
45	0.00
46	0.00
47	0.00
48	0.00
49	0.00
50	8.92
51	19.91
52	32.30
53	18.46
54	10.78
55	1.97
56	4.01
57	0.00
58	0.27
59	0.52
60	0.00
61	0.00
62	0.20
63	0.22
64	0.00
65	0.00
66	2.12
67	
68	
69	
70	

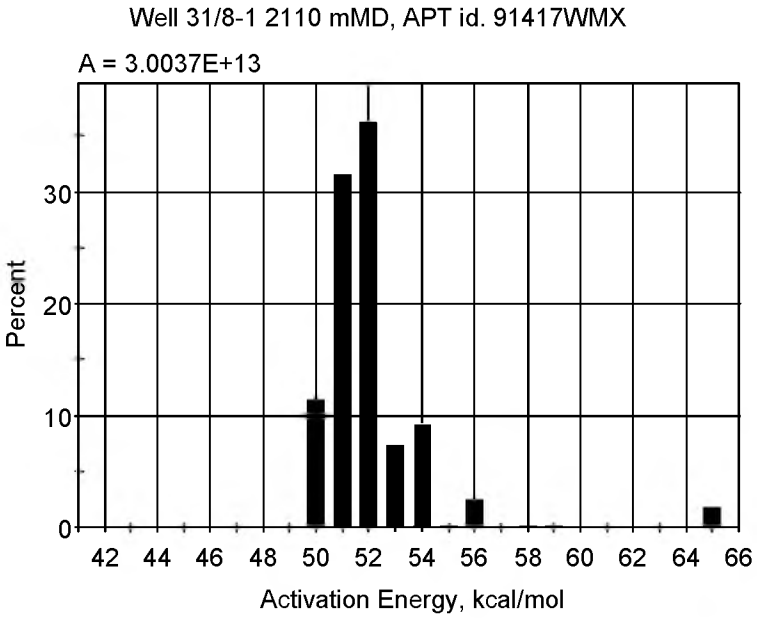


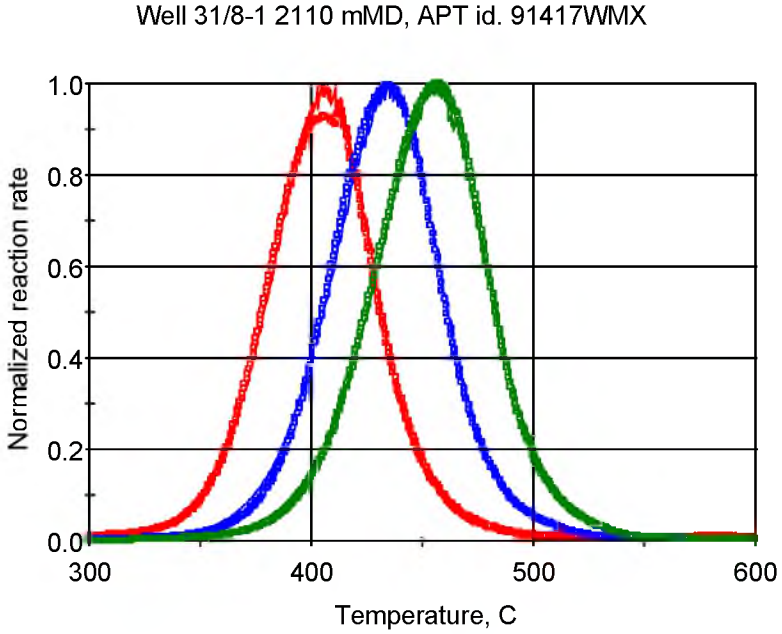


Well 31/8-1 2110 mMD, APT id. 91417WMX

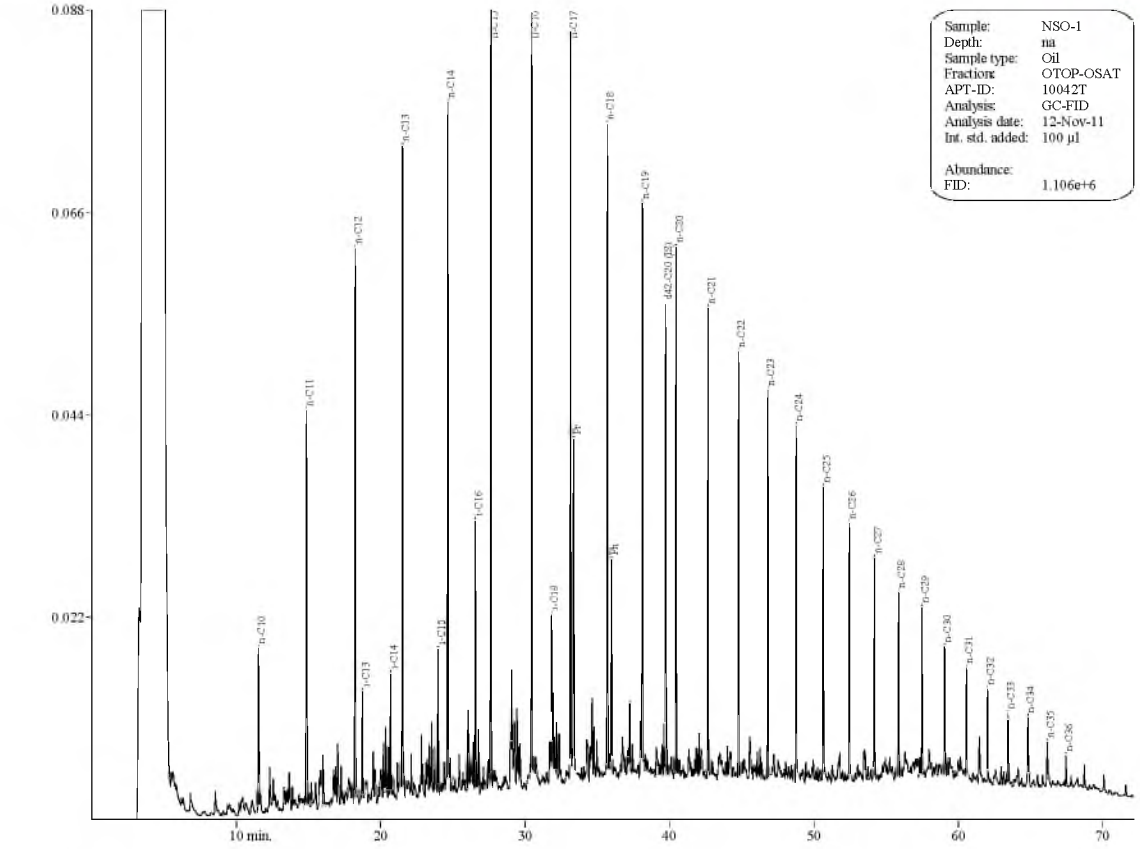
Arrhenius constant =	3.0037E+13/s
TOC, %=	7.74
HI, mg HC/g TOC =	449
Tmax, °C =	420

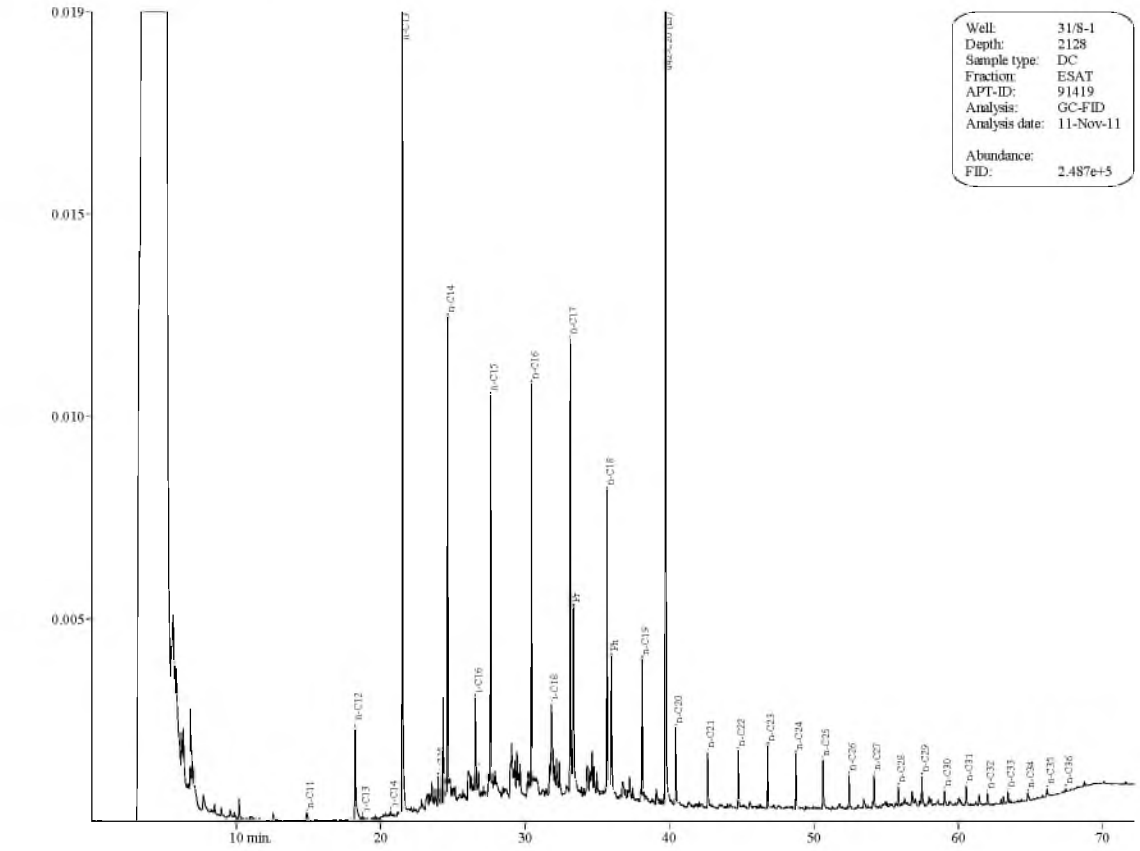
Activation energy kcal/mole	%
40	
41	
42	0.03
43	0.00
44	0.00
45	0.00
46	0.00
47	0.00
48	0.00
49	0.00
50	11.32
51	31.44
52	36.13
53	7.35
54	9.25
55	0.11
56	2.36
57	0.00
58	0.19
59	0.13
60	0.00
61	0.00
62	0.00
63	0.00
64	0.00
65	1.69
66	
67	
68	
69	
70	

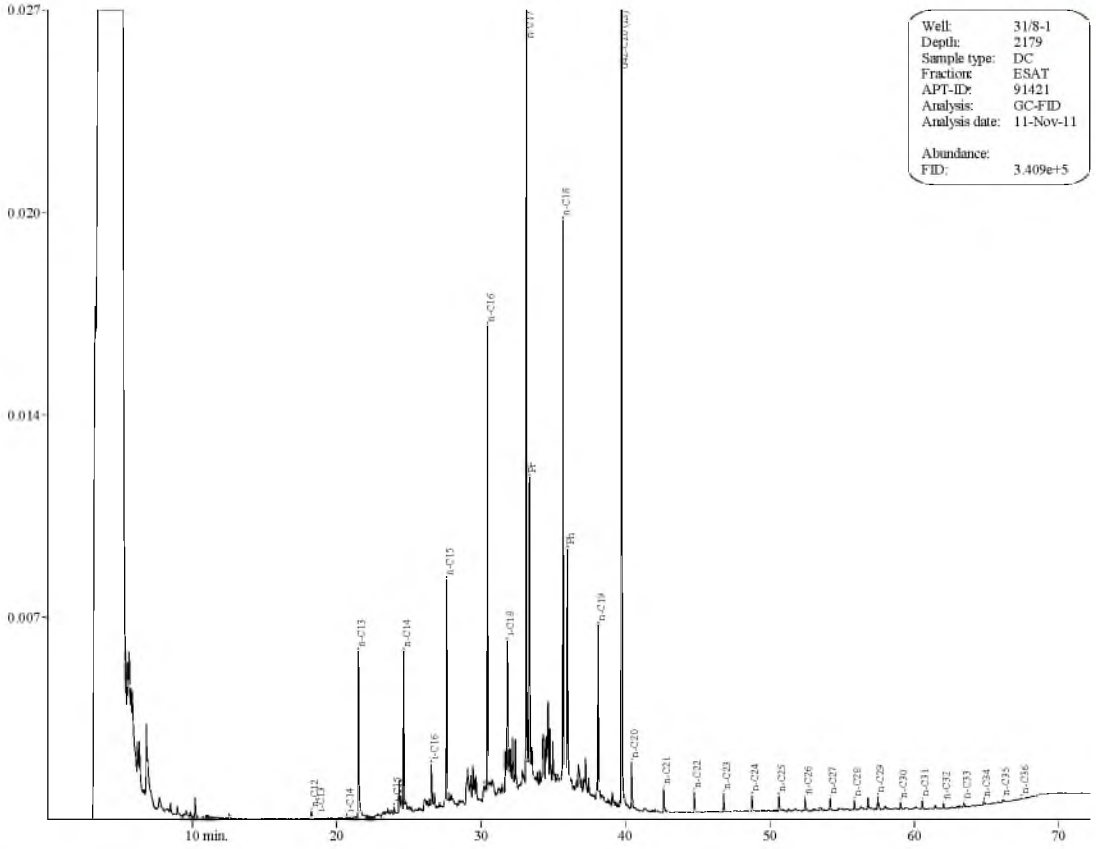


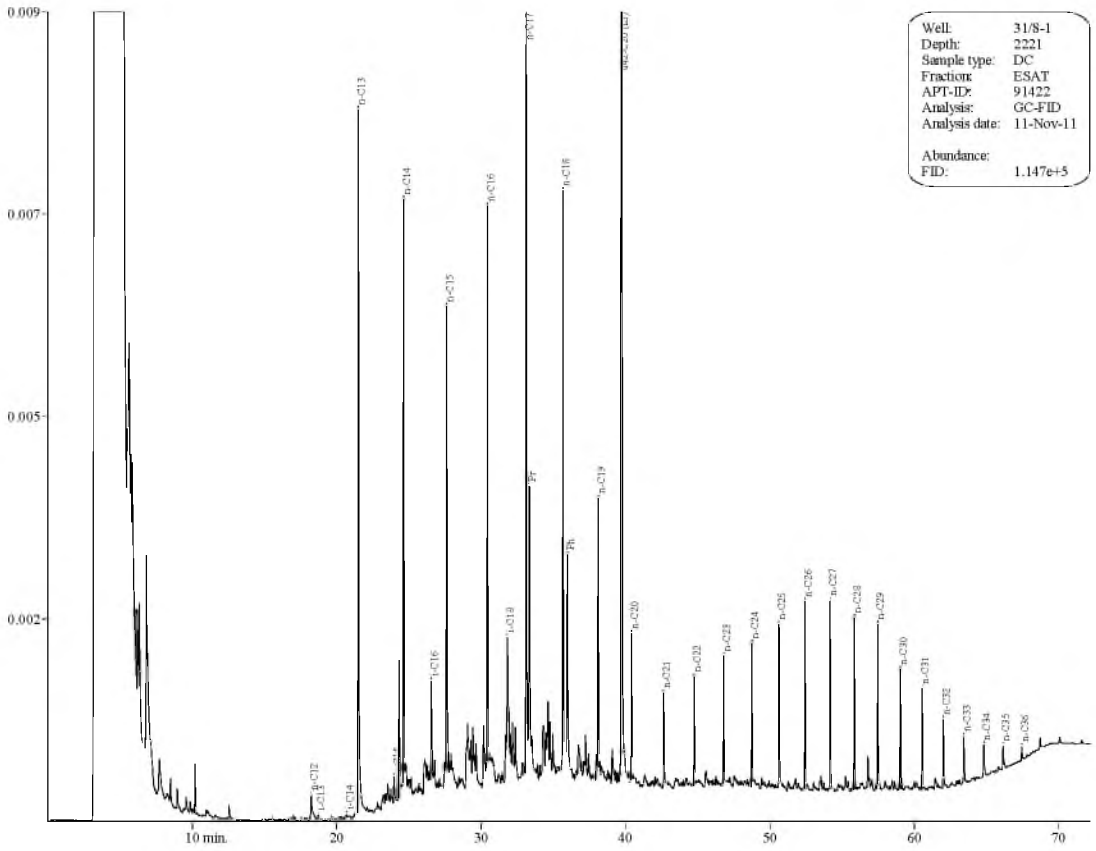


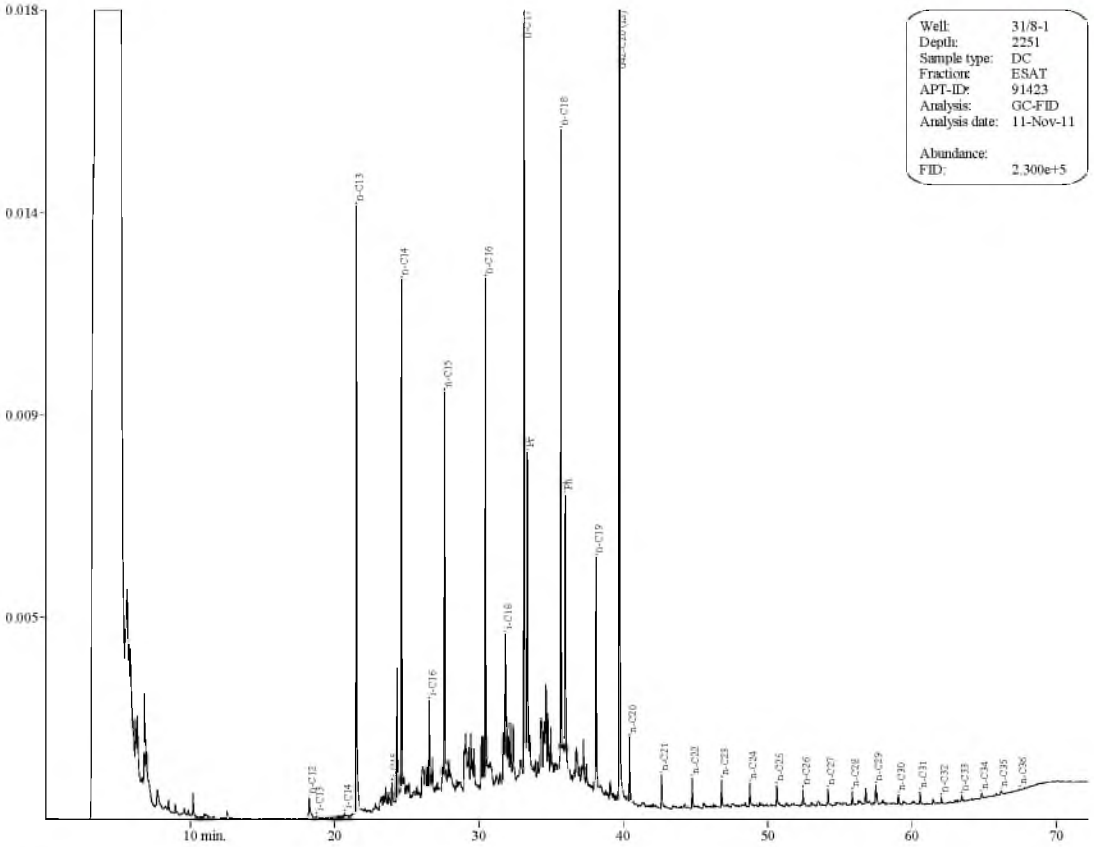
GC Chromatograms of Saturated Hydrocarbons

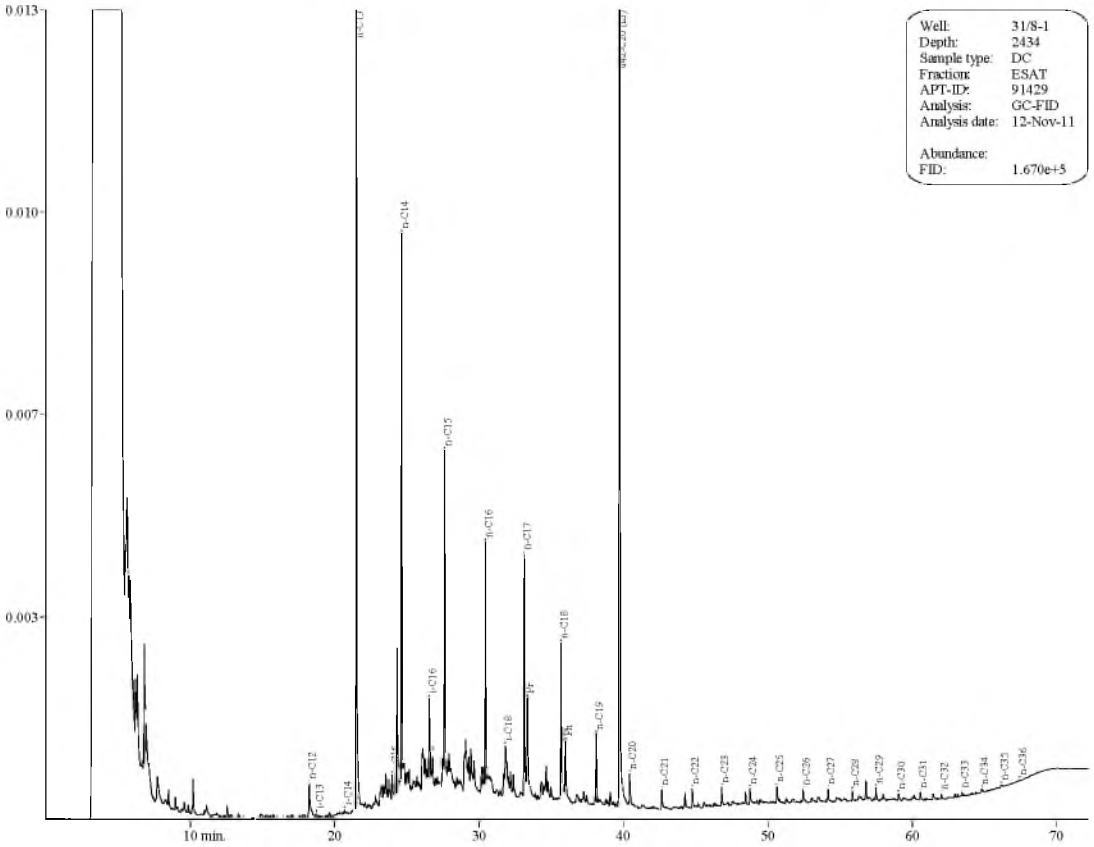

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-FID
Analysis date: 12-Nov-11
Int. std. added: 100 µl
Abundance:
FID: 1.106e+6
0.088
0.066
0.044
0.022
10 min.
20
30
40
50
60
70

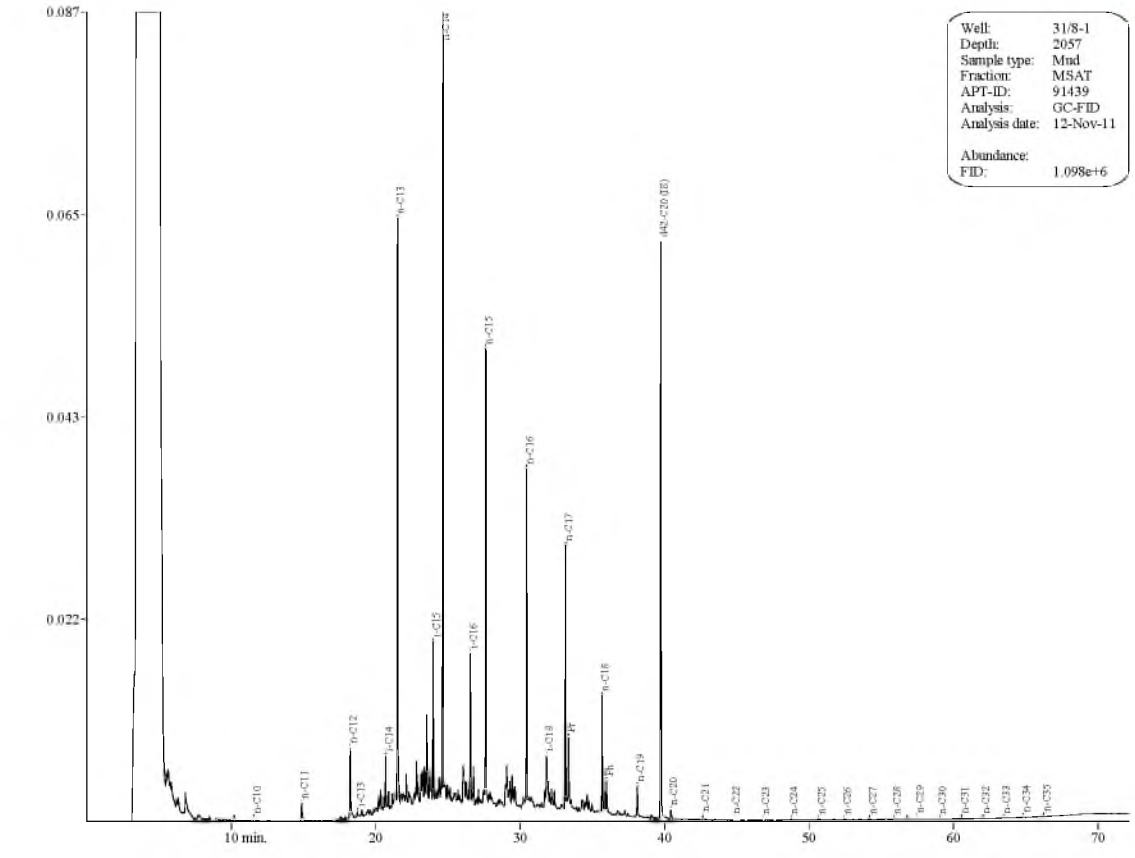

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-FID
Analysis date: 11-Nov-11
Abundance:
FID: 2.487e+5
0.019
0.015
0.010
0.005
10 min.
20
30
40
50
60
70


Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-FID
Analysis date: 11-Nov-11
Abundance:
FID: 3.409e+5
0.027
0.020
0.014
0.007
10 min.
20
30
40
50
60
70
n-C13
n-C14
n-C15
n-C16
i-C16
n-C17
Pr
i-C18
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
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36

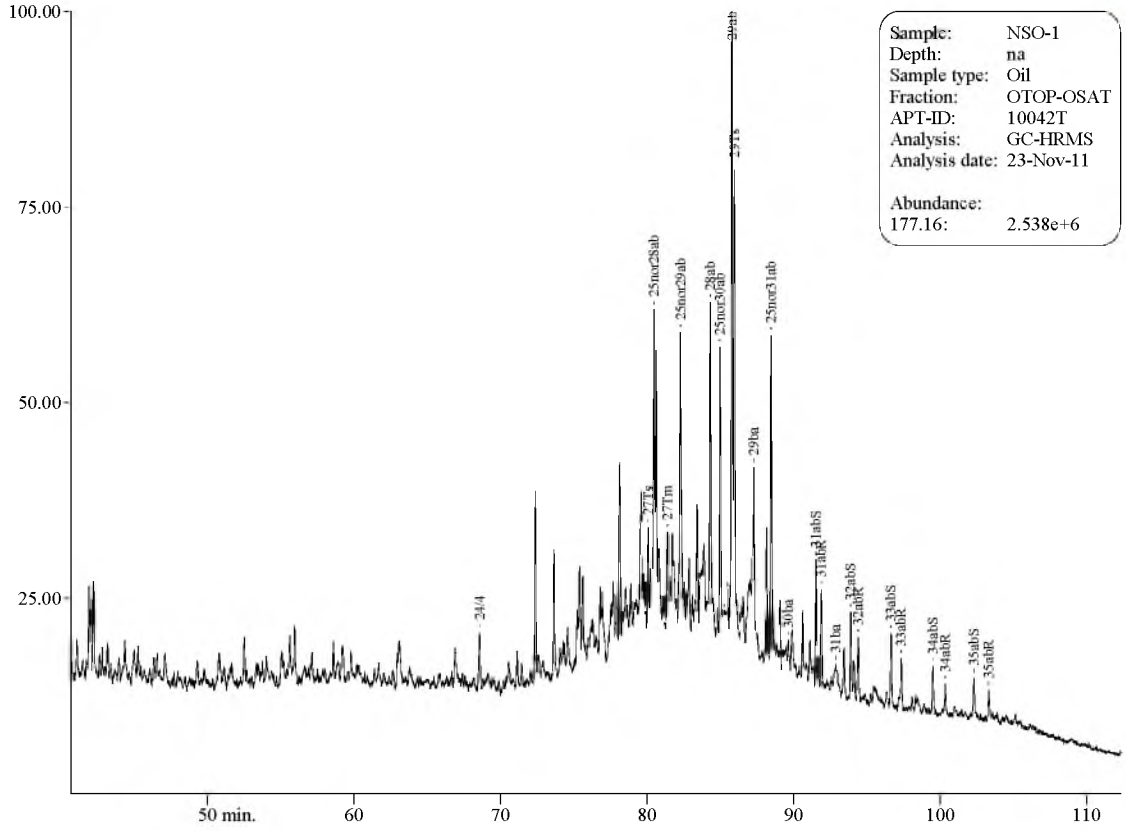

Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-FID
Analysis date: 11-Nov-11
Abundance:
FID: 1.147e+5
0.009
0.007
0.005
0.002
10 min.
20
30
40
50
60
70
n-C13
n-C14
n-C15
n-C16
i-C16
n-C17
Pr
i-C18
n-C18
Ph
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36

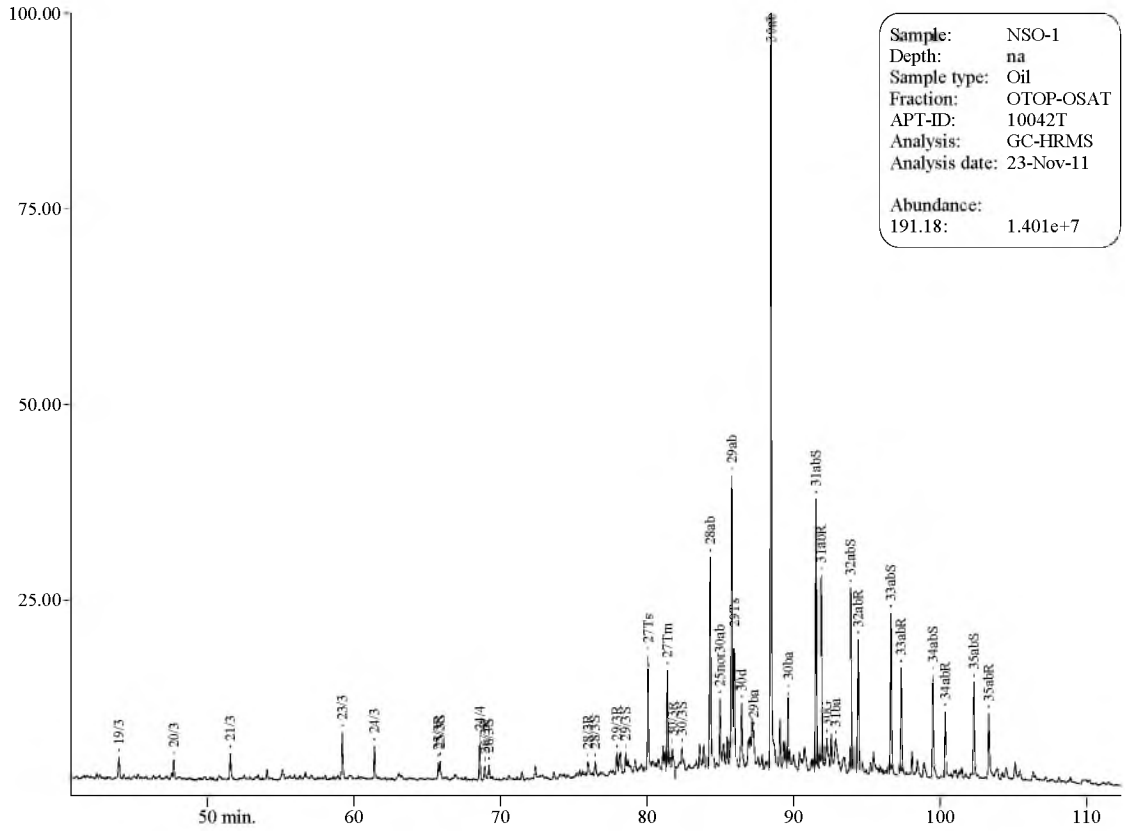

Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-FID
Analysis date: 11-Nov-11
Abundance:
FID: 2.300e+5
0.018
0.014
0.009
0.005
10 min.
20
30
40
50
60
70

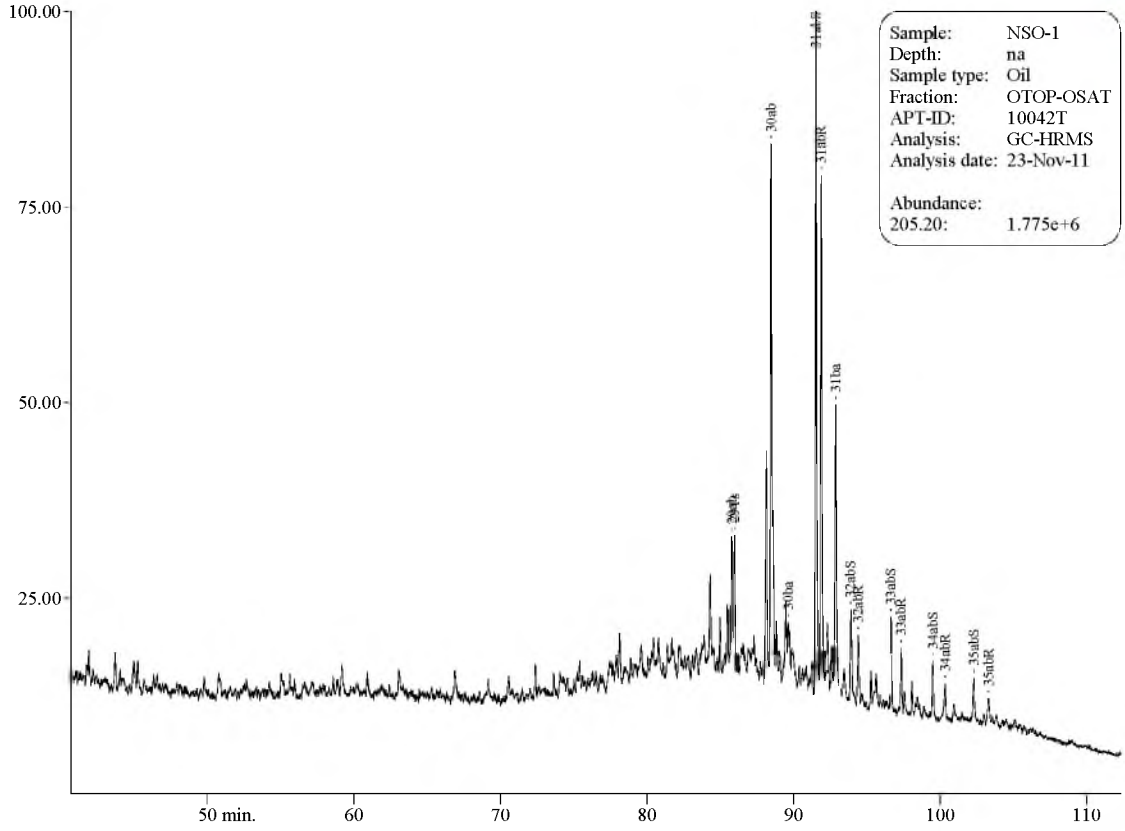

Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-FID
Analysis date: 12-Nov-11
Abundance:
FID: 1.670e+5
0.013
0.010
0.007
0.003
10 min.
20
30
40
50
60
70

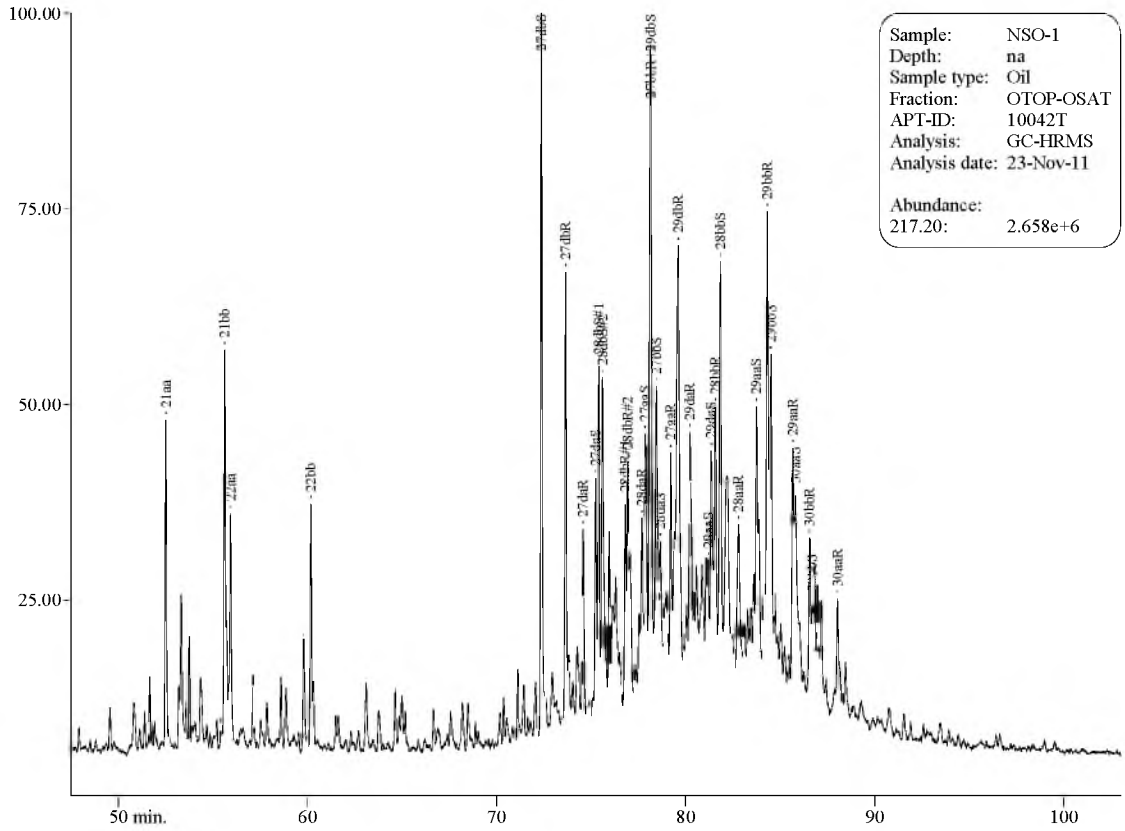

Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-FID
Analysis date: 12-Nov-11
Abundance:
FID: 1.098e+6
0.087
0.065
0.043
0.022
10 min.
20
30
40
50
60
70
n-C13
n-C15
n-C16
n-C17
n-C18
Ph
n-C19
(M2-C20 ISS)

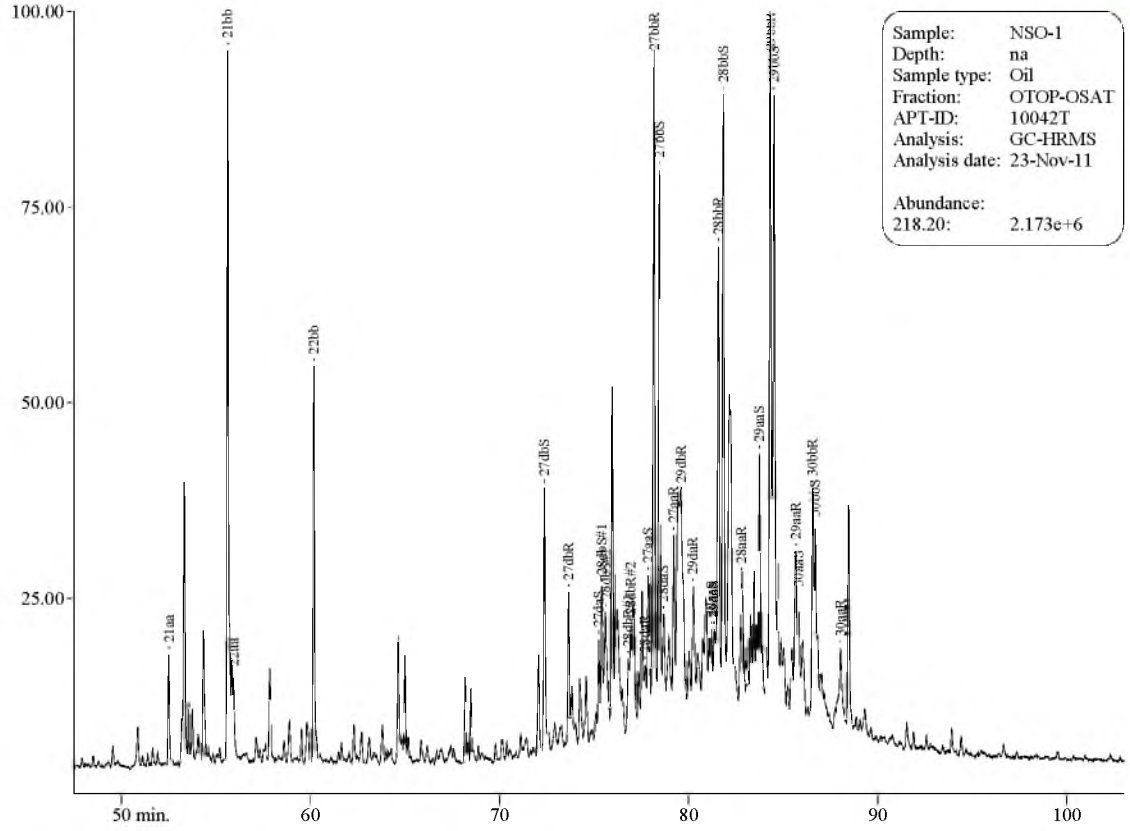
GC-MS Chromatograms of Saturated Hydrocarbons

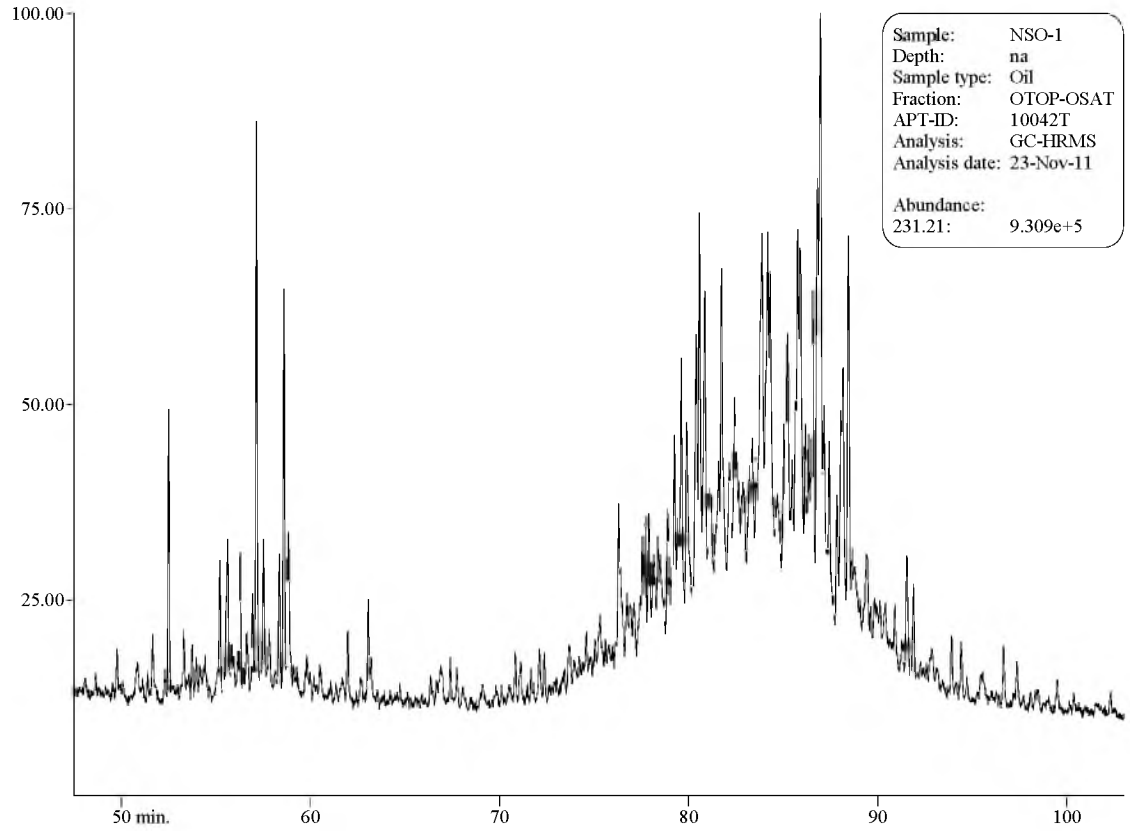

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
177.16: 2.538e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
25nor28ab
25nor29ab
28ab
25nor30ab
25nor31ab
29ab
29ts
27Ts
27Tm
29ba
31abS
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
30ba
31ba
24/4

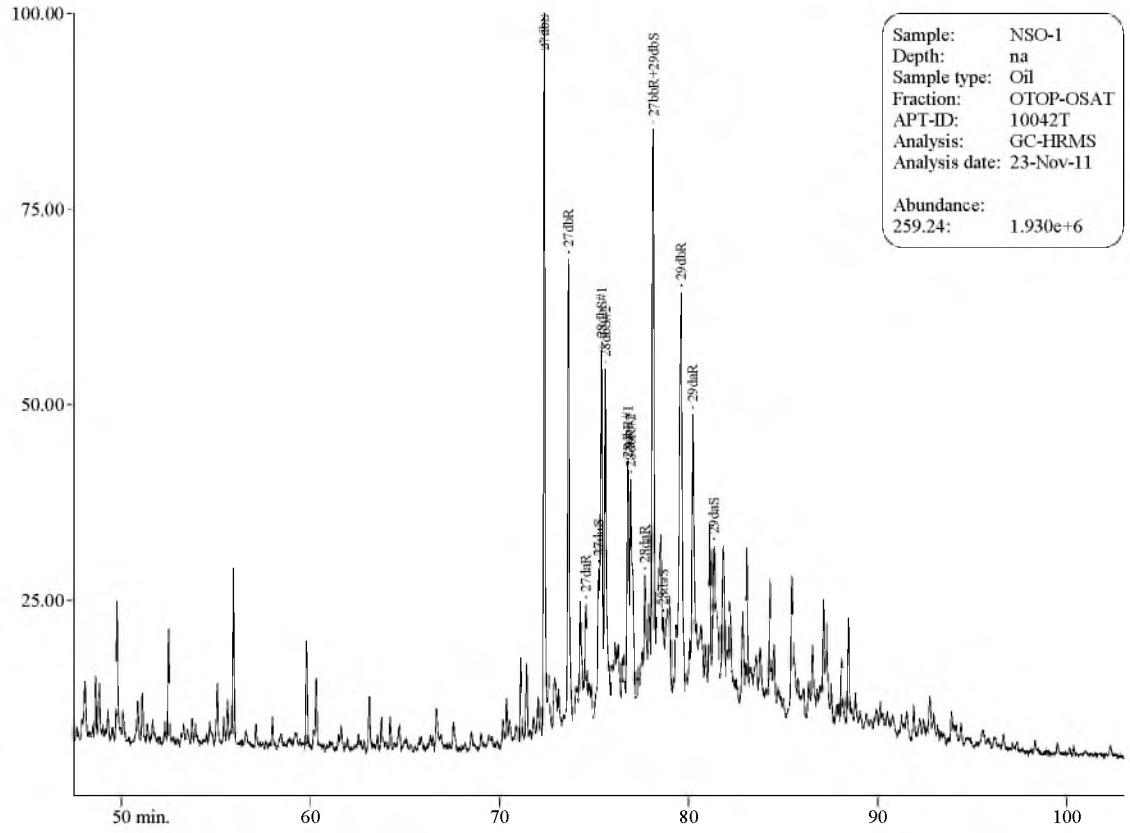

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
191.18: 1.401e+7
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
19/3
20/3
21/3
23/3
24/3
29/3R
29/3S
27Ts
27Tm
28ab
25nor30ab
29ab
29ts
30d
29ba
30ba
31abS
31abR
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

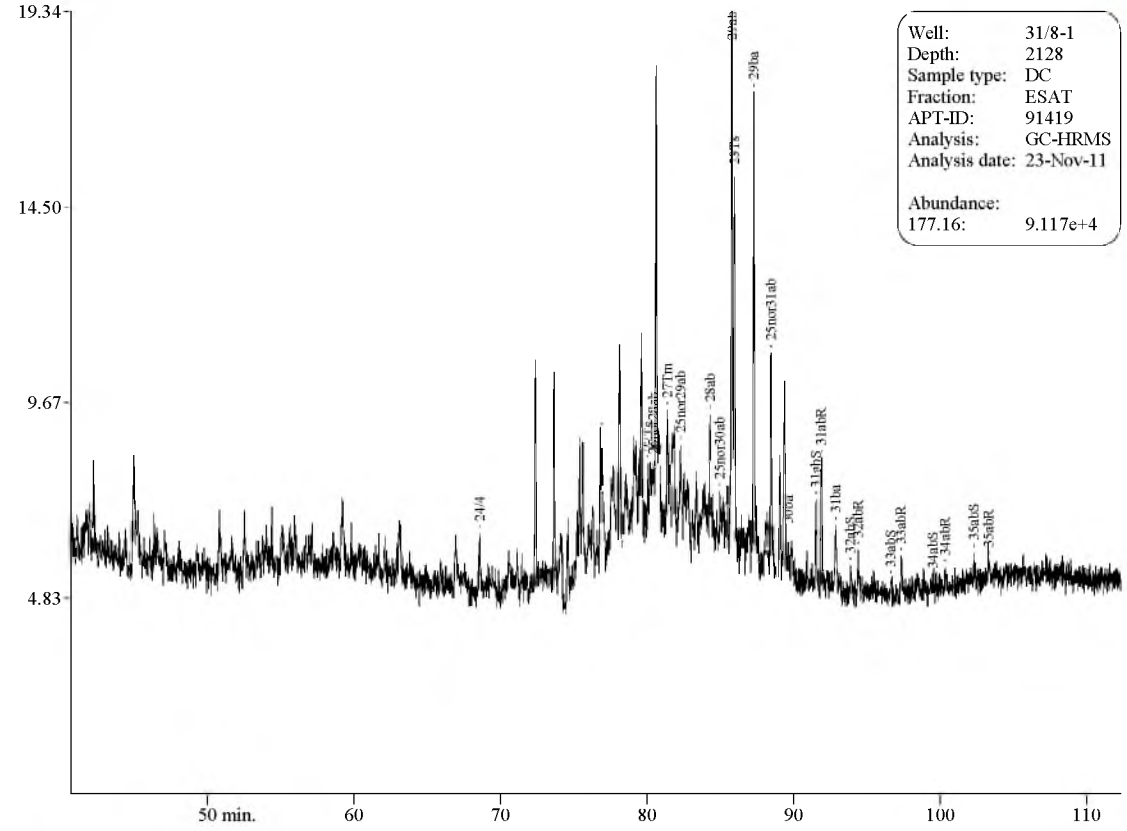

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
205.20: 1.775e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
30ab
31abR
31ba
30ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

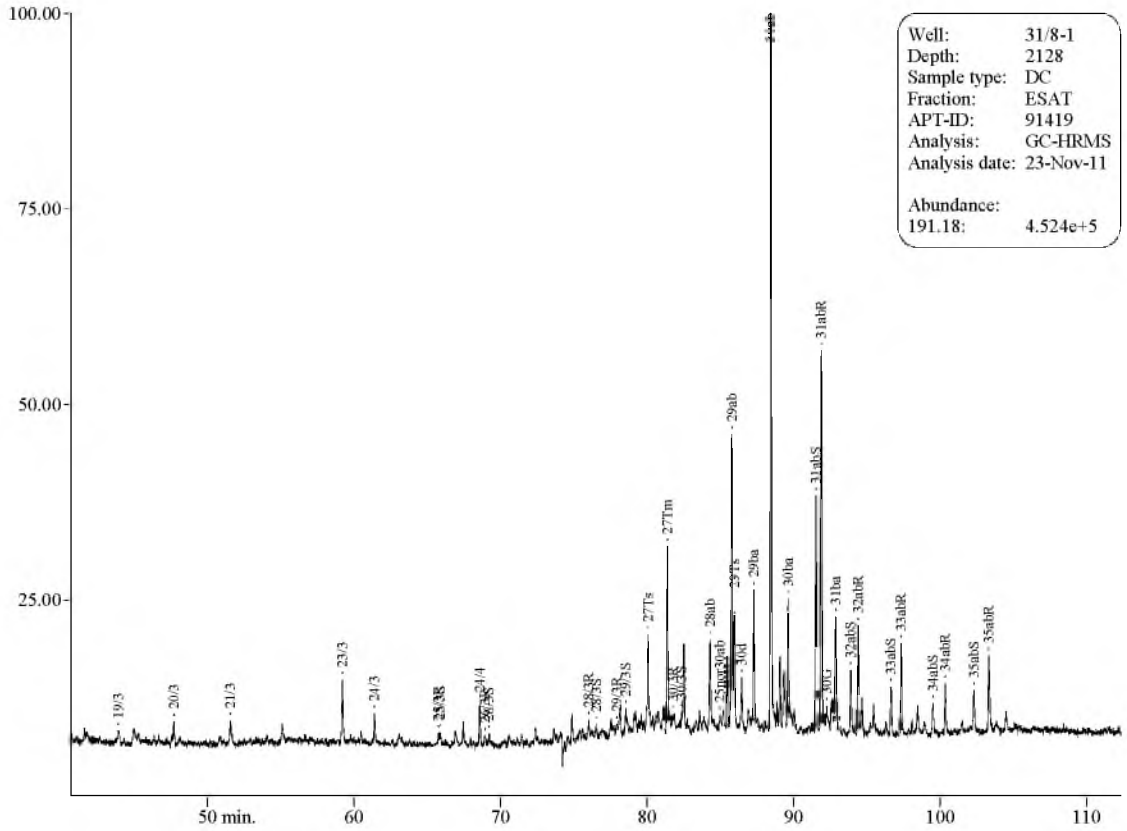

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
217.20: 2.658e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27dbR
27daR
27aaR
28aaR
29dbR
29bbR
29aaS
29aaR
30bbR
30aaR

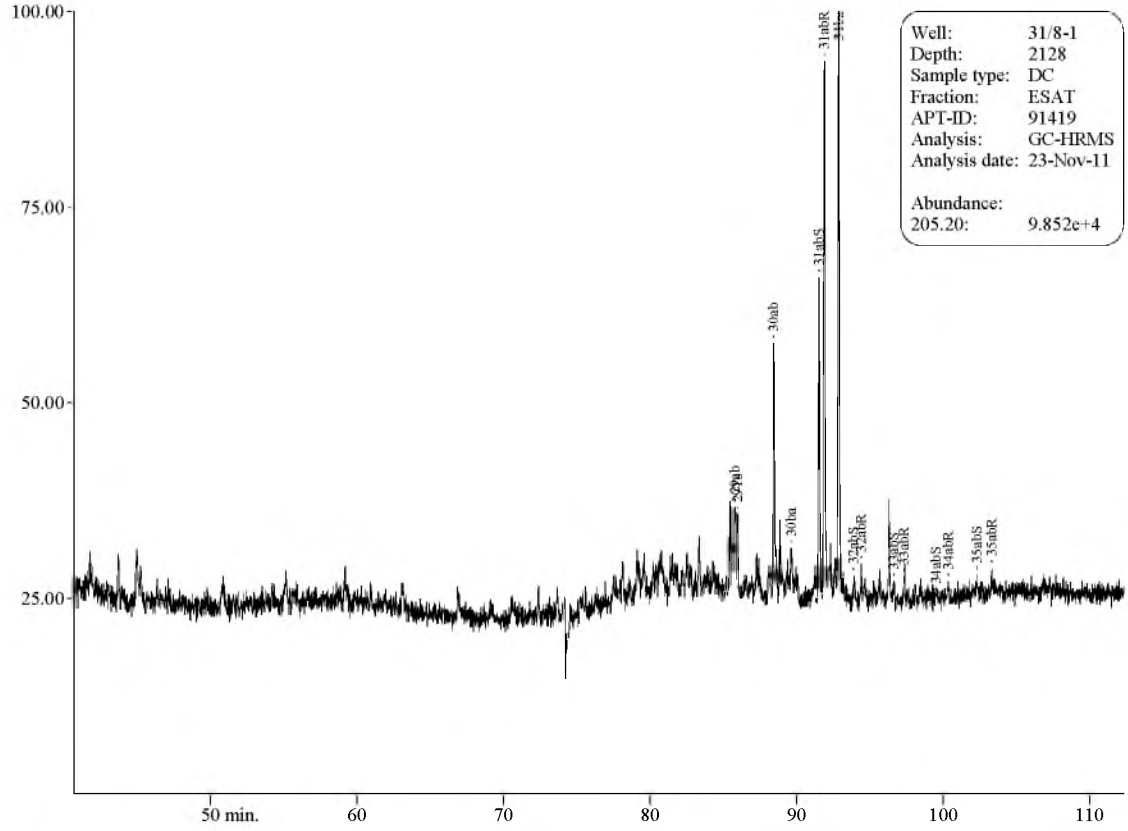

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
218.20: 2.173e+6

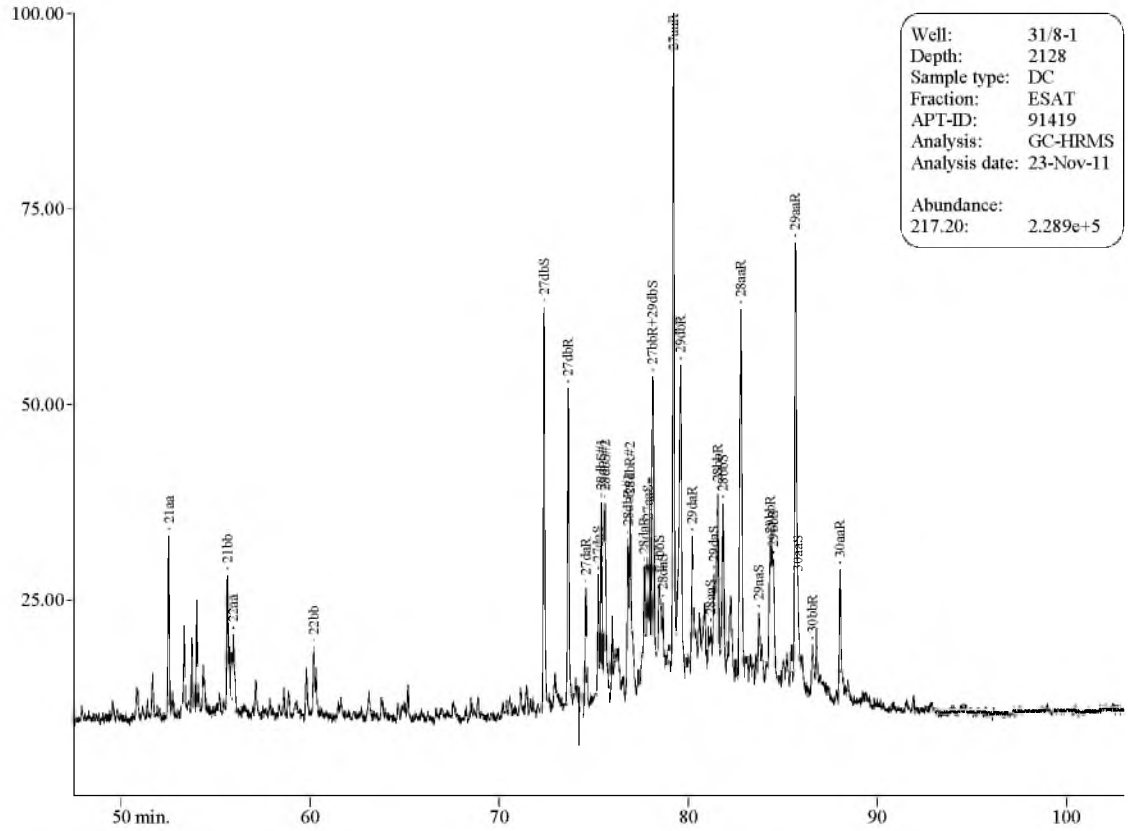

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
231.21: 9.309e+5

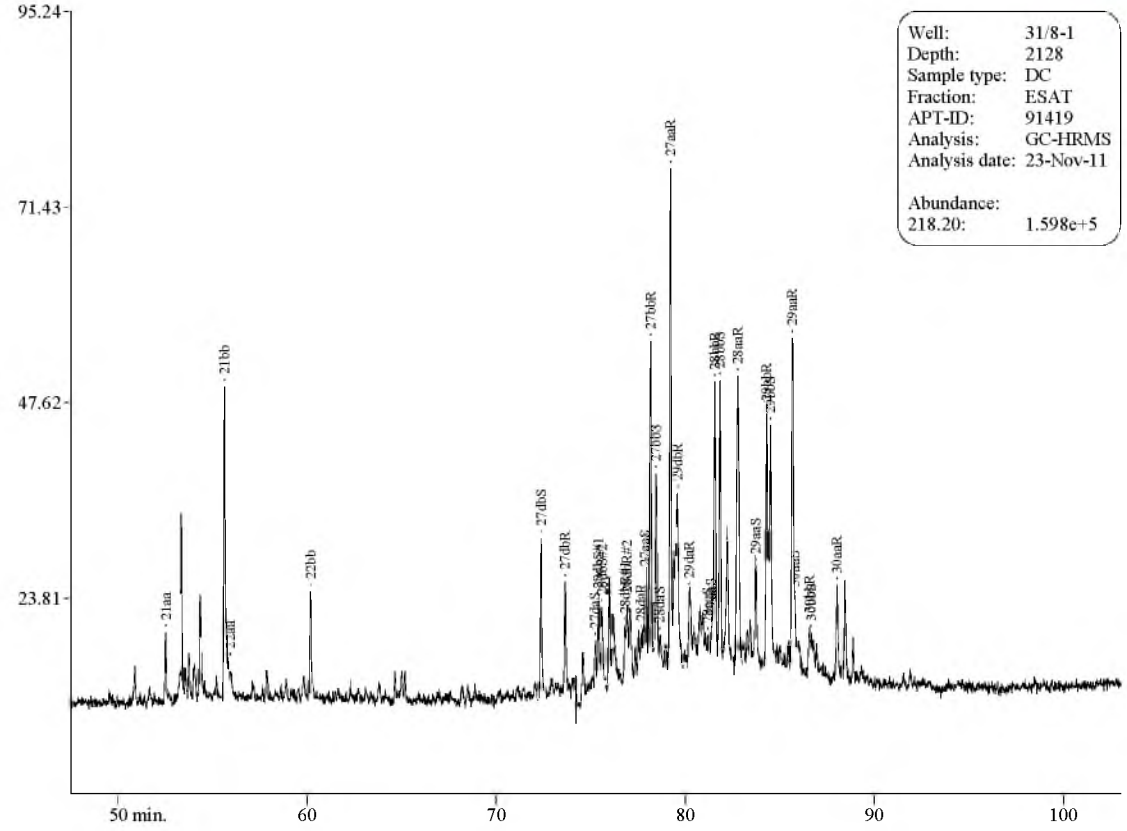

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OSAT
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
259.24: 1.930e+6
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbR
27daR
27dbS
27daS
27bbR-29dbS
29dbR
29daR
29daS

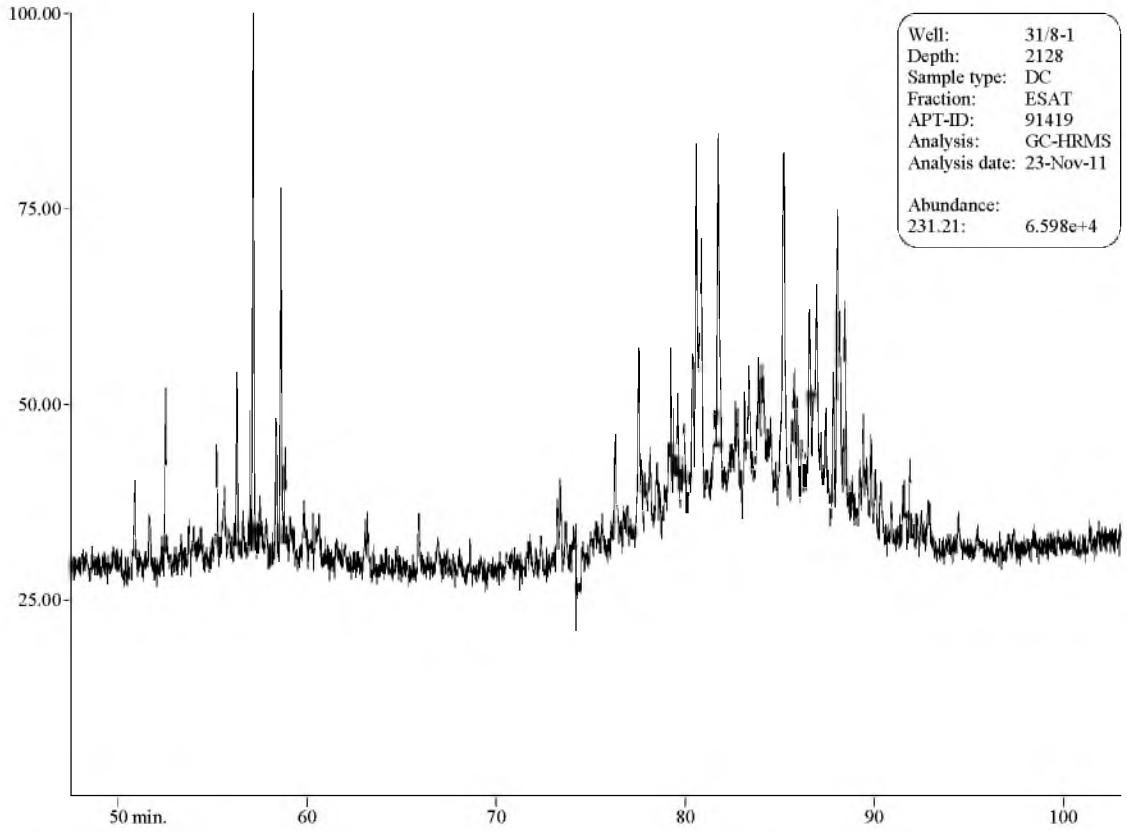

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
177.16: 9.117e+4
19.34
14.50
9.67
4.83
50 min.
60
70
80
90
100
110

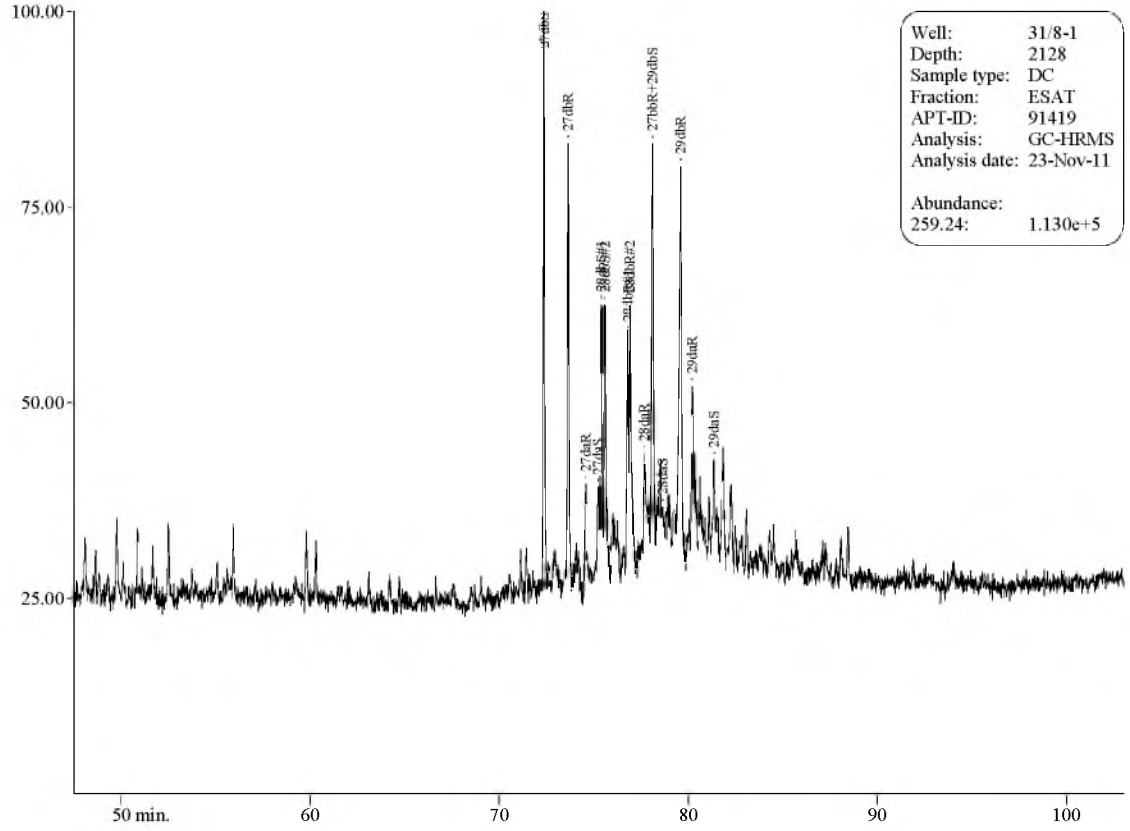

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
191.18: 4.524e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110

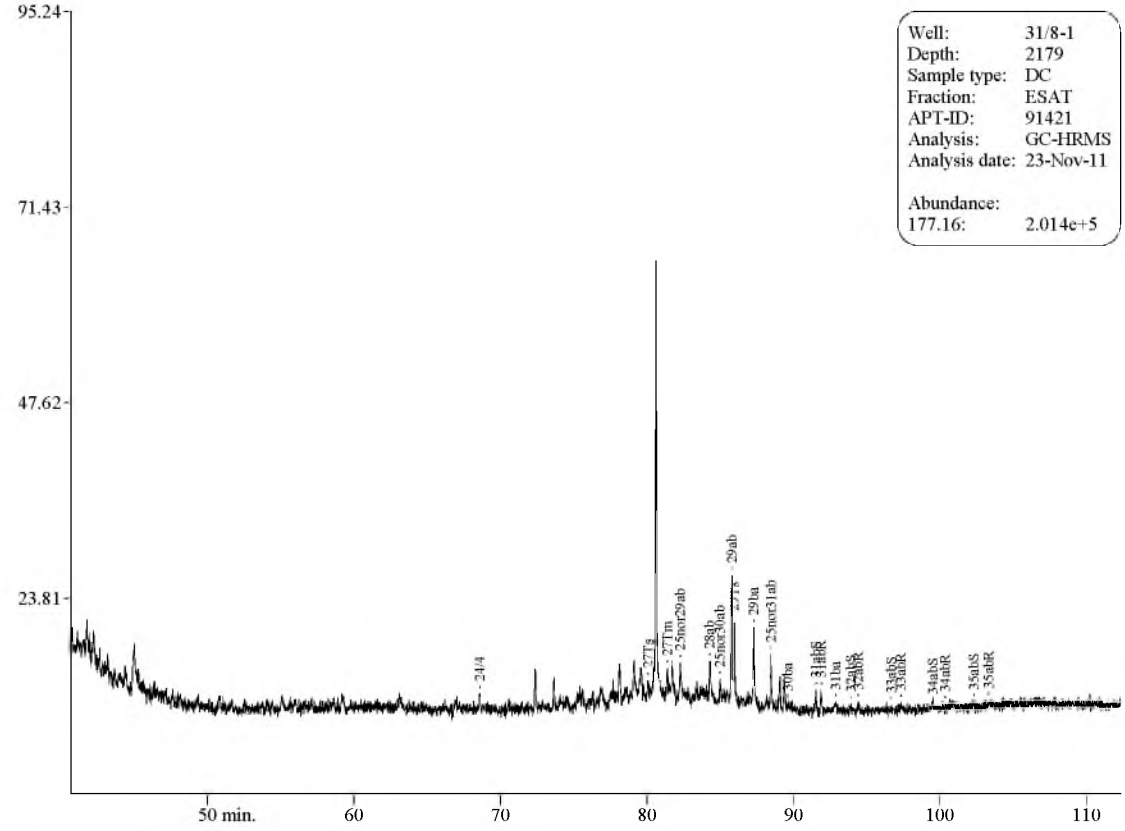

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
205.20: 9.852e+4
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110
31abR
31abS
30ab
29ab
30ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR

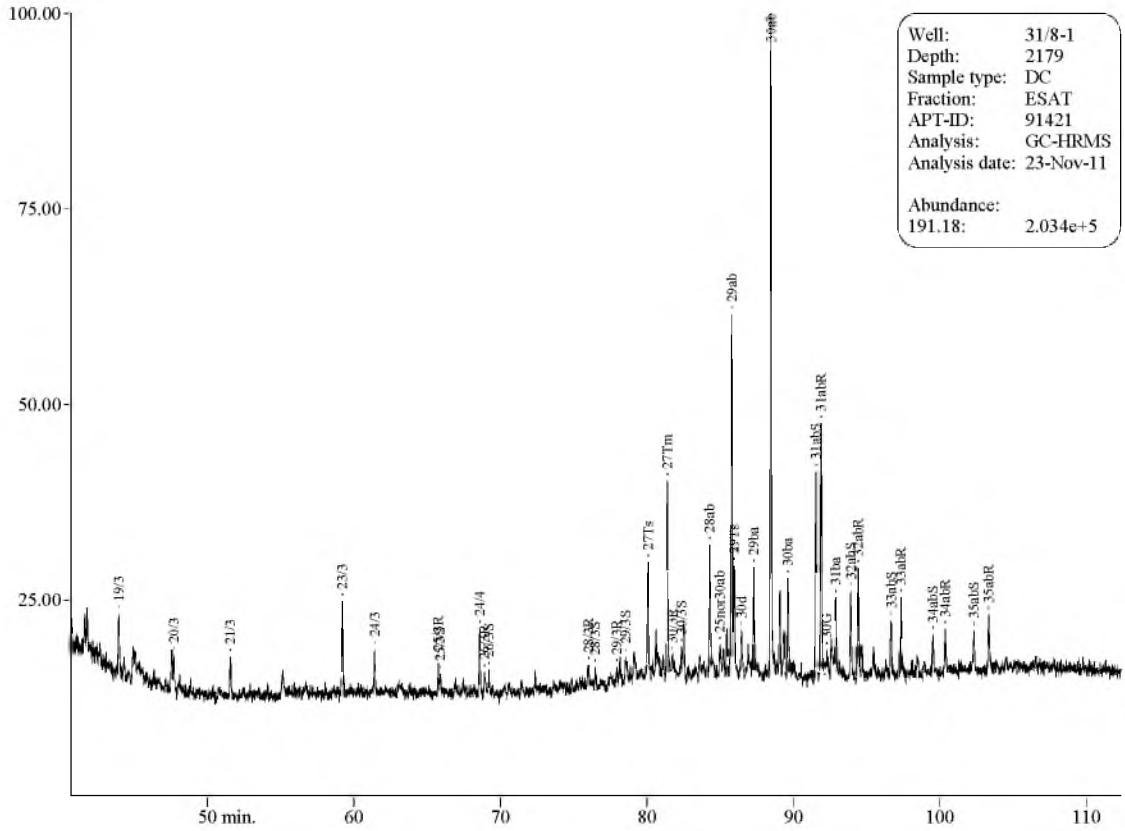

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
217.20: 2.289e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27bbR+29dbS
29dbR
28naR
29naR
21aa
21bb
22aa
22bb
27daR
29daR
29naS
30bbR
30naR

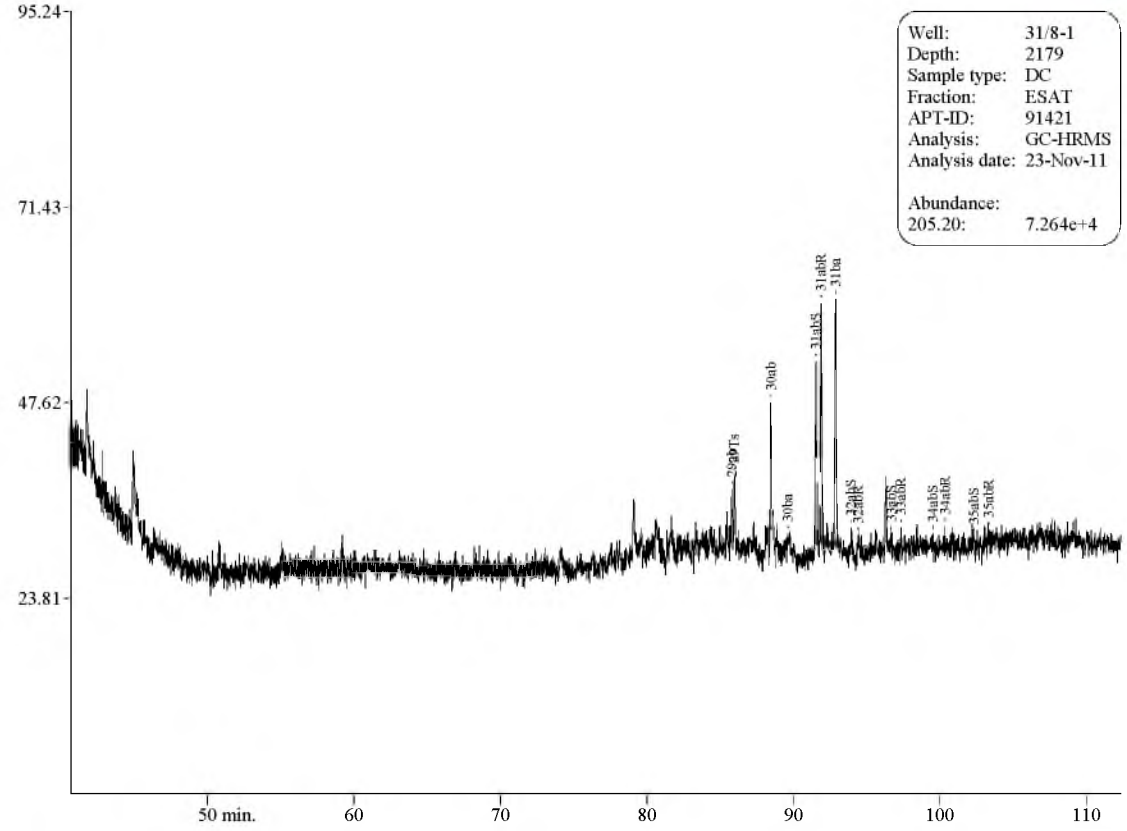

95.24
71.43
47.62
23.81
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
218.20: 1.598e+5
21aa
21bb
22bb
27dbS
27dbR
27aaR
27bbR
29dbR
28aaR
29aaS
29aaR
30aaR
50 min.
60
70
80
90
100

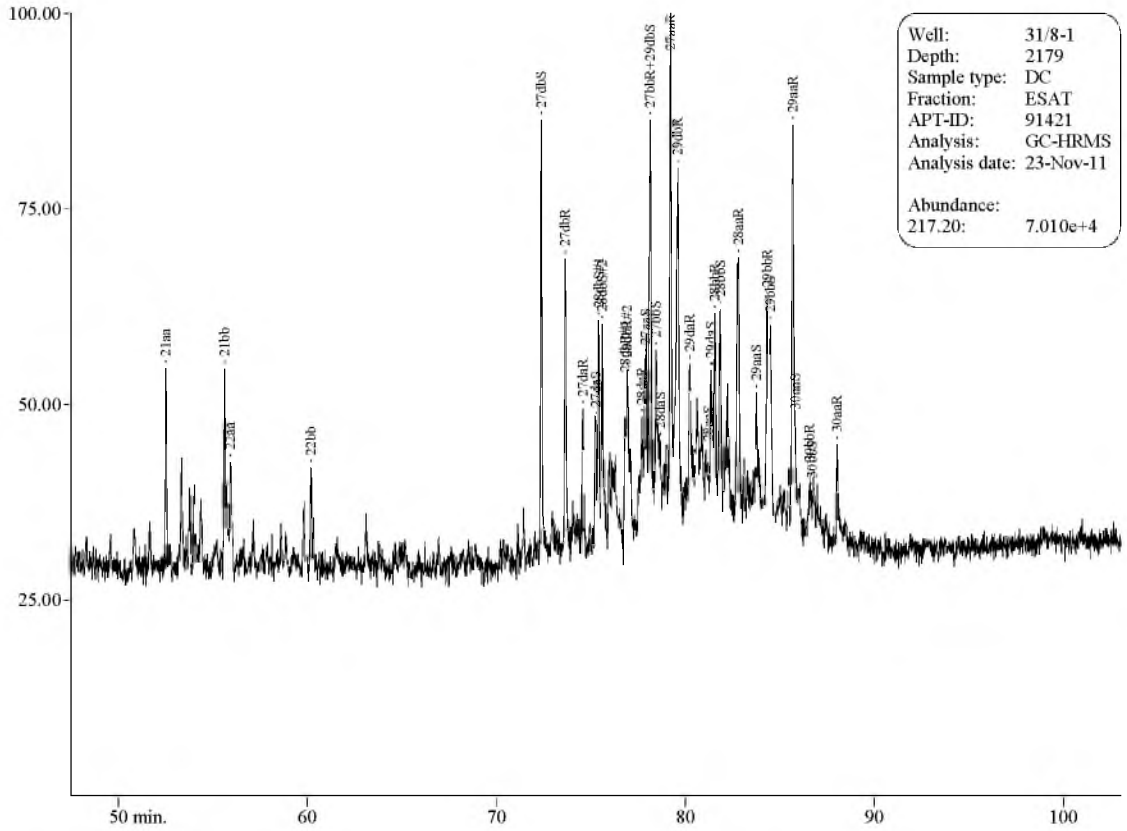

100.00
75.00
50.00
25.00
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
231.21: 6.598e+4
50 min.
60
70
80
90
100

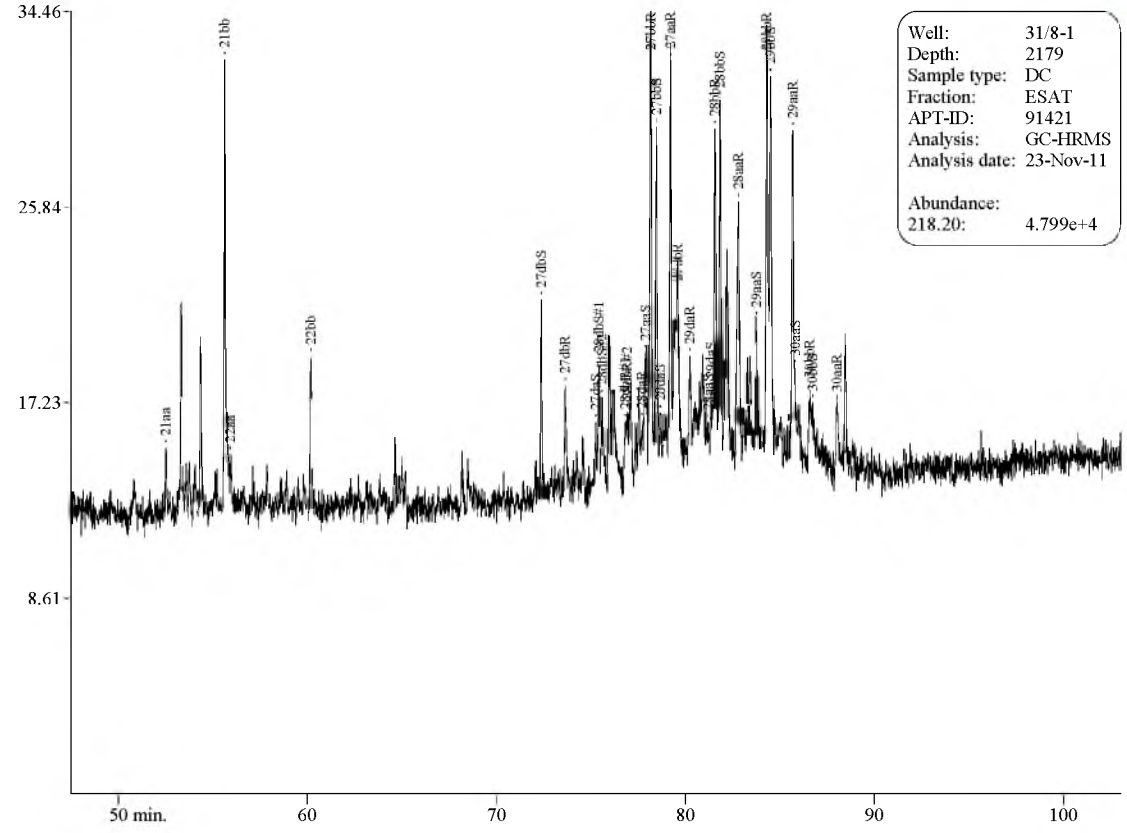

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: ESAT
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
259.24: 1.130e+5
27dbR
27baR
28baR
27bbR+29dbS
29dbR
29baR
29baS

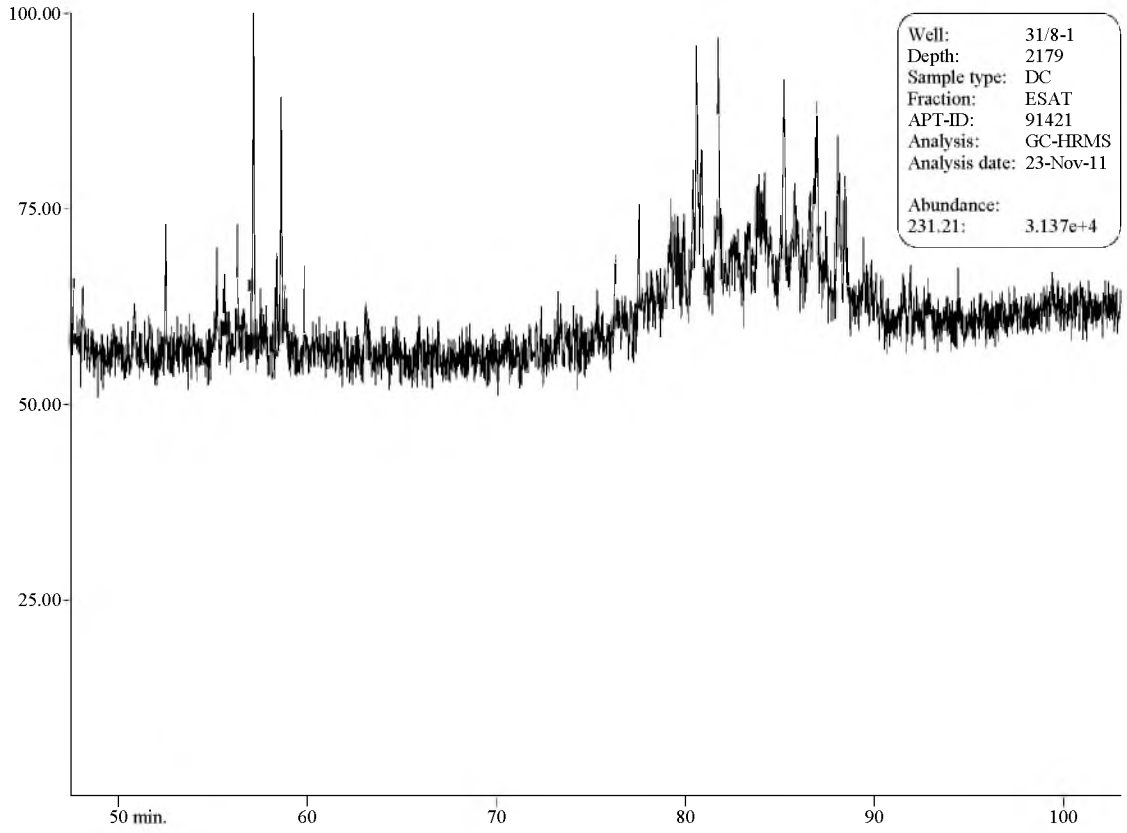

95.24
71.43
47.62
23.81
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
177.16: 2.014e+5
24/4
27Ts
27Tm
25nor29ab
28ab
25nor30ab
29ab
29Ts
29ba
25nor31ab
30ba
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
50 min.
60
70
80
90
100
110

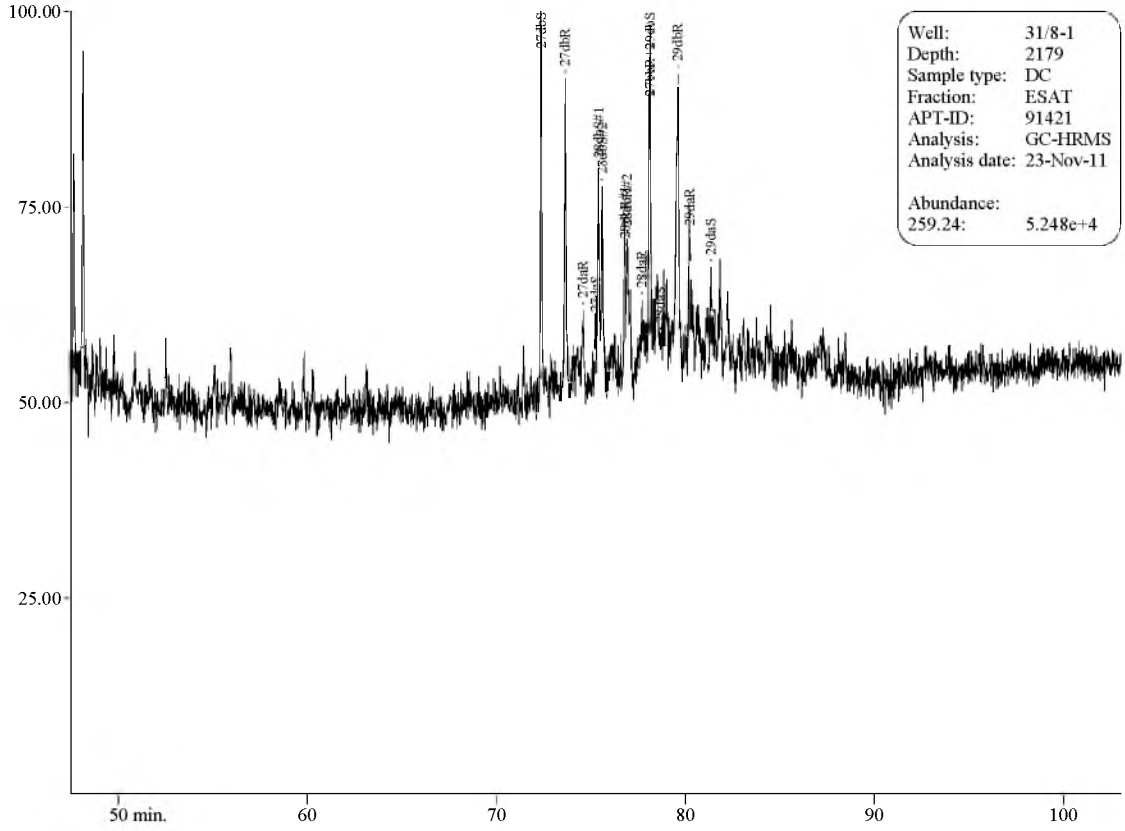

100.00
75.00
50.00
25.00
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
191.18: 2.034e+5
19/3
20/3
21/3
23/3
24/3
24/4
27Ts
27Tm
28ab
29ab
29Ts
29ba
30ba
31abS
31abR
31ba
32abS
32abR
33abS
33abR
34abS
34abR
35abS
35abR
50 min.
60
70
80
90
100
110

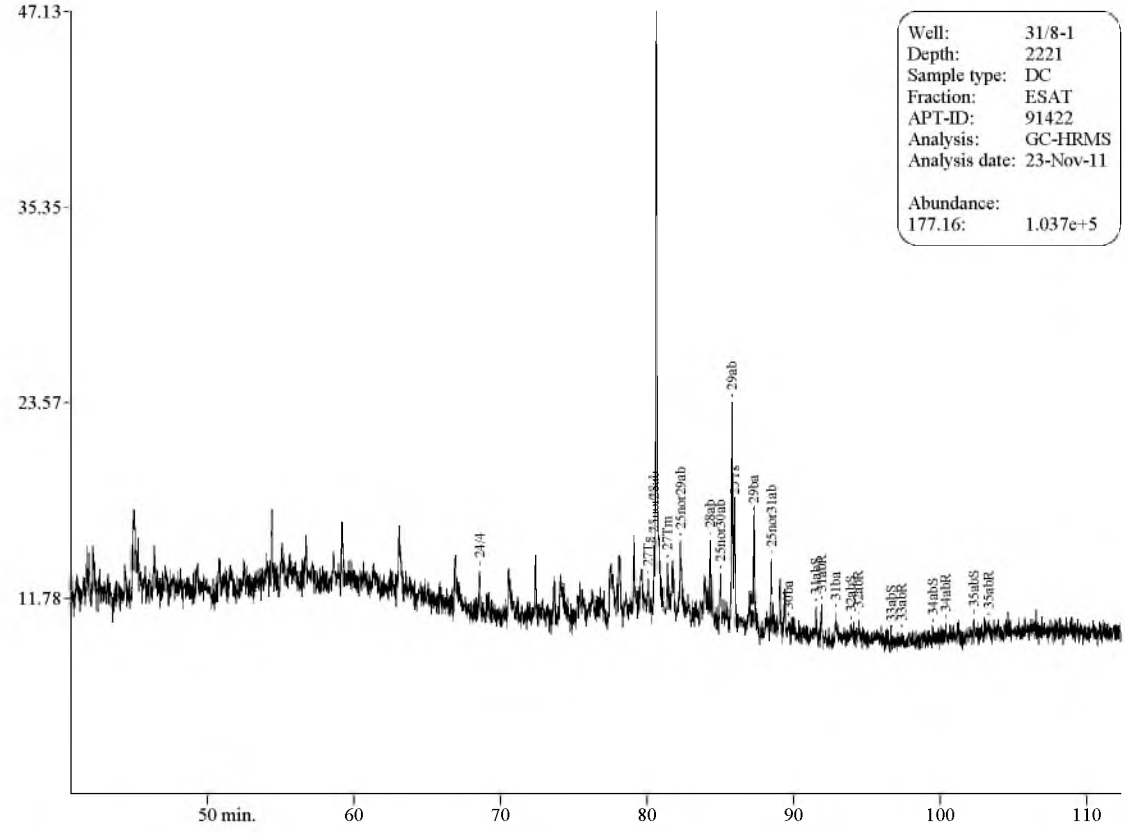

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
205.20: 7.264e+4
31abR
31ba
31abS
30ab
30ba
34abS
34abR
35abS
35abR

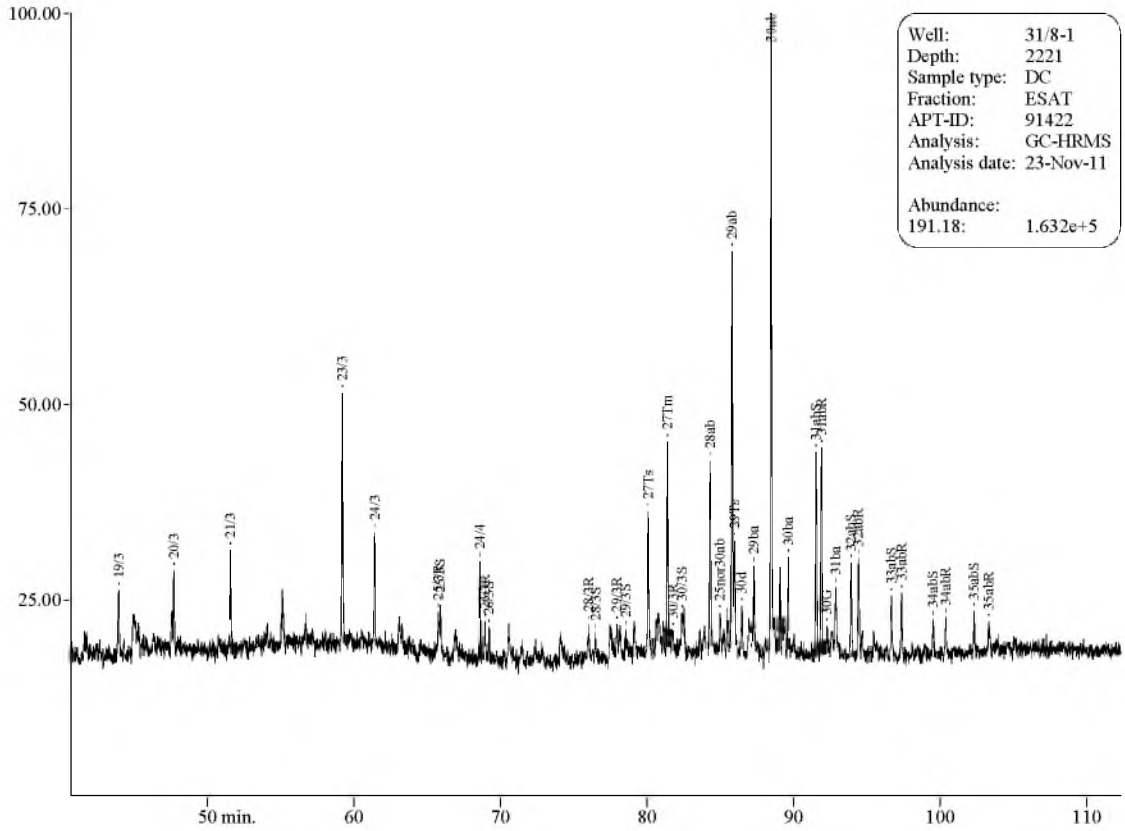

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
217.20: 7.010e+4
21aa
21bb
22aa
22bb
27dbS
27dbR
27daR
27bbR+29dbS
29dbR
29daR
28aaR
29aaS
29aaR
30aaR

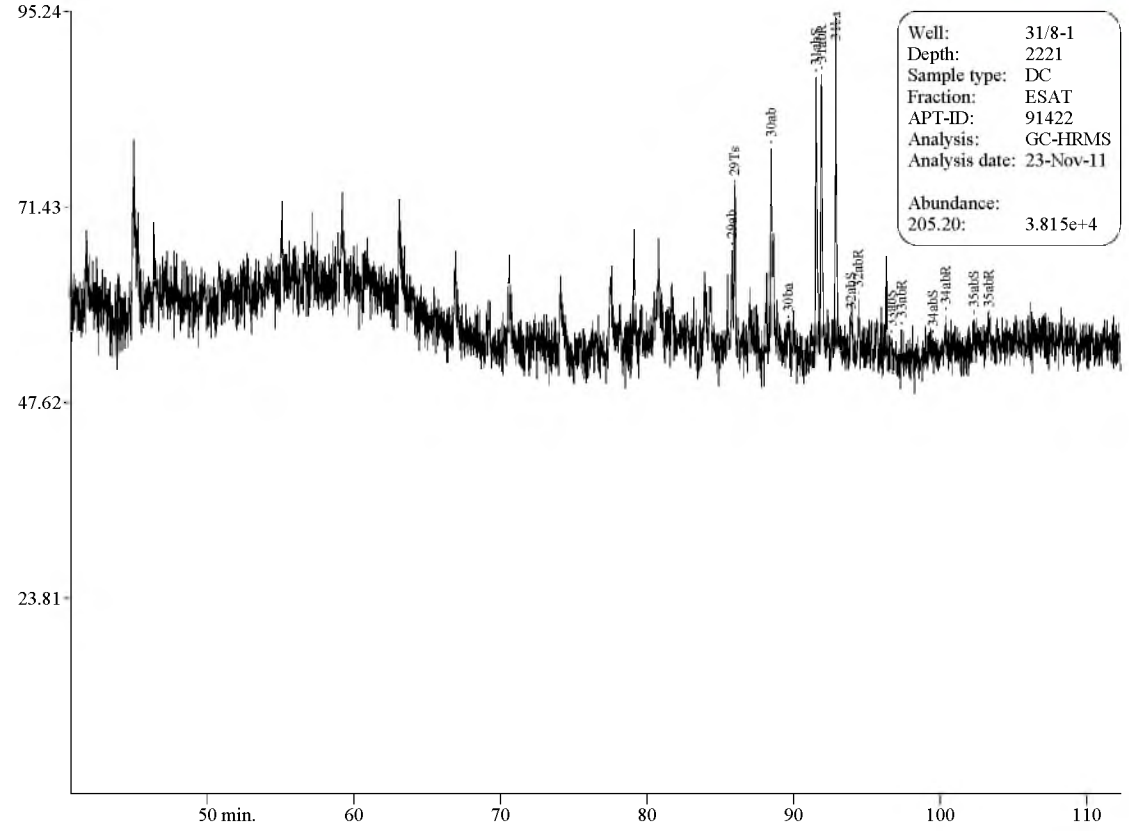

34.46
25.84
17.23
8.61
21aa
21bb
22bb
27dbS
27dbR
27aaR
29aaS
29aaR
30aaS
30aaR
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
218.20: 4.799e+4
50 min.
60
70
80
90
100

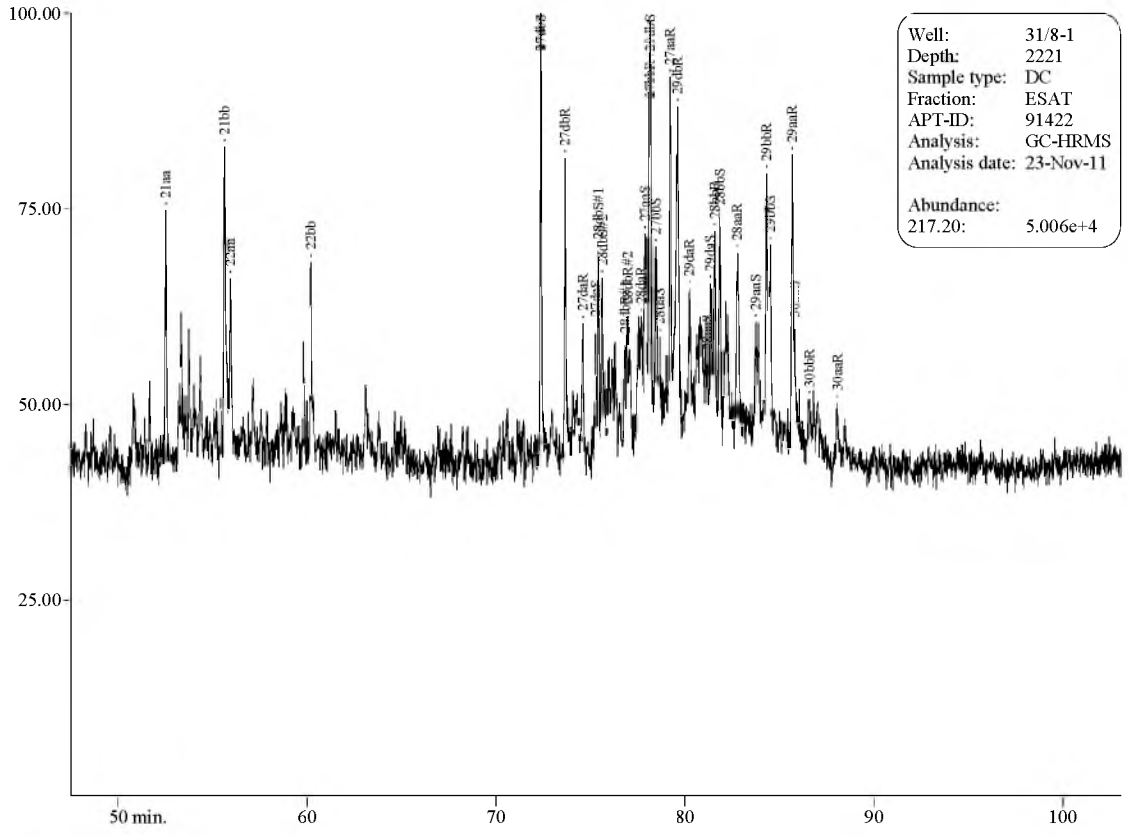

100.00
75.00
50.00
25.00
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
231.21: 3.137e+4
50 min.
60
70
80
90
100

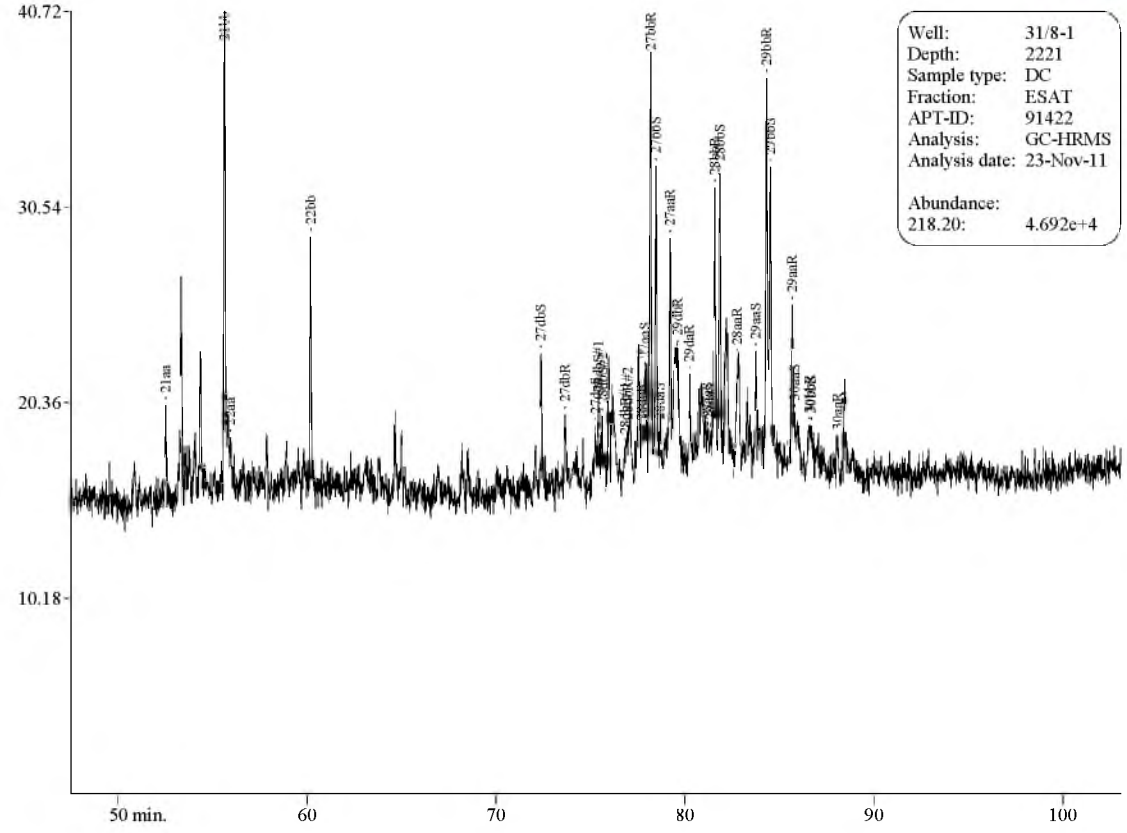

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbR
27daR
29dbR
29daR
29daS
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: ESAT
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
259.24: 5.248e+4

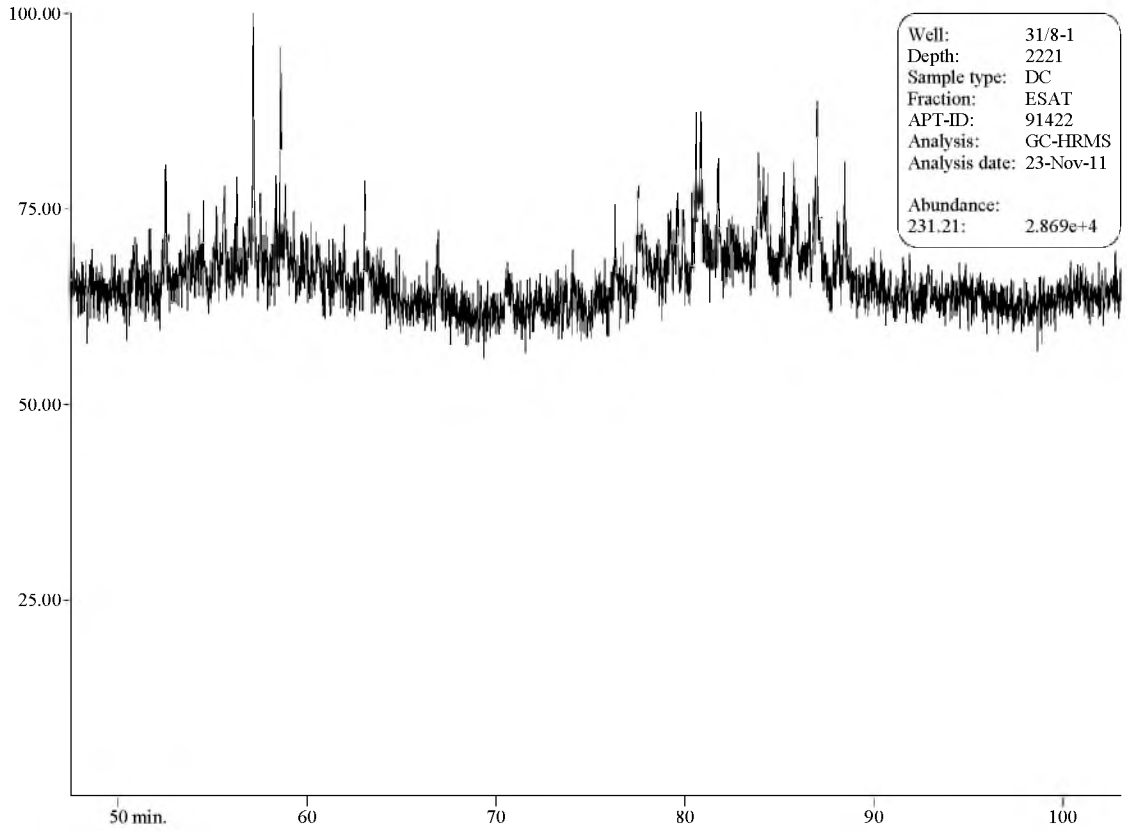

47.13
35.35
23.57
11.78
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
177.16: 1.037e+5
29ab
29ba
25nor31ab
24/4
50 min.
60
70
80
90
100
110

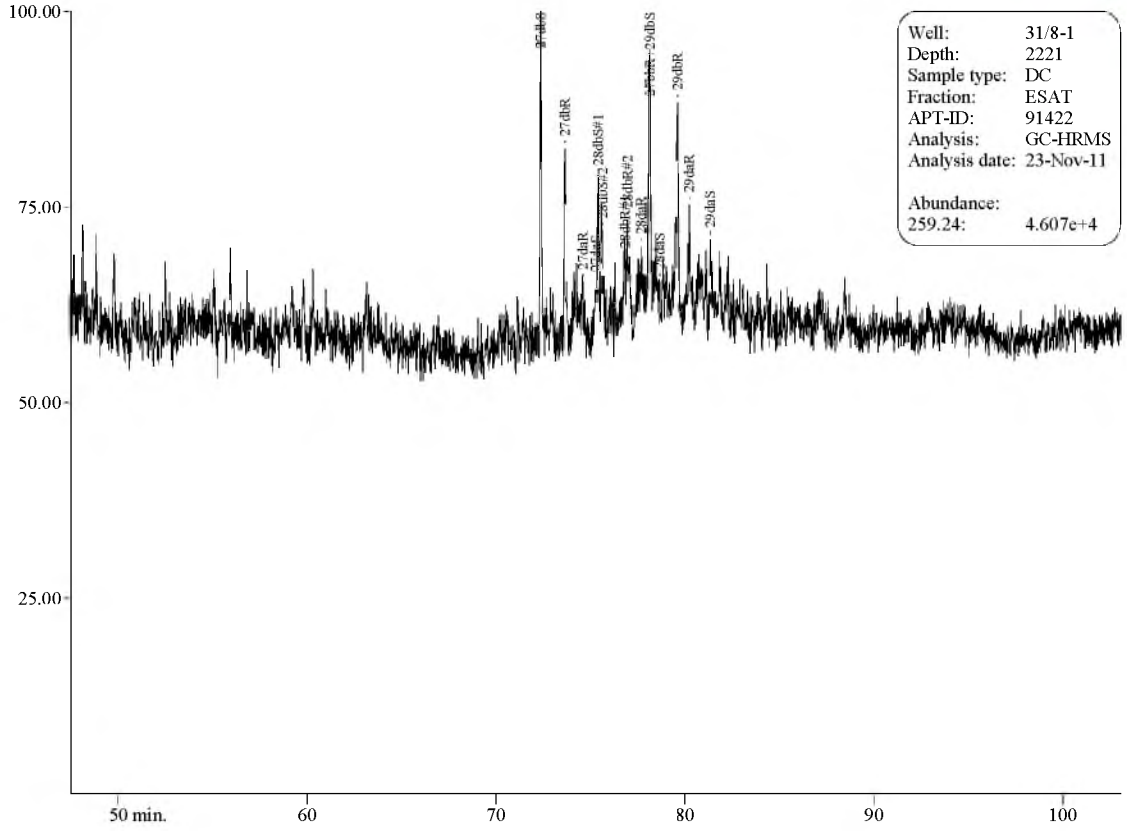

100.00
75.00
50.00
25.00
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
191.18: 1.632e+5
19/3
20/3
21/3
23/3
24/3
24/4
29ab
29ba
30ba
50 min.
60
70
80
90
100
110

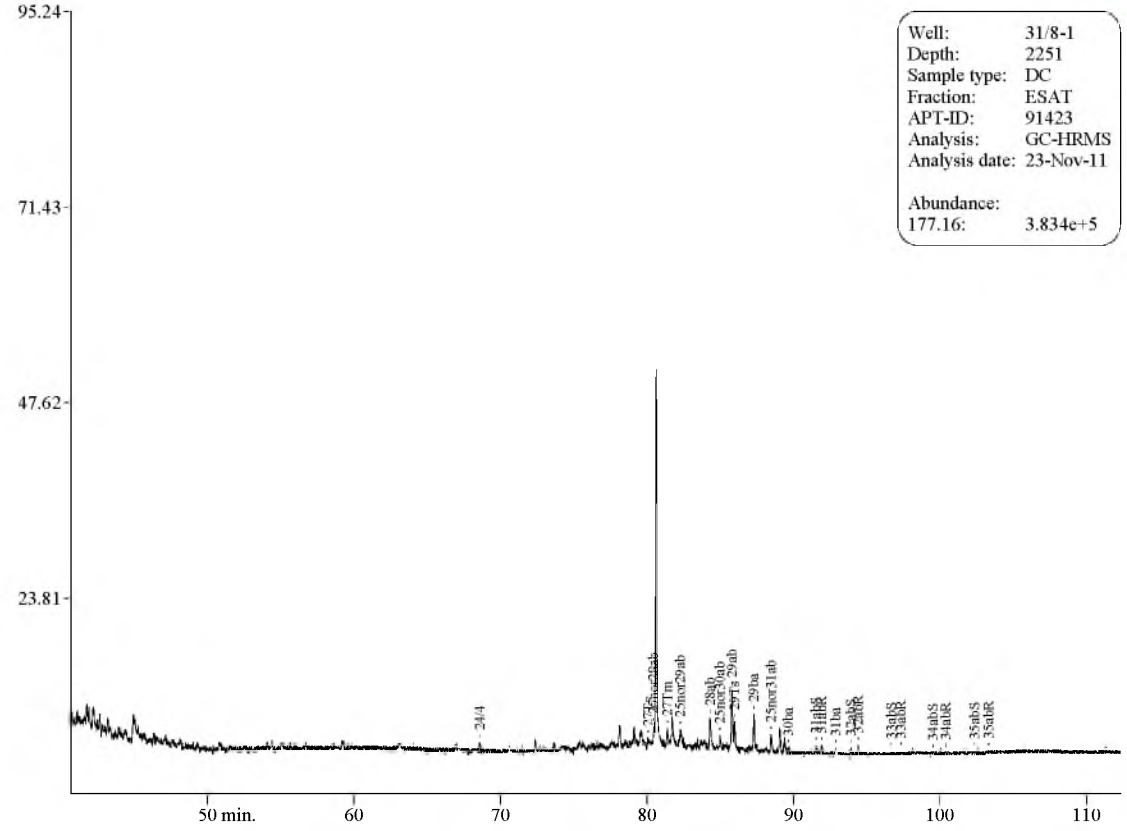

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
205.20: 3.815e+4

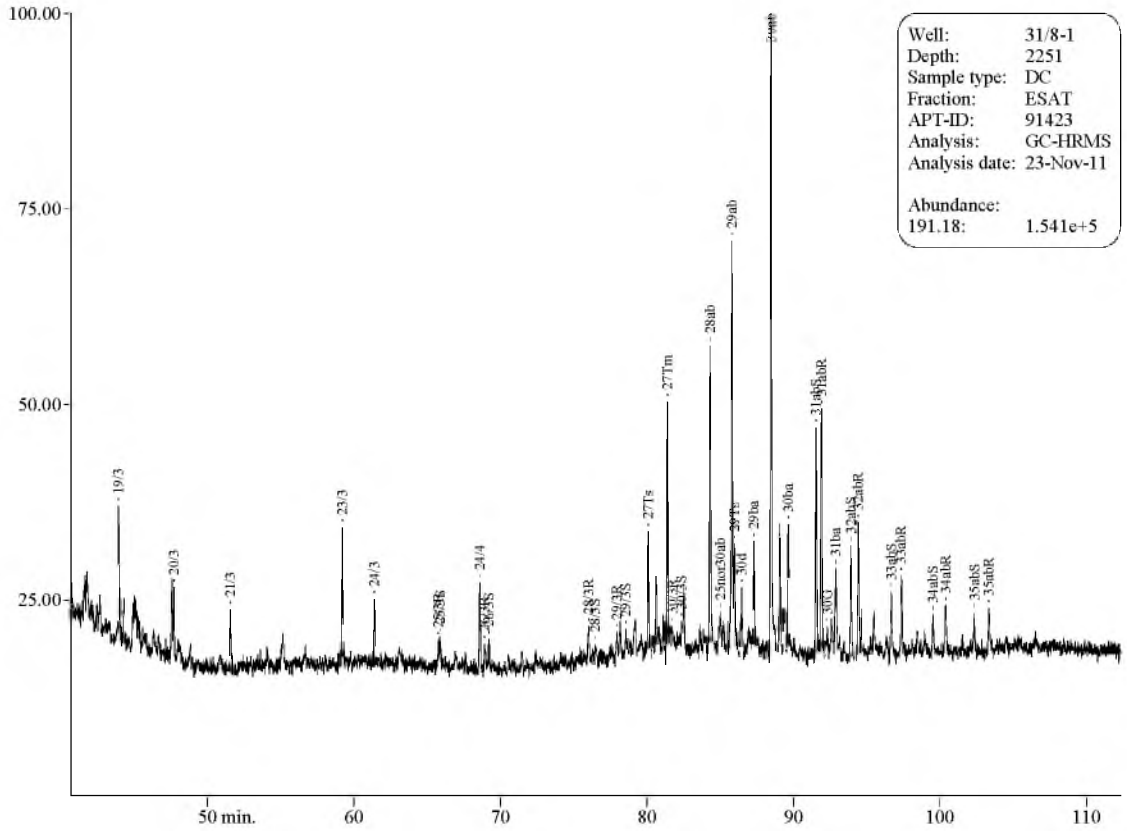

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
217.20: 5.006e+4

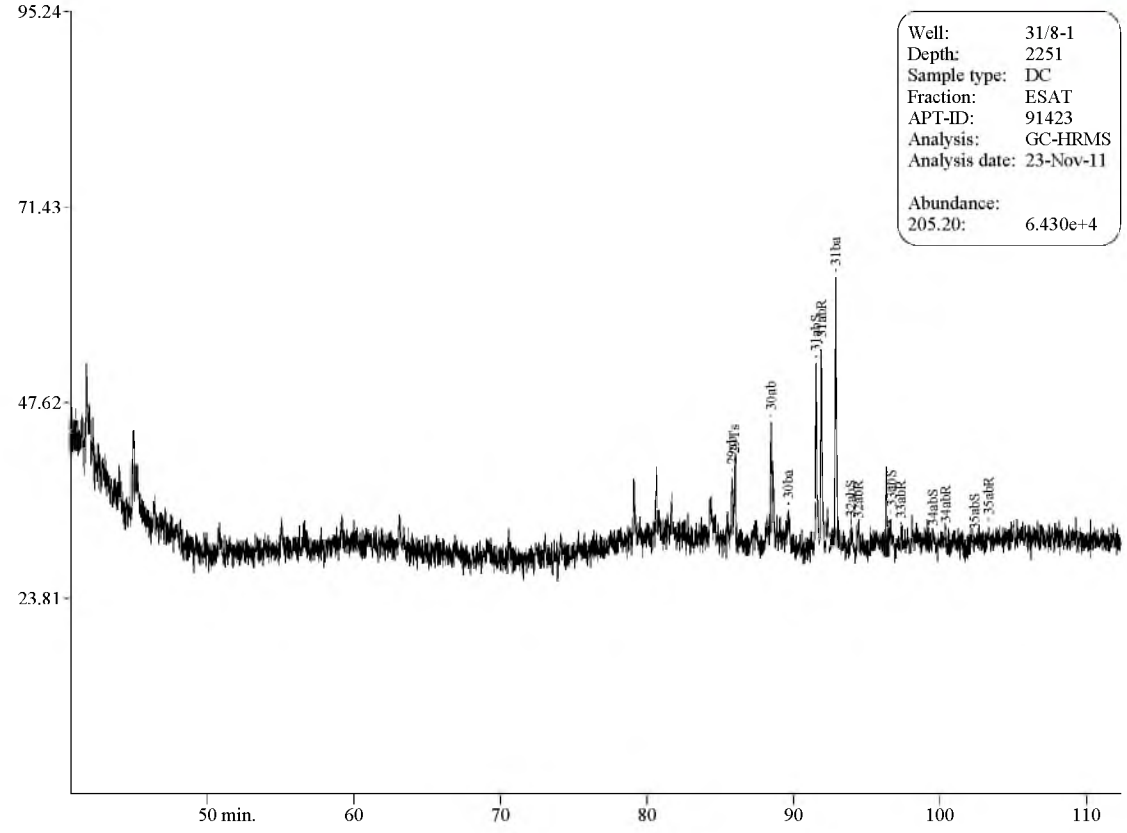

40.72
30.54
20.36
10.18
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
218.20: 4.692e+4

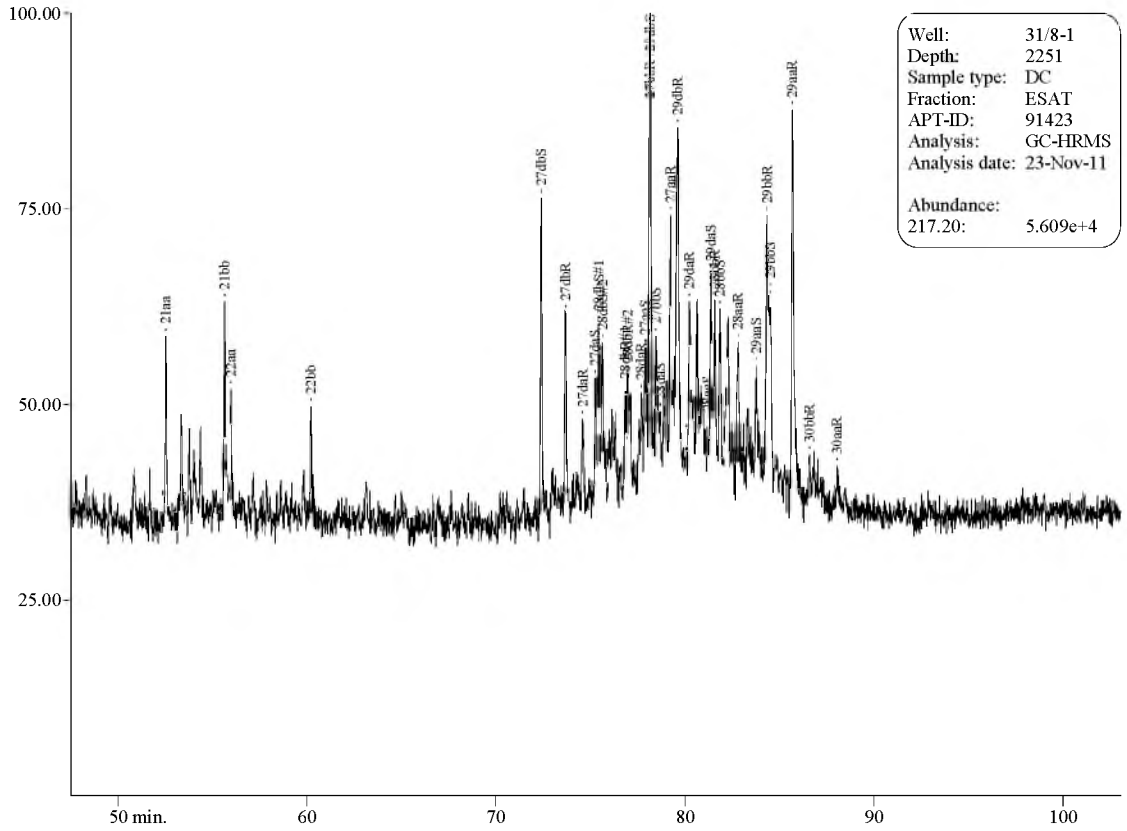

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
231.21: 2.869e+4

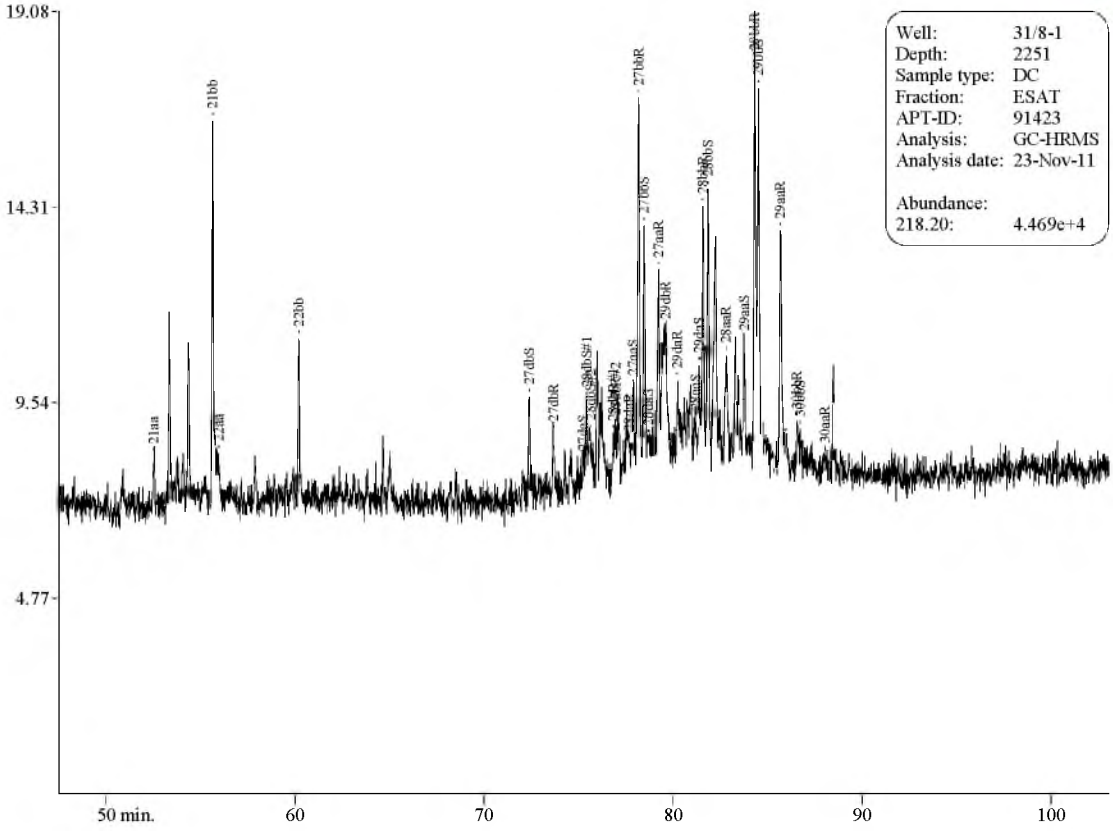

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27daR
27dbR
28dbS#1
29dbS
29dbR
29daR
29daS
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: ESAT
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
259.24: 4.607e+4

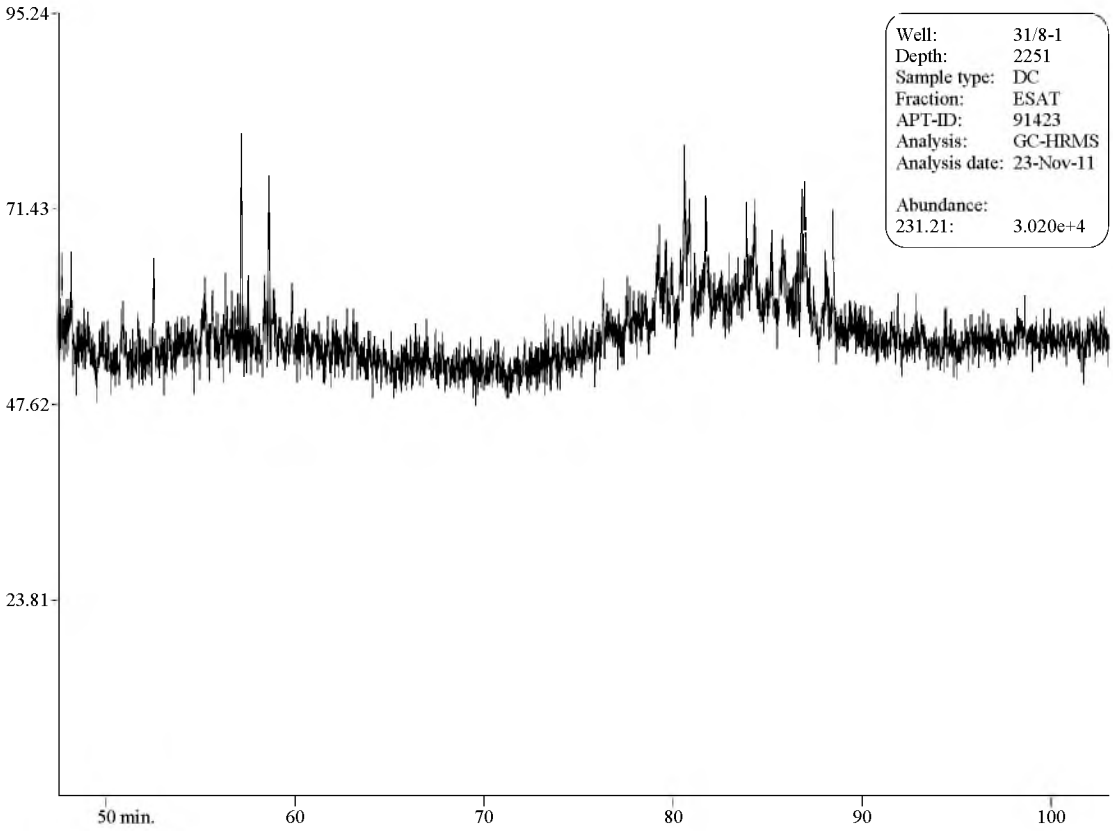

Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
177.16: 3.834e+5
95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110

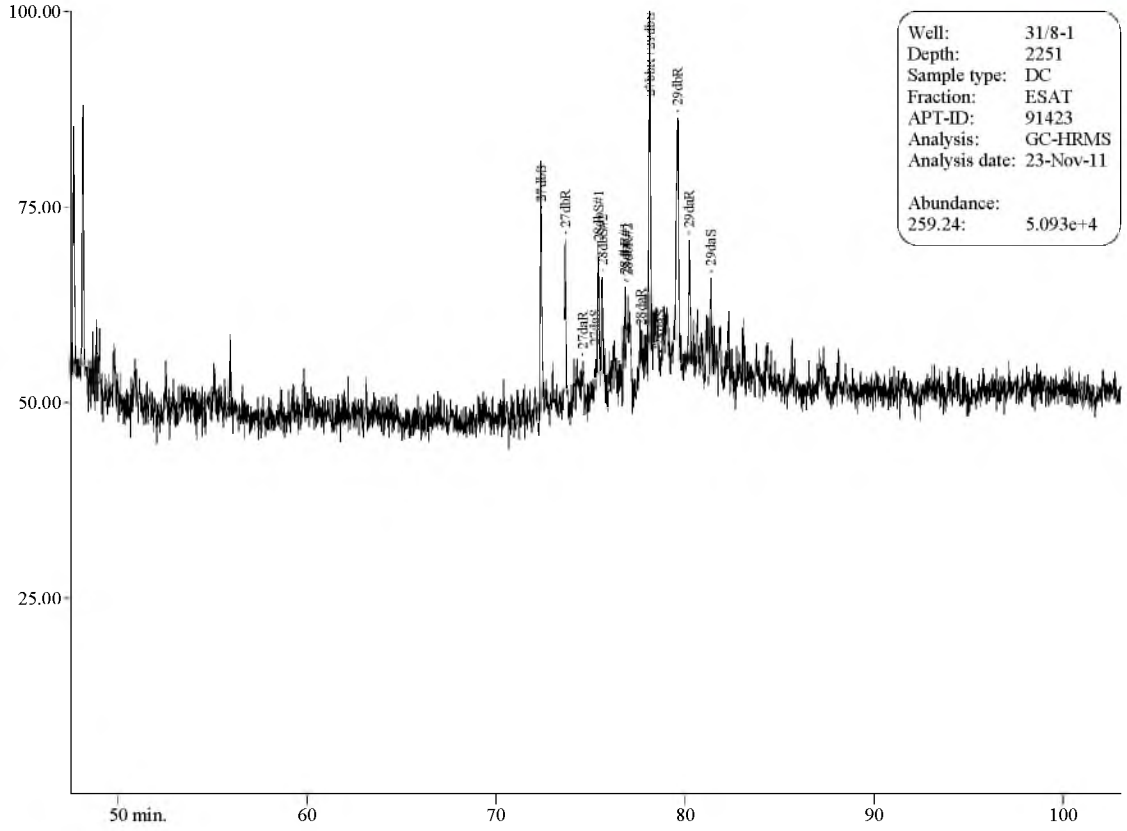

Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
191.18: 1.541e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
110

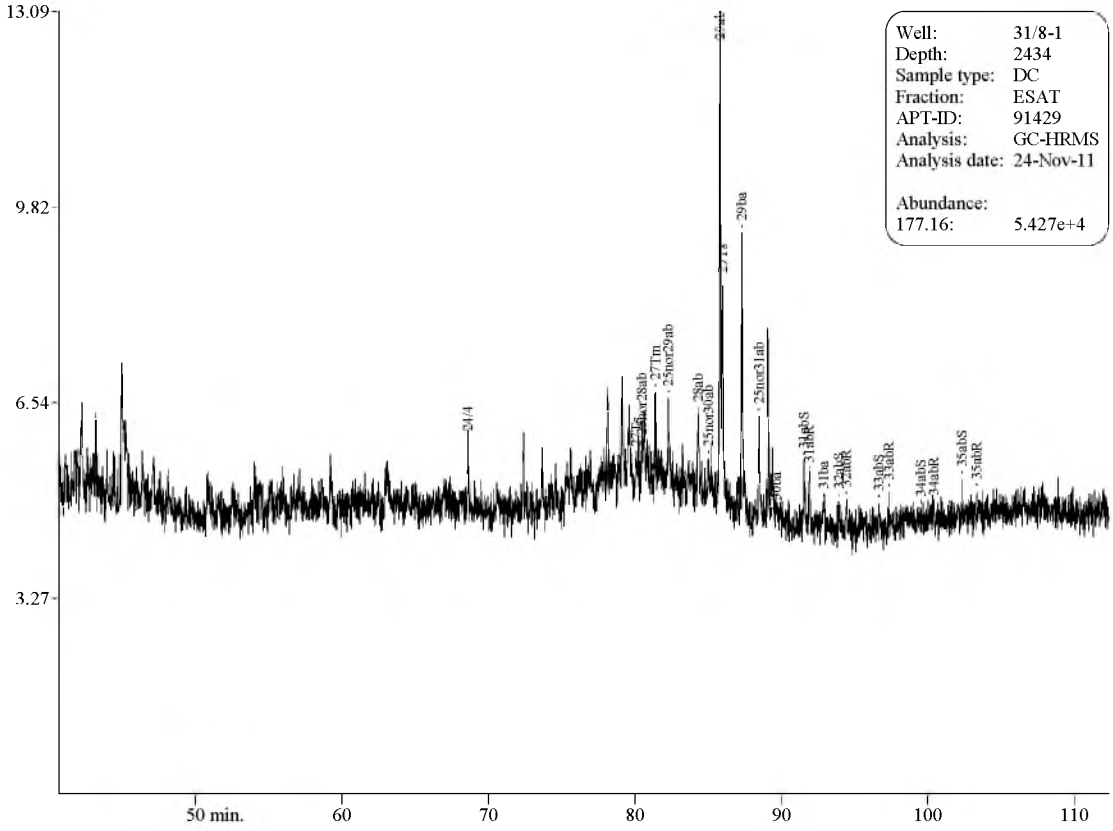

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
205.20: 6.430e+4
31ba
30ab
30ba

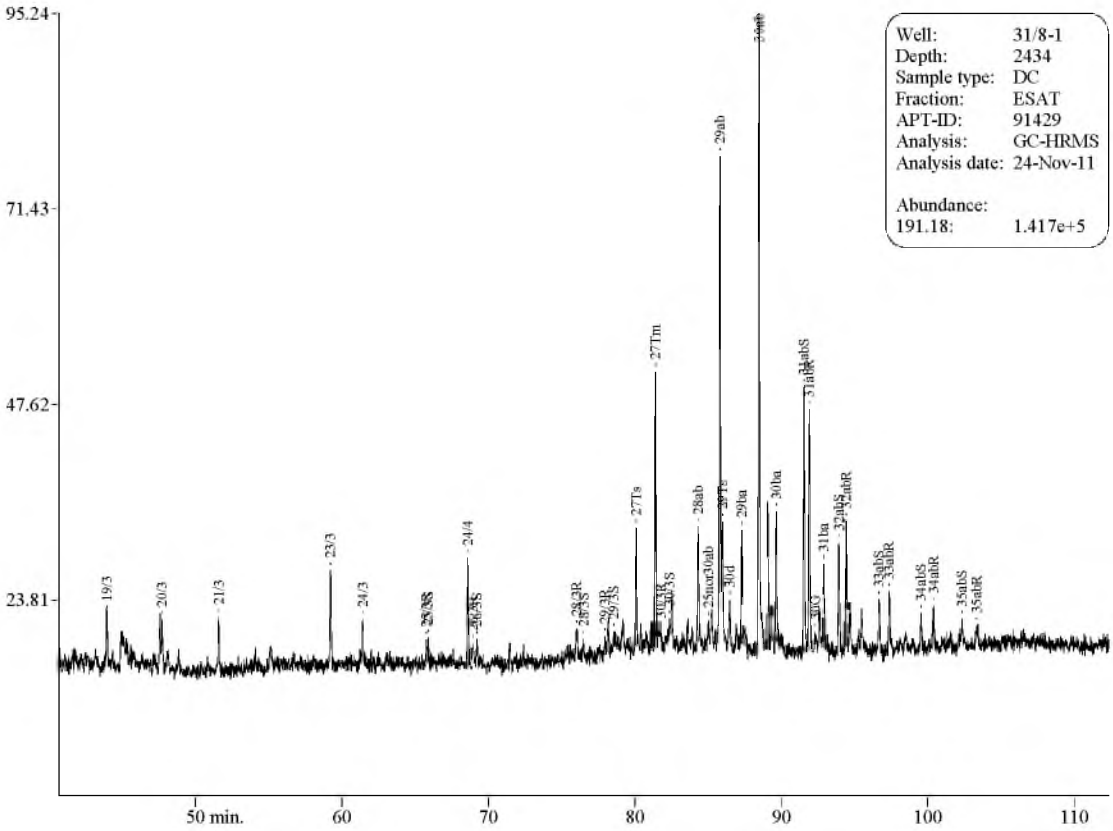

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
217.20: 5.609e+4
21na
21bb
22aa
22bb
27dbS
27dbR
27daR
29dbR
29daR
29aaR
29bbR
30bbR
30aaR

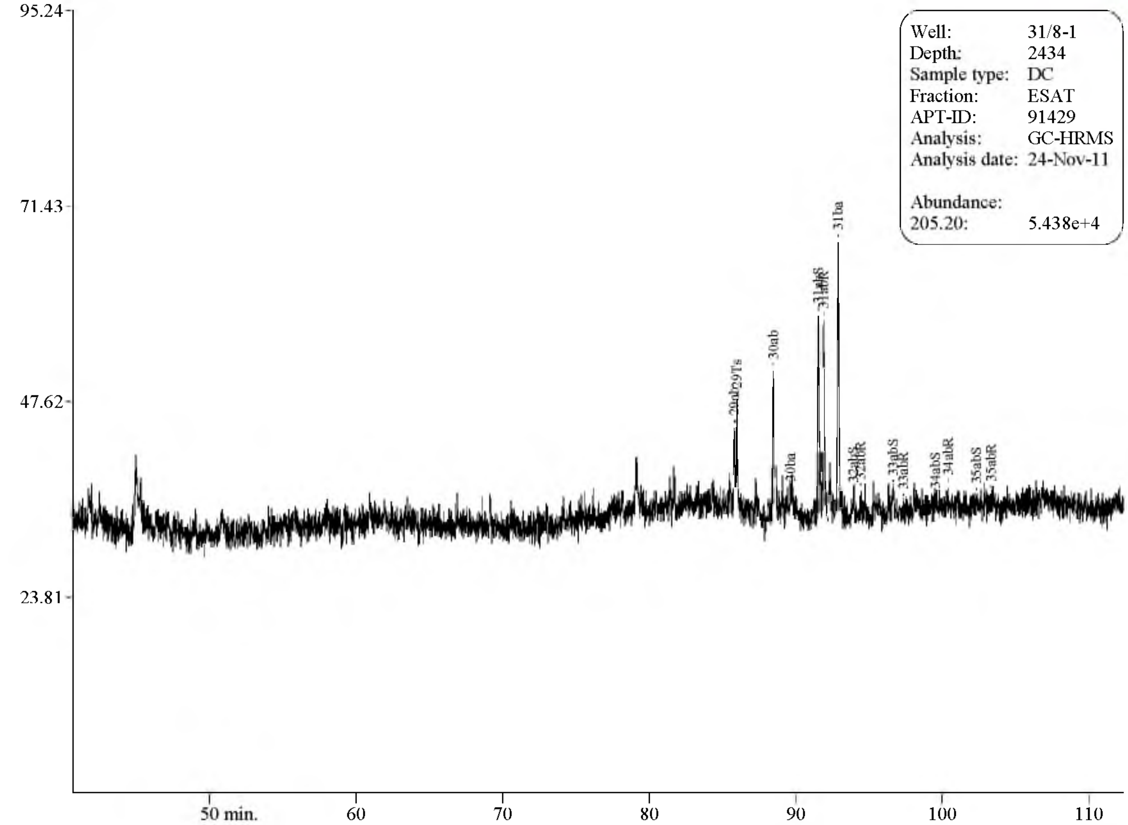

19.08
14.31
9.54
4.77
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
218.20: 4.469e+4

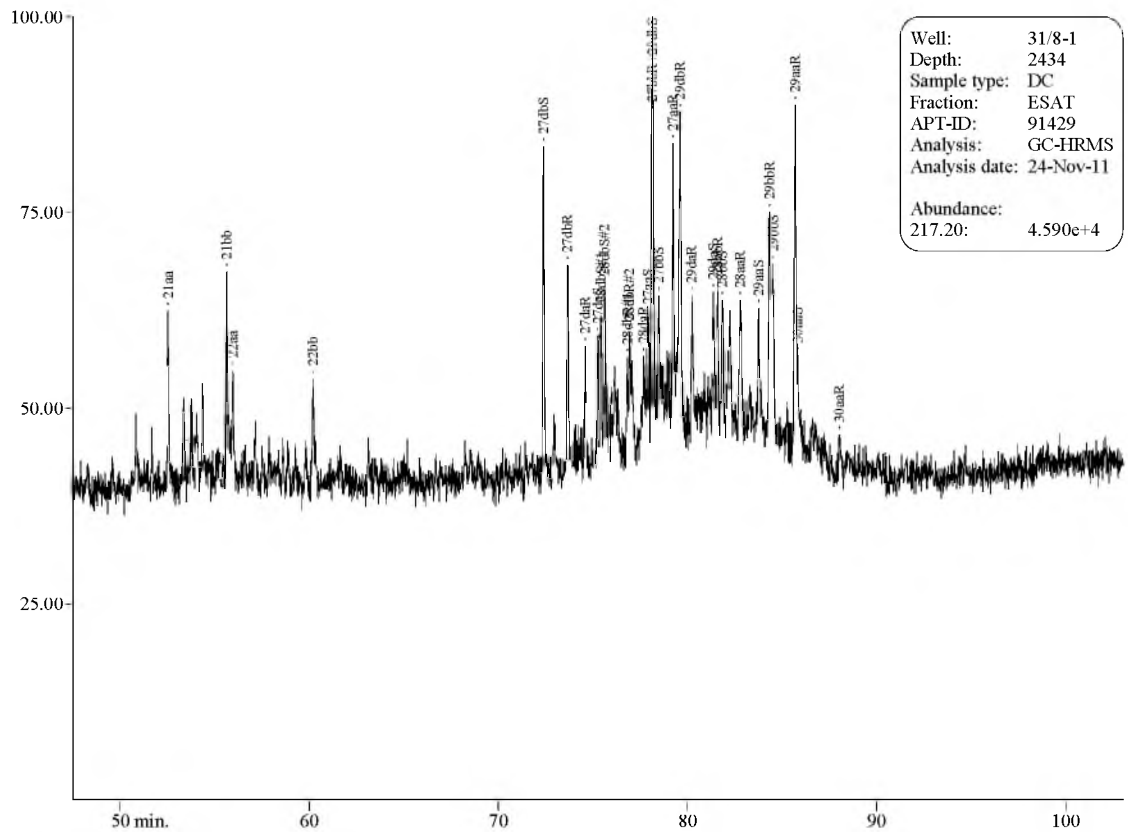

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
231.21: 3.020e+4

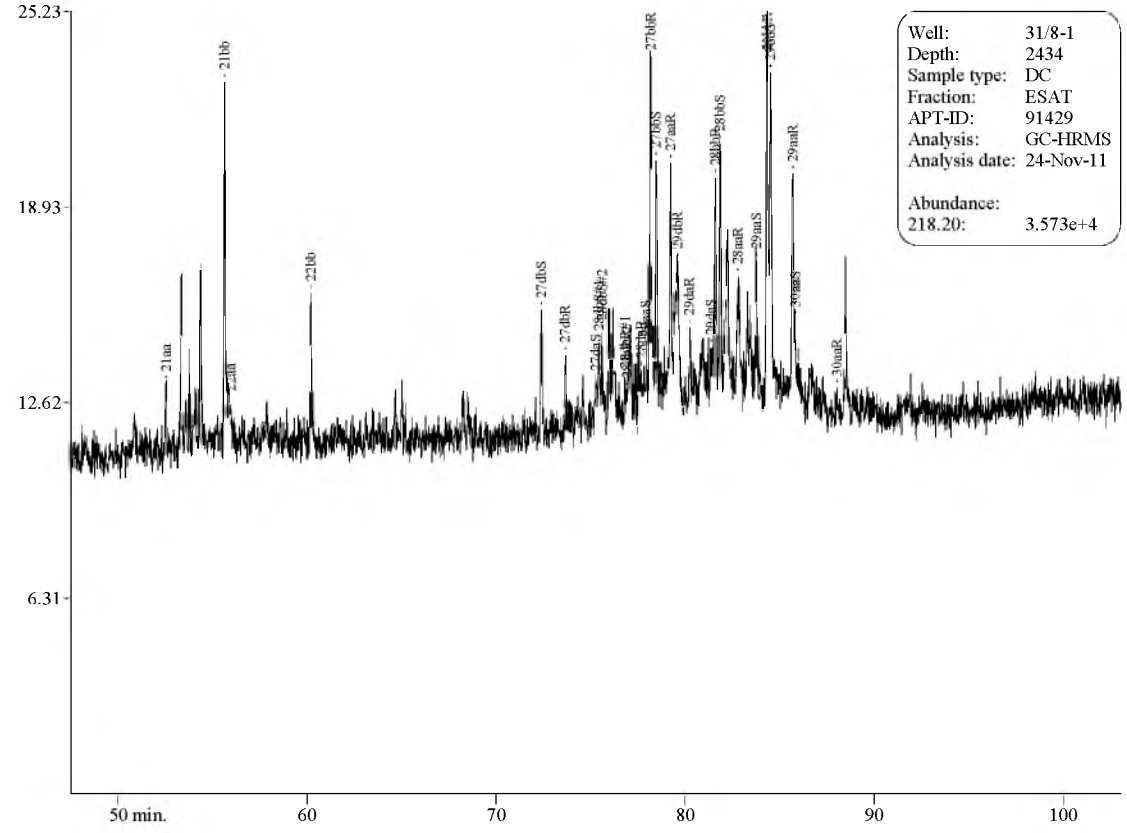

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: ESAT
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 23-Nov-11
Abundance:
259.24: 5.093e+4
27dbR
29dbR
29dbS

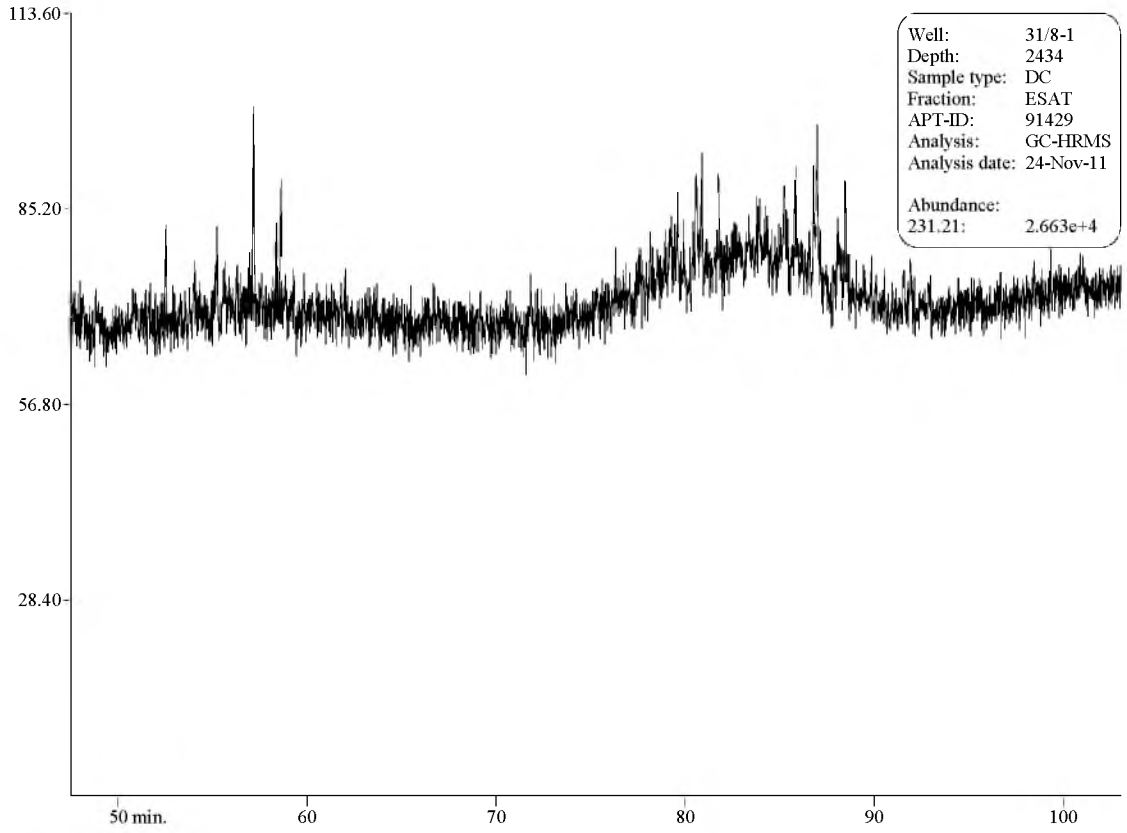

13.09
9.82
6.54
3.27
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
177.16: 5.427e+4

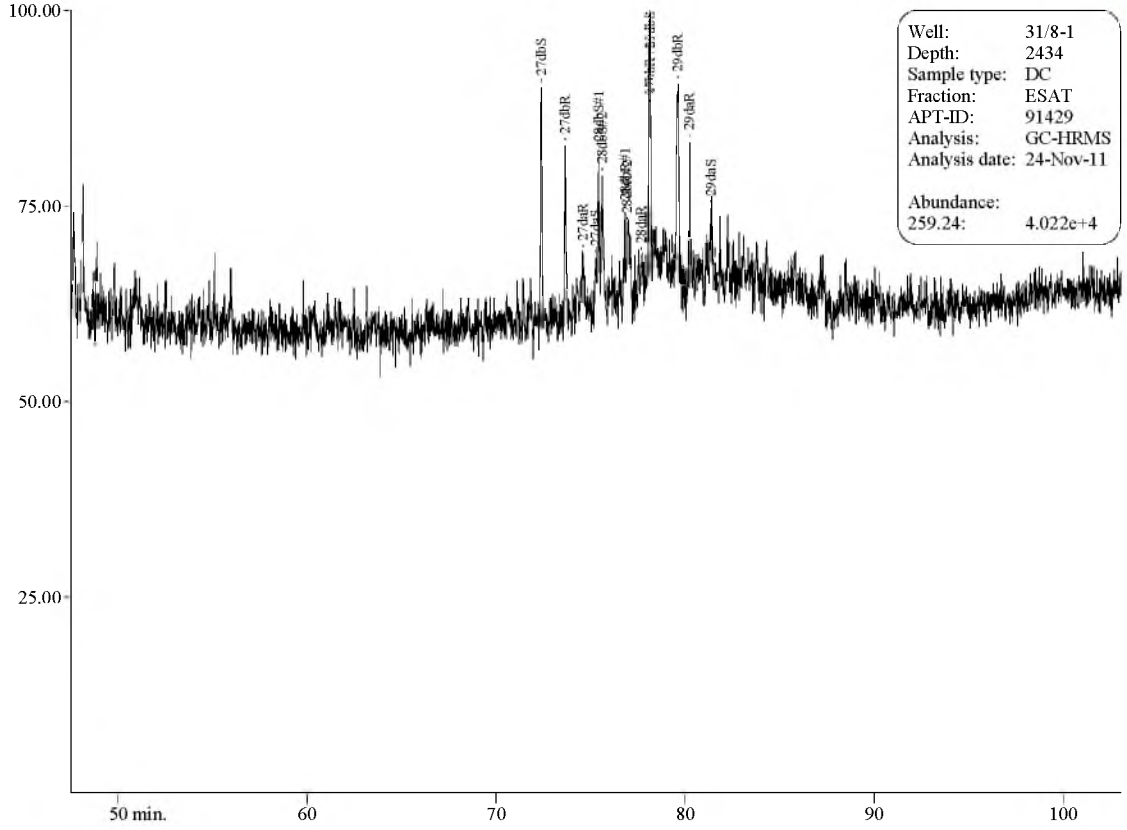

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
191.18: 1.417e+5

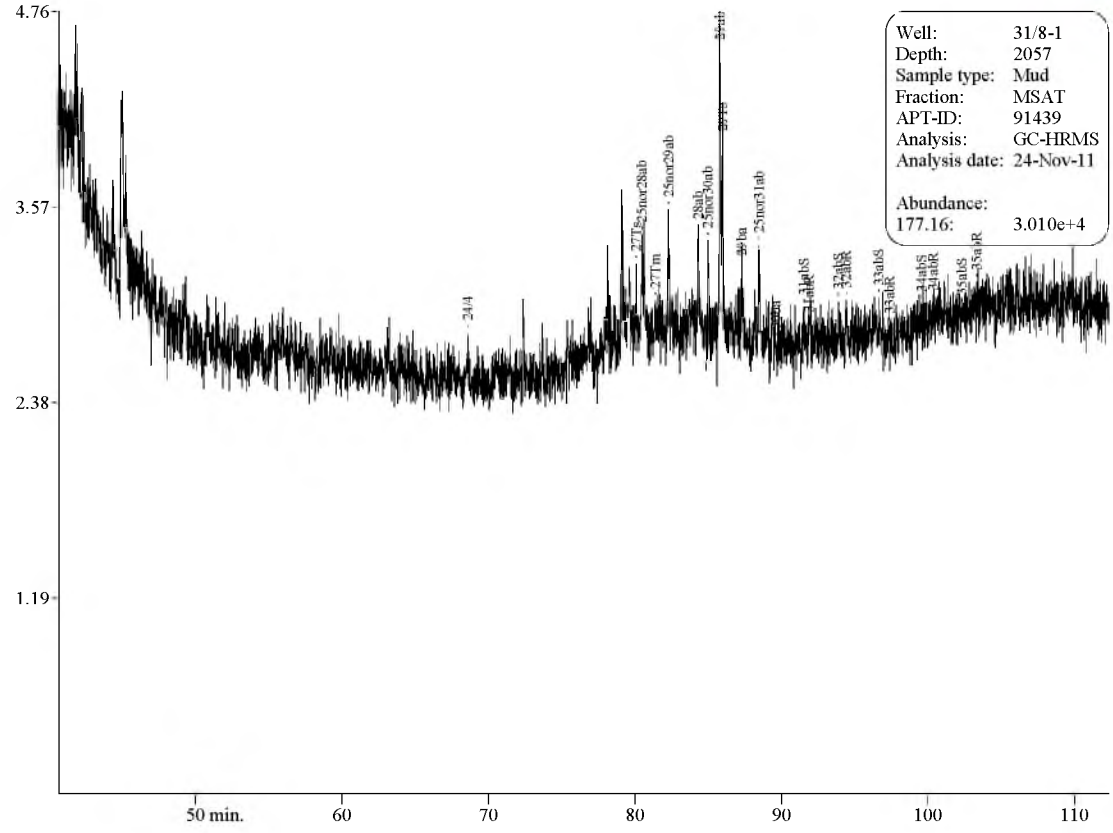

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
205.20: 5.438e+4
29Ts
30ab
30ba
31abS
31abR
31ba
33abS
33abR
34abS
34abR
35abS
35abR

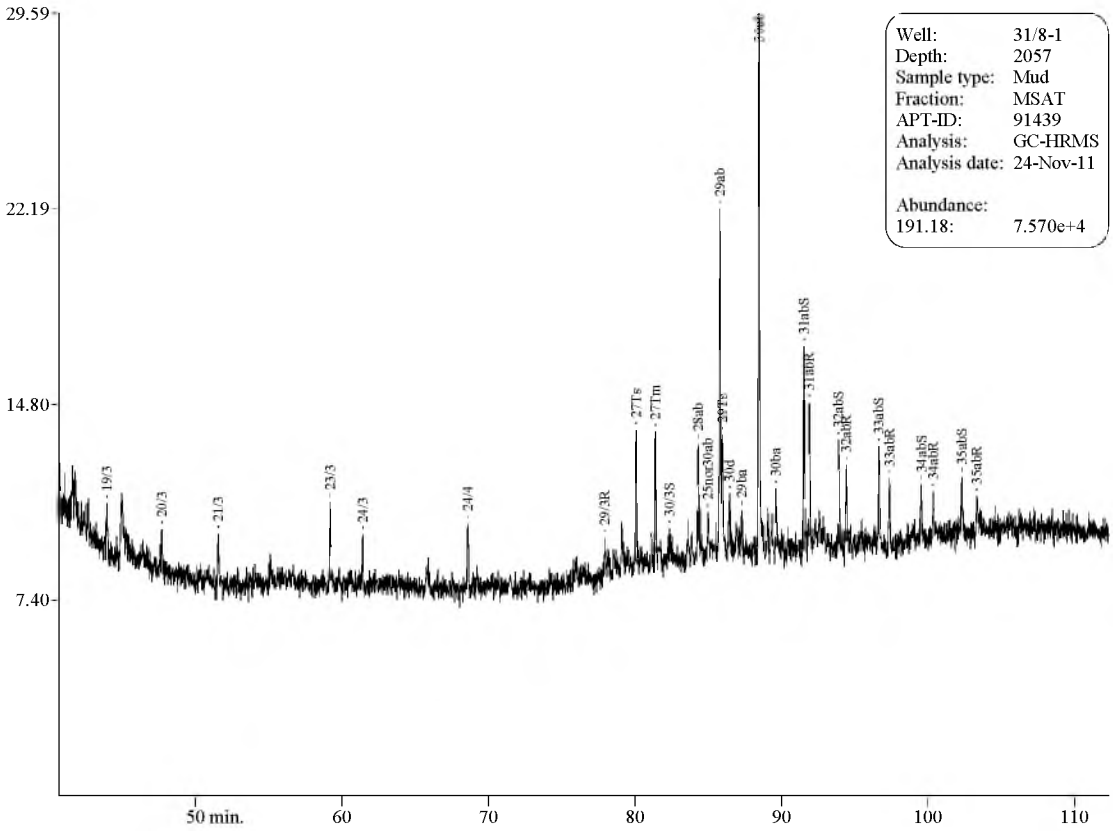

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
217.20: 4.590e+4
21aa
21bb
22aa
22bb
27dbS
27dbR
27daR
27aaR
29dbR
29daR
28aaR
29aaS
29bbR
29aaR
30aaR

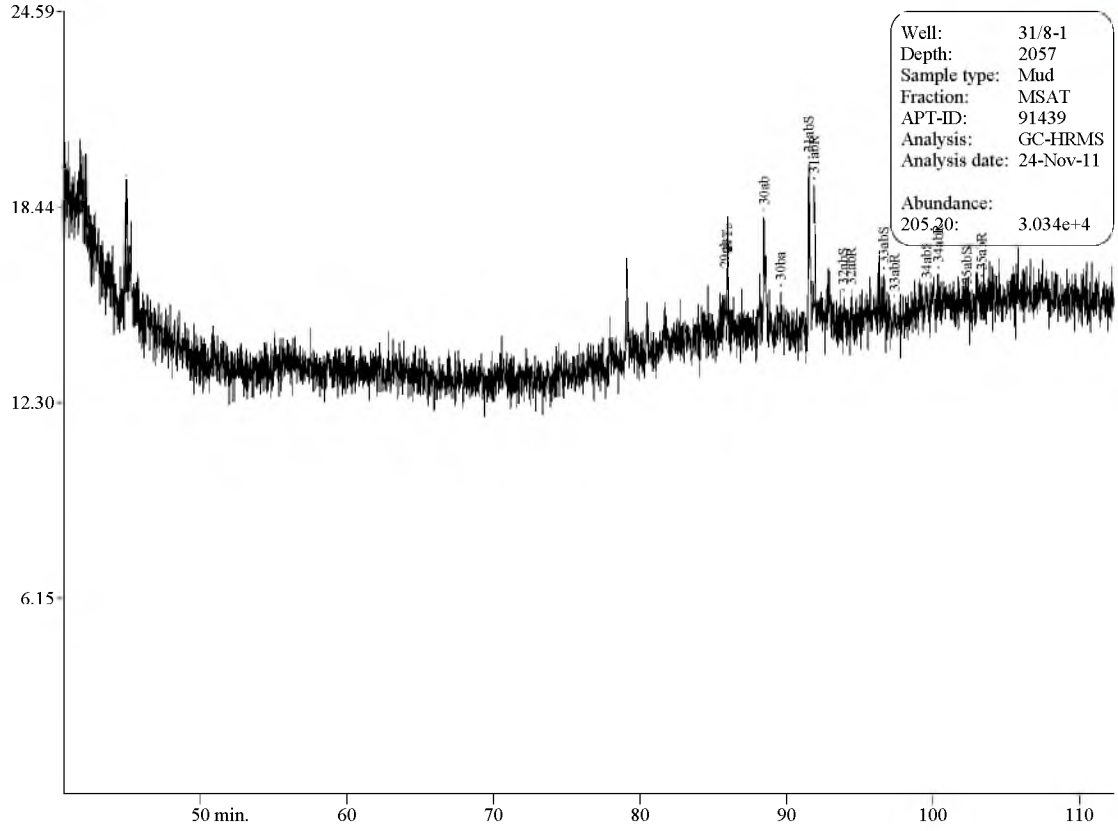

25.23
18.93
12.62
6.31
21aa
21bb
22bb
27dbS
27dbR
27baR
29dbR
28naR
29naS
29naR
30naR
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
218.20: 3.573e+4
50 min.
60
70
80
90
100

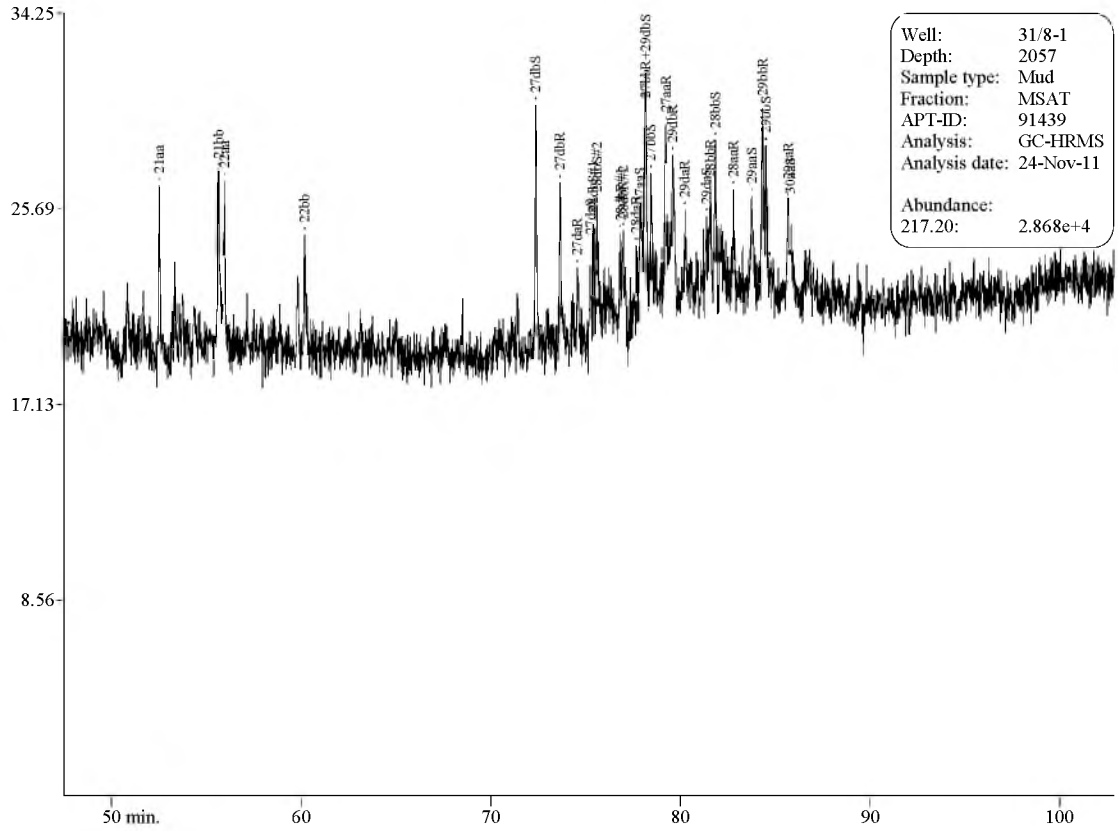

113.60
85.20
56.80
28.40
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.21: 2.663e+4
50 min.
60
70
80
90
100

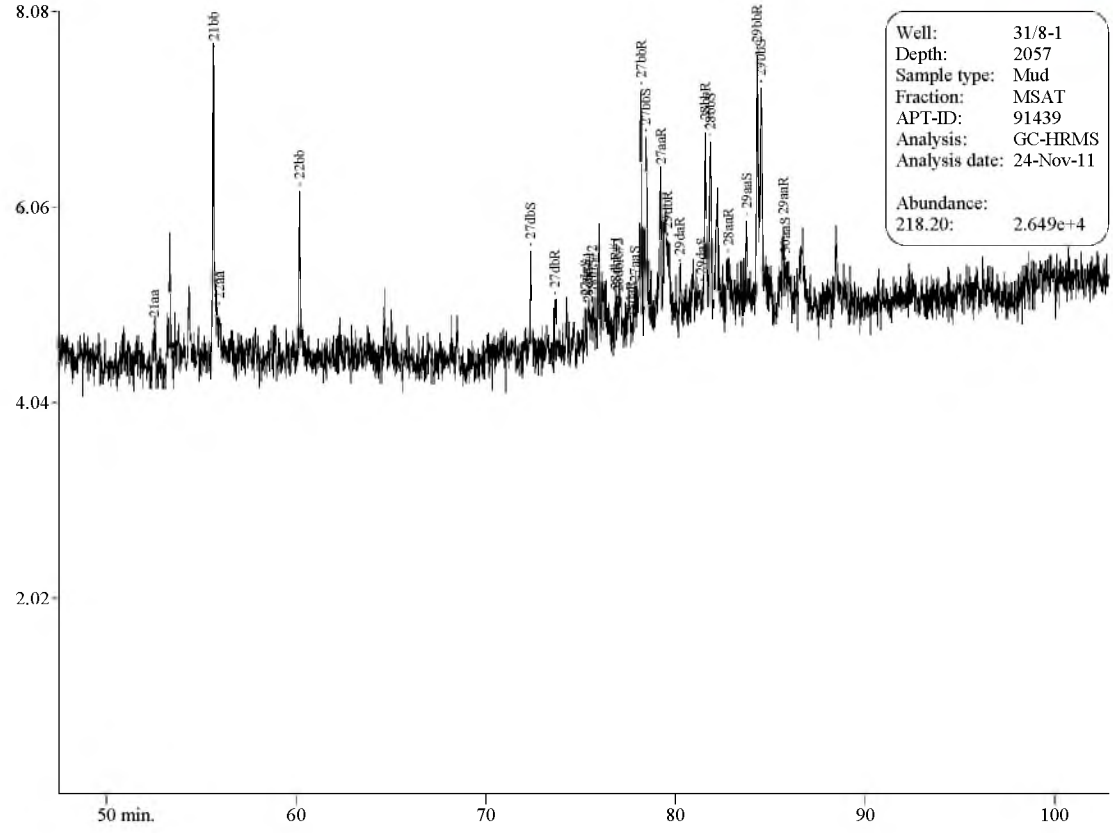

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
29dbR
29daR
29daS
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: ESAT
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
259.24: 4.022e+4

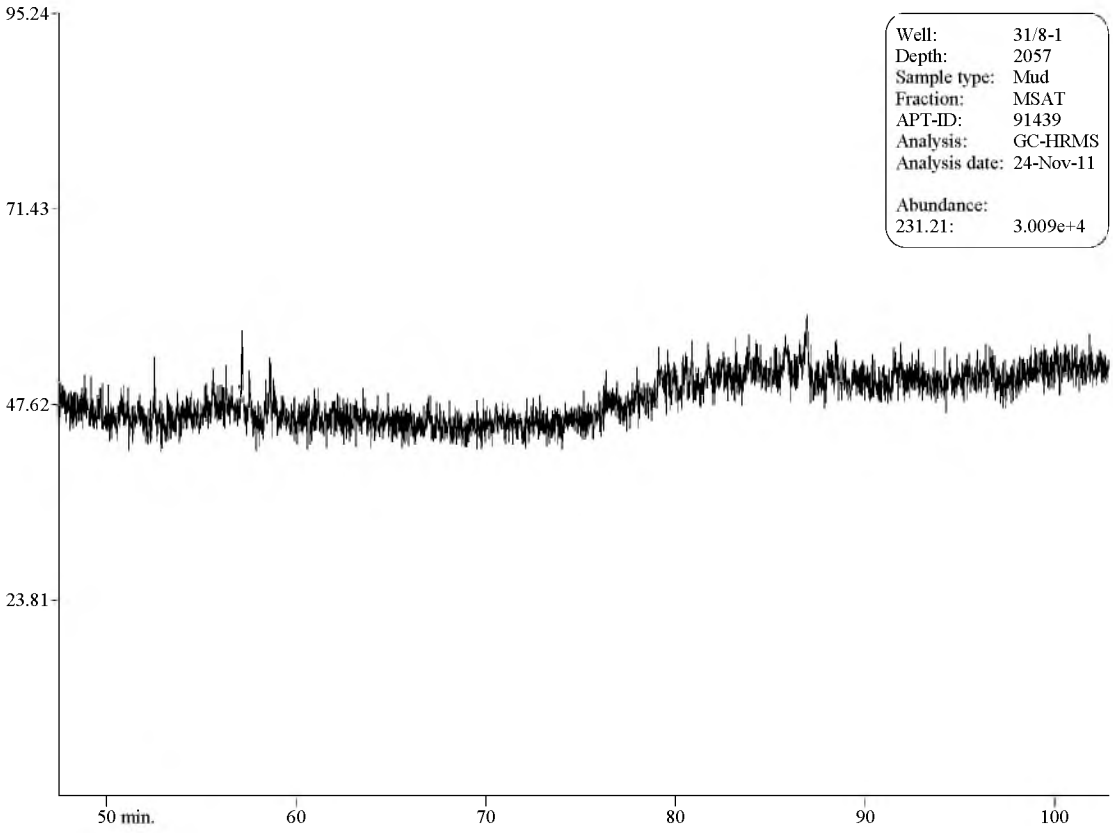

Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
177.16: 3.010e+4
4.76
3.57
2.38
1.19
50 min.
60
70
80
90
100
110

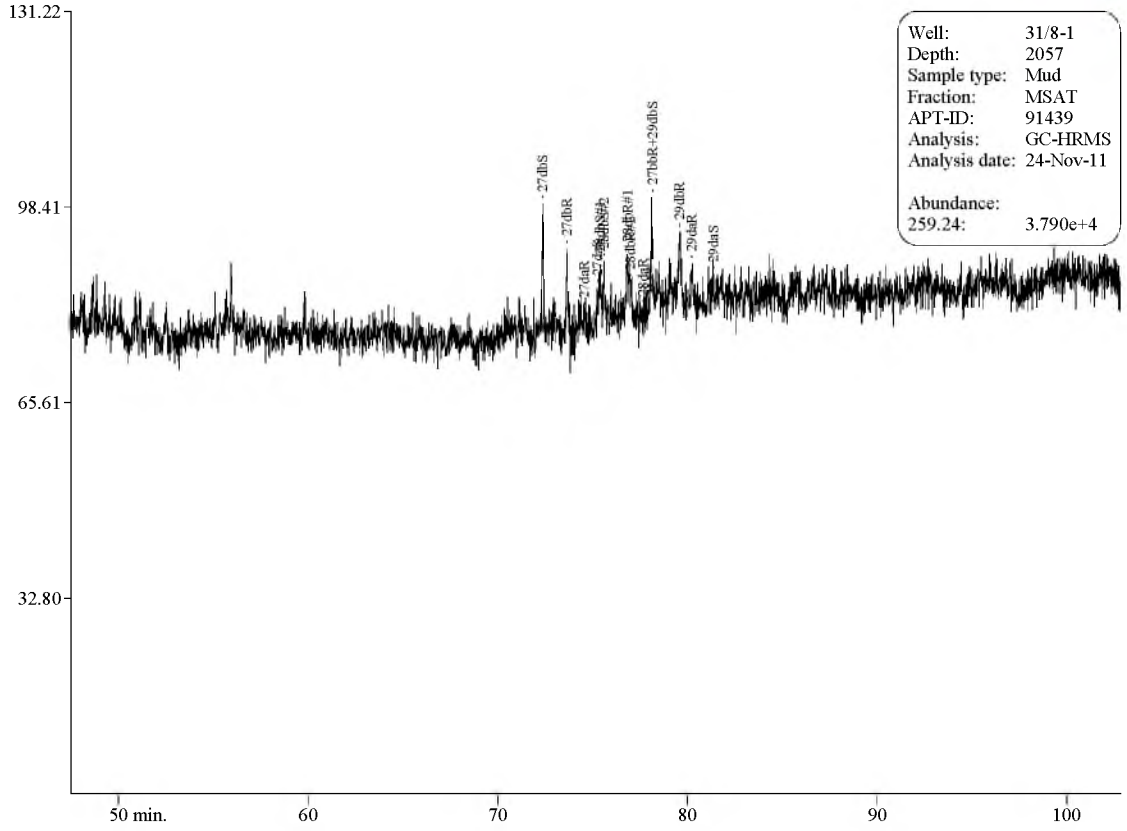

Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
191.18: 7.570e+4
29.59
22.19
14.80
7.40
50 min.
60
70
80
90
100
110


24.59
18.44
12.30
6.15
50 min.
60
70
80
90
100
110
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
205.20: 3.034e+4

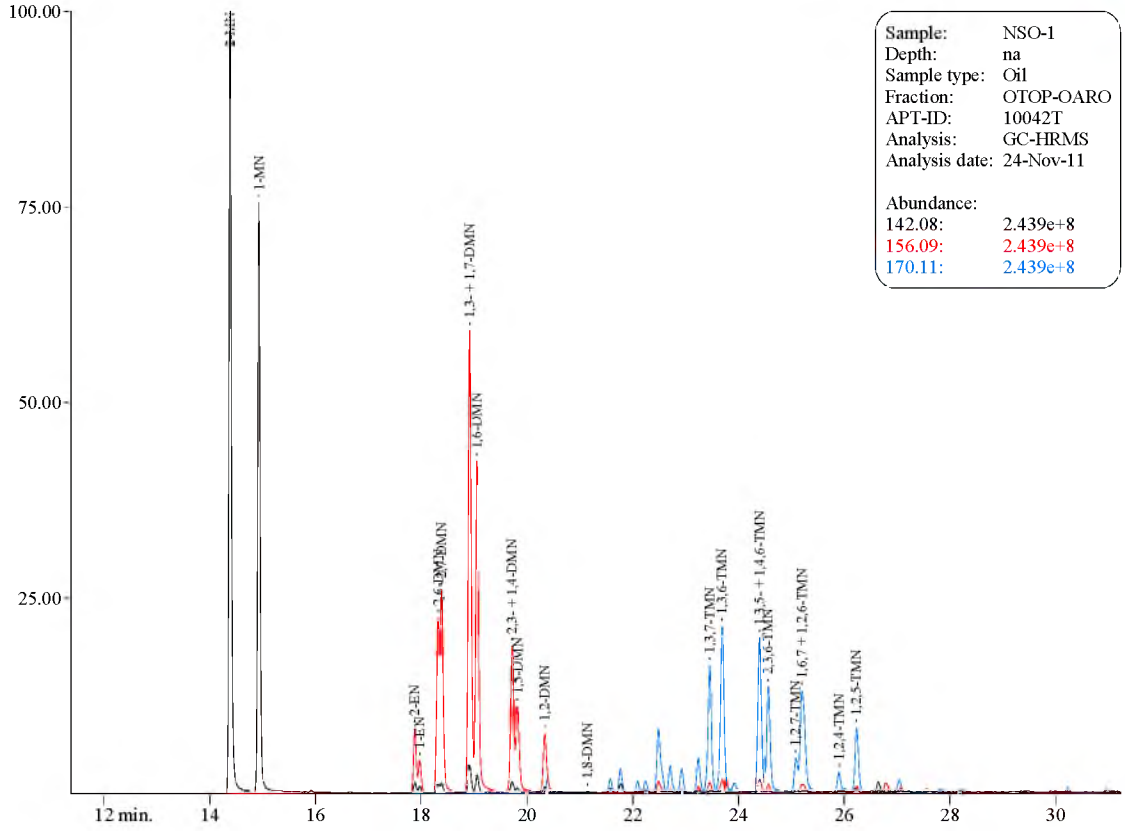

34.25
25.69
17.13
8.56
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
217.20: 2.868e+4

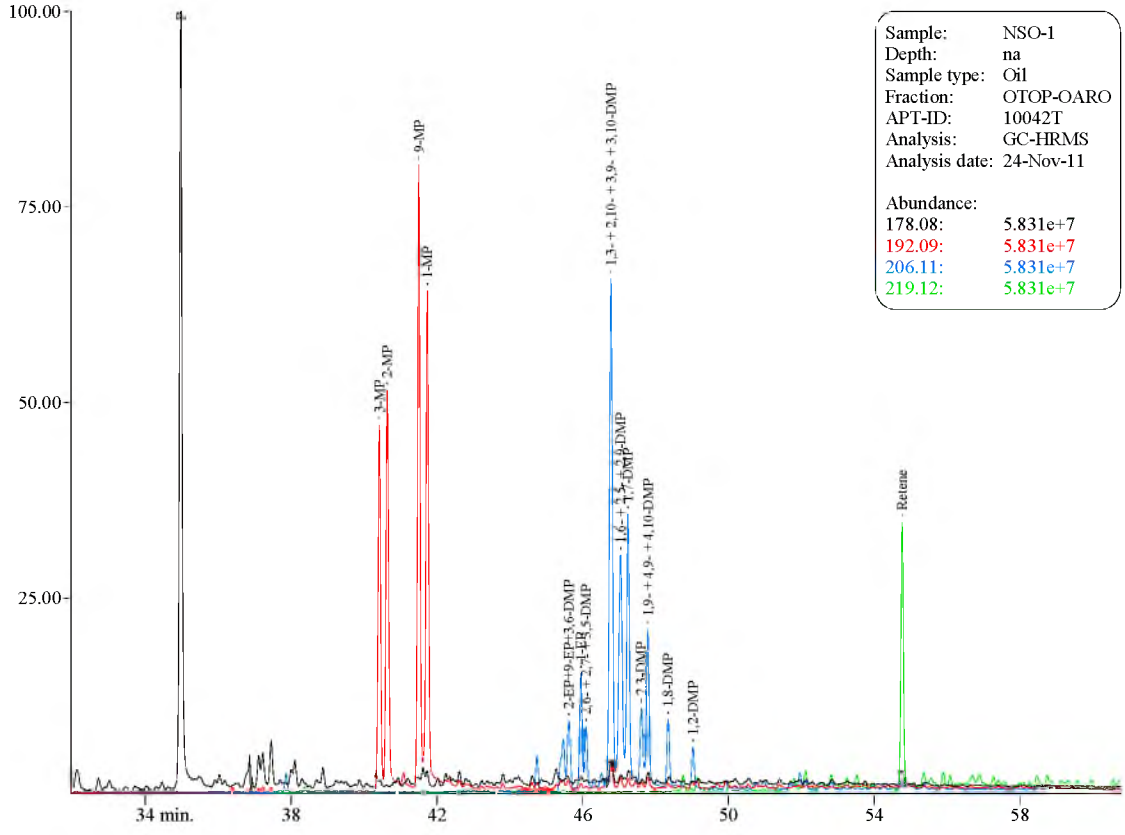

8.08
6.06
4.04
2.02
50 min.
60
70
80
90
100
21aa
21bb
22aa
22bb
27dbS
27dbR
27bbR
27aaR
29daR
29baR
28anR
29anS
29anR
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
218.20: 2.649e+4

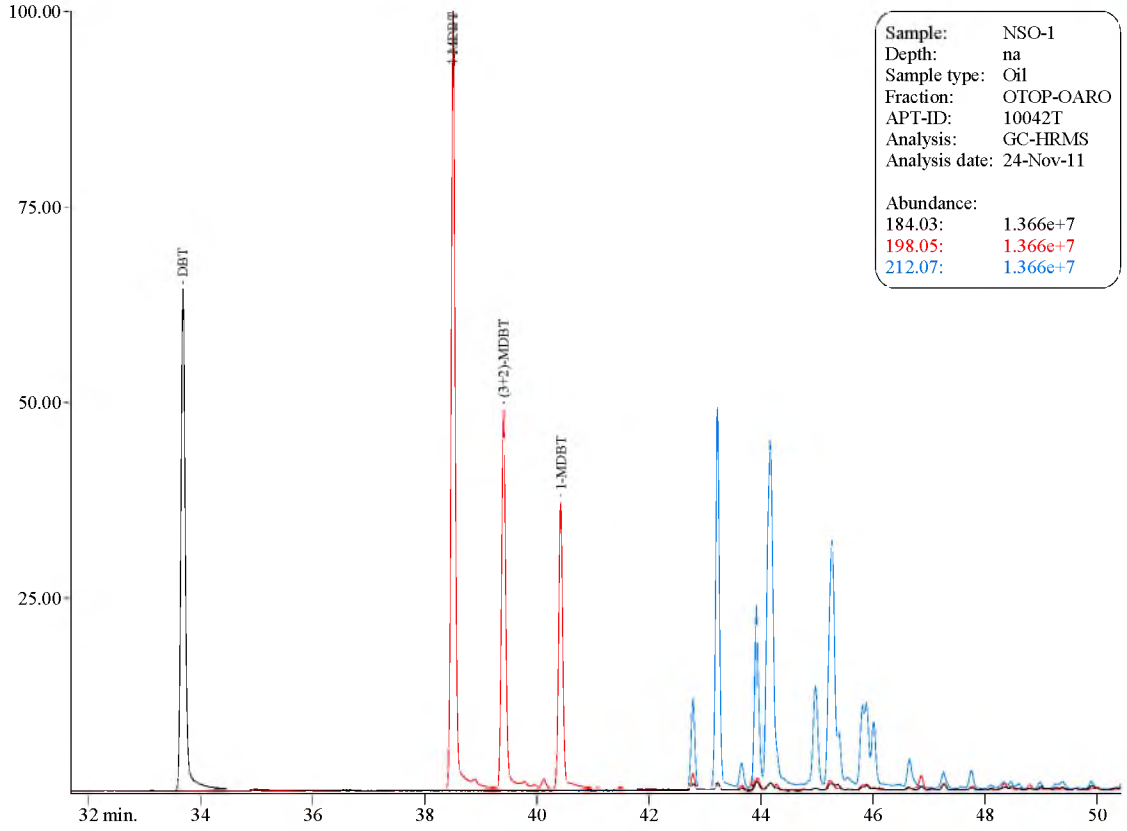

95.24
71.43
47.62
23.81
50 min.
60
70
80
90
100
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.21: 3.009e+4

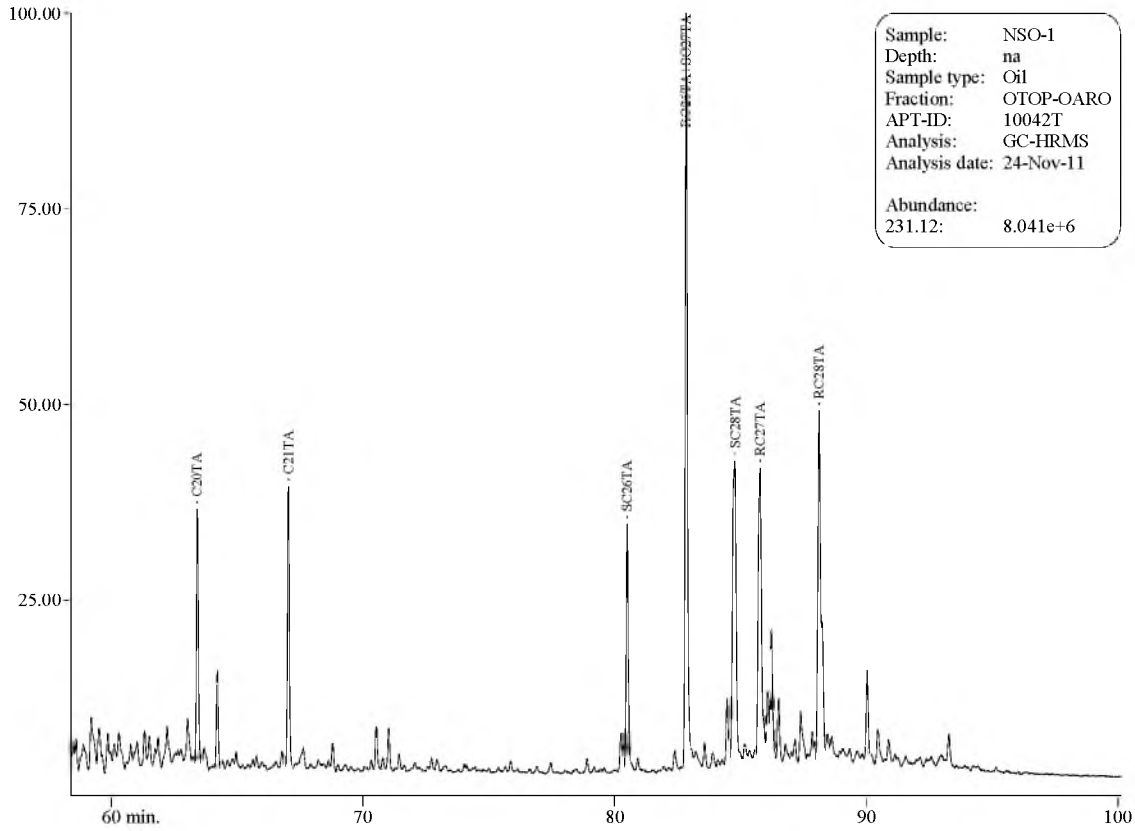

131.22
98.41
65.61
32.80
50 min.
60
70
80
90
100
27dbS
27dbR
27daR
27dbR#1
27bbR-29dbS
29dbR
29daR
29daS
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MSAT
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
259.24: 3.790e+4

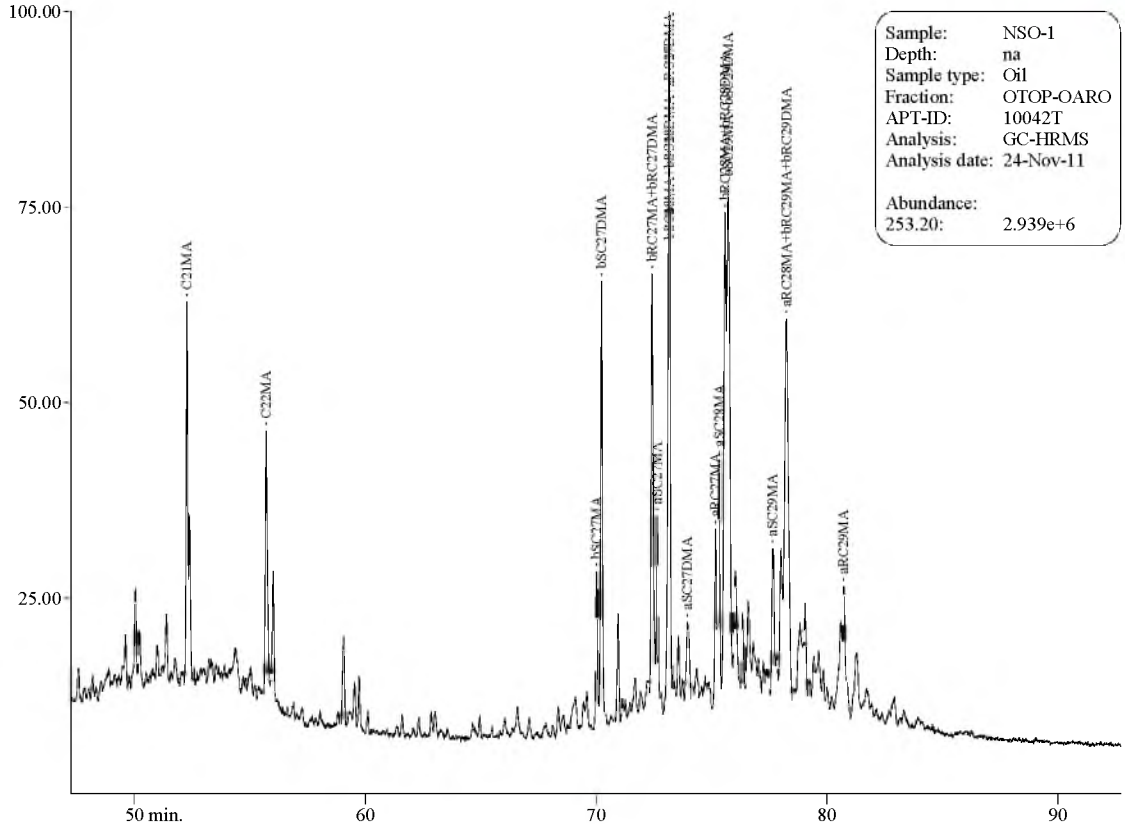
GC-MS Chromatograms of Aromatic Hydrocarbons

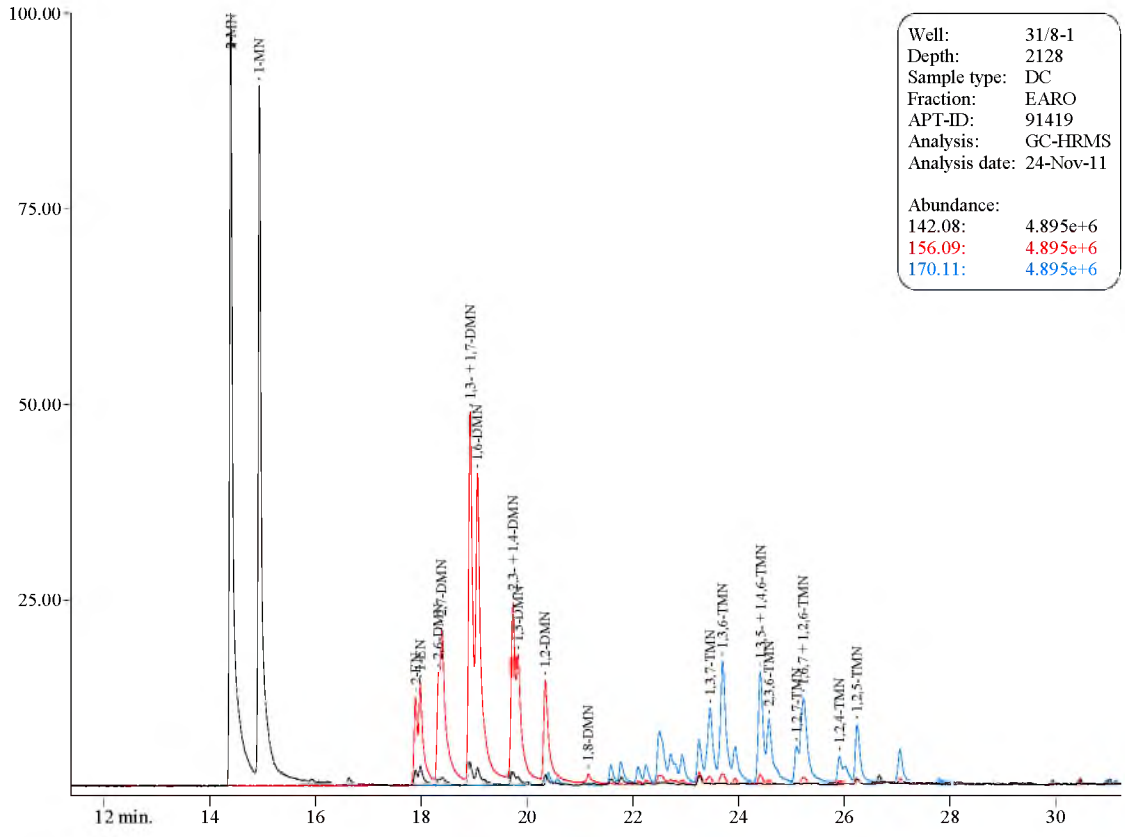

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
142.08: 2.439e+8
156.09: 2.439e+8
170.11: 2.439e+8
100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30
1-MN
2-EN
1,6-DMN
1,3- + 1,7-DMN
2,3- + 1,4-DMN
1,5-DMN
1,2-DMN
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
1,6,7 + 1,2,6-TMN
1,2,4-TMN
1,2,5-TMN

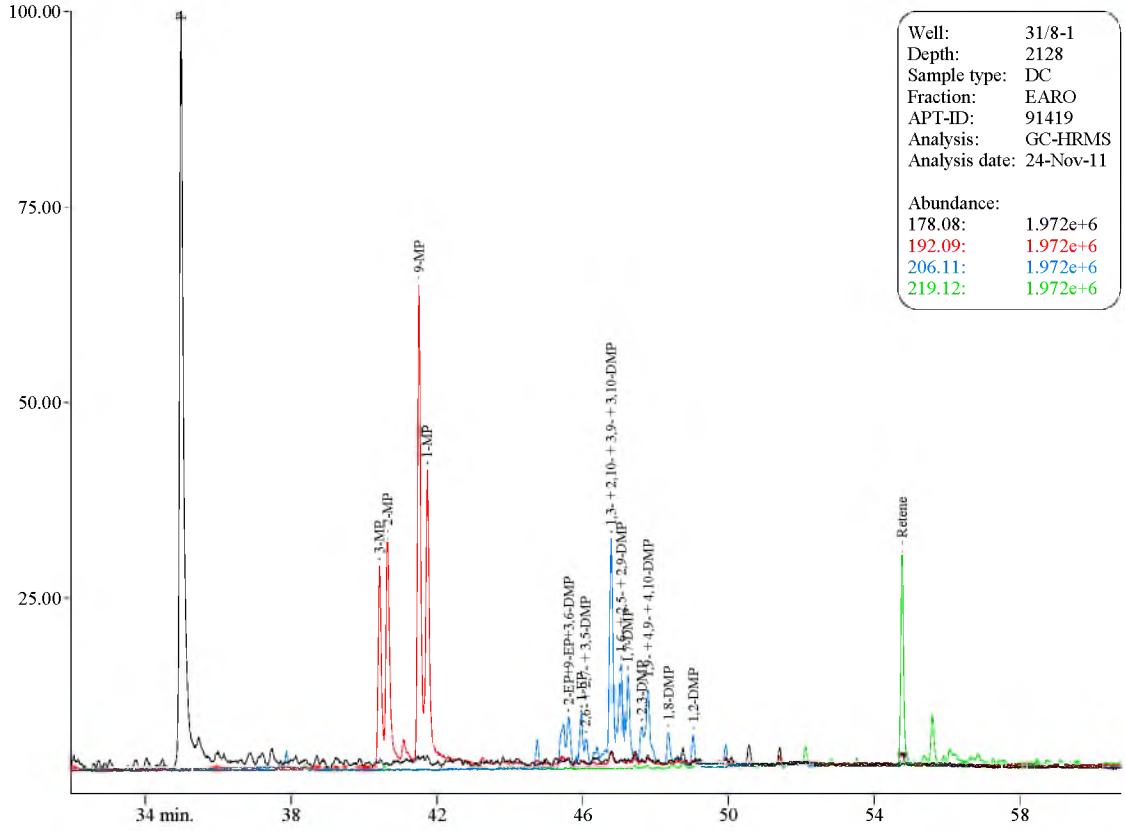

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
178.08: 5.831e+7
192.09: 5.831e+7
206.11: 5.831e+7
219.12: 5.831e+7
100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
1,3- + 2,10- + 3,9- + 3,10-DMP
1,6- + 1,7-DMP
2,3-DMP
1,8-DMP
1,2-DMP
Retene

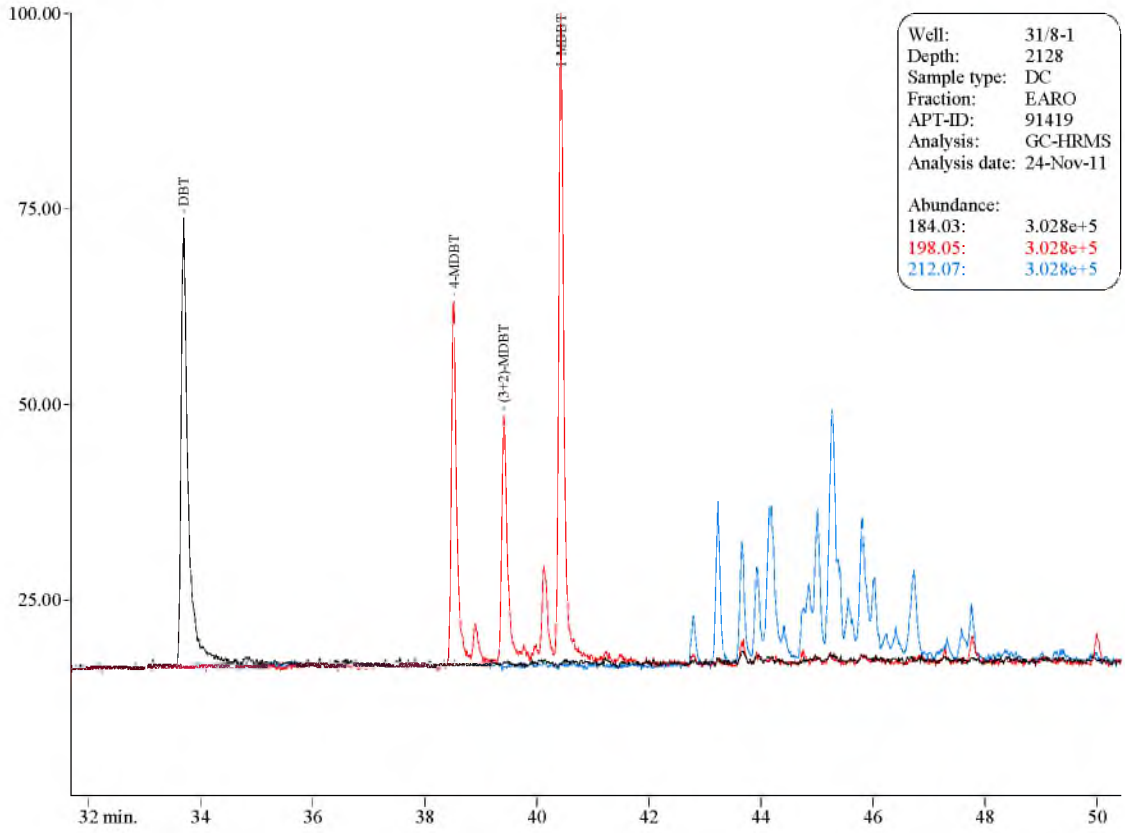

100.00
75.00
50.00
25.00
DBT
(3+2)-MDBT
1-MDBT
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
184.03: 1.366e+7
198.05: 1.366e+7
212.07: 1.366e+7
32 min.
34
36
38
40
42
44
46
48
50

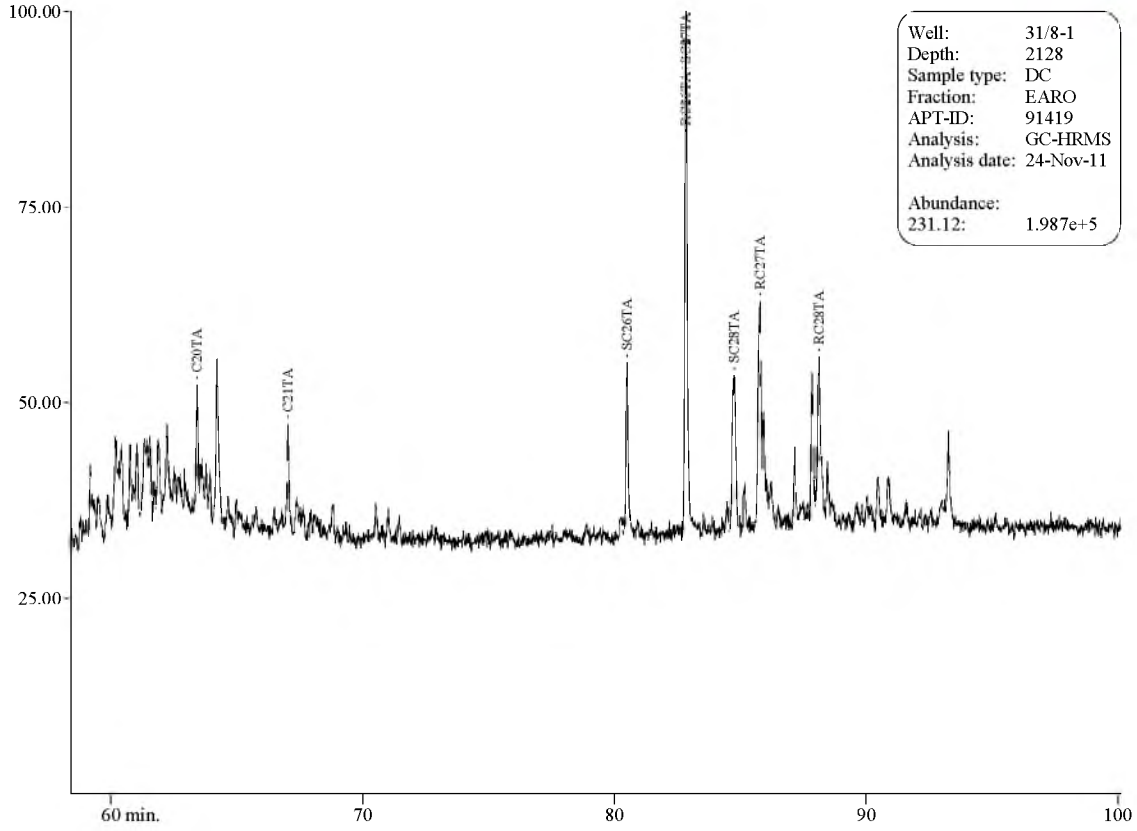

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
SC28TA
RC27TA
RC28TA
Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.12: 8.041e+6
60 min.
70
80
90
100

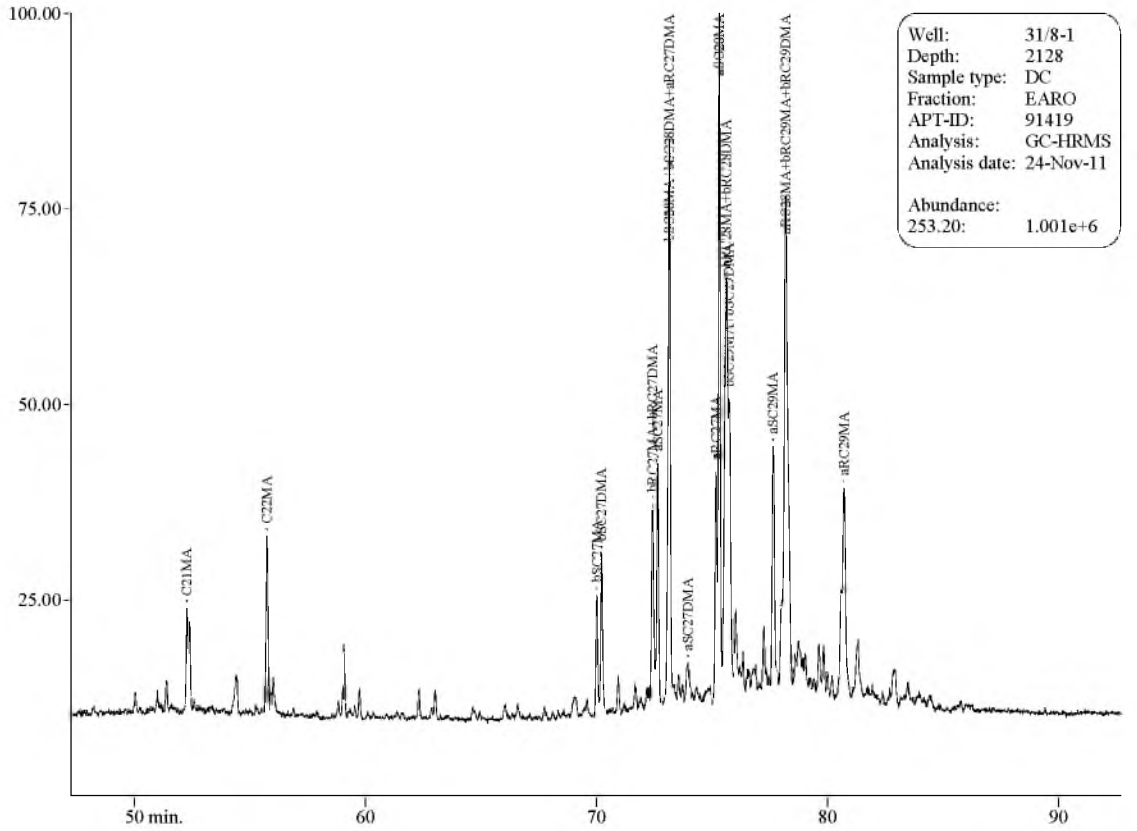

Sample: NSO-1
Depth: na
Sample type: Oil
Fraction: OTOP-OARO
APT-ID: 10042T
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
253.20: 2.939e+6
100.00
75.00
50.00
25.00
C21MA
C22MA
bSC27TDMA
bSC27MA
bRC27MA+bRC27DMA
aSC27DMA
aRC27MA
aSC29MA
aRC28MA+bRC29MA+bRC29DMA
aRC29MA
50 min.
60
70
80
90

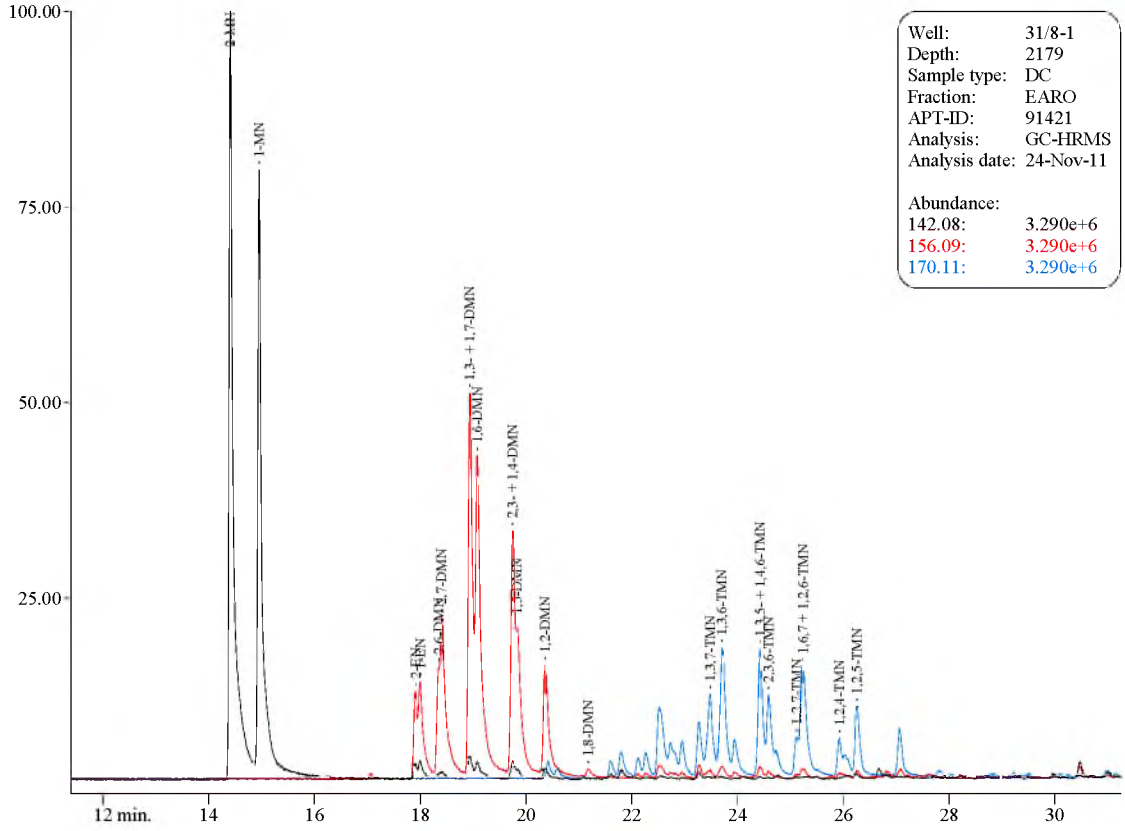

Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: EARO
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
142.08: 4.895e+6
156.09: 4.895e+6
170.11: 4.895e+6
100.00
75.00
50.00
25.00
1-MN
1,6-DMN
1,3- + 1,7-DMN
1,5-DMN
2,3- + 1,4-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
1,4,6-TMN
1,2,7-TMN
1,2,6-TMN
1,2,4-TMN
1,2,5-TMN
12 min.
14
16
18
20
22
24
26
28
30

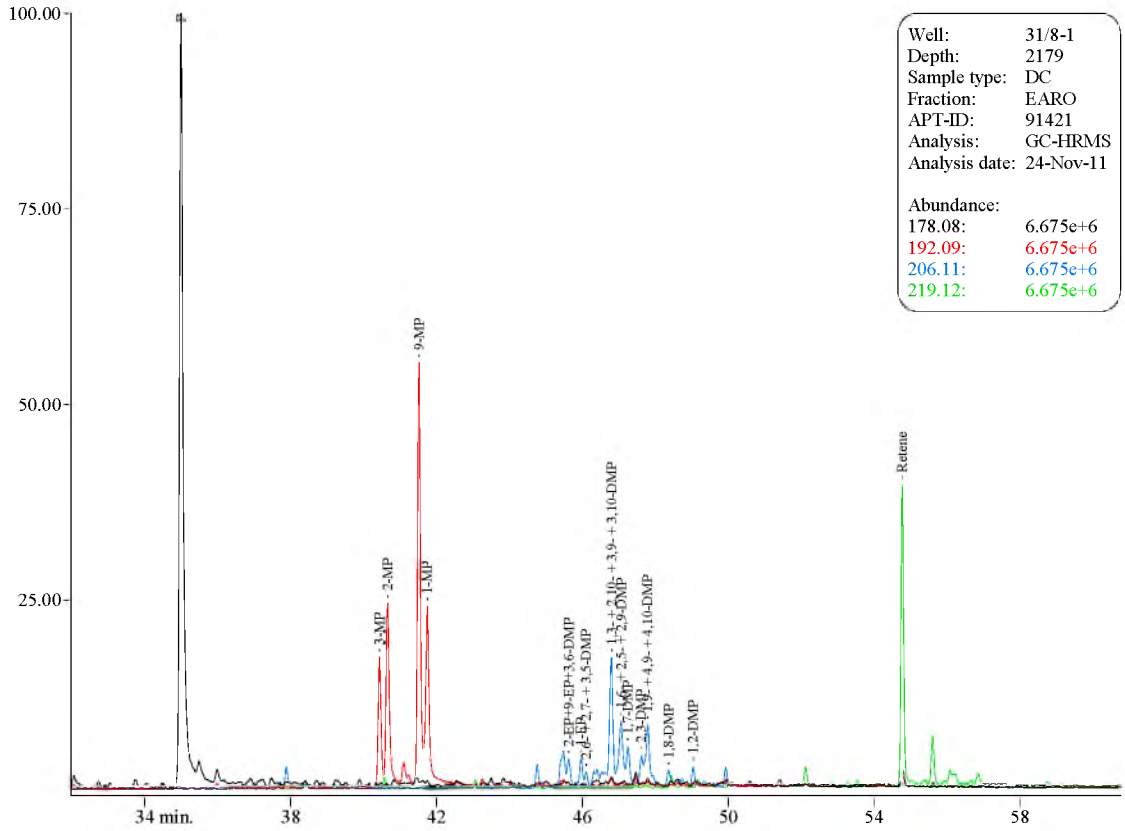

100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
2-EP+9-EP+3,6-DMP
2,6- + 1-EP + 3,5-DMP
1,3- + 2,10- + 3,9- + 3,10-DMP
2,9-DMP
1,5- + 2,3- + 1,9- + 4,10-DMP
2,3-DMP
1,8-DMP
1,2-DMP
Retene
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: EARO
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
178.08: 1.972e+6
192.09: 1.972e+6
206.11: 1.972e+6
219.12: 1.972e+6

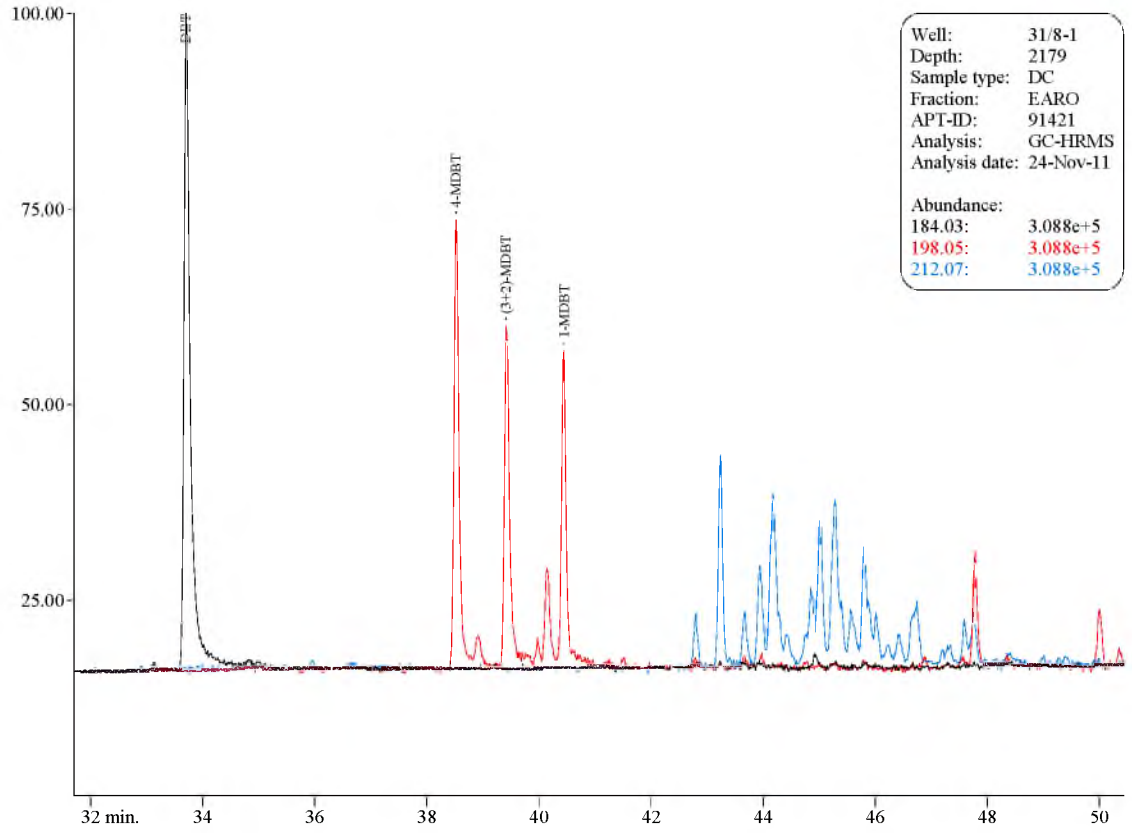

100.00
75.00
50.00
25.00
32 min.
34
36
38
40
42
44
46
48
50
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: EARO
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
184.03: 3.028e+5
198.05: 3.028e+5
212.07: 3.028e+5

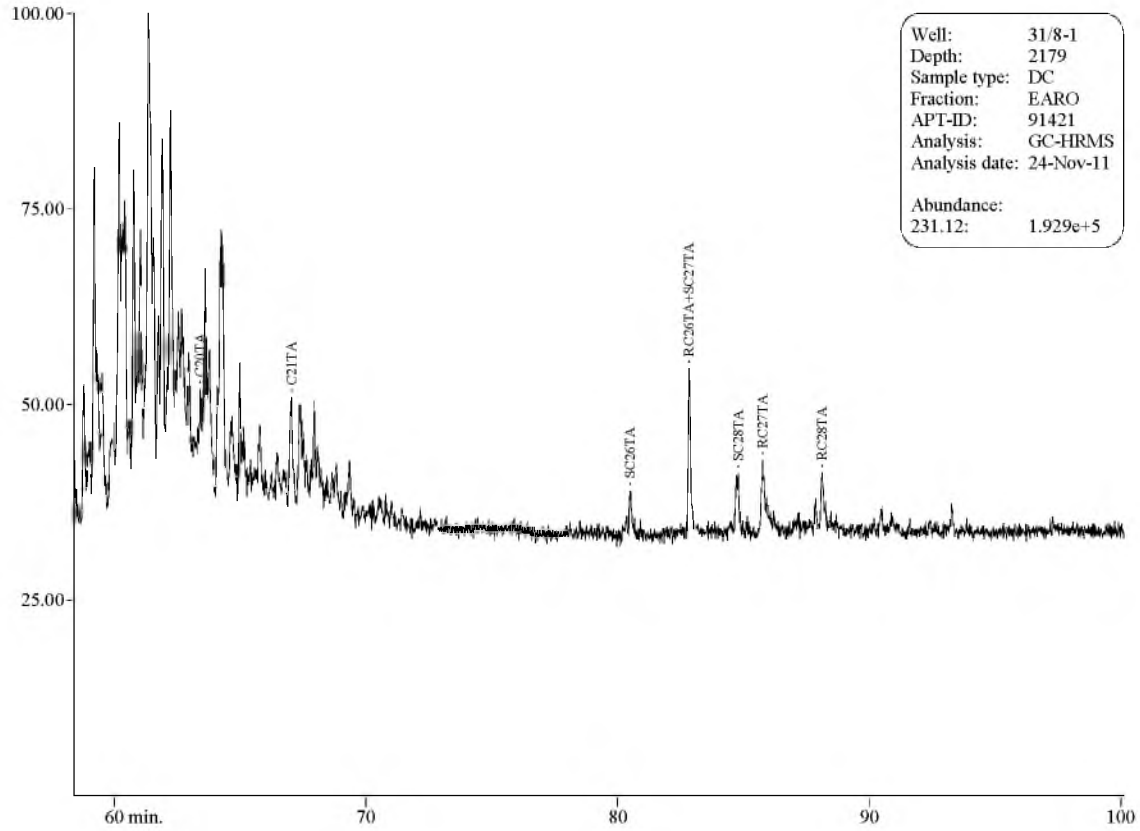

100.00
75.00
50.00
25.00
60 min.
70
80
90
100
C20TA
C21TA
SC26TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: EARO
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.12: 1.987e+5

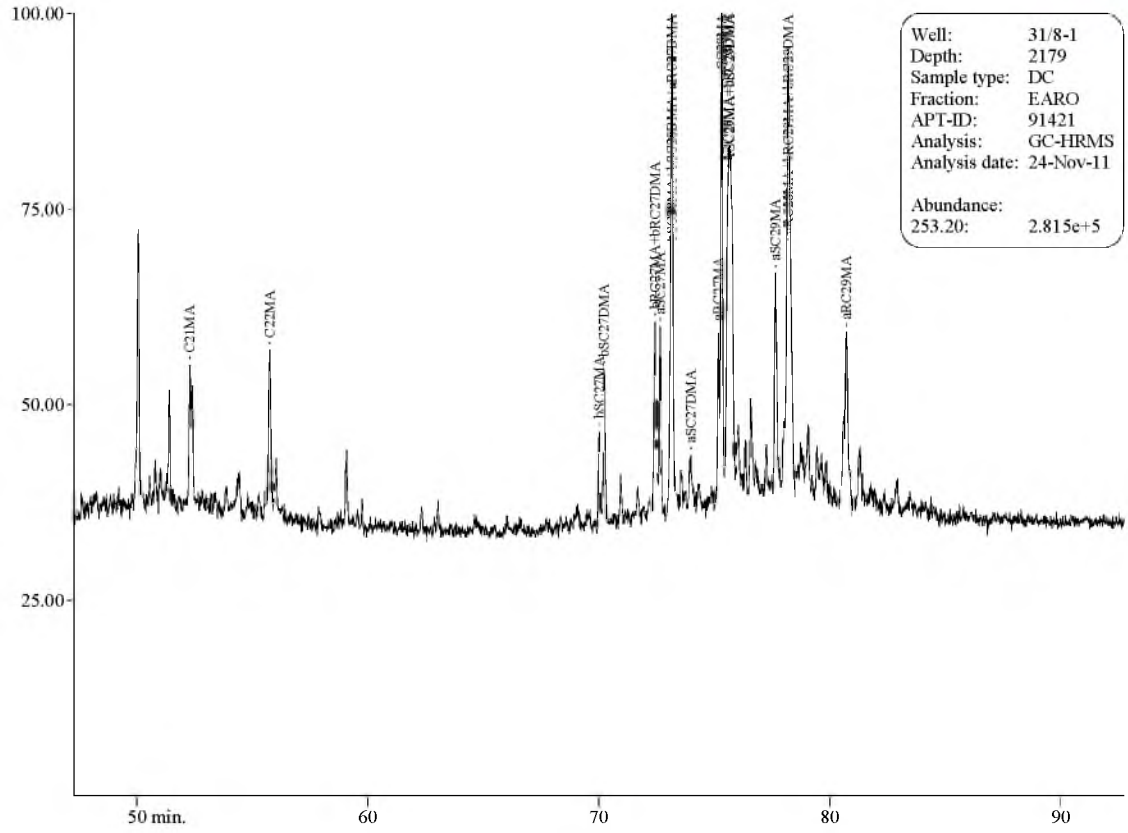

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
aSC27DMA
aRC27DMA
aSC29MA
aRC29MA
Well: 31/8-1
Depth: 2128
Sample type: DC
Fraction: EARO
APT-ID: 91419
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
253.20: 1.001e+6

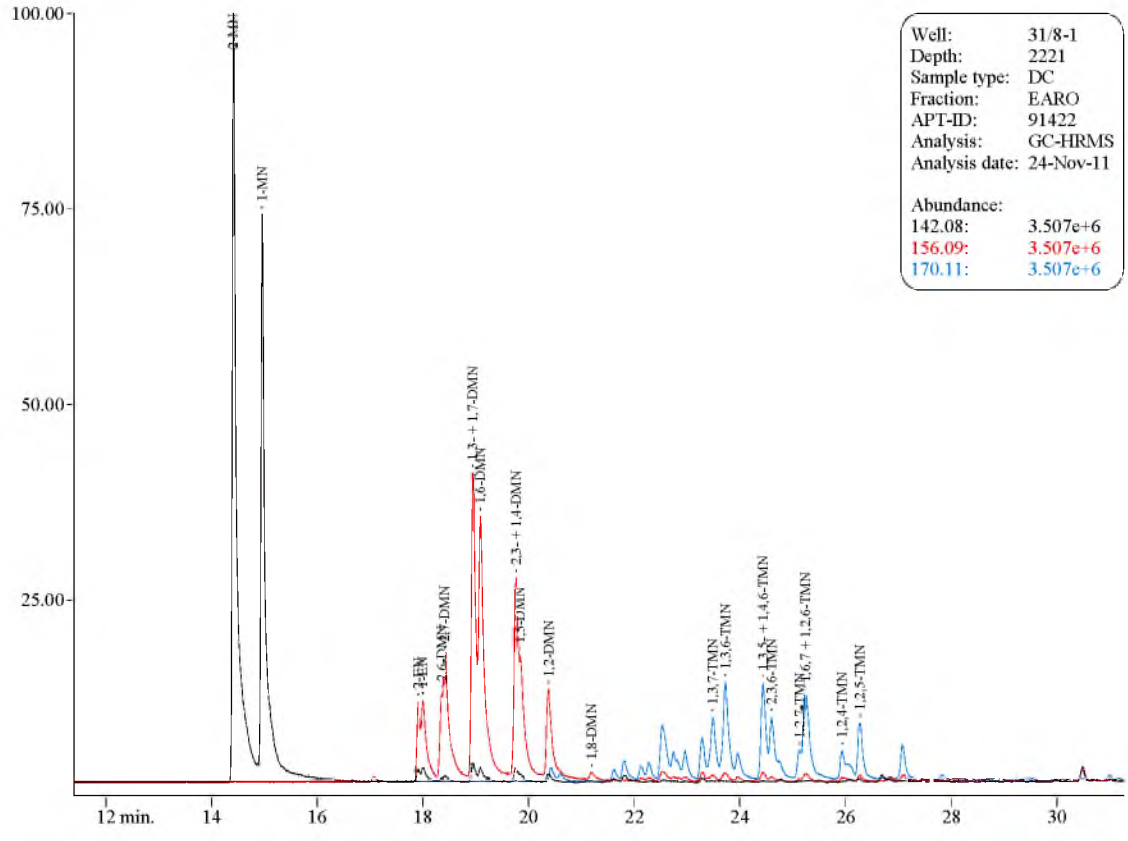

100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30
2-MN
1-MN
2-FRN
2,6-DMN
1,7-DMN
1,3- + 1,7-DMN
1,6-DMN
2,3- + 1,4-DMN
1,5-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
1,3,5- + 1,4,6-TMN
2,3,6-TMN
1,2,7-TMN
1,6,7 + 1,2,6-TMN
1,2,4-TMN
1,2,5-TMN
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: EARO
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
142.08: 3.290e+6
156.09: 3.290e+6
170.11: 3.290e+6

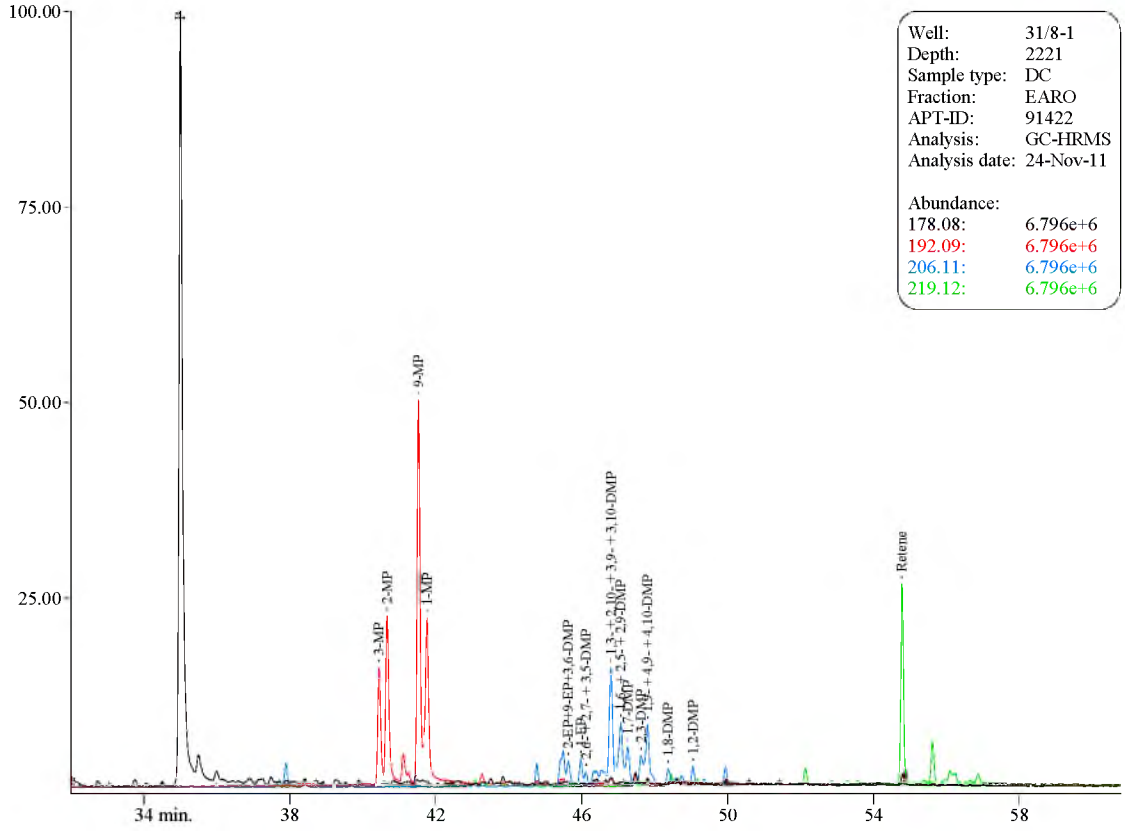

100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
2-EP+9-EP+3,6-DMP
2,6- + 2,7- + 3,5-DMP
2,5- + 2,9-DMP
3,9- + 3,10-DMP
4,9- + 4,10-DMP
1,8-DMP
1,2-DMP
Retene
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: EARO
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
178.08: 6.675e+6
192.09: 6.675e+6
206.11: 6.675e+6
219.12: 6.675e+6

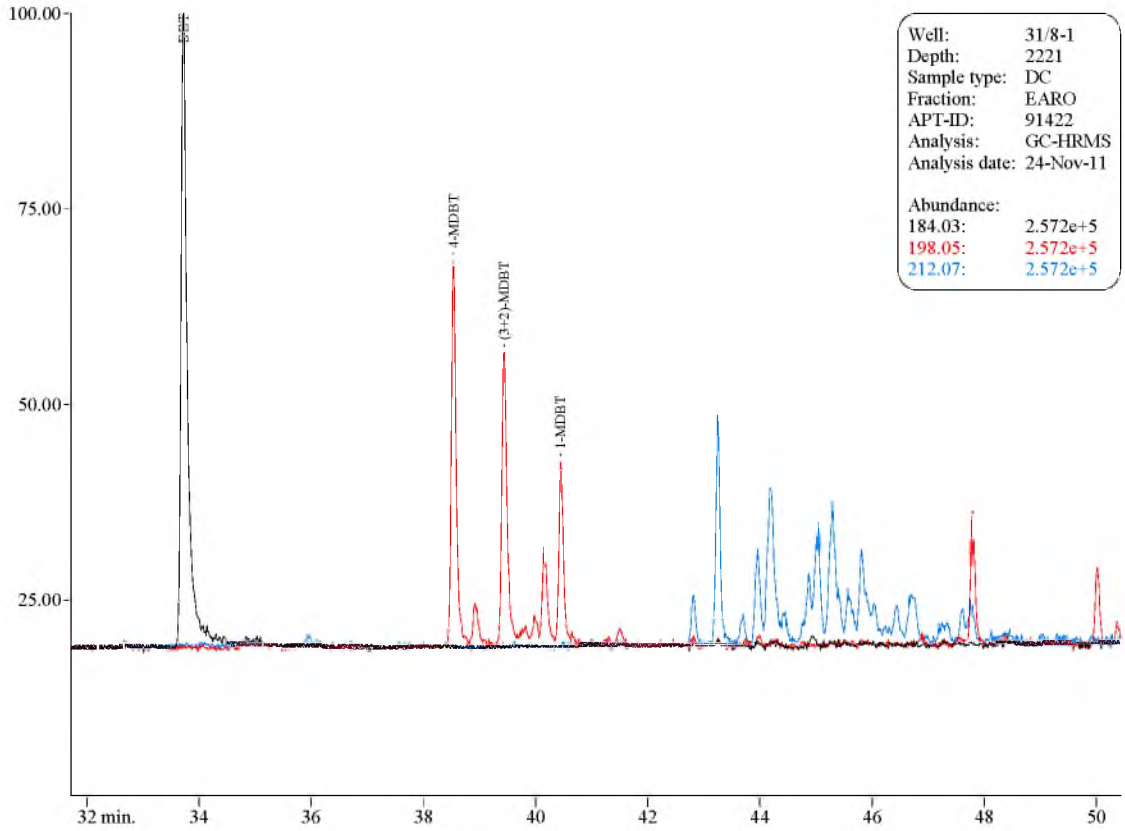

100.00
75.00
50.00
25.00
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: EARO
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
184.03: 3.088e+5
198.05: 3.088e+5
212.07: 3.088e+5
32 min.
34
36
38
40
42
44
46
48
50

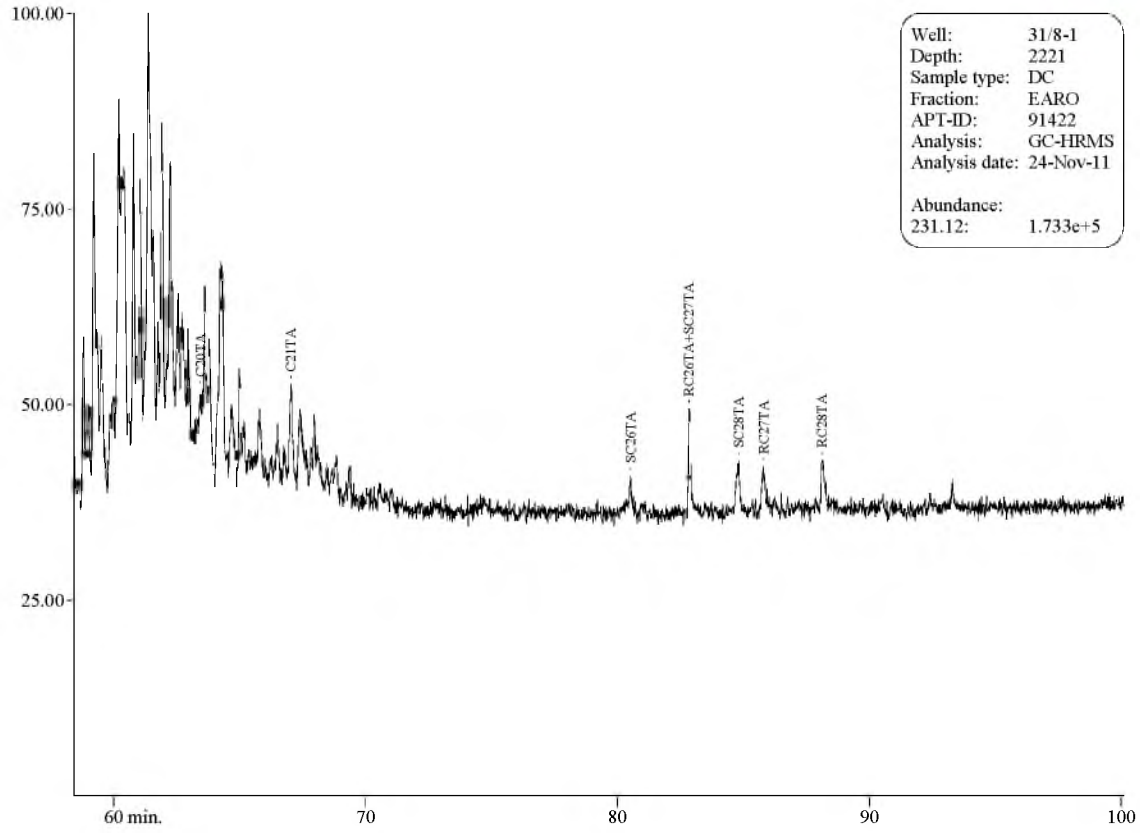

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: EARO
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.12: 1.929e+5
60 min.
70
80
90
100

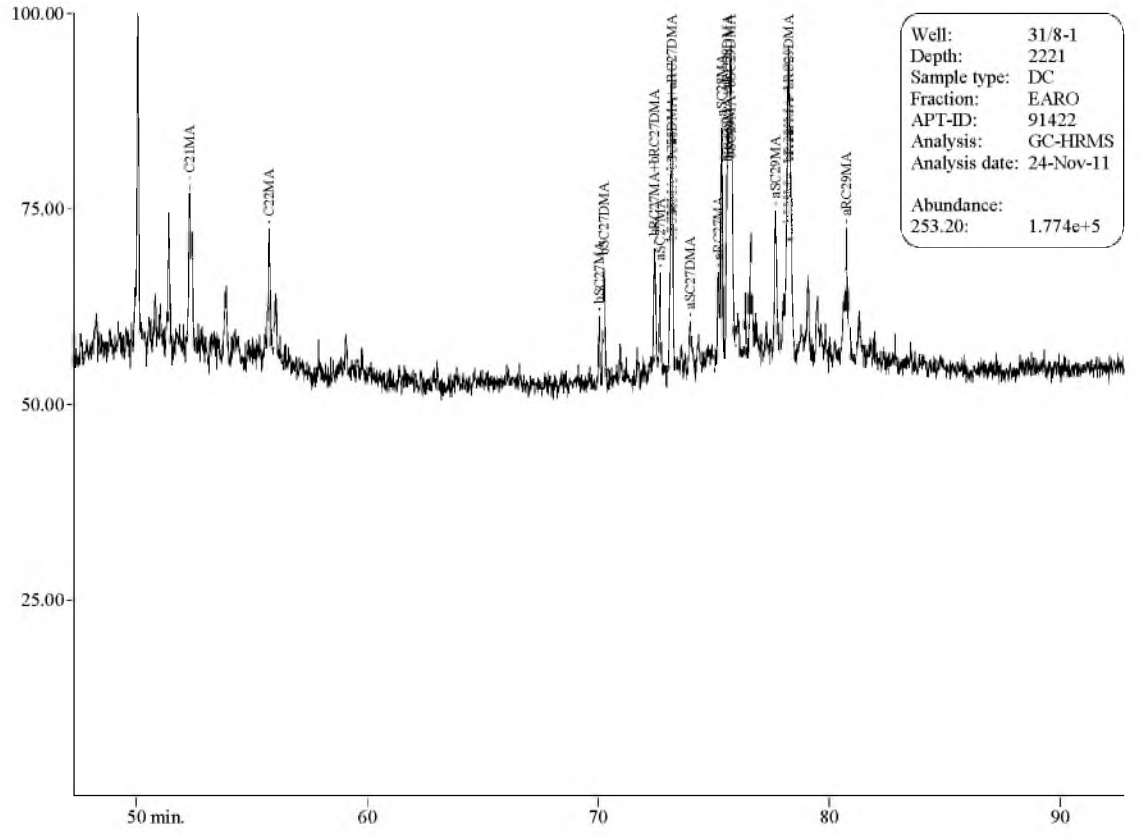

Well: 31/8-1
Depth: 2179
Sample type: DC
Fraction: EARO
APT-ID: 91421
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
253.20: 2.815e+5
100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27DMA
aSC27DMA
aSC29MA
bRC29MA

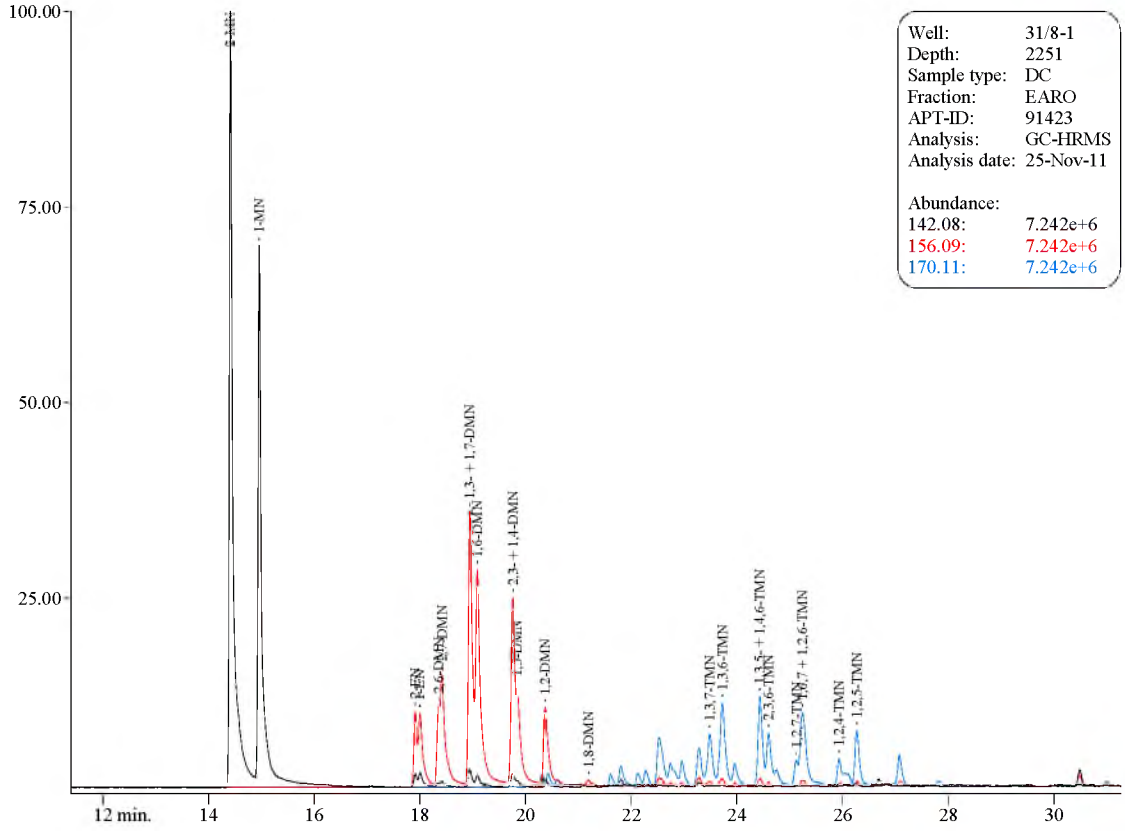

Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: EARO
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
142.08: 3.507e+6
156.09: 3.507e+6
170.11: 3.507e+6
100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30
1-MN
2-EN
2,6-DMN + 2,7-DMN
1,6-DMN + 1,3-DMN + 1,7-DMN
2,3-DMN + 1,4-DMN
1,5-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
2,3,6-TMN + 1,4,6-TMN
1,2,7-TMN + 1,6,7 + 1,2,6-TMN
1,2,4-TMN
1,2,5-TMN

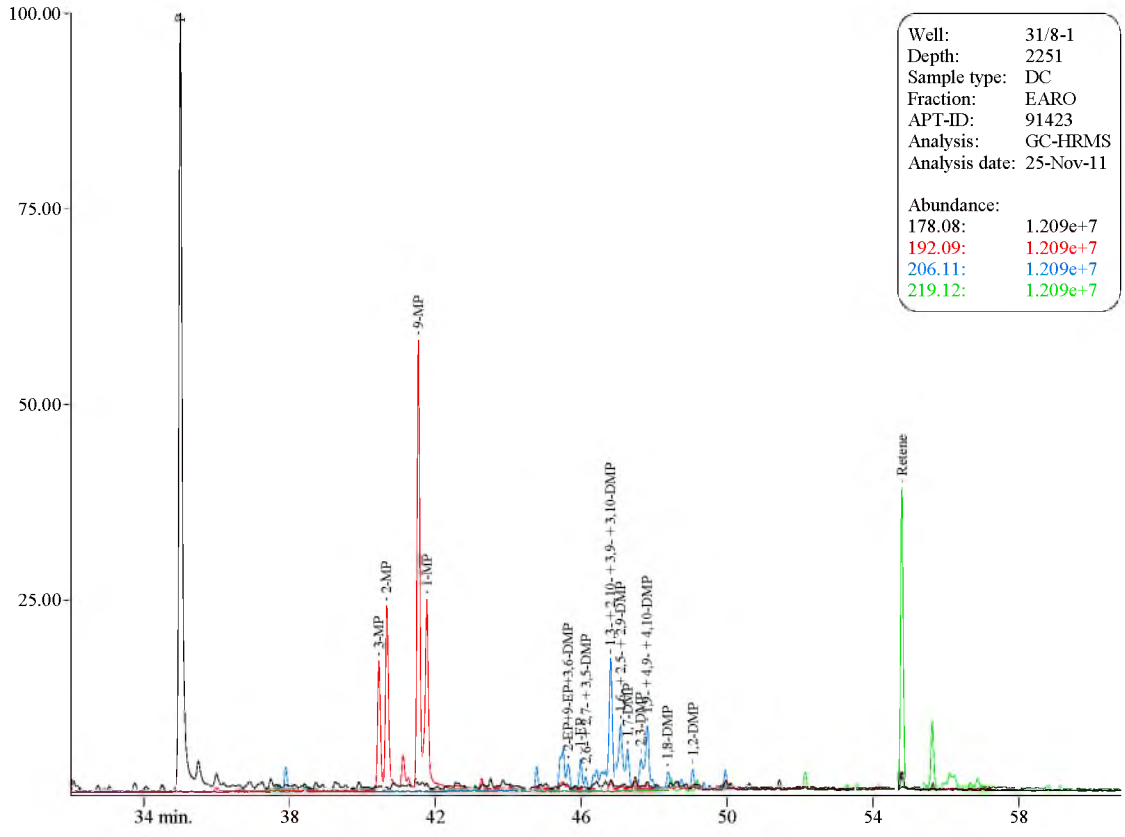

Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: EARO
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
178.08: 6.796e+6
192.09: 6.796e+6
206.11: 6.796e+6
219.12: 6.796e+6
100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
2-EP+9-EP+3,6-DMP
2,6-DMP
2,7-+3,5-DMP
1,3-+2,10-+3,9-+3,10-DMP
2,5-+2,9-DMP
1,7-DMP
2,3-DMP
1,9-+4,9-+4,10-DMP
1,8-DMP
1,2-DMP
Reteme

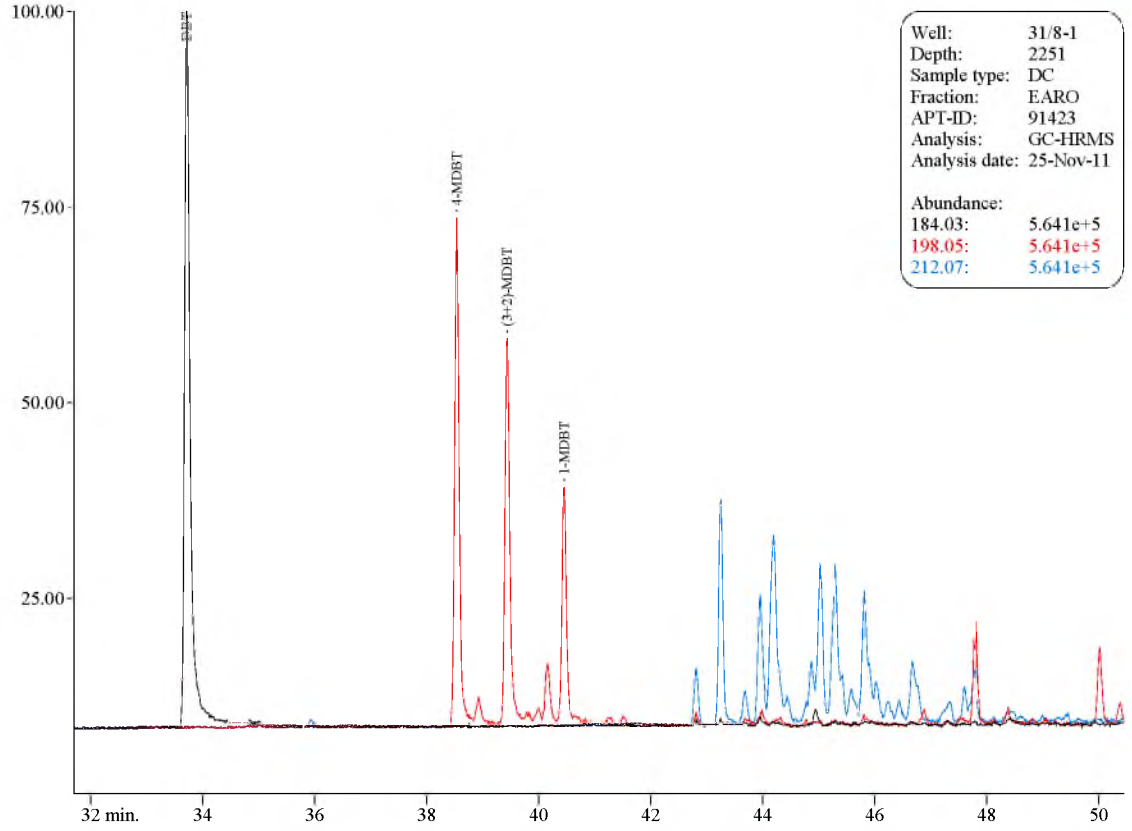

Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: EARO
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
184.03: 2.572e+5
198.05: 2.572e+5
212.07: 2.572e+5
100.00
75.00
50.00
25.00
32 min.
34
36
38
40
42
44
46
48
50
4-MDBT
(3+2)-MDBT
1-MDBT

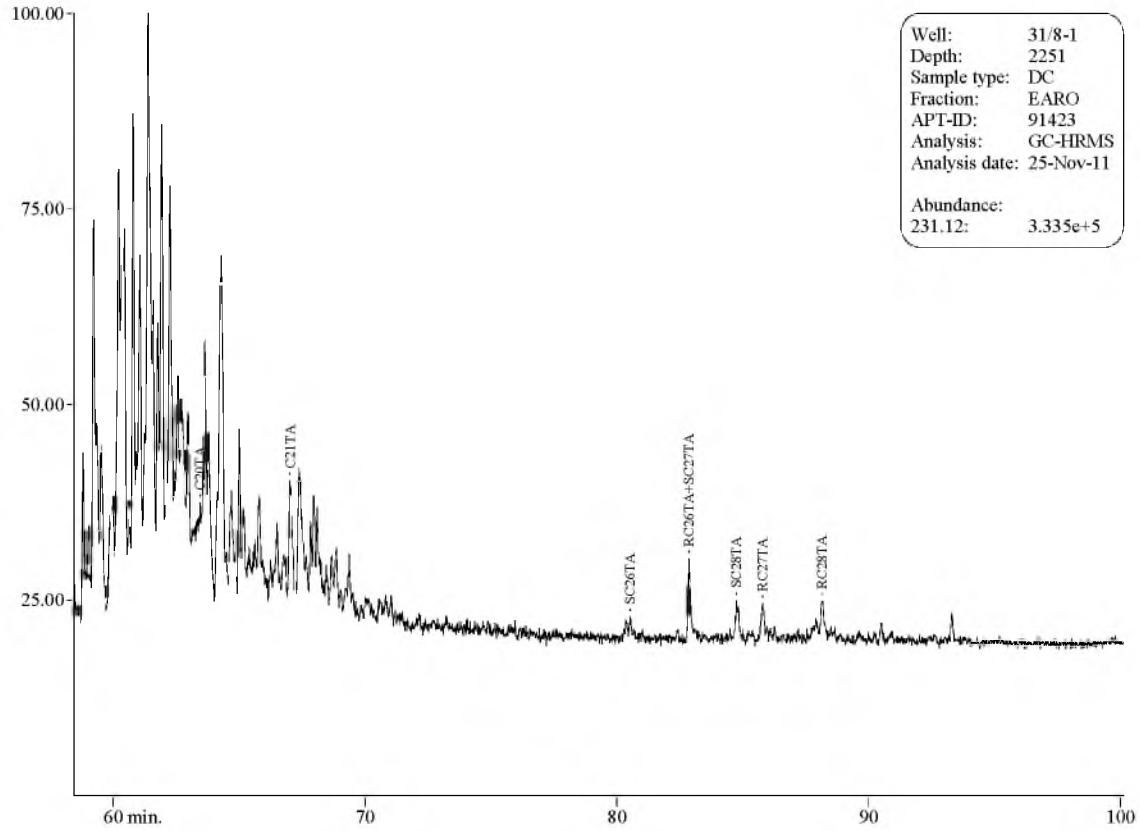

100.00
75.00
50.00
25.00
60 min.
70
80
90
100
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: EARO
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
231.12: 1.733e+5

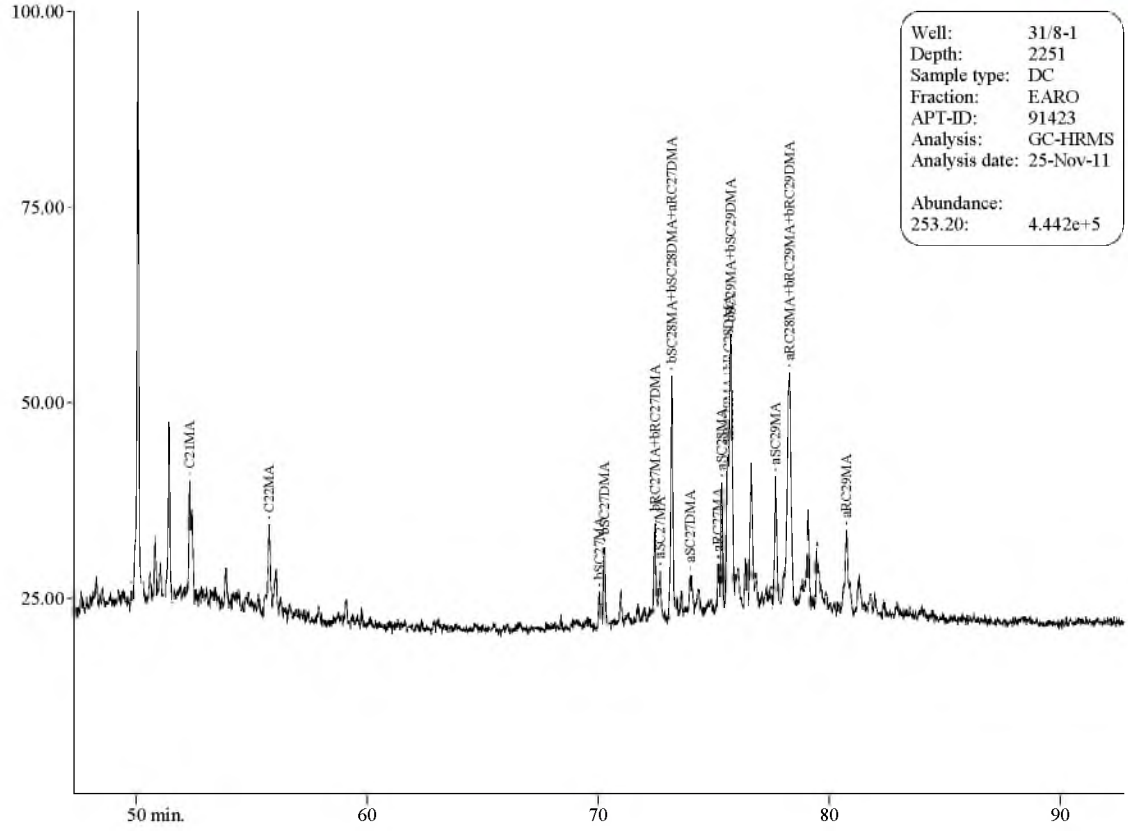

100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
aSC27DMA
aRC27DMA
aSC29MA
aRC29MA
Well: 31/8-1
Depth: 2221
Sample type: DC
Fraction: EARO
APT-ID: 91422
Analysis: GC-HRMS
Analysis date: 24-Nov-11
Abundance:
253.20: 1.774e+5

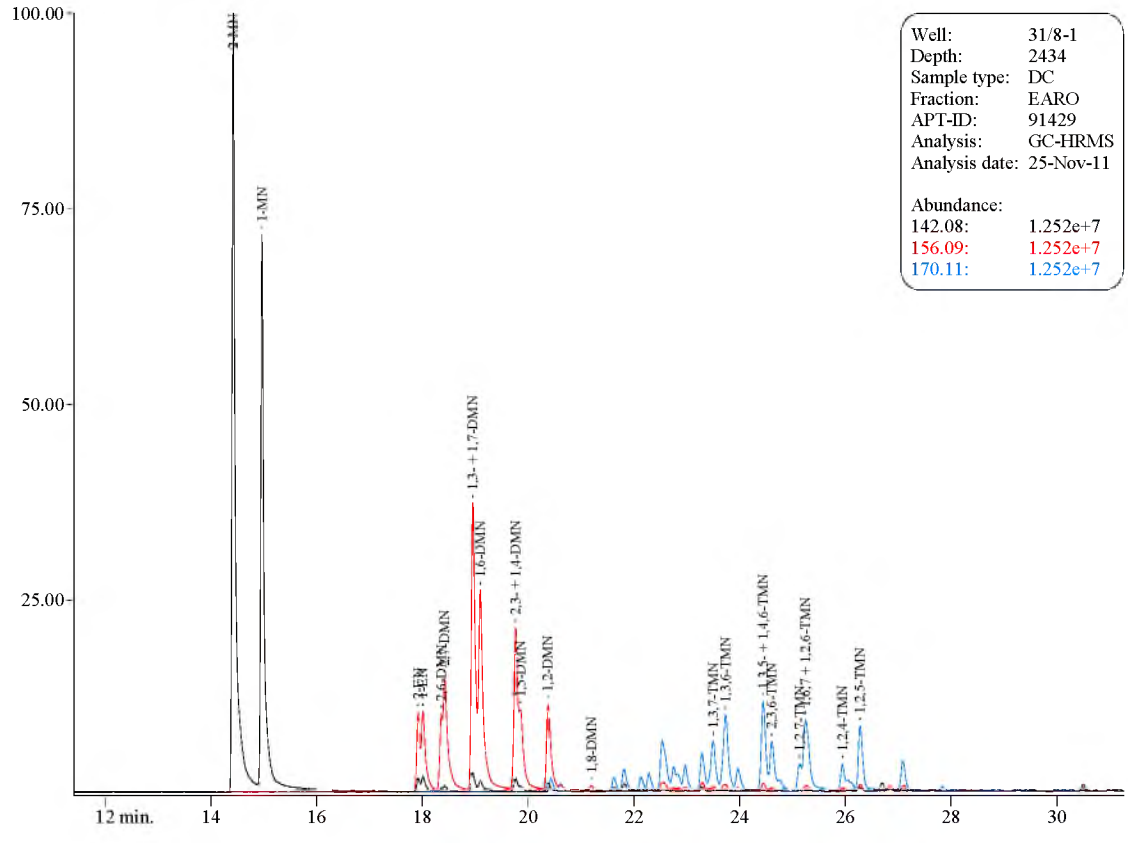

100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30
1-MN
2-MN
1,6-DMN
1,3- + 1,7-DMN
2,3- + 1,4-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
1,4,6-TMN
1,2,4-TMN
1,2,5-TMN
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: EARO
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
142.08: 7.242e+6
156.09: 7.242e+6
170.11: 7.242e+6

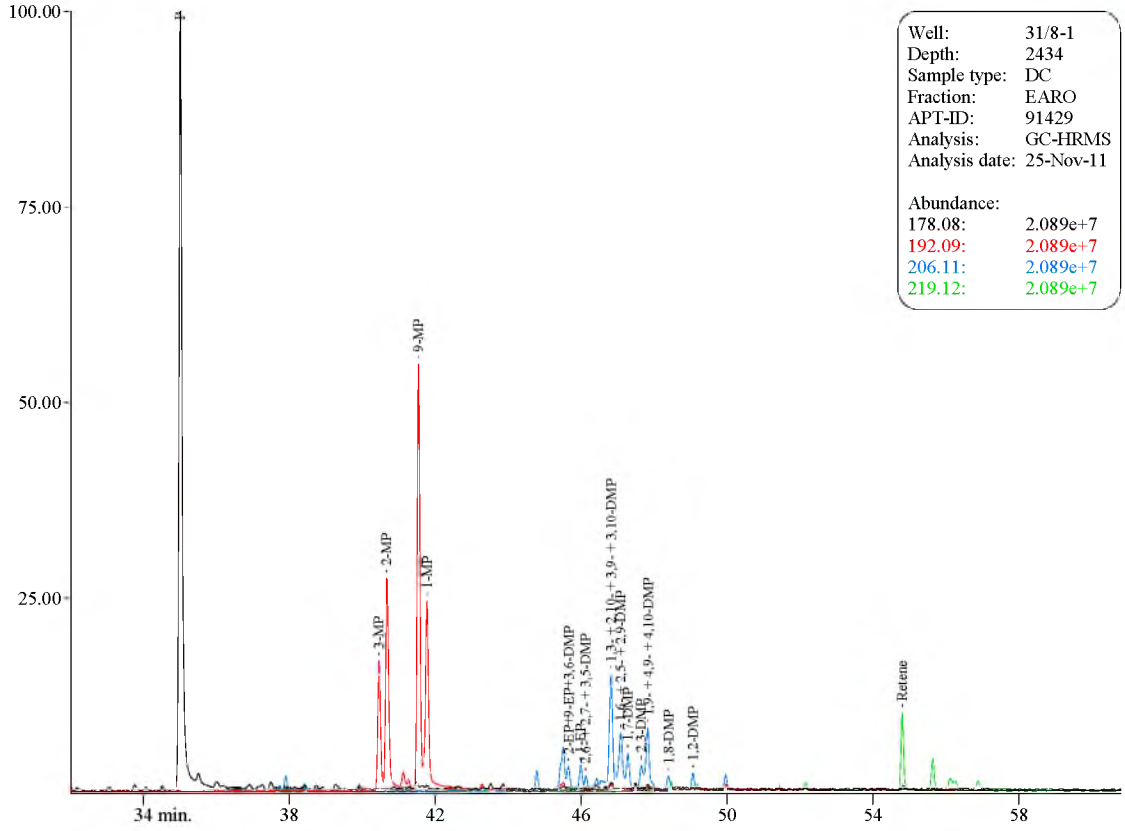

100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
1,8-DMP
1,2-DMP
Retene
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: EARO
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
178.08: 1.209e+7
192.09: 1.209e+7
206.11: 1.209e+7
219.12: 1.209e+7

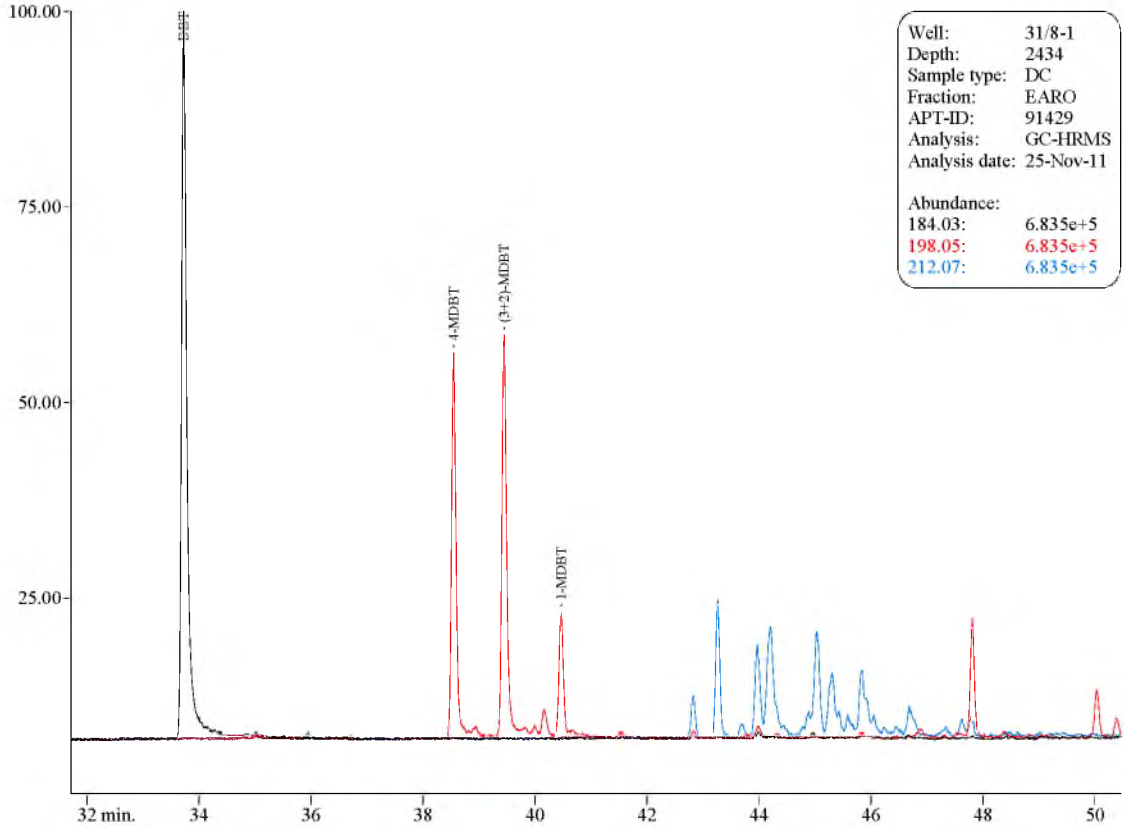

100.00
75.00
50.00
25.00
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: EARO
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
184.03: 5.641e+5
198.05: 5.641e+5
212.07: 5.641e+5
32 min.
34
36
38
40
42
44
46
48
50

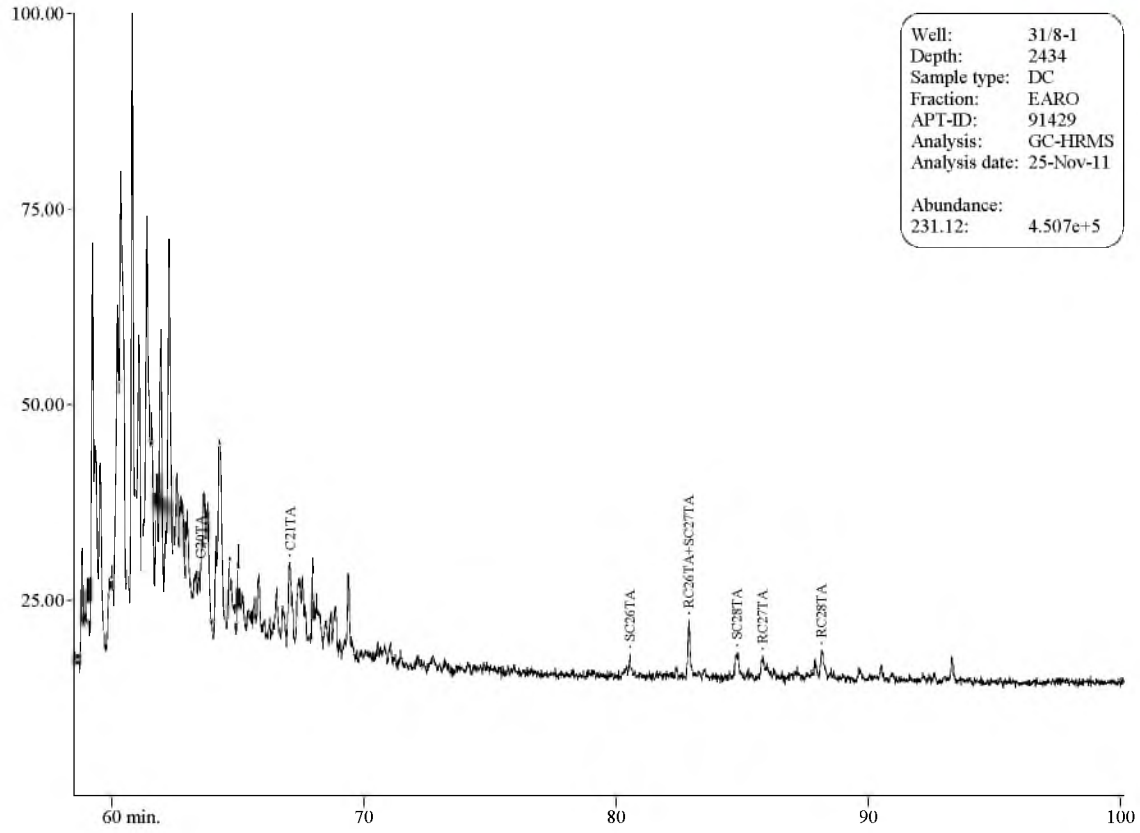

100.00
75.00
50.00
25.00
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: EARO
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
231.12: 3.335e+5
60 min.
70
80
90
100

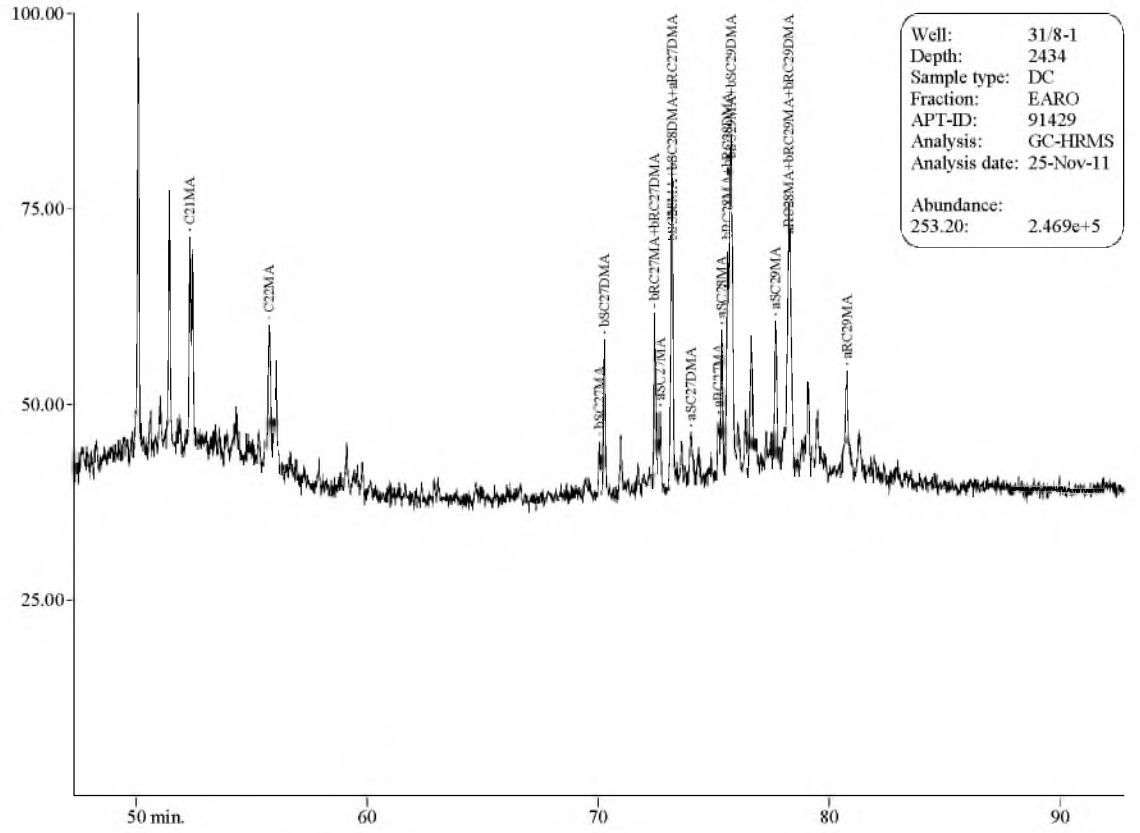

Well: 31/8-1
Depth: 2251
Sample type: DC
Fraction: EARO
APT-ID: 91423
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
253.20: 4.442e+5
C21MA
C22MA
bSC27TDMA
bSC27MA+bRC27TDMA
bSC28MA+bSC28DMA+nRC27DMA
aSC27TDMA
aRC27MA
nSC29MA
aRC28MA+bRC29MA+bRC29DMA
aRC29MA
100.00
75.00
50.00
25.00
50 min.
60
70
80
90

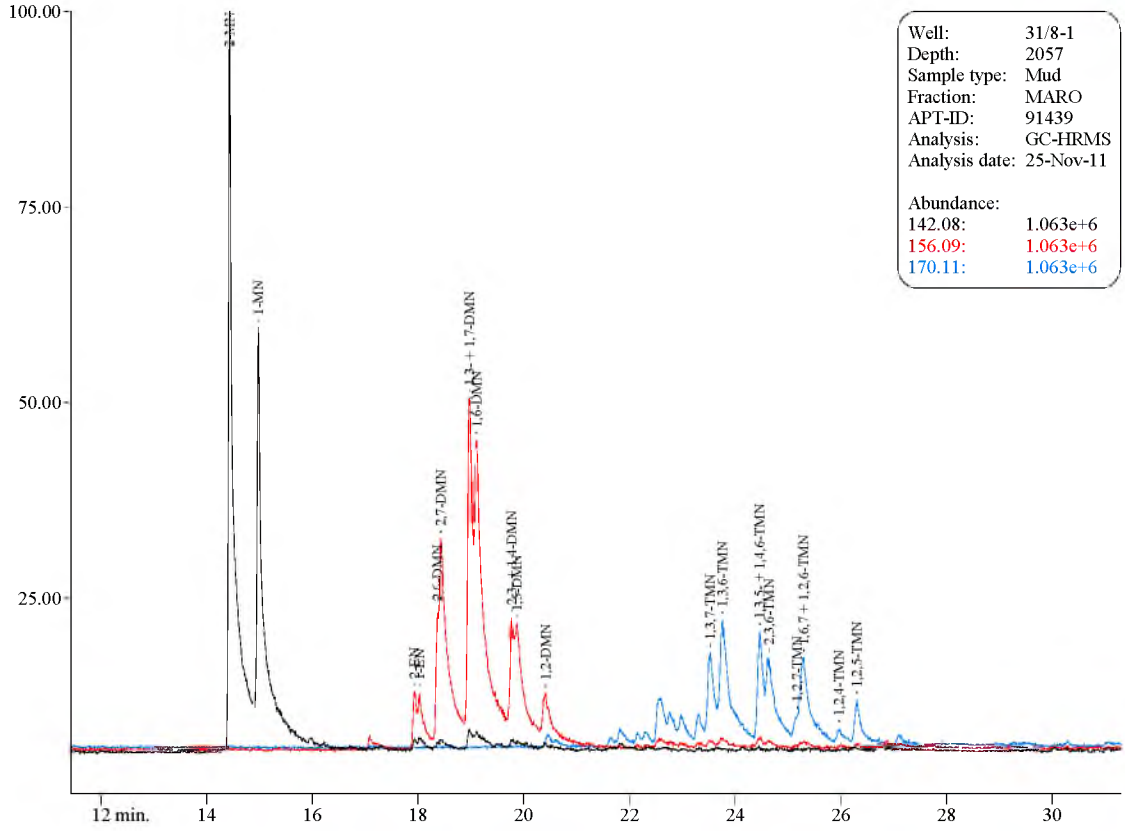

Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: EARO
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
142.08: 1.252e+7
156.09: 1.252e+7
170.11: 1.252e+7
1-MN
1,3- + 1,7-DMN
1,6-DMN
2,3- + 1,4-DMN
1,5-DMN
1,2-DMN
1,8-DMN
1,3,7-TMN
1,3,6-TMN
2,3,5- + 1,4,6-TMN
2,3,6-TMN
1,2,7- + 1,2,6-TMN
1,2,4-TMN
1,2,3-TMN
100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30

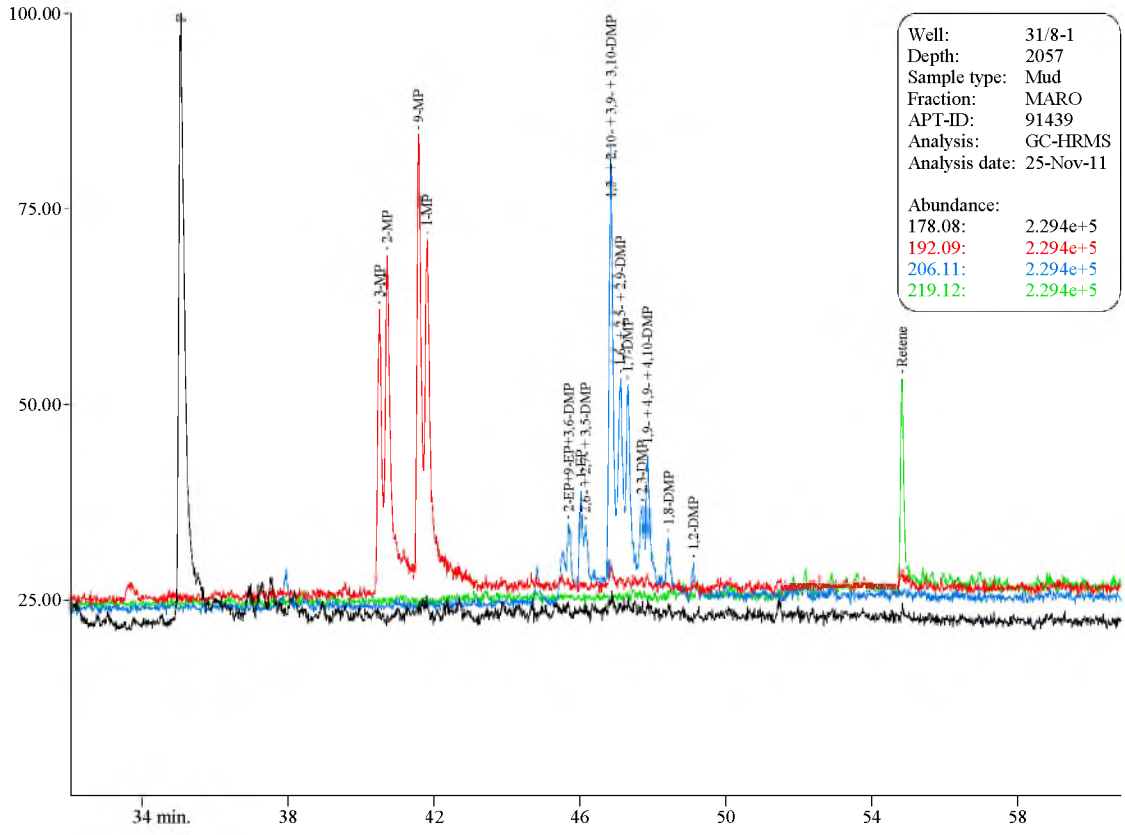

100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: EARO
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
178.08: 2.089e+7
192.09: 2.089e+7
206.11: 2.089e+7
219.12: 2.089e+7
3-MP
2-MP
9-MP
1-MP
1,8-DMP
1,2-DMP
Retene

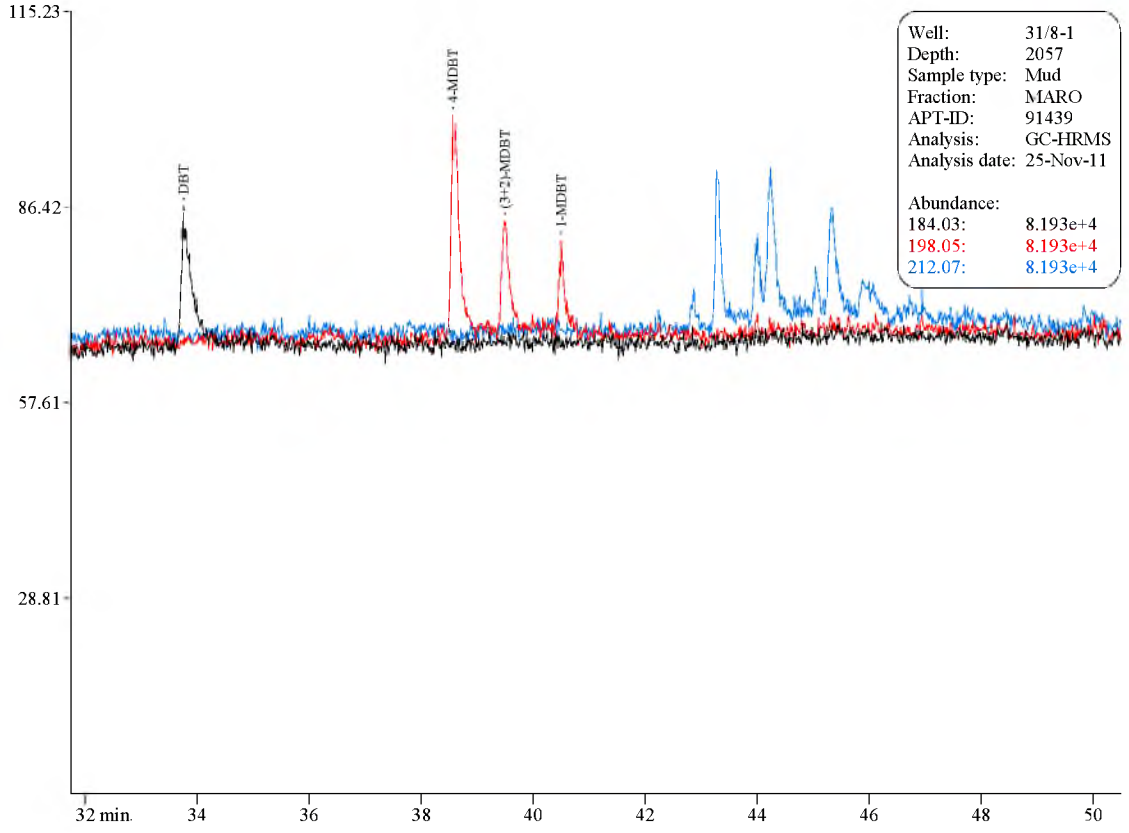

100.00
75.00
50.00
25.00
32 min.
34
36
38
40
42
44
46
48
50
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: EARO
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
184.03: 6.835e+5
198.05: 6.835e+5
212.07: 6.835e+5
4-MDBT
(3+2)-MDBT
1-MDBT

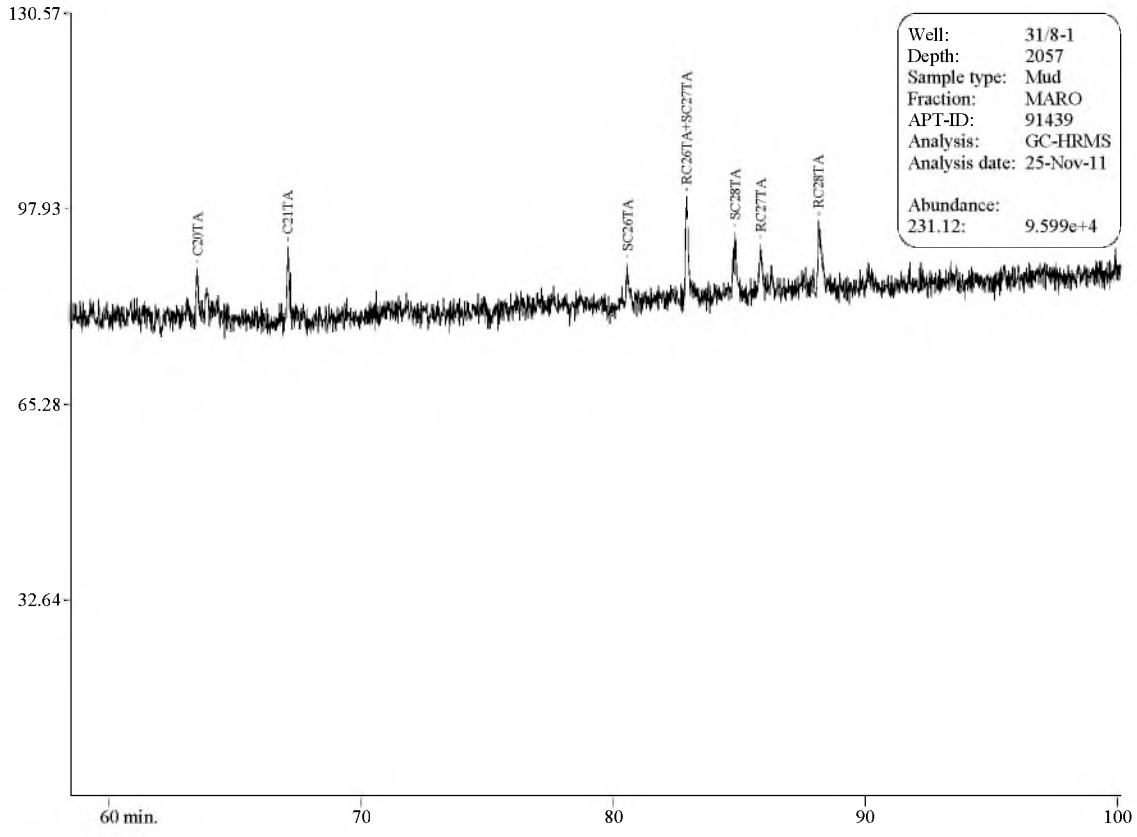

100.00
75.00
50.00
25.00
60 min.
70
80
90
100
C20TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: EARO
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
231.12: 4.507e+5


100.00
75.00
50.00
25.00
50 min.
60
70
80
90
C21MA
C22MA
bSC27MA
bSC27DMA
bRC27MA+bRC27DMA
aSC27MA
aSC27DMA
aSC28MA
aSC29MA
aRC29MA
Well: 31/8-1
Depth: 2434
Sample type: DC
Fraction: EARO
APT-ID: 91429
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
253.20: 2.469e+5


100.00
75.00
50.00
25.00
12 min.
14
16
18
20
22
24
26
28
30
1-MN
2-EN
2,6-DMN
2,7-DMN
1,6-DMN
1,7-DMN
1,4-DMN
1,5-DMN
1,2-DMN
1,3,7-TMN
1,3,6-TMN
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
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MARO
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
142.08: 1.063e+6
156.09: 1.063e+6
170.11: 1.063e+6


100.00
75.00
50.00
25.00
34 min.
38
42
46
50
54
58
3-MP
2-MP
9-MP
1-MP
2-EP+9-EP+3,6-DMP
2,6- + 1,4-DMP
3,5-DMP
2,9-DMP
2,10- + 3,9- + 3,10-DMP
1,7-DMP
2,3-DMP
1,9- + 4,9- + 4,10-DMP
1,8-DMP
1,2-DMP
Retene
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MARO
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
178.08: 2.294e+5
192.09: 2.294e+5
206.11: 2.294e+5
219.12: 2.294e+5


115.23
86.42
57.61
28.81
DBT
4-MDBT
(3+2)-MDBT
1-MDBT
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MARO
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
184.03: 8.193e+4
198.05: 8.193e+4
212.07: 8.193e+4
32 min.
34
36
38
40
42
44
46
48
50


130.57
97.93
65.28
32.64
C29TA
C21TA
SC26TA
RC26TA+SC27TA
SC28TA
RC27TA
RC28TA
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MARO
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
231.12: 9.599e+4
60 min.
70
80
90
100

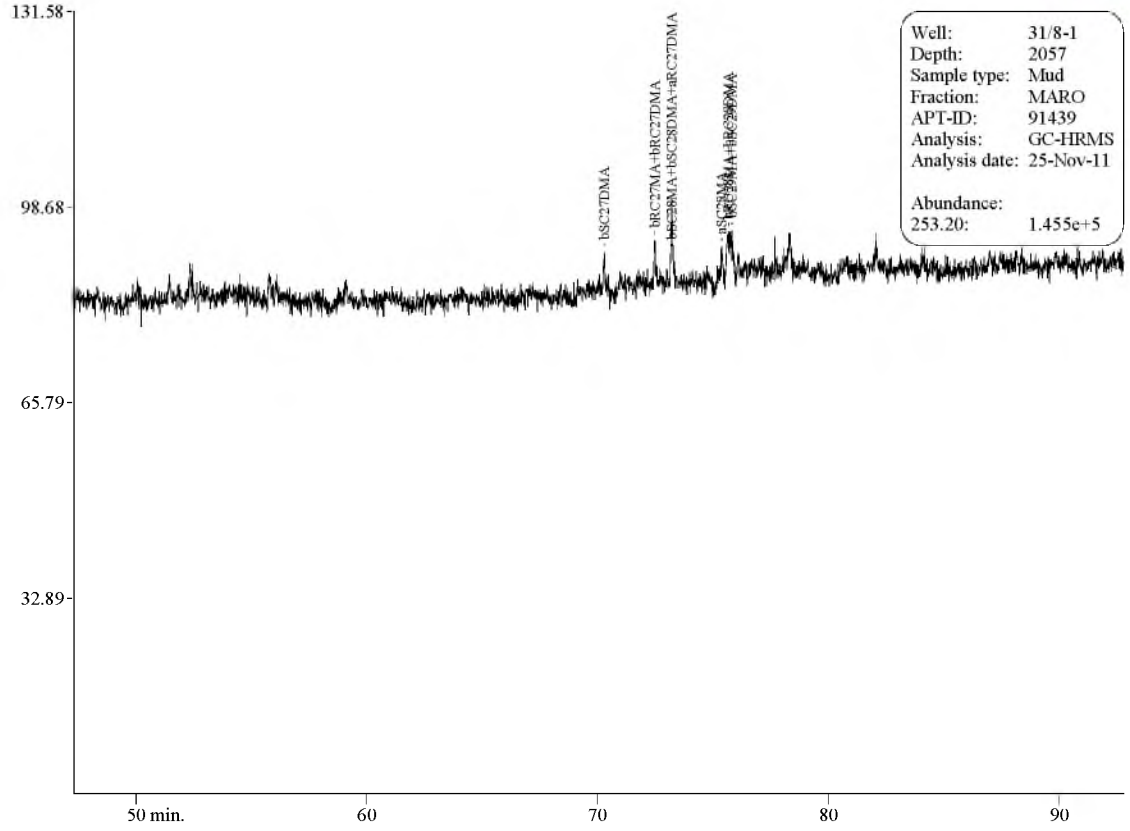

131.58
98.68
65.79
32.89
50 min.
60
70
80
90
bSC27DMA
bRC27MA+bRC27DMA
bSC28DMA+aRC27DMA
Well: 31/8-1
Depth: 2057
Sample type: Mud
Fraction: MARO
APT-ID: 91439
Analysis: GC-HRMS
Analysis date: 25-Nov-11
Abundance:
253.20: 1.455e+5

Table 16. Reference data for GC of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	11.11.2011	11.11.2011	12.11.2011	12.11.2011	12.11.2011
Pr/n-C17	0.55-0.66	0.60	0.60	0.60	0.61	0.59	0.59
n-C15/n-C20	1.4-2.0	1.8	1.5	1.5	1.5	1.5	1.5
n-C30/n-C20	0.20-0.32	0.29	0.28	0.28	0.28	0.29	0.28
n-C17/(n-C17+n-C27)	0.75-0.82	0.79	0.77	0.77	0.77	0.77	0.78

Table 17. Reference data for GC-MS of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	23.11.2011	24.11.2011
[23/3]/30ab	0.04-0.09	0.07	0.06	0.06
35abR/30ab	0.06-0.13	0.08	0.09	0.09
25nor30ab/25nor28ab	0.3-0.8	0.5	0.91	0.90
29aaR/27dbS	0.2-0.6	0.3	0.33	0.30
29bbS/27bbR	0.7-1.2	0.9	0.92	0.92

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

Table 18. Reference data for GC-MS of Aromatic Compounds measured on NSO-1

Variable	Permissible range	Most likely value	24.11.2011	25.11.2011
1-MP/P	0.53-0.70	0.59	0.64	0.64
A1/E1	0.3-0.7	0.5	0.57	0.54
a1/d1	0.2-0.4	0.31	0.34	0.36

Experimental Procedures

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

Sample preparation
Cuttings samples are washed in water to remove mud. When oil based mud is used, soap (Zalo) is added to the sample and the sample is washed thoroughly in warm water to remove mud and soap.

Extraction
A Soxtec Tecator instrument is used. Thimbles are pre extracted in dichloromethane with 7% (vol/vol) methanol, 10 min boiling and 20 min rinsing. The crushed sample is weighed accurately in the pre extracted thimbles and boiled for 1 hour and rinsed for 2 hours in approximately 80 cc of dichloromethane with 7% (vol/vol) methanol. Copper blades activated in concentrated hydrochloric acid are added to the extraction cups to cause free sulphur to react with the copper. An aliquot of 10% of the extract is transferred to a pre weighed bottle and evaporated to dryness. The amount of extractable organic matter is calculated from the weight of this 10% aliquot.

Deasphaltening
Extracts are evaporated almost to dryness before a small amount of dichloromethane (3 times the amount of EOM) is added. Pentane is added in excess (40 times the volume of EOM/oil and dichloromethane). 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.

TOC
A Leco SC-632 instrument is used. Diluted HCl is added to the crushed rock sample to remove carbonate. The sample is then introduced into the Leco combustion oven, and the amount of carbon in the sample is measured as carbon dioxide by an IR-detector.

Rock-Eval
A Rock-Eval 6 instrument is used. Jet-Rock 1 was run as every tenth sample and checked against the acceptable range given in NIGOGA.

Temperature programme
Pyrolysis: 300 °C (3 min.) - 25 °C/min. - 650 °C (0 min.)

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.

MPLC
The MPLC is constructed as described by Radke et al. (1980). The system includes two HPLC pumps, sample injector, sample collector and two packed columns. The pre column is filled with Kieselgel 100, which is heated at 600 °C for 2 hours to deactivate it. The main column, a LiChroprep Si60 column, is heated at 120 °C for 2 hours with a helium flow to make it water free.

Approximately 30 mg of deasphaltened oil or EOM diluted in 1 ml hexane is injected and separated into a saturated, an aromatic and a polar fraction.

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 Agilent 7890 RGA GC equipped with Molsieve and Poraplot Q columns, a flame ionisation detector (FID) and 2 thermal conductivity detector (TCD). Hydrocarbons were measured by FID. H_2, CO_2, N_2 and O_2/Ar by TCD.

Stable carbon and hydrogen isotope analysis of fractions
The samples were dissolved in a known amount of dichloromethane, and 0.2 mg of the sample (or as much as possible) was transferred to a Zn capsule. The solvent was evaporated in an oven at 50 °C. The samples were then combusted in an EuroVector Elemental Analyser EA3028-IRMS at 1030 °C. The produced water is trapped on $Mg(ClO_4)_2$ and the CO_2 is flushed into a Horizon, Isotope Ratio mass spectrometer (IRMS) from NU-Instruments. A standard (NGS NSO-1, topped oil) is analysed for each 10^{th} sample. The $\delta^{13}C$ value obtained for this standard is –28.61‰ VPDB. The variation in the isotopic values for the standard by repeated analysis over a period of three years is ± 0.09‰.

$H_2O_{(g)}$ 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 Micromass Optima Isotope Ratio mass spectrometer (IRMS). 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 ‰.

GC of saturated fraction
A HP7890 A instrument is used. The column is a CP-Sil-5 CB-MS, length 30 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.)

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.)

Vitrinite reflectance analysis
Reflected light studies were carried out using whole rock (bulk) samples, mounted in resin blocks and polished. The whole rock pieces were mixed with resin and allowed to set in moulds,.

The surface of the blocks was ground flat on carborundum papers using three dry grinding stages of 180, 240 and 600 grades of carborundum. Polishing was carried out in three stages; 5/20, 3/50 & gamma alumina on Selvyt cloths, using isopropanol as lubricant. This polishing

was done by hand on stationary laps. The finished blocks were mounted on microscope slides using a hand press and a small lump of plasticine, which ensured that the polished surface was normal to the incident light.

Reflectivity studies were conducted with a Zeiss MPM 03 microscope with photometer installed. The optical magnification system uses an Epiplan - Neofluar x40 oil immersion objective and x10.0 eyepiece, with an inherent tube magnification of 1.6x giving a total visual magnification of x640. The immersion oil used was Zeiss Immersol 518F having a refractive index of 1.518 at 23°C. Measurements were made in light at a wavelength of 546nm (green) which is the ICCP standard. The measuring aperture was circular with a diameter of 1.6 micron.

Measurements made are of Ro. (aver.) which means they are made in polarised light; as against Ro. random which are made in nominally un-polarised light, although some degree of polarisation is imparted by the coated cover slip of the vertical illuminator. Two of three standards are used; Spinel, with a Ro. in oil of 0.588%, Yttrium-Aluminium-Garnet with a Ro. in oil of 0.879% and Gadolinium-Gallium-Garnet with a Ro. of 1.696%. The choice of standards used is dependent on the expected range of reflectance of the samples being examined. The two selected standards are used each time a sample is analysed; a high degree of linearity in photometer response (R^2 0.99 or 1.00) is expected and obtained before analysis commences.

The polished surface of the block is searched for vitrinite phytoclasts until 55 have been measured or for half an hour, whichever is the sooner. For each sample quality ratings are given to various important aspects, which may affect the measurements. These aspects are abundance of vitrinite, uncertainties in the identification of indigenous vitrinite, type of vitrinite, particle size, particle surface quality and abundance of pyrite. All the observations and data are recorded into a digital spreadsheet format for QC purposes.

The techniques used for evaluation of the form, habit and thermal exposure of hydrocarbon residues (bitumen) are essentially the same as for the measurement of vitrinite reflectivity.

Photomicrographs were obtained using a Canon EOS 1000D digital camera placed in the light path to the photomultiplier tube using a prism off take. The objective used for the photographic work was a 25x oil immersion objective which, with the same ocular magnification of 10x and the inherent tube magnification of 1.6x, gives a total magnification of 400x.