

Main test results

Perforation: 2526 – 2563m
Choke: 40/64"
Gas: 606000 m³/d
Liquid: non.
Gas gravity: 1,133 (air = 1)
CO₂: 60 – 70%
H₂S: 6 – 13 PPM.

Comments: The test was stopped during the clean up phase due to high CO₂ production.

After testing the well was plugged and abandoned.

2.7.4 Well testing.

TEST 1

(2526 – 2563 m)

TEST DESCRIPTION

After descending the TCP string, a Gamma Ray log was recorded in order to exactly correlate the depth of the guns with the depth of the radioactive markers placed both in the 7" liner and into the TCP string, and the formation.

The packer was set at 2505 m according to the TCP string layout (see Annex A). After displacing the brine into the string (1250 g/l) with N₂ up to 1000 mRKB, the firing head was activated increasing the THP to 350 bars. Then the THP was immediately bled off to 18 bars in order to apply approximately 70 bars of underbalance pressure to the formation at the moment of the firing (delayed 30 minutes after the firing head activation).

The well was flowed with adjustable choke at first, increasing from 1/4" to 5/8" (with intermediate steps 3/8", 1/2"); then after recovering the theoretical fluid left into the well, with a 3/4" fixed choke (see Annex B). Since with the latter choke it was impossible to establish critical flow through the choke, the well was then choked back to a 5/8" fixed choke.

Continuous sampling of the produced gas revealed a very high percentage of CO₂ (up to 78%), thus explaining the extremely erratic behaviour of the flare.

Due to the low hydrocarbon content of the produced gas, the impossibility to burn it and the almost completed clean up of the well (no liquid production after recovering the remaining brine into the well), it was decided to stop the test after the well clean up phase and to close the LPRN Valve to record the final bottom hole build up.

After 14 hours of bottom hole build up, the well was killed, the TCP string pulled out and the memory gauges recovered.

2.7.3 Fluid Sampling

The Lower Cretaceous reservoir was sampled with MDT at 2246m. The chemical analysis of the sample is described in detail in the report "Well 7019/1-1: Gamma Field Geochemical study".

Samples were taken during the DST. The analysis of these samples is also described in the report mentioned above.

CHEMICAL ANALYSIS OF GAS

	Prof. (m)	C1 %	C2 %	C3 %	i-C4 %	n-C4 %	i-C5 %	n-C5 %	C6+ %	%CH4 Vol. tot.	N2	CO2	i/n-C4
MDT	2246	49,21	1,60	0,63	0,06	0,14	0,05	0,06	0,28	0,19	4,42	43,56	0,43
Test 1	2550	65,96	1,90	0,59	0,10	0,14	0,05	0,06	0,23	0,56	16,04	14,94	0,71

3.4.6 Mud Summary by Phase

Mud summary for the 36" hole section

The 36" hole section was drilled using seawater. High viscosity sweeps were used to keep the hole clean while drilling this section. The first attempt to spud the well was abandoned due to very slow drilling progress. The rig was moved 10 m and the well was re-spudded. A 17 ½" pilot hole was drilled to 343 m. The hole was circulated clean and displaced to 1.20 sg pre-hydrated bentonite mud.

The 17 ½" hole was now opened up to 36" down to 336 m. The hole was circulated clean and a wiper trip was made to the seabed. When running back to bottom, 2 m fill was found. The hole was again circulated with high viscous mud and then displaced to 1.20 sg pre-hydrated bentonite mud prior to pulling out for running the 30" casing string.

Mud summary for the 12 1/4" pilot hole and 26" hole section

After drilling out the 30" casing shoe with a 26" bit, a 12 1/4" pilot hole was drilled from the 30" shoe down to 665 m without any drilling problems using seawater, and with high viscosity sweeps to keep the hole clean. A flow check was made at section TD (no shallow gas detected). Minor tight spots were encountered when pulling out.

The pilot hole was then opening up to 26", using the same drilling fluids as for the pilot hole. When reaching section TD at 665 m the hole was circulated clean and then displaced with 1.20 sg pre-hydrated bentonite mud. A wiper trip was made to the seabed; a tight spot was encountered at 465 m. When running back to bottom, the last stand was washed down. The 26" hole was displaced to 1.20 sg pre-hydrated bentonite mud prior to pulling out for running the 20" casing string.

Mud summary for the 12 1/4" hole section

After having installed the 20" casing (shoe at 658 m), the cement in the shoe was drilled out with a 17 ½" bit. The drilling fluid in the well was then changed to 1.30 sg Formate brine where XC polymer and PAC was used for obtaining viscosity and to maintain rheology. After having displaced the well to the new mud, 12 ¼" hole was drilled down to 2015 m which was section TD. From 1937 m and down, the mud weight increased by adding concentrated formate brine to the mud. At section TD the weight was 1.40 sg.

The Formate brine was in itself heavy enough not to require any general addition of weighting materials. For mud pills where additional weight was required the weighting material used was ilmenite.

High viscous sweeps of Formate mud was used to circulate the hole clean. A wiper trip was made prior to pulling out to run the 9 5/8" casing string.

Mud summary for the 8 1/2" hole section

After drilling out of the 9 5/8" shoe the drilling of the 8 1/2" hole section commenced with the same mud as used for the 12 1/4" section, the mud weight was 1.40 sg. Cores were taken in the interval

2220 – 2235 m, 2457 - 2464 m, and 2561 - 2568 m. At 2530 m the circulation was partially lost and the mud weight was reduced to 1.35 sg – full circulation was regained. At 2550 the mud weight was reduced to 1.25 sg. The 8 1/2" hole was then drill to well TD at 3003 m.

MUD SUMMARY REPORT

Well 7019/1-1

Day no.	TMD (m)	Hole size (in)	Mud type	MW (g/cm3)	Viscosity (s/L)	PV (mPa*s)	YP (Pa)	Gels 10s/10m (Pa)	API WL (mL)	HTHP WL (mL)	HTHP TEMP (deg. C)	pH	Cl- (mg/L)	Sand (%)	TS (%)	LGS (kg/m3)	MBT (kg/m3)	Tot. Hard (mg/L)	Oil (%)	Tot. Vol. (m3)
2	224	36.00	SW/Bentonite	1.03	110			0/0/0											0	137
3	250	36.00	SW/Bentonite	1.03	110			0/0/0											0	314
4	343	36.00	SW/Bentonite	1.03	110			0/0/0											0	
5	343	36.00	SW/Bentonite	1.03	110			0/0/0											0	
6	564	12.25	SW/Bentonite	1.03	110			0/0/0											0	251
7	665	12.25	SW/Bentonite	1.03	110			0/0/0											0	23
8	665	26.00	SW/Bentonite	1.03	110			0/0/0											0	0
9	665	12.25	FORMATE/POLYMER	1.30	39	8	45	1/2/0	5.2			9.5	4000	0.1		20	5		0	0
10	721	12.25	FORMATE/POLYMER	1.30	40	10	5	2/2/0	4			9	4000			20	5		0	449
11	1311	12.25	FORMATE/POLYMER	1.30	39	10	6	1/2/0	4.8			9	5000			80	12		0	462
12	1821	12.25	FORMATE/POLYMER	1.30	39	11	6	1/2/0	5			9	4500			75	15		0	468
13	2015	12.25	FORMATE/POLYMER	1.40	48	14	11	3/4/0	5			9.1	4500			32	20		0	465
14	2015	12.25	FORMATE/POLYMER	1.40	48	13	8	2/4/0	4.5			9.6	4000			30	26		0	366
15	2095	8.50	FORMATE/POLYMER	1.40	40	13	7	2/2/0	5			11	4000			30	27		0	398
16	2200	8.50	FORMATE/POLYMER	1.40	41	13	5	2/2/0	5			11	4000			35	23		0	394
17	2208	8.50	FORMATE/POLYMER	1.40	40	12	7	2/3/0	4.5			11	4000			35	21		0	393
18	2223	8.50	FORMATE/POLYMER	1.40	40	11	9	2/3/0	4			11	4000			30	19		0	397
19	2236	8.50	FORMATE/POLYMER	1.40	40	12	7	2/4/0	4			11	4000			30	20		0	397
20	2298	8.50	FORMATE/POLYMER	1.40	42	13	8	2/3/0	4.5			9.8	4100			30	18		0	396
21	2335	8.50	FORMATE/POLYMER	1.40	40	13	8	2/4/0	4.8			9.4	4700			30	18	1100	0	391
22	2382	8.50	FORMATE/POLYMER	1.40	52	13	10	2/3/0	3.2			9.6	4500			30	18	1100	0	387
23	2409	8.50	FORMATE/POLYMER	1.40	55	13	9	2/4/0	3.4			9.6	4800	0.1		43	21	1200	0	382
24	2433	8.50	FORMATE/POLYMER	1.40	50	11	10	2/4/0	3.8			9.6	4500	0.1		133	21	1200	0	383
25	2457	8.50	FORMATE/POLYMER	1.40	45	14	7	2/4/0	4.4			9.5	4500	0.1		133	21	1100	0	388
26	2466	8.50	FORMATE/POLYMER	1.40	45	12	7	2/4/0	4.2			9	4000	0.1		43	18	1200	0	388
27	2514	8.50	FORMATE/POLYMER	1.40	44	13	8	2/4/0	4			9	4000	0.1		43	21	1200	0	393
28	2539	8.50	FORMATE/POLYMER	1.35	44	12	8	2/4/0	3.8			9	3200	0.1		43	21	1000	0	378
29	2550	8.50	FORMATE/POLYMER	1.35	44	13	8	2/4/0	3.8			9	3500	0.1		43	18	960	0	366
30	2550	8.50	FORMATE/POLYMER	1.30	40	11	9	2/4/0	4			9	2800	0.1		38	15	880	0	400
31	2567	8.50	FORMATE/POLYMER	1.25	40	9	9	2/4/0	4.4			9	2300	0.1		64	12	800	0	441
32	2569	8.50	FORMATE/POLYMER	1.25	40	10	9	2/4/0	4.2			9	2300	0.1		64	12	800	0	444

(continued next page)

MUD SUMMARY REPORT

Well 7019/1-1

(continued)

Day no.	TMD (m)	Hole size (in)	Mud type	MW (g/cm ³)	Viscosity (s/L)	PV (mPa·s)	YP (Pa)	Gels 10s/10m (Pa)	API WL (mL)	HTHP WL (mL)	HTHP TEMP (deg. C)	pH	Cl- (mg/L)	Sand (%)	TS (%)	LGS (kg/m ³)	MBT (kg/m ³)	Tot. Hard. (mg/L)	Oil (%)	Tot. Vol. (m ³)
33	2657	8.50	FORMATE/POLYMER	1.25	40	10	8	2/4/0	5			9	2000	0.1		76	10	880	0	468
34	2727	8.50	FORMATE/POLYMER	1.25	40	9	9	2/4/0	5.2			9	2000	0.1		75	10	800	0	494
35	2794	8.50	FORMATE/POLYMER	1.25	40	11	8	2/3/0	4.5			9	2000	0.1		75	10	880	0	499
36	2849	8.50	FORMATE/POLYMER	1.25	41	10	8	2/3/0	4.5			8.7	2000	0.1		74	7	880	0	555
37	2875	8.50	FORMATE/POLYMER	1.25	43	11	8	2/3/0	4.5			8.7	1900	0.1		74	7	880	0	464
38	2960	8.50	FORMATE/POLYMER	1.25	38	9	9	2/3/0	5			8.7	1850	0.1		74	7		0	470
39	2988	8.50	FORMATE/POLYMER	1.25	38	10	8	2/3/0	4.5			8.7	1850	0.1		75	7		0	465
40	3003	8.50	FORMATE/POLYMER	1.25	37	10	8	2/3/0	4.5			8.7	1850	0.1		70	7		0	460
41	3003	8.50	FORMATE/POLYMER	1.25	37	10	8	2/3/0	4.5			8.7	1850	0.1		70	7		0	455
42	3003	8.50	FORMATE/POLYMER	1.25	37	10	8	2/3/0	4.5			8.7	1850	0.1		70	7		0	454
43	3003	8.50	FORMATE/POLYMER	1.25	37	10	8	2/3/0	4.5			8.7	1850	0.1		70	7		0	454
44	3003	8.50	FORMATE/POLYMER	1.25	45	9	10	2/3/0	5			8.7	2100	0.1		60	7		0	449
45	3003	8.50	FORMATE/POLYMER	1.25	42	9	10	2/3/0	5			8.7	2100	0.1		75	7		0	447
46	3003	8.50	FORMATE/POLYMER	1.25	43	10	9	2/3/0	5			8.7	2400	0.1		75	7		0	456
47	3003	8.50	FORMATE/POLYMER	1.25	45	10	10	3/4/0	5			8.7	2500	0.1		75	8		0	451
48	3003	8.50	FORMATE/POLYMER	1.25	45	10	9	3/4/0	5			9.5	2500	0.1		75	8		0	451
49	3003	8.50	FORMATE/POLYMER	1.25	90		9	4/35/0	6								8			425
50	3003	8.50	FORMATE/POLYMER	1.25	90		9	4/35/1	7								8			396
51	3003	8.50	FORMATE/POLYMER	1.25	90		9	4/35/2	8								8			
52	3003	8.50	FORMATE/POLYMER	1.25	90		9	4/35/3	9								8			



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**Well 7019/1-1: Gamma Field
Geochemical study**



Edited by: R. Galimberti

S. Donato Milanese, October 2001

GEOCHEMISTRY
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1 – INTRODUCTION

On request of NorskAGIP a geochemical study has been performed on the gas and cutting samples coming from the well 7019/1-1 drilled in the Gamma structure.

A geochemical log of the well, obtained by the analyses of the head space and of the cutting samples, has been performed in order to define the distribution of the migrated fluids (mainly gas but also oil traces) and to identify the possible source rock properties and maturity.

It must be pointed out that some problems arise considering the test separator samples
 As shown in the following table the compositional data of the three different samples are not consistent (in particular for Methane, CO₂ and Nitrogen).

Tab.1 Chemical composition of the gas samples

	MDT sample (bottle TS-47-15)	PT (bottle 5732A 20 l)	PT (bottle 4-83 300 cc)	PT (bottle 7-80 300 cc)
Depth (m)	2246	2526-2563	2526-2563	2526-2563
Sampling date	n.a.	27/11/00 h.15:00-15:30	27/11/00 h.15:55	27/11/00 h.15:55
Mol % C₁	49.21	43.5	65.38	65.96
Mol % C₂	1.60	1.19	1.92	1.90
Mol % C₃	0.63	0.39	0.92	0.59
Mol % iC₄	0.06	0.04	0.16	0.10
Mol % nC₄	0.14	0.09	0.19	0.14
Mol % C₅+	0.11	0.06	0.16	0.11

¹ As proposed by Stahl and Koch (1974) and later revised by Faber (1982):

$$\delta^{13}\text{C CH}_4 = 15.4 \log_{(10)} \text{Ro} - 41.3 \quad \delta^{13}\text{C C}_2\text{H}_6 = 22.6 \log_{(10)} \text{Ro} - 32.2 \quad \delta^{13}\text{C C}_3\text{H}_8 = 20.9 \log_{(10)} \text{Ro} - 29.7$$

Mol % CO₂	43.56	44.10	14.32	14.94
Mol % N₂	4.42	10.40	16.96	16.04

It is important to note that the two small bottles sampled at 15:55 show comparable results, while the CO₂ content of the 20 litres bottle is three times higher.

In any case these measures differ from the results obtained by Petrotech for the on-site tests. In fact, although the method used by Petrotech was not calibrated for such a high CO₂ content, through an adaptation they were able to measure a CO₂ percentage in the 60-78% range as summarised in the following table.

Some doubt about the accuracy of this method could arise; nevertheless the indication of a higher CO₂ content must be taken into consideration.

Tab.2 Chemical composition of the gas during the test measured on site by Petrotech.

Time (27/11/00)	CO₂ (mol%)	Notes
8:00 – 11:30	>20	Out of the analytical range
11:50	70	4 Drager tubes in serie
12:00	78	10 ml of gas injected
13:00	60	10 ml of gas injected
14:00	60	10 ml of gas injected
15:30	75	10 ml of gas injected
16:30	70	10 ml of gas injected

Since the analytical procedures have been carefully checked in our labs by repetition of the analyses, the only explanation for these differences is a problematic sampling of the gas at the well site.

2.1.2 Carbon dioxide characterisation

The concentration of the CO₂ and the isotopic signature of its carbon are reported in the following table:

	MDT sample	PT (bottle 7-80 300 cc)	PT (bottle 5732A 20 l)
Depth (m)	2246	2526-2563	2526-2563
%CO₂	43.56	14.94	44.10
δ¹³C	-21.03	-6.82	-6.51

2.2 - GEOCHEMICAL WELL PROFILE

A geochemical study of the cuttings coming from the well 7019/1-1 has been performed with the following aims:

- to verify the presence of residual traces of liquid HCs, drawing a log of their quantity vs. depth
- to identify possible source rock levels and define their maturity.

Around seventy-five cutting samples in the 2100-2994 m interval have been analysed by Total Organic Carbon (TOC), Rock-Eval (RE) and Kerogene optical analyses in order to detect:

- free HCs in the sample (S1 - migrated or in situ generated HCs)
- petroleum potential of the possible source rocks (S2)
- source rock maturity (Tmax and Vitrinite Reflectance – Ro)
- kerogen quality (Hydrogen Index - HI and Kerogen composition)

The analytical results are reported in the Annex 2, while the Fig.7-10 summarises the parameters discussed in the following paragraph.

The samples have been selected on the basis of the geochemical log and of the preliminary stratigraphic interpretation supplied by Norsk AGIP:

Depth (m)		Technique
2151		Extraction / GC-MS
2364		Thermodesorption / GC-MS
2379		Extraction / GC-MS
2511		Thermodesorption / GC-MS
2553		Thermodesorption / GC-MS
2571		Extraction / GC-MS
2628		Thermodesorption / GC-MS
2637		Extraction / GC-MS
2655		Thermodesorption / GC-MS
2673		Thermodesorption / GC-MS
2709		Thermodesorption / GC-MS



WELL 7019/1-1 (NORWAY)
CHEMICAL ANALYSIS OF HEAD SPACE

Depth (m)	C1 %	C2 %	C3 %	i-C4 %	n-C4 %	i-C5 %	n-C5 %	C6+ %	%CH4 Vol. tot.	ppb CH4	i/n-C4
2100	37,28	21,36	30,05	3,64	5,89	1,06	0,72		0,19	73	0,62
2200	37,04	19,62	29,04	3,36	8,21	1,41	1,32		0,56	210	0,41
2300	52,64	16,58	20,24	2,89	5,35	1,27	1,03		0,45	292	0,54
2400	51,11	22,99	18,89	2,01	3,72	0,69	0,59		2,51	955	0,54
2500	86,18	6,44	4,73	0,64	0,86	0,42	0,73		0,14	22	0,74
2600	57,14	12,81	21,37	2,86	4,62	1,20			0,02	2	0,62
2700	72,12	12,64	9,48	1,70	2,42	0,96	0,68		0,02	5	0,70
2800	64,59	35,41							0,00	1	
2900	44,42	18,31	21,30	4,74	11,23				0,00	15	0,42
3000	30,87	19,50	30,45	4,66	8,65	3,00	2,87		0,00	9	0,54

Note: n.a. = not analyzed



WELL 7019/1-1 (NORWAY)
ISOTOPIC ANALYSIS OF HEAD SPACE

Depth (m)	$\delta^{13}\text{C}$ C1	$\delta^{13}\text{C}$ C2	$\delta^{13}\text{C}$ C3	$\delta^{13}\text{C}$ I-C4	$\delta^{13}\text{C}$ n-C4	$\delta^{13}\text{C}$ I-C5	$\delta^{13}\text{C}$ n-C5	$\delta^{13}\text{C}$ CO2
2100	-42,85	-30,25	-30,02	-29,22	-30,59			
2200	-40,52	-30,47	-30,69	-29,75	-32,25			
2300	-39,62	-31,74	-28,83	-30,82	-30,33			
2400	-40,53	-33,33	-31,42	-30,52	-30,12	-28,35		
2500	-37,50							
2600	-37,90	-31,00	-30,07	-29,76	-31,18			
2700								
2800								
2900								
3000								

Note: n.a. = not analyzed



WELL 7019/1-1 (NORWAY)
CHEMICAL ANALYSIS OF GAS

	Prof. (m)	C1 %	C2 %	C3 %	i-C4 %	n-C4 %	i-C5 %	n-C5 %	C6+ %	%CH4 Vol. tot.	N2	CO2	i/n-C4
MDT	2246	49,21	1,60	0,63	0,06	0,14	0,05	0,06	0,28	0,19	4,42	43,56	0,43
Test 1	2550	65,96	1,90	0,59	0,10	0,14	0,05	0,06	0,23	0,56	16,04	14,94	0,71

Note: n.a. = not analyzed



WELL 7019/1-1 (NORWAY)
ISOTOPIC ANALYSIS OF GAS

	Prof. (m)	$\delta^{13}\text{C}$ C1	$\delta^{13}\text{C}$ C2	$\delta^{13}\text{C}$ C3	$\delta^{13}\text{C}$ i-C4	$\delta^{13}\text{C}$ n-C4	$\delta^{13}\text{C}$ i-C5	$\delta^{13}\text{C}$ n-C5	$\delta^{13}\text{C}$ CO2
MDT	2246	-39,91	-31,23	-28,92	-25,78	-25,92	-23,23	-22,09	-21,03
Test 1	2550	-40,86	-30,57	-26,73	-25,44	-27,37	-27,21	-27,91	-6,82

Note: n.a. = not analyzed



WELL 7019/1-1 (NORWAY)
Cuttings
ROCK-EVAL and ORGANIC CARBON

Depth m	Sample Type	TOC Wt%	S1 mg/g	S2 mg/g	S3 mg/g	HI	OI	Tmax °C	PI
2100,00	original	1,45	0,51	1,78	1,07	123	74	442	0,22
2118,00	original	1,52	0,58	1,94	1,02	128	67	444	0,23
2136,00	original	1,35	0,60	1,95	0,73	144	54	444	0,24
2151,00	original	1,56	0,59	2,60	0,51	167	33	444	0,18
2151,00	ws-dicl.	1,40	0,04	2,03	0,53	145	38	445	0,02
2166,00	original	1,56	0,66	2,86	0,46	183	29	446	0,19
2181,00	original	1,93	0,66	4,83	0,36	250	19	442	0,12
2181,00	ws-dicl.	1,77	0,06	4,12	0,43	233	24	441	0,01
2196,00	original	2,08	0,47	1,85	0,81	89	39	447	0,20
2208,00	original	2,41	0,75	2,53	0,96	105	40	443	0,23
2223,00	original	0,94	0,46	1,07	0,75	114	80	444	0,30
2238,00	original	1,68	0,68	1,53	1,21	91	72	447	0,31
2253,00	original	0,18	0,18	0,30	0,22	167	122	443	0,38
2268,00	original	0,19	0,17	0,25	0,09	132	47	443	0,40
2283,00	original	0,84	0,33	0,69	1,24	82	148	450	0,32
2298,00	original	0,94	0,48	0,82	1,11	87	118	452	0,37
2313,00	original	1,02	0,45	0,88	1,05	86	103	449	0,34
2328,00	original	1,10	0,63	1,02	0,85	93	77	451	0,38
2346,00	original	0,42	0,11	0,31	1,19	74	283	461	0,26
2355,00	original	3,39	1,68	5,09	0,60	150	18	450	0,25
2364,00	original	3,30	1,59	4,91	0,58	149	18	450	0,24
2364,00	ws-dicl.	3,01	0,06	3,66	0,63	122	21	450	0,02
2373,00	original	5,53	2,55	7,39	0,66	134	12	449	0,26
2379,00	original	8,92	3,46	11,56	0,60	130	7	449	0,23
2379,00	ws-dicl.	8,27	0,09	9,50	0,64	115	8	448	0,01
2391,00	original	3,68	1,40	4,11	0,72	112	20	450	0,25
2412,00	original	1,01	0,36	0,80	0,97	79	96	450	0,31
2433,00	original	0,79	0,23	0,58	1,50	73	190	453	0,28



WELL 7019/1-1 (NORWAY)
Cuttings
ROCK-EVAL and ORGANIC CARBON

Depth m	Sample Type	TOC Wt%	S1 mg/g	S2 mg/g	S3 mg/g	HI	OI	Tmax °C	PI
2454,00	original	0,13	0,06	0,08	0,34	62	262	451	0,43
2475,00	original	0,11	0,05	0,09	0,22	82	200	N.D.	0,36
2493,00	original	0,19	0,10	0,15	0,30	79	158	N.D.	0,40
2511,00	original	0,54	0,31	0,48	0,60	89	111	448	0,39
2532,00	original	0,16	0,10	0,25	0,64	156	400	402	0,29
2553,00	original	0,50	0,51	0,60	1,26	120	252	333	0,46
2571,00	original	0,59	0,91	0,78	1,20	132	203	420	0,54
2571,00	ws-dicl.	0,48	0,08	0,35	1,03	73	215	436	0,19
2583,00	original	0,08	0,05	0,08	0,11	100	138	N.D.	0,38
2592,00	original	0,12	0,06	0,15	0,16	125	133	N.D.	0,29
2601,00	original	0,08	0,04	0,07	0,10	88	125	N.D.	0,36
2610,00	original	0,04	0,03	0,04	0,02	100	50	N.D.	0,43
2619,00	original	0,13	0,10	0,15	0,10	115	77	N.D.	0,40
2628,00	original	0,26	0,26	0,38	0,13	146	50	444	0,41
2637,00	original	0,32	0,60	0,55	0,20	172	63	409	0,52
2637,00	ws-dicl.	0,23	0,03	0,17	0,17	74	74	N.D.	0,15
2646,00	original	0,40	0,26	0,55	0,11	138	28	448	0,32
2655,00	original	0,19	0,28	0,25	0,12	132	63	440	0,53
2664,00	original	0,21	0,39	0,22	0,09	105	43	448	0,64
2664,00	ws-dicl.	0,19	0,06	0,20	0,09	105	47	451	0,23
2673,00	original	0,21	0,28	0,21	0,03	100	14	453	0,57
2682,00	original	0,44	0,33	0,47	0,05	107	11	453	0,41
2691,00	original	0,30	0,12	0,24	0,16	80	53	456	0,33
2700,00	original	0,73	0,30	0,96	0,33	132	45	453	0,24
2709,00	original	1,29	0,48	1,69	0,17	131	13	449	0,22
2709,00	ws-dicl.	1,10	0,13	1,55	0,24	141	22	452	0,08
2718,00	original	0,20	0,12	0,19	0,08	95	40	N.D.	0,39
2727,00	original	0,09	0,05	0,07	0,05	78	56	N.D.	0,42



WELL 7019/1-1 (NORWAY)
Cuttings
ROCK-EVAL and ORGANIC CARBON

Depth m	Sample Type	TOC Wt%	S1 mg/g	S2 mg/g	S3 mg/g	HI	OI	Tmax °C	PI
2745,00	original	0,21	0,08	0,18	0,15	86	71	N.D.	0,31
2763,00	original	0,17	0,09	0,16	0,10	94	59	N.D.	0,36
2781,00	original	0,27	0,12	0,27	0,16	100	59	455	0,31
2802,00	original	0,19	0,08	0,18	0,25	95	132	N.D.	0,31
2811,00	original	0,35	0,10	0,28	0,31	80	89	456	0,26
2820,00	original	1,80	0,29	1,48	0,22	82	12	455	0,16
2829,00	original	0,30	0,10	0,29	0,13	97	43	456	0,26
2838,00	original	1,89	0,37	2,04	0,18	108	10	456	0,15
2838,00	ws-dicl.	1,72	0,09	1,76	0,16	102	9	457	0,05
2847,00	original	0,47	0,10	0,48	0,08	102	17	456	0,17
2856,00	original	0,17	0,05	0,13	0,17	76	100	N.D.	0,28
2865,00	original	0,21	0,17	0,31	0,07	148	33	456	0,35
2874,00	original	0,44	0,38	0,43	0,16	98	36	457	0,47
2904,00	original	0,94	0,21	0,30	0,46	32	49	416	0,41
2934,00	original	0,33	0,07	0,10	0,30	30	91	N.D.	0,41
2964,00	original	0,51	0,06	0,07	0,27	14	53	N.D.	0,46
2979,00	original	0,19	0,05	0,09	0,24	47	126	N.D.	0,36
2994,00	original	0,56	0,14	0,39	0,51	70	91	461	0,26

ws-dicl. = samples washed by dichloromethane

N.D. = Tmax not determinable



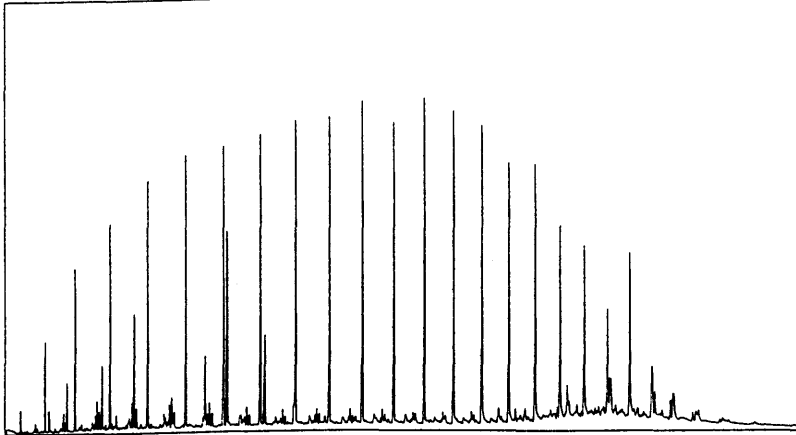
Summary Report

Country: NORVEGIA
 Field:
 Form Name:

Site Name:7019/1-1
 Basin: GAMMA
 Age:

Sample_ID: NOR_7216_CUT
 Depth: 2151(M)
 S_Type: CUTTING

Total Ion Chromatogram



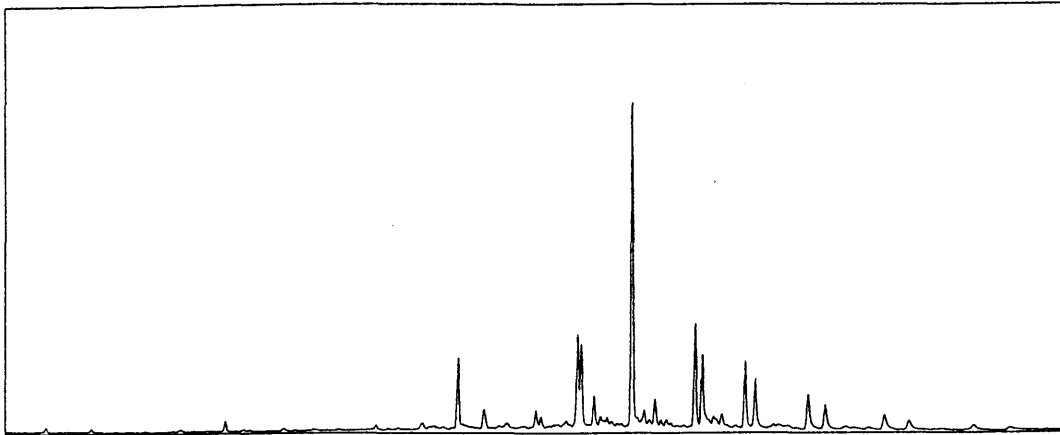
Bulk Parameters

API Gravity:
 % Sulfur:
 delt C13 Whole Crude:
 delt C13 Saturates:
 delt C13 Aromatics:
 % Saturates:
 % Aromatics:
 % NONHCPC:
 OEP: 1.05

GCMS Para 1

PrPh: 2.04
 Tri: 0.02
 Tet: 0.03
 Trit: 0.49
 TsTm: 3.66
 C29Hop/C30Hop: 0.28
 C30Lin:
 C29Ts/C30Hop: 0.25
 C30*/C30Hop: 0.09
 Gam/C30:
 Dia: 0.67

TERPANES(m/z 191)



GCMS Para 2

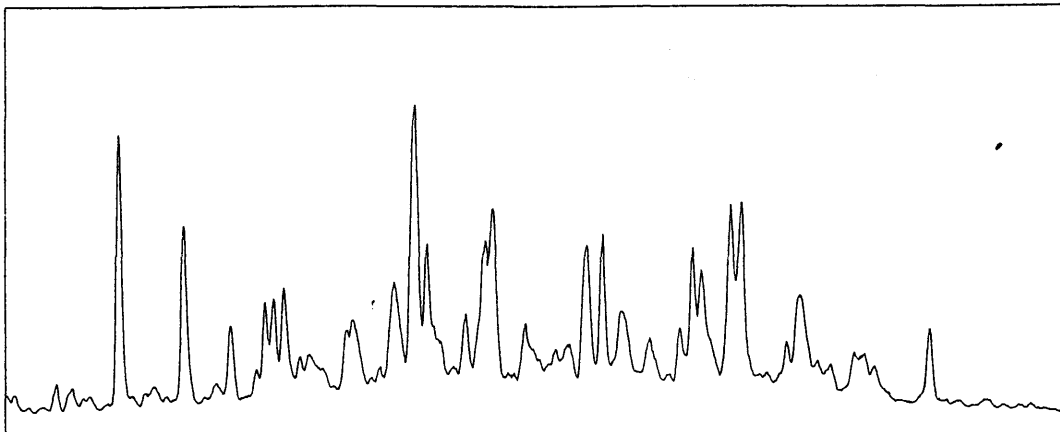
Organic Matter Parameters:

C27/C29 Sterane: 0.78
 %27: 32.08
 %28: 26.64
 %29: 41.28
 Sterani/Hopani: 0.03

Maturity Parameters:

PrC17: 0.71
 PhC18: 0.31
 S/S+R Terpanes: 0.59
 S/S+R Steranes: 0.54
 TsTm: 3.66
 BB/aa: 0.73
 T/TM: 0.73
 MPI: 0.47

STERANES(m/z 217)



Age Parameters:

Oleanane/30Hop:

Baccarane:

Other Parameters:

31/30: 0.54
 Methylhopane: 2.80



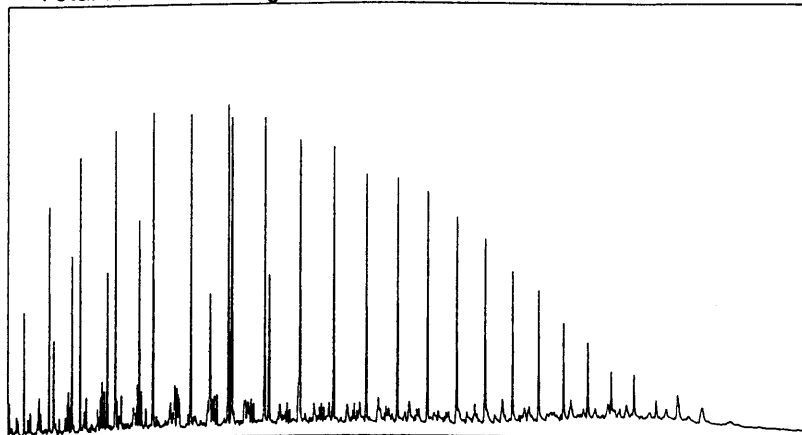
Summary Report

Country: NORVEGIA
 Field:
 Form Name:

Site Name:7019/1-1
 Basin: GAMMA
 Age:

Sample_ID: NOR_7217_CUT
 Depth: 2379(M)
 S_Type: CUTTING

Total Ion Chromatogram



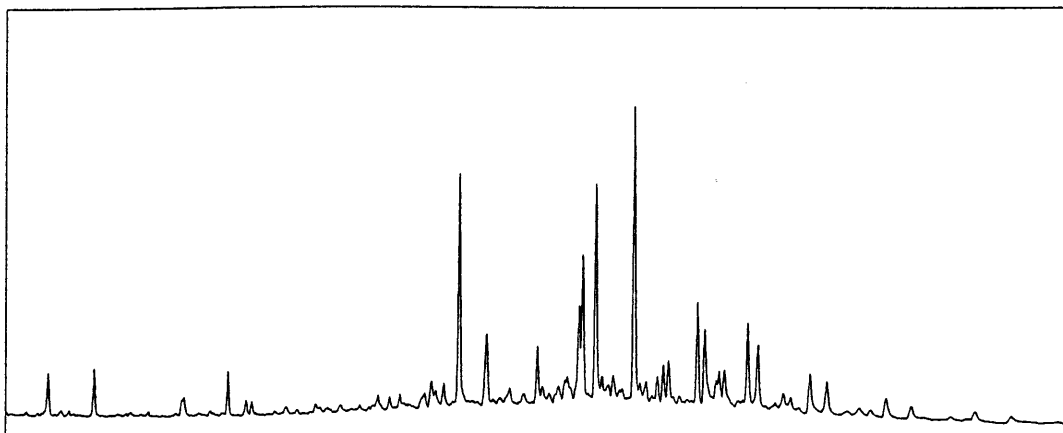
Bulk Parameters

API Gravity:
 % Sulfur:
 delt C13 Whole Crude:
 delt C13 Saturates:
 delt C13 Aromatics:
 % Saturates:
 % Aromatics:
 % NONHCPC:
 OEP: 1.01

GCMS Para 1

PrPh: 1.96
 Tri: 0.14
 Tet: 0.15
 Trit: 0.94
 TsTm: 3.20
 C29Hop/C30Hop: 0.32
 C30Lin:
 C29Ts/C30Hop: 0.49
 C30*/C30Hop: 0.73
 Gam/C30:
 Dia: 0.75

TERPANES(m/z 191)

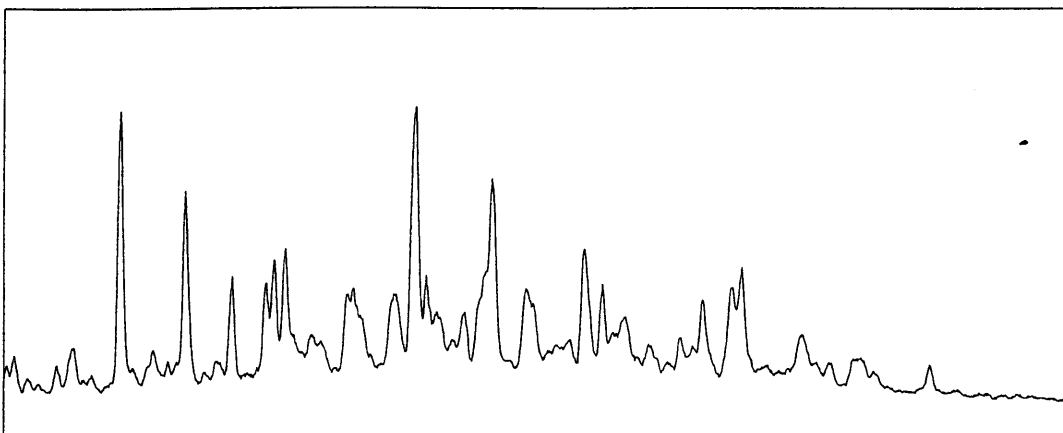


GCMS Para 2

Organic Matter Parameters:

C27/C29 Sterane: 0.83
 %27: 32.86
 %28: 27.69
 %29: 39.45
 Sterani/Hopani: 0.10
 Maturity Parameters:
 PrC17: 0.98
 PhC18: 0.49
 S/S+R Terpanes: 0.58
 S/S+R Steranes: 0.63
 TsTm: 3.20
 BB/aa: 0.70
 T/TM: 0.71
 MPI: 0.61

STERANES(m/z 217)



Age Parameters:

Oleanane/30Hop:
 Baccarane:
 Other Parameters:
 31/30: 0.60
 Methylhopane: 1.63



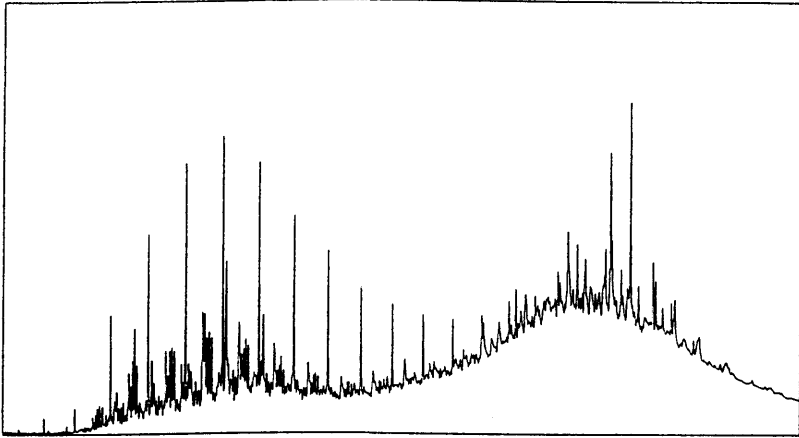
Summary Report

Country: NORVEGIA
 Field:
 Form Name:

Site Name:7019/1-1
 Basin: GAMMA
 Age:

Sample_ID: NOR_7218_CUT
 Depth: 2571(M)
 S_Type: CUTTING

Total Ion Chromatogram



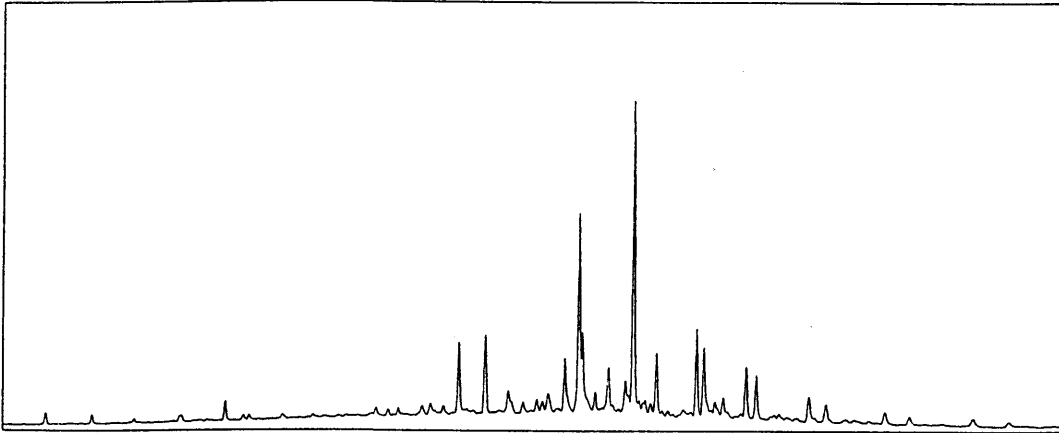
Bulk Parameters

API Gravity:
 % Sulfur:
 delt C13 Whole Crude:
 delt C13 Saturates:
 delt C13 Aromatics:
 % Saturates:
 % Aromatics:
 % NONHCPC:
 OEP: 1.00

GCMS Para 1

PrPh: 1.86
 Tri: 0.04
 Tet: 0.06
 Trit: 0.60
 TsTm: 0.91
 C29Hop/C30Hop: 0.64
 C30Lin:
 C29Ts/C30Hop: 0.26
 C30*/C30Hop: 0.07
 Gam/C30:
 Dia: 0.53

TERPANES(m/z 191)



GCMS Para 2

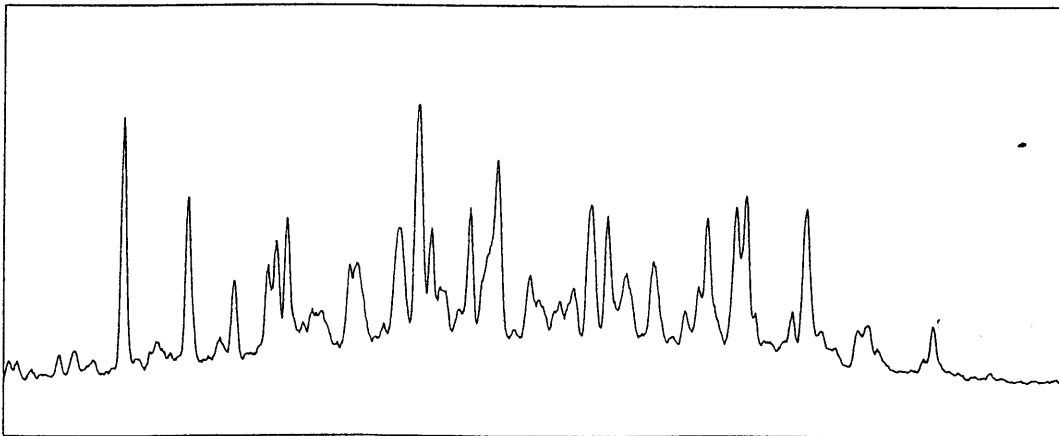
Organic Matter Parameters:

C27/C29 Sterane: 0.80
 %27: 31.75
 %28: 28.69
 %29: 39.57
 Sterani/Hopani: 0.08

Maturity Parameters:

PrC17: 0.52
 PhC18: 0.29
 S/S+R Terpanes: 0.56
 S/S+R Steranes: 0.47
 TsTm: 0.91
 BB/aa: 0.61
 T/TM: 0.18
 MPI: 0.51

STERANES(m/z 217)



Age Parameters:

Oleanane/30Hop: 0.10
 Baccarane:
 Other Parameters:
 31/30: 0.50
 Methylhopane:



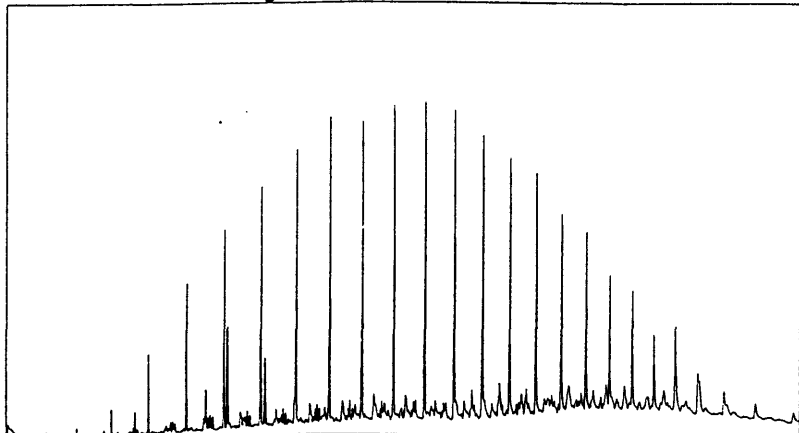
Summary Report

Country: NORVEGIA
 Field:
 Form Name:

Site Name:7019/1-1
 Basin: GAMMA
 Age:

Sample_ID: NOR_7219_CUT
 Depth: 2637(M)
 S_Type: CUTTING

Total Ion Chromatogram



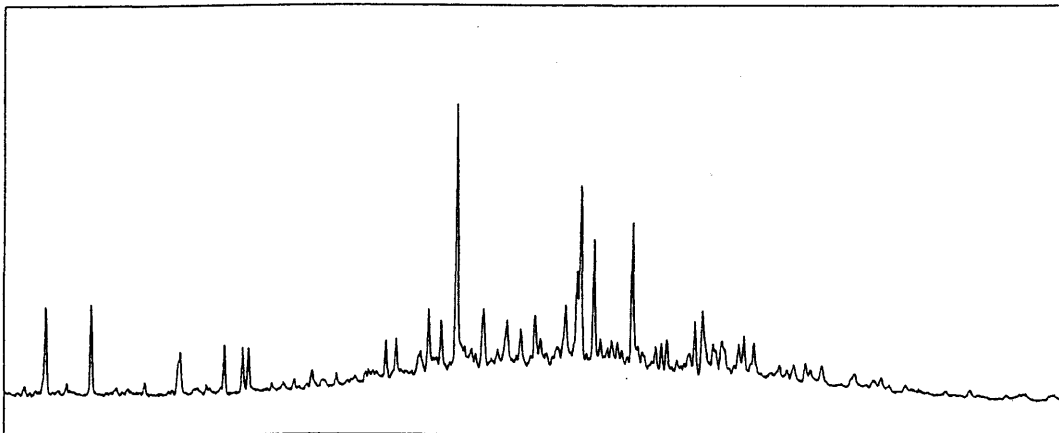
Bulk Parameters

API Gravity:
 % Sulfur:
 delt C13 Whole Crude:
 delt C13 Saturates:
 delt C13 Aromatics:
 % Saturates:
 % Aromatics:
 % NONHCPC:
 OEP: 1.00

GCMS Para 1

PrPh: 1.43
 Tri: 0.62
 Tet: 0.36
 Trit: 1.74
 TsTm: 4.40
 C29Hop/C30Hop: 0.63
 C30Lin:
 C29Ts/C30Hop: 1.24
 C30*/C30Hop: 0.86
 Gam/C30:
 Dia: 0.78

TERPANES(m/z 191)

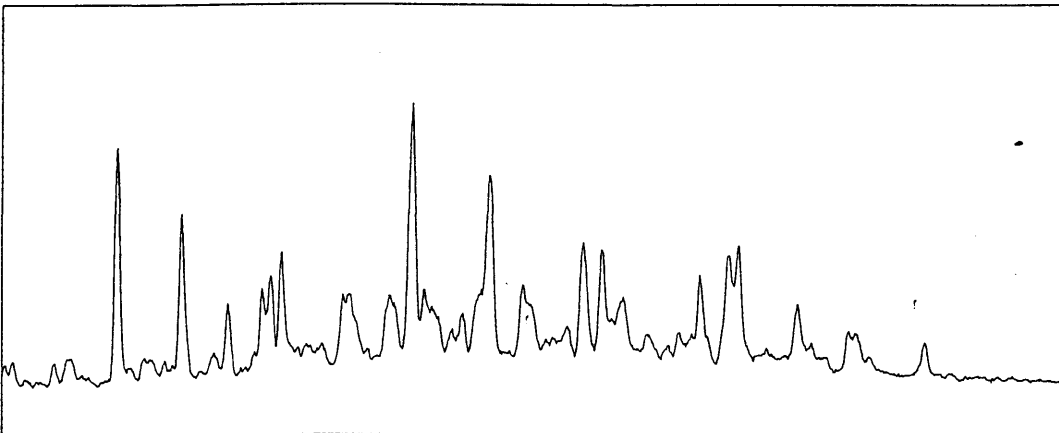


GCMS Para 2

Organic Matter Parameters:

C27/C29 Sterane: 0.66
 %27: 28.33
 %28: 28.53
 %29: 43.15
 Sterani/Hopani: 0.29
 Maturity Parameters:
 PrC17: 0.52
 PhC18: 0.28
 S/S+R Terpanes:
 S/S+R Steranes: 0.60
 TsTm: 4.40
 BB/aa: 0.69
 T/TM: 0.42 NO
 MPI: 0.55

STERANES(m/z 217)



Age Parameters:

Oleanane/30Hop:
 Baccarane:
 Other Parameters:
 31/30: 0.00
 Methylhopane:



Carbon Isotopes Characterization on Hydrocarbon Fractions

WELL : 7019 / 1-1 (Norway)

Depth (m)	Description	$\delta^{13}\text{C}$ SAT.	$\delta^{13}\text{C}$ ARO.	$\delta^{13}\text{C}$ RES.	$\delta^{13}\text{C}$ ASPH.
2151	Ext. Cuttings	-32.02	-29.75	-28.67	-28.88
2379	Ext. Cuttings	-29.18	-27.89	-26.49	-26.32
2571	Ext. Cuttings	-28.18	-27.92	-28.86	-28.93
2637	Ext. Cuttings	-30.11	-29.33	-29.32	-28.87

Isotopic Ratio vs. PDB Standard.

Note :
N.A. = Not analysed



WELL 7019/1-1 (NORWAY)
KEROGEN COMPOSITION and MATURITY DATA

Depth m	Sample Type	AOM %	MPH %	CHF %	CWF %	TAI	Fluor.	Ro %	ST- DEV	N° Measured Points
2100	cuttings	traces	45	35	20	2,2	DY-O	0,67	0,03	37
2208	cuttings	35	20	15	30	2,2 / 2,5	DY-O	0,72	0,03	35
2328	cuttings	5	25	20	50	2,2 / 2,5	NF	0,78	0,03	31
2379	cuttings	60	traces	traces	40	0,0	NF	V.A.		
2511	cuttings	20	20	30	30	2,5	NF	0,84	0,04	11
2628	cuttings	10?	5?	15?	70?	0,0	NF	V.A.		
2709	cuttings	10	10	20	60	0,0	NF	0,88	0,03	46
2820	cuttings			50	50	2,7	NF	0,94	0,04	47
2994	cuttings			30	70	2,7	NF	1,08	0,04	20