

## Formation Fluid Samples (FMT)

Results from 1 gallon chambers, well 34/7-14.

RUN NO.	DEPTH (mRKB)	FLUID CONTENT/TYPE (room cond.)	BUBBLE POINT PRESSURE (bar)
3A	2223.0	111 liter gas 1200 ml oil	114 at 21 degc
3B	2223.0	95 liter gas 1000 ml oil 150 ml water	129 at 21 degc
3C	2247.0	90 liter gas 800 ml oil 200 ml water 300 ml mud	135 at 20 degc

NOTE: Samples from each of the 1 gallon chambers were transferred to Proserv storage bottles (3x600 ml bottles). Fluid content/type and analysis are based on remaining volume in 1 gallon chambers.

Table 5.4 Results from 1 gallon chambers (FMT), Well 34/7-14

10.05.90 TT/ERP HBL

## Operations

### Production test No. 1

The interval 2232.3 - 2241.3 was perforated underbalanced with a 5 inch tubing conveyed perforating gun (60 degree phasing, 6 shots/foot). Following the perforation (against closed choke), the well was maintained shut-in for approximately one hour to assess the initial reservoir pressure.

The well was then opened up for the clean-up flow. During the 5 hours flow period the choke was increased stepwise to 17.5 mm fixed choke. The final flowrate was estimated to 1500 Sm<sup>3</sup>/d (unstable separator conditions) with a corresponding wellhead pressure of 132.3 bar and a bottomhole pressure of 316.7 bar (Matre No. 14 at 2190.78 mRKB). The well was shut in for 9 hours, during which two memory gauges were installed in the RN-nipple.

The main flow period was originally planned for 3 days, but was terminated after 1 1/2 days due to the stable well rate and pressure behaviour. During the 35.5 hours flow test, the rate and bottomhole pressure were constant at 960 Sm<sup>3</sup>/d and 325.1 bar (Matre no. 2 at 2208.69 mRKB), respectively. This corresponds to an actual productivity index of 85 Sm<sup>3</sup>/d/bar. The wellhead pressure was 154.8 bar with a choke opening of 12.7 mm. The test performance is shown in fig. 5.2. A summary of the main flowrate and pressure data are included in table 5.5.

Following the 24.4 hour main build-up period, the well was bullheaded/conditioned with mud and the test string retrieved. The perforated interval was then squeeze cemented, and a 7 inch retainer was set and cemented at 2227 mRKB to isolate for test No. 2.

### Production test No. 2

The interval 2204.7 - 2210.7 mRKB was perforated underbalanced with a 5 inch tubing conveyed perforating gun (120 degree phasing, 3 shots/foot).

The well was shut-in for a 1 hour stabilization period after perforating to obtain the initial reservoir pressure. When opening up for the clean-up flow, the flowpath was found plugged. Investigations concluded the OMNI ball valve to be closed. To open the well, the OMNI valve was cycled to well test position. During the 6.2 hours clean-up flow, the choke size was gradually increased to 14.3 mm fixed. The final flowrate was measured to 1120 Sm<sup>3</sup>/d with a corresponding wellhead pressure of 157.0 bar and a bottomhole pressure of 329.21 bar (Matre No. 12 at 2151.66 mRKB). The well was shut in for 10.6 hours during which two memory gauges were installed in the RN-nipple.

The well was opened for the 23.8 hours main flow period. After obtaining monophasic fluid samples at the wellhead, the choke size was increased from 9.5 mm fixed to 14.3 mm fixed. The flowrate was 1150 Sm<sup>3</sup>/d with a corresponding wellhead pressure of 158.5 bar and a bottomhole pressure of 331.66 bar (Matre No. 2 at 2181.53 mRKB). This corresponds to an actual productivity index of 385 Sm<sup>3</sup>/d/bar.

After the main build-up period of 24.1 hours, a 5.0 hour sand detection flow period was performed. The choke was increased stepwise to 22.2 mm. The maximum flowrate was estimated to 2030 Sm<sup>3</sup>/d with a corresponding wellhead pressure of 123.1 bar. The bottomhole pressure was 329.93 bar (Matre No. 2 at 2181.53 mRKB). No sand production was observed.

The well was shut in and two memory gauges installed in the R-nipple. A mini-fracture test was performed to determine the formation strength. The test performance is shown in fig. 5.3. A summary of the main flowrate and pressure data are included in table 5.6.

## 5.5 Fluid Analyses

### FMT samples

Three FMT fluid samples were obtained, two at 2223 mRKB and one at 2247 mRKB.

## Summary of Flow Periods, Test No. 1

EVENT	DATE	TIME	FLOWRATE (Sm <sup>3</sup> /d)	BOTTOMHOLE PRESSURE/TEMP (bar)/(deg.C)	WELLHEAD PRESSURE/TEMP (bar)/(deg.C)	GOR (Sm <sup>3</sup> /Sm <sup>3</sup> )	SEPARATOR PRESSURE/TEMP (bar)/(deg.C)	CHOKE (mm)
WELL PERFORATED	891117	05:00 06:20		331.85/75.9	108.0/10.3			
STABILIZATION, CLEAN-UP FLOW		06:25 06:55 08:30 09:07 11:25	1500	328.32/77.3 327.54/79.1 323.35/79.9 316.69/82.0	129.8/17.9 163.8/28.1 152.7/36.8 132.3/53.1	UNSTABLE SEPARATOR COND.		VARIOUS ADJ. 9.5 FIXED 12.7 FIXED 17.5 FIXED
SHUT-IN AT LPR-N		11:30 20:20		336.32/78.4	171.1/12.9			
MAIN FLOW		20:23 20:31 21:00 24:00	908	332.89/80.3 326.08/82.7 325.08/83.3	167.0/14.0 152.9/29.0 154.1/45.7	96	28.8/43.5	VARIOUS ADJ. 12.7 FIXED
	891118	06:00 12:00 18:00 24:00	910 931 938 960	325.03/83.5 325.07/83.6 325.10/83.6 325.05/83.6	154.5/49.5 154.4/51.4 154.8/54.1 154.6/52.7	94 87 86 80	28.8/44.4 28.8/45.7 29.0/48.1 29.3/47.2	
	891119	06:00 09:30	963 958	325.07/83.6 325.07/83.6	154.6/53.9 154.8/54.7	81 80	29.2/47.8 29.3/49.6	
SHUT-IN AT LPR-N		09:54						

NOTE; Bottomhole pressure data for clean-up flow from MURR no.14 at 2190.78 mRKB.  
Bottomhole pressure data for main flow from MURR no.2 at 2208.69 mRKB.

Table 5.5 Summary of flow periods

## Summary of Flow Periods, Test No. 2

EVENT	TIME	FLOWRATE (Sm <sup>3</sup> /D)	BOTTOM HOLE PRESSURE/TEMP (bar)/(deg.C)	WELLHEAD PRESSURE/TEMP (bar)/(deg.C)	GOR (Sm <sup>3</sup> /Sm <sup>3</sup> )	SEPARATOR PRESSURE/TEMP (bar)/(deg.C)	CHOKE (mm)
Well perforated	891123	04:16					
Stabilization		05:30	327.55/73.5 <sup>1)</sup>	98.6/7.3			
Clean-up flow		12:55					Various adj.
		15:34	331.31/78.7	172.8/25.9			9.5 fixed
		16:25	329.68/79.4	160.0/40.1			12.7 fixed
Shut-in at LPR-N		19:05	1102	329.16/80.6	68	46.5/48.6	14.3 fixed
Main flow	891124	05:42		334.11/77.7 <sup>2)</sup>			9.5 adj.
		06:00		332.74/81.2			9.5 fixed
		10:00	814	332.64/82.0	70	35.0/45.1	
		11:00	1150	331.98/82.1	66	44.2/52.2	14.3 fixed
		17:00	1143	331.80/82.3	67	44.4/55.4	
		23:00	1144	331.73/82.4	67	44.4/56.4	
Shut in at LPR-N	891125	05:00	1141	331.65/82.4	65	44.5/55.8	
		05:31		331.62/82.4			
Sand detection flow	891126	05:36		333.84/79.1			15.9 adj.
		06:45	1456	331.57/82.4	59	45.7/42.5	15.9 fixed
		07:45	1653	331.04/82.4	61	45.7/51.6	17.5 fixed
		09:15	1821	330.55/82.5	63	45.8/57.8	19.8 fixed
		10:30	1977	329.94/82.5	82 <sup>3)</sup>	45.5/59.7	22.2 fixed
Shut in at LPR-N		10:35		329.97/82.5			

1) BHP until main flow from MURR NO. 25 at 2151.66 mRKB

2) BHP from MURR NO. 2 at 2181.53 mRKB

3) Unstable separator conditions (Downstream choke pressure = 63.7 bar)

Table 5.6 Summary of flow periods, test no. 2, well 34/7-14

18.04.90 TT/ERF AMJo

# Surface Sampling, Test No. 1



SURFACE SAMPLING DATA , WELL 34/7-14 , TEST No. 1

no	date	start time ( hr:min )	fluid	sampling			bottle no.	remarks
				point	press. [ bar ]	temp. [ °C ]		
1	17.11.90	08:05	oil	wellhead	163.7	26.9	TS 05-19	monophasic (clean up flow)
2	17.11.90	08:05	oil	wellhead	163.7	26.9	TS 11-18	monophasic (clean up flow)
3	17.11.90	21:15	oil	wellhead	153.2	36.5	TS 11-20	monophasic
4	17.11.90	22:30	oil	wellhead	155.6	43.0	TS 09-10	monophasic
5	17.11.90	22:30	oil	wellhead	155.6	43.0	TS 07-05	monophasic, used in PVT analysis
6	18.11.90	00:20	oil	wellhead	154.0	46.7	TS 05-06	monophasic
7	18.11.90	01:10	oil	wellhead	154.1	47.7	TS 02-10	monophasic
8	18.11.89	15:00	oil	separator	29.0	44.3	TS 10-22	set 1
9	18.11.89	15:00	gas	separator	29.0	44.3	A-14798	set 1
10	18.11.89	16:21	oil	separator	29.0	44.8	TS 09-20	set 2
11	18.11.89	16:21	gas	separator	29.0	44.4	A-16280	set 2
12	18.11.89	17:22	oil	separator	29.3	45.4	TS 06-18	set 3
13	18.11.89	17:22	gas	separator	29.3	45.4	A-16721	set 3
14	18.11.89	18:21	oil	separator	29.3	45.7	TS 06-07	set 4
15	18.11.89	18:21	gas	separator	29.3	45.7	A-14630	set 4
16	18.11.89	19:09	oil	separator	29.5	45.9	TS 11-21	set 5
17	18.11.89	19:09	gas	separator	29.5	45.9	A-14408	set 5
18	18.11.89	20:51	oil	separator	29.1	45.6	TS 01-05	set 6
19	18.11.89	20:51	gas	separator	29.1	45.6	A-14050	set 6
20	19.11.89	09:13	gas	separator	29	47.1	A-14639	for geochemical analysis

Table 5.7 Surface sampling during test no. 1, well 34/7-14

## Surface Sampling, Test No. 2

SURFACE SAMPLING DATA , WELL 34/7-14 , TEST No. 2

no	date	start time ( hr:min )	fluid	sampling			bottle no.	remarks
				point	press. [ bar ]	temp. [ °C ]		
21	23.11.90	14:55	oil	wellhead	172.7	25.6	TS 11-12	monophasic (clean up flow)
22	23.11.90	14:55	oil	wellhead	172.7	25.6	TS 09-15	monophasic (clean up flow)
23	24.11.90	06:35	oil	wellhead	166.0	34.0	TS 15-06	monophasic
24	24.11.90	06:35	oil	wellhead	166.0	34.0	TS 16-08	monophasic
25	24.11.90	07:35	oil	wellhead	166.4	41.0	TS 05-20	monophasic
26	24.11.90	07:35	oil	wellhead	166.4	41.0	TS 06-05	monophasic
27	24.11.90	08:40	oil	wellhead	166.7	46.0	TS 09-19	monophasic
28	24.11.90	08:53	oil	wellhead	166.7	46.0	TK 03-10	monophasic
29	24.11.90	09:25	oil	wellhead	167.0	47.0	TK 03-24	monophasic, used in PVT analysis
30	24.11.90	14:30	oil	separator	44.5	52.3	TS 06-09	set 1
31	24.11.90	14:30	gas	separator	44.5	52.3	A-16682	set 1
32	24.11.90	15:25	oil	separator	44.5	51.2	TS 11-22	set 2
33	24.11.90	15:22	gas	separator	44.5	51.2	A-15718	set 2
34	24.11.90	16:45	oil	separator	44.4	52.2	TS 03-11	set 3
35	24.11.90	16:45	gas	separator	44.4	52.2	A-15441	set 3
36	24.11.90	17:28	oil	separator	44.0	53.7	TS 10-25	set 4
37	24.11.90	17:28	gas	separator	44.0	53.7	A-15777	set 4
38	24.11.90	18:28	oil	separator	44.3	53.7	TS 06-10	set 5
39	24.11.90	18:28	gas	separator	44.3	53.7	A-15707	set 5
40	24.11.90	20:17	oil	separator	43.9	53.7	TS 06-20	set 6
41	24.11.90	20:17	gas	separator	43.9	53.7	A-16222	set 6
42	24.11.90	21:55	gas	separator	43.9	53.7	A-14779	for geochemical analysis

Table 5.8 Surface sampling during test no. 2, well 34/7-14

## Fluid Analysis, Test No. 1

### PVT DATA SUMMARY, WELL 34/7-14, TEST NO. 1

Reservoir pressure	[ bar ]	:	338.4
Reservoir temperature	[ ° C ]	:	84.0
Saturation pressure at $T_{res}$	[ bar ]	:	169.5
Reservoir oil density	[ kg/m <sup>3</sup> ]	:	716.9
Reservoir oil viscosity	[ m Pa s ]	:	0.585
Viscosity at saturation pressure	[ m Pa s ]	:	0.494

#### Differential liberation

$B_o$ at reservoir conditions	[ m <sup>3</sup> /Sm <sup>3</sup> ]	:	1.370
GOR	[ Sm <sup>3</sup> /Sm <sup>3</sup> ]	:	118.3
Residual oil density	[ kg/m <sup>3</sup> ]	:	845.1

#### Flash data

			SINGLE	5-STAGE
$B_o$ at reservoir conditions	[ m <sup>3</sup> /Sm <sup>3</sup> ]	:	1.352	1.333
GOR	[ Sm <sup>3</sup> /Sm <sup>3</sup> ]	:	117.1	109.0
Stock tank oil density	[ kg/m <sup>3</sup> ]	:	844.4	844.3

Separator conditions for single stage flash : 1) 1.01bar and 15 ° C

Separator conditions for 5-stage flash:

- 1) 63 bar and 66 ° C
- 2) 31 bar and 60 ° C
- 3) 11 bar and 54 ° C
- 4) 1 atm and 54 ° C
- 5) 1 atm and 15 ° C

Table 5.9 PVT data summary, test no. 1, well 34/7-14



## Fluid Composition, Test No. 1

### COMPOSITION OF RESERVOIR OIL Wellhead Sample , Bottle No. TS 07-05

COMPONENT	weight %	mol %
CO <sub>2</sub>	0.19	0.71
N <sub>2</sub>	0.11	0.27
C <sub>1</sub>	5.34	35.69
C <sub>2</sub>	1.90	6.78
C <sub>3</sub>	2.77	6.74
i - C <sub>4</sub>	0.64	1.18
n - C <sub>4</sub>	1.96	3.61
i - C <sub>5</sub>	0.88	1.31
n - C <sub>5</sub>	1.29	1.91
C <sub>6</sub>	2.00	2.54
C <sub>7</sub>	3.38	3.92
C <sub>8</sub>	4.27	4.35
C <sub>9</sub>	3.40	3.07
C <sub>10+</sub>	71.87	27.92
C <sub>20+</sub>	41.62	9.91

Average molecular weight	:	107
Molecular weight of C <sub>7+</sub>	(calculated) :	227
Density of C <sub>7+</sub>	(calculated) :	861 [ kg/m <sup>3</sup> ]
Molecular weight of C <sub>10+</sub>	(measured) :	276
Density of C <sub>10+</sub>	(calculated) :	879 [ kg/m <sup>3</sup> ]

Table 5.10 Reservoir oil composition, test no. 1, well 34/7-14

## Fluid Analysis, Test No. 2

### PVT DATA SUMMARY, WELL 34/7-14 , TEST NO. 2

Reservoir pressure	[ bar ]	:	336.4
Reservoir temperature	[ ° C ]	:	83.0
Saturation pressure at $T_{res}$	[ bar ]	:	169.5
Reservoir oil density	[ kg/m <sup>3</sup> ]	:	712.5
Reservoir oil viscosity	[ m Pa s ]	:	0.586
Viscosity at saturation pressure	[ m Pa s ]	:	0.494

#### Differential liberation

$B_o$ at reservoir conditions	[ m <sup>3</sup> /Sm <sup>3</sup> ]	:	1.384
GOR	[ Sm <sup>3</sup> /Sm <sup>3</sup> ]	:	120.8
Residual oil density	[ kg/m <sup>3</sup> ]	:	844.1

#### Flash data

			SINGLE	5-STAGE
$B_o$ at reservoir conditions	[ m <sup>3</sup> /Sm <sup>3</sup> ]	:	1.357	1.362
GOR	[ Sm <sup>3</sup> /Sm <sup>3</sup> ]	:	117.3	112.0
Stock tank oil density	[ kg/m <sup>3</sup> ]	:	844.1	844.1

Separator conditions for single stage flash : 1) 1.01bar and 15 ° C

Separator conditions for 5-stage flash:

- 1) 63 bar and 66 ° C
- 2) 31 bar and 60 ° C
- 3) 11 bar and 54 ° C
- 4) 1 atm and 54 ° C
- 5) 1 atm and 15 ° C

Table 5.11 PVT data summary, test no. 2, well 34/7-14

## Fluid Composition, Test No. 2

### COMPOSITION OF RESERVOIR OIL Wellhead Sample , Bottle No. TK 03-24

COMPONENT	weight %	mol %
CO <sub>2</sub>	0.19	0.70
N <sub>2</sub>	0.11	0.27
C <sub>1</sub>	5.42	35.78
C <sub>2</sub>	1.94	6.83
C <sub>3</sub>	2.72	6.53
i - C <sub>4</sub>	0.65	1.18
n - C <sub>4</sub>	1.97	3.58
i - C <sub>5</sub>	0.88	1.29
n - C <sub>5</sub>	1.28	1.87
C <sub>6</sub>	2.02	2.54
C <sub>7</sub>	3.28	3.77
C <sub>8</sub>	4.38	4.40
C <sub>9</sub>	3.47	3.11
C <sub>10+</sub>	71.69	28.15
C <sub>20+</sub>	41.15	9.93

Average molecular weight	:	106
Molecular weight of C <sub>7+</sub> (calculated)	:	224
Density of C <sub>7+</sub> (calculated)	:	861 [ kg/m <sup>3</sup> ]
Molecular weight of C <sub>10+</sub> (measured)	:	270
Density of C <sub>10+</sub> (calculated)	:	880 [ kg/m <sup>3</sup> ]

Table 5.12 Reservoir oil composition, test no. 2, well 34/7-14

## Trace Elements, Test No. 1

### TRACE ELEMENT ANALYSIS, WELL 34/7-14 TEST NO. 1

#### GAS PHASE

		Range	Aritmetic average	# of measure-ments
Hydrogen Sulphide	[ppm-mol]	< 0.30	0.21	10
Mercaptans	[ppm-mol]	< 0.1	< 0.1	9
Carbon Dioxide	[mol %]	0.50 - 0.60	0.51	10
Nitrogen	[mol %]	1.648 - 1.756	1.702	2
Helium	[mol %]	0.011 - 0.013	0.012	2
Radon 222	[Bq/l]	0.120 - 0.172	0.145	4

#### OIL PHASE

		Range	Aritmetic average	#of measure-ments
Density @ 20 °C	[g/cm <sup>3</sup> ]	0.841 - 0.850	0.847	9
Water in Oil	[mg/l]	80 - 3460	789	9
Total Sulphur	[weight %]	0.36 - 0.37	0.36	3
Polonium 210	[Bq/l]	< 0.1	< 0.1	1
Nickel	[ppm-weight]	0.7 - 1.3	1.0	3
Vanadium	[ppm-weight]	1.7 - 1.8	1.8	3
Mercury	[ppm-weight]	1.4	1.4	1

Measurements on samples from clean-up flow excluded

Table 5.13 Trace element analysis, test no. 1, well 34/7-14

## Trace Elements, Test No. 2

### TRACE ELEMENT ANALYSIS, WELL 34/7-14 TEST NO. 2

#### GAS PHASE

		Range	Aritmetic average	# of measure-ments
Hydrogen Sulphide	[ppm-mol]	< 0.35	0.22	11
Mercaptans	[ppm-mol]	< 0.1	< 0.1	8
Carbon Dioxide	[mol %]	0.50 - 0.60	0.55	8
Nitrogen	[mol %]	1.724 - 1.808	1.766	2
Helium	[mol %]	0.008 - 0.010	0.009	2
Radon 222	[Bq/l]	0.024 - 0.106	0.073	5

#### OIL PHASE

		Range	Aritmetic average	#of measure-ments
Density @ 20 °C	[g/cm <sup>3</sup> ]	0.840 - 0.843	0.842	6
Water in Oil	[mg/l]	88 - 715	297	9
Total Sulphur	[weight %]	0.36 - 0.37	0.36	3
Polonium 210	[Bq/l]	< 0.1	< 0.1	1
Nickel	[ppm-weight]	0.5 - 0.6	0.5	3
Vanadium	[ppm-weight]	1.6 - 1.7	1.7	3
Mercury	[ppm-weight]	1.8 - 2.3	2.0	3

Measurements on samples from clean-up flow excluded

Table 5.14 Trace element analysis, test no. 2, well 34/7-14

Saga Petroleum a.s.

6.2.1

MUD PROPERTIES, DAILY REPORT

Well: 34/7-14

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf /Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
890928	9 7/8"	306.0	1.20			/		/					GEL MUD
890929	9 7/8"	355.0	1.20			/		/					GEL MUD
890930	9 7/8"	355.0	1.20			/		/					GEL MUD
891001	9 7/8"	355.0	1.20			/		/					GEL MUD
891002	9 7/8"	514.0	1.20			/		/					GEL MUD
891003	36"	530.0	1.20			/		/					GEL MUD
891004	36"	530.0	1.05			/		/					GEL MUD
891005	26"	530.0	1.05			/		/					GEL MUD
891006	26"	495.0	1.20			/		/					GEL MUD
891007	26"	495.0	1.20			/		/					GEL MUD
891008	17 1/2"	523.0	1.10	14.0	12.0	2/7	8.5	.2/	360	50000	2.0	8.0	KCL MUD
891009	17 1/2"	1201.0	1.18	20.0	11.0	2/3	8.3	/1.2		56000	1.5	10.0	KCL MUD
891010	17 1/2"	1575.0	1.30	16.0	12.0	3/6	9.0	/1.5	353	53000	1.0	14.0	KCL MUD
891011	17 1/2"	1575.0	1.30	18.0	12.0	2/6	8.1	/1.1		49000	1.0	15.0	KCL MUD
891012	17 1/2"	1575.0	1.30	18.0	9.0	2/4	8.1	/1.2	1010	49000	1.0	13.0	KCL MUD
891013	12 1/4"	1610.0	1.40	18.0	12.0	2/5	8.5	/1.5	160	62000	1.0	16.0	KCL MUD
891014	12 1/4"	1751.0	1.40	17.0	12.0	2/5	8.4	/1.5	320	56000	1.5	17.0	KCL MUD
891015	12 1/4"	1950.0	1.63	27.0	10.0	3/9	8.3	/1.3	620	56000	2.0	25.0	KCL MUD
891016	12 1/4"	1959.0	1.63	26.0	11.0	2/8	8.5	/1.2	300	50000	1.5	23.0	KCL MUD
891017	12 1/4"	2065.0	1.62	26.0	12.0	2/11	8.0	/1.1	340	52000	1.5	23.0	KCL MUD
891018	12 1/4"	2137.0	1.65	30.0	13.0	2/8	8.0	/1.1	440	55000	1.0	24.0	KCL MUD
891019	12 1/4"	2137.0	1.65	30.0	15.0	2/4	8.0	/1.1	220	57000	.5	23.0	KCL MUD
891020	12 1/4"	2137.0	1.65	45.0	31.0	2/3	8.0	/1.1	200	55000	.5	22.0	KCL MUD
891021	12 1/4"	1683.0	1.65	31.0	14.0	3/5	11.5	.0/0	280	55000	.5	22.0	KCL MUD
891022	12 1/4"	1697.0	1.60	21.0	10.0	2/4	10.0	.5/8	280	51000	.5	20.0	KCL MUD
891023	12 1/4"	1591.0	1.60	27.0	13.0	2/9	11.7	1.2/2.3	80	48000	1.5	21.0	KCL MUD
891024	12 1/4"	1896.0	1.60	29.0	14.0	3/9	10.2	.1/5	120	56000	1.0	21.0	KCL MUD

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6.2.1

MUD PROPERTIES, DAILY REPORT

Well: 34/7-14

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf /Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
891025	12 1/4"	2009.5	1.60	26.0	14.0	4/16	9.9	.4/.9	160	51000	1.5	22.0	KCL MUD
891026	12 1/4"	2009.5	1.60	26.0	9.0	3/11	9.6	.1/.3	200	54000	.5	22.0	KCL MUD
891027	12 1/4"	2009.5	1.60	28.0	11.0	3/7	9.6	/	120	52000	1.0	23.0	KCL MUD
891028	8 1/2"	2009.5	1.68	31.0	10.0	3/8	9.0	/.3		51000	1.0	22.0	KCL MUD
891029	8 1/2"	2032.0	1.68	30.0	13.0	4/13	11.3	.2/		53000	1.5	75.0	KCL MUD
891030	8 1/2"	2125.0	1.68	32.0	15.0	4/15	10.0	.2/		51000	1.0	24.0	KCL MUD
891031	8 1/2"	2189.0	1.68	29.0	10.0	3/12	9.8	1.5/.3		51000	1.0	24.0	KCL MUD
891101	8 1/2"	2189.0	1.68	30.0	15.0	3/14	9.5	.1/		49000	.5	23.0	KCL MUD
891102	8 1/2"	2322.0	1.68	30.0	12.0	2/9	9.4	/		52000	.8	23.0	KCL MUD
891103	8 1/2"	2380.5	1.68	36.0	18.0	3/10	9.1	/	320	51000	.8	23.0	KCL MUD
891104	8 1/2"	2380.0	1.68	33.0	12.0	3/7	8.8	/	240	51000	.5	23.0	KCL MUD
891105	8 1/2"	2380.0	1.68	33.0	10.0	3/8	8.8	/	240	51000	.5	23.0	KCL MUD
891106	8 1/2"	2408.0	1.68	27.0	11.0	3/6	8.8	/	260	53000	.3	23.0	KCL MUD
891107	8 1/2"	2490.0	1.65	28.0	15.0	3/7	8.3	/	240	50000	.3	23.0	KCL MUD
891108	8 1/2"	2620.0	1.65	27.0	16.0	3/16	8.3	/	200	56000	.3	23.0	KCL MUD
891109	8 1/2"	2653.0	1.68	32.0	12.0	4/25	8.1	/	360	55000	.3	24.0	KCL MUD
891110	8 1/2"	2653.0	1.65	24.0	12.0	3/24	8.3	/	480	48000	.3	24.0	KCL MUD
891111	8 1/2"	2653.0	1.65	25.0	12.0	4/20	8.2	/	360	54000	.3	24.0	KCL MUD
891112	8 1/2"	2653.0	1.65	27.0	10.0	3/20	8.5	/	360	50000	.5	24.0	KCL MUD
891113	8 1/2"	2191.0	1.65	27.0	14.0	5/24	10.4	.1/.1	20	45000	.8	24.0	KCL MUD
891114	8 1/2"	2191.0	1.65	26.0	13.0	6/26	10.8	.1/.1	80	48000	.2	76.0	KCL MUD
891115	8 1/2"	2191.0	1.65	27.0	10.0	5/24	10.8	.1/.1	40	48000	.2	24.0	KCL MUD
891116	8 1/2"	2191.0	1.65	26.0	11.0	5/22	10.4	.1/.1	40	48000	.5	24.0	KCL MUD
891117	8 1/2"	2191.0	1.65	23.0	13.0	7/22	10.6	3.2/6.8	40	47000	.5	24.0	KCL MUD
891118	8 1/2"	2191.0	1.65	24.0	13.0	7/23	10.6	3.3/6.2	40	47000	.5	24.0	KCL MUD
891119	8 1/2"	2191.0	1.65	24.0	13.0	8/22	10.6	3.2/6.2	40	47000	1.0	24.0	KCL MUD
891120	8 1/2"	2191.0	1.65	28.0	24.0	20/44	9.6	1.7/4.2	40	47000	1.0	25.0	KCL MUD

Saga Petroleum a.s.

6.2.1

MUD PROPERTIES, DAILY REPORT

Well: 34/7-14

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf /Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
891121	8 1/2"	2191.0	1.65	25.0	14.0	4/21	10.2	1.0/1.7	80	44000	1.0	25.0	KCL MUD
891122	8 1/2"	2191.0	1.65	23.0	14.0	6/20	9.9	.9/1.6	80	46000	1.0	25.0	KCL MUD
891123	8 1/2"	2191.0	1.65	23.0	14.0	7/22	9.9	1.1/1.6	80	46000	1.0	25.0	KCL MUD
891124	8 1/2"	2191.0	1.65	23.0	14.0	8/21	9.9	1.1/1.6	80	46000	1.0	25.0	KCL MUD
891125	8 1/2"	2191.0	1.65	24.0	13.0	6/22	10.0	1.2/1.7	80	46000	1.0	25.0	KCL MUD
891126	8 1/2"	2191.0	1.65	22.0	14.0	6/18	9.8	1.0/1.6	80	46000	1.0	25.0	KCL MUD
891127	8 1/2"	2191.0	1.65	20.0	12.0	4/17	9.8	1.1/1.6	80	46000	1.0	25.0	KCL MUD
891128	8 1/2"	2191.0	1.65	22.0	11.0	4/18	11.2	1.5/2.2	200	46000	1.5	25.0	KCL MUD
891129	17 1/2"	491.0	1.20	13.0	15.0	7/17	10.8	/					KCL MUD
891130	17 1/2"	491.0	1.20	13.0	4.0	1/6	11.4	.3/		49000	1.0	11.0	KCL MUD
891201						/		/					KCL MUD
891202						/		/					KCL MUD



MATERIALS	UNIT	9 7/8" HOLE	36" HOLE	26" HOLE	17 1/2" HOLE	12 1/4" HOLE	8 1/2" HOLE	DST	P&A	TOTAL
BARITE	MT	323	55	38	61	660	240	30	18	1425
BENTONITE	MT	69	23	19		2			5	118
BENTONITE	50 KG			45		15	10			70
CAUSTIC	25 KG	28	6	6				1	2	43
SODA ASH	25 KG	46	12	12		5				75
LAMPAC REG.	25 KG				100	91	89		13	293
LAMPAC L.V.	25 KG				185	258	32			475
KCL BRINE	M <sup>3</sup>				227	197	97			521
KCL POWDER	25 KG				100	1560	11			1671
POLY PLUS	25 KG				8	35	7			50
BICARBONATE	25 KG				16	366	257	35	1	675
GYPHUM	25 KG					157	127	29	5	318
LIME	25 KG					5				5
PERFECT SEAL	25 KG					34				34
NUT PLUG COARSE	25 KG					30				30
NUT PLUG FINE	25 KG					137				137
MICA FINE	25 KG					87				87
MICA COARSE	25 KG					62				62
OILEX	200 L						1			1
MAGCONOL	200 L							1		1
XANTHAN GUM	25 KG							2	2	4
HEC	25 KG							32		32
HCL	LITRE							15		15

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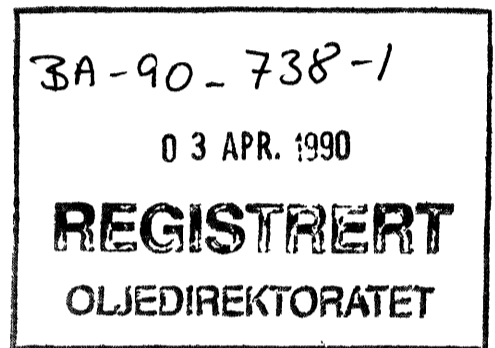
GEOCHEMICAL ANALYSIS REPORT  
FOR WELL NOCS 34/7-14

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## INTRODUCTION

Geochemical analyses were performed on material (cuttings, side-wall cores, cores, gas and oil samples) from well NOCS 34/7-14. The analyses were performed according to a program requested by Saga Petroleum. Fifty-eight rock samples were described from 1030 m to 2520 m. The analytical program was as follows:

TOC analyses on LECO carbon analyser	14 samples
Rock-Eval analyses	14 samples
Extraction, separation and asphaltene precipitation of rock samples	6 samples
Separation and asphaltene precipitation of oil samples	2 samples
Whole oil chromatography	2 samples
Saturated and aromatic GC analyses of rock and oil samples	5 samples
Gas chromatography - mass spectrometry	4 samples
Vitrinite reflectance measurements	15 samples
Gas composition	2 samples
Isotope composition of gas	2 samples
Isotope composition of oil	2 samples

Tables listing in detail the samples analysed and the results are found in Appendix 1. Reflectance histograms are found in Appendix 2. Whole oil, saturated and aromatic gas

chromatograms are found in Appendix 3. Gas chromatography - mass spectrometry fragmentograms are found in Appendix 4. Gas data from Institutt for Energiteknikk are found in Addendum 1.

In an attempt to make the report more concise, it is shorter and with more emphasis on figures and tables than is usual. This was done in agreement with Saga Petroleum.



## ANALYTICAL PROCEDURE

The natural gas samples have been quantified and separated into the different gas components by a Carlo Erba 4200 instrument.

The hydrocarbon gas components were oxidized in separate CuO-ovens in order to prevent cross contamination. The combustion products CO<sub>2</sub> and H<sub>2</sub>O were frozen into collection vessels and separated.

The water was reduced with zinc metal in sealed tubes to prepare hydrogen for isotopic analysis. The isotopic measurements were performed on a Finnigan Mat 251 and a Finnigan Delta mass spectrometer. IFE's value on NBS 22 is  $-29.77 \pm .06$  ‰ PDB.

The volume composition of the gas samples is given in table 1. The results have been normalized to 100%. The stable isotope results are given in table 2.

The uncertainty on the  $\delta^{13}\text{C}$  value is estimated to be  $\pm 0.3$  ‰ PDB and includes all the different analytical steps. The uncertainty on the  $\delta\text{D}$  value is likewise estimated to be  $\pm 5$  ‰.

Table 1 Volume composition of gas samples from well 34/7-14.

SAMPLE	IFE no.	C <sub>1</sub> %	C <sub>2</sub> %	C <sub>3</sub> %	iC <sub>4</sub> %	nC <sub>4</sub> %	iC <sub>5</sub> %	nC <sub>5</sub> %	CO <sub>2</sub> %	ΣC <sub>1</sub> -C <sub>5</sub>	ΣC <sub>2</sub> -C <sub>5</sub> /ΣC <sub>1</sub> -C <sub>5</sub>	iC <sub>4</sub> /nC <sub>4</sub>
A 15779	8574	81.9	10.3	4.8	0.55	1.24	0.27	0.31	0.58	99.4	0.18	0.44
A 14639	8575	79.7	11.1	5.7	0.66	1.46	0.31	0.36	0.65	99.4	0.20	0.45

Table 2 Isotopic composition of gas samples from well 34/7-14.

SAMPLE	IFE no.	C <sub>1</sub> δ <sup>13</sup> C PDB	C <sub>1</sub> δ D SMOW	C <sub>2</sub> δ <sup>13</sup> C PDB	C <sub>3</sub> δ <sup>13</sup> C PDB	iC <sub>4</sub> δ <sup>13</sup> C PDB	nC <sub>4</sub> δ <sup>13</sup> C PDB
A 15779	8574	-46.0	-213	-31.6	-29.4	-27.9	-28.3
A 14639	8575	-45.7	-200	-31.5	-29.2	-27.6	-27.7

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type	Trb	Sample
Int Cvd	TOC%		
-----			
	%	Lithology description	
-----			
1030.00			0046
	100	Sh/Clst: lt ol gy, calc, slt	
			0046-1L
1150.00			0047
	100	Sh/Clst: lt ol gy, calc, slt	
			0047-1L
1240.00			0048
	100	Sh/Clst: lt ol gy to ol gy, calc, slt	
			0048-1L
1350.00			0049
	100	Sh/Clst: ol gy to gn gy	
			0049-1L
1440.00			0050
	100	Sh/Clst: ol gy to gn gy	
			0050-1L
1520.00			0051
	100	Sh/Clst: ol gy to gn gy	
			0051-1L
1630.00			0052
	100	Sh/Clst: ol gy to gn gy, calc	
			0052-1L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type	Trb	Sample
Int Cvd	TOC%	%	Lithology description
1730.00			0053
		100	Sh/Clst: lt ol gy to ol gy to gn gy, calc 0053-1L
1840.00			0054
		100	Sh/Clst: lt ol gy to ol gy to gn gy, calc tr S/Sst : w, l 0054-1L 0054-2L
1910.00			0055
		80	Sh/Clst: lt ol gy to ol gy to gn gy, calc 20 S/Sst : v col, l tr Other : pyr 0055-1L 0055-2L 0055-3L
2010.00			0056
		100	Sh/Clst: lt ol gy to ol gy to gn gy, calc tr S/Sst : v col, l 0056-1L 0056-2L
2170.00			0008
	1.09	60	Sh/Clst: m gy 20 S/Sst : lt gy to lt brn gy, calc, glauc, f, cem 20 Ca : drk y brn, dol tr Other : pyr tr Cont : prp 0008-1L 0008-2L 0008-3L 0008-4L 0008-5L
2179.00			0009
	1.34	80	Sh/Clst: m gy 10 S/Sst : lt gy to lt brn gy, calc, glauc, f, cem 10 Ca : drk y brn, dol tr Cont : prp 0009-1L 0009-2L 0009-3L 0009-4L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description	
2184.00	swc				0001
		3.00	100	Sh/Clst: blk to dsk y brn	0001-1L
2185.00					0010
			50	S/Sst : v col, l	0010-2L
			20	Sh/Clst: m gy	0010-1L
			10	Ca : drk y brn, dol	0010-3L
			10	Ca : w, chk	0010-4L
			5	S/Sst : lt gy to lt brn gy, calc, glauc, f, cem	0010-5L
			5	Cont : prp	0010-6L
2186.00	swc				0002
		2.23	100	Sh/Clst: blk to dsk y brn	0002-1L
2189.00	swc				0003
		1.63	100	S/Sst : drk ol gy	0003-1L
2190.00	swc				0004
			100	S/Sst : drk ol gy	0004-1L
2191.00	swc				0005
			100	S/Sst : ol gy to brn gy	0005-1L
2192.00	swc				0006
			100	S/Sst : ol gy to brn gy	0006-1L



Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type	Trb	Sample
Int Cvd	TOC%		
-----			
	%	Lithology description	
-----			
2194.00	swc		0007
	100	S/Sst : ol gy to brn gy	0007-1L
2229.50	ccp		0057
	100	Coal : blk	0057-1L
2272.30	ccp		0058
	100	Coal : blk	0058-1L
2415.00			0011
	70	S/Sst : w to lt gy, calc, mic, f, cem	0011-2L
	10	Sh/Clst: m gy	0011-1L
	10	S/Sst : v col, l	0011-4L
	5	Sh/Clst: blk to dsk y brn	0011-3L
	5	Cont : prp	0011-5L
2418.00			0012
	80	S/Sst : w, l	0012-4L
	5	Sh/Clst: m gy	0012-1L
	5	Sh/Clst: blk to dsk y brn	0012-3L
	5	Cont : prp	0012-5L
	5	Cont : Coal-ad	0012-6L
	tr	S/Sst : w to lt gy, calc, mic, f, cem	0012-2L
2421.00			0013
	100	S/Sst : w, l	0013-3L
	tr	S/Sst : w to lt gy, calc, mic, f, cem	0013-1L
	tr	Sh/Clst: blk to dsk y brn to drk gy	0013-2L
	tr	Cont : prp	0013-4L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type	Trb	Sample
Int Cvd	TOC%		
-----			
	%	Lithology description	
-----			
2424.00			0014
	100	S/Sst : w, l	0014-2L
		tr Sh/Clst: dsk y brn to drk gy, mic	0014-1L
		tr Cont : prp	0014-3L
2427.00			0015
	90	S/Sst : w, l	0015-2L
	5	Sh/Clst: m gy, drk gy, dsk y brn	0015-1L
	5	Cont : prp	0015-3L
2430.00			0016
	90	S/Sst : w, l	0016-2L
	5	Sh/Clst: m gy, drk gy, dsk y brn	0016-1L
	5	Cont : prp	0016-3L
2433.00			0017
	90	S/Sst : w, l	0017-2L
	5	Sh/Clst: m gy, drk gy, dsk y brn	0017-1L
	5	Cont : prp	0017-3L
		tr Cont : Coal-ad	0017-4L
2436.00			0018
	85	S/Sst : w, l	0018-2L
	5	Sh/Clst: m gy, drk gy, dsk y brn	0018-1L
	5	Cont : prp	0018-3L
	5	Other : pyr	0018-5L
		tr Cont : Coal-ad	0018-4L
		tr Ca : dsk y brn, dol	0018-6L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	%		
-----				
2439.00				0019
		80 S/Sst : w, l		0019-2L
		15 Other : pyr		0019-5L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0019-1L
		tr Cont : prp		0019-3L
		tr Cont : Coal-ad		0019-4L
2442.00				0020
		75 S/Sst : w, l		0020-2L
		15 Other : pyr		0020-5L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0020-1L
		5 Cont : prp		0020-3L
		tr Cont : Coal-ad		0020-4L
2445.00				0021
		85 S/Sst : w, l		0021-2L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0021-1L
		5 Cont : prp		0021-3L
		5 Other : pyr		0021-5L
		tr Cont : Coal-ad		0021-4L
2448.00				0022
		65 S/Sst : w, l		0022-2L
	2.36	25 Sh/Clst: dsk y brn, wx		0022-6L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0022-1L
		5 Cont : prp		0022-3L
		tr Cont : Coal-ad		0022-4L
		tr Other : pyr		0022-5L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	% Lithology description		
2451.00				0023
	2.34	70 S/Sst : w, l		0023-2L
		20 Sh/Clst: dsk y brn, wx		0023-6L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0023-1L
		5 Cont : prp		0023-3L
		tr Cont : Coal-ad		0023-4L
		tr Other : pyr		0023-5L
2457.00				0024
		85 S/Sst : w, l		0024-2L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0024-1L
		5 Cont : prp		0024-3L
		5 Sh/Clst: dsk y brn, wx		0024-6L
		tr Cont : Coal-ad		0024-4L
		tr Other : pyr		0024-5L
2460.00				0025
		70 S/Sst : w, l		0025-2L
		10 Sh/Clst: dsk y brn, wx		0025-6L
		5 Sh/Clst: m gy, drk gy, dsk y brn		0025-1L
		5 Cont : prp		0025-3L
		5 Other : pyr		0025-5L
		5 S/Sst : lt gy to lt brn gy, f, cem		0025-7L
		tr Cont : Coal-ad		0025-4L
2463.00				0026
		60 S/Sst : w, l		0026-2L
		10 Sh/Clst: m gy, drk gy, dsk y brn		0026-1L
		10 Other : pyr		0026-5L
		10 Sh/Clst: dsk y brn, wx		0026-6L
		5 Cont : prp		0026-3L
		5 S/Sst : lt gy to lt brn gy, f, cem		0026-7L
		tr Cont : Coal-ad		0026-4L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	%		
-----				
Lithology description				
-----				
2466.00				0027
	1.65	60	S/Sst : w, l	0027-2L
		25	Sh/Clst: m gy, drk gy	0027-1L
		5	Cont : prp	0027-3L
		5	Other : pyr	0027-5L
		5	S/Sst : lt gy to lt brn gy, f, cem	0027-7L
		tr	Cont : Coal-ad	0027-4L
		tr	Sh/Clst: dsk y brn, wx	0027-6L
2469.00				0028
		60	S/Sst : w, l	0028-2L
		15	Sh/Clst: m gy, drk gy	0028-1L
		10	Other : pyr	0028-5L
		5	Cont : prp	0028-3L
		5	Sltst : brn gy, mic	0028-6L
		5	S/Sst : lt gy to lt brn gy, f, cem	0028-7L
		tr	Cont : Coal-ad	0028-4L
2472.00				0029
		60	S/Sst : w, l	0029-2L
		15	Sh/Clst: m gy, drk gy	0029-1L
		10	Other : pyr	0029-5L
		5	Cont : prp	0029-3L
		5	Sltst : brn gy, mic	0029-6L
		5	S/Sst : lt gy to lt brn gy, f, cem	0029-7L
		tr	Cont : Coal-ad	0029-4L
2475.00				0030
	2.34	40	S/Sst : w, l	0030-2L
		35	Ca : drk y brn to dsk y brn, dol	0030-6L
		15	Sh/Clst: m gy, drk gy	0030-1L
		5	Cont : prp	0030-3L
		5	Other : pyr	0030-5L
		tr	Cont : Coal-ad	0030-4L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	% Lithology description		
2478.00				0031
	2.05	35 S/Sst : w to lt gy, l		0031-2L
		35 Ca : drk y brn to dsk y brn, dol		0031-6L
		20 Sh/Clst: m gy, drk gy		0031-1L
		5 Cont : prp		0031-3L
		5 Other : pyr		0031-5L
		tr Cont : Coal-ad		0031-4L
2481.00				0032
	2.57	35 Ca : drk y brn to dsk y brn, dol		0032-6L
		30 S/Sst : w to lt gy, l		0032-2L
		15 Sh/Clst: m gy, drk gy		0032-1L
		15 Other : pyr		0032-5L
		5 Cont : prp		0032-3L
		tr Cont : Coal-ad		0032-4L
2484.00				0033
		45 S/Sst : w to lt gy, l		0033-2L
		25 Ca : drk y brn to dsk y brn, dol		0033-6L
		15 Sh/Clst: m gy, drk gy		0033-1L
		10 Other : pyr		0033-5L
		5 Cont : prp		0033-3L
		tr Cont : Coal-ad		0033-4L
2487.00				0034
		45 Sh/Clst: m gy to drk gy, mic, wx		0034-1L
		45 S/Sst : w to lt gy, l		0034-2L
		5 Cont : prp		0034-3L
		5 Other : pyr		0034-4L
		tr Ca : drk y brn to dsk y brn, dol		0034-5L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	%		
Lithology description				
2490.00				0035
	1.63	60	Sh/Clst: m gy to drk gy, mic, wx	0035-1L
		30	S/Sst : w to lt gy, l	0035-2L
		5	Cont : prp	0035-3L
		5	Other : pyr	0035-4L
		tr	Ca : drk y brn to dsk y brn, dol	0035-5L
2493.00				0036
		55	S/Sst : w to lt gy, l	0036-2L
		40	Sh/Clst: m gy to drk gy, mic, wx	0036-1L
		5	Cont : prp	0036-3L
		tr	Other : pyr	0036-4L
		tr	Ca : drk y brn to dsk y brn, dol	0036-5L
2496.00				0037
		40	Sh/Clst: m gy to drk gy, mic, wx	0037-1L
		35	S/Sst : w to lt gy, l	0037-2L
		10	Other : pyr	0037-4L
		10	Ca : drk y brn to dsk y brn, dol	0037-5L
		5	Cont : prp	0037-3L
2499.00				0038
		40	S/Sst : w to lt gy, l	0038-2L
		20	Sh/Clst: m gy to drk gy, mic, wx	0038-1L
		20	Cont : Coal-ad, ns	0038-6L
		10	Ca : drk y brn to dsk y brn, dol	0038-5L
		5	Cont : prp	0038-3L
		5	Other : pyr	0038-4L

Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int	Cvd	TOC%	%	Lithology description
2502.00				0039
			40	S/Sst : w to lt gy, l 0039-2L
			35	Sh/Clst: m gy to drk gy, mic, wx 0039-1L
			10	Cont : Coal-ad, ns 0039-6L
			5	Cont : prp 0039-3L
			5	Other : pyr 0039-4L
			5	Ca : drk y brn to dsk y brn, dol 0039-5L
2505.00				0040
			70	S/Sst : w to lt gy, l 0040-2L
			25	Sh/Clst: m gy to drk gy, mic 0040-1L
			5	Cont : Coal-ad, prp, ns 0040-3L
			tr	Other : pyr 0040-4L
			tr	Ca : drk y brn to dsk y brn, dol 0040-5L
2508.00				0041
			50	S/Sst : w to lt gy, l 0041-2L
			35	Sh/Clst: m gy to drk gy, wx 0041-1L
			5	Cont : Coal-ad, prp, ns 0041-3L
			5	Other : pyr 0041-4L
			5	Ca : drk y brn to dsk y brn, dol 0041-5L
2511.00				0042
	2.21		50	Sh/Clst: m gy to drk gy, wx 0042-1L
			35	S/Sst : w to lt gy, l 0042-2L
			5	Cont : Coal-ad, prp, ns 0042-3L
			5	Other : pyr 0042-4L
			5	Ca : drk y brn to dsk y brn, dol 0042-5L



Table 1 : Lithology description for well NOCS 34/7-14

Depth unit of measure: m

Depth	Type		Trb	Sample
Int Cvd	TOC%	%		
Lithology description				
2514.00				0043
		50 Sh/Clst: m gy to drk gy, wx		0043-1L
		30 S/Sst : w to lt gy, l		0043-2L
		10 Other : pyr		0043-4L
		5 Cont : Coal-ad, prp, ns		0043-3L
		5 Ca : drk y brn to dsk y brn, dol		0043-5L
2517.00				0044
		55 Sh/Clst: m gy to drk gy, wx		0044-1L
		25 S/Sst : w to lt gy, l		0044-2L
		10 Other : pyr		0044-4L
		5 Cont : Coal-ad, prp, ns		0044-3L
		5 Ca : drk y brn to dsk y brn, dol		0044-5L
2520.00				0045
	2.02	65 Sh/Clst: m gy to drk gy, wx		0045-1L
		20 S/Sst : w to lt gy, l		0045-2L
		5 Cont : Coal-ad, prp, ns		0045-3L
		5 Other : pyr		0045-4L
		5 Ca : drk y brn to dsk y brn, dol		0045-5L

Table 2 : Rock-Eval table for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2170.00	cut	Sh/Clst: m gy	0.28	1.03	0.57	1.81	1.09	94	52	1.3	0.21	432	0008-1L
2179.00	cut	Sh/Clst: m gy	0.61	1.55	0.50	3.10	1.34	116	37	2.2	0.28	427	0009-1L
2184.00	swc	Sh/Clst: blk to dsk y brn	0.68	4.17	0.35	11.91	3.00	139	12	4.8	0.14	432	0001-1L
2186.00	swc	Sh/Clst: blk to dsk y brn	0.45	2.06	0.83	2.48	2.23	92	37	2.5	0.18	434	0002-1L
2189.00	swc	S/Sst : drk ol gy	10.95	5.17	0.14	36.93	1.63	317	9	16.1	0.68	411	0003-1L
2448.00	cut	Sh/Clst: dsk y brn	0.41	1.81	0.24	7.54	2.36	77	10	2.2	0.18	432	0022-6L
2451.00	cut	Sh/Clst: dsk y brn	0.45	1.13	-	-	2.34	48	-	1.6	0.28	436	0023-6L
2466.00	cut	Sh/Clst: m gy, drk gy	0.20	0.82	0.33	2.48	1.65	50	20	1.0	0.20	430	0027-1L
2475.00	cut	Ca : drk y brn to dsk y brn	0.18	1.62	0.48	3.38	2.34	69	21	1.8	0.10	434	0030-6L
2478.00	cut	Ca : drk y brn to dsk y brn	0.25	1.43	0.59	2.42	2.05	70	29	1.7	0.15	433	0031-6L
2481.00	cut	Ca : drk y brn to dsk y brn	2.29	2.51	4.69	0.54	2.57	98	182	4.8	0.48	410	0032-6L
2490.00	cut	Sh/Clst: m gy to drk gy	0.06	0.56	0.20	2.80	1.63	34	12	0.6	0.10	433	0035-1L
2511.00	cut	Sh/Clst: m gy to drk gy	0.13	1.20	0.17	7.06	2.21	54	8	1.3	0.10	434	0042-1L
2520.00	cut	Sh/Clst: m gy to drk gy	0.14	1.13	0.17	6.65	2.02	56	8	1.3	0.11	431	0045-1L

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
DST#1	oil		-	63.6	42.6	14.4	1.9	4.7	57.0	6.6	-	0059-0B
DST#2	oil		-	55.9	36.8	13.4	1.6	4.1	50.2	5.7	-	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	3.3	6.4	1.8	1.4	1.2	2.0	3.2	3.2	2.70	0001-1L
2189.00	swc	S/Sst : drk ol gy	5.4	126.7	71.3	38.8	6.4	10.2	110.1	16.6	1.85	0003-1L
2190.00	swc	S/Sst : drk ol gy	9.7	168.9	100.3	49.5	11.3	7.8	149.8	19.1	1.35	0004-1L
2191.00	swc	S/Sst : ol gy to brn gy	4.8	101.7	64.1	31.9	5.2	0.5	96.0	5.7	1.39	0005-1L
2192.00	swc	S/Sst : ol gy to brn gy	7.4	187.0	111.3	54.4	14.2	7.1	165.7	21.3	1.63	0006-1L
2194.00	swc	S/Sst : ol gy to brn gy	5.9	91.4	52.6	25.7	5.9	7.2	78.3	13.1	1.02	0007-1L

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
DST#1	oil		-	-	-	-	-	-	-	0059-0B
DST#2	oil		-	-	-	-	-	-	-	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	1957	550	428	366	611	978	978	0001-1L
2189.00	swc	S/Sst : drk ol gy	23333	13130	7145	1178	1878	20276	3057	0003-1L
2190.00	swc	S/Sst : drk ol gy	17430	10350	5108	1166	804	15459	1971	0004-1L
2191.00	swc	S/Sst : ol gy to brn gy	21187	13354	6645	1083	104	20000	1187	0005-1L
2192.00	swc	S/Sst : ol gy to brn gy	25168	14979	7321	1911	955	22301	2866	0006-1L
2194.00	swc	S/Sst : ol gy to brn gy	15570	8960	4378	1005	1226	13339	2231	0007-1L

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
DST#1	oil		-	-	-	-	-	-	-	0059-0B
DST#2	oil		-	-	-	-	-	-	-	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	72.49	20.39	15.86	13.59	22.65	36.24	36.24	0001-1L
2189.00	swc	S/Sst : drk ol gy	1261.26	709.77	386.24	63.71	101.54	1096.01	165.25	0003-1L
2190.00	swc	S/Sst : drk ol gy	1291.14	766.73	378.40	86.38	59.63	1145.13	146.01	0004-1L
2191.00	swc	S/Sst : ol gy to brn gy	1524.28	960.73	478.12	77.94	7.49	1438.85	85.43	0005-1L
2192.00	swc	S/Sst : ol gy to brn gy	1544.06	919.01	449.18	117.25	58.62	1368.19	175.87	0006-1L
2194.00	swc	S/Sst : ol gy to brn gy	1526.54	878.51	429.23	98.54	120.25	1307.75	218.79	0007-1L

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	HC	Non-HC	Sat	HC	Sample
			EOM	EOM	EOM	EOM	EOM	EOM	EOM	Aro	
DST#1	oil		66.98	22.64	2.99	7.39	89.62	10.38	295.83	863.64	0059-0B
DST#2	oil		65.83	23.97	2.86	7.33	89.80	10.20	274.63	880.70	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	28.13	21.88	18.75	31.25	50.00	50.00	128.57	100.00	0001-1L
2189.00	swc	S/Sst : drk ol gy	56.27	30.62	5.05	8.05	86.90	13.10	183.76	663.25	0003-1L
2190.00	swc	S/Sst : drk ol gy	59.38	29.31	6.69	4.62	88.69	11.31	202.63	784.29	0004-1L
2191.00	swc	S/Sst : ol gy to brn gy	63.03	31.37	5.11	0.49	94.40	5.60	200.94	1684.21	0005-1L
2192.00	swc	S/Sst : ol gy to brn gy	59.52	29.09	7.59	3.80	88.61	11.39	204.60	777.93	0006-1L
2194.00	swc	S/Sst : ol gy to brn gy	57.55	28.12	6.46	7.88	85.67	14.33	204.67	597.71	0007-1L

Table 4 : Saturated Hydrocarbon Ratios for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Pristane	Pristane	Pristane + Phytane	Phytane	CPI	Sample
			nC17	Phytane	nC17 + nC18	nC18		
DST#1	oil		0.59	1.55	0.53	0.45	1.04	0059-0B
DST#2	oil		0.61	1.55	0.55	0.48	1.02	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	0.74	1.51	0.63	0.52	1.17	0001-1L
2189.00	swc	S/Sst : drk ol gy,	0.81	1.51	0.70	0.59	1.04	0003-1L
2192.00	swc	S/Sst : ol gy to brn gy	0.62	1.50	0.55	0.47	0.98	0006-1L

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
DST#1	oil		1.10	1.72	0.13	0.60	0.47	0.51	0.68	0.48	4.10	1.06	0059-0B
DST#2	oil		1.13	1.53	0.15	0.69	0.55	0.58	0.73	0.46	4.91	1.20	0060-0B
2184.00	swc	Sh/Clst: blk to dsk y brn	0.82	1.46	0.20	0.65	0.31	0.30	0.59	0.41	2.51	0.60	0001-1L
2189.00	swc	S/Sst : drk ol gy	0.84	1.31	-	0.92	0.72	0.78	0.83	0.76	3.76	1.28	0003-1L
2192.00	swc	S/Sst : ol gy to brn gy	0.85	1.36	-	0.93	0.67	0.73	0.80	0.52	3.73	0.83	0006-1L



Table 6 : Thermal Maturity Data for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	T <sub>max</sub> (°C)	Sample
1030.00	cut	bulk	0.33	5	0.04	NDP	-	-	0046-0B
1150.00	cut	bulk	0.36	5	0.03	NDP	-	-	0047-0B
1240.00	cut	bulk	0.32	6	0.05	NDP	-	-	0048-0B
1350.00	cut	bulk	0.29	3	0.08	NDP	-	-	0049-0B
1440.00	cut	bulk	0.43	4	0.08	NDP	-	-	0050-0B
1520.00	cut	bulk	0.76	6	0.03	NDP	-	-	0051-0B
1630.00	cut	bulk	0.57	4	0.04	NDP	-	-	0052-0B
1730.00	cut	bulk	0.94	8	0.17	NDP	-	-	0053-0B
1840.00	cut	bulk	0.93	14	0.07	NDP	-	-	0054-0B
1910.00	cut	bulk	0.96	11	0.10	NDP	-	-	0055-0B
2010.00	cut	bulk	0.95	15	0.10	NDP	-	-	0056-0B
2179.00	cut	bulk	0.94	8	0.08	NDP	-	-	0009-0B
2229.50	ccp	bulk	0.98	13	0.08	NDP	-	-	0057-0B
2272.30	ccp	bulk	0.82	17	0.09	NDP	-	-	0058-0B

Table 6 : Thermal Maturity Data for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2517.00	cut	bulk	1.03	15	0.14	NDP	-	-	0044-0B

Table 7a : Tabulation of carbon isotope data for EOM/EOM - fractions or Oils for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	EOM/Oil	Saturated	Aromatic	NSO	Asphaltenes	Kerogen	Sample
DST#1	oil		-29.23	-29.57	-28.71	-28.72	-28.85	-	0059-0B
DST#2	oil		-28.84	-29.55	-28.77	-28.46	-29.04	-	0060-0B
2189.00	swc		-29.21	-29.68	-28.90	-29.00	-29.21	-	0003-1L
2192.00	swc		-29.32	-29.75	-28.86	-28.88	-29.66	-	0006-1L

Table 7b : Tabulation of cv values from carbon isotope data for well NOCS 34/7-14

Depth unit of measure: m

Depth	Typ	Lithology	Saturated	Aromatic	cv value	Sample
DST#1	oil		-29.57	-28.71	-0.57	0059-0B
DST#2	oil		-29.55	-28.77	-0.76	0060-0B
2189.00	swc		-29.68	-28.90	-0.72	0003-1L
2192.00	swc		-29.75	-28.86	-0.45	0006-1L

Table 8A: Variation in Triterpane Distribution (peak height) for Well NOCS 34/7-14

Depth unit of measure: m

Depth	Lithology	B/A	B/B+A	B		C/E	C/C+E	X/E	Z/E	Z/C	Z/Z+E	Q/E	E/E+F	C+D		J1		Sample
				B+E+F										C+D+E+F	D+F/C+E	J1+J2%		
DST#1		0.76	0.43	0.11	0.42	0.30	0.09	0.30	0.72	0.23	0.09	0.93	0.30	0.09	58.35	0059-0		
DST#2		0.76	0.43	0.11	0.42	0.29	0.09	0.28	0.66	0.22	0.10	0.93	0.30	0.09	61.01	0060-0		
2189.00	S/Sst	0.75	0.43	0.08	0.42	0.29	0.10	0.28	0.68	0.22	0.10	0.93	0.30	0.09	59.89	0003-1		
2192.00	S/Sst	0.71	0.41	0.10	0.45	0.31	0.09	0.28	0.62	0.22	0.11	0.93	0.31	0.08	58.69	0006-1		

Table 8 B: Variation in Sterane Distribution (peak height) for Well NOCS 34/7-14

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Ratio10	Sample
DST#1		0.62	47.34	76.56	0.89	0.78	0.28	0.21	0.62	0.90	3.10	0059-0
DST#2		0.62	42.99	77.40	0.95	0.80	0.28	0.22	0.63	0.75	3.00	0060-0
2189.00	S/Sst	0.63	44.79	78.16	0.94	0.80	0.24	0.18	0.64	0.81	3.24	0003-1
2192.00	S/Sst	0.62	44.98	76.02	0.86	0.78	0.29	0.22	0.61	0.82	2.88	0006-1

Ratio1:  $a / a + j$   
 Ratio2:  $q / q + t * 100\%$   
 Ratio3:  $2(r + s) / (q + t + 2(r + s)) * 100\%$   
 Ratio4:  $a + b + c + d / h + k + l + n$   
 Ratio5:  $r + s / r + s + q$

Ratio6:  $u + v / u + v + q + r + s + t$   
 Ratio7:  $u + v / u + v + i + m + n + q + r + s + t$   
 Ratio8:  $r + s / q + r + s + t$   
 Ratio9:  $q / t$   
 Ratio10:  $r + s / t$

Table 8C: Raw GCMS triterpane data (peak height) for Well NOCS 34/7-14

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
DST#1		21.95	18.21	9.74	12.09	5.30	35.92	27.31	59.79	83.61	0059-0
		18.22	10.31	199.72	15.43	80.19	56.01	6.99	49.49		
		35.32	37.05	23.68	17.92	9.44	13.53	6.67			
DST#2		21.54	20.89	11.16	12.77	5.86	37.85	28.82	59.42	89.45	0060-0
		19.59	9.84	213.79	16.80	77.32	53.36	8.93	55.79		
		35.66	39.12	23.87	20.37	11.33	13.55	9.05			
2189.00	S/Sst	34.97	28.87	15.55	15.42	8.47	34.28	25.87	78.17	114.82	0003-1
		27.07	11.76	275.76	22.14	113.63	77.53	12.32	78.14		
		52.33	58.56	36.71	31.18	17.26	24.42	13.52			
2192.00	S/Sst	34.09	27.05	15.31	16.89	6.91	44.31	31.43	71.72	114.83	0006-1
		21.96	9.33	257.29	18.73	101.75	69.86	10.63	65.61		
		46.19	47.19	31.35	24.45	13.39	20.35	11.70			

Table 8 D: Raw GCMS sterane data (peak height) for Well NOCS 34/7-14

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
DST#1		43.00	21.44	66.01	41.23	12.85	34.32	30.15	28.66	43.64	0059-0
		80.37	38.74	39.79	41.64	18.56	6.75	33.86	45.39		
		27.92	30.22	52.12	52.12	33.61					
DST#2		45.67	24.56	71.20	44.81	14.94	36.11	33.02	30.02	39.15	0060-0
		84.07	35.89	43.85	43.49	22.19	7.31	25.41	36.96		
		28.01	28.65	57.05	57.05	37.99					
2189.00	S/Sst	58.11	36.23	103.67	66.74	20.22	51.62	46.73	41.22	56.62	0003-1
		112.31	55.47	60.65	62.34	31.62	10.67	50.69	67.63		
		42.93	48.41	96.68	96.68	59.68					
2192.00	S/Sst	60.15	35.95	94.87	59.02	18.92	47.69	40.65	41.45	53.74	0006-1
		113.38	52.35	57.83	64.94	30.81	8.67	47.95	62.06		
		37.87	40.41	71.21	71.21	49.42					