

Well: 6406/2-3T3

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf /Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
970102	8 1/2"	4754.0	2.07	67.0	23.0	12/24		/		90000	1.0	38.0	OIL BASED
970103	8 1/2"	4776.5	2.07	66.0	22.0	12/23		/		100000	1.2	38.0	OIL BASED
970104	8 1/2"	4777.5	2.07	66.0	23.0	11/22		/		100000	1.2	38.0	OIL BASED
970105	8 1/2"	4805.5	2.07	66.0	21.0	11/23		/		109000	1.0	38.0	OIL BASED
970106	8 1/2"	4806.0	2.07	65.0	20.0	11/21		/		106000	1.0	38.0	OIL BASED
970107	8 1/2"	4843.0	2.07	64.0	20.0	11/22		/		108000	1.0	38.0	OIL BASED
970108	8 1/2"	4897.0	2.07	66.0	22.0	11/23		/		106000	1.0	38.0	OIL BASED
970109	8 1/2"	4897.0	2.07	67.0	23.0	11/23		/		108000	1.2	38.0	OIL BASED
970110	8 1/2"	4926.0	2.07	66.0	22.0	11/23		/		97000	1.2	38.0	OIL BASED
970111	8 1/2"	4926.0	2.07	65.0	23.0	10/19		/		108000	1.2	38.5	OIL BASED
970112	8 1/2"	4926.0	2.07	64.0	23.0	10/19		/		108000	1.2	38.5	OIL BASED
970113	8 1/2"	4926.0	2.07	65.0	23.0	11/21		/		108000	1.2	38.5	OIL BASED
970114	8 1/2"	4926.0	2.07	64.0	24.0	10/20		/		10800	1.2	38.5	OIL BASED
970115	8 1/2"	4976.0	2.07	63.0	18.0	10/19		/		101000	1.3	39.0	OIL BASED
970116	8 1/2"	5000.0	2.07	64.0	19.0	10/20		/		108	.5	38.0	OIL BASED
970117	8 1/2"	5000.0	2.07	64.0	19.0	10/20		/		104	.8	38.0	OIL BASED
970118	8 1/2"	5020.0	2.07	63.0	18.0	9/18		/		109000	.5	38.0	OIL BASED
970119	8 1/2"	5038.0	2.07	65.0	20.0	10/20		/		105000	.4	38.0	OIL BASED
970120	8 1/2"	5063.0	2.07	63.0	19.0	10/21		/		101000	.3	38.0	OIL BASED
970121	8 1/2"	5066.0	2.07	65.0	21.0	10/20		/		105000	.3	38.0	OIL BASED
970122	8 1/2"	5081.0	2.07	63.0	18.0	10/20		/		105000	.3	38.5	OIL BASED
970123	8 1/2"	5123.0	2.07	63.0	23.0	11/21		/		112000	.4	38.5	OIL BASED
970124	8 1/2"	5169.0	2.07	71.0	24.0	11/26		/		120000	.5	39.0	OIL BASED
970125	8 1/2"	5228.0	2.07	68.0	24.0	12/26		/		112000	.4	39.0	OIL BASED
970126	8 1/2"	5258.0	2.07	65.0	21.0	9/20		/		109000	.5	39.0	OIL BASED
970127	8 1/2"	5258.0	2.07	66.0	22.0	9/20		/		112000	.5	39.0	OIL BASED
970128	8 1/2"	5258.0	2.07	66.0	22.0	9/20		/		112000	.5	39.0	OIL BASED

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf /Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
970129	8 1/2"	5258.0	2.07	66.0	22.0	9/20		/		112000	.5	39.0	OIL BASED
970130	8 1/2"	5258.0	2.07	86.0	33.0	11/22		/		116000	.5	39.0	OIL BASED
970131	8 1/2"	5258.0	2.07	86.0	33.0	11/22		/		116000	.5	39.0	OIL BASED
970201	8 1/2"	5258.0	2.07	86.0	33.0	11/22		/		116000	.5	39.0	OIL BASED
970202	8 1/2"	5258.0	2.07	86.0	33.0	11/22		/		116000	.5	39.0	OIL BASED
970203	8 1/2"	5258.0	2.07	91.0	36.0	16/38		/		105000	.5	39.5	OIL BASED
970204	8 1/2"	5258.0	2.07	91.0	36.0	16/38		/		105000	.5	39.5	OIL BASED
970205	8 1/2"	5258.0	2.07	68.0	24.0	11/23		/		86000	.5	38.0	OIL BASED
970206	8 1/2"	5258.0	2.07	67.0	21.0	10/19		/		90000	.5	39.0	OIL BASED
970207	8 1/2"	5258.0	2.07	67.0	21.0	10/19		/		90000	.5	39.0	OIL BASED
970208	8 1/2"	5258.0	2.07	66.0	11.0	7/13		/		107000	1.0	38.0	OIL BASED
970209	8 1/2"	5258.0	2.07	67.0	21.0	10/19		/		90000	.5	39.0	OIL BASED
970210	8 1/2"	5258.0	2.07	67.0	21.0	10/19		/		90000	.5	39.0	OIL BASED
970211	8 1/2"	5258.0	2.07	76.0	17.0	8/19		/		97000	1.0	38.0	OIL BASED
970212	8 1/2"	5258.0	2.07	71.0	18.0	8/17		/		107000	1.0	38.0	OIL BASED
970213	8 1/2"	5258.0	2.07	74.0	17.0	8/17		/		104000	1.5	38.5	OIL BASED
970214	8 1/2"	5258.0	2.07	76.0	16.0	8/18		/		104000	1.5	38.5	OIL BASED
970215	8 1/2"	5258.0	2.07	76.0	18.0	9/19		/		80000	1.0	38.0	OIL BASED
970216	5 7/8"	5258.0	2.07	78.0	22.0	10/20		/		80000	1.5	38.0	OIL BASED
970217	5 7/8"	5258.0	2.07	82.0	20.0	9/19		/		75000	1.5	38.0	OIL BASED
970218	5 7/8"	5258.0	2.07	84.0	18.0	9/19		/		75000	1.5	38.0	OIL BASED
970219	5 7/8"	5258.0	2.07	86.0	18.0	9/20		/		75000	1.5	38.0	OIL BASED
970220	5 7/8"	5258.0	2.07	73.0	19.0	8/18		/		75000	1.5	38.0	OIL BASED
970221	5 7/8"	5258.0	2.07	75.0	17.0	8/18		/		75000	1.5	38.0	OIL BASED
970222	5 7/8"	5258.0	2.07	75.0	17.0	8/18		/		75000	1.5	38.0	OIL BASED
970223	5 7/8"	5258.0	2.07	77.0	19.0	8/17		/		78000	1.2	37.5	OIL BASED
970224	5 7/8"	5258.0	2.07	77.0	19.0	8/17		/		70000	1.2	37.5	OIL BASED

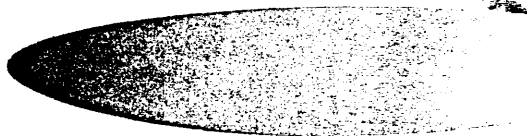
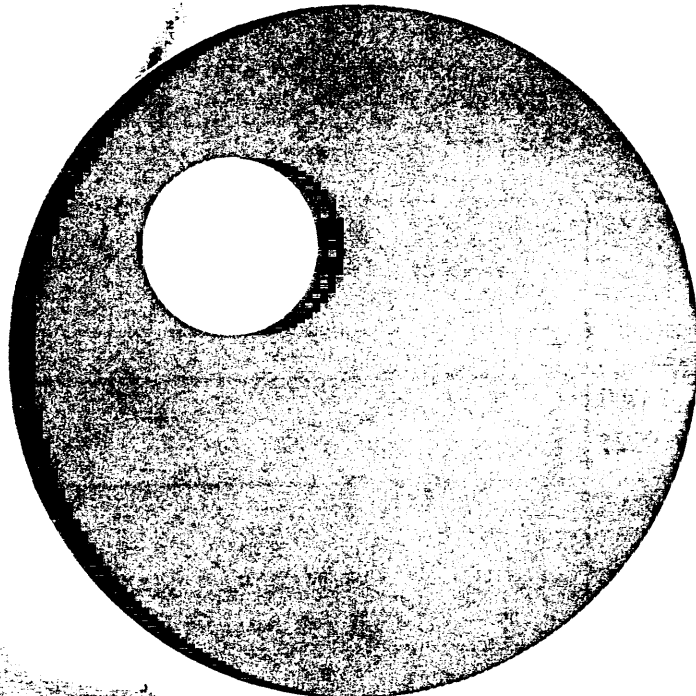
## TOTAL MATERIAL COST AND CONSUMPTION

OPERATOR: Saga Petroleum

WELL: 6406/2-3 T2&amp;T3

(incl. P&amp;A)

Product	Unit size	Unit price NOK	36" sect.	Cost NOK	24" sect.	Cost NOK	17 1/2" sect.	Cost NOK	12 1/4" sect.	Cost NOK	12 1/4" T2 sect.	Cost NOK	8 1/2" T2 sect.	Cost NOK	8 1/2" T3 sect.	Cost NOK	Total consump.	Total cost NOK
Bartite	ton	698.00	132	92 136	130	90 740	510	355 980	1 250	872 500	155	108 190	243	169 614	1 105	771 290	3 525	2 460 450
Bentonite	ton	1950.00	48	93 600	55	107 250									12	23 400	115	224 250
CMC EHV	kg	11.50	600	6 900	3 800	43 700	350	4 025							850	9 775	5 600	64 400
Soda Ash	kg	2.52	550	1 386	625	1 575	500	1 260							125	315	1 800	4 536
Rhodopol 23 P	kg	72.96					1 925	140 448							1 000	72 960	2 925	213 408
Calpol Lovis	kg	23.80					1 300	30 940									1 300	30 940
Lampac Lovis	kg	23.80					9 375	223 125									9 375	223 125
KCI-Brine	M3	887.08					550	487 894									550	487 894
ANCO 208	M3	10417.00					10	104 170									10	104 170
KCI-Powder	MT	1750.00					5	8 750									5	8 750
Citric Acid	kg	12.24					200	2 448									200	2 448
Pot. Bicarb.	kg	10.00					200	2 000									200	2 000
ANCO VERT P	kg	33.00							18 350	605 550	4 150	136 950	3 050	100 650	17 100	564 300	42 650	1 407 450
ANCO VERT S	kg	33.25							7 450	247 713	2 300	76 475	1 800	59 850	7 900	262 675	19 450	646 713
ANCO VERT F	kg	27.90							9 000	251 100	3 900	108 810	1 800	50 220	4 700	131 130	19 400	541 260
ANCO VERT VIS	kg	31.29							9 375	293 344	2 975	93 088	525	16 427	3 700	115 773	16 575	518 632
ANCOTEC B	m3	7700.00											21	158 235	9	68 530	29	226 765
LIME	kg	1.90							13 020	24 738	7 680	14 592	1 060	2 014	4 300	8 170	26 060	49 514
CaCl2	kg	2.63							10 425	27 418	6 875	18 081	350	921	7 575	19 922	25 225	66 342
BASEOIL	m3	2946.86							395	1 164 010	93	274 058	31	91 353	362	1 066 763	881	2 596 184
NUT PLUG F	kg	3.92							525	2 058							525	2 058
NUT PLUG C	kg	3.92							750	2 940							750	2 940
MICA F	kg	3.92							500	1 960							500	1 960
MICA C	kg	3.92							750	2 940							750	2 940
ANCO VERT MUD	m3	2500.00							645	1 612 500	540	1 350 000	521	1 302 500	619	1 547 500	2 325	5 812 500
ANCO VERT MUD	m3	-2500.00							760	-1 900 000	521	-1 302 500	570	-1 425 000	445	-1 112 500	2 296	-5 740 000
Anco 2000 mud	M3	-700.00					382	-267 400									382	-267 400
<b>Total cost</b>	<b>NOK</b>			<b>194 022</b>		<b>243 265</b>		<b>1 093 640</b>		<b>3 208 770</b>		<b>877 744</b>		<b>526 783</b>		<b>3 550 004</b>		<b>9 694 228</b>
<b>Hole drilled</b>	<b>m</b>			<b>92</b>		<b>926</b>		<b>1 430</b>		<b>1 753</b>		<b>1 690</b>		<b>88</b>		<b>678</b>		<b>6 657</b>
<b>Cost per metre</b>	<b>NOK</b>			<b>2 109</b>		<b>263</b>		<b>765</b>		<b>1 830</b>		<b>519</b>		<b>5 986</b>		<b>5 236</b>		<b>1 458</b>
<b>Total days</b>				<b>2</b>		<b>6</b>		<b>10</b>		<b>43</b>		<b>24</b>		<b>20</b>	<b>(to TD)</b>	<b>52</b>		<b>157</b>
<b>Cost per day</b>	<b>NOK</b>			<b>97 011</b>		<b>40 544</b>		<b>109 364</b>		<b>74 623</b>		<b>36 573</b>		<b>26 339</b>		<b>68 269</b>		<b>61 747</b>
<b>Mud mixed</b>	<b>m3</b>			<b>651</b>		<b>1 120</b>		<b>824</b>		<b>796</b>		<b>141</b>		<b>108</b>		<b>638</b>		<b>4 278</b>
<b>Cost per m3</b>	<b>NOK</b>			<b>298</b>		<b>217</b>		<b>1 327</b>		<b>4 031</b>		<b>6 225</b>		<b>4 878</b>		<b>5 564</b>		<b>2 266</b>



BA 97-1133-1  
18 JULI 1997  
**REGISTRERT**  
OLJEDIREKTORATET

**IFE/KR/F-97/113**  
**Datareport on stable isotopes,  
gas samples from  
well 6406/2-3T3**

**Institutt for energiteknikk**  
*Institute for Energy Technology*



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<b>ADDRESS</b> KJELLER Box 40, N-2007 Kjeller, Norway <b>TELEPHONE</b> +47 63 806000 <b>TELEX</b> 76 361 isotp n <b>TELEFAX</b> +47 63 815553		<b>HALDEN</b> N-1751 Halden, Norway +47 69 183100 76 335 energ n		<b>AVAILABILITY</b>  In Confidence
<b>REPORT TYPE</b>	<b>REPORT NO.</b> IFE/KR/F-97/113		<b>DATE</b> 1997-05-09	
	<b>REPORT TITLE</b>  DATAREPORT ON STABLE ISOTOPES, GAS SAMPLES FROM WELL 6406/2-3T3 (ref. IFE no. 2.5.028.97)		<b>DATE OF LAST REV.</b>	
	<b>CLIENT</b> Saga		<b>NUMBER OF PAGES</b> 7	
	<b>CLIENT REF.</b> O-ERT-20657		<b>NUMBER OF ISSUES</b> 9	
<b>SUMMARY</b>  Four gas samples from well 6406/2-3T3 are analysed for gas and isotopic composition.  The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.			<b>DISTRIBUTION</b>  Saga (3) Andresen, B. Bjørnstad, T. Johansen, H. Sieglé, S. File (2)	
<b>KEYWORDS</b>				
	<b>NAME</b>	<b>DATE</b>	<b>SIGNATURE</b>	
<b>PREPARED BY</b>	Bjørg Andresen Sylviane Sieglé	1997-05-09		
<b>REVIEWED BY</b>	Harald Johansen	1997-05-09		
<b>APPROVED BY</b>	Tor Bjørnstad	1997-05-09		

## 1 Introduction

Four gas samples from well 6406/2-3 T3, FMT 1A, FMT 2B, DST 1 and DST 2 are analysed for gas and isotopic composition.

On the samples C<sub>1</sub> - C<sub>5</sub> and CO<sub>2</sub> are quantified. The δ<sup>13</sup>C value is measured on methane, ethane, propane, the butanes and CO<sub>2</sub>. In addition the δD value is measured on methane.

## 2 Analytical procedures

1.0 ml of the different gas samples is sampled with a syringe for analysis on a Porapak Q/Poraplot Q column connected with flame ionisation (FID) and thermal conductivity (TCD) detectors. The detection limit for the hydrocarbon gas components is 0.01 µl/ml and for CO<sub>2</sub> 0.2 µl/ml.

For the isotope analysis 5 - 10 ml is sampled with a syringe and then separated into the different gas components by a Carlo Erba 4200 gas chromatograph. The hydrocarbon gas components are oxidised in separate CuO-ovens in order to prevent cross contamination. The combustion products CO<sub>2</sub> and H<sub>2</sub>O are frozen into collection vessels and separated.

The combustion water is reduced with zinc metal in sealed quartz tubes to prepare hydrogen for isotopic analysis. The isotopic measurements are performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

IFEs value on NBS 22 is  $-29.77 \pm .06\text{‰}$  PDB.

The uncertainty in the δ<sup>13</sup>C value is estimated to be  $\pm 0.3\text{‰}$  PDB and includes all the different analytical steps. The estimate is based on repeated analysis of a laboratory standard gas mixture. The uncertainty in the δD value is likewise estimated to be  $\pm 5\text{‰}$ .

## 3 Results

The volume composition of the gas samples is shown in Table 1 (normalised composition), and the stable isotope composition is shown in Table 2.

*Table 1 Volume composition (normalised values) of gas samples from well 6406/2-3 T3*

Sample	IFE no GEO	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> %	Wet- ness	iC <sub>4</sub> / nC <sub>4</sub>
FMT 1 A	970045	76.3	9.8	5.2	1.2	2.0	0.81	0.87	3.8	96.2	0.21	0.60
FMT 2 B, 4811.5m	970128	77.8	9.1	5.2	1.1	1.9	0.71	0.72	3.6	96.4	0.19	0.56
DST 1	970381	81.2	7.1	4.2	1.1	1.9	0.39	0.36	3.8	96.2	0.16	0.57
DST 2	970382	78.4	9.1	4.4	0.96	1.5	0.26	0.25	5.1	94.9	0.17	0.62

*Table 2 Isotopic composition of gas samples from well 6406/2-3 T3*

Sample	IFE no GEO	C <sub>1</sub> δ <sup>13</sup> C ‰PDB	C <sub>1</sub> δD ‰ 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	CO <sub>2</sub> δ <sup>13</sup> C ‰PDB	CO <sub>2</sub> δ <sup>18</sup> O ‰PDB
FMT 1 A	970045	-46.0	-195	-30.2	-28.6	-29.6	-28.9	-10.8	-15.2
FMT 2 B, 4811.5m	970128	-45.3	-196	-30.5	-28.1	-30.0	-28.7	-10.4	-16.2
DST 1	970381	-46.0	-196	-31.1	-28.5	-28.8	-28.7	-11.0	-13.5
DST 2	970382	-46.4	-218	-30.6	-28.4	-29.3	-28.8	-10.9	-10.2

The molecular composition related to the carbon isotope variations in methane is plotted in Figure 1 (Schoell, 1983), the carbon and hydrogen variations in methane are plotted in Figure 2 (Schoell, 1983) and the carbon isotope variations in ethane related to the carbon isotope variations in methane in Figure 3 (Schoell, 1983).



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<b>REPORT TYPE</b>	<b>REPORT NO.</b> IFE/KR/F-97/028		<b>DATE</b> 1997-01-27	
	<b>REPORT TITLE</b>  DATAREPORT ON STABLE ISOTOPES, GAS SAMPLES FROM WELL 6406/2-3 (ref. IFE no. 2.5.0188.96)		<b>DATE OF LAST REV.</b>	
	<b>CLIENT</b> Robertson Laboratories/Saga Petroleum		<b>NUMBER OF PAGES</b> 7	
	<b>CLIENT REF.</b> Purchase order no. 4058		<b>NUMBER OF ISSUES</b> 10	
<b>SUMMARY</b>  20 gas samples from well 6406/2-3 are analysed for isotopic composition.  The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.			<b>DISTRIBUTION</b>  Robertson (3) Andresen, B. Bjørnstad, T. Johansen, H. Johansen, I. Sieglé, S. File (2)	
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p>EA 97-745-1</p> <p>23 APR. 1997</p> <p><b>REGISTRERT</b></p> <p><b>OLJEDIREKTORATET</b></p> </div>				
<b>KEYWORDS</b>				
	<b>NAME</b>	<b>DATE</b>	<b>SIGNATURE</b>	
<b>PREPARED BY</b>	Bjørg Andresen Ingar Johansen Sylviane Sieglé	1997-01-27	Bjørg Andresen Ingar Johansen Sylviane Sieglé	
<b>REVIEWED BY</b>	Harald Johansen	1997-01-27	Harald Johansen	
<b>APPROVED BY</b>	Tor Bjørnstad	1997-01-27	Tor Bjørnstad	



## 1 Introduction

Twenty gas samples (2 tubes of each) from well 6406/2-3 are analysed for isotopic composition. The gas composition is given by Robertson Laboratories.

The  $\delta^{13}\text{C}$  value is measured on methane, ethane, propane, the butanes and  $\text{CO}_2$  when possible. In addition the  $\delta\text{D}$  value is measured on methane when possible.

## 2 Analytical procedures

Due to low hydrocarbon concentration in most of the samples two different approaches are used for the isotope determination.

### 2.1 Preperative sampling

For the isotope analysis of three samples (sample depth 1700, 2300 and 2800m) 10 ml is sampled with a syringe from each of the two tubes, the gas is mixed and then separated into the different gas components by a Carlo Erba 4200 gas chromatograph. Methane is oxidised in a  $\text{CuO}$ -oven, the combustion products  $\text{CO}_2$  and  $\text{H}_2\text{O}$  are frozen into collection vessels and separated.  $\text{CO}_2$  in the gas samples are collected directly for isotope determination.

The combustion water is reduced with zinc metal in sealed quartz tubes to prepare hydrogen for isotopic analysis. The isotopic measurements are performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

Based on repeated analysis of a laboratory standard gas mixture, the uncertainty in the  $\delta^{13}\text{C}$  value is estimated to be  $\pm 0.3\text{‰}$  PDB and includes all the different analytical steps. The uncertainty in the  $\delta\text{D}$  value is likewise estimated to be  $\pm 5\text{‰}$ .

IFEs value on NBS 22 is  $-29.77 \pm .06\text{‰}$  PDB.

## 2.2 Gas Chromatography Combustion Isotope Ratio Mass Spectrometry - GC-C-IRMS

Aliquots are sampled with a syringe and analysed on a VG Isochrom connected on line to a VG Optima Mass spectrometer. A HP 5890 II with a poraplot Q column is used for the separation and helium is used as a carrier gas. The injections are performed either in splitless or in split mode depending on the hydrocarbon concentrations. No hydrogen or oxygen isotopic composition is included in the analytical procedure.

Based on repeated analysis of a laboratory standard gas mixture, the reproducibility in the  $\delta^{13}\text{C}$  value is better than 0.5‰ PDB.

## 3 Results

The gas composition of the gas samples is shown in Table 1 (determined by Robertson Laboratories) together with the sample codes, and the stable isotope composition is shown in Table 2. Results made by preparative sampling are marked with \* in Table 2.

A complete analysis of all components has not been possible due to low hydrocarbon concentration. Due to the low hydrocarbon concentration the uncertainty in the reported values may be higher than obtained by repeated analysis of the laboratory standard.

The molecular composition related to the carbon isotope variations in methane from the gas samples from well 6406/2-3 is plotted in Figure 1 (Schoell, 1983), the carbon and hydrogen variations in methane are plotted in Figure 2 (Schoell, 1983) and the carbon isotope variations in ethane related to the carbon isotope variations in methane in Figure 3 (Schoell, 1983).

## 4 Literature

Schoell, M. (1983). Genetic characterisation of natural gases. *The American Association of Petroleum Geologists Bulletin*, **67**, 2225-2238.

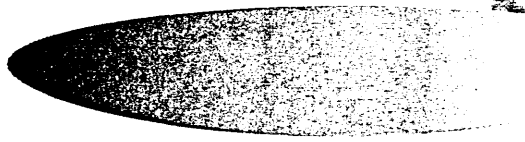
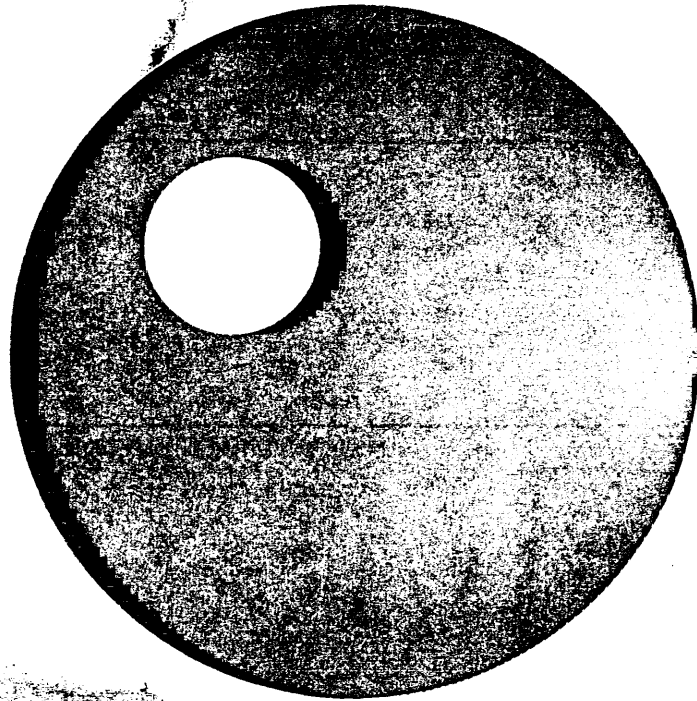
Table 1 List of sample codes and gas composition of samples from well 6406/2-3

Sample	Upper-Lower Depth	IFE no GEO	C <sub>1</sub> ppm	C <sub>2</sub> ppm	C <sub>3</sub> ppm	iC <sub>4</sub> ppm	nC <sub>4</sub> ppm	iC <sub>5</sub> ppm	nC <sub>5</sub> ppm	C <sub>6+</sub> ppm
96024-29	1700.0	961314	14680.0	45.6	32.3	7.0	4.6	5.4	3.4	12.4
96024-44	1850.0	961315	9815.0	30.0	28.8	10.1	3.6	4.2	0.5	11.5
96024-59	2000.0	961316	5740.0	31.2	39.7	18.5	5.3	5.1	2.7	14.0
96024-74	2150.0	961317	5847.0	53.6	44.3	5.8	8.8	2.2	2.4	14.8
96024-89	2300.0	961318	11887.0	179.0	39.5	5.1	6.8			18.6
96024-104	2450.0	961319	3914.0	44.5	28.5					17.8
96024-109	2500.0	961320	5701.0	99.2	61.5	12.9	12.6	5.5	3.1	19.6
96024-124	2650.0	961321	7845.0	375.0	298.0	69.3	61.1	30.9	9.4	111.0
96024-139	2800.0	961322	10174.0	382.0	189.0	50.2	44.8	30.8	13.2	91.3
96024-154	2950.0	961323	4585.0	165.0	48.1	12.3	6.1	9.2	5.9	27.2
96024-169	3100.0	961324	1509.0	402.0	184.0	51.4	23.6	5.3	4.1	16.6
96024-184	3250.0	961325	1026.0	346.0	216.0	28.3	19.3	7.5	4.4	18.4
96024-199	3400.0	961326	1541.0	438.0	437.0	50.6	77.3	12.5	10.3	21.4
96024-214	3550.0	961327	436.0	134.0	180.0	22.5	39.5	6.1	5.8	18.3
96024-229	3700.0	961328	113.0	18.9	38.1	7.5	9.5	2.6	2.4	20.8
96024-244	3850.0	961329	261.1	31.1	54.5	11.5	11.6	3.8	3.0	18.2
96024-259	4000.0	961330	64.9	8.4	17.0	3.8	3.9	1.6	1.3	11.7
96024-276	4152.0	961331	767.4	121.4	98.6	13.8	16.3	2.7	1.8	16.0
96024-292	4305.0	961332	184.7	51.6	29.3	2.0	2.9	0.6	0.9	14.5
96024-308	4450.0	961333	387.4	163.6	122.5	15.0	23.4	5.3	4.4	20.9

Table 2 Isotopic composition of gas samples from well 6406/2-3

IFE no GEO	C <sub>1</sub> $\delta^{13}\text{C}$ ‰ PDB	C <sub>1</sub> $\delta\text{D}$ ‰ SMOW	C <sub>2</sub> $\delta^{13}\text{C}$ ‰ PDB	C <sub>3</sub> $\delta^{13}\text{C}$ ‰ PDB	iC <sub>4</sub> $\delta^{13}\text{C}$ ‰ PDB	nC <sub>4</sub> $\delta^{13}\text{C}$ ‰ PDB	CO <sub>2</sub> $\delta^{13}\text{C}$ ‰ PDB	CO <sub>2</sub> $\delta^{18}\text{O}$ ‰ PDB
961314	-66.6						-26.0	
961314*	-66.9	-184					-29.9	-18.6
961315	-67.9						-26.3	
961316	-66.4						-26.4	
961317	-61.1						-26.7	
961318	-55.3		-42.4				-26.3	
961318*	-53.6	-241					-22.1	-13.9
961319	-49.8						-27.0	
961320	-49.7		-34.7	-32.0			-26.7	
961321	-46.2		-34.3	-31.8	-33.2	-28.0	-26.5	
961322	-46.7		-34.6	-32.7	-31.4	-32.5	-26.5	
961322*	-47.0	-170					-23.0	-15.0
961323	-43.7		-33.2	-32.6			-26.9	
961324	-37.8		-30.2	-32.0	-30.5	-29.3	-26.2	
961325	-35.2		-28.1	-30.5	-27.7	-26.5	-26.6	
961326	-35.3		-26.0	-28.2	-29.0	-28.7	-26.4	
961327	-36.9		-23.2	-28.8	-29.7	-29.5	-25.9	
961328	-33.9			-26.5			-26.2	
961329	-34.4			-23.8			-25.5	
961330	nd						-26.2	
961331	-36.6		-24.6	-27.6			-25.9	
961332	nd						-26.9	
961333	-29.4		-23.1	-25.6			-26.2	

nd - not determined



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**REGISTRERT**  
OLJEDIREKTORATET

**IFE/KR/F-97/106**  
**Datareport on stable isotopes,  
headspace gas from  
well 6406/2-3T2**

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REPORT TYPE	REPORT NO. IFE/KR/F-97/106	DATE 1997-05-02	
	REPORT TITLE  DATAREPORT ON STABLE ISOTOPES, HEADSPACE GAS FROM WELL 6406/2-3T2 (ref. IFE no. 2.5.070.97)	DATE OF LAST REV.	
		REV. NO.	
	CLIENT Robertson Laboratories/Saga Petroleum	NUMBER OF PAGES 4	
CLIENT REF. Purchase order no. 5560	NUMBER OF ISSUES 9		
SUMMARY  28 gas samples from well 6406/2-3T2 are analysed for isotopic composition.  The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.		DISTRIBUTION  Robertson (3) Andresen, B. Bjørnstad, T. Johansen, H. Johansen, I. File (2)	
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## 1 Introduction

Twenty eight gas samples from Saga Petroleum well 6406/2-3T2 are analysed for isotopic composition. The gas composition is given by Robertson Laboratories.

The  $\delta^{13}\text{C}$  value is measured on methane, ethane, propane, the butanes and  $\text{CO}_2$  when possible. Due to low methane concentration no hydrogen isotopes are determined.

## 2 Analytical procedures

All isotopic determination is performed with our GC - C- IRMS system (gas chromatography combustion isotope ratio mass spectrometry) due to low hydrocarbon concentration in the received samples.

Aliquots are sampled with a syringe and analysed on a VG Isochrom connected on line to a VG Optima Mass spectrometer. A HP 5890 II with a poraplot Q column is used for the separation and helium is used as a carrier gas. The injections are performed either in splitless or in split mode depending on the hydrocarbon concentrations. No hydrogen or oxygen isotopic composition is included in the analytical procedure.

Based on repeated analysis of a laboratory standard gas mixture, the reproducibility in the  $\delta^{13}\text{C}$  value is better than 0.5‰ PDB.

## 3 Results

The gas composition of the headspace gas is shown in Table 1 (determined by Robertson Laboratories) together with the sample codes, and the stable isotope composition is shown in Table 2.

A complete analysis of all components has not been possible due to low hydrocarbon concentration. All sample tubes contained a lot of air in addition to the hydrocarbon gas components and the samples were not well suited for isotope analysis. Due to the high concentration of air and low hydrocarbon concentration the uncertainty in the reported values are higher than obtained by repeated analysis of the laboratory standard. The uncertainty in the present  $\delta^{13}\text{C}$  values for  $\text{C}_1$ ,  $\text{C}_3$ ,  $i\text{C}_4$ ,  $n\text{C}_4$  and  $\text{CO}_2$  are  $\pm 1\text{‰}$  and  $\pm 2\text{‰}$  for  $\text{C}_2$ .

Stable isotopes are not determined on samples in the interval between 4070m and 4220m and from 4596m due to low hydrocarbon concentrations. Some of the samples are characterised by heavy isotope values and a secondary fractionation effect cannot be excluded.

The carbon isotope variations in ethane related to the carbon isotope variations in methane are plotted in Figure 1 (Schoell, 1983).

*Table 1 List of sample codes and gas composition of samples from well 6406/2-3T2*

Sample	Depth (m)	IFE no GEO	C <sub>1</sub> ppm	C <sub>2</sub> ppm	C <sub>3</sub> ppm	iC <sub>4</sub> ppm	nC <sub>4</sub> ppm	C <sub>5+</sub> ppm
96024-323	2870	970280	849.0	317.0	222.0	42.7	51.2	170.1
96024-332	2960	970281	1226.0	127.0	48.3	15.6	7.6	96.4
96024-342	3060	970282	2342.0	296.0	104.0	30.5	13.8	109.5
96024-350	3140	970283	143.0	83.1	75.4	24.2	14.6	117.0
96024-357	3210	970284	2591.0	519.0	252.0	46.3	23.9	106.9
96024-363	3270	970285	477.0	155.0	131.0	20.5	14.5	91.1
96024-374	3380	970286	1219.0	372.0	317.0	38.4	47.9	65.7
96024-379	3430	970287	33.3	48.3	149.0	38.9	58.0	111.2
96024-386	3500	970288	384.0	102.0	128.0	16.7	28.5	88.5
96024-393	3570	970289	84.2	26.9	37.6	3.8	9.0	65.0
96024-401	3650	970290	5838.0	617.0	314.0	49.2	46.8	88.7
96024-409	3730	970291	856.0	110.0	112.0	25.3	18.1	73.9
96024-416	3800	970292	121.0	35.2	68.8	18.5	14.2	79.1
96024-429	3930	970293	804.0	115.0	131.0	23.2	19.3	94.8
96024-436	4000	970294	614.0	101.0	125.0	19.7	24.0	91.8
96024-443	4070	970295	146.0	20.9	29.2	4.8	6.6	91.8
96024-450	4140	970296	172.0	37.0	41.0	5.7	9.0	63.4
96024-458	4220	970297	67.4	13.2	13.8	1.6	3.2	56.4
96024-462	4260	970298	149.0	28.3	23.7	2.3	4.2	47.1
96024-470	4340	970299	168.0	53.1	45.3	5.9	9.0	81.8
96024-476	4440	970300	1432.0	226.0	98.0	11.4	20.2	91.4
96024-480	4490	970301	864.0	185.0	85.9	9.1	13.5	69.6
96024-485	4540	970302	535.0	129.0	51.1	7.0	6.3	78.6
96024-486	4550	970303	1354.0	241.0	66.7	7.8	6.6	80.5
96024-489	4569	970304	309.0	54.0	23.6	2.8	4.1	43.4
96024-492	4596	970305	107.0	22.4	19.4	2.8	3.5	38.3
96024-495	4623	970306	469.0	121.0	57.2	5.4	10.3	36.0
96024-496	4632	970307	752.0	361.0	125.0	5.8	13.9	40.0



Table 2 Isotopic composition of gas samples from well 6406/2-3T2

Sample	IFE no GEO	C <sub>1</sub> $\delta^{13}\text{C}$ ‰ PDB	C <sub>2</sub> $\delta^{13}\text{C}$ ‰ PDB	C <sub>3</sub> $\delta^{13}\text{C}$ ‰ PDB	iC <sub>4</sub> $\delta^{13}\text{C}$ ‰ PDB	nC <sub>4</sub> $\delta^{13}\text{C}$ ‰ PDB	CO <sub>2</sub> $\delta^{13}\text{C}$ ‰ PDB
96024-323	970280	-34.1	-29.6	-28.6	-29.2	-28.3	-20.4
96024-332	970281	-39.5	-33.9	-32.5	-30.1	-	-18.1
96024-342	970282	-28.7	-32.0	-31.8	-28.7	-28.3	-19.3
96024-350	970283	-	-	-23.2	-22.7	-20.1	-18.6
96024-357	970284	-34.1	-31.5	-31.5	-30.4	-28.5	-19.1
96024-363	970285	-21.4	-25.3	-28.5	-27.6	-26.5	-18.2
96024-374	970286	-29.4	-28.1	-28.7	-29.2	-28.7	-19.5
96024-379	970287	-	-	-22.3	-26.0	-25.9	-24.0
96024-386	970288	-38.2	-27.0	-28.2	-27.4	-28.4	-18.3
96024-393	970289	-	-21.5	-28.0	-22.3	-26.8	-23.1
96024-401	970290	-25.7	-31.4	-33.2	-33.0	-32.6	-22.5
96024-409	970291	-37.3	-32.2	-32.5	-31.0	-31.7	-21.4
96024-416	970292	-	-	-26.4	-26.5	-24.9	-17.8
96024-429	970293	-40.6	-32.4	-31.5	-30.1	-30.6	-20.8
96024-436	970294	-41.6	-28.9	-30.4	-27.8	-29.6	-22.0
96024-462	970298	-38.4	-18.5	-22.7	-	-	-20.4
96024-470	970299	-	-14.4	-22.0	-	-23.4	-20.2
96024-476	970300	-32.4	-26.8	-24.4	-	-23.9	-20.9
96024-480	970301	-31.2	-28.3	-28.4	-27.6	-28.1	-22.9
96024-485	970302	-36.8	-27.5	-24.1	-	-	-21.9
96024-486	970303	-34.5	-28.7	-22.7	-	-	-21.3
96024-489	970304	-34.8	-28.9	-24.5	-	-	-22.1
96024-495	970306	-35.8	-27.7	-24.6	-	-	-21.0
96024-496	970307	-31.1	-29.5	-28.9	-	-25.2	-21.7

#### 4 Literature

Schoell, M. (1983). Genetic characterisation of natural gases. *The American Association of Petroleum Geologists Bulletin*, **67**, 2225-2238.



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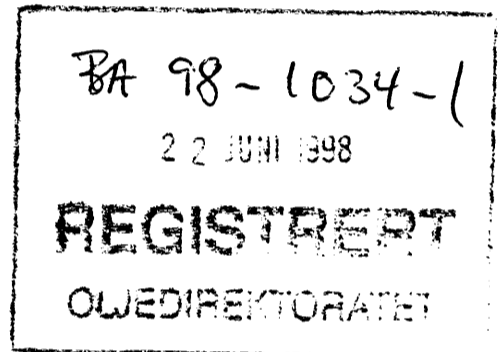
Memorandum Number: RL/98/661

**Title:**

**GEOCHEMICAL ANALYSIS OF WELL & SIDETRACKS  
6406/2-3  
6406/2-3T2  
6406/2-3T3**

**Prepared For:**

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## SUMMARY & INTRODUCTION

<b>Client name</b>	<b>Saga Petroleum A.S.A.</b>
<b>Well names</b>	<b>6406/2-3 6406/2-3T2 6406/2-3T3</b>
<b>Location</b>	<b>Haltenbanken</b>
<b>Dates of receipt</b>	
6406/2-3 (1420 - 2840m)	30/9/96
6406/2-3 (2850 - 4575m)	9/10/96
6406/2-3T2 (2870 - 4632m)	12/12/96
6406/2-3T3 (4587 - 5253m)	11/2/97
<b>Dates of analysis</b>	<b>9/10/96 - 8/9/97</b>
<b>Sample types</b>	<b>Cuttings</b>
<b>RL job no</b>	<b>96024</b>
<b>Client ref. nos.</b>	<b>K-FK-94-052/EUG-005</b>

Wet ditch cuttings were received in geochemical cans from well 6406/2-3 and the subsequent sidetracks T2, and T3. For the 6406/2-3 well 322 samples were submitted for analysis in the interval 1420 - 4575m. For the 6406/2-3T2 sidetrack 174 samples were submitted for analysis in the interval 2870 - 4632m. For the 6406/2-3T3 sidetrack 74 samples were submitted for analysis in the interval 4587 - 5253m.

The objective of this report is to present analytical data produced from the samples documented above. All selection of analysis was carried out by Saga's personnel. The isotope analysis presented in this report was performed, at Saga's request, by IFE.

The tables on pages 4 to 15 of this report fully document the analysis carried out on each sample. No advanced geochemistry was performed on these wells. Problems caused by the mud system meant that analysis was halted after quantitative solvent extraction.

## EXPERIMENTAL PROCEDURES

Unless otherwise stated, analysis was carried out following 'the Norwegian Industry Guide to Organic Geochemical Analysis, November 1992'. A detailed table documenting the methodologies adopted can be found overleaf.

**EXPERIMENTAL PROCEDURES (Table 1)**

<b>ANALYSIS</b>	<b>INSTRUMENT</b>	<b>METHOD</b>	<b>TEMPERATURE PROGRAM</b>	<b>COLUMNS</b>
Headspace gas	Perkin Elmer Sigma 3	NPD method	isothermal 110C	1/8" SS, packed
Occluded gas	Perkin Elmer Sigma 3	NPD method	isothermal 110C	1/8" SS, packed
Gas Isotopes +	VG Optima Mass Spectrometer	NPD method		Poraplot Q
TOC	Leco CS 125	OLS 1 *		
Rock Eval Pyrolysis	Rock Eval II	OLS 5 *	Cycle 1	
Quantitative Extraction	Soxhtec Tecator 1043	NPD method	Boil 1 hr, rinse 2hrs (DCM:MeOH, 7:1)	

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+ - Gas Isotope Analysis was subcontracted to IFE at the request of the client.

\* - TOC and Rock Eval methods are comparable with NPD method. However we do not have Black Ven Marl. Consequently, the Rock Eval was calibrated with a standard related to Delsi IFP standard. In house check standards are run at greater frequency than prescribed in the NPD guidelines. Furthermore, both these methods are UKAS accredited. Robertson Laboratories has been UKAS accredited for the majority of it's geochemical services since 1991. UKAS, an organisation established by the UK government, has reciprocal agreements with Norske Veritas. UKAS accreditation is specifically designed for laboratory testing and is broadly based on ISO 9001. Robertson Laboratories were audited by Saga (Audit no. SAGA-93-110) and it's geochemical methods which are accredited by UKAS were found to be satisfactory.

ANALYTICAL PROGRAM (Table 2)

Well	Nation	Sample Name	Upper Depth	Lower Depth	Headspace gas analysis	Occluded gas analysis	Gas isotope analysis	Lithology descriptions	TOC	Rock Eval Pyrolysis	Solvent Extraction
6406/2-3	NOR	96024-1	1420.0	1420.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-2	1430.0	1430.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-3	1440.0	1440.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-4	1450.0	1450.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-5	1460.0	1460.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-6	1470.0	1470.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-7	1480.0	1480.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-8	1490.0	1490.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-9	1500.0	1500.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-10	1510.0	1510.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-11	1520.0	1520.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-12	1530.0	1530.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-13	1540.0	1540.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-14	1550.0	1550.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-15	1560.0	1560.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-16	1570.0	1570.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-17	1580.0	1580.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-18	1590.0	1590.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-19	1600.0	1600.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-20	1610.0	1610.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-21	1620.0	1620.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-22	1630.0	1630.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-23	1640.0	1640.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-24	1650.0	1650.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-25	1660.0	1660.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-26	1670.0	1670.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-27	1680.0	1680.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-28	1690.0	1690.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-29	1700.0	1700.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-30	1710.0	1710.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-31	1720.0	1720.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-32	1730.0	1730.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-33	1740.0	1740.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-34	1750.0	1750.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-35	1760.0	1760.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-36	1770.0	1770.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-37	1780.0	1780.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-38	1790.0	1790.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-39	1800.0	1800.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-40	1810.0	1810.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-41	1820.0	1820.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-42	1830.0	1830.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-43	1840.0	1840.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-44	1850.0	1850.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-45	1860.0	1860.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-46	1870.0	1870.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-47	1880.0	1880.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-48	1890.0	1890.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-49	1900.0	1900.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-50	1910.0	1910.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-51	1920.0	1920.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-52	1930.0	1930.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-53	1940.0	1940.0	*	*	*	*	*	*	*
6406/2-3	NOR	96024-54	1950.0	1950.0	*	*	*	*	*	*	*

ANALYTICAL PROGRAM (Table 2)

Well	Nation	Sample Name	Upper Depth	Lower Depth	Headspace gas analysis	Occluded gas analysis	Gas Isotope analysis	Lithology descriptions	TOC	Rock Eval Pyrolysis	Solvent Extraction
6406/2-3	NOR	96024-55	1960.0	1960.0	*	*		*			
6406/2-3	NOR	96024-56	1970.0	1970.0	*	*		*			
6406/2-3	NOR	96024-57	1980.0	1980.0	*	*		*		*	
6406/2-3	NOR	96024-58	1990.0	1990.0	*	*		*		*	
6406/2-3	NOR	96024-59	2000.0	2000.0	*	*	*	*		*	
6406/2-3	NOR	96024-60	2010.0	2010.0	*	*		*		*	
6406/2-3	NOR	96024-61	2020.0	2020.0	*	*		*		*	
6406/2-3	NOR	96024-62	2030.0	2030.0	*	*		*		*	
6406/2-3	NOR	96024-63	2040.0	2040.0	*	*		*		*	
6406/2-3	NOR	96024-64	2050.0	2050.0	*	*		*		*	
6406/2-3	NOR	96024-65	2060.0	2060.0	*	*		*		*	
6406/2-3	NOR	96024-66	2070.0	2070.0	*	*		*		*	
6406/2-3	NOR	96024-67	2080.0	2080.0	*	*		*		*	
6406/2-3	NOR	96024-68	2090.0	2090.0	*	*		*		*	
6406/2-3	NOR	96024-69	2100.0	2100.0	*	*		*		*	
6406/2-3	NOR	96024-70	2110.0	2110.0	*	*		*		*	
6406/2-3	NOR	96024-71	2120.0	2120.0	*	*		*		*	
6406/2-3	NOR	96024-72	2130.0	2130.0	*	*		*		*	
6406/2-3	NOR	96024-73	2140.0	2140.0	*	*		*		*	
6406/2-3	NOR	96024-74	2150.0	2150.0	*	*	*	*		*	
6406/2-3	NOR	96024-75	2160.0	2160.0	*	*		*		*	
6406/2-3	NOR	96024-76	2170.0	2170.0	*	*		*		*	
6406/2-3	NOR	96024-77	2180.0	2180.0	*	*		*		*	
6406/2-3	NOR	96024-78	2190.0	2190.0	*	*		*		*	
6406/2-3	NOR	96024-79	2200.0	2200.0	*	*		*		*	
6406/2-3	NOR	96024-80	2210.0	2210.0	*	*		*		*	
6406/2-3	NOR	96024-81	2220.0	2220.0	*	*		*		*	
6406/2-3	NOR	96024-82	2230.0	2230.0	*	*		*		*	
6406/2-3	NOR	96024-83	2240.0	2240.0	*	*		*		*	
6406/2-3	NOR	96024-84	2250.0	2250.0	*	*		*		*	
6406/2-3	NOR	96024-85	2260.0	2260.0	*	*		*		*	
6406/2-3	NOR	96024-86	2270.0	2270.0	*	*		*		*	
6406/2-3	NOR	96024-87	2280.0	2280.0	*	*		*		*	
6406/2-3	NOR	96024-88	2290.0	2290.0	*	*		*		*	
6406/2-3	NOR	96024-89	2300.0	2300.0	*	*	*	*		*	
6406/2-3	NOR	96024-90	2310.0	2310.0	*	*		*		*	
6406/2-3	NOR	96024-91	2320.0	2320.0	*	*		*		*	
6406/2-3	NOR	96024-92	2330.0	2330.0	*	*		*		*	
6406/2-3	NOR	96024-93	2340.0	2340.0	*	*		*		*	
6406/2-3	NOR	96024-94	2350.0	2350.0	*	*		*		*	
6406/2-3	NOR	96024-95	2360.0	2360.0	*	*		*		*	
6406/2-3	NOR	96024-96	2370.0	2370.0	*	*		*		*	
6406/2-3	NOR	96024-97	2380.0	2380.0	*	*		*		*	
6406/2-3	NOR	96024-98	2390.0	2390.0	*	*		*		*	
6406/2-3	NOR	96024-99	2400.0	2400.0	*	*		*		*	
6406/2-3	NOR	96024-100	2410.0	2410.0	*	*		*		*	
6406/2-3	NOR	96024-101	2420.0	2420.0	*	*		*		*	
6406/2-3	NOR	96024-102	2430.0	2430.0	*	*		*		*	
6406/2-3	NOR	96024-103	2440.0	2440.0	*	*		*		*	
6406/2-3	NOR	96024-104	2450.0	2450.0	*	*	*	*		*	
6406/2-3	NOR	96024-105	2460.0	2460.0	*	*		*		*	
6406/2-3	NOR	96024-106	2470.0	2470.0	*	*		*		*	
6406/2-3	NOR	96024-107	2480.0	2480.0	*	*		*		*	
6406/2-3	NOR	96024-108	2490.0	2490.0	*	*		*		*	