

Summary of FMT Results

One sample was taken at 3821 mRKB. The sample contained a mixture of formation water and mudfiltrate with traces of oil and gas. The chloride concentration of 9100 mg/l was found to be approximately three times higher than the chloride concentration from the mud filtrate (3000 mg/l).

DEPTH m RKB	INITIAL HP (PSI)	SHUT-IN SG (PSI)	REMARKS
RUN 3A			
3819.4			tight
3821.0	5663.8	5681	ok
3823.0	5667.3	5685	ok
3827.0	5674.4	5693	ok
3832.0	5695.1	5710	ok
3835.0			tight
3842.0	5714.3	5725	ok
3856.0	5716.3	5725	ok
3868.0	5738.4	5739	ok
3870			void
3874.0	5738.4	5741	ok
3839.0	5764.3	5767	ok
3905.0	5782.4	5786	ok
3953.4	5931.1	5938	ok
3958.4	5940.1	5942	ok
3968.4	5950.8	5961	ok
3958.4	5951.1	5949	repeat
4148.4			tight
4161.0	6343.1	6328	tight
4166.0	6360.0	6347	tight
4213.4	6301.1	6300	plug?

PRODUCT	UNIT	UNIT PRICE \$	36" SECTION	COST	26" SECTION	COST	17.5" SECTION	COST	12.25" SECTION	COST	8.5" SECTION	COST	6" SECTION	COST	TEST P & A \$	TOTAL USED	TOTAL COST \$
BARITE	M.T.	86.00	154	13244.00	.00	494	42484.00	1554	133644.00	140	12040.00	.00	251	21586.00	2593	222998.00	
BENTONITE	M.T.	219.00	35	7665.00	.00	7	1533.00	.00	.00	46	10074.00	.00	3	657.00	91	19929.00	
CAUSTIC SODA	25 KG	11.50	19	218.50	.00	15	172.50	101	1161.50	83	954.50	.00	1	11.50	219	2518.50	
BICARBONATE	50 KG	17.92		.00	.00		.00		.00	3	53.76	.00	17	304.64	20	358.40	
SODA ASH	30 KG.	9.60	5	48.00	.00	1	9.60		.00		.00	.00		.00	6	57.60	
GYPSUM	40 KG.	8.50		.00	.00		.00	30	255.00		.00	.00		.00	30	255.00	
BENTONITE	50 KG.	14.08		.00	.00		.00		.00		.00	.00		.00	0	.00	
SODA ASH	50 KG.	16.00		.00	.00		.00		.00	9	144.00	.00		.00	9	144.00	
XC-POLYMER	50 LBS.	216.00		.00	.00		.00		.00		.00	.00		.00	0	.00	
DRISPAC REG.	50 LBS.	80.50		.00	.00	316	25438.00	18	1449.00		.00	.00	4	322.00	338	27209.00	
DRISPAC SLO.	50 LBS.	80.50		.00	.00	378	30429.00	745	59972.50		.00	.00		.00	1123	90401.50	
GYPSUM	25 KG.	5.31		.00	.00	818	4343.58	814	4322.34		.00	.00		.00	1632	8665.92	
LIME	25 KG.	6.40		.00	.00		.00	129	825.60		.00	.00		.00	129	825.60	
SPERCELL C	25 KG	12.00		.00	.00		.00	124	1488.00	236	2832.00	.00	65	780.00	425	5100.00	
DESCO	25 LBS.	35.84		.00	.00	6	215.04	392	14049.28		.00	.00		.00	398	14264.32	
CMC HIVIS	25 KG.	30.00		.00	.00		.00		.00		.00	.00		.00	0	.00	
ANCOLIG C	25 KG.	20.48		.00	.00		.00		.00	89	1822.72	.00		.00	89	1822.72	
NICA C	25 KG.	10.00		.00	.00	63	630.00		.00		.00	.00		.00	63	630.00	
NICA F	25 KG.	10.00		.00	.00	63	630.00		.00		.00	.00		.00	63	630.00	
NUT PLUG C	25 KG.	14.08		.00	.00	63	887.04		.00		.00	.00		.00	63	887.04	
NUT PLUG F	25 KG.	14.08		.00	.00	63	887.04		.00		.00	.00		.00	63	887.04	
ANCO RESIN	25 KG	89.60		.00	.00		.00		.00	114	10214.40	.00		.00	114	10214.40	
IMCOSPOT	50 LBS	90.00		.00	.00		.00	50	4500.00		.00	.00		.00	50	4500.00	
ZINCCARBONATE	25 KG.	57.60		.00	.00	50	2880.00		.00		.00	.00		.00	50	2880.00	
DEFOAMER	25 LIT.	75.52		.00	.00		.00	1	75.52	2	151.04	.00		.00	3	226.56	
ANCOXIDE	25 KG.	69.12		.00	.00	21	1451.52	16	1105.92		.00	.00		.00	37	2557.44	
PIPELAX	200 L	160.00		.00	.00		.00	3	480.00		.00	.00		.00	3	480.00	

TOTALS			21175.50	.00	111990.32	222848.66	38286.42	.00	23661.14	418442.04
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HOLE DRILLED (METRES)	86	127	1204	2064	470	3951
COST PR.METRE	246.23	.00	93.02	107.97	81.46	105.91

TOTAL DAYS	4	1	12	29	7	6	59
COST PR. DAY	5293.88	.00	9332.53	7684.44	5469.49	3943.52	7092.24

MUD MIXED (CU.M)	714	0	1687	1865	657	192	5115
COST PR.CU.M	29.66	.00	66.38	119.49	58.27	123.24	81.81

DRILLING MUD PROPERTIES RECORD

AREA: HALTENBANKEN

MUD SYSTEM: SPUD MUD/GYP POLYMER

RIG: WEST DELTA

SHEET 1 OF 2

DAY DATE	DEPTH HOLE	M.W.	F.V.	600	300	A.V	P.V	Y.P	GEL	GEL	API	Chl.	CaC12	pH	%Sol.	%Sand	CEC	Ex.Gypsum	
No. 1986	metre	SIZE	S.g	s/qt		cps	cps		0	10	ml.	mg/l	mg/l				ppb	ppb	

(M)																			
1	31/ 3																		
2	1/ 4																		
3	2/ 4	475	1.05	100										10.6					
4	3/ 4	348	36.00	1.05	100									10.6					
5	4/ 4	419	36.00	1.05	100									10.6					
6	5/ 4	473	26.00	1.05	100									10.5					
7	6/ 4	545	26.00	1.05	100									10.6					
8	7/ 4		1.20	45	23	14	12	9	5		1	18.0	21000	5000	10.1	6.0		3.7	
9	8/ 4		1.20	45	24	14	12	10	4		1	11.0	22000	5600	9.4	6.0		3.2	
10	9/ 4	905	17.50	1.21	51	36	21	18	15	6		4.5	24000	4600	9.2	7.0	.75	3.0	
11	10/ 4	1116	17.50	1.20	45	26	16	13	10	6		1	4.5	21000	5000	9.0	6.0		2.5
12	11/ 4	1116	17.50	1.20	44	28	17	14	11	6		1	4.8	23000	4600	9.0	6.0	2.5	4.5
13	12/ 4	823	17.50	1.23	49	39	23	20	16	7		1	4.5	23000	4000	10.1	7.0	.75	3.5
14	13/ 4	1352	17.50	1.23	48	31	19	16	12	7		1	4.6	22000	3900	9.4	8.0	1.00	7.5
15	14/ 4	1362	17.50	1.23	49	26	16	13	10	6	1	1	5.0	21000	4000	9.8	9.0	1.00	7.5
16	15/ 4	1614	17.50	1.25	46	27	16	14	11	5	1	1	5.3	21000	4000	9.7	10.0	.50	7.5
17	16/ 4	1749	17.50	1.26	47	32	19	16	13	6	1	1	5.3	21000	3800	9.4	9.0	.75	7.5
18	17/ 4	1749	17.50	1.26	53	35	20	18	15	5	1	1	4.8	22000	3800	9.3	10.0	1.00	7.5
19	18/ 4	1749	12.25	1.70	45	24	14	12	10	4		1	4.6	22000	3720	9.4	10.0	.25	8.0
20	19/ 4	1749	12.25	1.70	67	50	29	25	21	8	3	29	6.4	22000	3800	9.4	24.0	.75	8.0
21	20/ 4	2102	12.25	1.60	53	56	34	28	22	12	4	66	7.5	22000	4000	8.8	23.0	.50	12.0
22	21/ 4	2102	12.25	1.68	46	42	24	21	18	6	2	20	5.5	22000	3520	9.0	21.0	1.00	13.0
23	22/ 4	2288	12.25	1.69	61	66	39	33	27	12	3	35	5.3	22000	4000	8.8	23.0	1.00	17.0
24	23/ 4	2596	12.25	1.69	64	72	45	36	27	18	6	36	5.4	22000	4320	8.6	22.0	1.00	17.0
25	24/ 4	2790	12.25	1.69	52	71	42	36	29	13	3	33	5.6	22000	4480	8.9	22.0	.75	16.0
26	25/ 4	2809	12.25	1.69	52	70	41	35	29	12	4	34	5.8	22000	4400	8.6	22.0	.75	17.0
27	26/ 4	2918	12.25	1.69	53	60	38	30	22	16	6	31	5.8	22000	4440	8.7	22.0	.75	16.0
28	27/ 4	3032	12.25	1.69	50	61	37	31	24	13	7	31	6.0	22000	4360	8.8	22.0	.75	15.0
29	28/ 4	3129	12.25	1.69	52	65	40	33	25	15	10	42	6.0	22000	4160	9.0	24.0	1.00	14.0
30	29/ 4	3208	12.25	1.69	56	73	44	37	29	15	11	52	5.6	22000	4040	8.8	24.0	1.00	12.5
31	30/ 4	3228	12.25	1.69	57	75	46	38	29	17	14	60	6.0	21000	3840	8.6	23.0	.75	12.5
32	1/ 5	3303	12.25	1.69	55	70	44	35	26	18	19	53	5.9	22000	4000	8.8	23.0	.75	13.5
33	2/ 5	3367	12.25	1.69	56	68	44	34	24	20	15	65	5.6	20000	3840	8.5	24.0	.50	12.5
34	3/ 5	3437	12.25	1.69	60	68	44	34	24	20	18	65	5.4	21000	3800	8.6	24.0	.50	12.5

DRILLING MUD PROPERTIES RECORD

AREA: HALTENBANKEN

MUD SYSTEM: SPUD MUD/GYP POLYMER

RIG: WEST DELTA

SHEET 2 OF 2

DAY DATE	DEPTH HOLE	H.W.	F.V.	600	300	A.V	P.V	Y.P	GEL	GEL	API	Chl.	CaCl2	pH	%Sol.	%Sand	CEC	Ex.Gypsum	
No. 1986	metre	SIZE	S.g	s/qt		cps	cps		0	10	ml.	mg/l	mg/l				ppb	ppb	
	(M)																		
35 4/ 5	3456	12.25	1.69	62	66	42	33	24	18	16	66	5.5	21000	3680	8.4	23.0	.50	13.0	2.0
36 5/ 5	3456	12.25	1.69	70	72	46	36	26	20	19	66	5.2	21000	3740	8.4	23.0	.25	12.5	1.8
37 6/ 5	3464	12.25	1.69	66	69	44	35	25	19	19	65	5.3	21000	3720	8.6	23.5	.75	13.0	1.8
38 7/ 5	3548	12.25	1.69	57	71	46	36	25	21	19	58	5.4	21500	3640	8.4	24.0	.50	13.0	1.6
39 8/ 5	3626	12.25	1.69	56	72	47	36	25	22	20	60	5.8	21500	3640	8.3	24.0	.50	13.0	1.7
40 9/ 5	3663	12.25	1.69	64	70	46	35	24	22	20	60	5.6	21500	3440	8.5	24.0	.50	13.0	1.6
41 10/ 5	3729	12.25	1.69	58	68	44	34	24	20	18	54	5.9	21500	3140	8.4	24.0	.50	13.0	.9
42 11/ 5	3735	12.25	1.69	56	67	44	34	23	21	16	48	5.6	21500	3140	8.2	23.0	.50	13.0	.7
43 12/ 5	3798	12.25	1.69	53	59	39	30	20	19	13	51	6.2	22000	3040	8.6	23.0	.50	14.5	.9
44 13/ 5	3801	12.25	1.69	50	62	40	31	22	18	10	40	6.4	22000	2320	8.9	23.0	.50	14.5	1.0
45 14/ 5	3801	12.25	1.69	50	58	38	29	20	18	10	42	6.2	22000	2560	8.8	23.0	.50	14.5	.9
46 15/ 5	3808	12.25	1.69	63	58	36	29	22	14	6	40	6.4	22000	2000	9.1	23.0	.50	14.0	.8
47 16/ 5	3814	12.25	1.69	50	46	28	23	18	10	3	24	7.2	22000	1600	9.1	22.0	.25	12.0	
48 17/ 5	3814	12.25	1.69	56	46	28	23	18	10	2	22	7.6	22000	1400	8.8	22.0	.25	12.0	
49 18/ 5	3814	8.50	1.24	51	42	25	21	17	8	2	18	6.0	2500	440	9.5	9.0		20.0	
50 19/ 5	3816	8.50	1.24	52	38	22	19	16	6	2	6	5.7	1900	200	9.6	8.0		20.0	
51 20/ 5	3923	8.50	1.24	56	44	25	22	19	6	2	5	5.2	2700	200	10.1	9.0	.50	24.0	
52 21/ 5	4073	8.50	1.24	58	49	28	25	21	7	2	8	5.6	3300	160	10.3	9.0	.25	23.0	
53 22/ 5	4139	8.50	1.24	61	60	33	30	27	6	2	7	5.6	3000	120	10.0	10.0	.25	24.0	
54 23/ 5	4283	8.50	1.24	60	61	34	31	27	7	2	9	5.8	2900	100	10.3	10.0	.25	24.0	
55 24/ 5	4283	8.50	1.24	60	61	34	31	27	7	2	9	5.8	2900	100	10.3	10.0	.25	24.0	
56 25/ 5	4283	1.24		120	96	55	48	41	14	5	50	8.2	4500	440	11.7	11.0	.50	22.0	
57 26/ 5	2318	1.69		82	109	60	55	49	11	2	11	7.4	3500	120	10.1	23.0	2.00	20.0	
58 27/ 5	2318	1.69		113	140	79	70	61	18	9	82	8.0	4900	280	10.7	23.0	2.00	19.5	
59 28/ 5	1570	1.69		115	125	70	63	55	15	5	73	7.9	5900	320	11.0	23.0	2.00	18.0	
60 29/ 5	610	1.20		70	38	23	19	15	8	16	36	9.3	5800	320	10.6	10.0	1.00	13.0	

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Title A GEOCHEMICAL EVALUATION OF HYDROCARBONS EXTRACTED FROM THE SANDSTONE CORE AT 3815.90-3835.39 METRES IN THE 6406/3-5 WELL		
Requested by Odd Ragnar Heum, Let-K	Project Routine geochemistry	
Date 30.11.88	No. of pages 11 10 Tables 15 Figures	No. of enclosures

Key words

Abstract

The present report is in accordance with Statoil's requirements for analytical work and reporting within organic geochemistry.

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INTRODUCTION

This report presents a geochemical evaluation and hydrocarbon correlation study based upon extracted material from a sandstone core at 3815.9 - 3835.39 metres in Statoil's 6404/3-5 well.

The study was designed to characterise the extracted hydrocarbons, to correlate them with the 6406/3-2 DST-2 oil and if possible determine oil water contact.

This project was authorised by T. Meyer, Statoil, Stavanger under contract 6192 No 39.

Analytical

Eleven core fragments from the 3815.90 to 3835.39 metres interval were received and assigned the Geochem job number 1852.

The samples were screened using the Rockeval analysis to measure their thermal bitumen (S1) content. Subsequent analyses were based upon the screen results in accordance with telexes (26.8.88, 5.9.88 and 4.10.88). Analyses performed in this study are as follows:

ANALYSIS	NUMBER OF ANALYSES
	CORE
Sample preparation	11
Pyrolysis	11
Thermal bitumen chromatograms	10
C ₁₅₊ extractions	5
C ₁₅₊ extraction and chromatography	5
Capillary GC - paraffin-naphthenes	5
Capillary GC - aromatics	5
Total extract chromatograms	5
Carbon isotopes - extract fractions	20
GC-MS biomarker analysis SIR	5
GC-MS biomarker analysis SMIM	5

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
<u>WELL: 6406/3-5</u>				
1852-001	3815- 3815m	A 98% SANDSTONE - coarse to very coarse grained, blocky, mod. well sorted, mod. hard to mod. soft, non. calc, Yellow F, rapid blooming milky C yellow grey to light olive grey	5Y8/1- 5Y6/1	
1852-002	3817- 3817m	A 98% SANDSTONE - coarse to very coarse grained, blocky, mod. well sorted, mod. hard, non calc, slightly micaceous, Yellow F, instant blooming milky C, yellow grey to light olive grey	5Y8/1- 5Y6/1	
1852-003	3819- 3819m	A 98% SANDSTONE - coarse to very coarse grained, blocky, mod. well sorted, mod. hard, non calc, slightly micaceous, Yellow F, rapid blooming milky C, yellow grey to light olive grey	5Y8/1- 5Y6/1	
1852-004	3821- 3821m	A 98% SANDSTONE - coarse to very coarse grained, blocky, mod. gritty, mod. well sorted, mod hard to hard, non calc, Gold F, rapid blooming milky C, pink grey to yellow grey	5YR8/1- 5Y6/1	
1852-005	3823- 3823m	A 98% SANDSTONE - coarse to very coarse grained, blocky, mod. gritty, mod. well sorted, hard, non calc, occ. carbonaceous incursions, Gold F, rapid blooming milky cut, pink grey to yellow grey	5YR8/1- 5Y6/1	
1852-006	3825- 3825m	A 98% SANDSTONE - coarse to very coarse grained, blocky, well sorted, hard, mod. micaceous, frequent carbonaceous speckles, non calc, Gold F, rapid blooming milky C, pink grey to medium light grey	5YR8/1- N6	
1852-007	3827- 3827m	A 98% SANDSTONE - coarse to very coarse grained, blocky, well sorted, hard, mod. micaceous, occ. carbonaceous speckles and laminae, non calc, part with Gold F, rapid blooming milky cut, yellow grey to medium light grey	5Y8/1- N6	
1852-008	3829- 3829m	A 98% SANDSTONE - coarse to very coarse grained, blocky, well sorted, hard, mod. micaceous, occ. carbonaceous speckles and laminae, non calc, very light grey to medium light grey	N8- N6	

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1852-009	3831- 3831m	A 98% SANDSTONE - coarse grained, blocky, well sorted, hard, sl to mod. micaceous, occ. carbonaceous speckles, non calc, Yellow F, rapid blooming milky C, pink grey to yellow grey	5YR8/1- 5Y8/1	
1852-010	3833- 3833m	A 98% SANDSTONE - coarse grained, well sorted, blocky, hard, with occ. micaceous and carbonaceous laminae, non calc, dull gold, rapid blooming milky cut, yellow grey to light olive grey	5YR8/1- 5Y8/1	
1852-011	3835- 3835m	A 98% SANDSTONE - coarse grained, well sorted, blocky, hard, with occ. micaceous and carbonaceous laminae, non calc, speckles of fluorescence, white to light olive grey	5YR8/1- 5Y8/1	

CG2

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 2

ROCKEVAL PYROLYSIS DATA

GEOCHEM SAMPLE NUMBER	DEPTH	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Production INDEX
1852-001A	3815.90	2.51	0.36	0.45	0.87
1852-002A	3817.54	3.70	0.75	0.46	0.83
1852-003A	3819.32	1.63	0.34	0.34	0.83
1852-004A	3821.42	1.22	0.38	1.46	0.76
1852-005A	3823.17	2.19	0.59	0.39	0.79
1852-006A	3825.28	0.66	0.29	0.30	0.69
1852-007A	3827.12	0.09	0.01	0.14	0.90
1852-008A	3829.20	0.09	0.05	0.12	0.64
1852-009A	3831.19	1.40	0.40	0.37	0.78
1852-010A	3833.67	1.77	0.57	0.38	0.76
1852-011A	3835.31	0.15	0.06	0.20	0.71

TABLE 3a
THERMAL BITUMEN COMPOSITION (NORM. %) AND ABUNDANCE

GEOCHEM SAMPLE NUMBER	DEPTH	% CX-C6	% C7-C14	% C15+	% nC17	ABUNDANCE (ppm)
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WELL: 6406/3-5

1852-001A	3815-3815m	0.98	17.24	81.78	4.44	2890
1852-002A	3817-3817m	0.63	9.59	88.84	4.34	4116
1852-003A	3819-3819m	1.17	4.26	94.56	4.22	2760
1852-004A	3821-3821m	1.73	3.47	94.80	4.60	1546
1852-005A	3823-3823m	3.58	8.36	90.01	3.58	2760
1852-006A	3825-3825m	1.89	11.67	86.44	5.89	960
1852-007A	3827-3827m	15.51	15.14	69.35	2.39	250
1852-009A	3831-3831m	1.71	3.68	94.61	1.37	1510
1852-010A	3833-3833m	5.93	6.40	87.67	3.76	1850
1852-011A	3835-3835m	52.21	12.63	35.16	0.21	58

TABLE 3b
THERMAL BITUMEN COMPOSITION (NORM. %) AND ABUNDANCE

GEOCHEM SAMPLE NUMBER	DEPTH	% CX-C5	% C6-C14	% C15+	% nC17	ABUNDANCE (ppm)
WELL: 6406/3-5						
1852-001A	3815-3815	0.80	17.42	81.78	4.44	2890
1852-002A	3817-3817	0.47	10.69	88.84	4.34	4116
1852-003A	3819-3819	0.91	4.53	94.56	4.22	2760
1852-004A	3821-3821	1.06	4.13	94.80	4.60	1546
1852-005A	3823-3823	0.76	9.23	90.01	3.58	2760
1852-006A	3825-3825	0.89	12.67	86.44	5.89	960
1852-007A	3827-3827	7.16	23.49	69.35	2.39	250
1852-009A	3831-3831	0.30	5.09	94.61	1.37	1510
1852-010A	3833-3833	4.27	8.07	87.67	3.76	1850
1852-011A	3835-3835	44.42	20.42	35.16	0.21	58

TABLE 4
METHYLPHENANTHRENE INDICES (MPI)

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	MPI 1		MPI 2	
			AREA	HEIGHT	AREA	HEIGHT

WELL: 6406/3-5

1852-001A	3815-3815m		0.83	0.70	0.59	0.68
1852-003A	3819-3819m		0.59	0.60	0.63	0.68
1852-005A	3823-3823m		0.86	0.72	0.61	0.65
1852-009A	3831-3831m		2.03	0.98	2.15	1.13
1852-010A	3833-3833m		1.03	0.97	1.28	1.00

$$\text{MPI 1} = \frac{1.5(2\text{-MP} + 3\text{-MP})}{\text{P} + 1\text{-MP} + 9\text{-MP}} \quad \text{MPI 2} = \frac{3(2\text{-MP})}{\text{P} + 1\text{-MP} + 9\text{-MP}}$$

CT - ditch cuttings CO - core SWC - sidewall core

TABLE 5a
 CONCENTRATION (PPM) OF EXTRACTED C₁₅₊ MATERIAL IN ROCK



JOB	LITHO	DEPTH	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS			
GEOCHEM SAMPLE NUMBER				Saturates	Aromatics	TOTAL	Preciptd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	TOTAL

1852-001A		3815.90	4468	3137	348	3485	324	646	13	983
1852-003A		3819.32	4041	2902	336	3238	125	661	17	803
1852-005A		3823.17	4157	3003	361	3365	137	643	13	793
1852-009A		3831.19	3589	2390	277	2667	125	790	7	922
1852-010A		3833.67	3544	2574	296	2870	139	524	11	674
1852-002A		3817.54	2973							
1852-004A		3821.42	3352							
1852-006A		3825.28	3071							
1852-008A		3829.20	123							
1852-011A		3835.31	124							

S — shale, SS — sandstone, L — limestone, D — dolomite, M — mixed, see Table 1.



TABLE 5b
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL

JOB	LITHO	DEPTH	HYDROCARBONS		NON HYDROCARBONS		
			Saturates	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's

1852-001A		3815.90	70.21	7.78	7.24	14.47	0.30
1852-003A		3819.32	71.81	8.31	3.09	16.36	0.43
1852-005A		3823.17	72.24	8.69	3.29	15.47	0.32
1852-009A		3831.19	66.59	7.72	3.50	22.00	0.20
1852-010A		3833.67	72.63	8.35	3.92	14.79	0.31

S – shale, SS – sandstone, L – limestone, D – dolomite, M – mixed, see Table 1.



TABLE 5b
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL

JOB	LITHO	DEPTH	HYDROCARBONS		NON HYDROCARBONS		
			Saturates	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's

1852-001A		3815.90	70.21	7.78	7.24	14.47	0.30
1852-003A		3819.32	71.81	8.31	3.09	16.36	0.43
1852-005A		3823.17	72.24	8.69	3.29	15.47	0.32
1852-009A		3831.19	66.59	7.72	3.50	22.00	0.20
1852-010A		3833.67	72.63	8.35	3.92	14.79	0.31
1505-001		3937-3995	75.64	17.24	2.01	4.70	0.22
		6406/3-2					
		DST-2					

S - shale, SS - sandstone, L - limestone, D - dolomite, M - mixed, see Table 1.

TABLE 6
SIGNIFICANT RATIOS (%) OF C₁₅₊ FRACTIONS AND ORGANIC CARBON



JOB	LITHO	DEPTH	ORGANIC CARBON (wt. %)	HYDROCARBONS TOTAL EXTRACT	HYDROCARBONS ORG. CARBON	TOTAL EXTRACT ORG. CARBON	SATURATES AROMATICS
GEOCHEM SAMPLE NUMBER							

1852-001A		3815.90	0.05	77.99	697.00	893.66	9.02
1852-003A		3819.32	0.07	80.12	462.51	577.29	8.64
1852-005A		3823.17	0.05	80.93	672.91	831.46	8.31
1852-009A		3831.19	0.05	74.30	533.40	717.86	8.63
1852-010A		3833.67	0.06	80.98	478.29	590.64	8.70

S — shale, SS — sandstone, L — limestone, D — dolomite, M — mixed, see Table 1.

TABLE 7
COMPOSITION (NORMALISED %) OF C₁₅+ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS



GEOCHEM SAMPLE NUMBER	001A	003A	005A	009A	010A
DEPTH	3815.90- 3815.97	3819.32- 3819.32	3823.17- 3823.20	3831.19- 3831.29	3833.67- 3833.74
SAMPLE TYPE					
nC15	5.60	1.22	2.20	1.04	4.59
nC16	6.93	2.38	3.66	2.73	6.53
nC17	7.70	3.19	5.86	4.94	9.11
nC18	9.52	6.18	6.99	6.89	10.64
nC19	7.35	6.92	6.59	7.28	9.11
nC20	7.56	7.81	8.52	8.12	11.04
nC21	6.37	7.20	7.52	8.45	6.93
nC22	7.49	8.55	8.18	7.80	7.41
nC23	6.09	7.40	8.65	6.43	6.69
nC24	6.72	8.42	8.38	6.76	6.61
nC25	4.90	6.25	5.06	7.41	3.63
nC26	4.41	5.70	5.06	4.68	4.03
nC27	3.57	3.94	4.39	6.17	2.74
nC28	3.29	4.82	3.99	4.68	2.34
nC29	2.87	5.23	3.53	4.22	2.34
nC30	2.59	4.01	3.39	3.38	1.77
nC31	2.17	3.46	2.66	2.66	1.45
nC32	1.61	2.51	1.66	2.08	1.05
nC33	1.33	2.04	1.53	1.62	0.73
nC34	1.12	1.70	1.26	1.56	0.81
nC35	0.84	1.09	0.93	1.10	0.48
Paraffin	52.40	48.39	47.62	48.31	47.77
Isoprenoid	6.53	4.30	4.85	5.24	6.04
Naphtene	41.07	47.31	47.53	46.45	46.19
CPI 1 Index	0.88	0.86	0.92	1.12	0.83
CPI 2 Index	0.96	0.96	0.93	1.22	0.90
CPI 3 Index	0.93	0.75	0.97	1.32	0.86
Prist/Phytane	1.00	0.85	0.78	0.80	1.21
Prist/nC17	0.81	1.28	0.76	0.97	0.76
Phytane/nC18	0.65	0.78	0.82	0.88	0.54

$$C.P.I. 1 = \frac{1}{2} \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}}$$

Job Number : 1852

$$C.P.I. 2 = \frac{1}{2} \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}}$$

$$C.P.I. 3 = \frac{2x (C_{27})}{C_{26}+C_{28}}$$

CT - ditch cuttings CO - core SWC - sidewall core

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TABLE 8
CARBON ISOTOPE COMPOSITIONS (‰, PDB)

GEOCHEM SAMPLE NUMBER	DEPTH	TOTAL EXTRACT WHOLE OIL	SATURATES	AROMATICS	NSO	ASPHALTENES	KEROGEN	PYROLYSATE S2
1852-001A	3815.90- 3815.97m	-29.66	-29.49	-29.09	-29.04	-28.85		
1852-003A	3819.32- 3819.39m	-29.55	-29.67	-28.97	-29.29	-29.37		
1852-005A	3823.17- 3823.20m	-29.73	-29.30	-29.05	-29.54	-29.05		
1852-009A	3831.19- 3831.29m	-29.82	-29.97	-29.55	-29.00	-29.33		
1852-010A	3833.67- 3833.74m	-29.88	-30.35	-29.54	-29.32	-29.14		
1505-001	3937- 3995m 6406/3-2 DST-2	-29.85	-28.96	-28.27	-28.04	-29.21		



Table 9a

BIOMARKER PEAK HEIGHTS (SIR)STERANES M/Z 217

SAMPLE	DEPTH	29E	29F	29G	29H
1852 001	3815-3815m	25.5	45.0	33.5	25.0
1852 003	3819-3819m	24.5	32.5	37.5	22.0
1852 005	3823-3823m	33.0	47.5	44.5	33.0
1852 009	3831-3831m	31.0	40.5	41.0	28.0
1852 010	3833-3833m	32.5	50.5	42.5	32.0

Table 9b

BIOMARKER PEAK HEIGHTS (SIR)STERANES M/Z 218

SAMPLE	DEPTH	27F	27G	28F	28G	29F	29G
1852 001	3815-3815m	110.5	85.5	72.0	83.0	87.0	78.0
1852 003	3819-3819m	71.5	81.0	42.5	67.0	60.0	79.5
1852 005	3823-3823m	109.5	84.0	68.0	80.0	88.5	90.0
1852 009	3831-3831m	97.5	92.0	77.0	98.5	102.0	100.00
1852 010	3833-3833m	91.5	97.0	67.0	89.5	94.5	99.5

Table 9c

BIOMARKER PEAK HEIGHTS (SIR)TRITERANES M/Z 191

SAMPLE	DEPTH	Q	27A	28B	28A	29A	29B	X	30A	30B	31A	31B
1852 001	3815-3815m											
						TOO WEAK						
1852 003	3819-3819m	12.5	20.0	47.5		61.0			92.5	4.0	40.5	31.0
1852 005	3823-3823m	16.5	31.5	24.5		66.0	2.5	10.0	110.00	6.5	57.5	37.5
1852 009	3831-3831m	13.0	30.5	17.0	7.0	53.5	3.0	10.5	114.5	5.0	64.5	44.5
1852 010	3833-3833m	10.0	31.0	14.5	6.5	45.5	1.5	10.0	116.5	4.0	63.0	44.5

SAMPLE	DEPTH	32A	32B	33A	33B	34A	34B
1852 001	3815-3815m						
						TOO WEAK	
1852 003	3819-3819m	28.0	20.5	23.0	14.5	16.5	7.0
1852 005	3823-3823m	36.5	25.0	21.5	16.0	21.0	13.0
1852 009	3831-3831m	44.0	30.5	34.0	20.0	29.5	13.5
1852 010	3833-3833m	48.0	29.0	37.0	21.0	28.0	17.0

Table 10a

BIOMARKER PEAK AREAS (MRM)C₂₇ STERANES

SAMPLE	DEPTH	A	B	C	D	E	F	G	H	A27
1852 001M	3815-3815m	1475	847	147	323	310	632	586	336	6361
1852 003M	3819-3819m	282	180	35	27	66	108	68	82	1219
1852 005M	3823-3823m	1941	1213	206	518	457	632	572	511	8307
1852 009M	3831-3831m	925	584	128	219	220	276	245	166	3700
1852 010M	3833-3833m	762	448	109	193	82	183	165	86	3067

Table 10b

BIOMARKER PEAK HEIGHTS (MRM)C₂₈ STERANES

SAMPLE	DEPTH	A	B	C	D	E	F	G	H	A28
1852 001M	3815-3815m	707	655	188	232	229	419	379	147	4862
1852 003M	3819-3819m	124	144	40	49	31	74	73	36	1085
1852 005M	3823-3823m	953	1141	434	446	254	400	428	241	6763
1852 009M	3831-3831m	388	482	179	179	58	179	143	99	3088
1852 010M	3833-3833m	351	415	148	135	84	178	154	85	2932

Table 10c

BIOMARKER PEAK HEIGHTS (MRM)C₂₉ STERANES

SAMPLE	DEPTH	A	B	C	D	E	F	G	H	A29
1852 001M	3815-3815m	657	418	206	150	196	346	378	128	4527
1852 003M	3819-3819m	166	120	40	31	53	94	89	49	954
1852 005M	3823-3823m	986	778	281	245	305	501	470	337	7170
1852 009M	3831-3831m	475	331	134	93	124	250	240	132	2529
1852 010M	3833-3833m	430	289	128	89	103	209	207	117	2314

Table 10d

BIOMARKER PEAK HEIGHTS (MRM)TRITERPANES

SAMPLE	DEPTH	Q	27A	27B	28A	29A	29B	X	30A	30B	31A	31B
1852 001M	3815-3815m		44.5	28.0	12.5	74.0		9.0	118		42.0	335
1852 003M	3819-3819m		35.0	18.0	4.5	73.0		7.0	110.5		47.5	31.5
1852 005M	3823-3823m		30.5	23.0		75.0		9.5	115.0		57.5	38.0
1852 009M	3831-3831m		35.5	14.0		51.5		9.0	118.0		58.0	38.0
1852 010M	3833-3833m		30.5	13.0		48.0		7.0	118.0		56.0	41.0

SAMPLE	DEPTH	32A	32B	33A	33B	34A	34B
1852 001M	3815-3815m	31.5	17.5	14.0	8.0	9.0	5.0
1852 003M	3819-3819m	30.5	15.5	15.5	10.5	12.0	7.5
1852 005M	3823-3823m	34.0	22.0	18.5	11.5	13.0	7.0
1852 009M	3831-3831m	35.0	22.0	20.0	12.0	14.0	8.5
1852 010M	3833-3833m	34.0	21.5	21.0	12.0	14.5	8.0

CG2