2.8.2. Oil Shows

Good trace of crude oil in the mud was observed from 1498m. At 1544 m, a kick was taken which resulted in crude oil being circulated up to the rig. Circulating gas varied between 40-100%, with peaks way above 100% caused by large amount of hydrocarbons. The crude oil collected at surface was dark yellowish brown and had a density of 0.84 g/cc (37 API) measured with a pressurised mud balance. Later laboratory analysis onshore gave a density of 0.80 g/cc (35.1 API).

Acetone has been used as solvent for show descriptions (Table 8).

Table 8: Observed Oil Shows

SOURCE	DEPTH	LITHOLOGY	SHOWS DESCRIPTION
Cuttings	1480-1520m	Trace DOL	Dull yellow direct predominantly mineral fluorescence. No visual direct cut, trace very slow streaming bright yellow fluorescence cut. Trace of yellow-blue white fluor residue to no residue.
Cuttings	1510-1540m	Trace SLTST	Spoty dull yellow direct fluorescence. Very slow streaming bright white fluorescent cut, bright yellow-white residual ring.
Cuttings	1540-1544m	Trace SLTST	100% bright yellow direct fluorescent. Instant to later moderately fast streaming bright blue-white fluorescent cut. Bright yellow-white residual ring. Locally bleeding micro oil stain observed.

Company:	NORSKE CONOCO AS	Country:	NORWAY
Well Name:	1/5-3S	Geo Area:	NORTH SEA
Contractor:	DOLPHIN AS	Field:	EXPLORATION
Rig:	BYFORD DOLPHIN	Region:	OFFSHORE

Interval Material Consumption

Interval #01 36 in. Hole Section

Top of Interval 94 meters
Bottom of Interval 166 meters

Material	Unit size	Quantity	Total cost (Kr)
barite	1000 KG. TON	45.000	29,880.00
guar gum	25 KG. BAG	44	14,696.00
soda ash	25 KG. BAG	50	3,250.00
wyoming bentonite	1000 KG. TON	30.000	58,530.00

Interval mud cost Kr 106,356.00

Programmed mud cost Kr 58,997.16

Variance Kr 47,358.84

Company:	NORSKE CONOCO AS	Country:	NORWAY
Well Name:	1/5-3S	Geo Area:	NORTH SEA
Contractor:	DOLPHIN AS	Field:	EXPLORATION
Rig:	BYFORD DOLPHIN	Region:	OFFSHORE

Interval Material Consumption

Interval #02 26 in. Hole Section

Top of Interval 166 meters
Bottom of Interval 793 meters

Material	Unit size	Quantity	Total cost (Kr)
barite	1000 KG. TON	99.000	65,736.00
guar gum	25 KG. BAG	6	2,004.00
N-VIS HI	20 KG. BAG	26	65,234.00
soda ash	25 KG. BAG	68	4,420.00
wyoming bentonite	1000 KG. TON	36.000	70,236.00

Interval mud cost Kr 207,630.00

Programmed mud cost Kr 70,941.66

Variance Kr 136,688.34

Company:	NORSKE CONOCO AS	Country:	NORWAY
Well Name:	1/5-3S	Geo Area:	NORTH SEA
Contractor:	DOLPHIN AS	Field:	EXPLORATION
Rig:	BYFORD DOLPHIN	Region:	OFFSHORE

Interval Material Consumption

Interval #03 17.5" in. Hole Section

Top of Interval 793 meters
Bottom of Interval 1,545 meters

Material	Unit size	Quantity	Total cost (Kr)
BARACOR 95	200 L. DRUM	7	23,583.00
BARASCAV D	25 KG. BAG	37	6,142.00
BARASIL-S.	1000 KG.	225.410	672,398.03
BARAZAN-D PLUS	25 KG. BAG	114	177,840.00
barite	1000 KG. TON	1,200.000	796,800.00
BAROFIBRE	25 LB. BAG	10	2,760.00
bentonite	25 KG. BAG	6	748.62
FILTER-CHEK	25 KG. BAG	174	72,862.50
FILTER-CHEK	50 LB. BAG	257	97,631.73
GEM GP	220 KG. DRUM	15	39,240.00
GEM GP	1000 L. BULK	53.000	571,181.00
kcl	1000 KG. BAG	19	27,303.00
Kwikseal Coarse	40 LB. BAG	35	5,530.00
Kwikseal Fine	40 LB. BAG	100	15,800.00
Kwikseal Medium	40 LB. BAG	115	18,170.00
mica fine	25 KG. BAG	80	6,240.00
PAC-L	25 KG. BAG	260	170,040.00
potassium chloride brine	1000 L.	749.000	328,811.00
WALL-NUT COARSE	25 KG. BAG	40	3,400.00
WALL-NUT FINE	25 KG. BAG	140	11,900.00
wyoming bentonite	1000 KG. TON	9.000	17,559.00

Interval mud cost Kr 3,065,939.88

Programmed mud cost Kr 1,303,969.82

Variance Kr 1,761,970.06

Company:	NORSKE CONOCO AS	Country:	NORWAY
Well Name:	1/5-3S	Geb Area:	NORTH SEA
Contractor:	DOLPHIN AS	Field:	EXPLORATION
Rig:	BYFORD DOLPHIN	Region:	OFFSHORE

Interval Material Consumption

Interval #04 17.5" in. Hole Section

Top of Interval 1,102 meters
Bottom of Interval 1,422 meters

Material	Unit size	Quantity	Total cost (Kr)
BARACOR 95	200 L. DRUM	5	16,845.00
BARASCAV D	25 KG. BAG	19	3,154.00
BARASIL-S.	1000 KG.	91.550	273,093.65
BARAZAN-D PLUS	25 KG. BAG	37	57,720.00
barite	1000 KG. TON	177.000	117,528.00
FILTER-CHEK	25 KG. BAG	48	20,100.00
FILTER-CHEK	50 LB. BAG	53	20,134.17
GEM GP	1000 L. BULK	17.000	183,209.00
kcl	1000 KG. BAG	11	15,807.00
PAC-L	25 KG. BAG	93	60,822.00
potassium chloride brine	1000 L.	195.000	85,605.00

Interval mud cost Kr 854,017.82

Company:	NORSKE CONOCO AS	Country:	NORWAY
Well Name:	1/5-3S	Geo Area:	NORTH SEA
Contractor:	DOLPHIN AS	Field:	EXPLORATION
Rig:	BYFORD DOLPHIN	Region:	OFFSHORE

Interval Material Consumption

Interval #05 12 1/4 in. Hole Section

Top of Interval 1,422 meters
Bottom of Interval 1,566 meters

Material	Unit size	Quantity	Total cost (Kr)
BARACARB 600	25 KG. BAG	5	565.00
BARASIL-S.	1000 KG.	14.500	43,253.50
barite	1000 KG. TON	164.000	108,896.00
FILTER-CHEK	50 LB. BAG	10	3,798.90
kcl	1000 KG. BAG	5	7,185.00
wyoming bentonite	1000 KG. TON	5.000	9,755.00

Interval mud cost Kr 173,453.40

GEOCHEMICAL INTERPRETATION REPORT

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EXP 10363

TITLE

NOCS 1/5-3S and 1/5-3ST2

AUTHOR(S)

Peter Barry Hall

GEOLAB PROJECT NO.	DATE
62455	6.1.99
PROJECT MANAGER	QA RESPONSIBLE
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REPORT NO./FILE	PAGE 1 of 1

1.2 Analytical Program[1]

Analysis type	*No of samples*	*Figures*	*Tables*
Headspace and Occluded Gas	16(9)	2a-c	1a-c
Lithology description	16(9)		2
Soxtec Extraction of Rock samples	4(1)		
Soxtec Extraction of Mud sample	1		
MPLC separation*	6(1)		3a-e
Saturated hydrocarbon GC	7	3a-c,5a	4a-b
Aromatic hydrocarbon GC	6	5b	5a-b
GC - MS of saturated and aromatic HC	1	6a-e	6a-k
Isotope composition C_{15}+ fractions	2		7a-b
Physical parameters and inorganic analysis	1		8
Whole Oil GC	1	4	9a-c

* MPLC separation of EOM into saturated hydrocarbons, aromatics, NSO and asphaltenes was performed on 5 rock samples (4 from 1/5-3S, and 1 from 1/5-3ST2), 1 mud sample and 1 oil sample (from 1/5-3S).

1 1/5-3S with the 1/5-3ST2 analysis numbers in brackets ()

Table 3a MPLC Bulk Composition: Weight of Mud Fractions for NOCS 1/5-3S						
Description	Sat	Aro	Asph	NSO	HC	Non-HC
	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)
1052 m ref. mud	5.1	7.6	51.9	5.7	12.7	57.6
Table 3b MPLC Bulk Composition: % composition of Mud EOM (%) for NOCS 1/5-3S						
Description	Sat	Aro	Asph	NSO	HC	Non-HC
	%	%	%	%	%	%
1052 m ref. mud	7.2	10.8	73.8	8.1	18.1	81.9
Table 3c MPLC Bulk Composition: Ratios of Mud for NOCS 1/5-3S						
Description	Sat/Aro	HC/Non-HC	ASP/NSO			
1052 m ref. mud	0.67	0.22	9.11			

Table 1: Saturated Hydrocarbon Ratios (peak area) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane/nC17 / Phytane/nC18	Phytane / nC18	CPI1	nC17 / nC17+nC27	Sample
1052.00	mud		0.44	1.79	1.45	0.30	1.10	0.86	0017-0B

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Table 1a: C1 to C7 hydrocarbons in HEADSPACE gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3S
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4/nC4
800.00	1376	141	67	8	22	28	1614	238	14.7	0.36
850.00	4355	703	503	217	494	1475	6272	1917	30.6	0.44
900.00	8700	1111	1045	708	1416	5309	12981	4281	33.0	0.50
950.00	5259	939	763	432	862	3226	8255	2996	36.3	0.50
1000.00	15009	2757	4970	2747	4821	12446	30304	15295	50.5	0.57
1050.00	66969	35789	39525	18114	30832	58158	191230	124*	65.0	0.59
1100.00	59494	43277	60901	21953	43678	92636	229301	170*	74.1	0.50
1150.00	34981	24546	46909	17097	32675	53670	156209	121*	77.6	0.52
1200.00	52494	11836	16721	6455	13412	30239	100917	48423	48.0	0.48
1250.00	91157	24035	35841	13597	30096	64932	194726	104*	53.2	0.45
1300.00	14937	3737	5023	2221	3942	7895	29860	14923	50.0	0.56
1350.00	11783	4311	5630	2054	4273	7536	28051	16267	58.0	0.48
1400.00	13859	2632	2843	1235	2216	4794	22786	8927	39.2	0.56
1450.00	37175	14116	15431	5029	9871	20306	81623	44448	54.5	0.51
1500.00	14829	3240	2694	877	1485	3109	23125	8296	35.9	0.59
1544.00	11508	5793	6047	2347	4901	11445	30597	19089	62.4	0.48

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Table 1b: C1 to C7 hydrocarbons in CUTTINGS gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3S
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4/nC4
800.00	3					76	4	1	19.7	0.37
850.00	13	2	4	3	11	436	33	20	60.1	0.32
900.00	8	1	1	1	4	333	15	7	45.6	0.33
950.00	5	1	1	2	4	176	13	8	59.6	0.35
1000.00	4	1	7	23	50	1076	86	81	94.8	0.45
1050.00	49	62	1376	2257	4471	21280	8214	8165	99.4	0.5(
1100.00	24	81	1472	2041	4283	18159	7900	7876	99.7	0.48
1150.00	19	66	1429	2268	4537	16039	8319	8300	99.8	0.50
1200.00	74	23	386	821	1779	12858	3083	3009	97.6	0.46
1250.00	40	10	165	458	1033	9328	1706	1666	97.7	0.44
1300.00	15	19	231	428	876	7013	1570	1555	99.1	0.49
1350.00	14	13	154	279	644	5547	1104	1090	98.7	0.43
1400.00	28	11	24	60	135	2395	258	230	89.3	0.44
1450.00	31	13	294	587	1201	9095	2125	2095	98.6	0.49
1500.00	38	14	68	81	175	1643	375	338	90.0	0.46
1544.00	70	17	139	201	425	3189	852	782	91.8	0.47

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Table 1c: C1 to C7 hydrocarbons in HEADSPACE and CUTTINGS gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3S
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4/nC4
800.00	1380	141	68	8	22	104	1618	239	14.7	0.36
850.00	4369	705	507	220	505	1911	6306	1937	30.7	0.44
900.00	8709	1112	1046	710	1420	5642	12996	4288	33.0	0.50
950.00	5265	939	764	433	867	3403	8269	3004	36.3	0.50
1000.00	15014	2758	4977	2770	4871	13522	30390	15376	50.6	0.57
1050.00	67019	35850	40901	20371	35303	79439	199444	132*	66.4	0.58
1100.00	59517	43358	62372	23993	47960	111*	237202	178*	74.9	0.50
1150.00	35001	24613	48338	19366	37211	69709	164528	130*	78.7	0.52
1200.00	52568	11859	17107	7276	15190	43098	104000	51432	49.5	0.48
1250.00	91197	24045	36006	14055	31129	74260	196432	105*	53.6	0.45
1300.00	14952	3756	5254	2649	4819	14908	31430	16478	52.4	0.55
1350.00	11797	4324	5784	2333	4917	13083	29155	17357	59.5	0.47
1400.00	13887	2643	2868	1295	2351	7189	23044	9157	39.7	0.55
1450.00	37206	14130	15725	5616	11072	29401	83748	46542	55.6	0.51
1500.00	14866	3254	2762	958	1660	4752	23500	8634	36.7	0.58
1544.00	11578	5810	6186	2549	5325	14634	31449	19870	63.2	0.48

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Table 2 : Lithology description for well NOCS 1/5-3S

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
800.00								0001
			90	Sh/Clst: lt gy, carb, slt, mic, st				0001-1L
			10	Cont : dd				0001-2L
			tr	Sh/Clst: m gy to m drk gy				0001-3L
850.00								0002
			95	Sh/Clst: lt gy, carb, slt, mic, st				0002-1L
			5	Cont : dd				0002-2L
			tr	Sh/Clst: m gy to m drk gy				0002-3L
900.00								0003
			100	Sh/Clst: lt gy, carb, slt, mic, st				0003-1L
			tr	Cont : dd				0003-2L
			tr	Sh/Clst: m gy to m drk gy				0003-3L
950.00								0004
			100	Sh/Clst: lt gy to ol gy, calc, carb, pyr, slt, s, st				0004-1L
			tr	Sh/Clst: m gy to m drk gy				0004-2L
1000.00								0005
			100	Sh/Clst: lt gy to ol gy, calc, carb, pyr, slt, s, st				0005-1L
			tr	Sh/Clst: m gy to m drk gy				0005-2L
1050.00								0006
			90	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st				0006-1L
			10	Sh/Clst: brn gy, st				0006-2L
1100.00								0007
			90	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st				0007-1L
			10	Sh/Clst: brn gy, st				0007-2L

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Table 2 : Lithology description for well NOCS 1/5-3S

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp	Frm	Age	Trb	Sample	Lithology description
1150.00								0008	
			90					0008-1L	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st
			10					0008-2L	Sh/Clst: brn gy, st
			tr					0008-3L	S/Sst : w, f, l
1200.00								0009	
			80					0009-1L	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st
			20					0009-2L	Sh/Clst: brn gy, st
			tr					0009-3L	S/Sst : w, f, l
1250.00								0010	
			80					0010-1L	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st
			20					0010-2L	Sh/Clst: brn gy, st
			tr					0010-3L	S/Sst : w, f, l
1300.00								0011	
			70					0011-1L	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st
			20					0011-2L	Sh/Clst: brn gy, st
			10					0011-3L	Ca : pl y brn
1350.00								0012	
			50					0012-1L	Sh/Clst: m gy to ol gy, calc, slt, st
			40					0012-2L	Sh/Clst: brn gy, st
			10					0012-3L	Ca : pl y brn
1400.00								0013	
			90					0013-1L	Sh/Clst: m gy to m drk gy, calc, slt, st
			10					0013-2L	Sh/Clst: brn gy, st

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Table 2 : Lithology description for well NOCS 1/5-3S

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1450.00								0014
			90	Sh/Clst: m gy to m drk gy, calc, slt, st				0014-1L
			10	Sh/Clst: pl y brn				0014-2L
1500.00								0015
			90	Sh/Clst: lt gy to m drk gy, calc, slt, st				0015-1L
			10	Sh/Clst: pl y brn				0015-2L
1544.00								0016
			90	Sh/Clst: lt gy to m drk gy, calc, slt, st				0016-1L
			10	Sh/Clst: pl y brn				0016-2L

Table 3a: MPLC Bulk Composition: Weight of EOM and Fraction for well NOCS 1/5-3S

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
1050.00	com	Composite sample - see table 3f	3.1	12.3	4.6	2.3	0.8	4.6	6.9	5.4	1.32	0018-0B
1150.00	com	Composite sample - see table 3f	3.5	31.3	15.5	7.3	1.7	6.8	22.8	8.5	1.49	0019-0B
1250.00	com	Composite sample - see table 3f	3.6	10.1	3.9	1.3	0.9	3.9	5.2	4.9	1.73	0020-0B
1450.00	com	Composite sample - see table 3f	8.6	17.8	3.3	0.8	0.8	12.8	4.1	13.7	0.93	0021-0B

Table 3b: MPLC Bulk Composition: Concentration of EOM and Fraction (wt ppm rock) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1050.00	com	Composite sample - see table 3f	4006	1493	746	272	1493	2240	1765	0018-0B
1150.00	com	Composite sample - see table 3f	8994	4458	2089	496	1950	6547	2446	0019-0B
1250.00	com	Composite sample - see table 3f	2774	1078	359	258	1078	1438	1336	0020-0B
1450.00	com	Composite sample - see table 3f	2057	383	95	94	1484	478	1578	0021-0B

Table 3c: MPLC Bulk Composition: Concentration of EOM and Fraction (mg/g TOC(e)) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1050.00	com	Composite sample - see table 3f	303.52	113.16	56.58	20.63	113.16	169.74	133.79	0018-0B
1150.00	com	Composite sample - see table 3f	603.64	299.20	140.25	33.29	130.90	439.45	164.19	0019-0B
1250.00	com	Composite sample - see table 3f	160.39	62.34	20.78	14.92	62.34	83.13	77.26	0020-0B
1450.00	com	Composite sample - see table 3f	221.27	41.20	10.30	10.12	159.65	51.50	169.77	0021-0B

Table 3d: MPLC Bulk Composition: Material extracted from the rock (%) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	Total	HC	Non-HC	Recov. MPLC	Recov. Asph	Sample
1050.00	com	Composite sample - see table 3f	37.28	18.64	6.80	37.28	100.00	55.92	44.08	-	1.00	0018-0B
1150.00	com	Composite sample - see table 3f	49.57	23.23	5.51	21.69	100.00	72.80	27.20	-	1.00	0019-0B
1250.00	com	Composite sample - see table 3f	38.87	12.96	9.30	38.87	100.00	51.83	48.17	-	1.00	0020-0B
1450.00	com	Composite sample - see table 3f	18.62	4.65	4.58	72.15	100.00	23.27	76.73	-	1.00	0021-0B

Table 3e: MPLC Bulk Composition: Ratios for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	Sat / Aro	HC / Non-HC	Asp / NSO	Sample
1050.00	com	Composite sample - see table 3f	2.00	1.27	0.18	0018-0B
1150.00	com	Composite sample - see table 3f	2.13	2.68	0.25	0019-0B
1250.00	com	Composite sample - see table 3f	3.00	1.08	0.24	0020-0B
1450.00	com	Composite sample - see table 3f	4.00	0.30	0.06	0021-0B

Table 3f: MPLC Bulk Composition: List of composite samples for well NOCS 1/5-3S

Depth unit of measure: m

NOTE: Depths shown in tables 3 a to e correspond to the composite samples' lower depth.

Upper depth	Lower depth	Typ	Sample	Depth	Typ	Lithology	Sample
1050.00	1050.00	com	0018-0B is composed of:	1050.00	cut	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st	0006-1L
				1050.00	cut	Sh/Clst: brn gy, st	0006-2L
1150.00	1150.00	com	0019-0B is composed of:	1150.00	cut	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st	0008-1L
				1150.00	cut	Sh/Clst: brn gy, st	0008-2L
1250.00	1250.00	com	0020-0B is composed of:	1250.00	cut	Sh/Clst: m gy to ol gy, calc, carb, pyr, slt, s, st	0010-1L
				1250.00	cut	Sh/Clst: brn gy, st	0010-2L
1450.00	1450.00	com	0021-0B is composed of:	1450.00	cut	Sh/Clst: m gy to m drk gy, calc, slt, st	0014-1L
				1450.00	cut	Sh/Clst: pl y brn	0014-2L

Table 4A: Quantitative Analysis of Saturated Fraction for well NOCS 1/5-3S

sample	nC15 mg/g sat	nC16 mg/g sat	iC18 mg/g sat	nC17 mg/g sat	Pr mg/g sat	nC18 mg/g sat	Ph mg/g sat	nC19 mg/g sat	nC20 mg/g sat	nC21 mg/g sat	nC22 mg/g sat	nC23 mg/g sat	nC24 mg/g sat	nC25 mg/g sat	nC26 mg/g sat	nC27 mg/g sat	nC28 mg/g sat	nC29 mg/g sat	nC30 mg/g sat	nC31 mg/g sat	nC32 mg/g sat	nC33 mg/g sat	nC34 mg/g sat
1050.00m	7.57	17.37	11.74	19.72	15.30	23.40	17.28	21.52	12.91	7.53	5.86	5.65	4.18	*0.00	1.58	1.86	1.30	1.11	0.83	0.92	0.00	0.00	0.00
1150.00m	8.22	8.57	5.13	5.58	5.80	6.21	4.57	4.12	3.27	2.07	1.61	1.32	0.97	4.12	0.92	0.54	0.47	0.37	0.00	0.00	0.00	0.00	0.00
1250.00m	19.64	55.45	23.41	49.66	33.06	37.63	20.54	19.33	12.49	6.23	4.39	4.29	2.63	*0.00	1.73	2.50	2.36	2.44	1.81	1.76	0.00	0.00	0.00
1450.00m	29.75	53.79	18.80	63.76	27.87	58.45	21.27	49.29	36.56	26.16	19.99	16.95	13.32	16.02	8.08	6.43	4.39	3.61	2.87	2.18	1.41	1.41	1.08

* Probably a phthalate - nC25 data is inaccurate

Table 4B: Saturated Hydrocarbon Ratios (peak area) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane/nC17 / Phytane/nC18	Phytane / nC18	CPI1	nC17 / nC17+nC27	Sample
1050.00	com	bulk	0.78	0.89	1.05	0.74	0.77	0.91	0018-0B
1150.00	com	bulk	1.04	1.27	1.41	0.74	2.86	0.91	0019-0B
1250.00	com	bulk	0.67	1.61	1.22	0.55	0.96	0.95	0020-0B
1450.00	com	bulk	0.44	1.31	1.20	0.36	1.34	0.91	0021-0B

Table 5a: Aromatic Hydrocarbon Ratios (peak area) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
1050.00	com	bulk	-	-	-	1.41	0.99	0.97	1.00	-	-	-	0018-0B
1150.00	com	bulk	-	-	-	2.26	1.35	1.34	1.21	-	-	-	0019-0B
1250.00	com	bulk	-	2.62	-	1.34	0.84	0.81	0.91	-	-	-	0020-0B
1450.00	com	bulk	-	2.68	-	1.53	0.97	1.00	0.98	0.22	9.43	2.34	0021-0B

Table 5b: Aromatic Hydrocarbon Ratios (peak area) for well NOCS 1/5-3S

Depth unit of measure: m

Depth	Typ	Lithology	F1	F2	Sample
1050.00	com	bulk	0.51	0.25	0018-0B
1150.00	com	bulk	0.56	0.28	0019-0B
1250.00	com	bulk	0.51	0.25	0020-0B
1450.00	com	bulk	0.50	0.26	0021-0B

Table 3a MPLC Bulk Composition: Weight of Oil and Fractions for NOCS 1/5-3S									
Description	Whole Oil	Light	Topped	Sat	Aro	Asph	NSO	HC	Non-HC
	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)
Oil from header tank				55.3	11.4	9.1	5.9	66.7	15.0

Table 3b MPLC Bulk Composition: % composition of topped oil (%) for NOCS 1/5-3S						
Description	Sat	Aro	Asph	NSO	HC	Non-HC
	%	%	%	%	%	%
Oil from header tank	67.7	13.9	7.2	11.1	81.6	18.4

Table 3c MPLC Bulk Composition: Ratios of topped oil for NOCS 1/5-3S			
Description	Sat/Aro	HC/Non-HC	ASP/NSO
Oil from header tank	4.86	4.44	0.65

Table 4: Saturated Hydrocarbon Ratios (peak area) for 1/5-3S Oil

Well	Description	Pristane / nC17	Pristane / Phytane	Pristane/nC17 / Phytane/nC18	Phytane / nC18	CPI1	nC17 / nC17+nC27	Sample
1/5-3S		0.44	1.65	1.38	0.32	1.13	0.81	R39/0001

Table 5a: Aromatic Hydrocarbon Ratios (peak area) for 1/5-3S Oil

Well	Description	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
1/5-3S		1.72	5.50	0.52	2.17	0.81	1.05	0.88	-	-	-	R39/0001

Table 5b: Aromatic Hydrocarbon Ratios (peak area) for 1/5-3S Oil

Well	Description	F1	F2	Sample
1/5-3S		0.54	0.35	R39/0001

Table 6a: Variation in Triterpane Distribution (peak height) SIR for 1/5-3S Oil

Well	Descript.	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Rat.10	Rat.11	Rat.12	Rat.13	Rat.14	Sample
1/5-3S		0.72	0.42	0.22	0.75	0.43	0.24	0.16	0.21	0.14	0.12	0.86	0.45	0.22	56.00	R39/0001

List of Triterpane Distribution Ratios

Ratio 1: 27Tm / 27Ts

Ratio 2: 27Tm / 27Tm+27Ts

Ratio 3: 27Tm / 27Tm+30aß+30ßa

Ratio 4: 29aß / 30aß

Ratio 5: 29aß / 29aß+30aß

Ratio 6: 30d / 30aß

Ratio 7: 28aß / 30aß

Ratio 8: 28aß / 29aß

Ratio 9: 28aß / 28aß+30aß

Ratio 10: 24/3 / 30aß

Ratio 11: 30aß / 30aß+30ßa

Ratio 12: 29aß+29ßa / 29aß+29ßa+30aß+30ßa

Ratio 13: 29ßa+30ßa / 29aß+30aß

Ratio 14: 32aßS / 32aßS+32aßR (%)

Table 6 b: Variation in Sterane Distribution (peak height) SIR for 1/5-3S Oil

Well	Descript.	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Ratio10	Sample
1/5-3S		0.47	25.03	48.74	1.24	0.66	0.26	0.19	0.32	0.33	0.63	R39/0001

List of Sterane Distribution Ratios

Ratio 1: 27dßS / 27dßS+27aaR

Ratio 2: 29aaS / 29aaS+29aaR (%)

Ratio 3: 2*(29ßßR+29ßßS) / (29aaS+29aaR + 2*(29ßßR+29ßßS)) (%)

Ratio 4: 27dßS+27dßR+27daR+27daS / 29dßS+29dßR+29daR+29daS

Ratio 5: 29ßßR+29ßßS / 29ßßR+29ßßS+29aaS

Ratio 6: 21a+22a / 21a+22a+29aaS+29ßßR+29ßßS+29aaR

Ratio 7: 21a+22a / 21a+22a+28daS+28aaS+29daR+29aaS+29ßßR+29ßßS+29aaR

Ratio 8: 29ßßR+29ßßS / 29aaS+29ßßR+29ßßS+29aaR

Ratio 9: 29aaS / 29aaR

Ratio 10: 29ßßR+29ßßS / 29aaR

Table 6c: Variation in Triaromatic Sterane Distribution (peak height) for 1/5-3S Oil

Well	Descript.	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Sample
1/5-3S		0.66	0.59	0.35	0.38	0.48	R39/0001

Ratio1: a1 / a1 + g1
Ratio2: b1 / b1 + g1
Ratio3: a1 + b1 / a1 + b1 + c1 + d1 + e1 + f1 + g1

Ratio4: a1 / a1 + e1 + f1 + g1
Ratio5: a1 / a1 + d1

Table 4d: Variation in Monoaromatic Sterane Distribution (peak height) for 1/5-3S Oil

Well	Descript.	Ratio1	Ratio2	Ratio3	Ratio4	Sample
1/5-3S		0.51	0.37	0.33	0.25	R39/0001

Ratio1: A1 / A1 + E1
Ratio2: B1 / B1 + E1

Ratio3: A1 / A1 + E1 + G1
Ratio4: A1+B1 / A1+B1+C1+D1+E1+F1+G1+H1+I1

Table 6e: Aromatisation of Steranes (peak height) for 1/5-3S Oil

Well	Descript.	Ratio1	Ratio2	Sample
1/5-3S		0.42	0.73	R39/0001

$$\text{Ratio1:} \quad \frac{C1+D1+E1+F1+G1+H1+I1}{C1+D1+E1+F1+G1+H1+I1 + c1+d1+e1+f1+g1}$$

Ratio2: g1 / g1 + I1

Table 6f: Raw triterpane data (peak height) m/z 191 SIR for 1/5-3S Oil

Well	Descript.	23/3	24/3	25/3	24/4	26/3	27Ts	27Tm	28aß	25nor30aß	Sample
		29aß	29Ts	30d	29ßa	30O	30aß	30ßa	30G	31aßS	
		31aßR	32aßS	32aßR	33aßS	33aßR	34aßS	34aßR	35aßS	35aßR	
1/5-3S		12561.2	9360.5	9551.5	10000.9	3854.5	34338.6	24583.7	12050.9	8565.0	R39/0001
		56419.7	36311.0	18323.1	16854.5	10060.8	75448.3	12601.1	4469.5	23572.1	
		23633.0	13857.8	10887.1	9767.8	7700.4	6100.8	4599.9	4725.8	4268.4	

Table 6g: Raw sterane data (peak height) m/z 217 SIR for 1/5-3S Oil

Well	Descript.	21a	22a	27dßS	27dßR	27daR	27daS	28dßS	28dßR	28daR*	Sample
		29dßS*	28daS*	27aaR	29dßR	29daR	28aaS	29daS*	28ßßS		
		28aaR	29aaS	29ßßR	29ßßS	29aaR					
1/5-3S		11201.3	4198.7	24386.7	15457.1	9401.4	9390.2	12355.0	7352.2	10789.0	R39/0001
		17943.4	8730.5	27043.7	13815.2	6110.7	4117.0	9284.4	7436.0		
		15463.6	7453.2	9434.4	4725.8	22326.0					

* 28daR coel with 27aaS, 29dßS coel with 27ßßR, 28daS coel with 27ßßS, 29daS coel with 28ßßR

Table 6h: Raw triaromatic sterane data (peak height) m/z 231 for 1/5-3S Oil

Well	Descript.	a1	b1	c1	d1	e1	f1	g1	Sample
1/5-3S		6859.4	5216.2	3762.4	7453.5	4317.2	3392.9	3561.4	R39/0001

Table 6i: Raw monoaromatic sterane data (peak height) m/z 253 for 1/5-3S Oil

Well	Descript.	A1	B1	C1	D1	E1	F1	G1	H1	I1	Sample
1/5-3S		3449.3	1945.0	1906.1	1733.3	3263.5	715.6	3755.9	3664.8	1296.2	R39/0001

Table 6j: Raw sterane data (peak height) m/z 218 SIR for 1/5-3S Oil

Well	Descript.	27ßßR	27ßßS	28ßßR	28ßßS	29ßßR	29ßßS	30ßßR	30ßßS	Sample
1/5-3S		12302.7	7401.1	7483.5	7755.6	8813.6	7206.3	3579.6	2465.8	R39/0001

Table 6k: Raw triterpane data (peak height) m/z 177 SIR for 1/5-3S Oil

Well	Descript.	25nor28aß	25nor30aß	Sample
1/5-3S		0.0	5632.0	R39/0001

Table 7a: Tabulation of carbon isotope data on oils for 1/5-3S Oil

Well	Descript.	Whole oil	Topped oil	Saturated	Aromatic	NSO	Asphaltenes	Sample
1/5-3S		-28.32	-	-28.60	-28.26	-	-	R39/0001

Table 7b: Tabulation of cv values from carbon isotope data for 1/5-3S Oil

Well	Descript.	Saturated	Aromatic	cv value	Sample
1/5-3S		-28.60	-28.26	-2.03	R39/0001

Table 8.

LABORATORIE RAPPORT

Forespørsel:
Bestemmelse av API-gravity, svovel, nikkel og vanadium innhold.

Prøve ID:
1 prøve merket: Oil from A-1 Header Box

Metode:

API-gravity:	Bestemmelse av tetthet etter ASTM D-4052 v/ 15 °C, med påfølgende omregning til API-gravitet v/ 60 °F v.h.a API tabell 51.
Svovel	ASTM D-2622
Nikkel	ICP AES
Vanadium	ICP AES

Resultat:

Analyse	Resultat
API-gravity	**35,10**
Svovel, vekt %	**0,15**
Nikkel, ppm	**8**
Vanadium, ppm	**1**

Table 9A: Light Hydrocarbons from Whole Oil GC for 1/5-3S Oil

Well	Description	iC4	nC4	iC5	nC5	2,2DMC4	2,3DMC4	2MC5	3MC5	nC6	MCyC5	Benz	Sample
1/5-3S		-	-	-	-	0.18	-	-	-	2.42	1.07	2.49	R39/0001

Table 9B: Light Hydrocarbons from Whole Oil GC for 1/5-3S Oil

Well	Description	CyC6	2MC6	3MC6	1,3ci-DMCyC5	1,3tr-DMCyC5	1,2tr-DMCyC5	nC7	MCyC6	Tol	nC8	p/m-Xylene	Sample
1/5-3S		1.69	2.14	1.68	0.29	0.28	0.61	4.57	4.66	6.27	6.74	8.49	R39/0001

Table 9c: Thompson's indices for 1/5-3S Oil

Well	Description	A	B	X	W	C	I	F	H	U	R	S	Sample
1/5-3S		1.03	1.37	1.26	14.73	1.10	3.24	0.98	28.71	1.58	2.14	13.44	R39/0001

THOMPSON'S INDICES

$$A = \frac{\text{Benzene}}{\text{nC6}} \qquad B = \frac{\text{Toluene}}{\text{nC7}} \qquad X = \frac{\text{p/m-xylene}}{\text{nC8}} \qquad W = \frac{\text{Benzene} * 10}{\text{CyC6}}$$

$$C = \frac{\text{nC6} + \text{nC7}}{\text{CyC6} + \text{MCyC6}} \qquad I = \frac{\text{2MC6} + \text{3MC6}}{\text{1,3ciDMCyC5} + \text{1,3trDMCyC5} + \text{1,2trDMCyC5}} \qquad F = \frac{\text{nC7}}{\text{MCyC6}}$$

$$H = \frac{\text{nC7} * 100}{\text{CyC6} + \text{2MC6} + \text{2,3DMC4} + \text{3MC6} + \text{1,3ciDMCyC5} + \text{1,3trDMCyC5} + \text{1,2trDMCyC5} + \text{nC7} + \text{MCyC6}}$$

$$U = \frac{\text{CyC6}}{\text{MCyC5}} \qquad R = \frac{\text{nC7}}{\text{2MC6}} \qquad S = \frac{\text{nC6}}{\text{2,2DMC4}}$$

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Table 1a: C1 to C7 hydrocarbons in HEADSPACE gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3 ST2
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4 / nC4
1100.00	5619	2690	3893	1516	2731	5482	16448	10829	65.8	0.56
1260.00	10805	3528	5953	2802	4933	13741	28021	17217	61.4	0.57
1310.00	23197	5257	7557	3383	4955	7434	44349	21152	47.7	0.68
1330.00	21591	5932	8410	3847	6932	17839	46714	25122	53.8	0.55
1360.00	14986	3641	3911	1537	2758	5401	26834	11848	44.2	0.56
1410.00	15088	3472	3579	1355	2343	6364	25836	10748	41.6	0.58
1460.00	13284	6185	9252	3650	6149	11135	38519	25235	65.5	0.59
1510.00	9366	1806	1555	458	819	1890	14004	4638	33.1	0.56
1560.00	778	589	1041	537	1023	2229	3969	3190	80.4	0.53

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Table 1b: C1 to C7 hydrocarbons in CUTTINGS gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3ST2
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4/nC4
1100.00	16	5	82	171	369	3382	643	627	97.5	0.46
1260.00	12	16	127	210	462	3772	827	815	98.5	0.46
1310.00	38	23	124	220	437	3506	842	805	95.5	0.50
1330.00	11	3	47	156	363	3964	579	569	98.2	0.43
1360.00	12	4	51	106	248	2629	421	409	97.1	0.43
1410.00	16	13	109	169	359	2929	667	651	97.6	0.4
1460.00	50	25	285	439	861	5291	1660	1610	97.0	0.51
1510.00	25	15	111	138	306	2554	595	570	95.8	0.45
1560.00	86	19	138	202	436	3397	880	795	90.3	0.46

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Table 1c: C1 to C7 hydrocarbons in HEADSPACE and CUTTINGS gas
(µl gas/kg rock)

Project: 3 BRØNNER
Well: NOCS 1/5-3ST2
Depth unit of measure: m * Indicated values in ml gas/kg rock

Depth	C1	C2	C3	iC4	nC4	C5+	sum C1-C4	sum C2-C4	%wet ness	iC4 / nC4
1100.00	5635	2695	3975	1687	3100	8864	17092	11456	67.0	0.54
1260.00	10817	3543	6080	3012	5395	17514	28848	18031	62.5	0.56
1310.00	23235	5280	7681	3603	5392	10940	45191	21956	48.6	0.67
1330.00	21602	5935	8458	4003	7295	21803	47293	25691	54.3	0.55
1360.00	14999	3645	3962	1643	3006	8031	27255	12256	45.0	0.55
1410.00	15104	3485	3688	1524	2702	9293	26503	11400	43.0	0.56
1460.00	13334	6210	9536	4090	7010	16426	40180	26846	66.8	0.58
1510.00	9391	1822	1666	596	1125	4444	14600	5209	35.7	0.53
1560.00	864	608	1179	739	1458	5626	4849	3985	82.2	0.51

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Table 2 : Lithology description for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp	Frm	Age	Trb	Sample	Lithology description
1100.00								0001	
			70	Sh/Clst				0001-1L	lt gy to m gy, ol gy, slt
			30	Cont				0001-2L	cem
1260.00								0002	
			95	Sh/Clst				0002-1L	m gy to m drk gy, brn gy, slt, st
			5	Cont				0002-2L	cem
1310.00								0003	
			95	Sh/Clst				0003-1L	m gy to m drk gy, brn gy, slt, st
			5	Cont				0003-2L	cem
			tr	Ca				0003-3L	w, pl y brn
1330.00								0004	
			100	Sh/Clst				0004-1L	m gy to m drk gy, brn gy, slt, st
			tr	Ca				0004-2L	w, pl y brn
1360.00								0005	
			100	Sh/Clst				0005-1L	m gy to m drk gy, brn gy, slt, st
			tr	Ca				0005-2L	w, pl y brn
1410.00								0006	
			100	Sh/Clst				0006-1L	m gy to m drk gy, brn gy, slt, st
			tr	Ca				0006-2L	w, pl y brn
1460.00								0007	
			90	Sh/Clst				0007-1L	m gy to m drk gy, brn gy, slt, st
			10	Ca				0007-2L	w, pl y brn

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Table 2 : Lithology description for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1510.00								0008
			95	Sh/Clst	:	m gy to m drk gy, brn gy, slt, st		0008-1L
			5	Ca	:	w, pl y brn		0008-2L
1560.00								0009
			60	Sh/Clst	:	m gy to m drk gy, brn gy, slt, st		0009-1L
			40	Ca	:	w, pl y brn, m gy, argill, crs		0009-2L
			tr	Cont	:	ns		0009-3L

Table 3a: MPLC Bulk Composition: Weight of EOM and Fraction for well NOCS 1/5-3ST2

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
1560.00	cut	Ca : w, pl y brn, m gy	1.5	7.8	3.3	1.7	0.7	2.1	5.0	2.8	0.33	0009-2L

Table 3b: MPLC Bulk Composition: Concentration of EOM and Fraction (wt ppm rock) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1560.00	cut	Ca : w, pl y brn, m gy	5064	2169	1084	454	1355	3254	1810	0009-2L

Table 3c: MPLC Bulk Composition: Concentration of EOM and Fraction (mg/g TOC(e)) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1560.00	cut	Ca : w, pl y brn, m gy	1534.83	657.45	328.73	137.74	410.91	986.18	548.65	0009-2L

Table 3d: MPLC Bulk Composition: Material extracted from the rock (%) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	Total	HC	Non-HC	Recov. MPLC	Recov. Asph	Sample
1560.00	cut	Ca : w, pl y brn, m gy	42.84	21.42	8.97	26.77	100.00	64.25	35.75	-	1.00	0009-2L

Table 3e: MPLC Bulk Composition: Ratios for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	Sat Aro	HC Non-HC	Asp NSO	Sample
1560.00	cut	Ca : w, pl y brn, m gy	2.00	1.80	0.34	0009-2L

Table 4A: Quantitative Analysis of Saturated Fraction for well NOCS 1/5-3ST2

sample	nC15 mg/g sat	nC16 mg/g sat	iC18 mg/g sat	nC17 mg/g sat	Pr mg/g sat	nC18 mg/g sat	Ph mg/g sat	nC19 mg/g sat	nC20 mg/g sat	nC21 mg/g sat	nC22 mg/g sat	nC23 mg/g sat	nC24 mg/g sat	nC25 mg/g sat	nC26 mg/g sat	nC27 mg/g sat	nC28 mg/g sat	nC29 mg/g sat	nC30 mg/g sat	nC31 mg/g sat	nC32 mg/g sat	nC33 mg/g sat	nC34 mg/g sat
1560.00m	14.28	29.18	11.13	33.11	16.10	35.76	14.44	36.58	34.40	29.47	28.66	26.43	22.00	28.28	11.70	8.71	6.13	4.52	3.96	2.71	2.24	2.35	2.03

Table 4B: Saturated Hydrocarbon Ratios (peak area) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane/nC17 / Phytane/nC18	Phytane / nC18	CPI1	nC17 / nC17+nC27	Sample
1560.00	cut	Ca : w, pl y brn, m gy	0.49	1.11	1.20	0.40	1.42	0.79	0009-2L

Table 5a: Aromatic Hydrocarbon Ratios (peak area) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
1560.00	cut	Ca : w, pl y brn, m gy	-	-	-	1.86	1.04	1.19	1.02	-	-	-	0009-2L

Table 5b: Aromatic Hydrocarbon Ratios (peak area) for well NOCS 1/5-3ST2

Depth unit of measure: m

Depth	Typ	Lithology	F1	F2	Sample
1560.00	cut	Ca : w, pl y brn, m gy	0.52	0.30	0009-2L