

# **GEOCHEMICAL REPORT ON NCS WELL 7124/4-1 S**

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## Chapter 1

# INTRODUCTION

### 1.1 General Well Information

The well under consideration in this report is exploration well NCS 7124/4-1 S from the South-East Barents Sea.

The aims of the analytical program were to evaluate the composition and characteristics of the source rocks and migrated hydrocarbons and where possible correlate these with possible source rocks. Cuttings from 830 m to 2813 m were received for analysis. Two sets of samples were received, these were

- A set of samples for geochemical analyses  
(360 samples received 19/01/2012).
- Canned samples for headspace gas analysis  
(300 samples received 28/02/2012)

The first set of samples after washing proved to be too small individually for some of the screening analysis, mainly those in the interval including the Snadd formation and the upper part of the Kobbe Formation. The canned sample material was sufficient to cover this part of the well.

A water-based mud system was used in drilling the well. However, the composition of the mud contained certain organic mud additives, particularly glycols. These cause problems in the interpretation of source potential, particularly in low maturity shales. Normal procedures for removal of these compounds, i.e. water washing cannot remove these compounds from smectite-rich claystones. Instead, a mild acid solution (10% HCl) was added to an aliquot of claystone (it is not necessary to analyse sandstones or limestone this way, as only clay minerals are badly affected by glycol) and then washed with methanol/acetone and then water, before drying and analysis, by thermal extraction and pyrolysis GC and Rock-Eval.

## 1.2 Analytical Program

The final analytical program for well 7124/4-1 S was decided by Fugro Geolab Nor AS in prior consultation with the client. The numbers of samples for the individual analyses are listed in Table 1.1 below.

**Table 1.1**

<b>Well</b>	<b>Types of analyses</b>	<b>Number of analyses</b>
<b>NCS 7124/4-1 S</b>		
	Headspace Gas C <sub>1</sub> -C <sub>5</sub> +	100
	Lithology description	100
	Total Organic Carbon Content (wt%)	95
	Rock-Eval Pyrolysis	86
	Thermal Extraction – Gas Chromatography	2
	Vitrinite Reflectance Measurement	40
	Extraction	4
	Deasphaltene and MPLC	4
	GC-MS saturated hydrocarbons	4
	GC-MS aromatic hydrocarbons	4
	Stable Carbon Isotope Analysis of saturated and aromatic hydrocarbon fractions	4

Table 2 NCS 7124/4-1 S Headspace gas amounts: in µl/kg dry cuttings

Lower Depth (m)	C1	C2	C3	iC4	nC4	C5+	Sum C1-C4	Sum C2-C4	Wetness	iC4/nC4
900	18031	187	85	34	14	28	18351	320	1,7	2,36
920	14808	182	80	31	14	26	15115	307	2	2,27
940	10422	155	66	26	11	22	10680	258	2,4	2,23
970	17106	275	94	30	14	30	17520	414	2,4	2,08
1000	9375	76	29	6	4	11	9492	117	1,2	1,44
1020	16909	145	52	9	7	15	17122	213	1,2	1,31
1040	12847	150	56	8	6	12	13066	220	1,7	1,39
1060	7968	86	29	3	2	7	8088	120	1,5	1,3
1080	5266	129	53	7	5	10	5460	194	3,6	1,55
1100	789	44	25	6	3	12	866	77	8,9	2,28
1120	9604	303	103	22	9	15	10042	438	4,4	2,59
1140	18876	591	228	74	26	40	19794	918	4,6	2,82
1160	5971	337	173	73	29	33	6583	611	9,3	2,52
1185	19956	2235	1271	567	252	273	24281	4325	17,8	2,25
1194	22488	2212	1029	420	177	203	26326	3837	14,6	2,38
1203	17130	1783	927	403	175	198	20420	3289	16,1	2,3
1212	11250	1052	590	250	116	138	13257	2007	15,1	2,16
1221	42589	4427	2335	857	587	964	50795	8206	16,2	1,46
1239	118476	6473	2360	692	426	483	128427	9951	7,7	1,62
1248	125472	9884	3978	1047	616	732	140996	15524	11	1,7
1266	60947	6346	2730	659	421	547	71104	10157	14,3	1,56
1275	19372	2305	1146	268	201	282	23292	3920	16,8	1,33
1293	44019	5414	2302	500	335	429	52570	8551	16,3	1,49
1302	37732	4629	1940	410	263	328	44973	7241	16,1	1,56
1321	33361	5410	2791	537	402	450	42501	9140	21,5	1,33
1339	31604	5770	3991	73	676	664	42114	10509	25	0,11
1363	9852	1958	1490	261	269	255	13830	3978	28,8	0,97
1381	2609	346	404	88	99	141	3544	936	26,4	0,89
1399	4283	824	559	138	110	120	5913	1630	27,6	1,25
1417	5210	871	786	154	190	219	7211	2001	27,8	0,81
1435	6097	890	613	99	121	100	7820	1723	22	0,82
1462	47222	4642	1853	306	283	146	54305	7083	13	1,08
1480	7546	1513	1014	181	209	121	10463	2917	27,9	0,87
1498	7639	935	504	85	84	44	9247	1608	17,4	1,02
1516	3058	844	533	95	91	59	4620	1563	33,8	1,04
1543	6635	588	458	95	85	122	7862	1227	15,6	1,12
1561	104533	7141	2067	476	236	543	114451	9919	8,7	2,02
1579	107508	7661	2011	506	220	471	117907	10399	8,8	2,3
1606	60882	5926	1713	478	206	481	69206	8324	12	2,32
1624	25366	2255	966	302	160	409	29049	3683	12,7	1,88
1642	12597	1560	668	215	119	414	15159	2562	16,9	1,8
1660	32091	3065	853	269	136	557	36415	4324	11,9	1,97
1678	66263	3996	848	262	130	604	71499	5236	7,3	2,01
1703	138	20	27	8	9	22	201	64	31,7	0,94
1721	2178	403	336	73	47	189	3037	859	28,3	1,55
1739	2667	410	254	50	53	147	3435	767	22,3	0,95

Lower Depth (m)	C1	C2	C3	iC4	nC4	C5+	Sum C1-C4	Sum C2-C4	Wetness	iC4/nC4
1766	1379	360	271	53	60	175	2123	744	35	0,89
1784	1284	327	246	56	57	186	1970	685	34,8	0,99
1811	2469	437	322	57	67	175	3352	883	26,3	0,86
1829	1910	287	349	47	72	284	2665	756	28,4	0,66
1847	3396	392	440	49	73	203	4351	955	21,9	0,67
1865	4154	674	864	96	175	277	5962	1808	30,3	0,55
1883	2734	506	700	108	191	302	4239	1505	35,5	0,57
1892	14867	2306	3567	652	1134	2266	22525	7658	34	0,57
1901	9408	975	1050	188	291	490	11911	2503	21	0,65
1919	36987	1804	401	232	110	538	39534	2546	6,4	2,11
1937	50325	3104	1886	423	424	822	56162	5837	10,4	1
1964	31256	2947	3051	658	792	1241	38704	7448	19,2	0,83
1982	23274	3022	4300	1058	1264	2036	32917	9643	29,3	0,84
2000	35728	2891	3111	759	782	1316	43271	7543	17,4	0,97
2027	13002	1556	1972	408	501	686	17440	4438	25,4	0,81
2045	16570	2546	2544	491	509	753	22660	6089	26,9	0,97
2063	12843	1596	1881	427	470	722	17217	4374	25,4	0,91
2081	12081	2000	2722	547	696	1156	18045	5964	33,1	0,79
2099	6362	1235	1246	203	227	307	9273	2911	31,4	0,89
2126	17823	1881	1804	330	338	634	22177	4353	19,6	0,98
2144	11925	1412	1536	280	300	542	15453	3529	22,8	0,93
2162	10535	1647	2150	412	430	667	15173	4638	30,6	0,96
2180	6507	983	1330	301	304	485	9426	2919	31	0,99
2198	3638	757	1256	322	318	464	6291	2653	42,2	1,01
2216	2936	695	1258	343	348	498	5580	2644	47,4	0,98
2243	4193	707	1581	561	601	1168	7644	3450	45,1	0,93
2261	5387	982	2235	893	872	1477	10369	4983	48,1	1,02
2279	2349	502	673	213	213	389	3949	1601	40,5	1
2306	2958	550	1157	409	423	736	5497	2539	46,2	0,97
2324	3262	544	1096	425	388	677	5715	2452	42,9	1,1
2351	1472	314	747	283	247	420	3063	1591	52	1,14
2360	1161	247	590	231	203	354	2432	1271	52,3	1,14
2387	1065	206	414	122	113	220	1920	855	44,5	1,09
2405	915	176	324	89	85	182	1590	675	42,4	1,05
2423	917	161	222	53	49	98	1402	485	34,6	1,09
2441	536	106	160	29	31	67	861	325	37,7	0,93
2459	677	103	134	25	28	70	967	290	30	0,9
2486	654	106	139	28	30	75	957	303	31,6	0,96
2504	660	113	153	28	28	92	982	322	32,8	0,99
2522	676	105	139	28	28	90	976	300	30,8	0,98
2540	685	126	173	39	39	118	1063	378	35,5	1,01
2567	753	117	174	45	39	111	1128	375	33,3	1,15
2594	735	130	215	69	55	145	1205	469	39	1,24
2603	568	90	154	46	40	104	897	329	36,7	1,14
2621	581	108	200	89	73	217	1051	470	44,7	1,22
2639	67	18	62	30	51	83	228	161	70,7	0,58
2657	185	48	187	60	91	228	572	386	67,6	0,66
2684	517	91	223	85	120	169	1037	520	50,1	0,71

<b>Lower Depth (m)</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>iC4</b>	<b>nC4</b>	<b>C5+</b>	<b>Sum C1-C4</b>	<b>Sum C2- C4</b>	<b>Wetness</b>	<b>iC4/nC4</b>
2702	427	66	150	41	65	91	749	322	43	0,63
2729	601	149	942	521	885	1080	3097	2497	80,6	0,59
2747	362	62	255	132	215	301	1026	664	64,7	0,61
2765	674	91	399	184	339	665	1688	1014	60,1	0,54
2783	463	58	181	62	119	220	883	420	47,5	0,52
2801	562	87	299	96	187	360	1231	668	54,3	0,52

**Table 3. NCS 7124/4-1 S Lithology Description**

**Lithology description for well NCS 7124/4-1 S**

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
-----	-----	----	----	-----	----	-----
Int	Cvd	TOC%	%	Lithology description		
----	-----	-----	-----	-----	-----	-----
900.00						0001
	1.30	100	Sh/Clst:	m drk gy to drk gy, slt, s		0001-1L
			tr Sh/Clst:	m gy		0001-2L
			tr Ca	: drk brn gy		0001-3L
920.00						0002
	1.27	75	Sh/Clst:	m gy to m drk gy, slt, s		0002-1L
		15	Ca	: brn gy to drk brn gy		0002-2L
		10	Sltst	: lt gy to m gy, s, argill		0002-3L
940.00						0003
	1.21	100	Sh/Clst:	m drk gy to drk gy, slt, s		0003-1L
			tr Ca	: brn gy to drk brn gy		0003-2L
			tr Sltst	: lt gy to m gy		0003-3L
970.00						0004
	1.18	75	Sh/Clst:	m drk gy to drk gy, slt, s		0004-1L
		15	Ca	: brn gy to drk brn gy		0004-2L
		10	Sltst	: lt gy to m gy, s, argill		0004-3L
980.00						0005
	1.12	90	Sh/Clst:	m gy to m drk gy, gy brn, slt, s		0005-1L
		5	Ca	: brn gy to drk brn gy		0005-2L
		5	Sltst	: lt gy to m gy, s, argill		0005-3L
1000.00						0006

**Lithology description for well NCS 7124/4-1 S**

0.85	85 Sh/Clst: lt gy to m gy, m drk gy	0006-1L
	10 Sh/Clst: lt gy to gy red	0006-2L
	5 S/Sst : w, l	0006-3L
	tr Chert : drk gy	0006-4L
	tr Ca : brn gy	0006-5L
1020.00		0007
0.78	100 Sh/Clst: m gy	0007-1L
	tr Ca : brn gy to drk brn gy	0007-2L
1040.00		0008
0.74	100 Sh/Clst: m gy	0008-1L
	tr Ca : w, brn gy	0008-2L
1060.00		0009
0.64	100 Sh/Clst: m gy	0009-1L
	tr Ca : w, brn gy	0009-2L
1080.00		0010
0.81	100 Sh/Clst: m gy to m drk gy	0010-1L
1100.00		0011
1.00	75 Sh/Clst: m gy to m drk gy	0011-1L
	25 Ca : w, brn gy	0011-2L
1120.00		0012
1.20	95 Sh/Clst: m gy to drk gy	0012-1L
	5 Ca : w, brn gy	0012-2L
1140.00		0013
1.22	100 Sh/Clst: m gy to drk gy	0013-1L
	tr Ca : w, brn gy	0013-2L



**Lithology description for well NCS 7124/4-1 S**

1160.00			0014
	1.02	100 Sh/Clst: m gy to m drk gy	0014-1L
		tr Ca : w, brn gy	0014-2L
1180.00			0015
		55 Sh/Clst: m gy to m drk gy	0015-1L
	6.04	25 Sh/Clst: drk brn gy to brn blk	0015-2L
		20 Ca : w, brn gy	0015-3L
		tr Other : pyr	0015-4L
		tr Cont : cem	0015-5L
1201.00			0016
		30 Ca : w, brn gy	0016-3L
	5.44	25 Sh/Clst: drk brn gy to brn blk	0016-2L
		25 Sh/Clst: gy red, mic	0016-6L
		15 Sh/Clst: m gy to m drk gy	0016-1L
		5 Cont : cem, dd	0016-5L
		tr Other : pyr	0016-4L
1219.00			0017
	6.71	90 Sh/Clst: drk brn gy to brn blk, slt, mic	0017-1L
		5 Sh/Clst: gy red to red brn	0017-2L
		5 Ca : w, brn gy	0017-3L
1221.00			0097
	9.00	100 Sh/Clst: drk brn gy to brn blk, slt, mic	0097-1L
		tr Sh/Clst: gy red to red brn	0097-2L
		tr Ca : w, brn gy	0097-3L
1240.00			0018
	11.00	80 Sh/Clst: drk brn gy to brn blk, slt, mic	0018-1L
		10 Ca : w, brn gy	0018-3L
		5 Sh/Clst: gy red to red brn	0018-2L
		5 Other : pyr	0018-4L

**Lithology description for well NCS 7124/4-1 S**

1248.00			0098
	11.70	100 Sh/Clst: drk brn gy to brn blk, calc, slt, mic	0098-1L
		tr Sh/Clst: gy red to red brn	0098-2L
		tr Ca : w, brn gy	0098-3L
		tr Other : pyr	0098-4L
1261.00			0019
		60 S/Sst : lt gy, f, l	0019-1L
	11.80	40 Sh/Clst: drk brn gy, slt, mic	0019-2L
1282.00			0020
	0.12	95 S/Sst : lt gy to gy pi, f, l	0020-1L
		5 Sh/Clst: drk brn gy, slt, mic	0020-2L
1300.00			0021
	0.64	100 S/Sst : lt gy to gy pi, f, l	0021-1L
		tr Sh/Clst: drk brn gy, slt, mic	0021-2L
1321.00			0022
	11.2	35 Sh/Clst: m gy to drk gy, slt	0022-4L
		30 S/Sst : w to gy w, calc, f, cem, l	0022-5L
		15 Ca : gy w, pl y brn to gy brn	0022-6L
		10 Sh/Clst: pl y brn to drk y brn, carb	0022-7L
		5 Sh/Clst: brn blk	0022-8L
		5 Cont : w	0022-9L
1339.00			0129
		70 S/Sst : gy w to w, calc, f, cem, l	0129-2L
	1.36	25 Sltst : m gy to m drk gy, argill, mic	0129-1L
		5 Sh/Clst: m drk gy to gy blk, pyr	0129-3L
		tr Ca	0129-4L
		tr Cont : dd	0129-5L

**Lithology description for well NCS 7124/4-1 S**

1363.00			0101
	85	S/Sst : gy w to w, pl y brn to pl brn, pl or pi, slt, argill, f, crs	0101-1L
	1.29	10 Sltst : m gy to m drk gy, argill	0101-2L
		5 Sh/Clst: pl or pi to pl brn	0101-3L
1381.00			0130
	75	Sh/Clst: pl brn, pl red, red brn, lt gn gy to gn gy	0130-1L
	15	S/Sst : gy w, calc, f, cem, l	0130-2L
	5	Ca : gy w, gy brn	0130-3L
	5	Cont : calc	0130-4L
1399.00			0131
	1.88	70 Sh/Clst: pl brn, pl red, red brn, lt gn gy to gn gy	0131-1L
		10 S/Sst : gy w, calc, f, cem, l	0131-2L
		10 Sh/Clst: m gy to m drk gy, slt	0131-5L
		5 Ca : gy w, gy brn	0131-3L
		5 Cont : calc	0131-4L
1417.00			0102
	0.69	70 Sh/Clst: pl red, lt gn gy, pl y brn, lt gy, brn gy, slt	0102-1L
		25 S/Sst : w to gy w, calc, mic, f	0102-3L
		5 Ca : gy w	0102-4L
		trCont : calc, dd	0102-5L
1435.00			0132
	50	Cont : calc	0132-1L
	40	S/Sst : gy w, calc, f, cem, l	0132-2L
	10	Sh/Clst: pl brn to pl y brn, pl red, lt gn gy, lt gy, slt	0132-3L
1462.00			0133

**Lithology description for well NCS 7124/4-1 S**

	70 S/Sst	: gy w, calc, pyr, glauc, f, cem, l	0133-1L
2.35	15 Sh/Clst:	lt gy to m gy, lt gn gy, pl brn, slt	0133-2L
	5 Coal	: drk gy to brn blk, argill	0133-3L
	5 Ca	: gy w	0133-4L
	5 Cont	: calc	0133-5L
1480.00			0030
	70 S/Sst	: gy w to lt gy, calc, f, cem, l	0030-1L
0.58	15 Sh/Clst:	lt gy to m gy, brn gy, gy red, lt gn gy	0030-3L
	15 Cont	: calc, dd	0030-4L
	tr Sh/Clst:	lt brn gy to drk brn gy, blk, carb	0030-2L
1498.00			0134
0.33	60 Sh/Clst:	lt gy to pl y brn, pl red, calc, slt	0134-3L
	15 S/Sst	: gy w, calc, pyr, glauc, f, cem, l	0134-1L
	10 Sh/Clst:	pl y brn to gy brn, slt	0134-2L
	10 Ca	: gy w	0134-4L
	5 Cont	: calc	0134-5L
1516.00			0135
	70 S/Sst	: gy w, l	0135-2L
0.43	15 Sh/Clst:	lt gy to m gy, pl brn, pl red, calc, slt	0135-1L
	10 Cont	: calc	0135-4L
	5 Ca	: gy w to gy brn	0135-3L
1543.00			0136
0.94	55 Sh/Clst:	lt gy to m gy, pl brn, slt	0136-1L
	25 S/Sst	: gy w, l	0136-2L
	10 Ca	: gy w, lt gy	0136-3L
	10 Cont	: calc	0136-4L
1561.00			0137

**Lithology description for well NCS 7124/4-1 S**

	1.47	35 Sh/Clst: lt gy to m gy, pl brn, slt	0137-1L
		25 S/Sst : gy w, l	0137-2L
		15 Ca : gy w, lt gy	0137-3L
	27.8	10 Coal : drk gy to gy blk, argill	0137-5L
		10 Sh/Clst: pl y brn to drk y brn, carb	0137-6L
		5 Cont : calc	0137-4L
	1579.00		0138
		35 Sh/Clst: lt gy to m gy, pl brn, slt	0138-1L
		35 S/Sst : gy w, calc, f, cem, l	0138-5L
	14.5	10 Sh/Clst: drk gy to gy blk, carb	0138-2L
	19.8	10 Sh/Clst: pl y brn to drk y brn, carb	0138-6L
		5 Ca : gy w, lt gy	0138-3L
		5 Cont : calc	0138-4L
	1606.00		0139
		35 Sh/Clst: lt gy to m gy, pl brn, slt	0139-1L
		25 S/Sst : gy w, calc, f, cem, l	0139-5L
	18.7	10 Sh/Clst: drk gy to gy blk, carb	0139-2L
		10 Ca : gy w, lt gy	0139-3L
		10 Cont : calc	0139-4L
		10 Sh/Clst: pl y brn to drk y brn, carb	0139-6L
	1624.00		0140
		35 S/Sst : gy w, calc, f, cem, l	0140-1L
	1.16	35 Sh/Clst: lt gy to m gy, pl brn, pl y brn, carb, slt	0140-5L
		10 Sh/Clst: drk gy to gy blk, carb	0140-2L
		10 Ca : gy w, lt gy	0140-3L
		10 Cont : calc	0140-4L
	1642.00		0038
		40 S/Sst : lt gy to gy w, f, cem, l	0038-1L
	0.99	40 Sh/Clst: lt gy, gy brn to gy red, lt gn gy to gn gy, slt, s	0038-3L
		20 Ca : gy w to lt gy	0038-4L
		tr Coal : gy blk to brn blk, argill	0038-6L

**Lithology description for well NCS 7124/4-1 S**

1660.00			0141
		40 S/Sst : gy w, calc, f, cem, l	0141-1L
		20 Sh/Clst: lt gy to m gy, pl brn, slt	0141-2L
3.02		20 Sh/Clst: pl y brn to drk y brn, carb	0141-3L
		10 Ca : gy w to pl brn	0141-4L
		5 Sh/Clst: drk gy to gy blk, carb	0141-5L
		5 Cont : calc	0141-6L
1678.00			0040
		40 S/Sst : gy w, pl gy to lt gy, calc, pyr, slt, glauc, f, cem	0040-1L
11.90		20 Sh/Clst: pl y brn to dsk y brn, carb, slt	0040-2L
		15 Sh/Clst: lt gy to m gy, lt gn gy, slt	0040-3L
		10 Ca : gy w to pl brn, s	0040-4L
18.3		10 Coal : gy blk to brn blk, argill	0040-6L
		5 Cont : w, calc	0040-7L
1703.00			0041
		100 Cont : cem, prp, dd	0041-1L
1721.00			0042
		50 Cont : calc, dd	0042-2L
2.19		40 Sh/Clst: m gy	0042-1L
		10 S/Sst : lt gy	0042-3L
1739.00			0043
		70 Cont : cem, dd	0043-2L
		30 Sh/Clst: v col	0043-1L
1766.00			0143
1.49		45 Sh/Clst: lt gy to m gy, pl brn, slt	0143-2L
		20 Cont : dd	0143-7L
		15 S/Sst : gy w, calc, f, cem, l	0143-1L
		10 Cont : calc	0143-6L
		5 Sh/Clst: pl y brn to drk y brn, carb	0143-3L
		5 Ca : gy w to pl brn	0143-4L

**Lithology description for well NCS 7124/4-1 S**

		tr Sh/Clst: drk gy to gy blk, carb	0143-5L
1784.00			0144
	1.22	45 Sh/Clst: lt gy to m gy, m brn to gy brn, gy red, slt	0144-4L
		25 S/Sst : gy w, calc, f, cem, l	0144-1L
		15 Ca : gy w to pl brn	0144-3L
		10 Cont : calc	0144-5L
		5 Cont : dd	0144-6L
		tr Sh/Clst: drk gy to gy blk, carb	0144-2L
1811.00			0109
		70 Sh/Clst: lt gy to m gy, pl brn to pl red, lt gn gy, slt	0109-6L
		15 S/Sst : gy w, pl gy to lt gy, calc, slt, f	0109-7L
		10 Ca : gy w to lt gy	0109-8L
		5 Cont : w, calc	0109-9L
	0.76	Com :	0109-0
1829.00			0110
		40 Sh/Clst: m gy to m drk gy, lt brn gy to brn gy, slt, s	0110-1L
		40 Sh/Clst: m brn to gy brn, gy red, lt gn gy	0110-2L
		10 S/Sst : gy w, calc, slt, f	0110-5L
		5 Ca : calc, dd	0110-3L
		5 Ca : gy w, gy brn	0110-4L
	0.64	Com :	0110-0
1847.00			0145
	0.80	85 Sh/Clst: lt gy to m gy, red brn to gy red, lt gn gy, slt	0145-2L
		5 S/Sst : gy w, cem	0145-1L
		5 Ca : gy w	0145-3L
		5 Cont : calc	0145-4L
1865.00			0146

**Lithology description for well NCS 7124/4-1 S**

	0.85	80 Sh/Clst: lt gy to m gy, red brn to gy w, lt gn gy, slt	0146-1L
		10 Sh/Clst: drk y brn, slt	0146-2L
		5 Ca : gy w	0146-3L
		5 Cont : calc	0146-4L
1883.00			0147
		30 Sh/Clst: lt gy to m gy, slt	0147-1L
		30 Sh/Clst: red brn, lt gn gy	0147-2L
	1.39	30 Sh/Clst: lt brn gy to pl y brn, slt	0147-4L
		5 Ca : gy w	0147-3L
		5 Cont : calc	0147-5L
1892.00			0113
		75 Sh/Clst: m brn to gy red, lt gn gy	0113-1L
	1.14	15 Sh/Clst: drk gy to drk y brn, slt, mic	0113-2L
		10 S/Sst : gy w, calc, mic, f	0113-3L
1901.00			0114
		75 Sh/Clst: m brn to gy red, lt gn gy	0114-1L
	1.15	15 Sh/Clst: drk gy to drk y brn, slt, mic	0114-2L
		10 S/Sst : gy w, calc, mic, f	0114-3L
		tr Ca : gy brn	0114-4L
		tr Ca : calc, dd	0114-5L
1919.00			0052
		95 S/Sst : w to gy w, f, cem, l	0052-1L
		5 Sh/Clst: v col	0052-2L
1937.00			0053
		60 S/Sst : gy w to w, f, cem, l	0053-1L
		30 Sh/Clst: m gy to m drk gy, slt, mic	0053-3L
		10 Sh/Clst: pl y brn to drk gy, gy blk, brn blk, carb	0053-4L
	1.65	Com :	0053-0
1964.00			0115



**Lithology description for well NCS 7124/4-1 S**

1.50	50 Sh/Clst: m gy to drk gy, drk y brn, slt, mic	0115-1L
	45 S/Sst : gy w, carb	0115-2L
	5 Sh/Clst: brn blk, blk, carb	0115-3L
1982.00		0116
1.47	75 Sh/Clst: m gy to drk gy, drk y brn, slt, mic	0116-1L
	25 S/Sst : gy w, carb	0116-2L
	tr Sh/Clst: brn blk, blk, carb	0116-3L
2000.00		0117
2.73	70 Sh/Clst: m gy to drk gy, drk y brn to drk brn gy, slt, mic	0117-1L
	20 S/Sst : gy w, carb	0117-2L
21.9	10 Sh/Clst: brn blk, blk, carb	0117-3L
2027.00		0057
1.65	75 Sh/Clst: m gy to drk gy, drk y brn to drk brn gy, gy blk to brn blk, carb, slt, mic	0057-9L
	25 S/Sst : gy w to w, lt gy, f, cem, l	0057-7L
2039.00		0058
	40 Cont : dd	0058-2L
2.66	40 Sh/Clst: brn gy to drk gy	0058-5L
	20 Sh/Clst: gy red, lt gn gy	0058-1L
	tr S/Sst : lt gy, l	0058-3L
	tr Ca	0058-4L
2045.00		0118
1.89	80 Sh/Clst: m gy to drk gy, drk y brn to drk brn gy, slt, mic	0118-1L
	10 S/Sst : gy w, carb	0118-2L
	10 Sh/Clst: brn blk, blk, carb	0118-3L

**Lithology description for well NCS 7124/4-1 S**

2063.00			0059
1.87	70 Sh/Clst:	lt gy to brn gy, m brn, m drk gy to drk gy, slt, s, mic	0059-1L
	15 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0059-2L
	10 Sltst	: lt gy to m gy	0059-4L
	5 Ca	: lt brn gy to gy w	0059-3L
2081.00			0060
	50 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0060-2L
3.31	25 Sh/Clst:	lt gy to brn gy, m brn, m drk gy to drk gy, slt, s, mic	0060-1L
	20 Sltst	: lt gy to m gy, mic	0060-4L
	5 Ca	: lt brn gy to gy w	0060-3L
2099.00			0061
	50 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0061-2L
1.49	25 Sh/Clst:	lt gy to brn gy, m brn, m drk gy to drk gy, slt, s, mic	0061-1L
	20 Sltst	: lt gy to m gy, mic	0061-4L
	5 Ca	: lt brn gy to gy w	0061-3L
2123.00			0062
	50 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0062-2L
1.31	40 Sh/Clst:	lt gy to brn gy, m brn, m drk gy to drk gy, slt, s, mic	0062-1L
	5 Ca	: lt brn gy to gy w	0062-3L
	5 Cont	: dd	0062-4L
2141.00			0063
	60 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0063-2L
1.35	30 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0063-1L

**Lithology description for well NCS 7124/4-1 S**

	5 Ca	: lt brn gy to gy w	0063-3L
	5 Cont	: dd	0063-4L
2159.00			0064
	65 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0064-2L
1.31	25 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0064-1L
	5 Ca	: lt brn gy to gy w	0064-3L
	5 Cont	: dd	0064-4L
2177.00			0065
	60 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0065-2L
1.10	30 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0065-1L
	5 Ca	: lt brn gy to gy w	0065-3L
	5 Cont	: dd	0065-4L
2201.00			0066
	70 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0066-2L
0.95	20 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0066-1L
	5 Ca	: lt brn gy to gy w	0066-3L
	5 Cont	: dd	0066-4L
2219.00			0067
	80 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0067-2L
1.00	10 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0067-1L
	5 Ca	: lt brn gy to gy w	0067-3L
	5 Cont	: dd	0067-4L
2243.00			0068
1.02	45 Sh/Clst:	m drk gy to drk gy, gy brn to m	0068-1L

**Lithology description for well NCS 7124/4-1 S**

		brn, slt, s, mic	
	40 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0068-2L
	15 Sltst	: lt gy to m gy, mic	0068-4L
	tr Ca	: lt brn gy to gy w	0068-3L
2261.00			0069
	0.98 55 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0069-1L
	25 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0069-2L
	15 Sltst	: lt gy to m gy, mic	0069-4L
	5 Ca	: lt brn gy to gy w	0069-3L
2279.00			0070
	1.78 50 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0070-1L
	30 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0070-2L
	15 Sltst	: lt gy to m gy, mic	0070-4L
	5 Ca	: lt brn gy to gy w	0070-3L
2300.00			0071
	85 S/Sst	: gy w to lt gy, calc, carb, slt, mic, f	0071-2L
	0.73 10 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0071-1L
	5 Cont	: dd	0071-4L
	tr Ca	: lt brn gy to gy w	0071-3L
2321.00			0072
	60 S/Sst	: gy w to lt gy, calc, slt, mic, f	0072-2L
	30 Cont	: dd	0072-4L
	0.79 10 Sh/Clst:	m drk gy to drk gy, gy brn to m brn, slt, s, mic	0072-1L
	tr Ca	: lt brn gy to gy w	0072-3L
2324.00			0119

**Lithology description for well NCS 7124/4-1 S**

	70 Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0119-1L
	30 S/Sst : gy w to lt gy, calc, slt, mic, f tr Ca	0119-2L 0119-3L
2351.00		0120
	55 Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0120-1L
	45 S/Sst : gy w to lt gy, calc, slt, mic, f tr Ca	0120-2L 0120-3L
	tr Sltst : lt gy to m gy, mic	0120-4L
2357.00		0073
	50 S/Sst : gy w to lt gy, calc, slt, mic, f	0073-2L
	40 Cont : dd	0073-4L
0.66	10 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0073-1L
	tr Ca : lt brn gy to gy w	0073-3L
2360.00		0121
	40 Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0121-1L
	40 S/Sst : gy w to lt gy, calc, slt, mic, f	0121-2L
	20 Sltst : lt gy to m gy, mic	0121-4L
	tr Ca	0121-3L
2381.00		0074
	50 Cont : dd	0074-4L
	40 S/Sst : gy w to lt gy, calc, slt, mic, f	0074-2L
0.46	10 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0074-1L
	tr Ca : lt brn gy to gy w	0074-3L
2399.00		0075
	45 Cont : dd	0075-4L
	40 S/Sst : gy w to lt gy, calc, slt, mic, f	0075-2L

**Lithology description for well NCS 7124/4-1 S**

0.36	15 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0075-1L
	tr Ca : lt brn gy to gy w	0075-3L
2405.00		0122
	40 S/Sst : gy w to lt gy, calc, slt, mic, f	0122-2L
	25 Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0122-1L
	25 Sltst : lt gy to m gy, mic	0122-4L
	10 Ca	0122-3L
2423.00		0076
0.34	45 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0076-1L
	40 S/Sst : gy w to lt gy, calc, slt, mic, f	0076-2L
	15 Sltst : lt gy to m gy, mic	0076-4L
	tr Ca : lt brn gy to gy w	0076-3L
2441.00		0077
0.31	55 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0077-1L
	20 S/Sst : gy w to lt gy, calc, slt, mic, f	0077-2L
	20 Sltst : lt gy to m gy, mic	0077-4L
	5 Ca : lt brn gy to gy w	0077-3L
2459.00		0078
0.26	50 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0078-1L
	25 S/Sst : gy w to lt gy, calc, slt, mic, f	0078-2L
	20 Sltst : lt gy to m gy, mic	0078-4L
	5 Ca : lt brn gy to gy w	0078-3L
2483.00		0079
	70 S/Sst : gy w to lt gy, calc, slt, mic, f	0079-2L
0.24	30 Sh/Clst: m drk gy to drk gy, gy brn to m brn, slt, s, mic	0079-1L
	tr Ca : lt brn gy to gy w	0079-3L

**Lithology description for well NCS 7124/4-1 S**

	tr Cont	: dd	0079-4L
2486.00			0123
	40 Sh/Clst:	m drk gy to m gy, gy brn to m brn, slt, s, mic	0123-1L
	30 S/Sst	: gy w to lt gy, calc, slt, mic, f	0123-2L
	25 Sltst	: lt gy to m gy, mic	0123-4L
	5 Ca		0123-3L
2501.00			0080
	45 S/Sst	: gy w to lt gy, calc, slt, mic, f	0080-2L
0.24	35 Sh/Clst:	m gy to drk gy, slt, s, mic	0080-1L
	20 Sltst	: lt gy to m gy, s, mic	0080-5L
	tr Ca	: lt brn gy to gy w	0080-3L
	tr Cont	: dd	0080-4L
2519.00			0081
	45 S/Sst	: gy w to lt gy, calc, slt, mic, f	0081-2L
	30 Sltst	: lt gy to m gy, s, mic	0081-5L
0.26	25 Sh/Clst:	m gy to drk gy, slt, s, mic	0081-1L
	tr Ca	: lt brn gy to gy w	0081-3L
	tr Cont	: dd	0081-4L
2543.00			0082
	55 S/Sst	: gy w to lt gy, calc, slt, mic, f	0082-2L
	25 Sltst	: lt gy to m gy, s, mic	0082-5L
0.27	20 Sh/Clst:	m gy to drk gy, slt, s, mic	0082-1L
	tr Ca	: lt brn gy to gy w	0082-3L
	tr Cont	: dd	0082-4L
2561.00			0083
	55 S/Sst	: gy w to lt gy, calc, slt, mic, f	0083-2L
	25 Sltst	: lt gy to m gy, s, mic	0083-5L
0.30	20 Sh/Clst:	m gy to drk gy, slt, s, mic	0083-1L
	tr Ca	: lt brn gy to gy w	0083-3L
	tr Cont	: dd	0083-4L

**Lithology description for well NCS 7124/4-1 S**

2567.00			0124
	40	Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0124-1L
	35	S/Sst : gy w to lt gy, calc, slt, mic, f	0124-2L
	25	Sltst : lt gy to m gy, mic	0124-4L
		tr Ca	0124-3L
2579.00			0084
	55	S/Sst : gy w to lt gy, calc, slt, mic, f	0084-2L
	25	Sltst : lt gy to m gy, s, mic	0084-5L
0.31	20	Sh/Clst: m gy to drk gy, slt, s, mic	0084-1L
		tr Ca : lt brn gy to gy w	0084-3L
		tr Cont : dd	0084-4L
2603.00			0085
0.38	30	Sh/Clst: m gy to drk gy, slt, s, mic	0085-1L
	30	S/Sst : gy w to lt gy, calc, slt, mic, f	0085-2L
	30	Sltst : lt gy to m gy, mic	0085-4L
	10	Sh/Clst: gy blk	0085-5L
		tr Ca : lt brn gy to gy w	0085-3L
2621.00			0086
	40	S/Sst : gy w to lt gy, calc, slt, mic, f	0086-2L
	30	Sltst : lt gy to m gy, s, mic	0086-5L
0.35	25	Sh/Clst: m gy to drk gy, slt, s, mic	0086-1L
	5	Sh/Clst: gy blk	0086-4L
		tr Ca : lt brn gy to gy w	0086-3L
2639.00			0087
	50	S/Sst : gy w to lt gy, calc, slt, mic, f	0087-2L
	40	Sltst : lt gy to m gy, s, mic	0087-5L
0.28	10	Sh/Clst: m gy to drk gy, slt, s, mic	0087-1L
		tr Ca : lt brn gy to gy w	0087-3L
2657.00			0088



**Lithology description for well NCS 7124/4-1 S**

	60 S/Sst : gy w to lt gy, calc, slt, mic, f	0088-2L
	35 Sltst : lt gy to m gy, s, mic	0088-5L
	5 Sh/Clst: m gy to drk gy, slt, s, mic	0088-1L
	tr Ca : lt brn gy to gy w	0088-3L
2681.00		0089
	40 Cont : dd	0089-4L
	30 S/Sst : gy w to lt gy, calc, slt, mic, f	0089-2L
	25 Sltst : lt gy to m gy, s, mic	0089-5L
	5 Sh/Clst: m gy to drk gy, slt, s, mic	0089-1L
	tr Ca : lt brn gy to gy w	0089-3L
2684.00		0125
	70 S/Sst : gy w to lt gy, calc, slt, mic, f	0125-2L
	25 Sltst : lt gy to m gy, mic	0125-4L
	5 Sh/Clst: m drk gy to m gy, gy brn to m brn, slt, s, mic	0125-1L
	tr Ca	0125-3L
2699.00		0090
	70 S/Sst : gy w to lt gy, calc, slt, mic, f	0090-2L
	15 Sltst : lt gy to m gy, s, mic	0090-5L
	10 Cont : dd	0090-4L
	5 Sh/Clst: m gy to drk gy, slt, s, mic	0090-1L
	tr Ca : lt brn gy to gy w	0090-3L
2717.00		0091
	70 S/Sst : gy w to lt gy, calc, slt, mic, f	0091-2L
	15 Sltst : lt gy to m gy, s, mic	0091-5L
	10 Cont : dd	0091-4L
	5 Sh/Clst: m gy to drk gy, slt, s, mic	0091-1L
	tr Ca : lt brn gy to gy w	0091-3L
2741.00		0092
	80 S/Sst : gy w to lt gy, calc, slt, mic, f	0092-2L
	10 Sltst : lt gy to m gy, s, mic	0092-5L
	5 Sh/Clst: m gy to drk gy, slt, s, mic	0092-1L

**Lithology description for well NCS 7124/4-1 S**

	5 Cont	: dd	0092-4L
	tr Ca	: lt brn gy to gy w	0092-3L
2759.00			0093
	80 S/Sst	: gy w to lt gy, calc, slt, mic, f	0093-2L
	10 Sltst	: lt gy to m gy, s, mic	0093-5L
	5 Sh/Clst:	m gy to drk gy, slt, s, mic	0093-1L
	5 Cont	: dd	0093-4L
	tr Ca	: lt brn gy to gy w	0093-3L
2783.00			0094
	80 S/Sst	: gy w to lt gy, calc, slt, mic, f	0094-2L
	10 Sltst	: lt gy to m gy, s, mic	0094-5L
	5 Sh/Clst:	m gy to drk gy, slt, s, mic	0094-1L
	5 Cont	: dd	0094-4L
	tr Ca	: lt brn gy to gy w	0094-3L
2801.00			0095
	85 S/Sst	: gy w to lt gy, calc, slt, mic, f	0095-2L
	10 Sltst	: lt gy to m gy, s, mic	0095-5L
	5 Sh/Clst:	m gy to drk gy, slt, s, mic	0095-1L
	tr Ca	: lt brn gy to gy w	0095-3L
	tr Cont	: dd	0095-4L
2813.00			0096
	85 S/Sst	: gy w to lt gy, calc, slt, mic, f	0096-2L
	10 Sltst	: lt gy to m gy, s, mic	0096-5L
	5 Sh/Clst:	m gy to drk gy, slt, s, mic	0096-1L
	tr Ca	: lt brn gy to gy w	0096-3L
	tr Cont	: dd	0096-4L

**Table 4. NCS 7124/4-1 S %Total Organic Carbon content (wt%)**

<b>Lower depth (m)</b>	<b>Sample type</b>	<b>Description</b>	<b>%Lith.</b>	<b>TOC</b>	<b>Sample number</b>
900	cut	shale/claystone	100	1,30	713/0001-1
920	cut	shale/claystone	75	1,27	713/0002-1
940	cut	shale/claystone	100	1,21	713/0003-1
970	cut	shale/claystone	75	1,18	713/0004-1
980	cut	shale/claystone	90	1,12	713/0005-1
1000	cut	shale/claystone	85	0,85	713/0006-1
1020	cut	shale/claystone	100	0,78	713/0007-1
1040	cut	shale/claystone	100	0,74	713/0008-1
1060	cut	shale/claystone	100	0,64	713/0009-1
1080	cut	shale/claystone	100	0,81	713/0010-1
1100	cut	shale/claystone	75	1,00	713/0011-1
1120	cut	shale/claystone	95	1,20	713/0012-1
1140	cut	shale/claystone	100	1,22	713/0013-1
1160	cut	shale/claystone	100	1,02	713/0014-1
1180	cut	shale/claystone	25	6,04	713/0015-2
1201	cut	shale/claystone	25	5,44	713/0016-2
1219	cut	shale/claystone	90	6,71	713/0017-1
1221	cut	shale/claystone	100	9,00	713/0097-1
1240	cut	shale/claystone	80	11,00	713/0018-1
1248	cut	shale/claystone	100	11,70	713/0098-1
1261	cut	shale/claystone	40	11,80	713/0019-2
1282	cut	sandstone/sand	95	0,12	713/0020-1
1300	cut	sandstone/sand	100	0,64	713/0021-1
1321	cut	shale/claystone	35	11,20	713/0022-4
1339	cut	shale/claystone	25	1,86	713/0129-1
1363	cut	siltstone	10	1,29	713/0101-2
1399	cut	shale/claystone	10	1,88	713/0131-1
1417	cut	shale/claystone	70	0,69	713/0102-1
1462	cut	shale/claystone	70	2,35	713/0133-2
1462	cut	shale/claystone	5	46,60	713/0133-3
1480	cut	shale/claystone	70	0,45	713/0030-2
1480	cut	shale/claystone	15	0,58	713/0030-3
1498	cut	shale/claystone	60	0,33	713/0134-3
1516	cut	shale/claystone	15	0,43	713/0135-1
1543	cut	shale/claystone	55	0,94	713/0136-1
1561	cut	Carb.shale/coal	35	27,80	713/0137-5
1561	cut	shale/claystone	10	1,47	713/0137-1
1579	cut	Carb.shale/coal	10	14,50	713/0138-2
1579	cut	Carb.shale/coal	10	19,80	713/0138-6
1606	cut	Carb.shale/coal	10	18,70	713/0139-2
1624	cut	shale/claystone	35	1,16	713/0140-5
1642	cut	shale/claystone	40	0,99	713/0038-3
1660	cut	shale/claystone	20	3,02	713/0141-3
1678	cut	Carb.shale/coal	20	18,30	713/0040-6
1678	cut	shale/claystone	10	11,90	713/0040-3
1721	cut	shale/claystone	40	2,19	713/0042-1
1766	cut	shale/claystone	45	1,46	713/0143-2

Lower depth (m)	Sample type	Description	%Lith.	TOC	Sample number
1784	cut	shale/claystone	45	1,22	713/0144-4
1811	com	bulk fraction		0,76	713/0126-0
1829	com	bulk fraction		0,64	713/0127-0
1847	cut	shale/claystone	85	0,80	713/0145-2
1865	cut	shale/claystone	80	0,85	713/0146-1
1883	cut	shale/claystone	30	1,39	713/0147-4
1892	cut	shale/claystone	15	1,14	713/0113-2
1901	cut	shale/claystone	15	1,15	713/0114-2
1937	com	bulk fraction		1,65	713/0128-0
1964	cut	shale/claystone	50	1,50	713/0115-1
1982	cut	shale/claystone	75	1,47	713/0116-1
2000	cut	Carb.shale/coal	10	21,90	713/0117-3
2000	cut	shale/claystone	70	2,73	713/0117-1
2027	cut	shale/claystone	75	1,65	713/0057-9
2039	cut	shale/claystone	40	2,66	713/0058-5
2045	cut	shale/claystone	80	1,89	713/0118-1
2063	cut	shale/claystone	70	1,87	713/0059-1
2081	cut	shale/claystone	25	3,31	713/0060-1
2099	cut	shale/claystone	25	1,49	713/0061-1
2123	cut	shale/claystone	40	1,31	713/0062-1
2141	cut	shale/claystone	30	1,35	713/0063-1
2159	cut	shale/claystone	25	1,31	713/0064-1
2177	cut	shale/claystone	30	1,10	713/0065-1
2201	cut	shale/claystone	20	0,95	713/0066-1
2219	cut	shale/claystone	10	1,00	713/0067-1
2243	cut	shale/claystone	45	1,02	713/0068-1
2261	cut	shale/claystone	55	0,98	713/0069-1
2279	cut	shale/claystone	50	1,78	713/0070-1
2300	cut	shale/claystone	10	0,73	713/0071-1
2321	cut	shale/claystone	10	0,79	713/0072-1
2357	cut	shale/claystone	10	0,66	713/0073-1
2381	cut	shale/claystone	10	0,46	713/0074-1
2399	cut	shale/claystone	15	0,36	713/0075-1
2423	cut	shale/claystone	45	0,34	713/0076-1
2441	cut	shale/claystone	55	0,31	713/0077-1
2459	cut	shale/claystone	50	0,26	713/0078-1
2483	cut	shale/claystone	30	0,24	713/0079-1
2501	cut	shale/claystone	35	0,24	713/0080-1
2519	cut	shale/claystone	25	0,26	713/0081-1
2543	cut	shale/claystone	20	0,27	713/0082-1
2561	cut	shale/claystone	20	0,30	713/0083-1
2579	cut	shale/claystone	20	0,31	713/0084-1
2603	cut	shale/claystone	30	0,38	713/0085-1
2621	cut	shale/claystone	25	0,35	713/0086-1
2639	cut	shale/claystone	10	0,28	713/0087-1
2702	bulk	not treated*	100	0,36	713/0150-0
2747	bulk	not treated*	100	0,32	713/0151-0
2783	bulk	not treated*	100	0,43	713/0152-0

<b>Lower depth (m)</b>	<b>Sample type</b>	<b>Description</b>	<b>%Lith.</b>	<b>TOC</b>	<b>Sample number</b>
2801	bulk	not treated*	100	0,40	713/0153-0

\* bulk samples water washed only

**Table 5 Rock-Eval Pyrolysis**

<b>Lower depth (m)</b>	<b>Description</b>	<b>%Lith.</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>TOC</b>	<b>T max</b>	<b>S2/S3</b>	<b>HI</b>	<b>OI</b>	<b>PP</b>	<b>PI</b>	<b>Sample number</b>
900	shale/claystone	100	0,3	0,92	0,35	1,3	424	2,6	71	27	1,2	0,25	713/0001-1
920	shale/claystone	75	0,29	0,78	0,36	1,27	421	2,2	61	28	1,1	0,27	713/0002-1
940	shale/claystone	100	0,31	0,8	0,26	1,21	421	3,1	66	21	1,1	0,28	713/0003-1
970	shale/claystone	75	0,35	0,68	0,3	1,18	423	2,3	58	25	1,0	0,34	713/0004-1
980	shale/claystone	90	1,31	1,45	0,3	1,12	359	4,8	129	27	2,8	0,47	713/0005-1
1000	shale/claystone	85	0,5	0,54	0,29	0,85	333	1,9	64	34	1,0	0,48	713/0006-1
1020	shale/claystone	100	0,17	0,17	0,26	0,78	337	0,7	22	33	0,3	0,50	713/0007-1
1040	shale/claystone	100	0,14	0,19	0,26	0,74	334	0,7	26	35	0,3	0,42	713/0008-1
1060	shale/claystone	100	0,2	0,35	0,3	0,64	335	1,2	55	47	0,6	0,36	713/0009-1
1080	shale/claystone	100	0,17	0,24	0,25	0,81	423	1,0	30	31	0,4	0,41	713/0010-1
1100	shale/claystone	75	0,41	0,39	0,27	1	334	1,4	39	27	0,8	0,51	713/0011-1
1120	shale/claystone	95	0,24	0,58	0,47	1,2	427	1,2	48	39	0,8	0,29	713/0012-1
1140	shale/claystone	100	0,28	0,51	0,35	1,22	425	1,5	42	29	0,8	0,35	713/0013-1
1160	shale/claystone	100	0,12	0,27	0,23	1,02	424	1,2	26	23	0,4	0,31	713/0014-1
1180	shale/claystone	25	0,34	4,56	0,53	6,04	429	8,6	75	9	4,9	0,07	713/0015-2
1201	shale/claystone	25	0,4	4,91	0,43	5,44	431	11,4	90	8	5,3	0,08	713/0016-2
1219	shale/claystone	90	0,73	21,76	0,35	6,71	420	62,2	324	5	22,5	0,03	713/0017-1
1231	shale/claystone	100	1,04	32,09	0,6	9	415	53,5	357	7	33,1	0,03	713/0097-1
1240	shale/claystone	80	1,41	35,95	0,57	11	415	63,1	327	5	37,4	0,04	713/0018-1
1252	shale/claystone	100	1,14	41,95	0,61	11,7	414	68,8	359	5	43,1	0,03	713/0098-1
1261	shale/claystone	40	1,13	39,82	0,59	11,8	414	67,5	337	5	41,0	0,03	713/0019-2
1282	sandstone/sand	95	0,04	0,12	0,26	0,12	420	0,5	100	217	0,2	0,25	713/0020-1
1300	sandstone/sand	100	0,03	0,1	0,44	0,64	429	0,2	16	69	0,1	0,23	713/0021-1
1321	shale/claystone	25	1,64	33,23	0,73	11,2	413	45,5	297	7	34,9	0,05	713/0022-4
1339	shale/claystone	50	0,21	2,3	0	1,86	426	0,0	124	0	2,5	0,08	713/0129-1
1363	siltstone	10	0,13	0,88	0	1,29	430	0,0	68	0	1,0	0,13	713/0101-2
1399	shale/claystone	70	0,37	1,39	0	1,88	427	0,0	74	0	1,8	0,21	713/0131-1
1417	shale/claystone	70	0,1	0,41	0	0,69	430	0,0	59	0	0,5	0,20	713/0102-1
1462	coal/Carb.shale	5	13,2	162,98	0,35	46,6	421	465,7	350	1	176,2	0,07	713/0133-3
1480	shale/claystone	15	0,05	0	1,85	0,58	288	0,0	0	319	0,1	1,00	713/0030-3

Lower depth (m)	Description	%Lith.	S1	S2	S3	TOC	T max	S2/S3	HI	OI	PP	PI	Sample number
1498	shale/claystone	60	0,28	0,49	0,02	0,33	327	24,5	148	6	0,8	0,36	713/0134-3
1516	shale/claystone	15	0,14	0,55	0,01	0,43	424	55,0	128	2	0,7	0,20	713/0135-1
1543	shale/claystone	55	0,27	1,17	0	0,94	428	0,0	124	0	1,4	0,19	713/0136-1
1561	shale/claystone	10	0,26	1,26	0	1,47	432	0,0	86	0	1,5	0,17	713/0137-1
1579	coal/Carb.shale	10	2,79	78,71	0,03	19,8	432	2623,7	398	0	81,5	0,03	713/0138-6
1606	coal/Carb.shale	10	2,91	47,96	0,04	18,7	431	1199,0	256	0	50,9	0,06	713/0139-2
1624	shale/claystone	35	0,22	1,62	0	1,16	435	0,0	140	0	1,8	0,12	713/0140-5
1642	shale/claystone	40	0,24	1,1	0,05	0,99	433	22,0	111	5	1,3	0,18	713/0038-3
1660	shale/claystone	20	0,39	3,51	0,01	3,02	434	351,0	116	0	3,9	0,10	713/0141-3
1678	shale/claystone	20	2	26,23	0,13	11,9	433	201,8	220	1	28,2	0,07	713/0040-3
1721	shale/claystone	40	1,45	4,01	0,32	2,19	394	12,5	183	15	5,5	0,27	713/0042-1
1766	shale/claystone	5	1,45	4,01	0,32	1,46	334	12,5	275	22	5,5	0,36	713/0143-2
1784	shale/claystone	45	0,69	1,25	0,12	1,22	430	10,4	102	10	1,9	0,18	713/0144-4
1811	bulk shale fraction	70	0,18	0,67	0,16	0,76	431	4,2	88	21	0,9	0,21	713/0126-0
1829	bulk shale fraction	80	0,11	0,53	0,16	0,64	428	3,3	83	25	0,6	0,17	713/0127-0
1847	shale/claystone	75	0,11	0,47	0,06	0,8	429	7,8	59	8	0,6	0,19	713/0145-2
1865	shale/claystone	85	0,12	0,6	0,02	0,85	430	30,0	71	2	0,7	0,17	713/0146-1
1883	shale/claystone	30	0,22	1,53		1,39	431	0,0	110	0	1,8	0,13	713/0147-4
1892	shale/claystone	15	0,15	0,92	0,02	1,14	432	46,0	81	2	1,1	0,14	713/0113-2
1901	shale/claystone	15	0,16	0,84	0,02	1,15	431	42,0	73	2	1,0	0,16	713/0114-2
1937	bulk shale fraction	40	0,13	1,69		1,65	436	0,0	102	0	1,8	0,07	713/0128-0
1964	shale/claystone	50	0,13	1,46	0,01	1,5	435	146,0	97	1	1,6	0,08	713/0115-1
1982	shale/claystone	75	0,4	1,72	0,03	1,47	435	57,3	117	2	2,1	0,19	713/0116-1
2000	shale/claystone	70	0,35	4,02	0,03	2,73	436	134,0	147	1	4,4	0,08	713/0117-1
2027	shale/claystone	75	0,24	1,62	0,03	1,65	436	54,0	98	2	1,9	0,13	713/0057-9
2039	shale/claystone	40	0,49	3,34	0,32	2,66	435	10,4	126	12	3,8	0,13	713/0058-5
2045	shale/claystone	80	0,13	1,96	0,03	1,89	436	65,3	104	2	2,1	0,06	713/0118-1
2063	shale/claystone	70	0,18	2,4	0,24	1,87	436	10,0	128	13	2,6	0,07	713/0059-1
2081	shale/claystone	25	0,23	4,78	0,24	3,31	435	19,9	144	7	5,0	0,05	713/0060-1
2099	shale/claystone	25	0,15	1,36	0,23	1,49	435	5,9	91	15	1,5	0,10	713/0061-1
2123	shale/claystone	40	0,13	1,23	0,2	1,31	435	6,2	94	15	1,4	0,10	713/0062-1
2141	shale/claystone	30	0,14	1,04	0,16	1,35	435	6,5	77	12	1,2	0,12	713/0063-1

Lower depth (m)	Description	%Lith.	S1	S2	S3	TOC	T max	S2/S3	HI	OI	PP	PI	Sample number
2159	shale/claystone	25	0,15	1,07	0,14	1,31	434	7,6	82	11	1,2	0,12	713/0064-1
2177	shale/claystone	30	0,08	0,85	0,1	1,1	436	8,5	77	9	0,9	0,09	713/0065-1
2201	shale/claystone	20	0,1	0,74	0,14	0,95	436	5,3	78	15	0,8	0,12	713/0066-1
2219	shale/claystone	10	0,11	0,8	0,13	1	435	6,2	80	13	0,9	0,12	713/0067-1
2243	shale/claystone	45	0,13	0,81	0,03	1,02	434	27,0	79	3	0,9	0,14	713/0068-1
2261	shale/claystone	55	0,12	0,76	0,02	0,98	436	38,0	78	2	0,9	0,14	713/0069-1
2279	shale/claystone	50	0,24	2,09	0,03	1,78	433	69,7	117	2	2,3	0,10	713/0070-1
2300	shale/claystone	10	0,13	0,58	0,12	0,73	435	4,8	79	16	0,7	0,18	713/0071-1
2321	shale/claystone	10	0,19	0,65	0,28	0,79	431	2,3	82	35	0,8	0,23	713/0072-1
2357	shale/claystone	10	0,16	0,53	0,19	0,66	432	2,8	80	29	0,7	0,23	713/0073-1
2381	shale/claystone	10	0,12	0,34	0,17	0,46	432	2,0	74	37	0,5	0,26	713/0074-1
2399	shale/claystone	15	0,08	0,24	0,16	0,36	431	1,5	67	44	0,3	0,25	713/0075-1
2423	shale/claystone	15	0,04	0,2	0,15	0,34	434	1,3	59	44	0,2	0,17	713/0076-1
2441	shale/claystone	25	0,05	0,15	0,12	0,31	434	1,3	48	39	0,2	0,25	713/0077-1
2459	shale/claystone	25	0,04	0,15	0,1	0,26	436	1,5	58	38	0,2	0,21	713/0078-1
2483	shale/claystone	30	0,05	0,16	0,12	0,24	435	1,3	67	50	0,2	0,24	713/0079-1
2501	shale/claystone	35	0,02	0,1	0,08	0,24	436	1,3	42	33	0,1	0,17	713/0080-1
2519	shale/claystone	25	0,04	0,15	0,1	0,26	434	1,5	58	38	0,2	0,21	713/0081-1
2543	shale/claystone	20	0,06	0,18	0,09	0,27	434	2,0	67	33	0,2	0,25	713/0082-1
2561	shale/claystone	20	0,1	0,22	0,17	0,3	434	1,3	73	57	0,3	0,31	713/0083-1
2579	shale/claystone	20	0,07	0,2	0,12	0,31	433	1,7	65	39	0,3	0,26	713/0084-1
2603	shale/claystone	25	0,17	0,28	0,17	0,38	433	1,6	74	45	0,5	0,38	713/0085-1
2621	shale/claystone	10	0,15	0,28	0,15	0,35	434	1,9	80	43	0,4	0,35	713/0086-1
2639	shale/claystone	10	0,11	0,21	0,12	0,28	432	1,8	75	43	0,3	0,34	713/0087-1



**Table 6 Vitrinite reflectance statistics**

<b>Depth (m.)</b>	<b>Vitrinite reflectance (%Ro)</b>	<b>Standard deviation</b>	<b>Count</b>	<b>Confidence (95%)</b>	<b>Sample Type</b>
900	0,30	0,04	13	0,02	Cuttings
1000	0,33	0,04	21	0,02	Cuttings
1100	0,34	0,04	14	0,02	Cuttings
1203	0,36	0,04	14	0,03	Cuttings
1239	0,38	0,04	13	0,02	Cuttings
1266	0,48	0,06	8	0,05	Cuttings
1293	0,40	0,05	7	0,05	Cuttings
1321	0,39	0,03	9	0,03	Cuttings
1363	0,40	0,05	11	0,03	Cuttings
1399	0,45	0,04	9	0,03	Cuttings
1435	0,46	0,05	10	0,03	Cuttings
1480	0,43	0,03	10	0,02	Cuttings
1516	0,47	0,04	10	0,03	Cuttings
1561	0,41	0,04	5	0,04	Cuttings
1606	0,49	0,06	14	0,03	Cuttings
1642	0,46	0,04	5	0,05	Cuttings
1678	0,41	0,04	15	0,02	Cuttings
1766	0,42	0,04	7	0,04	Cuttings
1829	0,45	0,05	9	0,04	Cuttings
1883	0,49	0,03	7	0,03	Cuttings
1919	0,46	0,04	9	0,03	Cuttings
1964	0,46	0,04	9	0,03	Cuttings
2000	0,46	0,04	14	0,02	Cuttings
2063	0,50	0,04	12	0,02	Cuttings
2126	0,62	0,05	15	0,03	Cuttings
2162	0,52	0,05	11	0,03	Cuttings
2198	0,53	0,04	8	0,04	Cuttings
2261	0,73	0,06	13	0,03	Cuttings
2324	0,74	0,04	9	0,03	Cuttings
2360	0,94	0,04	2	0,4	Cuttings

<b>Depth (m.)</b>	<b>Vitrinite reflectance (%Ro)</b>	<b>Standard deviation</b>	<b>Count</b>	<b>Confidence (95%)</b>	<b>Sample Type</b>
2405	0,86	0,04	10	0,03	Cuttings
2441	1,04	0,05	7	0,05	Cuttings
2486	0,86	0,05	9	0,04	Cuttings
2522	0,88	0,04	8	0,04	Cuttings
2567	0,91	0,03	8	0,03	Cuttings
2603	1,00	0,07	10	0,05	Cuttings
2639	1,02	0,05	9	0,03	Cuttings
2684	1,30	0,06	2	0,53	Cuttings
2747	1,05	0,03	9	0,02	Cuttings
2801	1,26	0,04	5	0,05	Cuttings

**Table 7a. NCS 7124/4-1 S. Extraction and MPLC fractionation data (absolute weights, rock extracted in grams and EOM and fractions in mg)**

Lower depth (m)	Sample type	Description	%Lith.	Rock ext.(g)	EOM (mg)	Sat. (mg)	Aro. (mg)	NSO (mg)	Asph. (mg)	%TOC (e)	HC (mg)	Non-HC (mg)	Sample number
1248	cut	shale/claystone	100	12,8	116,6	4,66	13,97	76,51	21,46	11,7	18,63	97,97	713/0098-1
1579	cut	carbonaceous shale	10	1,51	21,3	1,15	2,16	10,36	7,63	19,8	3,31	17,96	713/0138-2
2081	cut	shale/claystone	25	6,5	5,4	0,62	1,09	2,49	1,2	3,31	1,71	3,69	713/0060-1
2279	cut	shale/claystone	50	6,6	7,1	2,23	0,42	3,35	1,1	1,78	2,65	4,45	713/0070-1

**Table 7b. NCS 7124/4-1 S. Extraction and MPLC fractionation relative data (percentage and ratios)**

Lower depth (m)	Sample type	Description	%Lith.	Sat/ EOM	Aro/ EOM	Asph/ EOM	NSO/ EOM	HC/ EOM	Non-HC/ EOM	Sat/ Aro	HC/ Non-HC	Sample number
1248	cut	shale/claystone	100	3,99	11,98	18,4	65,62	15,98	84,02	0,33	0,19	713/0098-1
1579	cut	carbonaceous shale	10	5,40	10,14	48,64	35,82	15,54	84,46	0,53	0,18	713/0138/2
2081	cut	shale/claystone	25	11,52	20,16	22,22	46,09	31,69	68,31	0,57	0,46	713/0060-1
2279	cut	shale/claystone	50	31,44	5,9	15,49	47,17	37,34	62,66	5,33	0,6	713/0070-1

**Table 8a. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak areas from m/z 141 fragmentograms)**

<b>Lower depth (m)</b>	<b>Sample type</b>	<b>Description</b>	<b>nC12</b>	<b>nC13</b>	<b>nC14</b>	<b>nC15</b>	<b>nC16</b>	<b>nC17</b>	<b>Pristane</b>	<b>nC18</b>	<b>Phytane</b>	<b>nC19</b>
1248	cut	shale/claystone	259278	1410381	1544032	1812653	1384304	1573279	9935622	1125869	9796192	1129990
1579	cut	carbonaceous shale	182378	2460959	2986860	3674415	3832921	4899477	8858560	5253294	1752392	6799327
2081	cut	shale/claystone	43495	882676	2643488	4424568	4642678	5044842	6337375	4379931	2297603	4025172
2279	cut	shale/claystone	117179	2978721	7910460	17443260	13438390	8294184	7591782	5498998	5495176	3477189

  

<b>Lower depth (m)</b>	<b>Sample type</b>	<b>Description</b>	<b>nC20</b>	<b>nC21</b>	<b>nC22</b>	<b>nC23</b>	<b>nC24</b>	<b>nC25</b>	<b>nC26</b>	<b>nC27</b>	<b>nC28</b>	<b>nC29</b>
1248	cut	shale/claystone	745895	700651	588378	814530	723730	892607	696722	1011060	572751	743842
1579	cut	carbonaceous shale	4992121	6516806	5386267	9917539	6834618	12489570	7793536	19735960	5277718	8059319
2081	cut	shale/claystone	2766318	2615432	2423784	3391320	4149785	5964819	5104448	7364998	4366973	4767924
2279	cut	shale/claystone	1825574	1340412	1177469	1587497	2010112	2736187	2405180	2877508	1966392	2108378

  

<b>Lower depth</b>	<b>Sample type</b>	<b>Description</b>	<b>nC30</b>	<b>nC31</b>	<b>nC32</b>	<b>nC33</b>	<b>nC34</b>	<b>nC35</b>	<b>Sample number</b>
1248	cut	shale/claystone	305774	299864	108722	124831	67386	102459	713/0098-1
1579	cut	carbonaceous shale	2622360	3641743	940569	1285815	165944	260708	713/0138-2
2081	cut	shale/claystone	2895693	2142419	913232	588300	227980	177482	713/0060-1
2279	cut	shale/claystone	1248717	972943	447144	288007	113704	101613	713/0070-1

Table 8b. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak heights from m/z 141 fragmentograms)

Lower depth	Sample type	Description	nC12	nC13	nC14	nC15	nC16	nC17	Pristane	nC18	Phytane	nC19
1248	cut	shale/claystone	148342	706338	738744	724729	448368	365936	1476479	270959	1484826	261301
1579	cut	carbonaceous shale	79459	966094	1140669	1146556	927325	858960	1277917	931586	280532	1132075
2081	cut	shale/claystone	24413	535652	1179465	1147145	1132599	931816	990353	782616	337570	792277
2279	cut	shale/claystone	63903	1293771	2408099	2828114	1948204	1288743	1089597	1012495	758863	767570

  

Lower depth	Sample type	Description	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29
1248	cut	shale/claystone	163935	146557	132993	175314	146646	183418	133267	190229	106489	143930
1579	cut	carbonaceous shale	877721	1073454	885262	1421971	1033869	2080306	1126107	2043627	858477	1106072
2081	cut	shale/claystone	570304	530358	491176	666931	705685	985752	810586	1064911	673938	722310
2279	cut	shale/claystone	414326	280688	253504	331605	390008	522171	448755	546477	367319	353117

  

Lower depth	Sample type	Description	nC30	nC31	nC32	nC33	nC34	nC35	Sample number
1248	cut	shale/claystone	59618	58401	20166	19562	9190	13883	713/0098-1
1579	cut	carbonaceous shale	475616	582757	157172	205587	28703	38300	713/0138-2
2081	cut	shale/claystone	469187	361424	151484	102453	35211	25645	713/0060-1
2279	cut	shale/claystone	220653	180482	75008	48159	16994	12953	713/0070-1

Table 8c. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS ratios (peak areas from m/z 141 fragmentograms)

Lower depth	Sample type	Description	Pris/nC17	Pris/Phyt	(Pris/nC17)/(Phyt/nC18)	CPI 1	Phyt/nC18	nC17/(nC17+nC27)	(Pris+Phyt)/(nC17+nC18)	Sample number
1248	cut	shale/claystone	6.32	1.01	0.73	1.52	8.70	0.61	7.31	713/0098-1
1579	cut	carbonaceous shale	1.81	5.06	5.42	2.31	0.33	0.20	1.05	713/0138-2
2081	cut	shale/claystone	1.26	2.76	2.39	1.37	0.52	0.41	0.92	713/0060-1
2279	cut	shale/claystone	0.92	1.38	0.92	1.28	1.00	0.74	0.95	713/0070-1

**Table 8d. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS ratios (peak heights from m/z 141 fragmentograms)**

<b>Lower depth</b>	<b>Sample type</b>	<b>Description</b>	<b>Pris/nC17</b>	<b>Pris/Phyt</b>	<b>(Pris/nC17)/(Phyt/nC18)</b>	<b>CPI 1</b>	<b>Phyt/nC18</b>	<b>nC17/(nC17+nC27)</b>	<b>(Pris+Phyt)/(nC17+nC18)</b>	<b>Sample number</b>
1248	cut	shale/claystone	4.03	0.99	0.74	1.54	5.48	0.66	4.65	713/0098-1
1579	cut	carbonaceous shale	1.49	4.56	4.94	1.96	0.30	0.30	0.87	713/0138-2
2081	cut	shale/claystone	1.06	2.93	2.46	1.33	0.43	0.47	0.77	713/0060-1
2279	cut	shale/claystone	0.85	1.44	1.13	1.28	0.75	0.70	0.80	713/0070-1

**Table 8e. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak heights from m/z 191 fragmentograms)  
Triterpanes, peak heights, SIR: TRITPHS m/z 191**

Lower depth	Sample type	Description	%Lith.	19/3	20/3	21/3 (N)	22/3 (O)	23/3 (P)	24/3 (Q)	25/3 (R)	24/4 (S)	26/3R (T)	26/3S
1248	cut	shale/claystone	100	36205	16755	22969	nm	28696	17868	6201	28005	5931	6617
1579	cut	carbonaceous shale	10	33276	23304	6591	3432	19059	15982	0	52347	0	0
2081	cut	shale/claystone	25	334812	75361	30665	6960	41893	18390	5341	40770	2390	2666
2279	cut	shale/claystone	50	75542	23380	18682	3244	20517	10552	3492	15071	2548	2887

  

Lower depth	Sample type	Description	28/3R	28/3S	29/3R	29/3S	27Ts (A)	27Tm (B)	28ab (Z)	25nor30ab (Z1)	29ab (C)	29Ts (C1)
1248	cut	shale/claystone	nm	nm	nm	nm	21876	372970	31775	nm	316980	24395
1579	cut	carbonaceous shale	nm	nm	nm	nm	23431	648271	119384	nm	872786	67615
2081	cut	shale/claystone	nm	nm	nm	nm	14120	434840	132472	nm	557903	32583
2279	cut	shale/claystone	nm	nm	nm	nm	11688	153884	24442	nm	197030	19282

  

Lower depth	Sample type	Description	30d (X)	29ba (D)	30ab (E)	30ba (F)	30G	31abS (G)	31abR (H)	31ba (I)	32abS (J1)	32abR (J2)
1248	cut	shale/claystone	33830	166173	546463	234054	26405	351253	414084	176456	54557	114578
1579	cut	carbonaceous shale	64154	461357	1010611	414159	0	414693	334711	0	131393	143388
2081	cut	shale/claystone	35465	255375	583356	220147	0	294502	193723	101460	99182	73749
2279	cut	shale/claystone	20629	90641	287331	109396	9771	143765	157028	62504	32447	43426

  

Lower depth	Sample type	Description	%Lith.	33abS (K1)	33abR (K2)	34abS (L1)	34abR (L2)	35abS (M1)	35abR (M2)	Sample number
1248	cut	shale/claystone	100	26362	53300	15551	29753	17366	36852	713/0098-1
1579	cut	carbonaceous shale	10	21986	27939	11108	13317	3387	3714	713/0138-2
2081	cut	shale/claystone	25	29262	20228	14668	9250	4233	3722	713/0060-1
2279	cut	shale/claystone	50	12745	18299	6812	9292	3157	7973	713/0070-1

**Table 8f. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak heights from m/z 177 fragmentograms)  
Triterpanes, peak heights, SIR: TRITPHS m/z 177**

Lower depth	Sample type	Description	%Lith.	25nor28ab	25nor30ab	Sample number
1248	cut	shale/claystone	100	0	0	713/0098-1
1579	cut	carbonaceous shale	10	0	0	713/0138-2
2081	cut	shale/claystone	25	0	0	713/0060-1
2279	cut	shale/claystone	50	0	0	713/0070-1

**Table 8g. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS triterpane ratios (peak heights from m/z 191 fragmentograms)**

Lower depth	Sample type	Description	Ratio 1	Ratio 2	Ratio 3	Ratio 4	Ratio 5	Ratio 6	Ratio 7	Ratio 8	Ratio 9	Ratio 10
1248	cut	shale/claystone	17.1	0.94	0.32	0.58	0.37	0.06	0.06	0.10	0.05	0.03
1579	cut	carbonaceous shale	27.7	0.97	0.31	0.86	0.46	0.06	0.12	0.14	0.11	0.02
2081	cut	shale/claystone	30.8	0.97	0.35	0.96	0.49	0.06	0.23	0.24	0.19	0.03
2279	cut	shale/claystone	13.2	0.93	0.28	0.69	0.41	0.07	0.09	0.12	0.08	0.04

Lower depth	Sample type	Description	Ratio 11	Ratio 12	Ratio 13	Ratio 14	Sample number
1248	cut	shale/claystone	0.70	0.38	0.46	32.3	713/0098-1
1579	cut	carbonaceous shale	0.71	0.48	0.46	47.8	713/0138/2
2081	cut	shale/claystone	0.73	0.50	0.42	57.4	713/0060-1
2279	cut	shale/claystone	0.72	0.42	0.41	42.8	713/0070-1



### Triterpane Ratios Definitions

Ratio 1	$27Tm/27Ts$
Ratio 2	$27Tm/(27Tm+27Ts)$
Ratio 3	$27Tm/(27Tm+30\alpha\beta+30\beta\alpha)$
Ratio 4	$29\alpha\beta/30\alpha\beta$
Ratio 5	$29\alpha\beta/(29\alpha\beta+30\alpha\beta)$
Ratio 6	$30d/30\alpha\beta$
Ratio 7	$28\alpha\beta/30\alpha\beta$
Ratio 8	$28\alpha\beta/29\alpha\beta$
Ratio 9	$28\alpha\beta/(28\alpha\beta+30\alpha\beta)$
Ratio 10	$24/3/30\alpha\beta$
Ratio 11	$30\alpha\beta/(30\beta\alpha+30\alpha\beta)$
Ratio 12	$(29\alpha\beta+29\beta\alpha)/(29\alpha\beta+29\beta\alpha+30\alpha\beta+30\beta\alpha)$
Ratio 13	$(29\beta\alpha+30\beta\alpha)/(29\alpha\beta+30\alpha\beta)$
Ratio 14	$32\alpha\beta S/(32\alpha\beta S+32\alpha\beta R) \%$

**Table 8h. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak heights from m/z 217 fragmentograms)  
Steranes, peak heights, SIR: STERPHS m/z 217**

Lower depth	Sample type	Description	%Lithology	21a (u)	22a (v)	27dbS (a)	27dbR (b)	27daR (c)	27daS (d)	28dbS (e)	28dbR (f)
1248	cut	shale/claystone	100	115290	41340	249201	181731	104214	82610	125985	88624
1579	cut	carbonaceous shale	10	15437	4675	13609	9798	9541	6702	20546	12359
2081	cut	shale/claystone	25	23048	7910	27909	18245	13843	11371	35635	19601
2279	cut	shale/claystone	50	24209	9686	47341	37265	23219	16958	34091	26952

Lower depth	Sample type	Description	28daR+ 27aaS (g)	29dbS+ 27bbR (h)	27bbS+ 28daS (i)	27aaR (j)	29dbR (k)	29daR (l)	28aaS (m)	28bbR+ 29daS (n)	28bbS (o)	28aaR (p)
1248	cut	shale/claystone	120396	246894	86523	279307	174723	71040	42179	86627	93291	137251
1579	cut	carbonaceous shale	23400	80082	13919	20439	51347	26933	16139	19516	14763	28707
2081	cut	shale/claystone	39489	133882	21642	38672	87313	42360	29131	23213	21975	40070
2279	cut	shale/claystone	29182	68050	20360	64902	48077	20947	15903	21923	24541	39097

Lower depth	Sample type	Description	29aaS (q)	29bbR (r)	29bbS (s)	29aaR (t)	Sample number
1248	cut	shale/claystone	37284	130102	68987	249896	713/0098-1
1579	cut	carbonaceous shale	22213	60939	31127	98702	713/0138-2
2081	cut	shale/claystone	86008	79313	54061	171127	713/0060-1
2279	cut	shale/claystone	22767	40969	24333	80038	713/0070-1

**Table 8i. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS (peak heights from m/z 218 fragmentograms)  
Steranes, peak heights, SIR: STERPHS m/z 218**

Lower depth	Sample type	Description	%Lith.	27bbR (h)	27bbS (i)	28bbR (n)	28bbS (o)	29bbR (r)	29bbS (s)	30bbR (x)	30bbS (y)	Sample number
1248	cut	shale/claystone	100	172670	98330	105645	106098	139418	105136	19289	21410	713/0098-1
1579	cut	carbonaceous shale	10	29556	8186	17290	17450	62303	42217	3265	2523	713/0138/2
2081	cut	shale/claystone	25	51971	13677	24500	26472	91895	67167	1833	1770	713/0060-1
2279	cut	shale/claystone	50	38148	18457	21157	23338	41793	29610	3496	4556	713/0070-1

**Table 8j. NCS 7124/4-1 S. Saturated Hydrocarbon GC-MS sterane ratios (peak heights from m/z 217 fragmentograms)**

Lower depth	Sample type	Description	%Lith.	Ratio 1	Ratio 2	Ratio 3	Ratio 4	Ratio 5	Ratio 6	Ratio 7	Ratio 8	Ratio 9	Ratio 10	Sample number
1248	cut	shale/claystone	100	0.47	12.98	58.10	1.07	0.84	0.24	0.19	40.94	0.15	0.80	713/0098-1
1579	cut	carbonaceous shale	10	0.40	18.37	60.36	0.22	0.81	0.09	0.07	43.23	0.23	0.93	713/0138/2
2081	cut	shale/claystone	25	0.42	33.45	50.92	0.25	0.61	0.07	0.06	34.15	0.50	0.78	713/0060-1
2279	cut	shale/claystone	50	0.42	22.15	55.96	0.78	0.74	0.17	0.13	38.85	0.28	0.82	713/0070-1

**Sterane Ratios Definitions**

**Steranes**

- Ratio 1  $27d\beta S / (27d\beta S + 27\alpha\alpha R)$
- Ratio 2  $29\alpha\alpha S / (29\alpha\alpha S + 29\alpha\alpha R) \%$
- Ratio 3  $2 * (29\beta\beta R + 29\beta\beta S) / (29\alpha\alpha S + 29\alpha\alpha R + 2 * [29\beta\beta R + 29\beta\beta S]) \%$
- Ratio 4  $(27d\beta S + 27d\beta R + 27d\alpha R + 27d\alpha S) / (29d\beta S + 29d\beta R + 29d\alpha R + 29d\alpha S)$
- Ratio 5  $(29\beta\beta R + 29\beta\beta S) / (29\alpha\alpha S + 29\beta\beta R + 29\beta\beta S)$
- Ratio 6  $21\alpha + 22\alpha / (21\alpha + 22\alpha + 29\alpha\alpha S + 29\beta\beta R + 29\beta\beta S + 29\alpha\alpha R)$
- Ratio 7  $21\alpha + 22\alpha / (21\alpha + 22\alpha + 28d\alpha S + 28\alpha\alpha S + 29d\alpha R + 29\alpha\alpha S + 29\beta\beta R + 29\beta\beta S + 29\alpha\alpha R)$
- Ratio 8  $(29\beta\beta R + 29\beta\beta S) / (29\alpha\alpha S + 29\beta\beta R + 29\beta\beta S + 29\alpha\alpha R) \%$
- Ratio 9  $29\alpha\alpha S / 29\alpha\alpha R$
- Ratio 10  $(29\beta\beta R + 29\beta\beta S) / 29\alpha\alpha R$

**Table 9a. NCS 7124/4-1 S. Aromatic Fraction GC-MS (peak heights from m/z 142/156/170 fragmentograms)  
C<sub>1-3</sub>-Naphthalenes**

Lower depth	Sample type	Description	%Lith.	m/z 142				m/z 156					
				2MN	1MN	2EN	1EN	2.6+2.7 DMN	1.3+1.7 DMN	1.6DMN	2.3+1.4 DMN	1.5DMN	1.2DMN
1248	cut	claystone	100	313528	596918	75372	71558	86643	291171	17268	148079	93351	104453
1579	cut	claystone	10	907425	897910	108233	53269	179349	598400	515677	291642	192088	135112
2081	cut	claystone	25	412221	399184	75559	52111	137453	397177	357881	258480	107513	93652
2279	cut	claystone	50	44507	57403	4878	5193	11323	29644	26132	30063	11455	16983

**m/z 170**

Lower depth	Sample type	Description	1.3.5+							
			1.3.7 TMN	1.3.6 TMN	1.4.6 TMN	2.3.6 TMN	1.6.7+1.2.7 TMN	1.2.6 TMN	1.2.4 TMN	1.2.5 TMN
1248	cut	shale/claystone	39659	111579	80610	39423	51149	49476	27352	92611
1579	cut	shale/claystone	74954	202888	165910	12434	139253	8193	26822	347240
2081	cut	shale/claystone	49428	142727	110722	86456	108693	67148	24961	155021
2279	cut	shale/claystone	2119	6694	5538	6339	8779	6302	1440	14467

**Table 9a. NCS 7124/4-1 S. Aromatic Fraction GC-MS (peak heights from m/z 178 & 192 fragmentograms  
C<sub>0-1</sub>-Phenanthrenes [P and MP] and from m/z 184 & 198 fragmentograms, C<sub>0-1</sub> dibenzothiophenes [DBT and MDBT])**

Lower depth	Sample type	Description	P	3MP	2MP	9MP	1MP	DBT	4MDBT	2+3 MDBT	1MDBT	Sample number
1248	cut	shale/claystone	195378	48602	43905	132009	82213	66814	41623	17967	78126	713/0098-1
1579	cut	shale/claystone	1872003	221628	319570	569799	342437	56640	28039	13231	12914	713/0138/2
2081	cut	shale/claystone	2405541	200599	273421	522976	373387	158448	55311	28032	26570	713/0060-1
2279	cut	shale/claystone	856953	79213	88808	141917	150006	46523	17389	8191	22205	713/0070-1

**Table 9b. NCS 7124/4-1 S. Aromatic Fraction GC-MS (peak heights from m/z 231 fragmentograms)**

**Triaromatic steranes, peak heights: TASTPH m/z 231**

Lower depth	Sample type	Description	%Lith.	a1	b1	c1	d1	e1	f1	g1	Sample number
1248	cut	shale/claystone	100	4935	2730	10862	21090	6331	10307	6244	713/0098-1
1579	cut	shale/claystone	10	2458	2326	856	2908	3865	1436	3962	713/0138-2
2081	cut	shale/claystone	25	4014	2261	1809	4008	6056	2278	4828	713/0060-1
2279	cut	shale/claystone	50	2648	1289	1100	2481	1608	1482	1469	713/0070-1

**Table 9b. NCS 7124/4-1 S. Aromatic Fraction GC-MS Ratios (from peak heights from m/z 231 fragmentograms)**

**Triaromatic steranes, peak heights: TASTPH m/z 231**

Lower depth	Sample type	Description	%Lith.	a1/ (a1+g1)	b1/ (b1+g1)	(a1+b1)/(a1+b1+c1+d1+e1+f1+g1)	a1/ (a1+e1+f1+g1)	a1/ (a1+d1)	Sample number
1248	cut	shale/claystone	100	0.44	0.3	0.12	0.18	0.19	713/0098-1
1579	cut	shale/claystone	10	0.38	0.37	0.27	0.21	0.46	713/0138-2
2081	cut	shale/claystone	25	0.45	0.32	0.25	0.23	0.5	713/0060-1
2279	cut	shale/claystone	50	0.64	0.47	0.33	0.37	0.52	713/0070-1

**Table 9c. NCS 7124/4-1 S. Aromatic Fraction GC-MS (peak heights from m/z 253 fragmentograms)  
Monoaromatic steranes, peak heights: MASTPH m/z 253**

Lower depth	Sample type	Description	%Lith.	A1	B1	C1	D1	E1	F1	G1	H1	I1	Sample number
1248	cut	shale/claystone	100	34377	15328	37561	30983	77158	16084	64631	49362	17723	713/0098-1
1579	cut	carbonaceous shale	10	5991	4175	14864	11982	45729	21774	102585	71250	24800	713/0138-2
2081	cut	shale/claystone	25	18295	10286	32365	25893	84099	48368	214157	145958	33439	713/0060-1
2279	cut	shale/claystone	50	84753	36978	207455	181212	499323	92615	283234	261507	88239	713/0070-1

**Table 9d. NCS 7124/4-1 S. Aromatic Fraction GC-MS Ratios (from peak heights from m/z 253 fragmentograms)  
Monoaromatic steranes, peak height ratios: MASTRAT m/z 253**

Lower depth	Sample type	Description	%Lith.	A1/ (A1+E1)	B1/ (B1+E1)	A1/ (A1+E1+G1)	(A1+B1)/(A1+B1+C1+D1+E1+F1+G1+H1+I1)	Sample number
1248	cut	shale/claystone	100	0.31	0.17	0.2	0.14	713/0098-1
1579	cut	carbonaceous shale	10	0.12	0.08	0.04	0.03	713/0138-2
2081	cut	shale/claystone	25	0.18	0.11	0.06	0.05	713/0060-1
2279	cut	shale/claystone	50	0.15	0.07	0.1	0.07	713/0070-1

**Table 10. NCS 7124/4-1 S. Stable Carbon isotope composition of Saturated and Aromatic Fractions  
Carbisot: Carbon isotope**

Lower depth	Sample type	Description	%Lith.	d13C SAT	d13C ARO	Sample number
1248	cut	shale/claystone	100	-31.36	-30.79	713/0098-1
1579	cut	carbonaceous shale	10	-29.43	-26.71	713/0138-2
2081	cut	shale/claystone	25	-28.98	-28.6	713/0060-1
2279	cut	shale/claystone	50	-29.47	-28.26	713/0070-1

## Experimental Procedures

### Headspace Gas Analysis

The analysis is performed using a Varian 3400 gas chromatograph with a 50 m Plot fused silica Al<sub>2</sub>O<sub>3</sub>/KCL column, loop injector and flame ionization detector. Helium is used as carrier gas and the column is run from 70°C to 200°C, at a rate of 12°C/min. Final hold time is 13 min. Two cm<sup>3</sup> of headspace gas are removed from each sample can for chromatographic analysis of the C<sub>1</sub> to C<sub>7</sub> range of hydrocarbons.

### Total Organic Carbon (TOC) Analysis

This analysis is performed using a LECO CS244 Carbon Analyser. Hand-picked lithologies from cuttings samples are crushed with a mortar and pestle and approximately 200 mg (50 mg for coals) are accurately weighed into LECO crucibles. The samples are then treated three times with 10 % hydrochloric acid to remove oxidized (carbonate) carbon, and washed four times with distilled water. The samples are dried on a hotplate at 60 - 70°C before analysis of total organic carbon.

### Rock-Eval Pyrolysis

This analysis is performed by using a Rock-Eval VI Pyrolyser. Approximately 100 mg crushed whole rock is analysed. The sample is first heated at 325°C for three min to release the free hydrocarbons present (S1 peak) and then pyrolysed by increasing the temperature from 300°C to 650°C (temp. gradient 25°C/min) (S2 peak). Both the S1 and S2a and S2b yields are measured using a flame ionization detector (FID). In the temperature interval between 300°C and 390°C, the released gases are split and a proportion passed through a carbon dioxide trap, which is connected to an IR detector. Various parameters from both detectors are obtained. A further heating phase -oxidation generates additional data on CO<sub>2</sub> and CO production up to a temperature of 850°C. TOC and mineral Carbon is determined from the combined pyrolysis and oxidation phases.

### Vitrinite Reflectance Analysis

Samples to be analysed for vitrinite reflectance are ground to small granules (if necessary) using a pestle and mortar and are then mounted in a fast setting resin. The resin blocks are first ground flat using a coarse corundum paper to expose the rock granule surfaces and then with three finer grades of corundum paper to improve these surfaces and reduce scratches. The blocks are finally polished on a rotating Selvyt-covered lap using three grades of diamond suspension fluid. An appropriate lubricant is used when necessary.

Reflectance measurements are made under oil immersion.

The polished blocks are mounted on the microscope stage and scanned manually in order to locate and measure particles of vitrinite. An attempt is made to obtain readings from 20 individual particles per sample, but this is not always possible in samples with low amounts of phytoclasts.

Reflectance populations are identified on the software using the following key:

Type	ID number
Indigenous	1
Low reflecting	2
Caved	3
Reworked/semifusinite	4
Bitumen	5

### Solvent Extraction of Organic Matter (EOM)

The samples are extracted using a Tecator Soxtec HT-System. Carefully weighed samples are taken in a pre-extracted thimble. Some activated copper is added to the extraction cup and dichloromethane/methanol (93/7) is used as an extraction solvent. The samples are boiled for 1 hour and then rinsed for 2 hours. If the samples contain more than 10 % TOC, then the whole procedure is repeated once. The resulting solution is transferred to a flask and the solvent removed by rotary evaporation (200 mb, 30°C). The amount of EOM is gravimetrically established.

### Removal of Asphaltenes

The EOM is dissolved in n-pentane in a flask to precipitate the asphaltenes by ultrasonic bath for 3 min. The solution is then stored in the dark and at ambient temperature for at least 8 hours. The solution is then filtered (Baker 10-spe system) and the precipitated asphaltenes returned to the original flask by dissolution in dichloromethane. The solvent is removed by rotary evaporation at 200 mB and 30°C.

### **Chromatographic Separation of deasphalted EOM**

Chromatographic separation is performed using an MPLC system developed by the company. The EOM (minus asphaltenes) is injected into the MPLC and separated using hexane as an eluent. The saturated and aromatic hydrocarbon fractions are collected and the solvent removed using a rotary evaporator at 30°C. The fractions are then transferred to small pre-weighed vials and evaporated to dryness overnight. The vials are re-weighed to obtain the weights of both the saturated and the aromatic fractions. The weight of the NSO fraction which is retained on the column, is obtained by weight difference.

### **Combined Gas Chromatography - Mass Spectrometry (GC-MS)**

The GC-MS analyses are performed on a Autospec Ultima system interfaced to a Hewlett Packard 5890 gas chromatograph. The GC is fitted with a fused silica SE54 capillary column (40 m x 0.22 mm i.d.) directly into the ion source. Helium (12 psi) is used as carrier gas and the injections are performed in splitless mode. The GC oven is programmed from 45°C to 150°C at 35°C/min, at which point the programme rate is 2°C/min up to 310°C where the column is held isothermally for 15 min. For the aromatic hydrocarbons, the GC oven is programmed from 50°C to 310°C at 5°C/min. and held isothermally at 310°C for 15 min. The mass spectrometer is operated in electron impact (EI) mode at 70 eV electron energy, a trap current of 500 uA and a source temperature of 220°C. The instrument resolution used is 1500 (10 % value). The data system used is a VG OPUS system. The samples are analysed in multiple ion detection mode (MID) at a scan cycle time of approximately 1.1 sec. Calculation of peak ratios is performed from peak heights in the appropriate mass fragmentograms.

### **Saturated Fractions**

#### *Terpanes*

The most commonly used fragment ions for detection of terpanes are m/z 177 for detection of demethylated hopanes or moretanes, m/z 191 for detection of tricyclic, tetracyclic- and pentacyclic terpanes and m/z 205 for methylated hopanes or moretanes.

#### *Steranes*

The most commonly used fragment ions for detection of steranes are m/z 217 for detection of rearranged and normal steranes, m/z 218 for detection of 5 $\alpha$ (H)14 $\beta$ (H) 17 $\beta$ (H) steranes and m/z 259 for detection of rearranged steranes. The m/z 253 fragment ion is used to detect possible aromatic contamination of the saturated fraction. It can also be used for detection of isoprenoids.



Norwegian Standard Guide Annotation

**Mass Fragmentograms representing Terpanes  
(m/z 177, 191, 205)**

Peak Identification: ( $\alpha$  and  $\beta$  refer to hydrogen atoms at C-17 and C-21 respectively unless indicated otherwise).

27Ts	18 $\alpha$ trisnorneohopane (T <sub>s</sub> )	C <sub>27</sub> H <sub>44</sub>	(I)
27Tm	17 $\alpha$ trisnorhopane (T <sub>m</sub> )	C <sub>27</sub> H <sub>46</sub>	(II, R=H)
28 $\alpha\beta$	Bisnorhopane	C <sub>28</sub> H <sub>48</sub>	(IV)
25nor30 $\alpha\beta$ *	norhopane	C <sub>29</sub> H <sub>50</sub>	
29 $\alpha\beta$	$\alpha\beta$ norhopane	C <sub>29</sub> H <sub>50</sub>	(II, R=C <sub>2</sub> H <sub>5</sub> )
29Ts	norneohopane	C <sub>29</sub> H <sub>50</sub>	
29 $\beta\alpha$	$\beta\alpha$ norhopane	C <sub>29</sub> H <sub>50</sub>	(III, R=C <sub>2</sub> H <sub>5</sub> )
30 $\alpha\beta$	$\alpha\beta$ hopane	C <sub>30</sub> H <sub>52</sub>	(II, R=i-C <sub>3</sub> H <sub>7</sub> )
30O	Oleanane	C <sub>30</sub> H <sub>52</sub>	
30 $\beta\alpha$	$\beta\alpha$ hopane	C <sub>30</sub> H <sub>52</sub>	(III, R=i-C <sub>3</sub> H <sub>7</sub> )
31 $\alpha\beta$ S	22S $\alpha\beta$ homohopane	C <sub>31</sub> H <sub>54</sub>	(II, R=i-C <sub>4</sub> H <sub>9</sub> )
31 $\alpha\beta$ R	22R $\alpha\beta$ homohopane	C <sub>31</sub> H <sub>54</sub>	(II, R=i-C <sub>4</sub> H <sub>9</sub> )
30G	gammacerane	C <sub>30</sub> H <sub>52</sub>	
31 $\beta\alpha$	$\beta\alpha$ homohopane	C <sub>31</sub> H <sub>54</sub>	(III, R=i-C <sub>4</sub> H <sub>9</sub> )
32 $\alpha\beta$ S	22S $\alpha\beta$ bishomohopane	C <sub>32</sub> H <sub>56</sub>	(II, R=i-C <sub>5</sub> H <sub>11</sub> )
32 $\alpha\beta$ R	22R $\alpha\beta$ bishomohopane	C <sub>32</sub> H <sub>56</sub>	(II, R=i-C <sub>5</sub> H <sub>11</sub> )
33 $\alpha\beta$ S	22S $\alpha\beta$ trishomohopane	C <sub>33</sub> H <sub>56</sub>	(II, R=i-C <sub>5</sub> H <sub>11</sub> )
33 $\alpha\beta$ R	22R $\alpha\beta$ trishomohopane	C <sub>33</sub> H <sub>58</sub>	(II, R=i-C <sub>6</sub> H <sub>13</sub> )
34 $\alpha\beta$ S	22S $\alpha\beta$ tetrakishomohopane	C <sub>34</sub> H <sub>60</sub>	(II, R=i-C <sub>7</sub> H <sub>15</sub> )
34 $\alpha\beta$ R	22R $\alpha\beta$ tetrakishomohopane	C <sub>34</sub> H <sub>60</sub>	(II, R=i-C <sub>7</sub> H <sub>15</sub> )
35 $\alpha\beta$ S	22S $\alpha\beta$ pentakishomohopane	C <sub>35</sub> H <sub>62</sub>	(II, R=i-C <sub>8</sub> H <sub>17</sub> )
35 $\alpha\beta$ R	22R $\alpha\beta$ pentakishomohopane	C <sub>35</sub> H <sub>62</sub>	(II, R=i-C <sub>8</sub> H <sub>17</sub> )
23/3	Tricyclic terpane	C <sub>23</sub> H <sub>42</sub>	(V, R=i-C <sub>4</sub> H <sub>9</sub> )
24/3	Tricyclic terpane	C <sub>24</sub> H <sub>44</sub>	(V, R=i-C <sub>5</sub> H <sub>11</sub> )
25/3	Tricyclic terpane (17R, 17S)	C <sub>25</sub> H <sub>66</sub>	(V, R=i-C <sub>6</sub> H <sub>13</sub> )
24/4	Tetracyclic terpane	C <sub>24</sub> H <sub>42</sub>	(VI)
26/3	Tricyclic terpane (17R, 17S)	C <sub>26</sub> H <sub>48</sub>	(V, R=i-C <sub>7</sub> H <sub>15</sub> )
21/3	Tricyclic terpane	C <sub>21</sub> H <sub>38</sub>	(V, R=C <sub>2</sub> H <sub>5</sub> )
22/3	Tricyclic terpane	C <sub>22</sub> H <sub>40</sub>	(V, R=C <sub>3</sub> H <sub>7</sub> )
25nor28	* 25,28,30-trisnorhopane/moretane	C <sub>27</sub> H <sub>46</sub>	(VII)
30d	Diahopane	C <sub>30</sub> H <sub>52</sub>	(VIII)

\* Also identified and quantified in m/z 177 fragmentograms

**Mass Fragmentograms representing Steranes**  
(m/z 217, 218, 259)

Peak Identifications:  $\alpha$  and  $\beta$  refer to hydrogen atoms at C-5, C-14 and C-17 in regular steranes and at C-13 and C-17 in diasteranes.

21 $\alpha$	5 $\alpha$ sterane	C <sub>21</sub> H <sub>36</sub>	( VI, R=C <sub>2</sub> H <sub>5</sub> )
22 $\alpha$	5 $\alpha$ sterane	C <sub>22</sub> H <sub>38</sub>	( VI, R=C <sub>3</sub> H <sub>7</sub> )
27d $\beta$ S	20S $\beta\alpha$ diacholestane	C <sub>27</sub> H <sub>48</sub>	( I, R=H)
27d $\beta$ R	20R $\beta\alpha$ diacholestane	C <sub>27</sub> H <sub>48</sub>	( I, R=H)
27d $\alpha$ S	20S $\alpha\beta$ diacholestane	C <sub>27</sub> H <sub>48</sub>	( II, R=H)
27d $\alpha$ R	20R $\alpha\beta$ diacholestane	C <sub>27</sub> H <sub>48</sub>	( II, R=H)
28d $\beta$ S	20S $\beta\alpha$ 24-methyl-diacholestane	C <sub>28</sub> H <sub>50</sub>	( I, R=CH <sub>3</sub> )
28d $\beta$ R	20R $\beta\alpha$ 24-methyl-diacholestane	C <sub>28</sub> H <sub>50</sub>	( I, R=CH <sub>3</sub> )
28d $\alpha$ R	20R $\alpha\beta$ 24-methyl-diacholestane	C <sub>28</sub> H <sub>50</sub>	( II, R=CH <sub>3</sub> )
27 $\alpha\alpha$ S	+ 20S $\alpha\alpha\alpha$ cholestane	C <sub>27</sub> H <sub>48</sub>	(III, R=H)
29d $\beta$ S	20S $\beta\alpha$ 24-ethyl-diacholestane	C <sub>29</sub> H <sub>52</sub>	( II, R=C <sub>2</sub> H <sub>5</sub> )
27 $\beta\beta$ R*	+ 20R $\alpha\beta\beta$ cholestane	C <sub>27</sub> H <sub>48</sub>	( IV, R=H)
27 $\beta\beta$ S*	20S $\alpha\beta\beta$ cholestane	C <sub>27</sub> H <sub>48</sub>	( IV, R=H)
28d $\alpha$ S	+ 20S $\alpha\beta$ 24-methyl-diacholestane	C <sub>28</sub> H <sub>50</sub>	( II, R=CH <sub>3</sub> )
27 $\alpha\alpha$ R	20R $\alpha\alpha\alpha$ cholestane	C <sub>27</sub> H <sub>48</sub>	(III, R=H)
29d $\beta$ R	20R $\beta\alpha$ 24-ethyl-diacholestane	C <sub>29</sub> H <sub>52</sub>	( I, R=C <sub>2</sub> H <sub>5</sub> )
29d $\alpha$ R	20R $\alpha\beta$ 24-ethyl-diacholestane	C <sub>29</sub> H <sub>52</sub>	( II, R=C <sub>2</sub> H <sub>5</sub> )
28 $\alpha\alpha$ S	20S $\alpha\alpha\alpha$ 24-methyl-cholestane	C <sub>28</sub> H <sub>50</sub>	(III, R=CH <sub>3</sub> )
28 $\beta\beta$ R*	20R $\alpha\beta\beta$ 24-methyl-cholestane	C <sub>28</sub> H <sub>50</sub>	( IV, R=CH <sub>3</sub> )
29d $\alpha$ S	+ 20S $\alpha\beta$ 24-ethyl-diacholestane	C <sub>29</sub> H <sub>52</sub>	( II, R=C <sub>2</sub> H <sub>5</sub> )
28 $\beta\beta$ S*	20S $\alpha\beta\beta$ 24-methyl-cholestane	C <sub>28</sub> H <sub>50</sub>	( IV, R=CH <sub>3</sub> )
28 $\alpha\alpha$ R	20R $\alpha\alpha\alpha$ 24-methyl-cholestane	C <sub>28</sub> H <sub>50</sub>	(III, R=CH <sub>3</sub> )
29 $\alpha\alpha$ S	20S $\alpha\alpha\alpha$ 24-ethyl-cholestane	C <sub>29</sub> H <sub>52</sub>	(III, R=C <sub>2</sub> H <sub>5</sub> )
29 $\beta\beta$ R*	20R $\alpha\beta\beta$ 24-ethyl-cholestane	C <sub>29</sub> H <sub>52</sub>	( IV, R=C <sub>2</sub> H <sub>5</sub> )
29 $\beta\beta$ S*	20S $\alpha\beta\beta$ 24-ethyl-cholestane	C <sub>29</sub> H <sub>52</sub>	( IV, R=C <sub>2</sub> H <sub>5</sub> )
29 $\alpha\alpha$ R	20R $\alpha\alpha\alpha$ 24-ethyl-cholestane	C <sub>29</sub> H <sub>52</sub>	(III, R=C <sub>2</sub> H <sub>5</sub> )
M30 $\alpha\alpha$	$\alpha\alpha$ 4-methyl-24-ethyl-cholestane	C <sub>30</sub> H <sub>54</sub>	
M30D	$\alpha\alpha$ 4,23,24-trimethyl-cholestane	C <sub>30</sub> H <sub>54</sub>	
30 $\alpha\alpha$ S	20S $\alpha\alpha\alpha$ 24-propyl-cholestane	C <sub>30</sub> H <sub>54</sub>	( IV, R=C <sub>3</sub> H <sub>7</sub> )
30 $\beta\beta$ R*	20R $\alpha\beta\beta$ 24-propyl-cholestane	C <sub>30</sub> H <sub>54</sub>	( V, R=C <sub>3</sub> H <sub>7</sub> )
30 $\beta\beta$ S*	20S $\alpha\beta\beta$ 24-propyl-cholestane	C <sub>30</sub> H <sub>54</sub>	( IV, R=C <sub>3</sub> H <sub>7</sub> )
30 $\alpha\alpha$ R	20R $\alpha\alpha\alpha$ 24-propyl-cholestane	C <sub>30</sub> H <sub>54</sub>	( IV, R=C <sub>3</sub> H <sub>7</sub> )

- Compounds identified and quantified in m/z 218 fragmentograms

## Abbreviations

### List of abbreviations used for lithology description

(sorted alphabetically)

ang	= angular
bar	= Baryte (mud additive)
bit	= bituminous
bl	= blue/blueish
blk	= black
br	= brittle
brn	= brown/brownish
Ca	= Carbonate (limestone/chalk/dolomite/siderite)
calc	= calcareous
carb	= carbonaceous
cem	= cement used as additive (under "cont") or to describe cemented S/Sst
Chert	= Chert
chk	= Chalk/chalky
cly	= clayey/shaly
cngl	= conglomeratic
Coal	= Coal
Coal-ad	= Coal-like additive (e.g. chromlignosulfonate)
Congl	= Conglomerate
Cont	= Contamination(s)
crs	= coarse grained
dd	= dried drilling mud
dol	= Dolomite/dolomitic
drk	= dark (colour)
dsk	= dusk/dusky (colour)
evap	= Salt/Gypsum/Halite (natural "Other" or as additive "Cont")
f	= fine grained
fe	= ferruginous
fib	= fibres (mud additive/contamination)
fis	= fissile
fos	= fossiliferous
glauc	= glauconite/glauconitic
gn	= green/greenish
gy	= grey/greyish
hd	= hard
ign	= Igneous (material derived from igneous source)
Kaolin	= Kaolin(ite)
kln	= kaolinitic
l	= loose
lam	= laminated/laminae
lt	= light (colour)
m	= medium (colour or grain size)
Marl	= Marl (calcareous claystone/mudstone)
mic	= micaceous
Mica-ad	= Mica used as mud additive
mrl	= marly
No Mat.	= No material left over after washing
ns	= nutshells (mud additive)
ol	= olive
ool	= Oolite/oolitic
or	= orange
Other	= Other lithology/mineral, specified after this word
pi	= pink/pinkish
pl	= pale (colour)
prp	= paint/rust/plastic contaminations/additives
pu	= purple
pyr	= Pyrite/pyritic

red	= red/reddish
rnd	= round/rounded
s	= sandy
sft	= soft
S/Sst	= Sand and/or sandstone
Sh/Clst	= Shale and/or claystone
sid	= Siderite/sideritic
sil	= siliceous/cherty
slt	= silty
Sltst	= siltstone
st	= stained (with natural oil or oil-like additive)
tar-ad	= Tar-like additive (e.g. "Black Magic")
trbfgs	= turbodrilled fragments
Tuff	= Tuff
tuff	= tuffaceous
v col	= various colours
w	= white
wx	= waxy
y	= yellow/yellowish

### General

EOM	=	Extractable Organic Matter
GC-MS	=	Gas Chromatograph - Mass Spectrometer
HC	=	Hydrocarbons
MPLC	=	Medium Pressure Liquid Chromatograph
NSO	=	Nitrogen-, Sulphur- and Oxygen-compounds
TOC	=	Total Organic Carbon
VRe	=	Vitrinite Reflectance equivalent
FID	=	Flame Ionisation Detector
GC	=	Gas Chromatograph
CPI	=	Carbon Preference Index, $0.5 \times \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{24}+C_{26}+C_{28}+C_{30}+C_{32}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{26}+C_{28}+C_{30}+C_{32}+C_{34}}$