



COMPLETION INTERVAL

COMPANY STATOIL Well No. 7120/5-1 Page 1 of 4

Casing Size 30 " from 317 to 381 (Bit Size) 36 " hole from 317 to 386 Meters

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	48	mt	325.00	15,600.00
Caustic Soda	25	25 kg	14.50	362.50
Soda Ash	11	50 kg	21.65	238.15
Prothin	13	25 kg	13.50	175.50

Material Cost for Interval \$ 16,376.15 Average Cost per meter \$ 237.34

Number of Days 2 Average Cost per Day \$ 8,188.08

Comments



COMPLETION INTERVAL

COMPANY STATOIL Well No. 7120/5-1 Page 2 of 4

Casing Size 20 " from 3 Meters to 850 (Bit Size) 26 " hole from 381 Meters to 865

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	16	mt	325.00	5,200.00
Barite	271	mt	123.90	33,576.90
Caustic Soda	40	25 kg	14.50	580.00
Soda Ash	4	50 kg	21.65	86.60
Drispac Reg.	52	50 lb	92.00	4,784.00
Prothin	9	25 kg	13.50	121.50

Material Cost for Interval \$ 44,349.00 Average Cost per meter \$ 91.63

Number of Days 8 Average Cost per Day \$ 5,543.63

Comments



COMPLETION INTERVAL

COMPANY STATOIL Well No. 7120/5-1 Page 3 of 4

Casing Size 13 3/8 " from 317 Meters to 1975 (Bit Size) 17 1/2 " hole from 865 Meters to 1988

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	3	mt	325.00	975.00
Caustic Soda	103	25 kg	14.50	1,493.50
Soda Ash	1	50 kg	21.65	21.65
Barite	181	mt	123.90	22,425.90
Milpolymer 302	207	25 kg	200.00	41,400.00
Gypsum	647	40 kg	8.80	5,693.60
Drispac Regular	87	50 lb	92.00	8,004.00
Drispac S/L	83	50 lb	92.00	7,636.00
Prothin	18	25 kg	13.50	243.00
Prodefoamer	8	5 gal	114.00	912.00
Permalose	200	25 kg	38.50	7,700.00
Milbio	4	55 gal	712.50	2,850.00

Material Cost for Interval \$ 99,354.65 Average Cost per meter \$ 88.32

Number of Days 14 Average Cost per Day \$ 7,096.76

Comments



COMPLETION INTERVAL

COMPANY STATOIL Well No. 7120/5-1 Page 4 of 4

Casing Size _____ Meters _____ (Bit Size) _____ Meters _____
" from _____ to _____ 12 1/4" hole from 1975 to 2700

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	2	mt	325.00	650.00
Caustic Soda	65	25 kg	14.50	942.50
Barite	109	mt	123.90	13,505.10
Milpolymer 302	42	25 kg	200.00	8,400.00
Gypsum	47	40 kg	8.80	413.60
Drispac Regular	48	50 lb	92.00	4,416.00
Drispac S/L	86	50 lb	92.00	7,912.00
NaCl	408	50 kg	10.97	4,475.76

Material Cost for Interval \$ 40,714.96 Average Cost per meter \$ 56.16

Number of Days 20 Average Cost per Day \$ 2,035.75

Comments

REPEAT FORMATION TESTER

Pretest records:

Test no.	Depth mRKB	Temp. deg C	Formation pressure kPa , gm/cc		Permeability	Comments
1	2286.0	61.3	25173	1.123	Excellent	Used
2	2290.0	61.6	25214	1.123	Very good	Used
3	2293.5	61.8	25247	1.123	Excellent	Used
4	2295.0	62.0	25268	1.123	Very good/exc	Used
5	2301.5	62.0	25336	1.123	Very good	Used
6	2303.0	62.0	25345	1.122	Very good	Used
7	2313.0	62.5	25462	1.123	Fair/good	Used
8	2318.0	62.8	25768	1.134	Poor	Not used
9	2317.8	62.8	25735	1.132	Poor	Not used
10	2321.5	64.2	25671	1.128	Poor	Not used
11	2332.5	64.2	25679	1.123	Poor	Used
12	2336.0	64.2	25753	1.124	Poor/fair	Used
13	2339.0	64.2	26490	1.155	Poor/incor.	Not used
14	2339.7	64.2	26469	1.154	Poor/incor.	Not used
15	2341.0	65.1	25752	1.122	Very good/exc	Used
16	2343.0	65.1	25787	1.123	Excellent	Used
17	2346.0	65.2	25807	1.122	Excellent	Used
18	2348.0	65.2	25832	1.122	Excellent	Used
19	2350.0	65.2	25853	1.122	Excellent	Used
20	2352.0	65.7	25869	1.122	Excellent	Used
21	2354.0	65.7	25892	1.122	Excellent	Used
22	2361.0	66.0	25967	1.122	Excellent	Used
23	2370.0	66.1	26062	1.122	Excellent	Used
24	2375.0	66.1	29186	1.253	Seal failure	Not used
25	2375.0	66.1	26117	1.122	Excellent	Used
26	2384.0	67.1	26210	1.121	Very good	Used
27	2401.0	67.3	26404	1.122	Very good	Not used
28	2403.0	67.3	-	-	Tight	-
29	2405.0	67.3	-	-	Very tight	-
30	2406.0	67.3	-	-	Very tight	-
31	2408.0	68.5	26910	1.140	Very tight	Not used
32	2410.0	68.5	-	-	Very tight	-
33	2416.0	68.9	26600	1.123	Poor/fair	Used
34	2517.0	71.0	27610	1.119	Very good	Used
35	2555.0	71.8	-	-	Seal failure	-
36	2555.0	71.8	-	-	Very tight	-
37	2559.0	72.1	28109	1.120	Fair	Used
38	2563.5	72.1	-	-	Very tight	-
39	2567.0	72.6	28137	1.118	Fair	Used
40	2569.0	72.6	28172	1.118	Fair	Used
41	2570.0	72.7	28239	1.121	Fair	Used
42	2572.0	72.7	28212	1.119	Fair	Used
43	2624.0	73.8	28673	1.115	Good	Not used
44	2670.0	73.9	29174	1.114	Fair	Not used

Two RFT-runs were performed in this well. The first run resulted in 37 pretest pressure points out of 44 attempts in an interval from 2286 to 2670 m RKB. Evaluation of the RFT gives a water gradient of 1.087 g/cm³ between 2286 and 2572 m RKB. Run number two was an unsuccessful attempt to get a segregated sample at 2416 m RKB.

SAMPLING

Sample no.1:

Segregated sample taken at 2346.0 m RKB. The 2 3/4 gallon chamber was bled off at wellsite:

H₂S : 0 ppm
CO₂ : trace
Opening pressure : 4514 kPa
Gas : 4.814 10⁻³ m³
Water + mudfiltrate : 10.250 10⁻³ m³

	MUD ANALYSIS	WATER ANALYSIS
Chloride content, ppm	36000	36500
pH	9.6	6.6
Resistivity, ohm at 15 deg. C	0.159	0.132

Opening pressure 1 gallon chamber offshore : 4100 kPa.

The 1 gallon chamber was sent onshore for analysis. The sample in the chamber was primarily water with a little associated gas.

Opening pressure at 15.5 deg.C : 4860 kPa
Gas less than : 1.00 10⁻³ m³
Water and mudfiltrate : 2.27 10⁻³ m³

RESULTS OF WATER ANALYSIS:

Apperance before filtration : Yellow/brown cloudy water
Apperance after filtration : Clean yellow/brown water

Specific gravity : 1.046
Chloride content : 41713 ppm
pH : 6.55

GAS COMPOSITION:

Component	Mol%
CO ₂	5.31
N ₂	1.77
Methane	89.82
Ethane	2.48
Propane	0.37
i-butane	0.04
n-butane	0.09
i-pentane	0.05
n-pentane	0.01
Hexanes	0.04
Heptanes+	0.02
Total	100.00

Calculated gas gravity (air = 1.0) : 0.633

Expansion factor : 215 sm³/m³

Sample no.2:

Unsuccessful attempt to get a segregated sample at 2416 m RKB.

U-461

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Prepared for

STATOIL

GEOCHEMICAL EVALUATION OF STATOIL'S 7120/5-1 WELL TROMS-1 AREA, OFFSHORE NORWAY

Text and Tables

NOVEMBER 1985

GEOCHEM



**Petroleum
Geochemistry
Division**

INTRODUCTION

This report presents a geochemical evaluation of the section between 386 metres and 2700 metres (TD) in Statoil's 7120/5-1 well.

The analytical format was specified by Statoil and was designed to:-

- evaluate the hydrocarbon source potential of the section
- define the maturation profile and check for possible inversion
- detect and characterise shows of migrated hydrocarbons

This study was authorised by Kjell Oeygard, Statoil, Stavanger under the conditions of Contract T-6192 Number 14.

ANALYTICAL

A total of one hundred and twenty nine (129) canned ditch cuttings samples, composited over thirty (30) metres down to 1110 metres and thereafter at fifteen (15) metres, were received for this study. In addition, sixteen (16) sidewall cores and ten (10) core pieces were also included. These samples were assigned the Geochem job number 1140.

Formation tops (RKB) were supplied by K. Oeygard and are listed below:-

EGGA GR.	307 M
NORDKAPP GR.	420 M
KVALOEY GR.	1193 M
TORSVAAG FM.	1219 M
ANDA FM.	1804 M
TAMSOEY FM.	2149 M
SLETTNES FM.	2207 M
OLDERFJORD FM.	2248 M
RISFJORD FM.	2271 M
STOE FM.	2285 M
NORDMELA FM.	2427 M
DYROEY FM.	2515 M
YTTEROEY FM.	2648 M
TD	2700 M

Geochem were instructed to perform screening analyses on seven (7) samples above 1804 metres, to employ a thirty (30) metre spacing from 1804 metres to 2207 metres and then to analyse every sample.

The following analyses were performed in this study.

<u>ANALYSIS</u>	<u>NUMBER OF SAMPLES</u>
Head space and occluded gas analysis	54
Sample preparation	81
Total organic carbon	102
Rockeval pyrolysis	80
Vitrinite reflectance	30
Kerogen type and spore colour	30
C ₁₅₊ extraction and chromatography	15
GC - saturates	15
GC - aromatics	15
Pyrolysis-GC	20
Carbon isotopes	34*
GC-MS biomarker analysis	15**

*insufficient sample for a further 11 analyses

**insufficient samples for GC-MS on saturates of 2 samples

Extractions were performed according to Statoil's standard method, resulting in lower yields of the non-hydrocarbons than in earlier studies.

The data are presented in tables 1 through 14 and graphically in figures 1 through 17. A brief description of the analytical techniques employed in this study is included in the back of the report.

GENERAL INFORMATION

Ten (10) copies of this report have been forwarded to K. Oeygard together with the kerogen slides prepared for this study. A copy of the data has been retained by Geochem for future consultation with authorised Statoil personnel.

The remaining sample material will be handled as directed.

All of the results related to this study are proprietary to Statoil A.S.

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-001	386-390m	A 60% Shaly mudstone, subfissile, soft to mod. hard, non-calc., sig. cavings, light grey	N7	0.63
		B 40% Igneous, blocky, hard, very light grey to greyish orange	N8-10YR7/4	
1140-008	570-600m	A 70% Shaly mudstone, as 1140-001A, sig. abundant cavings	N7	0.48
		B 30% Shaly mudstone, subfissile, soft to mod. hard, non-calc., medium grey	N5	0.63,0.65
1140-015	780-810m	A 98% Shaly mudstone, subfissile, soft to mod. hard, non-calc., sig. cavings, medium grey Minor caved mudstone	N5	1.31
1140-019	901m SWC	A 98% Shaly mudstone, subfissile, soft, non-calc., medium olive grey	5Y5/1	1.12
1140-023	1000m SWC	A 98% Shaly mudstone, subfissile, soft, non-calc., medium grey to medium olive grey	N5-5Y5/1	1.00
1140-026	1050-1080m	A 70% Shaly mudstone, subfissile to platy, mod. hard, non-calc., sig. cavings, medium grey to medium olive grey	N5-5Y5/1	0.73
		B 30% Mudstone, blocky, soft, non-calc., medium light grey	N6	0.65,0.66
1140-028	1100m SWC	A 98% Shaly mudstone, subfissile, soft, non-calc., medium olive grey	5Y5/1	0.70
1140-034	1190m SWC	A 98% Shaly mudstone/claystone, subfissile, soft, non-calc., medium dark grey to olive grey	N4-5Y4/1	0.42
1140-037	1215-1230m	A 60% Shaly mudstone, subfissile, soft to mod. hard, non-calc., sig. cavings, medium dark grey	N4	1.25
		B 40% Mudstone, subfissile, soft, non-calc., minor cavings, medium light grey to light grey Minor other caved mudstone	N6-7	0.52
1140-041	1270m SWC	A 98% Shaly mudstone, subfissile, soft, non-calc., medium dark grey to medium grey	N4-5	0.89
1140-048	1365-1380m	A 60% Shale, platy to thinly fissile, mod. hard, non-calc., minor cavings, medium dark grey	N4	0.98,1.00
		B 40% Mudstone, blocky, soft, non-calc., sl. silty, minor cavings, medium grey Minor other caved mudstone	N5	1.02
1140-051	1426m SWC	A 98% Shaly mudstone, subfissile, soft, non-calc., medium dark grey to medium grey	N4-5	0.50

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

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GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-059	1525-1540m	A 50% Shale, platy to thinly fissile, mod. hard, non-calc., minor cavings, medium dark grey	N4	0.80
		B 50% Mudstone, blocky, soft to mod. hard, non-calc., sl. silty, minor cavings, medium grey	N5	1.02
1140-062	1565m SWC	A 98% Shaly mudstone, subfissile to platy, soft, non-calc., medium grey to medium olive grey	N5-5Y5/1	1.39,1.39
1140-066	1615-1630m	A 70% Shale, platy to thinly fissile, mod. hard, non-calc., sig. cavings, medium dark grey	N4	0.73
		B 30% Mudstone, blocky, soft, non-calc., sl. silty, minor cavings, medium grey	N5	1.25
1140-069	1663m SWC	A 98% Shale, grading to shaly mudstone, subfissile, soft to mod. hard, non-calc., medium dark grey to medium grey	N4-5	1.23
1140-074	1720-1735m	A 60% Shale, platy to thinly fissile, mod. hard, non-calc., minor cavings, medium dark grey	N4	1.35
		B 40% Mudstone, blocky, soft, non-calc., sl. silty, minor cavings, medium grey	N5	1.31,1.31
1140-078	1781m SWC	A 98% Shaly mudstone, subfissile, soft to mod. hard, non-calc., medium grey	N5	0.99
1140-080	1795-1810m	A 60% Shale, platy to thinly fissile, mod. hard, non-calc., sig. cavings, medium dark grey	N4	1.15,1.16
		B 30% Mudstone, blocky, soft, non-calc., minor cavings, medium grey	N5	0.85
		C 10% LCM - paint and cement		
1140-082	1825-1840m	A 50% Shale, as 1140-080A, sig. cavings	N4	1.15
		B 25% Mudstone, as 1140-080B, minor cavings	N5	0.74
		C 25% Limestone, blocky, mod. hard, sl. silty, very light grey	N8	0.22
1140-084	1855-1870m	A 45% Shale, as 1140-080A, sig. cavings	N4	1.28,1.28
		B 35% Mudstone, as 1140-080B, minor cavings	N5	1.60
		C 20% Limestone, as 1140-082C	N8	0.66
1140-085	1875m SWC	A 98% Shale, platy to subfissile, mod. hard, non-calc., medium dark grey	N4	2.85
1140-087	1885-1900m	A 70% Mudstone, as 1140-080B, minor cavings	N5	2.14
		B 30% Shale, as 1140-080A, sig. cavings Minor limestone	N4	1.81
1140-089	1915-1930m	A 60% Mudstone, blocky, soft, silty, v. sl. calc., minor cavings, medium grey to medium brownish grey	N5-5YR5/1	2.55,2.53
		B 40% Shale, as 1140-080A, sig. to abundant cavings	N4	1.38
1140-091	1945-1960m	A 60% Mudstone, as 1140-089A, minor cavings	N5-5YR5/1	2.30

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

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GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-091	1945-1960m	B 40% Shale, platy to subfissile, mod. hard, non-calc., minor to sig. cavings, medium dark grey Minor siltstone and limestone	N4	2.25
1140-092	1960m SWC	A 98% Siltstone/silty mudstone, subfissile, mod. hard, non-calc., medium grey to medium light grey	N5-6	2.04
1140-094	1975-1988m	A 60% Calc. silty mudstone, grading to arg. limestone, blocky, soft, very light brownish grey	5YR7/1	1.93,1.93
		B 40% Shale, as 1140-091B, sig. cavings Minor other mudstone	N4	2.02
1140-096	2005-2020m	A 60% Shale, subfissile to platy, soft to mod. hard, non-calc., minor cavings, medium dark grey	N4	3.12
		B 40% Siltstone, blocky, soft to mod. hard, non-calc., medium grey to medium light grey	N5-6	1.49
1140-098	2035-2050m	A 60% Shale, as 1140-096A, minor cavings	N4	3.02
		B 40% Siltstone, as 1140-096B, minor cavings Minor mudstone	N5-6	1.37
1140-100	2065-2080m	A 50% Shale, as 1140-096A, minor cavings	N4	2.69,2.68
		B 50% Siltstone, as 1140-096B, minor cavings Minor mudstone	N5-6	1.34
1140-102	2095-2110m	A 70% Shale, as 1140-096A, minor cavings	N4	2.99
		B 30% Siltstone, as 1140-096B, minor cavings Minor mudstone	N5-6	1.36
1140-104	2125-2140m	A 60% Shale, as 1140-096A, minor to sig. cavings	N4	2.89
		B 40% Siltstone, as 1140-096B, minor cavings	N5-6	1.32,1.34
1140-106	2150m SWC	A 98% Shale, subfissile, soft, brittle, non-calc., medium dark grey to dark grey	N4-3	3.10
1140-107	2155-2170m	A 85% Shale, platy to subfissile, mod. hard, non-calc., minor cavings, medium dark grey	N4	3.49
		B 15% Limestone, blocky, hard, non-calc., medium grey	N5	1.13
1140-109	2185-2200m	A 80% Shale, as 1140-107A, minor cavings	N4	1.61
		B 20% Siltstone, as 1140-107B	N5	0.70
1140-110	2200-2215m	A 85% Shale, as 1140-107A, minor cavings	N4	3.99
		B 15% Siltstone, as 1140-107B Minor dolomite	N5	2.09
1140-111	2215-2230m	A 90% Shale, as 1140-107A, minor cavings	N4	4.33

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

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ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-111	2215-2230m	B 10% Siltstone, blocky, hard, non-calc., medium grey Minor dolomite and red mudstone	N5	0.69
1140-112	2230-2245m	A 80% Dolomitic siltstone, blocky, mod. hard, light grey to very light brownish grey	N7-5YR7/1	0.65
		B 15% Shale, platy to subfissile, mod. hard, non-calc., sig. to abundant cavings, medium dark grey	N4	2.22
		C 5% Silty mudstone, blocky, soft, v. sl. calc., minor to sig. cavings, greyish red	5R4/2	0.42
1140-113	2246m SWC	A 98% Siltstone, blocky to subfissile, soft, non-calc., medium grey to medium light grey	N5-6	0.30
1140-114	2245-2260m	A 98% Shale, subfissile, soft to mod. hard, sl. silty, non-calc., dark grey to dark brownish grey Minor siltstone and other shale	N3-5YR3/1	9.26
1140-115	2260-2275m	A 98% Shale, as 1140-114A, minor to sig. cavings Minor siltstone	N3-5YR3/1	10.50, 10.60
1140-116	2275-2290m	A 50% Shale, as 1140-114A, sig. to abundant cavings	N3-5YR3/1	6.81
		B 50% Siltstone, blocky, mod. hard, non- calc., dolomitic in part, medium grey to medium brownish grey	N5-5YR5/1	1.06
1140-117	2290-2305m	A 50% Shale, platy to thinly fissile, mod. hard, non-calc., minor to sig. cavings, medium dark grey	N4	1.48
		B 35% Shale, subfissile, soft to mod. hard, non-calc., sl. silty, minor to sig. cavings, medium dark grey to brownish grey	N4-5YR4/1	5.53
		C 15% Silty mudstone, blocky, mod. hard, non-calc., light grey Minor red mudstone	N7	0.40
1140-118	2305-2320m	A 75% Shale, as 1140-117A, minor to sig. cavings	N4	1.53
		B 25% Shale, as 1140-117B, sig. cavings Minor dolomite and mudstone	N4-5YR4/1	4.39
1140-119	2320-2335m	A 60% Shale, as 1140-117A, sig. cavings	N4	1.97
		B 40% Shale, as 1140-117B, minor cavings Minor siltstone and dolomite	N4-5YR4/1	3.27
1140-120	2338.5m CORE	A 98% Sandstone, blocky, medium-fine grained, subangular, well sorted, non-calc. matrix, light grey to very light brownish grey	N7-5YR7/1	

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

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GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-121	2335-2342m	A 55% Shale, platy to thinly fissile, mod. hard, non-calc., minor to sig. to abundant cavings, medium dark grey	N4	1.92
		B 40% Shale, subfissile, soft to mod. hard, non-calc., sl. silty, sig. cavings, medium dark grey to brownish grey	N4-5YR4/1	2.68, 2.64
		C 5% Sandstone, blocky, fine grained, well sorted, very light grey	N8	
1140-122	2344.0m CORE	A 98% Sandstone, blocky, medium grained, subangular to subrounded, fairly well sorted, non-calc., yellow F., milky cut, yellowish grey	5Y7/2	
1140-123	2348.0m CORE	A 98% Sandstone, as 1140-122A, yellow F., milky cut	5Y7/2	
1140-124	2350.8m CORE	A 98% Sandstone, as 1140-122A, yellow F., milky cut	5Y7/2	
1140-125	2352.3m CORE	A 98% Sandstone, as 1140-122A, yellow F., milky cut	5Y7/2	
1140-126	2350-2365m	A 75% Shale, platy to thinly fissile, mod. hard, brittle, non-calc., sig. cavings, medium dark grey	N4	1.47
1140-127	2358.3m CORE	A 98% Sandstone, blocky, medium grained, subangular to subrounded, well sorted, grain supported, yellow F., milky cut, yellowish grey	5Y7/2	
1140-128	2362.0m CORE	A 98% Sandstone, as 1140-127A, yellow F., milky cut	5Y7/2	
1140-129	2371.5m CORE	A 98% Sandstone, blocky, medium grained, subangular to subrounded, well sorted, grain supported, minor darker laminations, yellow F., milky cut, yellowish grey	5Y7/2	
1140-130	2382.5m CORE	A 98% Sandstone, blocky, medium grained, subangular to subrounded, well sorted, grain supported, yellow F., milky cut, yellowish grey rarely dusky yellowish brown	5Y7/2- rarely 10YR2/2	
1140-131	2385.0m CORE	A 98% Sandstone, blocky, medium-fine grained, subangular to subrounded, well sorted, grain supported, yellow F., milky cut, very light brownish grey	5YR7/1	
1140-132	2380-2395m	A 75% Shale, platy to thinly fissile, mod. hard, non-calc., sig. cavings, medium dark grey to dark grey	N4-3	1.61
		B 15% Sandstone, blocky, medium grained, subangular, well sorted, yellow F., milky cut, pinkish grey	5YR8/1	

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

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-132	2380-2395m	C 10% Shaly mudstone, blocky to subfissile, mod. hard, non-calc., medium dark grey to medium grey	N4-5	1.87
1140-133	2395-2410m	A 70% Shale, platy to thinly fissile, hard, non-calc., sig. cavings, medium dark grey to dark grey	N4-3	1.49, 1.50
		B 30% Shaly mudstone, as 1140-132C, sig. cavings Minor sandstone	N4-5	1.61
1140-134	2425-2440m	A 80% Sandstone, blocky, medium grained, subangular, well sorted, non-calc., milky cut, very light brownish grey	5YR7/1	
		B 20% Shale, as 1140-133A, sig. to abundant cavings	N4-5	1.89
1140-135	2440-2455m	A 90% Sandstone, as 1140-134A, milky cut	5YR7/1	
		B 10% Shale, as 1140-133A, dominant cavings	N4-3	0.94
1140-136	2455-2470m	A 95% Sandstone, as 1140-134A, milky cut	5YR7/1	
		B 5% Shale, as 1140-133A, dominant cavings Minor mudstone and coal	N4-3	0.98
1140-137	2470m SWC	A 98% Silty sandstone, blocky, fine grained, well sorted, non-calc., very light brownish grey to light brownish grey	5YR7/1- 5YR6/1	0.84
1140-138	2470-2485m	A 95% Sandstone, blocky, fine grained, subangular, well sorted, non-calc. matrix, patchy yellow F., very light brownish grey to pinkish grey	5YR7/1- 5YR8/1	
		B 5% Shale, as 1140-132A, caved	5YR7/1- 5YR8/1	
1140-139	2485-2500m	A 95% Sandstone, as 1140-138A, minor cavings, patchy yellow F., milky cut	5YR7/1- 5YR8/1	
		B <5% Shale, as 1140-133A, abundant cavings Minor coal/lignite	N4-3	
1140-140	2500-2515m	A 98% Sandstone, blocky, medium-fine grained, subangular, fairly well sorted, non-calc. matrix, pale yellow F., milky cut, very light brownish grey Minor shale and coal	5YR7/1	
1140-141	2515-2530m	A 98% Sandstone, as 1140-140A, pale yellow F., milky cut, minor evaporite and caved? shale	5YR7/1	
1140-142	2530-2545m	A 98% Sandstone, as 1140-140A, pale yellow F., milky cut, minor caved? shale, rare coal	5YR7/1	
1140-143	2545-2560m	A 95% Sandstone, as 1140-140A, pale yellow F., milky cut	5YR7/1	

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

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-143	2545-2560m	B 5% Shale, platy to subfissile, mod. hard, brittle, non-calc., sig. cavings, medium dark grey Minor coal	N4	2.47, 2.47
1140-144	2560-2575m	A 55% Shale, as 1140-143B, sig. cavings B 45% Sandstone, blocky, medium grained, subangular, well sorted, non-calc. matrix, pale yellow F., milky cut, very pale yellowish brown	N4 10YR7/2	1.70
1140-145	2575-2590m	A 55% Sandstone, blocky, medium-fine grained, subangular, well sorted, non-calc. matrix, pale yellow F., milky cut, very light brownish grey B 40% Shale, as 1140-143B, sig. cavings C 5% Shaly coal, blocky to subfissile, brittle, greyish black	5YR7/1 N4 N2	2.35 28.40
1140-146	2595m SWC	A 98% Sandstone, blocky, fine grained, subangular, well sorted, non-calc. matrix, pinkish grey	5YR8/1	
1140-147	2590-2605m	A 60% Sandstone, as 1140-145A B 40% Shale, subfissile to platy, mod. hard, non-calc., minor to sig. cavings, medium dark grey to dark grey Minor coal	5YR7/1 N4-3	2.92, 2.88
1140-148	2605-2620m	A 60% Sandstone, as 1140-145A B 40% Shale, as 1140-147B, sig. cavings Minor coal. Minor LCM - paint	5YR7/1 N4-3	1.88
1140-149	2620-2635m	A 65% Sandstone, as 1140-145A B 20% Shale, as 1140-147B, sig. cavings C 15% Siltstone, blocky, soft, non-calc., dusky dark yellowish brown	5YR7/1 N4-3 10YR3/2	6.02 1.98
1140-151	2650-2665m	A 80% Sandstone, blocky, fine grained, sub-angular, well sorted, non-calc., pinkish grey B 15% Siltstone, blocky to subfissile, mod. hard, non-calc., minor cavings, medium grey C 5% Shale, as 1140-147B, abundant cavings Minor siltstone	5YR8/1 N5 N4-3	0.90 1.09
1140-152	2665-2680m	A 85% Sandstone, as 1140-151A B 15% Siltstone, as 1140-151B, minor cavings Minor caved shale and coal	5YR8/1 N5	1.03
1140-153	2680-2695m	A 80% Sandstone, as 1140-151A B 15% Silty shale, subfissile, soft to mod. hard, carbonaceous in part, non-calc., minor cavings, medium dark grey to dark grey C 5% Coal, blocky, brittle, greyish black	5YR8/1 N4-3 N2	1.15, 1.19 51.70

Abbreviations = arenaceous, argillaceous, calcareous, Cur, dolomitic, Fluorescence, foraminifera, fossiliferous

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1140-154	2696m SWC	A 98% Sandstone, fine grained, subangular, well sorted, sl. argillaceous/ carbonaceous?, milky cut, very light brownish grey to pinkish grey	5YR7/1- 5YR8/1	
1140-155	2695-2700m	A 50% Sandstone, blocky, fine grained, sub- angular, well sorted, non-calc., pinkish grey	5YR8/1	
		B 50% Shale, platy to subfissile, mod. hard, non-calc., abundant to dominant cavings, medium dark grey Minor caved siltstone	N4	1.94

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-001	386-390	91	34	16	8	12	161	70	43.5	91	0.63
1140-008	570-600	1585	24	11	3	4	1627	42	2.6	85	0.80
1140-015	780-810	1342	743	771	349	729	3934	2592	65.9	855	0.48
1140-026	1050-1080	162	33	51	29	40	315	153	48.6	104	0.72
1140-037	1215-1230	1414	606	354	95	97	2567	1153	44.9	149	0.98
1140-048	1365-1380	336	152	269	122	142	1021	685	67.1	519	0.86
1140-059	1525-1540	1169	529	476	155	188	2517	1349	53.6	323	0.82
1140-066	1615-1630	286	105	180	87	86	743	457	61.5	168	1.01
1140-074	1720-1735	858	249	220	71	46	1444	586	40.6	59	1.56
1140-080	1795-1810	523	154	179	59	42	956	433	45.3	39	1.41
1140-082	1825-1840	506	135	133	39	37	851	344	40.5	74	1.07
1140-084	1855-1870	1381	748	580	109	93	2910	1529	52.5	75	1.18
1140-087	1885-1900	349	112	85	13	13	573	223	39.0	11	0.99
1140-089	1915-1930	599	313	331	61	57	1361	762	56.0	38	1.06
1140-091	1945-1960	941	482	541	95	103	2161	1220	56.5	77	0.92
1140-094	1975-1988	1215	658	670	98	108	2748	1533	55.8	72	0.91
1140-096	2005-2020	468	137	42	4	3	654	186	28.4	3	1.32
1140-098	2035-2050	1811	844	634	62	48	3399	1589	46.7	25	1.29
1140-100	2065-2080	2485	1252	1060	121	118	5036	2551	50.7	67	1.03
1140-102	2095-2110	2048	1066	1018	235	241	4607	2559	55.5	116	0.98
1140-104	2125-2140	1678	964	1052	699	776	5169	3491	67.5	823	0.90
1140-107	2155-2170	2145	1097	1069	445	406	5161	3016	58.4	360	1.10
1140-109	2185-2200	545	261	251	152	104	1313	768	58.5	96	1.46
1140-110	2200-2215	649	285	229	37	34	1234	584	47.4	12	1.09
1140-111	2215-2230	1959	883	686	79	85	3692	1733	46.9	41	0.93
1140-112	2230-2245	1369	696	737	235	527	3564	2194	61.6	1242	0.44
1140-114	2245-2260	2376	1343	1232	941	1598	7491	5115	68.3	1996	0.59
1140-115	2260-2275	3396	1708	1472	734	1696	9006	5610	62.3	1302	0.43
1140-116	2275-2290	1799	916	877	363	916	4871	3072	63.1	805	0.40
1140-117	2290-2305	1604	806	766	293	602	4070	2466	60.6	546	0.49

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-118	2305-2320	8825	4739	3638	548	1121	18870	10045	53.2	1341	0.49
1140-119	2320-2335	1372	720	686	274	445	3497	2124	60.8	713	0.61
1140-121	2335-2342	10893	5678	5269	1279	2290	25409	14516	57.1	4378	0.56
1140-126	2350-2365	6532	3396	2409	372	634	13343	6811	51.0	1248	0.59
1140-132	2380-2395	2442	1372	1335	373	767	6289	3847	61.2	1685	0.49
1140-133	2395-2410	1622	942	879	174	267	3884	2262	58.2	493	0.65
1140-134	2425-2440	1131	624	604	463	715	3537	2407	68.0	906	0.65
1140-135	2440-2455	2385	1384	1410	957	1596	7732	5347	69.2	2222	0.60
1140-136	2455-2470	3334	2054	2294	1838	3078	12599	9265	73.5	5744	0.60
1140-138	2470-2485	2276	1380	1747	664	1335	7403	5126	69.2	1996	0.50
1140-139	2485-2500	752	444	504	448	693	2840	2088	73.5	1495	0.65
1140-140	2500-2515	2478	1628	1663	706	1417	7892	5414	68.6	2481	0.50
1140-141	2515-2530	1651	1044	1123	513	1071	5403	3751	69.4	1940	0.48
1140-142	2530-2545	1475	1122	1478	517	1285	5877	4401	74.9	2686	0.40
1140-143	2545-2560	1303	838	889	513	984	4528	3225	71.2	1406	0.52
1140-144	2560-2575	1086	557	550	319	459	2971	1885	63.4	776	0.70
1140-145	2575-2590	1544	740	673	271	417	3646	2101	57.6	478	0.65
1140-147	2590-2605	3037	1622	1560	241	530	6989	3953	56.6	358	0.45
1140-148	2605-2620	2446	1227	993	143	239	5047	2601	51.5	174	0.60
1140-149	2620-2635	3828	1946	1526	155	279	7734	3906	50.5	183	0.56
1140-151	2650-2665	1378	858	607	92	119	3054	1676	54.9	167	0.77
1140-152	2665-2680	1771	1031	602	51	70	3525	1754	49.7	65	0.73
1140-153	2680-2695	1309	644	264	24	31	2271	963	42.4	32	0.77
1140-155	2695-2700	1260	443	201	22	30	1957	696	35.6	79	0.74

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-001	386-390	117	85	67	23	40	331	214	64.7	269	0.59
1140-008	570-600	5308	509	402	84	167	6469	1161	17.9	779	0.50
1140-015	780-810	3686	1437	2033	548	1767	9471	5785	61.1	6052	0.31
1140-026	1050-1080	1432	290	339	157	326	2542	1111	43.7	1484	0.48
1140-037	1215-1230	1500	501	718	278	447	3444	1944	56.4	762	0.62
1140-048	1365-1380	523	232	737	437	754	2683	2160	80.5	2757	0.58
1140-059	1525-1540	2564	731	1012	342	658	5307	2743	51.7	2123	0.52
1140-066	1615-1630	329	250	701	327	570	2178	1849	84.9	1435	0.57
1140-074	1720-1735	506	262	408	117	165	1459	953	65.3	283	0.71
1140-080	1795-1810	634	338	668	180	259	2079	1445	69.5	229	0.69
1140-082	1825-1840	881	327	477	120	204	2008	1127	56.1	350	0.59
1140-084	1855-1870	161	44	40	7	8	261	100	38.4	26	0.88
1140-087	1885-1900	2382	1819	2066	273	400	6940	4558	65.7	213	0.68
1140-089	1915-1930	2800	1794	2512	403	627	8136	5336	65.6	450	0.64
1140-091	1945-1960	1770	1579	2618	372	677	7016	5246	74.8	423	0.55
1140-094	1975-1988	3066	2184	2581	287	490	8608	5542	64.4	269	0.59
1140-096	2005-2020	5531	3673	2665	238	313	12420	6889	55.5	169	0.76
1140-098	2035-2050	7105	4567	3705	293	342	16013	8907	55.6	149	0.86
1140-100	2065-2080	5834	4109	3765	335	482	14525	8690	59.8	272	0.69
1140-102	2095-2110	6821	4732	4807	585	849	17794	10973	61.7	518	0.69
1140-104	2125-2140	5857	4477	5708	1940	3430	21412	15556	72.6	4304	0.57
1140-107	2155-2170	6761	4743	5747	2209	2730	22191	15430	69.5	2256	0.81
1140-109	2185-2200	6492	3589	4489	1321	1729	17620	11128	63.2	3333	0.76
1140-110	2200-2215	8500	5093	5091	774	832	20290	11790	58.1	336	0.93
1140-111	2215-2230	7820	5461	5271	718	855	20126	12306	61.1	378	0.84
1140-112	2230-2245	5336	1666	1502	224	519	9247	3911	42.3	697	0.43
1140-114	2245-2260	7265	5127	6228	2916	9706	31243	23977	76.7	20757	0.30
1140-115	2260-2275	10482	7221	7805	4724	10533	40765	30283	74.3	10482	0.45
1140-116	2275-2290	7358	5812	6743	2475	8615	31004	23646	76.3	8343	0.29
1140-117	2290-2305	7068	5374	6378	2659	8335	29814	22746	76.3	11351	0.32

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-118	2305-2320	4142	4219	5145	1189	3250	17944	13803	76.9	4299	0.37
1140-119	2320-2335	6850	5227	6085	2133	4599	24895	18046	72.5	4749	0.46
1140-121	2335-2342	6491	4102	4716	1215	2954	19479	12987	66.7	8462	0.41
1140-126	2350-2365	6096	4040	4540	988	2205	17869	11773	65.9	3930	0.45
1140-132	2380-2395	4872	3902	4560	944	2227	16504	11632	70.5	3781	0.42
1140-133	2395-2410	7343	4440	4776	1208	2741	20507	13164	64.2	6562	0.44
1140-134	2425-2440	5825	4014	5182	1909	4979	21910	16085	73.4	12179	0.38
1140-135	2440-2455	6484	4198	5066	2058	5033	22839	16355	71.6	13108	0.41
1140-136	2455-2470	6031	4315	5032	1771	4875	22024	15994	72.6	14952	0.36
1140-138	2470-2485	7110	5166	6919	5873	10703	35772	28661	80.1	28792	0.55
1140-139	2485-2500	6142	4555	6904	6459	11450	35509	29367	82.7	29420	0.56
1140-140	2500-2515	5187	4434	4945	1273	3761	19600	14413	73.5	9961	0.34
1140-141	2515-2530	5444	4279	5113	4679	5136	24650	19207	77.9	18287	0.91
1140-142	2530-2545	1999	1994	3375	879	2462	10711	8712	81.3	13225	0.36
1140-143	2545-2560	2612	2356	4651	2118	5905	17642	15030	85.2	17257	0.36
1140-144	2560-2575	7718	4686	5093	1564	2942	22004	14285	64.9	10206	0.53
1140-145	2575-2590	8124	5586	5300	923	2000	21932	13808	63.0	3029	0.46
1140-147	2590-2605	6010	4317	4143	345	1049	15863	9853	62.1	596	0.33
1140-148	2605-2620	4523	2965	3952	637	2124	14201	9678	68.2	1599	0.30
1140-149	2620-2635	6978	4901	3830	299	729	16736	9759	58.3	332	0.41
1140-151	2650-2665	1332	633	293	25	54	2337	1006	43.0	42	0.47
1140-152	2665-2680	296	59	19	1	6	382	86	22.4	26	0.16
1140-153	2680-2695	6561	4650	3287	165	464	15126	8565	56.6	249	0.35
1140-155	2695-2700	3469	3175	2473	360	569	10045	6576	65.5	1223	0.63

TABLE 2C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-001	386-390	208	119	83	31	52	493	284	57.7	360	0.60
1140-008	570-600	6893	532	413	87	171	8096	1203	14.9	864	0.51
1140-015	780-810	5028	2181	2804	897	2496	13406	8377	62.5	6906	0.36
1140-026	1050-1080	1593	322	390	186	366	2857	1264	44.2	1588	0.51
1140-037	1215-1230	2914	1108	1072	373	544	6011	3097	51.5	910	0.69
1140-048	1365-1380	859	384	1006	558	896	3704	2845	76.8	3276	0.62
1140-059	1525-1540	3733	1260	1488	497	846	7824	4091	52.3	2445	0.59
1140-066	1615-1630	615	355	881	414	656	2921	2306	79.0	1603	0.63
1140-074	1720-1735	1364	512	628	188	211	2903	1539	53.0	342	0.89
1140-080	1795-1810	1157	492	846	239	301	3035	1878	61.9	268	0.79
1140-082	1825-1840	1387	462	610	159	240	2859	1472	51.5	425	0.66
1140-084	1855-1870	1542	792	620	116	101	3171	1629	51.4	100	1.15
1140-087	1885-1900	2731	1930	2151	287	413	7513	4781	63.6	224	0.69
1140-089	1915-1930	3399	2107	2843	464	684	9497	6098	64.2	488	0.68
1140-091	1945-1960	2711	2061	3159	467	779	9178	6466	70.5	500	0.60
1140-094	1975-1988	4281	2842	3250	385	598	11357	7076	62.3	341	0.64
1140-096	2005-2020	5999	3810	2708	242	316	13075	7075	54.1	172	0.77
1140-098	2035-2050	8916	5411	4339	355	391	19412	10496	54.1	174	0.91
1140-100	2065-2080	8319	5361	4825	455	600	19560	11241	57.5	340	0.76
1140-102	2095-2110	8869	5798	5825	820	1090	22401	13532	60.4	634	0.75
1140-104	2125-2140	7535	5442	6760	2639	4206	26582	19047	71.7	5127	0.63
1140-107	2155-2170	8905	5841	6816	2655	3136	27352	18447	67.4	2616	0.85
1140-109	2185-2200	7037	3850	4740	1473	1833	18932	11896	62.8	3429	0.80
1140-110	2200-2215	9149	5377	5320	811	866	21524	12374	57.5	348	0.94
1140-111	2215-2230	9779	6345	5957	797	940	23818	14039	58.9	420	0.85
1140-112	2230-2245	6705	2362	2239	458	1046	12811	6105	47.7	1939	0.44
1140-114	2245-2260	9642	6470	7461	3857	11304	38734	29092	75.1	22752	0.34
1140-115	2260-2275	13878	8929	9277	5458	12229	49771	35893	72.1	11784	0.45
1140-116	2275-2290	9158	6728	7620	2838	9531	35876	26718	74.5	9148	0.30
1140-117	2290-2305	8673	6180	7144	2952	8936	33884	25212	74.4	11897	0.33

TABLE 2 C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1140-118	2305-2320	12966	8958	8782	1737	4371	36815	23848	64.8	5640	0.40
1140-119	2320-2335	8222	5947	6771	2407	5045	28392	20170	71.0	5462	0.48
1140-121	2335-2342	17385	9781	9985	2494	5244	44888	27503	61.3	12840	0.48
1140-126	2350-2365	12627	7436	6950	1359	2839	31212	18584	59.5	5178	0.48
1140-132	2380-2395	7314	5274	5895	1317	2993	22793	15479	67.9	5465	0.44
1140-133	2395-2410	8965	5382	5655	1382	3008	24391	15426	63.2	7055	0.46
1140-134	2425-2440	6956	4639	5786	2372	5695	25447	18491	72.7	13085	0.42
1140-135	2440-2455	8869	5582	6475	3016	6629	30571	21702	71.0	15330	0.45
1140-136	2455-2470	9365	6369	7326	3610	7954	34624	25259	73.0	20695	0.45
1140-138	2470-2485	9387	6546	8667	6537	12038	43175	33788	78.3	30788	0.54
1140-139	2485-2500	6894	4999	7407	6907	12142	38350	31455	82.0	30915	0.57
1140-140	2500-2515	7665	6063	6608	1979	5178	27492	19827	72.1	12442	0.38
1140-141	2515-2530	7095	5323	6236	5192	6206	30053	22958	76.4	20227	0.84
1140-142	2530-2545	3475	3116	4853	1396	3747	16587	13113	79.1	15912	0.37
1140-143	2545-2560	3915	3193	5541	2632	6889	22170	18255	82.3	18663	0.38
1140-144	2560-2575	8804	5243	5643	1883	3401	24975	16170	64.7	10982	0.55
1140-145	2575-2590	9668	6326	5973	1194	2417	25578	15910	62.2	3507	0.49
1140-147	2590-2605	9047	5938	5703	586	1579	22852	13805	60.4	954	0.37
1140-148	2605-2620	6968	4192	4944	780	2363	19248	12279	63.8	1773	0.33
1140-149	2620-2635	10806	6847	5356	454	1008	24470	13665	55.8	516	0.45
1140-151	2650-2665	2710	1491	900	117	173	5392	2682	49.7	210	0.68
1140-152	2665-2680	2068	1090	622	52	76	3907	1839	47.1	91	0.68
1140-153	2680-2695	7870	5294	3550	188	495	17398	9528	54.8	281	0.38
1140-155	2695-2700	4729	3618	2674	382	599	12002	7273	60.6	1302	0.64

TABLE 3

ROCKEVAL PYROLYSIS DATA

GEOCHEM		S1	S2	S3	Production	Hydrogen	Oxygen	Tmax
SAMPLE	DEPTH	(mg/g)	(mg/g)	(mg/g)	INDEX	INDEX	INDEX	(°C)
1140-001A	386-390	0.06	0.18	0.49	0.25	28.6	77.8	408
1140-008A	570-600	0.06	0.30	0.44	0.17	62.5	91.7	425
1140-008B	570-600	0.06	0.66	0.52	0.08	103.1	81.2	426
1140-015A	780-810	0.08	0.88	0.98	0.08	67.2	74.8	434
1140-019A	901	0.09	0.61	1.42	0.13	54.5	126.8	435
1140-023A	1000	0.02	0.14	0.81	0.13	14.0	81.0	426
1140-026A	1050-1080	0.05	0.30	0.24	0.14	41.1	32.9	431
1140-026B	1050-1080	0.03	0.20	0.24	0.13	30.8	36.9	426
1140-028A	1100	0.02	0.27	0.50	0.07	38.6	71.4	431
1140-034A	1190	0.01	0.03	0.20	0.25	7.1	47.6	427
1140-037A	1215-1230	0.05	0.55	0.33	0.08	44.0	26.4	429
1140-041A	1270	0.03	0.27	0.39	0.10	30.3	43.8	428
1140-048A	1365-1380	0.09	0.57	0.34	0.14	57.6	34.3	431
1140-048B	1365-1380	0.11	0.72	0.35	0.13	70.6	34.3	430
1140-051A	1426	0.02	0.05	0.16	0.29	10.0	32.0	439
1140-059A	1525-1540	0.06	0.21	0.23	0.22	26.2	28.7	432
1140-059B	1525-1540	0.11	0.57	0.22	0.16	55.9	21.6	432
1140-062A	1565	0.16	0.85	0.86	0.16	61.2	61.9	438
1140-066B	1615-1630	0.13	0.77	0.39	0.14	61.6	31.2	439
1140-069A	1663	0.06	0.53	0.57	0.10	43.1	46.3	435
1140-074A	1720-1735	0.16	0.98	0.32	0.14	72.6	23.7	437
1140-074B	1720-1735	0.07	0.60	0.57	0.10	45.8	43.5	441
1140-078A	1781	0.04	0.34	0.34	0.11	34.3	34.3	437
1140-080A	1795-1810	0.13	1.03	0.43	0.11	89.6	37.4	434
1140-080B	1795-1810	0.09	0.81	0.85	0.10	95.3	100.0	444
1140-082A	1825-1840	0.15	0.64	0.33	0.19	55.7	28.7	432
1140-084A	1855-1870	0.13	0.95	0.34	0.12	74.2	26.6	436
1140-084B	1855-1870	0.16	1.49	0.79	0.10	93.1	49.4	436
1140-085A	1875	0.21	0.84	0.38	0.20	29.5	13.3	428
1140-087A	1885-1900	0.34	2.65	1.27	0.11	123.8	59.3	434
1140-087B	1885-1900	0.22	1.36	0.48	0.14	75.1	26.5	439
1140-089A	1915-1930	0.59	4.16	1.56	0.12	163.8	61.4	431
1140-089B	1915-1930	0.22	1.42	0.44	0.13	102.9	31.9	435
1140-091A	1945-1960	0.51	3.90	2.27	0.12	169.6	98.7	431
1140-091B	1945-1960	0.26	2.44	0.46	0.10	108.4	20.4	439
1140-092A	1960	0.50	1.82	0.91	0.22	89.2	44.6	442
1140-094A	1975-1988	0.68	3.30	4.41	0.17	171.0	228.5	431
1140-094B	1975-1988	0.32	2.71	0.47	0.11	134.2	23.3	438
1140-096A	2005-2020	0.62	4.08	0.83	0.13	130.8	26.6	442
1140-096B	2005-2020	0.29	1.39	1.69	0.17	93.3	113.4	444
1140-098A	2035-2050	0.32	3.35	0.75	0.09	110.9	24.8	442
1140-098B	2035-2050	0.20	1.14	1.63	0.15	83.2	119.0	441
1140-100A	2065-2080	0.45	3.22	0.54	0.12	120.0	20.0	442
1140-100B	2065-2080	0.25	1.30	1.08	0.16	97.0	80.6	442
1140-102A	2095-2110	0.65	3.93	0.61	0.14	131.4	20.4	442
1140-102B	2095-2110	0.28	1.09	1.86	0.20	80.1	136.8	445
1140-104A	2125-2140	0.88	3.69	0.72	0.19	127.7	24.9	444
1140-104B	2125-2140	0.39	1.18	1.98	0.25	88.7	148.9	442
1140-106A	2150	0.81	2.48	0.36	0.25	80.0	11.6	439
1140-107A	2155-2170	0.86	5.22	0.35	0.14	149.6	10.0	445

TABLE 3

ROCKEVAL PYROLYSIS DATA

GEOCHEM SAMPLE NUMBER	DEPTH	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Production INDEX	Hydrogen INDEX	Oxygen INDEX	Tmax (° C)
1140-109A	2185-2200	0.32	1.38	0.36	0.19	85.7	22.4	446
1140-110A	2200-2215	0.89	4.90	0.75	0.15	122.8	18.8	445
1140-110B	2200-2215	0.09	0.36	1.44	0.20	17.2	68.9	465
1140-111A	2215-2230	1.00	5.46	0.43	0.15	126.1	9.9	446
1140-112A	2230-2245	0.04	0.10	0.65	0.29	15.4	100.0	425
1140-112B	2230-2245	0.91	2.37	0.60	0.28	106.8	27.0	446
1140-114A	2245-2260	4.92	21.25	0.93	0.19	229.5	10.0	442
1140-115A	2260-2275	5.35	29.86	1.37	0.15	283.0	13.0	442
1140-116A	2275-2290	3.17	16.48	0.86	0.16	242.0	12.6	442
1140-117A	2290-2305	0.33	1.35	0.30	0.20	91.2	20.3	446
1140-117B	2290-2305	2.33	12.36	0.67	0.16	223.5	12.1	442
1140-118A	2305-2320	0.27	1.19	0.35	0.18	77.8	22.9	448
1140-119B	2320-2335	0.82	4.35	0.40	0.16	133.0	12.2	444
1140-121A	2335-2342	0.47	1.75	0.40	0.21	91.1	20.8	448
1140-121B	2335-2342	0.85	3.19	0.81	0.21	119.9	30.5	442
1140-126A	2350-2365	0.35	1.23	0.37	0.22	83.7	25.2	446
1140-126B	2350-2365	0.87	4.38	0.46	0.17	133.9	14.1	443
1140-132A	2380-2395	0.23	0.87	0.25	0.21	54.0	15.5	449
1140-133A	2395-2410	0.29	1.28	0.26	0.18	85.9	17.4	448
1140-134B	2425-2440	0.51	2.04	0.47	0.20	107.9	24.9	447
1140-137A	2470	0.50	2.10	0.95	0.19	250.0	113.1	434
1140-144A	2560-2575	0.25	1.23	0.49	0.17	72.4	28.8	450
1140-145C	2575-2590	3.06	42.90	1.88	0.07	151.1	6.6	450
1140-147B	2590-2605	0.41	4.67	0.42	0.08	161.0	14.5	449
1140-148B	2605-2620	0.26	1.17	0.39	0.18	62.2	20.7	450
1140-149B	2620-2635	0.50	6.26	0.32	0.07	104.0	5.3	451
1140-151B	2650-2665	0.05	0.32	1.06	0.14	35.6	117.8	457
1140-152B	2665-2680	0.06	0.50	1.29	0.11	48.5	125.2	459
1140-153C	2680-2695	6.53	120.39	3.36	0.05	232.9	6.5	451
1140-155B	2695-7200	0.37	2.31	0.43	0.14	119.1	22.2	449

TABLE 4

GOGI INDEX

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁	C ₂ -C ₅	C ₆ -C ₁₄	C ₁₅₊	TOTAL	%C ₁	%C ₂ -C ₅	%C ₆ -C ₁₄	%C ₁₅₊
1140-015A	780-810m	7795	12404	15822	0	36021	21.64	34.44	43.92	0
1140-028A	1100m SWC	1235	4736	2722	0	8693	14.21	54.48	31.31	0
1140-041A	1270m SWC	7038	9737	10371	0	27146	25.93	35.87	38.20	0
1140-051A	1426m SWC	676	1300	802	0	2778	24.33	46.80	28.87	0
1140-062A	1565m SWC	5931	6427	8701	325	21386	27.73	30.06	40.69	1.52
1140-085A	1875m SWC	5795	4202	6166	212	16375	35.39	25.66	37.65	1.29
1140-089A	1915-1930m	6390	10183	30354	1172	48099	13.29	21.17	63.11	2.44
1140-092A	1960m SWC	10759	5730	13432	1247	31168	34.52	18.38	43.10	4.00
1140-096A	2005-2020m	11886	10142	26436	1914	50378	23.59	20.13	52.48	3.80
1140-102A	2095-2110m	21780	13445	45339	236	80800	26.95	16.64	54.11	2.29
1140-107A	2155-2170m	14269	8741	17937	2376	43323	32.94	20.18	41.40	5.48
1140-111A	2215-2230m	54867	13700	72111	16912	157590	34.82	8.69	45.76	10.73
1140-114A	2245-2260m	38284	23169	105474	30721	197648	19.37	11.72	53.36	15.54
1140-115A	2260-2275m	23410	6785	45579	16929	92713	25.25	7.33	49.16	18.26
1140-117B	2290-2305m	18709	12951	60832	33838	126330	14.81	20.25	48.15	26.79
1140-121B	2335-2342m	24149	9005	49252	4269	86675	27.86	10.39	56.82	4.93
1140-126B	2350-2365m	4740	4659	5981	660	16040	29.55	29.05	37.29	4.11
1140-145B	2575-2590m	14292	10875	22497	897	48561	29.43	22.39	46.33	1.85
1140-149B	2620-2635m	11037	5812	9419	1023	27291	40.44	21.30	34.51	3.75
1140-153C	2680-2695m	19212	3960	19547	10827	53546	35.88	7.40	36.50	20.22

TABLE 5
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION	
		TYPES 40%; 10-40%; 10%	REMARKS	RE- WORKED (%)	PARTICLE SIZE	PRESEV- ATION	INDEX	1 - 10 SCALE
1140-001A	386-390m	W-I;Al-H	lean - unreliable dominant H at 2-	70	F-M	F-G	1+ to 2-(?)	
1140-015A	780-810m	W;I;H** -Al	Am like contamination dominant H at approximately 2- to 2	80	F-M	F-G	1+ to 2-(?)	
1140-028A	1100m SWC	W;I;H-Al	**unreliable, dominant H at approximately 2- to 2	75	F-M	F-G	**2-(?)	
1140-034A	1190m SWC	W-I;-;H-Al		80	F-M	F-G	---	
1140-041A	1270m SWC	W;I;H-Al-Am	dominant H marginally mature	70	F-M	F-G	1+ to 2-(?)	
1140-051A	1426m SWC	W-I;-;H-Al		80	F-M	F-G	2-(??)	
1140-059B	1525-1540m	W-I;H;Al	H at 2- to 2 and 2	70	F-M/C	F-G	2-	
1140-062A	1565m SWC	W;H-Al-I;Am	contamination	60	F-C	F-G	2-	
1140-069A	1663m SWC	W-I;-;H-Al		70	F-M/C	F-G	2- to 2	
1140-078A	1781m SWC	W-I;-;H-Al	contamination	85	F-C	F-G	2- to 2	
1140-085A	1875m SWC	W;I-H;Al		60	F-C	G	2- to 2	
1140-092A	1960m SWC	W;I-Al-H;-		60	F-C	F-G	2- to 2	
1140-096A	2005-2020m	W;I-H-Am**;Al	**includes fine grained, unrecognisable material	60	F-C	F-G	2- to 2	
1140-098B	2035-2050m	W;I-Al-H;Am		55	F-C	F-G	2- to 2	
1140-102A	2095-2110m	W;I-H;Am-Al		60	F-C	F-G	2	
1140-106A	2150m SWC	W;I-Al-H;Am		55	F-M/C	F	2	
1140-111A	2215-2230m	Am** -Al**;W-I;H	**includes material passing to amorphous	15	M-C	G	2	
1140-114A	2245-2260m	Al** -Am**;W-I;H	**as 111A	15	F-C	F-G	2	
1140-115A	2260-2275m	Al** -Am**;W-I-H	**as 111A	15	F-C	F-G	2	

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

postscript = coarse, cuticle, cysts, degraded, fine, other, structured, spore-pollen, thick-walled, unstructured

Dominant, Major, Significant, Minor

TABLE 5
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION				THERMAL MATURATION		
		TYPES 40%; 10-40%; 10%	REMARKS	RE- WORKED (%)	PARTICLE SIZE	PRESERV- ATION	INDEX	1 - 10 SCALE
1140-116A	2275-2290m	Al**-Am**;W;I-H	**includes material passing to amorphous		F-C	F	2(?)	
1140-117B	2290-2305m	-;Am*-W-I-Al**;H	*includes incompetely developed and poor quality material. **as 116A H at 2 to 2+	30	F-C	F-G	2	
1140-118A	2305-2320m	-;W-Am**-I-Al;H	differentiation difficult **poor quality, fine disseminated - contaminant?	50	F-M	P	2(?)	
1140-121B	2335-2342m	-;Am**-W-I-Al**;H	differentiation difficult **includes material passing to amorphous	30	F-C	F	2 to 2+(?)	
1140-126A	2350-2365m	-;W-Am**-I;Al-H	**as 117B	35	F-C	P-F	2 to 2+	
1140-133A	2395-2410m	-;W-I-Am**-Al;H	**finely disseminated, poor quality H at 2	55	F-M	P-F	2 to 2+(?)	
1140-137A	2470m SWC	-;W-I-Al;H-Am	lean, unreliable	50	F-M	P-F	2 to 2+(?)	
1140-144A	2560-2575m	-;W-Am**-I-Al;H	**as 133A	45	F-M/C	P-F	2 to 2+	
1140-149B	2620-2635m	W;I-Al**-Am**-H;-	differentiation difficult **includes material passing to amorphous		F-C	F	2 to 2+	
1140-152B	2665-2680m	-;W-Al**;I-H**;Am**	**as 149B		M-VC	F-G	2 to 2+	
1140-155B	2695-2700m	W;I-Am**-H;Al	**generally finely disseminated, poor quality. H at 2+		F-C	F	2 to 2+	

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

postscript = coarse, cuticle, cysts, degraded, fine, other, structured, spore-pollen, thick-walled, unstructured

Dominant, Major, Significant, Minor

TABLE 6
VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY R _o (%), (NUMBER OF PARTICLES)			REMARKS
			1	2	3	
1140-001A	386-390m	WR	0.58 (2)	-	-	
1140-015A	780-810m	KC	0.48 (13)	-	-	
1140-028A	1100m SWC	WR	0.44 (3)	0.85 (11)	-	
1140-034A	1190m SWC	WR	NO DETERMINATIONS POSSIBLE			
1140-041A	1270m SWC	WR	0.49 (6)	0.69 (11)	-	
1140-051A	1426m SWC	WR	1.01 (8)	-	-	
1140-059B	1525-1540m	WR	0.52 (2) 1.31 (2)	0.71 (6)	1.00 (7)	
1140-062A	1565m SWC	KC	0.54 (5)	0.73 (12)	0.89 (2)	
1140-069A	1663m SWC	WR	0.50 (13)	0.82 (8)	-	
1140-078A	1781m SWC	WR	1.13 (14)	-	-	
1140-085A	1875m SWC	KC	0.73 (30)	-	-	
1140-092A	1960m SWC	KC	0.76 (30)	-	-	
1140-096A	2005-2020m	KC	0.80 (20)	-	-	
1140-102A	2095-2110m	KC	0.82 (30)	-	-	
1140-106A	2150m SWC	KC	0.81 (30)	-	-	
1140-111A	2215-2230m	KC	0.83 (30)	-	-	
1140-114A	2245-2260m	KC	0.59 (21)	0.85 (9)	-	
1140-115A	2260-2275m	KC	0.63 (30)	-	-	
1140-117B	2290-2305m	KC	0.65 (26)	-	-	
1140-118A	2305-2320m	WR	0.69 (17)	-	-	
1140-121B	2335-2342m	WR	1.11 (9)	-	-	
1140-126A	2350-2365m	WR	0.54 (2)	0.82 (15)	-	
1140-133A	2395-2410m	WR	1.24 (12)	-	-	
1140-137A	2470m SWC	WR	NO DETERMINATIONS POSSIBLE			
1140-144A	2560-2575m	KC	0.76 (7)	1.02 (8)	-	
1140-145C	2575-2590m	WR	0.81 (17)	-	-	
1140-149B	2620-2635m	KC	0.84 (30)	-	-	
1140-152B	2665-2680m	KC	0.86 (30)	-	-	
1140-153C	2680-2695m	WR	0.89 (30)	-	-	
1140-155B	2695-2700m	KC	0.86 (22)	-	-	

CT—ditch cuttings; CO—core; WR—whole rock; KC—kerogen concentrate.

Colours — spore fluorescence.

*Reworked

TABLE 7

METHYL PHENANTHRENE INDEX

<u>GEOCHEM SAMPLE NUMBER</u>	<u>DEPTH</u>	<u>% AREA</u>	<u>% HEIGHT</u>
1140-015A	780-810	0.59	0.71
1140-048	1365-1380	0.51	0.61
1140-085A	1875	0.67	0.69
1140-106A	2150	0.63	0.57
1140-113A	2246	0.56	0.63
1140-115A	2260-2275	0.46	0.61
1140-120A	2338.5	0.75	0.71
1140-123A	2348.0	0.68	0.78
1140-128A	2362.0	0.65	0.73
1140-131A	2385.0	0.73	0.78
1140-137A	2470	0.66	0.69
1140-140A	2500-2515	0.74	0.81
1140-143A	2545-2560	0.67	0.71
1140-146A	2595	0.64	0.72
1140-154A	2696	0.64	0.71

TABLE 8a
CONCENTRATION (PPM) OF EXTRACTED C₁₅₊ MATERIAL IN ROCK

GEOCHEM SAMPLE NUMBER	DEPTH	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS			
			Paraffin- Naphthenes	Aromatics	TOTAL	Precipitd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	Sulphur
1140-015A	780-810	278	151	40	191	25	35	10	17
1140-048	1365-1380	154	60	19	80	38	30	5	2
1140-085A	1875	2146	701	654	1355	65	631	23	72
1140-106A	2150	1277	531	359	890	105	194	57	30
1140-113A	2246	277	73	70	144	56	62	9	7
1140-115A	2260-2275	7210	2708	2338	5046	1032	991	89	51
1140-120A	2338.5	1986	1546	245	1791	52	115	16	11
1140-123A	2348.0	9243	7552	1099	8650	7	508	62	16
1140-128A	2362.0	2967	1900	545	2444	175	297	19	32
1140-131A	2385.0	1517	1144	222	1367	41	89	10	11
1140-137A	2470	2668	1471	461	1933	309	361	23	42
1140-140A	2500-2515	12409	9817	1651	11467	155	695	67	25
1140-143A	2545-2560	2725	1972	424	2396	92	194	13	30
1140-146A	2595	196	59	25	85	77	30	4	0
1140-154A	2696	569	73	70	143	305	101	10	9

TABLE 8b
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL EXTRACTED FROM ROCK

GEOCHEM SAMPLE NUMBER	DEPTH	HYDROCARBONS		NON HYDROCARBONS			
		Paraffin – Naphthenes	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's	Sulphur
1140-015A	780-810	54.35	14.49	9.09	12.48	3.62	5.97
1140-048	1365-1380	39.05	12.58	24.88	19.19	3.31	1.00
1140-085A	1875	32.67	30.49	3.01	29.40	1.09	3.34
1140-106A	2150	41.60	28.11	8.25	15.18	4.50	2.36
1140-113A	2246	26.44	25.38	20.18	22.21	3.17	2.63
1140-115A	2260-2275	37.56	32.43	14.32	13.75	1.23	0.71
1140-120A	2338.5	77.87	12.34	2.64	5.80	0.82	0.54
1140-123A	2348.0	81.70	11.89	0.07	5.50	0.67	0.17
1140-128A	2362.0	64.03	18.35	5.90	10.01	0.63	1.08
1140-131A	2385.0	75.43	14.64	2.71	5.86	0.63	0.73
1140-137A	2470	55.15	17.30	11.58	13.53	0.86	1.59
1140-140A	2500-2515	79.11	13.30	1.25	5.60	0.54	0.20
1140-143A	2545-2560	72.36	15.56	3.37	7.13	0.48	1.11
1140-146A	2595	30.26	12.97	39.47	15.13	2.16	0.00
1140-154A	2696	12.86	12.25	53.70	17.76	1.84	1.61

TABLE 9
SIGNIFICANT RATIOS (%) OF C₁₅₊ FRACTIONS AND ORGANIC CARBON

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC CARBON (wt. %)	HYDROCARBONS	HYDROCARBONS	TOTAL EXTRACT	P-NAPHTHENES
			TOTAL EXTRACT	ORG. CARBON	ORG. CARBON	AROMATICS
1140-015A	780-810	0.78	68.84	2.45	3.56	3.75
1140-048	1365-1380	1.24	51.63	0.64	1.24	3.11
1140-085A	1875	2.74	63.16	4.95	7.83	1.07
1140-106A	2150	2.87	69.71	3.10	4.45	1.48
1140-113A	2246	0.29	51.81	4.96	9.56	1.04
1140-115A	2260-2275	9.17	69.99	5.50	7.86	1.16
1140-120A	2338.5	0.14	90.20	127.95	141.85	6.31
1140-123A	2348.0	0.07	93.59	1235.7	1320.4	6.87
1140-128A	2362.0	0.73	82.38	33.49	40.65	3.49
1140-131A	2385.0	0.14	90.07	97.62	108.37	5.15
1140-137A	2470	0.31	72.44	62.35	86.06	3.19
1140-140A	2500-2515	0.08	92.41	1433.3	1551.1	5.95
1140-143A	2545-2560	0.45	87.92	53.24	60.55	4.65
1140-146A	2595	0.31	43.23	2.73	6.32	2.33
1140-154A	2696	0.90	25.10	1.59	6.32	1.05

TABLE 10
COMPOSITION (NORMALISED %) OF C₁₅₊ PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-015A	-048	-085A	-106A	-113A	-115A	-120A	-123A
DEPTH	780-810m	1365-1380m	1875m SWC	2150m SWC	2246m SWC	2260-2275m	2338.5m CORE	2348.5m CORE
SAMPLE TYPE								
nC ₁₅	3.06	0.58	0.24	0.66	0.67	15.09	3.65	2.88
nC ₁₆	6.85	3.38	0.61	3.04	1.67	12.77	4.06	3.26
nC ₁₇	8.76	5.01	3.24	5.52	5.53	11.65	4.56	4.32
nC ₁₈	10.29	5.87	6.21	6.54	5.86	8.90	5.39	4.84
nC ₁₉	10.40	7.40	8.13	7.80	7.19	8.60	6.98	6.01
nC ₂₀	8.14	5.94	7.76	7.11	6.84	5.69	6.43	5.79
nC ₂₁	6.96	5.29	8.11	7.52	6.43	4.97	6.58	6.26
nC ₂₂	6.52	5.44	7.87	7.06	6.96	4.58	6.63	6.51
nC ₂₃	6.29	7.54	9.62	6.93	7.72	4.00	7.10	6.62
nC ₂₄	5.90	5.27	7.87	6.67	5.34	3.96	7.12	7.68
nC ₂₅	5.54	8.50	9.35	8.73	9.74	3.60	6.76	7.71
nC ₂₆	4.09	4.34	5.57	6.10	5.86	2.36	5.93	6.56
nC ₂₇	3.44	7.17	6.10	5.32	6.84	2.22	5.09	5.92
nC ₂₈	2.73	3.91	3.79	4.98	9.67	1.96	4.49	5.29
nC ₂₉	2.56	6.81	4.59	4.31	4.14	1.87	4.29	4.86
nC ₃₀	1.75	3.45	2.41	2.67	2.24	1.46	3.31	3.75
nC ₃₁	1.53	5.08	3.63	2.04	2.12	1.63	2.96	2.90
nC ₃₂	1.30	0.98	1.33	1.71	1.52	0.96	1.57	1.82
nC ₃₃	1.54	3.99	1.90	2.47	1.38	1.42	2.79	2.56
nC ₃₄	1.41	1.37	1.10	1.68	1.33	1.43	2.69	2.60
nC ₃₅	0.92	2.67	0.59	1.14	0.95	0.88	1.61	1.86
PARAFFIN	18.57	18.67	30.94	18.71	29.88	11.30	21.46	22.41
ISOPRENOID	3.33	2.73	1.94	1.84	2.36	2.42	1.60	1.42
NAPHTHENE	78.10	78.60	67.12	79.46	67.76	86.27	76.94	76.17
CPI INDEX A	1.03	1.43	1.23	1.10	1.17	1.02	1.02	1.01
CPI INDEX B	1.11	1.90	1.51	1.16	1.09	1.17	1.08	1.07
PRISTANE/PHYTANE	1.68	1.38	1.10	.384	0.60	2.05	1.37	1.54
PRISTANE/nC ₁₇	1.28	1.69	1.01	1.41	0.53	1.24	0.94	0.89

TABLE 10
COMPOSITION (NORMALISED %) OF C₁₅₊ PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-128A	-131A	-137A	-140A	-143A	-146A	-154A
DEPTH	2363.0m CORE	2385.0m CORE	2470m SWC	2500- 2515m	2545- 2560m	2595m SWC	2696m SWC
SAMPLE TYPE							
nC ₁₅	3.13	2.94	1.31	3.61	2.00	0.91	1.12
nC ₁₆	3.54	3.55	2.44	3.93	2.22	2.28	3.23
nC ₁₇	3.90	4.61	3.31	4.98	2.73	3.39	5.66
nC ₁₈	4.23	4.64	3.77	5.41	3.25	4.55	6.29
nC ₁₉	5.26	6.28	5.08	6.44	4.27	5.32	9.03
nC ₂₀	4.89	6.16	5.07	6.27	4.82	5.07	6.27
nC ₂₁	5.24	6.62	5.69	6.21	5.15	5.21	5.76
nC ₂₂	6.30	6.78	5.87	6.72	6.04	5.13	5.34
nC ₂₃	6.65	6.90	6.81	6.25	6.06	5.20	5.21
nC ₂₄	6.69	6.97	5.75	6.09	7.66	8.00	8.15
nC ₂₅	6.69	7.52	6.19	6.53	7.93	8.81	9.10
nC ₂₆	5.70	5.87	5.50	5.73	6.83	7.92	6.72
nC ₂₇	5.60	5.56	5.59	5.24	8.05	7.10	6.85
nC ₂₈	6.23	5.02	5.98	4.82	7.42	6.39	4.57
nC ₂₉	5.00	4.59	5.31	4.67	6.62	5.17	4.31
nC ₃₀	4.19	3.38	4.79	3.88	5.14	5.28	2.66
nC ₃₁	3.70	2.69	4.51	3.06	3.65	3.64	2.71
nC ₃₂	2.70	2.00	3.40	2.27	2.40	2.16	1.99
nC ₃₃	3.72	3.02	4.89	3.05	3.33	3.22	1.90
nC ₃₄	3.76	3.04	4.78	3.04	2.86	2.98	1.90
nC ₃₅	2.89	1.87	3.95	1.80	1.57	2.24	1.26
PARAFFIN	22.66	21.33	20.64	22.11	23.75	17.76	18.26
ISOPRENOID	1.11	1.50	1.01	1.68	0.93	0.84	1.31
NAPHTHENE	76.23	77.16	78.35	76.22	75.32	81.39	80.43
CPI INDEX A	1.00	1.06	1.07	1.01	1.02	0.98	1.05
CPI INDEX B	1.02	1.11	1.04	1.06	1.09	1.02	1.24
PRISTANE/PHYTANE	1.44	1.69	1.59	1.62	1.25	1.01	1.21
PRISTANE/nC ₁₇	0.74	0.96	0.91	0.94	0.80	0.70	0.69

TABLE 11

CARBON ISOTOPE DATA (‰, PDB)

<u>GEOCHEM</u> <u>SAMPLE</u> <u>NUMBER</u>	<u>DEPTH</u>	<u>SATURATES</u>	<u>AROMATICS</u>	<u>TOTAL EXTRACT</u>
1140-015A	780-810m	-29.62	-29.00	-29.30
1140-048	1365-1380m	n.a	n.a	-28.97
1140-085A	1875m	n.a	n.a	-25.67
1140-106A	2150m	-28.79	n.a	-27.93
1140-113A	2246m	n.a	n.a	-28.70
1140-115A	2260-2275m	-29.92	-27.71	-27.91
1140-120A	2338-5m	-29.89	-28.32	-29.26
1140-123A	2348-0m	-29.92	-28.18	-29.34
1140-128A	2362-0m	-29.86	-28.07	-29.06
1140-131A	2385-0m	-29.65	-28.20	-29.26
1140-137A	2470m	-29.47	-28.16	-28.95
1140-140	2500-2515m	-29.89	-28.30	-29.05
1140-143A	2545-2560m	-29.52	-28.48	-28.98
1140-146A	2595m	n.a	n.a	-28.74
1140-154A	2696m	n.a	n.a	-27.24

* n.a insufficient sample for analysis.

TABLE 12

MOLECULAR MATURATION PARAMETERS

GEOCHEM SAMPLE NO.	DEPTH	STERANES M/Z 217 (259)			TERPANES M/Z 191					
		$\frac{C_{29} \text{ 20S } (\alpha)}{C_{29} \text{ 20R } (\beta)}$	$\frac{C_{29} \text{ 20R } (\beta)}{C_{29} \text{ 20R } (\alpha)}$	$\frac{C_{27} \text{ (20S) Diasteranes}}{C_{27} \text{ (20R) Diasteranes}}$	$\frac{Tm}{Ts}$	$\frac{C_{30} \text{ Moretane}}{C_{30} \text{ Hopane}}$	$\frac{C_{29} \text{ normoretane}}{C_{29} \text{ norhopane} + C_{29} \text{ normoretane}}$	$\frac{\text{Bisnorhopane } (C_{28})}{Tm + \text{Bisnorhopane} + C_{29} \text{ norhopane}}$	$\frac{C_{31} \text{ (20S)}}{C_{31} \text{ (20S)} + C_{31} \text{ (20R)}}$	x 100
1140-015	780-810m	0.41	0.63	1.37	1.95	0.22	0.22	0.07		53%
1140-048	1365-1380m	C O N T A M I N A T I O N								
1140-085	1875m SWC	0.76	0.46	1.35						
1140-106	2150m SWC	1.30	1.74	1.65	1.67	0.09	0.07	0.07		59%
1140-113	2246m SWC	0.90	1.11	1.54	1.40	0.12	0.11	0.08		60%
1140-115	2260-2275m	1.02	1.52	1.51	0.65	0.07	0.11	0.18		60%
1140-120	2338.5m CORE	1.13	1.65	1.30	1.41	0.09	0.08	0.21		56%
1140-123	2348.0m CORE	1.17	1.68	1.39	0.67	0.08	0.07	0.19		60%
1140-128	2362.0m CORE	1.50	2.02	1.30	0.64	0.09	0.06	0.22		59%
1140-131	2385.0m CORE	1.36	2.03	1.47	0.70	0.09	0.07	0.20		59%
1140-137	2470m SWC	1.34	2.37	1.59	0.35	0.08	0.06	0.27		60%
1140-140	2500-2515m	0.91	1.45	1.23	0.80	0.08	0.07	0.20		60%
1140-143	2545-2560m	1.38	1.74	1.54	0.56	0.09	0.07	0.25		58%

TABLE 13

COMPOSITION (NORMALISED %) OF C₁₅₊ AROMATIC HYDROCARBONS

- DIBENZOTHIOPHENE

<u>GEOCHEM</u> <u>SAMPLE</u> <u>NUMBER</u>	<u>DEPTH</u>	<u>DIBENZOTHIOPHENE</u> <u>(m/z 184)</u>	<u>METHYL</u> <u>DIBENZOTHIOPHENE</u> <u>(m/z198)</u>	<u>DIMETHYL</u> <u>DIBENZOTHIOPHENE</u> <u>(m/z212)</u>
1140-015	780-810m	8.2	4.07	51.1
1140-048	1365-1380m	25.3	51.2	23.5
1140-085	1875m SWC	29.6	47.9	22.5
1140-106A	2150m SWC	18.6	48.3	33.1
1140-113A	2246m SWC	13.7	49.2	37.1
1140-115A	2260.2275m	17.9	41.6	40.5
1140-120A	2338.5m CORE	11.9	37.0	51.1
1140-123	2348.0m CORE	9.9	36.9	53.2
1140-128	2362.0m CORE	14.1	41.2	44.7
1140-131	2385.0m CORE	12.8	40.1	47.1
1140-137A	2470m SWC	15.2	39.5	45.3
1140-140A	2500-2515m	9.8	38.2	52.0
1140-143A	2545-2560m	11.3	36.2	52.5
1140-146A	2595m SWC	12.0	42.3	45.7
1140-154A	2696m SWC	13.7	46.2	40.1

TABLE 14

COMPOSITION (NORMALISED %) OF C₁₅₊ AROMATIC HYDROCARBONS- PHENANTHRENE SERIES

<u>GEOCHEM SAMPLE NUMBER</u>	<u>DEPTH</u>	<u>PHENANTHRENE (m/z 178)</u>	<u>METHYL PHENANTHRENE (m/z 192)</u>	<u>DIMETHYL PHENANTHRENE (m/z 206)</u>	<u>TRIMETHYL PHENANTHRENE (m/z 220)</u>
1140-015	780.810m	7.1	35.0	36.0	21.9
1140-048	1365.1380m	29.8	39.3	18.6	12.3
1140-08	1875m SWC		23.6	47.3	19.3 9.8
1140-106A	2150m SWC	11.3	40.4	31.4	16.9
1140-113A	2246m SWC	14.6	42.9	28.0	14.5
1140-115A	2260.2275m	12.0	38.0	32.9	17.1
1140-120A	2338.5m CORE	7.8	33.1	36.0	23.1
1140-123	2348.0m CORE	7.3	31.9	37.7	23.1
1140-128	2362.0 CORE	10.0	35.4	34.5	20.1
1140-131A	2385.0 CORE	9.3	36.6	35.1	19.0
1140-137A	2470m SWC	8.0	33.3	35.4	23.3
1140-140A	2500.2515m	8.0	33.0	36.8	22.2
1140-143A	2545.2560m	6.8	29.3	37.5	26.4
1140-146A	2595m SWC	9.8	39.6	34.6	16.0
1140-154A	2696m SWC	23.2	46.2	21.9	8.7

WELL: 7120/5-1



Norsk Hydro

U-461

Statoil, Harstad
Att: O.W.Lind-Hansen

Your ref.

Your letter of

Our ref.

Date

Harstad, 4/9-86

ANALYSIS OF SWC'S PL 110-WELLS

According to the permission Norsk Hydro received from the PL 110 licence late 1985 to analyse geochemically core pieces and some SWC's from the Pl 110-wells, Norsk Hydro will supply the licence with additional pyrolysis results on the 7121/5-1 and 7120/5-1 wells. The analysis has been performed by our Research Centre in Bergen on a Leco THA-100 instrument. The SWC's from well 7120/5-1 have also been extracted and group type separated and results are presented in the data-report from Geochem (August 1986). Together with "Data report wells Pl 110" (May 1986) should Norsk Hydro now have fulfilled the analytical obligations to the PL 110 - licence.

86-5739-BA

15 SEPT. 1986

REGISTRERT

OLJEDIREKTORATET

Yours faithfully

Jan H. Augustson
Jan H. Augustson

Norsk Hydro a.s.

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WELL : 7121/5-1

DEPTH (m)	SAMPLE		TOC %	PYROLYSIS - PARAMETERS				
	TYPE	LITHOLOGY		S ₁ (kg/tcn)	S ₂ (kg/tcn)	T _{max} (°C)	HYDROGEN INDEX	PROD. INDEX
2345	SWC	Dark grey shale	16.38	8,93	30.06	446	183,5	0,23
	Repeat	Analysis:		9,21	30.33	449		
2249	SWC	Dark grey shale	19.07	11.19	39.49	448	207.1	0,22
2351,2	n	- n -	13,42	8,56	26,74	452	192.1	0,24
2352,2	n	- n -	11,52	8,79	23,91	447	207,5	0,27
2355	n	- n -	7.04	7,48	14.31	453	203,3	0,34
2359,5	n	- n -	2.16	3,20	2,30	438	106,5	0,58

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DEPTH (m)	SAMPLE		TOC %	PYROLYSIS - PARAMETERS				
	TYPE	LITHOLOGY		S ₁ (kg/tcn)	S ₂ (kg/tcn)	T _{max} (°C)	HYDROGEN INDEX	PROD. INDEX
2242,5	SWC	SHALE	0,42	0,11	0,40	532	95,2	0,21
2253	"	- " -	9,73	5,33	16,02	436	164,6	0,25
2261,5	"	- " -	11,75	6,13	23,38	444	199,0	0,21
2267,5	"	- " -	14,46	6,36	26,81	435	185,4	0,19
2272	"	- " -	1,37	0,52	1,26	428	92,0	0,29
2284	"	- " -	1,31	0,64	1,74	441	132,8	0,27
2698	"	sst	0,85	0,14	0,65	451	76,5	0,18
"	"	Shale	3,15	0,48	3,28	443	104,1	0,13

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REGISTERET
OLJEDIREKTORATET

DATA REPORT

WELL 7120/5-1

August 1986

GEOCHEM



**Petroleum
Geochemistry
Division**

TABLE 1a
GAS OIL INDEX (1)

GEOCHEM SAMPLE NUMBER	DEPTH	% C1	% C2-5	% C6-14	% C15+	C1-5 C6+
1397-001	2253	22.28	29.61	47.03	1.07	1.08
1397-002	2261.5	26.59	21.95	48.34	3.12	0.94
1397-003	2267.5	26.37	21.20	46.59	5.85	0.91
1397-004	2272	9.13	46.13	43.78	0.97	1.23
1397-005	2284	12.34	43.32	43.44	0.90	1.26
1397-007	2698 B	22.62	20.80	51.32	5.27	0.77



TABLE 1b
GAS OIL INDEX (2)

GEOCHEM SAMPLE NUMBER	DEPTH	% C1	% C2-6	% C7-14	% C15+	C1-6 C7+
1397-001	2253	22.28	32.79	43.85	1.07	1.23
1397-002	2261.5	26.59	25.52	44.77	3.12	1.09
1397-003	2267.5	26.37	26.84	40.95	5.85	1.14
1397-004	2272	9.13	51.53	38.37	0.97	1.54
1397-005	2284	12.34	46.43	40.33	0.90	1.43
1397-007	2698 B	22.62	26.40	45.72	5.27	0.96

TABLE 2a
CONCENTRATION (PPM) OF EXTRACTED C₁₅₊ MATERIAL IN ROCK



JOB	LITHO	DEPTH	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS			
				Saturates	Aromatics	TOTAL	Preciptd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	TOTAL
<u>7120/5-1</u>										
1397-001		2253	8146	2752	1293	4045	2598	1467	37	4102
1397-002		2261.5	8421	2598	1895	4493	2378	1526	24	3928
1397-003		2267.5	9782	1977	2391	4368	3973	1414	27	5414
1397-004		2272	1887	369	206	574	979	312	21	1312
1397-005		2284	1706	761	208	969	453	273	10	737
1397-006		2698 A	1639	414	120	534	665	424	16	1105
1397-007		2698 B	1280	190	120	310	790	170	10	970

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

TABLE 2b
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL

JOB	LITHO	DEPTH	HYDROCARBONS		NON HYDROCARBONS		
GEOCHEM SAMPLE NUMBER			Saturates	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's
<u>7120/5-1</u>							
1397-001		2253	33.78	15.87	31.89	18.01	0.45
1397-002		2261.5	30.85	22.50	28.24	18.13	0.28
1397-003		2267.5	20.21	24.44	40.61	14.45	0.28
1397-004		2272	19.55	10.90	51.88	16.54	1.13
1397-005		2284	44.62	12.17	26.57	16.02	0.61
1397-006		2698 A	25.24	7.35	40.58	25.88	0.96
1397-007		2698 B	14.84	9.37	61.72	13.28	0.78

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

TABLE 3
SIGNIFICANT RATIOS (%) OF C₁₅₊ FRACTIONS AND ORGANIC CARBON

JOB	LITHO	DEPTH	ORGANIC CARBON (wt. %)	HYDROCARBONS TOTAL EXTRACT	HYDROCARBONS ORG. CARBON	TOTAL EXTRACT ORG. CARBON	SATURATES AROMATICS
GEOCHEM SAMPLE NUMBER							
<u>7120/5-1</u>							
1397-001		2253	7.78	49.65	5.20	10.47	2.13
1397-002		2261.5	9.61	53.35	4.68	8.76	1.37
1397-003		2267.5	12.20	44.66	3.58	8.02	0.83
1397-004		2272	1.13	30.45	5.08	16.69	1.79
1397-005		2284	1.07	56.80	9.05	15.94	3.67
1397-006		2698 A	0.92	32.59	5.80	17.81	3.43
1397-007		2698 B	2.74	24.22	1.13	4.67	1.58

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



TABLE 4
COMPOSITION (NORMALISED %) OF C₁₅₊ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS

CHEM SAMPLE NUMBER	-001	-002	-003	-004	-005	-006	-007
DEPTH	2253m	2261.5m	2267.5m	2272m	2284m	2698m A	2698m B
SAMPLE TYPE	SWC	SWC	SWC	SWC	SWC	SWC	SWC
5	3.37	5.72	6.96	0.31	0.46	0.55	0.17
5	7.25	9.31	10.85	1.17	3.47	2.60	1.63
7	9.11	10.13	10.77	5.00	7.48	7.32	6.76
8	9.47	10.78	10.36	8.02	8.87	9.21	7.76
9	8.97	10.21	9.28	8.45	10.42	8.50	6.94
0	8.25	8.01	8.29	7.59	10.19	8.10	6.41
1	6.96	6.94	6.96	8.27	9.49	6.92	5.83
2	6.89	6.45	6.30	8.20	8.10	5.66	6.01
3	5.67	5.56	5.47	6.85	7.41	5.51	5.95
4	5.09	4.33	4.64	6.72	7.64	5.66	5.31
5	5.52	4.08	4.06	6.35	6.33	8.10	5.36
6	4.23	3.92	3.23	5.74	4.78	5.43	4.43
7	4.30	3.27	3.15	5.24	3.86	5.35	4.78
8	3.52	2.61	2.40	5.00	3.01	4.33	4.43
9	3.23	2.45	2.24	4.44	2.85	4.88	5.25
0	2.44	1.72	1.41	2.96	1.62	3.38	4.66
1	2.15	1.47	1.16	3.27	1.62	3.93	4.96
2	1.29	0.90	0.91	2.28	0.93	1.73	4.49
3	1.15	0.98	0.75	2.04	0.85	1.65	3.67
4	0.79	0.65	0.50	1.30	0.39	0.79	3.09
5	0.36	0.49	0.33	0.80	0.23	0.39	2.10
PARAFFIN	40.49	37.34	32.23	49.66	45.46	26.38	49.48
OPRENOID	6.45	5.74	5.29	2.33	4.38	1.85	2.86
APHTHENE	53.06	56.92	62.48	48.01	50.16	71.77	47.66
PI INDEX 1	1.03	1.01	1.03	0.99	1.02	1.13	1.04
PI INDEX 2	1.16	1.06	1.12	1.08	1.14	1.34	1.10
PI INDEX 3	1.11	1.00	1.12	0.98	0.99	1.10	1.08
TRISTANE/PHYTANE	1.39	1.51	1.51	1.00	1.27	0.98	1.30
TRISTANE/nC ₁₇	1.02	0.91	0.92	0.47	0.72	0.47	0.48

$$I_1 = \frac{1}{2} \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}}$$

$$I_2 = \frac{1}{2} \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}}$$

$$I_3 = \frac{2 \times (C_{27})}{C_{26}+C_{28}}$$

- ditch cuttings CO - core SWC - sidewall core

E