

U-530

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GEOCHEMICAL REPORT

NORSK HYDRO

NORWAY

2/12-1



EXPLORATION LOGGING NORGE A/S

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CONTENTS

PAGE NO.

SECTION

WELL AND RIG DATA	1
INTRODUCTION	2
RESULTS AND INTERPRETATION	2
MATURITY	5
SUMMARY AND CONCLUSION	6

APPENDIX A

SAMPLE PREPARATION
SAMPLE CONTAMINATION
DESCRIPTION OF ANALYTICAL EQUIPMENT
PRESENTATION OF RESULTS
INTERPRETATION OF OSA DERIVED PARAMETERS
ORGANIC MATTER TYPES

APPENDIX B

TABULATION OF ANALYTICAL DATA

APPENDIX C

HYDROGEN INDEX/TMAX CROSSPLOTS

APPENDIX D

GEOCHEMICAL EVALUATION LOGS 1:5,000

APPENDIX E

QUALITY CONTROL DATA

APPENDIX F

LITHOLOGY DATA SHEETS

WELL AND RIG DATA

Company : Norsk Hydro
Well Name : 2/12-1
Well Type : Exploration
Location : Norwegian North Sea
Position : Latitude 56 Deg 14 Min 3.60 Sec N
Longitude 03 Deg 42 Min 27.80 Sec E
RKB-MSL : 23m
Spud Date : 14th October 1986
Completion Date : 30th December 1986 (for geochemistry
analysis)
Total Depth : 4707m (for geochemistry analysis)
Rig : Treasure Scout
Exploration Logging Unit : Geochemistry Unit #505
Geochemists : Phil Haynes, Hugh MacEwan
Simon Reed,

INTRODUCTION

Geochemical Screening using the Oil Shows Analyser was performed on 275 cuttings samples, 23 core samples and 19 sidewall core samples. The material was received as wet washed cuttings and analysed as an air dried ground powder. Two and three metre composite samples were received with the argillaceous material being picked for crushing and subsequent analysis.

In addition 248 cuttings samples and 17 sidewall core samples were solvent washed and reanalysed due to free hydrocarbon contamination.

Results and Interpretation

The pyrolysis geochemical data generated for the well 2/12-1 is used to divide the analysed section from 3977 to 4707m into five organic facies based upon lithological changes and organic matter content.

Organic Facies 1 : 3977m - 3997m

This consists of brown marls and limestones with a good organic content (greater than 2% TOC) averaging 3.4% with values ranging from 2.15 to a high of 4.3% TOC at 3982m from the brown argillaceous limestone. Pyrolysis S2 yields range from 2.06 to 14.9 mgHC/g rock suggesting fair to excellent source potential. Solvent washing of the samples indicates that the original values obtained are slightly depressed by the effects of free oil present in the section. S2 yields decline from 14.9 to 8.59 mgHC/g rock. Hydrogen indices from the argillaceous limestone samples range from 227 to 354 indicating this section is capable of generating gas and some oil. This suggests a Type II Kerogen of a mixed marine and terrestrial origin as being the dominant organic matter type (see HI/Tmax crossplot Appendix C). However it is evident from the large quantities of free oil present in the section that generation of hydrocarbons has already occurred and that the original quality of the organic

material may have been higher. Consideration of the Total Production Index (TPI) prior to solvent washing also indicates that some accumulation of free oil has occurred within this section.

Organic Facies II : 3997m - 4232m

The second facies is composed of a thick sequence of claystone and marl with thin horizons of limestone and dolomite. The organic matter content is generally very good with an average of 3%, although minor lithological variations account for a large range between 0.62% and 6.03% TOC. The organic richness is reflected in the pyrolysis S2 yields ranging from 0.90 to a high of 25.9 mgHC/g rock at 4102m. An average of 5 mgHC/g rock suggests fair to good source potential. The hydrogen indices range from 99 to 440 indicating that the organic matter is predominantly of a marine origin with a minor terrestrial influence suggesting a Type II Kerogen. Generation of free hydrocarbons has already occurred and it is probable that the organic material will be capable of generating both oil and gas with the majority of the sediments all lying within the oil window. The free hydrocarbon indicators (S0, S1 and TPI) suggests that the majority of the interval contains free oil generated from these source rocks. After solvent extraction the organic carbon content and source potential remains high with no significant change in the hydrogen indices or Tmax.

Organic Facies III : 4232 to 4337m

This third organic facies is composed of a thick sequence of dark claystones with only minor dolomitic limestone interbeds. A significant increase in organic richness is exhibited. Organic matter content is good to excellent with values ranging from 2.6 to a high of 10% TOC at 4247m. These values, recorded after solvent extraction, indicate an average of 5.15%. The increase in organic richness is reflected in the pyrolysis S2 yields, with values ranging from 5.8 to a high of 44 mgHC/g rock at 4247m. The average of 15 mg

HC/g rock suggests excellent source potential throughout the zone, with the exception of the non- claystone horizons (carbonates between 4287 and 4302m) which have a correspondingly poorer source potential. Hydrogen indices range from 203 to 441 with the majority of the samples providing values in excess of 300. This suggests that the organic matter is dominantly oil and gas prone and probably comprises of a mixture of marine and terrestrially derived organic matter of a Type II Kerogen (see HI/Tmax crossplot). Significant amounts of free hydrocarbons continued to be recorded probably due to generation within these source rocks (the whole section is thought to be mature with respect to oil generation).

Organic Facies IV : 4337 to 4610m

This section is marked by an increase in lithological variations. The massive claystone section of above grades to an interbedded sequence of siltones and sandstone, accounting for both a decrease in organic richness and a greater organic content variation. After solvent extraction the organic matter content ranges from 0.94 to a high of 6.61% at 4517m. The sandstone and siltstone sections exhibit the lowest organic matter content, as would be expected. Pyrolysis S2 yields range from 2.82 to 11.84 mgHC/g rock with an average of 5 mgHC/g rock suggesting good source potential. Hydrogen indices exhibit a greater range than in the upper sections (134 to 504), suggesting the presence of a variety of organic matter types, although generally capable of generating oil and gas from the zones of better quality organic material. A decline in the organic matter quality is evident although significant quantities of free hydrocarbons are recorded suggesting generation of oil and gas from within these sediments.

The highest TOC values of this section occur in the interval between 4512 and 4530m and are believed to be due to the addition of large quantities of

lignosulphonate organic mud additive. Depression of the hydrogen indices at this zone is also noted.

Organic Facies V : 4610 to 4707m

Organic Facies V comprises of sandstone interbedded with dolomitic limestones and claystone. Thin laminations of coal are also present within the cored section from 4634 to 4672m. Large variations in organic richness are observed with the highest value of 18.28% TOC recorded from a coal at 4649.49m. The average throughout the section is around 2%, although even after solvent extraction the sandstone section exhibits TOC values well above 1.0% indicating that some form of free hydrocarbon contamination is present. The pyrolysis S2 yield reflects the variable organic content with values ranging from 0.17 to 9.33mgHC/g within the claystones. Values from the three coal samples from the core range from 46 to 88mgHC/g rock, with Tmax figures between 448 and 461 degrees and average hydrogen indices of 350 it is suggested that these coals are hydrogen rich with excellent source potential. The remainder of the section is predominantly sandstone with, as expected, little source potential. The hydrogen indices from within the argillaceous samples continue to suggest dominantly oil and gas prone organic matter, comprising a mixture of marine and terrestrially derived organic material, equivalent to a Type II kerogen. Consideration of the geochemical plot and Total Production Indices suggest that the sandstone section has an accumulation of free oil.

Maturity Data

Tmax data for the analysed well section indicates that the sediments appear to be mature with respect to oil generation. The majority of the samples, from good pyrolysis S2 yields, have a Tmax higher than 435 degrees. Very little variation in values is seen although a maturity trend is difficult to identify as the upper part of the well was not analysed. As such it is difficult to determine the depth at which the 'oil window' starts.

Despite free hydrocarbon contamination throughout the well very little change in Tmax values is noted between the solvent washed and non solvent washed sample data. The section is organically rich and of good quality and suggests that the large free hydrocarbon yields (S0 and S1) are due to hydrocarbon generation and migration within the section.

SUMMARY AND CONCLUSIONS

The well has been divided into five sections (organic facies) based upon lithological and organic matter content.

The first section from 3977 to 3997m is composed of argillaceous limestone of a high organic content and quality. The section is mature with indications of free oil accumulation.

The second section from 3997 to 4232m is organically rich with good source potential suggestive of predominantly mixed marine and terrestrially derived material. Mature sediments with high free hydrocarbon values indicates oil generation has occurred with potential for further generation.

The third section from 4232 to 4337m is organically the richest part of the well analysed. Generally excellent source potential with good organic quality and sediments within the oil window. Significant quantities of free hydrocarbons appear to have been generated with excellent potential for the further generation of oil and gas.

The fourth section from 4337 to 4610m is characterised by a decline in organic richness and a more variable mixed clastic and carbonate lithological sequence. Source potential, organic richness and free hydrocarbon values still remain good but a general decline in organic quality is observed.

The fifth section from 4610 to 4705m is characterised by sandstone with indications of free hydrocarbon accumulation. Good organic content and source

potential is restricted to thin coal and claystone interbeds. The coal being hydrogen rich and of excellent source potential.

In conclusion:-

- 1) Organic matter content from the argillaceous sediments is good to excellent throughout the well. The richest zone is between 4232 and 4337m.
- 2) Source potential reflects the organic matter content variations and generally remains good to excellent. The greatest potential being between 4232 and 4337m.
- 3) Hydrogen indices average 250 throughout the well. This suggests a fairly uniform organic matter type, predominantly of marine and terrestrial origin of an oil and gas prone nature. Large quantities of free hydrocarbons throughout the section suggests that organic matter quality may have been greater before generation occurred.
- 4) The whole interval is probably mature with respect to oil generation. Significant amounts of free hydrocarbons generated from these samples have affected pyrolysis and TOC data. However results after solvent extraction suggest that the conclusions drawn are still valid.
- 5) Free hydrocarbon indicators suggest the presence of large quantities of free oil throughout the well, probably generated from the source rocks present. Accumulation of free oil is indicated between 3977 and 3997m and 4610 and 4707m.

APPENDIX A

SAMPLE PREPARATION

SAMPLE CONTAMINATION

DESCRIPTION OF ANALYTICAL EQUIPMENT

PRESENTATION OF RESULTS

INTERPRETATION OF OSA DERIVED PARAMETERS

SAMPLE PREPARATION

Small samples of ditch cuttings are taken and thoroughly washed in cold water through a 2.36mm sieve and collected in a 180 micron sieve to remove cavings. Any large quantities of contaminants such as lost circulation material are removed at this stage. The washed material is then examined under a binocular microscope and any further contaminants removed. The samples are then air dried at room temperature to prevent the loss of 'free hydrocarbons' and then ground to a homogenous powder in preparation for pyrolysis.

SAMPLE CONTAMINATION

The effects of contamination, if unrecognized, can lead to misleading geochemical data. The major contaminants usually encountered at the wellsite include paint chips, lost circulation material (mica, nuthulls, etc.), steel fragments, and pipe dope. In the 2/12-1 well these were removed by flotation and/or picking.

Organic mud additives, especially those used for water loss control, can also cause serious contamination problems.

Another source of contamination to be aware of is caused by migrated hydrocarbons. The presence of migrated oil or bitumen in a rock can give a major response in the vicinity of 300 degrees centigrade on the pyrogram (S1) while solid bitumen and the 'heavy end' fraction of petroleum has been found to produce a measurable response in the region 300-550 degrees centigrade. This is the same temperature range in which kerogen is cracked releasing hydrocarbons during pyrolysis. Thus large quantities of bitumen or migrated petroleum in rocks can affect the size and maximum temperature (T_{max}) of the (S2) peak and cause non-source rocks to be falsely identified as source rocks as reported by Clementz (1979)*.

The entire section of 2/12-1 (3977m to 4707m) well was drilled with up to 4% oil in the mud. The origin of the oil was of two sources: generated hydrocarbons and migrated hydrocarbons. This is probably the cause of the large S1 yields obtained throughout this analysed section of the well.

The problems encountered as a result of hydrocarbon contamination may be overcome by solvent extraction using a 50:50 solution of trichloroethane and acetone. As a guideline, samples with high S1 values (greater than 1.0 mgHC/g rock) are solvent extracted and reanalysed to obtain more valid values for S2 and Tmax. The S1 value obtained in the first analysis remains a useful indicator of oil accumulations, and degree of contamination.

* Clementz, D. 1979, 'Effect of Oil and Bitumen Saturation on Source Rock Pyrolysis', A.A.P.G. Bull., Vol 62 (12).

DESCRIPTION OF ANALYTICAL EQUIPMENT

Principle of Operation

Small quantities of sample (approx. 100 mg) are analysed by programmed pyrolysis in an inert Helium atmosphere. Any evolved hydrocarbons are detected by a Flame Ionisation Detector. The output from this sensor provides the peak data for the S0, S1 and S2 indices. In addition, the temperature, Tmax, for maximum generation of cracked hydrocarbons is measured by a probe monitoring oven temperature.

On completion of the pyrolysis cycle the sample is transferred to a second oven. The sample is heated in air and any carbonaceous material remaining is converted to carbon dioxide, this is detected by a thermal conductivity detector (TCD), the output of which is the S4 peak. The Oil Shows Analyser thus derives the Total Organic Carbon content from the sum of the pyrolysed carbon (S0+S1+S2) and the residual carbon (S4).

The Oil Shows Analyser used the following analytical cycle:-

Pyrolysis:

Carrier gas : Helium
Initial Isotherm : 90 deg. C
Isothermal Hold : 2 minutes
Second Isotherm : 300 Deg. C
Isothermal Hold : 2 minutes
Temperature Ramp : 30 deg/min
Final Temperature : 600 deg. C

Oxidation:

Oxidation Gas : Air (after removal of CO₂)
Oven Temperature : 600 deg. C
Oxidation Time : 5 minutes

The equipment was calibrated using a standard supplied by Exploration Logging Overseas, Inc. A quality control sample was run routinely at the wellsite every ten unknown samples, or every 24 hours if less than ten samples were analysed during this period.

In addition, as a quality control check, samples were re-run at the wellsite. The results from these are detailed in Appendix E.

PRESENTATION OF RESULTS

The processed data is expressed in terms of:-

- S0 : Low temperature gas yield (mgHC/g rock)
- S1 : Low temperature oil yield (mgHC/g rock).
- S2 : High temperature hydrocarbon yield (mgHC/g rock).
- Tmax : Temperature at which maximum emission of hydrocarbons occurs.
- T.O.C. : Total Organic Carbon (weight percent of whole rock) comprised of S4 (residual organic carbon) plus 82% of the quantity S0+S1+S2.
- T.P.I. : Total Production Index (S0+S1/S0+S1+S2).
- H.I. : Hydrogen Index (S2/TOC).

INTERPRETATION OF OSA DERIVED PARAMETERS

Total Organic Carbon (T.O.C.) - Organic Richness

The T.O.C. value represents the total organic content in a rock and is a simple measure of organic richness. It is also used in subsequent calculations to estimate the type of hydrocarbon which might be generated from a mature source rock. As a very general guideline, samples with less than 0.5% T.O.C. are regarded as being organically too lean to yield sufficient hydrocarbons to form commercial deposits and are considered non-sources. Samples with 0.5 to 1% T.O.C. are considered marginal in source quality and those with greater than 1% have good possibilities.

The following guidelines are suggested to interpret T.O.C. data:

<u>TOC Value (%Wt)</u>	<u>Organic Richness</u>
0.0 - 0.5	poor - fair
0.5 - 2.0	fair - good
2.0 +	good - excellent

S0 and S1 : Low Temperature Hydrocarbon Yield

S0 and S1 represent the hydrocarbons that are driven off at low temperatures (90°C and 30°C respectively) from the inherent gas/bitumen content of source rocks. They are termed "free hydrocarbons" and are measured in mgHC/g rock. Significant contributions to S0 and S1 also result from increasing maturity as hydrocarbons are generated from kerogen, and from 'out of place' hydrocarbons which have migrated from another source.

S2 : Source Potential

S2 corresponds to the hydrocarbons evolved from the sample as a result of the thermal cracking of kerogen. By simulating a gradual increase in maturity by means of a progressively increasing temperature gradient, an assessment of the overall source potential of the sediments can be made, i.e. the maximum amount of hydrocarbon which could be produced given sufficient temperature to permit thermal cracking of all kerogen present.

The following guidelines are suggested to interpret S2 values:-

<u>S2 Value (mgHC/g rock)</u>	<u>Source Rock Potential</u>
0.0 - 2.5	poor - fair
2.5 - 5.0	fair
5.0 - 10.0	good
10.0 +	excellent

Tmax : Maturity

Tmax is the analytical temperature at which the rate of thermal degradation of kerogen present in a sample is at a maximum and gives an indication of the overall maturity of the sample.

The expected onset of oil generation can be related to Tmax to delineate the 'oil window'. This is currently described as occurring approximately between 440 and 470 degrees centigrade. It is important to consider the overall trends of Tmax data as opposed to data points in isolation.

Consideration must also be given to values obtained from lean samples when it is difficult to determine the exact temperature at which the maximum rate of kerogen cracking occurred. Generally for S2 values of less than 0.2 mgHC/g rock, Tmax does not appear to be a reliable indicator of maturity and interpretations made from such results may be suspect. In addition the shape of the S2 peak is important in that sharp peaks give more reliable Tmax values.

Guidelines for interpreting maturity from Tmax are:-

<u>Tmax Values (deg. C)</u>	<u>Maturity</u>
Less than 440	immature
440 - 470	oil window
470 - 500	gas window
500 +	post mature or barren

H.I. : Hydrogen Index

The Hydrogen Index (S2/TOC) reflects the hydrogen content of the kerogen. The Hydrogen Index can be plotted against the Oxygen Index and Tmax to classify kerogen type, and thus the expected type of hydrocarbon that may be generated from a mature source.

The following guidelines are suggested in interpreting S₂/TOC data:-

<u>Hydrogen Index (S₂/TOC)</u>	<u>Expected hydrocarbon type Generated from mature source</u>
0 - 200	gas
200 - 300	gas and oil
300 +	oil

With increasing maturity more kerogen will be converted to hydrocarbons causing a decrease in the hydrogen index.

T.P.I. : Total Production Index (S₀+S₁/S₀+S₁+S₂)

The Total Production Index, also known as the transformation ratio, looks at the fraction of hydrocarbons that exist as free hydrocarbons. Any local increase in T.P.I. values may indicate the presence of migrated hydrocarbons or contamination. A decrease may be indicative of hydrocarbon expulsion. T.P.I. values will normally increase with maturity as hydrocarbons are generated by the cracking of kerogen.

ORGANIC MATTER TYPES

It is important to determine the type of organic matter in a sample, for two reasons. Firstly, different types of organic matter have different hydrocarbon generating potentials due to the variation in the chemistry of the organic matter. Secondly, as different types of organic matter are deposited in characteristic environments, some information can be obtained as to the conditions of deposition.

Four types of organic matter are described:-

Type I - Pure Type I kerogens are rare, they usually consist of structured algal material. Their favoured depositional environments are closed basins, lagoons and lakes. They are strongly oil prone.

Type II - Usually consists of sapropelic organic matter. This is derived from algal or other planktonic remnants and some higher plant material such as spores and pollen. A marine transgression over a broad shelf is a typical environment of deposition. Type II kerogens may be oil and gas prone.

Type III - Usually consists of humic, coaly material derived from continental higher plants. A delta, well supplied with terrestrial organic matter is a favourable environment for Type III organic matter. However, coals are believed to be the source for oil in many of the Tertiary basins of S.E. Asia where coastal plain peats developed in an everwet tropical climate. In such environments waterflow and reworking can concentrate lipinitic kerogen in preference to vitrinitic kerogen as documented by Teichmüller and Durand (1983)*. These lipinite-rich deposits are the precursors of hydrogen rich, oxygen poor coals with good source potential for oil generation.

Type IV - Organic matter which has no generative potential. Kerogens of this type may result from (i) severely oxidised organic matter; or, (ii) post mature organic matter. Pyrobitumens and inertinite are often described as Type IV kerogens.

* Teichmüller, M. and Durand, B., 1983. Fluorescence Microscopical Rank Studies on Liptinites and Vitrinites in Peat and Coals, and Comparison with Results of Rock Eval Pyrolysis: Int. Jour. Coal Geol., V.22, pt.. 1, p. 165-178.

APPENDIX B

TABULATION OF ANALYTICAL DATA

NON - SOLVENT EXTRACTED DATA

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 17:19
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
L	3977.00	3.35	7.62	433	227	1.88	19.40	.74
LL	3980.00	2.15	2.06	424	96	0.00	3.96	.66
LL	3982.00	4.30	10.37	433	241	0.00	29.94	.74
L ;	3985.00	4.21	14.90	433	354	.03	9.57	.39
	3992.00	3.42	11.24	438	329	.52	7.85	.43
	3995.00	3.18	10.21	440	321	.99	8.00	.47
	3997.00	3.45	9.34	437	271	.83	7.50	.47
	4000.00	4.04	14.30	437	354	.19	6.13	.31
	4002.00	3.14	8.98	436	286	.11	5.47	.38
	4005.00	2.28	9.98	437	438	.40	6.44	.41
	4007.00	2.88	8.77	439	305	.32	5.90	.41
	4010.00	2.47	6.32	439	256	.21	5.10	.46
	4012.00	3.03	8.79	437	290	.02	5.38	.38
	4015.00	3.12	10.49	439	336	.05	5.51	.35
	4018.00	3.33	10.49	437	315	.03	5.63	.35
	4020.00	3.06	10.18	434	333	.02	5.58	.35
	4023.00	4.72	17.38	436	368	.67	8.31	.34
	4025.00	2.84	10.68	439	376	.47	6.46	.39
	4027.00	3.06	9.59	438	313	.47	6.33	.41
	4030.00	2.99	8.93	438	299	.87	5.92	.43
	4032.00	2.56	9.27	436	362	.50	5.82	.41
	4035.00	2.76	8.48	434	307	.91	6.14	.45
	4038.00	2.34	8.87	437	379	.28	6.10	.42
	4040.00	3.71	9.95	437	268	.72	6.09	.41
	4042.00	2.73	7.97	434	292	.29	5.36	.41
	4045.00	2.46	7.60	435	309	.04	5.14	.41
	4047.00	2.65	7.13	436	269	.04	4.30	.38
	4050.00	2.02	6.43	433	318	.01	4.30	.40
	4052.00	3.03	8.65	438	285	.02	5.16	.37
	4055.00	2.92	8.45	435	289	.04	5.90	.41
	4057.00	2.12	6.95	434	328	.04	5.87	.46
	4060.00	2.13	6.88	436	323	.07	6.10	.47
	4062.00	1.85	7.26	439	392	.07	5.04	.41
	4065.00	3.07	6.42	438	209	.03	4.56	.42
ZZZZZZZZZZ	4067.00	.62	.93	437	150	0.00	1.90	.67
	4070.00	2.14	6.46	435	302	.06	4.40	.41
	4072.00	2.63	6.46	439	246	.11	4.57	.42
	4075.00	2.90	6.61	436	228	.07	5.43	.45
	4077.00	1.81	5.43	438	300	.05	4.01	.43
	4080.00	1.93	6.32	436	327	.17	5.06	.45
	4082.00	3.11	11.79	436	379	.09	7.98	.41
	4085.00	3.61	12.14	0	336	.61	7.14	.39
	4087.00	3.76	11.55	440	307	.61	6.88	.39
	4090.00	2.76	8.02	441	291	.57	5.60	.43
	4092.00	3.00	10.58	431	353	.70	6.17	.39
	4095.00	2.85	9.23	436	324	.39	6.10	.41

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 10:56
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cutttings Samples								
	4097.00	2.98	11.07	435	371	.17	6.57	.38
	4100.00	1.53	2.10	434	137	.02	1.68	.45
	4102.00	6.03	25.90	434	430	.28	8.56	.25
	4105.00	5.58	19.33	435	346	.23	8.85	.32
	4107.00	5.79	24.00	433	415	.30	9.19	.28
LLLLLLLLLL	4110.00	1.40	1.45	438	104	0.00	.95	.40
	4112.00	2.77	10.34	439	373	.18	6.07	.38
	4115.00	2.47	9.41	434	381	.17	6.21	.40
	4117.00	2.51	10.26	437	409	.22	6.45	.39
	4120.00	2.53	9.08	440	359	.18	5.27	.38
	4122.00	2.79	9.06	440	325	.17	5.55	.39
	4125.00	2.50	10.23	440	409	.17	5.42	.35
	4128.00	3.18	9.92	435	312	.15	5.84	.38
	4130.00	3.33	14.64	431	440	.04	6.22	.30
	4132.00	3.54	16.63	435	470	.11	6.47	.28
	4135.00	2.63	8.75	436	333	.05	4.47	.34
	4137.00	1.80	2.99	438	166	0.00	1.67	.36
	4140.00	3.15	9.68	440	307	.06	4.86	.34
	4142.00	2.46	9.56	438	389	.06	5.12	.35
	4145.00	2.85	7.86	437	276	.06	4.09	.35
	4147.00	2.26	8.82	442	390	.03	3.49	.29
	4150.00	2.91	9.85	441	338	.03	4.15	.30
	4152.00	3.40	11.51	439	339	.07	5.44	.32
	4155.00	3.39	11.79	438	348	.06	4.95	.30
	4157.00	2.87	10.37	443	361	0.00	3.19	.24
	4160.00	2.21	9.76	442	442	.04	3.73	.28
	4162.00	2.25	6.53	439	290	.02	3.18	.33
	4165.00	2.79	8.94	442	320	.04	4.12	.32
	4167.00	2.86	8.73	441	305	.04	4.38	.34
LLLLLLLLLL	4170.00	1.27	1.19	440	94	0.00	.87	.42
	4172.00	3.03	9.78	445	323	.07	4.61	.32
	4175.00	2.96	10.94	442	370	.12	5.48	.34
	4178.00	2.65	7.25	442	274	.04	3.86	.35
	4180.00	2.61	9.67	443	370	.10	5.69	.37
	4182.00	2.99	9.24	443	309	.06	4.89	.35
	4185.00	3.16	11.07	442	350	.06	5.47	.33
	4187.00	2.82	9.03	444	320	.04	4.72	.35
	4190.00	2.74	9.41	443	343	.04	4.91	.34
	4192.00	2.55	8.47	443	332	.03	4.38	.34
	4195.00	2.68	9.87	442	368	.04	5.32	.35
	4197.00	3.07	11.31	443	368	.09	5.61	.34
	4200.00	2.56	9.21	441	360	.03	4.44	.33
	4202.00	2.78	8.59	443	309	.03	4.65	.35
	4205.00	2.25	6.96	444	309	.01	3.50	.34
	4207.00	2.97	9.94	443	335	.05	5.04	.34
	4210.00	3.45	12.35	444	358	.05	5.48	.31
	4212.00	3.10	10.20	440	329	.03	4.95	.33

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 11:00
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
	4215.00	5.27	19.49	439	370	.02	5.97	.24
	4217.00	4.42	14.19	440	321	0.00	4.64	.25
	4220.00	4.19	12.46	440	297	.01	4.85	.28
	4222.00	3.11	11.24	443	361	.02	5.55	.33
	4225.00	3.25	10.20	439	314	.02	4.68	.32
	4227.00	3.14	9.85	439	314	.01	4.53	.32
	4230.00	3.49	9.25	439	265	.01	4.73	.34
	4232.00	3.14	10.00	439	318	.01	5.04	.34
	4235.00	5.88	23.86	440	406	0.00	6.58	.22
	4237.00	5.61	19.59	441	349	.02	6.33	.24
	4240.00	9.87	38.64	435	391	.03	10.69	.22
	4242.00	8.92	36.09	440	405	.05	9.86	.22
	4245.00	10.00	38.97	439	390	.10	11.28	.23
	4247.00	12.86	52.73	441	410	.13	12.66	.20
	4250.00	9.44	39.16	442	415	.08	10.81	.22
	4252.00	5.82	19.91	442	342	.04	7.65	.28
	4255.00	5.67	22.12	441	390	.04	7.50	.25
	4257.00	6.06	21.37	441	353	.03	7.55	.26
	4260.00	6.68	24.15	442	362	.02	8.03	.25
	4262.00	6.55	24.40	439	373	.02	7.71	.24
	4265.00	6.49	22.44	439	346	.04	7.51	.25
	4267.00	6.50	24.50	442	377	.05	8.58	.26
	4270.00	7.44	33.06	441	444	.06	10.02	.23
	4272.00	7.81	33.28	445	426	.07	10.47	.24
	4275.00	7.01	25.84	442	369	.04	8.72	.25
	4277.00	7.90	28.53	441	361	.02	9.92	.26
	4280.00	2.64	6.00	434	227	.01	1.00	.14
	4282.00	6.71	23.40	441	349	0.00	6.36	.21
	4285.00	7.81	27.34	441	350	.02	9.93	.27
	4287.00	4.81	15.24	442	317	0.00	5.64	.27
	4290.00	4.14	14.54	439	351	0.00	5.62	.28
	4292.00	5.91	23.03	443	390	.04	7.08	.24
	4295.00	6.30	19.59	442	311	.02	6.75	.26
L	4297.00	4.24	13.38	442	316	.02	5.77	.30
	4300.00	4.85	15.04	442	310	.02	5.89	.28
	4302.00	4.67	14.63	442	313	.01	5.53	.27
	4305.00	5.38	15.97	440	297	.02	5.73	.26
	4307.00	7.69	27.83	443	362	.02	9.21	.25
	4310.00	8.46	31.38	440	371	.02	9.55	.23
	4312.00	8.63	33.48	441	388	.04	10.26	.24
	4315.00	7.62	25.37	442	333	.04	8.88	.26
	4317.00	8.13	31.39	439	386	.06	10.19	.25
	4320.00	5.09	15.87	439	312	.02	6.02	.28
	4322.00	5.09	17.30	441	340	.02	6.59	.28
	4325.00	7.58	26.76	438	353	.05	8.93	.25
	4327.00	6.15	22.56	442	367	.04	8.02	.26
	4330.00	5.77	19.39	442	336	.03	7.33	.28

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 11:03
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
	4332.00	4.08	14.01	438	343	.04	6.35	.31
	4335.00	4.23	13.74	439	325	.04	6.12	.31
	4337.00	4.87	15.55	441	319	.05	7.05	.31
	4340.00	3.13	9.60	439	307	.01	4.84	.34
	4342.00	2.82	9.51	442	337	0.00	4.75	.33
	4345.00	2.80	7.19	442	257	0.00	3.76	.34
L	4347.00	2.55	8.16	437	320	.01	4.07	.33
	4350.00	3.03	9.80	443	323	.02	4.63	.32
	4352.00	3.62	9.29	439	257	0.00	4.30	.32
	4355.00	3.15	8.95	436	284	0.00	4.64	.34
LLL	4357.00	2.44	6.21	438	255	0.00	3.65	.37
LL	4360.00	2.56	6.47	444	253	0.00	3.08	.32
LLL	4362.00	2.62	7.42	442	283	.01	4.50	.38
	4365.00	2.41	6.71	442	278	0.00	3.97	.37
	4367.00	2.80	8.49	444	303	.01	4.52	.35
	4370.00	2.88	8.42	444	292	0.00	4.63	.35
	4372.00	2.57	7.96	442	310	.01	4.38	.36
, , , , ,	4375.00	2.57	7.19	443	280	0.00	3.92	.35
, , , , ,	4377.00	2.55	7.76	441	304	0.00	4.30	.36
, , , ,	4380.00	2.86	6.35	441	222	.01	4.03	.39
, ,	4382.00	1.58	3.73	440	236	0.00	3.13	.46
, , , ,	4385.00	2.14	5.79	441	271	.01	3.94	.41
, , ,	4387.00	2.50	6.46	440	258	.01	3.60	.36
, , , , ,	4390.00	2.25	6.98	444	310	.01	3.79	.35
, , , , ,	4392.00	2.10	6.61	441	315	0.00	3.69	.36
, , , ,	4395.00	2.29	7.06	442	308	.01	4.01	.36
, , , , ,	4397.00	2.32	7.20	444	310	.01	3.91	.35
, , , , ,	4400.00	2.21	6.51	444	295	0.00	3.68	.36
, , , , ,	4402.00	2.43	7.10	442	292	.01	3.78	.35
, , , , ,	4405.00	2.43	7.09	443	292	.01	4.24	.37
, , ,	4407.00	2.28	6.74	444	296	.01	4.26	.39
, , ,	4410.00	2.58	7.62	438	295	.01	4.30	.36
, , , ,	4412.00	1.91	5.88	439	308	0.00	3.48	.37
, , , , ,	4415.00	2.17	6.97	441	321	.02	4.18	.38
, , , , ,	4417.00	2.30	7.95	441	346	.01	4.12	.34
, , , , ,	4420.00	2.63	7.04	441	268	.01	4.12	.37
, , , , ,	4422.00	2.73	8.43	443	309	.01	4.58	.35
, , , ,	4425.00	3.17	10.94	443	345	.02	5.85	.35
, , , ,	4427.00	3.09	10.12	442	328	.02	5.67	.36
, , ,	4430.00	2.03	10.23	442	504	.02	5.98	.37
, ,	4432.00	3.37	11.33	442	336	.02	5.53	.33
, ,	4435.00	2.85	10.58	441	371	.02	5.48	.34
, ,	4437.00	3.74	11.43	441	306	.01	5.43	.32
, ,	4440.00	2.87	10.53	440	367	0.00	5.28	.33
, ,	4442.00	2.97	8.99	437	303	0.00	4.83	.35
, ,	4445.00	2.79	9.76	443	350	.01	4.40	.31
, ,	4447.00	2.40	8.21	444	342	.01	4.25	.34

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 11:08
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI

Cuttings Samples								
	4450.00	1.38	2.82	437	204	0.00	1.90	.40
	4452.00	2.93	6.88	441	235	0.00	3.40	.33
	4455.00	3.00	7.09	440	236	.01	3.69	.34
	4457.00	2.00	3.68	437	184	0.00	1.84	.33
,,	4460.00	2.25	4.27	443	190	0.00	2.22	.34
,,	4462.00	2.57	7.42	441	289	0.00	3.66	.33
,,	4465.00	2.50	7.23	444	289	.01	3.63	.33
,,	4467.00	1.91	7.01	441	367	.01	3.68	.34
,,	4470.00	2.87	9.01	442	314	.01	3.83	.30
,,	4472.00	2.18	5.61	445	257	0.00	3.15	.36
,,	4475.00	2.79	8.76	446	314	0.00	4.05	.32
,,	4477.00	2.95	9.55	446	324	0.00	4.36	.31
,,	4480.00	3.16	9.39	439	297	.01	4.58	.33
,,	4482.00	3.06	8.47	438	277	.01	4.35	.34
,,,::	4485.00	3.32	9.51	440	286	0.00	4.41	.32
::::	4487.00	3.57	6.66	437	187	0.00	3.61	.35
,,::::	4490.00	3.22	6.80	436	211	.01	3.85	.36
,,	4492.00	3.10	6.97	437	225	.01	3.58	.34
,,,::	4495.00	2.98	5.82	443	195	.13	1.87	.26
,,	4497.00	3.55	8.66	441	244	.01	4.22	.33
,,,::	4500.00	3.19	9.55	437	299	0.00	4.69	.33
,,	4502.00	3.06	8.61	440	281	.01	3.96	.32
,,	4505.00	3.98	8.06	438	203	0.00	3.68	.31
,,	4507.00	2.57	5.72	441	223	0.00	3.35	.37
,,	4510.00	2.91	6.76	434	232	.01	3.75	.36
,,	4512.00	3.43	6.92	442	202	0.00	3.77	.35
,,	4515.00	4.22	10.10	436	239	.01	4.51	.31
,,	4517.00	6.74	9.03	437	134	.37	4.97	.37
,,	4520.00	7.91	11.84	439	150	.01	8.75	.43
,,	4522.00	6.25	9.56	440	153	.01	4.12	.30
,,	4525.00	5.08	10.08	438	198	0.00	4.57	.31
,,	4527.00	4.94	8.93	442	181	0.00	3.93	.31
,,	4530.00	4.18	9.46	441	226	0.00	4.21	.31
,,	4532.00	3.25	8.53	443	262	0.00	4.04	.32
,,	4535.00	3.43	10.00	440	292	0.00	5.21	.34
,,	4537.00	3.46	8.68	442	251	0.00	4.36	.33
,,	4540.00	3.59	8.33	443	232	0.00	3.84	.32
,,	4542.00	2.94	8.06	442	274	0.00	3.99	.33
,,	4545.00	3.17	8.99	439	284	0.00	4.64	.34
,,	4547.00	3.51	10.16	442	289	.01	4.58	.31
,,	4550.00	3.23	9.41	438	291	0.00	4.59	.33
,,	4552.00	3.23	8.31	439	257	0.00	4.13	.33
,,	4555.00	3.11	7.56	438	243	0.00	4.06	.35
,,	4557.00	3.52	9.06	441	257	0.00	4.64	.34
,,	4560.00	2.24	6.98	441	312	0.00	3.31	.32
,,	4562.00	3.40	10.56	442	311	0.00	4.12	.28

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 11:29
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
,,	4565.00	5.28	10.27	441	195	0.00	4.76	.32
,,	4567.00	5.39	11.60	441	215	0.00	4.97	.30
,,	4570.00	4.18	9.94	443	238	0.00	4.57	.31
,,	4572.00	4.32	9.44	442	219	0.00	4.25	.31
,,	4575.00	4.00	10.53	443	263	0.00	4.83	.31
,,	4577.00	4.13	10.87	440	263	0.00	4.69	.30
,,	4580.00	3.82	10.37	438	271	0.00	4.56	.31
,,	4582.00	3.60	7.80	436	217	0.00	3.97	.34
,,,::	4585.00	2.89	5.90	441	204	.01	4.39	.43
,,,::::	4587.00	2.88	6.46	440	224	.01	5.00	.44
,,,::::	4590.00	3.39	7.19	442	212	0.00	4.53	.39
,,,::::	4592.00	2.93	6.30	440	215	0.00	4.91	.44
,,,::::	4595.00	3.00	6.89	440	230	0.00	5.07	.42
,,,::::	4597.00	3.18	6.12	441	192	0.00	4.40	.42
,,::	4600.00	3.09	8.44	439	273	0.00	4.40	.34
,,::	4602.00	3.50	7.95	440	227	0.00	4.55	.36
,,::	4605.00	3.81	10.19	441	267	0.00	5.30	.34
:::	4607.00	3.41	9.47	440	278	0.00	4.76	.33
,,::::	4610.00	2.87	3.95	437	138	0.00	2.76	.41
:::~::~:	4612.00	1.93	2.73	435	141	0.00	3.68	.57
:::~::~:	4615.00	2.17	2.37	431	109	0.00	5.36	.69
:::~::~:	4617.00	3.61	3.37	440	93	0.00	2.96	.47
	4620.00	2.30	2.59	439	113	0.00	2.97	.53
:::~::~:	4622.00	3.20	3.79	442	118	0.00	3.86	.50
:::~::~:	4625.00	2.16	2.19	443	101	0.00	2.73	.55
:::~::~:	4627.00	.41	.35	442	85	0.00	.90	.72
:::~::~:	4630.00	.45	.39	442	87	0.00	.85	.69
:::~::~:	4632.00	.57	.53	442	93	0.00	1.84	.78
LLLLLLLLL	4675.00	1.83	.73	443	40	.01	1.36	.65
LLLLLLLLL	4677.00	.59	.56	438	95	0.00	1.21	.68
LLLLLLLLL	4680.00	1.13	1.13	427	100	.14	7.56	.87
ZZZZZZZZZ	4682.00	.79	.92	438	116	0.00	1.74	.65
ZZZZZZZZZ	4685.00	.94	1.10	439	117	0.00	2.89	.72
ZZZZZZ :::	4687.00	3.16	6.90	439	218	.05	4.72	.41
ZZZZ :::	4690.00	3.73	6.22	439	167	.01	3.41	.35
ZZZZ :::	4692.00	3.05	8.36	443	274	.02	4.39	.35
ZZZ - :::	4695.00	3.29	7.69	438	234	.02	4.79	.38
ZZZ :::	4697.00	1.41	1.62	441	115	0.00	1.50	.48
ZZ :::	4700.00	3.35	9.00	438	269	.07	5.13	.37
:::	4702.00	3.26	9.33	439	286	.07	4.96	.35
:::~::~:	4705.00	.41	.44	440	107	.01	.47	.52
:::~::~:	4707.00	0.00	8.41	438	0	.13	4.92	.38

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 11:42
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Core Samples								
.....	4634.76	1.32	1.44	424	109	.07	10.67	.88
.....	4636.89	1.31	1.45	426	111	.10	12.04	.89
.....	4638.97	2.72	3.54	434	130	.26	16.10	.82
.....	4639.75	2.19	2.81	432	128	.12	10.99	.80
.....	4641.95	1.16	1.45	426	125	.10	8.91	.86
.....	4643.71	1.30	1.60	435	123	.11	7.89	.83
.....	4645.18	1.74	2.53	429	145	.17	12.15	.83
.....	4646.75	1.83	2.60	436	142	.14	12.04	.82
.....*	4648.76	4.35	7.54	442	173	.11	9.29	.55
*****	4649.49	18.28	62.73	448	343	.61	31.51	.34
.....	4650.19	5.42	6.84	446	126	.15	12.51	.65
*****	4652.72	13.83	46.74	455	338	.79	33.90	.43
.....	4655.38	.89	.97	429	109	.04	3.99	.81
.....	4657.39	1.98	2.55	430	129	.10	8.00	.76
.....	4658.28	4.02	5.00	440	124	.15	16.38	.77
.....	4662.00	1.27	1.32	429	104	.10	8.19	.86
*****	4663.37	17.98	88.68	461	493	.24	26.01	.23
=====	4663.73	1.10	1.49	457	135	.01	.42	.22
=====	4664.75	.29	1.77	484	610	.01	.08	.05
0000000000	4666.35	.32	.05	0	16	0.00	.04	.44
=====	4667.09	.29	.13	0	45	.01	.10	.46
=====	4669.50	.17	.52	0	306	0.00	.05	.09
=====	4672.10	.18	.43	0	239	0.00	.19	.31

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO A/S,
WELL : 2/12-1

Printed at : 17:39
: 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI

Sidewall Core Samples								
	3980.00	3.85	6.55	428	170	.01	9.37	.59
	3985.00	5.11	15.82	429	310	.02	8.39	.35
	3990.00	4.15	10.73	429	259	0.00	7.88	.42
	3992.00	3.83	9.13	431	238	0.00	7.75	.46
=====	3996.00	4.56	13.38	431	293	.01	8.09	.38
	4000.00	3.89	13.46	429	346	.01	6.26	.32
	4025.00	3.91	11.39	429	291	0.00	7.33	.39
	4040.00	2.97	6.19	430	208	.01	5.62	.48
	4050.00	2.41	4.50	434	187	.01	2.20	.33
	4105.00	4.27	11.90	433	279	0.00	6.00	.34
	4172.00	2.44	4.67	440	191	0.00	2.29	.33
=====	4215.00	5.42	13.19	432	243	.03	5.86	.31
=====	4240.00	10.37	37.61	432	363	.19	13.85	.27
	4247.00	2.74	6.33	430	231	.05	3.46	.36
	4380.00	2.69	4.11	427	153	.04	3.23	.44
LLLLLLLLLL	4470.00	.33	.19	428	58	0.00	.17	.47
::::::::::	4628.00	.88	.90	415	102	.01	4.85	.84
	4697.00	.28	.42	448	150	0.00	.47	.53
::::::::::	4707.00	.21	.21	485	100	.01	.26	.56

SOLVENT EXTRACTED DATA

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 12:08
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cutttings Samples								
LL	3982.00	1.23	1.88	437	153	0.00	.26	.12
L ;	3985.00	3.36	8.59	437	256	0.00	1.03	.11
	3992.00	2.46	7.91	441	322	0.00	.36	.04
	3995.00	2.21	6.45	440	292	0.00	.26	.04
	4000.00	2.85	8.36	439	293	0.00	.35	.04
	4002.00	2.28	4.99	438	219	0.00	.41	.08
	4005.00	2.21	5.57	441	252	0.00	.25	.04
	4007.00	2.08	5.20	439	250	0.00	.38	.07
	4010.00	2.02	4.13	438	204	0.00	.54	.12
	4012.00	2.19	5.85	440	267	0.00	.68	.10
	4015.00	2.06	6.06	443	294	0.00	.52	.08
	4018.00	2.34	6.26	438	268	0.00	1.15	.16
	4020.00	2.70	6.07	439	225	0.00	.83	.12
	4023.00	3.66	12.50	438	342	0.00	.73	.06
	4025.00	2.08	5.65	442	272	0.00	.18	.03
	4027.00	2.23	5.92	442	265	0.00	.31	.05
	4030.00	2.47	5.57	442	226	0.00	.30	.05
	4032.00	2.61	5.41	440	207	0.00	.40	.07
	4035.00	2.28	4.65	440	204	0.00	.24	.05
	4038.00	2.23	5.38	441	241	0.00	.28	.05
	4040.00	2.91	6.07	440	209	0.00	.51	.08
	4042.00	2.18	5.74	441	263	0.00	.37	.06
	4045.00	2.02	4.84	438	240	0.00	.26	.05
	4047.00	1.91	3.48	437	182	0.00	.26	.07
	4050.00	1.58	3.48	437	220	0.00	.25	.07
	4052.00	2.10	4.44	437	211	0.00	.42	.09
	4055.00	1.93	4.35	439	225	0.00	.57	.12
	4057.00	1.28	3.58	438	280	0.00	.39	.10
	4060.00	1.17	3.33	437	285	0.00	.30	.08
	4062.00	1.44	3.47	440	241	0.00	.25	.07
	4065.00	1.25	3.25	439	260	0.00	.19	.06
ZZZZZZZZZZ	4067.00	.45	.45	440	100	0.00	.17	.27
	4072.00	1.79	3.88	443	217	0.00	.20	.05
	4075.00	1.41	2.92	439	207	0.00	.18	.06
	4077.00	1.68	2.74	440	163	0.00	.21	.07
	4080.00	1.43	4.50	441	315	0.00	.28	.06
	4082.00	2.23	7.58	441	340	0.00	.65	.08
	4085.00	3.18	8.74	439	275	0.00	.37	.04
	4087.00	2.10	8.05	440	383	0.00	.32	.04
	4090.00	2.15	5.22	439	243	0.00	.18	.03
	4092.00	2.15	7.98	438	371	0.00	.33	.04
::::::::::	4095.00	.34	.50	438	147	0.00	.07	.12
	4097.00	1.74	6.39	440	367	0.00	.31	.05
	4100.00	1.30	1.58	437	122	0.00	.12	.07

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 12:16
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cutttings Samples								
	4102.00	4.31	21.75	435	505	0.00	.45	.02
	4105.00	3.03	11.97	431	395	0.00	.45	.04
	4107.00	1.35	1.45	438	107	0.00	.67	.32
	4112.00	2.22	6.92	440	312	0.00	.37	.05
	4115.00	1.82	6.51	440	358	0.00	.29	.04
	4117.00	2.32	7.26	440	313	0.00	.36	.05
	4120.00	2.12	6.06	443	286	0.00	.34	.05
	4122.00	2.00	6.22	443	311	0.00	1.04	.14
	4125.00	1.81	5.85	443	323	0.00	.94	.14
	4127.00	1.86	5.78	440	311	0.00	.69	.11
	4130.00	3.44	10.65	435	310	0.00	.72	.06
	4132.00	3.67	12.85	438	350	0.00	.87	.06
	4135.00	2.00	4.14	444	207	0.00	.16	.04
	4137.00	1.80	1.59	439	88	0.00	.18	.10
	4140.00	2.01	6.04	444	300	0.00	.26	.04
	4142.00	2.03	7.25	441	357	0.00	.47	.06
	4145.00	1.70	5.72	445	336	0.00	.24	.04
	4147.00	1.85	5.69	440	308	0.00	.24	.04
	4150.00	2.03	6.53	440	322	0.00	.29	.04
	4152.00	2.63	7.74	442	294	0.00	.35	.04
	4155.00	2.63	8.15	441	310	0.00	.24	.03
	4157.00	2.65	7.08	442	267	0.00	.22	.03
	4160.00	2.52	6.38	443	253	0.00	.46	.07
	4162.00	1.98	3.53	441	178	0.00	.27	.07
	4165.00	1.95	3.39	443	174	0.00	.13	.04
LL	4167.00	2.00	4.59	441	230	0.00	.19	.04
LLLL	4172.00	2.16	6.31	444	292	0.00	.33	.05
LLL	4175.00	2.02	5.94	443	294	0.00	.19	.03
LLL	4178.00	1.75	2.81	441	161	0.00	.33	.11
LLL	4180.00	2.17	5.13	442	236	0.00	.34	.06
L	4182.00	1.83	5.15	446	281	0.00	.28	.05
	4185.00	2.33	6.07	444	261	0.00	.30	.05
	4187.00	1.79	5.64	446	315	0.00	.25	.04
LLLL	4190.00	2.35	5.30	445	226	0.00	.21	.04
	4192.00	1.47	5.03	445	342	0.00	.22	.04
	4195.00	2.06	5.48	442	266	0.00	.26	.05
	4197.00	1.93	5.82	443	302	0.00	.19	.03
	4200.00	1.94	4.81	446	248	0.00	.21	.04
	4202.00	1.83	4.99	444	273	0.00	.29	.05
	4205.00	1.83	4.12	445	225	0.00	.25	.06
	4207.00	1.94	5.66	446	292	0.00	.28	.05
	4210.00	2.16	7.42	443	344	0.00	.43	.05
	4212.00	2.63	6.73	444	256	0.00	.35	.05
	4215.00	3.54	13.65	436	386	0.00	.46	.03
	4217.00	3.48	9.08	442	261	0.00	.56	.06
	4220.00	4.25	13.28	441	312	0.00	.54	.04

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
WELL : NORSK HYDRO 2/12-1

Printed at : 12:20
: 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
	4222.00	2.45	6.86	444	280	0.00	.51	.07
	4225.00	1.90	6.78	441	357	0.00	.52	.07
	4230.00	3.00	6.38	440	213	0.00	.52	.08
	4232.00	2.84	6.71	436	236	0.00	.60	.08
	4235.00	4.02	14.41	443	358	0.00	.47	.03
	4237.00	4.47	14.57	439	326	0.00	.46	.03
	4240.00	7.93	30.37	441	383	0.00	.73	.02
	4242.00	7.51	28.96	441	386	0.00	.99	.03
	4245.00	8.20	31.87	441	389	.02	1.22	.04
	4247.00	10.80	47.64	441	441	0.00	1.23	.03
	4250.00	9.94	33.95	441	342	.01	1.10	.03
	4252.00	4.06	12.15	440	299	.01	1.05	.08
	4255.00	4.42	15.23	439	345	.01	1.02	.06
	4257.00	4.74	16.10	444	340	.01	1.25	.07
	4260.00	4.54	17.06	444	376	.01	1.50	.08
	4262.00	4.26	14.90	441	350	0.00	1.43	.09
	4265.00	4.44	16.87	437	380	.01	1.32	.07
	4267.00	5.09	17.09	441	336	0.00	1.21	.07
	4270.00	6.67	23.46	442	352	.01	1.24	.05
	4272.00	6.42	22.70	443	354	.01	1.43	.06
	4275.00	5.44	16.17	437	297	0.00	1.08	.06
	4277.00	6.12	15.11	435	247	.01	1.20	.07
	4280.00	2.62	5.81	434	222	.01	1.12	.16
	4282.00	9.04	18.31	443	203	.01	.97	.05
	4285.00	5.50	16.67	444	303	0.00	.95	.05
	4287.00	4.00	10.81	446	270	0.00	.69	.06
	4290.00	3.15	8.15	441	259	0.00	.48	.06
	4292.00	4.68	14.87	441	318	0.00	.80	.05
	4295.00	4.58	10.67	441	233	0.00	.78	.07
	4297.00	3.01	8.63	446	287	0.00	.96	.10
	4300.00	3.87	10.70	444	276	0.00	.75	.07
	4302.00	3.31	9.15	443	276	.01	.88	.09
	4305.00	3.84	10.37	443	270	.01	.89	.08
	4307.00	7.08	21.80	441	308	.02	.99	.04
	4310.00	7.17	24.65	443	344	.05	1.17	.05
	4312.00	5.82	21.65	440	372	0.00	.79	.04
	4315.00	4.88	16.51	443	338	0.00	.63	.04
	4317.00	4.90	17.07	442	348	.11	1.82	.10
	4320.00	3.36	10.25	444	305	.06	1.41	.13
	4322.00	4.01	11.17	442	279	0.00	.67	.06
	4325.00	4.70	15.62	439	332	0.00	.92	.06
	4327.00	4.72	16.91	437	358	.31	2.72	.15
	4330.00	4.56	13.44	442	295	.04	1.22	.09
	4332.00	2.98	8.76	443	294	0.00	.51	.06
	4335.00	2.99	8.41	443	281	.03	.96	.11
	4337.00	3.41	9.69	442	284	.19	1.81	.17
	4340.00	2.10	6.21	445	296	.01	.70	.10

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 12:34
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
	4342.00	2.16	5.89	443	273	0.00	.28	.05
	4345.00	1.68	3.77	439	224	0.00	.31	.08
L	4347.00	1.92	4.70	443	245	0.00	.30	.06
	4350.00	3.03	5.16	445	170	0.00	.39	.07
	4352.00	2.66	6.41	444	241	0.00	.58	.08
	4355.00	2.43	6.17	443	254	0.00	.57	.08
LLL	4357.00	1.84	4.34	445	236	0.00	.39	.08
LL	4360.00	1.89	4.79	446	253	0.00	.56	.10
LLL	4362.00	2.00	4.67	446	234	0.00	.50	.10
	4365.00	2.01	4.21	441	209	.03	.95	.19
	4367.00	2.22	5.76	447	259	.02	1.26	.18
	4370.00	2.07	6.14	445	297	.01	1.10	.15
, , , , ,	4372.00	2.20	4.65	446	211	0.00	.54	.10
, , , , ,	4375.00	1.82	4.24	445	233	0.00	.54	.11
, , , , ,	4377.00	1.90	4.70	444	247	0.00	.67	.12
, , , ,	4380.00	2.00	4.37	444	218	.03	1.32	.24
, , ,	4382.00	1.49	3.14	439	211	.01	.86	.22
, , , ,	4385.00	1.50	3.75	444	250	.01	.94	.20
, , ,	4387.00	1.83	3.85	447	210	.04	1.42	.27
, , , , ,	4390.00	2.00	5.16	448	258	.01	1.15	.18
, , , , ,	4392.00	1.73	3.60	445	208	0.00	.51	.12
, , , , ,	4395.00	1.78	4.01	447	225	0.00	.51	.11
, , , , ,	4397.00	1.65	4.44	444	269	0.00	.66	.13
, , , , ,	4400.00	1.73	3.75	446	217	0.00	.54	.13
, , , , ,	4402.00	1.80	4.84	446	269	.05	1.32	.22
, , , , ,	4405.00	1.63	4.15	445	255	.03	1.08	.21
, , ,	4407.00	1.72	3.86	443	224	.06	1.32	.26
, , ,	4410.00	1.73	4.17	442	241	.06	1.43	.26
, , , , ,	4412.00	1.75	3.69	442	211	0.00	.57	.13
, , , , ,	4415.00	1.78	4.69	448	263	0.00	.66	.12
, , , , ,	4417.00	2.16	5.45	445	252	.02	1.11	.17
, , , , ,	4420.00	1.86	4.11	447	221	.01	1.32	.24
, , , , ,	4422.00	1.86	5.03	446	270	0.00	.72	.13
, , , ,	4425.00	1.81	5.95	448	329	.01	.80	.12
, , , ,	4427.00	2.15	5.56	446	259	.04	1.04	.16
, , ,	4430.00	2.11	5.86	446	278	.02	2.57	.31
, ,	4432.00	2.39	7.76	446	325	.01	.87	.10
, ,	4435.00	2.22	6.10	442	275	0.00	.66	.10
, ,	4437.00	2.62	7.95	445	303	.06	1.61	.17
, ,	4440.00	2.16	5.78	443	268	.05	1.86	.25
, ,	4442.00	2.07	5.84	444	282	0.00	.69	.11
	4445.00	1.97	5.71	444	290	0.00	.70	.11
	4447.00	1.93	5.53	445	287	.02	.88	.14
	4450.00	.94	1.66	443	177	0.00	.46	.22
	4452.00	2.35	4.35	446	185	.05	1.34	.24
	4455.00	2.45	4.85	443	198	.17	1.74	.28
	4457.00	1.81	2.45	446	135	.07	1.23	.35

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 14:25
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Cuttings Samples								
,,	4460.00	1.82	3.73	445	205	.07	1.68	.32
,,	4462.00	1.95	5.03	446	258	0.00	.50	.09
,,	4465.00	1.86	5.07	444	273	0.00	.52	.09
,,	4467.00	2.01	4.94	447	246	0.00	.48	.09
,,	4470.00	1.94	4.58	445	236	0.00	.55	.11
,,	4472.00	1.66	4.36	447	263	.03	1.11	.21
,,	4475.00	2.00	6.24	449	312	.02	1.16	.16
,,	4477.00	2.38	6.60	448	277	.01	1.31	.17
,,	4480.00	2.84	7.62	438	268	.08	2.30	.24
,,	4482.00	2.29	5.08	441	222	0.00	.60	.11
,,,::	4485.00	2.27	6.03	443	266	0.00	.68	.10
::,::	4487.00	2.72	4.46	440	164	0.00	.55	.11
,,,:::	4490.00	1.79	4.39	440	245	0.00	.61	.12
,,	4492.00	2.95	5.72	438	194	0.00	1.41	.20
,,,::	4495.00	2.54	4.89	439	193	.06	1.43	.23
,,,::	4497.00	2.82	4.79	438	170	.05	1.77	.28
,,,::	4500.00	2.42	5.76	442	238	.10	2.33	.30
,,,::	4502.00	2.34	5.44	442	232	.15	1.98	.28
,,	4505.00	2.22	4.80	441	216	.01	1.03	.18
,,	4507.00	2.25	4.01	442	178	.07	1.38	.27
,,	4510.00	2.50	4.62	444	185	.07	1.37	.24
,,	4512.00	2.99	4.37	442	146	.01	.67	.13
,,	4515.00	3.87	5.07	442	131	0.00	.70	.12
,,	4517.00	6.61	6.77	441	102	.04	1.66	.20
,,	4520.00	5.14	6.33	441	123	.04	1.77	.22
,,	4522.00	4.90	6.94	442	142	.02	1.59	.19
,,	4525.00	4.40	6.27	443	143	0.00	1.10	.15
,,	4527.00	3.24	5.98	445	185	0.00	1.17	.16
,,	4530.00	3.48	7.02	443	202	0.00	1.20	.15
,,	4532.00	2.42	5.62	446	232	0.00	.63	.10
,,	4535.00	2.58	5.65	444	219	0.00	.58	.09
,,	4537.00	2.66	5.20	442	195	0.00	.92	.15
,,	4540.00	2.81	4.91	445	175	.01	1.08	.18
,,	4545.00	2.46	5.65	440	230	0.00	.80	.12
,,	4547.00	2.91	6.77	443	233	.04	1.50	.19
,,	4550.00	2.67	7.67	444	287	.01	2.27	.23
,,	4552.00	2.60	6.12	443	235	0.00	.84	.12
,,	4555.00	2.57	4.87	444	189	0.00	.73	.13
,,	4557.00	1.99	5.61	444	282	0.00	.66	.11
,,	4560.00	2.22	5.56	445	250	0.00	.61	.10
,,	4562.00	2.29	6.00	444	262	0.00	.61	.09
,,	4565.00	4.36	7.03	444	161	0.00	.74	.10
,,	4567.00	5.67	7.34	443	129	0.00	1.08	.13
,,	4570.00	3.22	6.27	445	195	0.00	.83	.12
,,	4572.00	2.99	6.04	441	202	0.00	.69	.10
,,	4575.00	3.68	6.84	444	186	0.00	1.01	.13

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 14:30
 : 10 Feb 1987

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI

Cuttings Samples								
,,	4577.00	3.02	6.27	444	208	0.00	.68	.10
,,	4580.00	2.99	6.62	442	221	0.00	1.34	.17
,,	4582.00	2.70	5.30	445	196	0.00	.83	.14
,,,::	4585.00	2.36	3.33	442	141	0.00	.72	.18
,,,::	4587.00	2.14	3.52	442	164	0.00	.80	.19
,,,::	4590.00	2.72	4.19	441	154	0.00	.78	.16
,,,::	4592.00	2.21	3.85	443	174	0.00	.64	.14
,,,::	4595.00	2.29	4.21	443	184	0.00	.56	.12
,,,::	4597.00	2.21	3.18	440	144	0.00	.46	.13
,,:	4600.00	2.20	4.65	443	211	0.00	.48	.09
,,:	4602.00	2.55	4.58	442	180	0.00	1.17	.20
,,:	4605.00	2.69	5.99	442	223	0.00	.35	.06
::	4607.00	2.62	6.49	442	248	0.00	1.10	.14
,,::	4610.00	2.57	2.30	439	89	0.00	.70	.23
,,::	4612.00	1.54	1.39	441	90	0.00	.51	.27
,,::	4662.00	2.55	4.58	442	180	0.00	1.17	.20
ZZZZZ	4687.00	2.39	3.70	439	155	0.00	.28	.07
ZZZZ	4690.00	1.54	3.02	441	196	0.00	.28	.08

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO A/S,
WELL : 2/12-1

Printed at : 10:21
: 11 Feb 1987

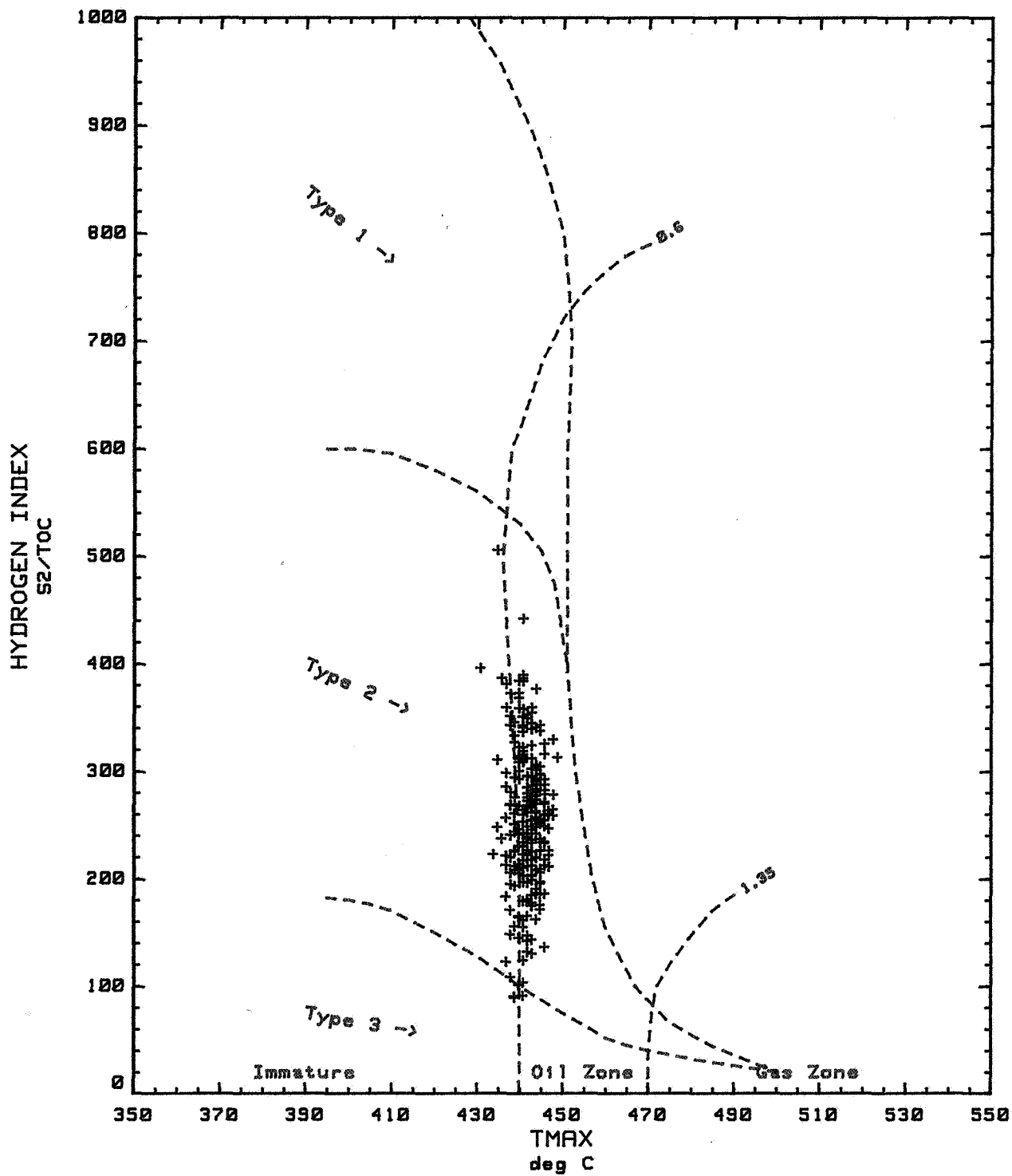
LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	S0 mg/g	S1 mg/g	TPI
Solvent Extracted Sidewall Core Samples								
	3980.00	2.02	1.60	435	79	0.00	.30	.16
	3985.00	2.86	8.74	437	306	0.00	.30	.03
	3990.00	2.97	4.38	432	147	0.00	.25	.05
	3992.00	2.73	3.70	436	136	0.00	.20	.05
=====	3996.00	3.20	5.81	436	182	0.00	.25	.04
	4000.00	2.69	5.57	434	207	0.00	.22	.04
	4025.00	2.72	5.39	437	198	.01	.21	.04
	4040.00	2.62	2.93	432	112	0.00	.18	.06
	4050.00	2.01	2.72	434	135	0.00	.32	.11
	4105.00	3.19	6.11	431	192	0.00	.40	.06
	4172.00	2.03	2.74	436	135	0.00	.74	.21
=====	4215.00	3.82	7.37	437	193	0.00	.45	.06
=====	4240.00	10.18	29.76	434	292	0.00	.78	.03
	4247.00	2.63	7.37	437	280	0.00	.45	.06
	4380.00	2.53	2.48	433	98	0.00	.62	.20
.....	4627.00	.84	.61	436	73	0.00	.47	.44
.....	4628.00	.84	.61	436	73	0.00	.47	.44

APPENDIX C

HYDROGEN INDEX/TMAX CROSSPLOTS



PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
NORSK HYDRO 2/12-1
3982 to 4690 m
12 Feb 1987



APPENDIX D

GEOCHEMICAL EVALUATION LOG 1 : 5,000

APPENDIX E

QUALITY CONTROL DATA

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO

Printed at : 14:58

WELL : NORSK HYDRO 2/12-1

: 10 Feb 1987

NON SOLVENT EXTRACTED QUALITY CONTROL DATA

LITHOLOGY	DEPTH M	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %WT	S2 mg/g	TMAX decC	S2/TOC HI	SO mg/g	S1 mg/g	TPI
QA Control Samples								
	3997	3.38	9.70	439	287	.39	7.73	.46
	4030	3.01	9.17	437	305	.60	5.79	.41
	4055	3.03	8.59	436	283	.02	6.10	.42
	4070	2.69	6.63	437	246	.04	4.28	.39
	4112	2.62	10.45	439	399	.10	5.92	.37
	4147	2.88	8.48	440	294	.02	3.64	.30
	4200	2.67	9.15	443	343	.03	4.73	.34
	4287	4.84	15.11	444	312	.02	5.33	.26
	4332	4.20	14.04	441	334	.03	6.22	.31
	4400	2.10	6.19	440	295	.01	3.79	.38
	4477	3.28	9.09	447	277	0.00	4.12	.31
	4520	5.74	10.01	443	174	0.00	4.83	.33
	4600	3.16	8.08	438	256	0.00	4.35	.35
	4700	3.28	9.14	437	279	.07	5.40	.37

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORSK HYDRO
 WELL : NORSK HYDRO 2/12-1

Printed at : 14.48
 : 10 Feb 87

SOLVENT EXTRACTED QUALITY CONTROL DATA

LITHOLOGY	DEPTH m	SOURCE BED EVALUATION				FREE HYDROCARBS		
		TOC %wt	S2 mg/g	TMAX degC	S2/TOC HI	SO mg/g	SI mg/g	TPI
QA Control Samples								
	4287	3.91	10.14	444	259	0.00	.89	.08
	4332	3.04	8.35	440	275	0.00	.47	.05
	4400	1.78	4.26	445	239	0.00	.62	.13
	4477	2.57	6.98	442	272	.03	1.43	.17
	4520	5.21	6.29	441	121	.03	1.74	.22
	4600	2.33	4.64	444	199	0.00	.51	.10

APPENDIX F

LITHOLOGY DATA SHEETS



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1, COMPANY: NORSK HYDRO

DEPTH	PRE-PICKED LITH				ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	clst	marl	lst	ost		
3977	10	80	10		Brown marl.	Marl, bm, hd,
3980	10	70	20		Grey mudstone	Marly clst, gy-med gy, sft-fm.
3982	40	40	20		Brown limestone	Lst, bm, hd, fluorescence, wht cut
3982	40	40	20		Grey Claystone	Clst, lt-dk gy, fm-hd, pyr, v. calc
3985	80	10	10		Claystone	Clst, dk gy-blk, sft
3985	80	10	10		Claystone	Clst, gy-m. dk gy, mod hd, plty.
3992	100				Claystone	Clst, gy-m. dk gy, mod hd, plty.
3995	100				Claystone	Clst a/a
3997	100				Claystone	Clst dk gy-olive gy, fm-sft, v. calc.
4000	100				Claystone	Clst a/a. v. calc. grading marl.
4002	10	90			Marl.	Marl, dk gy-olive gy, sft.
4005	100				Claystone	Clst, dk gy-blk, olive gy, sft-fm, v. calc
4007	100				Claystone	Clst a/a
4010	100				Claystone	Clst a/a
4012	100				Claystone	Clst, dk gy-blk, olive gy-blk, fm, v. calc
4015	100				Claystone	Clst a/a
4018	100				Claystone	Clst a/a
4020	100				Claystone	Clst a/a
4023	100				Claystone	Clst a/a
4025	100				Claystone	Clst a/a
4027	100				Claystone	Clst blk-olive blk, sft-fm, orch hd, blk, mod calc
4030	100				Claystone	Clst blk-olive blk sft-fm.
4032	100				Claystone	Clst a/a
4035	100				Claystone	Clst a/a
4038	100				Claystone	Clst a/a
4040	100				Claystone	Clst a/a
4042	100				Claystone	Clst blk-gy blk, sft-fm, blk, amor, mod-v. calc
4045	100				Claystone	Clst a/a
404	100				Claystone	Clst a/a
4050	100				Claystone	Clst a/a
4052	100				Claystone	Clst a/a
4055	100				Claystone	Clst a/a
405	100				Claystone	Clst a/a
4060	100				Claystone	Clst a/a
4062	100				Claystone	Clst a/a
4065	100				Claystone	Clst a/a
4067	100				Dolomite	Dol Bm, hd, x. talline, flour.
4067	100				Claystone	Clst Olive blk-gy, fm, blk, occ plty.
4070	100				Claystone	Clst a/a
4072	100				Claystone	Clst a/a
4075	100				Claystone	Clst, Olive blk-gy, sft-fm, rnd, loc amor, mod calc
4077	90		10		Claystone	Clst a/a
4077	90		10		Sandstone	Sst, bm, mod hd-hd, f-vf, subang, subrd, calc cont
4080	100				Claystone	Clst, a blk-gy, fm-sft, rnd, loc amor,
4082	100				Claystone	Clst a/a
4085	100				Claystone	Clst a/a
4087	100				Claystone	Clst a/a
4090	100				Claystone	Clst, gy-gy blk, fm, blk, plty.



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1, COMPANY: Norsk Hydro

DEPTH	PRE-PICKED LITH		ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	clst	1st sst		
4092	100		Claystone	Clst, olgy-gn, sft-fm, occ amr,
4096	100		Claystone	Clst a/a
4095	100		Sandstone	Sandst.
4097	100		Claystone	Clst, olgy-gn, sft-fm.
4100	100		Claystone	Clst, cr, sft amr, lam, grad marly 1st.
4102	100		Claystone	Clst, olgy-gn, sft-fm.
4105	100		Claystone	Clst a/a
4107	100		Claystone	Clst a/a
4110	50	50	Marl	Marl cr-gy, sft
4112	80	20	Claystone	Clst, olgy-blk, fm, blk, plty.
4115	100		Claystone	Clst a/a
4117	100		Claystone	Clst a/a
4120	100		Claystone	Clst a/a
4122	100		Claystone	Clst a/a
4125	100		Claystone	Clst a/a
4128	100		Claystone	Clst a/a
4130	100		Claystone	Clst, olgy-gn, sft-fm, amr.
4132	100		Claystone	Clst a/a
4135	100		Claystone	Clst a/a
4137	60	40	Claystone	Clst wht-gy, amorph. marly.
4140	90	10	Claystone	Clst olgy-blk, fm, plty, blk.
4142	100		Claystone	Clst a/a
4145	100		Claystone	Clst a/a
4147	100		Claystone	Clst a/a
4150	100		Claystone	Clst a/a
4152	100		Claystone	Clst a/a
4155	100		Claystone	Clst a/a
4157	100		Claystone	Clst a/a
4160	100		Claystone	Clst a/a
4162	100		Claystone	Clst a/a
4165	100		Claystone	Clst a/a
4167	80	20	Claystone	Clst a/a
4170	60	40	Limestone	Est, gy-lt gy, amr-fm, occ microstall.
4172	60	40	Claystone	Clst olgy-blk, fm, plty, blk.
4175	70	30	Claystone	Clst a/a
4177	70	30	Claystone	Clst a/a
4180	90	10	Claystone	Clst a/a
4182	90	10	Claystone	Clst a/a
4185	100		Claystone	Clst a/a
4187	100		Claystone	Clst a/a
4190	60	40	Claystone	Clst a/a
4192	100		Claystone	Clst a/a
4195	100		Claystone	Clst a/a
4197	100		Claystone	Clst a/a
4200	100		Claystone	Clst a/a
4202	100		Claystone	Clst a/a
4205	100		Claystone	Clst a/a
4207	100		Claystone	Clst a/a

WELL: 2/12-1, COMPANY: NORSK HYDRO

CELVY
#2

DEPTH	PRE-PICKED LITH				ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	DOL	LST	MARL	CLYST		
4210					Claystone	Clust olgy-blk, fm, pthy, blk.
4212				100	Claystone	Clust a/a
4215				"	Claystone	Clust a/a
4217				"	Claystone	Clust a/a
4220				"	Claystone	Clust a/a
4222				"	CLAYSTONE	CLYST a/a
4225				"	CLAYSTONE	CLYST a/a
4227				"	"	"
4230				"	"	"
4232	TR	TR		"	"	"
4235	TR			"	"	"
4237				"	"	"
4240				"	"	"
4242				"	"	"
4245				"	"	"
4247				"	"	"
4250	TR			"	"	"
4252	TR			"	"	"
4255				"	"	"
4257				"	"	"
4260				"	"	"
4262				"	"	"
4265		TR		"	"	"
4267				"	"	"
4270				"	"	"
4272		TR		"	"	"
4275	TR			"	"	"
4277				"	"	"
4280		TR		"	"	"
4282				"	"	"
4285				"	"	"
4287				"	"	"
4290		TR		"	"	"
4292		TR		"	"	"
4295		TR		"	"	"
4297		10		90	"	"
4300		TR		100	"	"
4302		TR		"	"	"
4305				"	"	"
4307				"	"	"
4310				"	"	"
4312				"	"	"
4315				"	"	"
4317		TR		"	"	"
4320		TR		"	"	CLYST a/a OCC SPEC LOC GRDNG → MARL
4322				"	"	"
4325				"	"	"
4327				"	"	"



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1 , COMPANY: NORSK HYDRO

DEPTH	PRE-PICKED LITH				ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	DOL	LST	MARL	CLYST		
4330				100	CLYST	CLAYSTONE
4332				"	"	OLV BLK → GRN BLK, SFT → FRM, LOG HD, TR P/R
4335				"	"	"
4337				"	"	"
4340				"	"	"
4342		TR		"	"	"
4345		10		90	"	"
4347				100	"	"
4350				"	"	"
4352				"	"	"
4355		TR		"	"	"
4357		30		70	"	"
4360		20		80	"	"
4362		30		70	"	"
4365		TR		100	"	"
4367		TR		"	"	"
4370		TR		"	"	"
4372			SILT	40	SILTSTONE	SILTSTONE; OLV GY, SFT-FRM, SPEC CARB MAT, WF SD GRAMS
4375		TR	50	50	"	"
4378			40	60	"	"
4380		TR	40	60	"	"
4382		TR	30	70	"	"
4385		TR	40	60	"	"
4387		TR	40	60	"	"
4390		TR	50	50	"	"
4392		TR	50	50	"	"
4395		TR	40	60	"	"
4397		TR	60	40	"	"
4400		TR	50	50	"	"
4402		TR	50	50	"	"
4405			50	50	"	"
4407			30	70	"	"
4410			30	70	"	"
4412			40	60	"	"
4415			50	50	"	"
4417			50	50	"	"
4420			50	50	"	"
4422			50	50	"	"
4425			40	60	CLYST	CLAYSTONE; OLV BLK, BLK/GY, FRM-HO, MICROMIC
4427			40	60	"	"
4430			30	70	"	"
4432			10	90	"	"
4435			10	90	"	"
4437			10	90	"	"
4440			10	90	"	"
4442			100	"	"	"
4445			100	"	"	CLAYSTONE; A/R OLV SHALE LAM.



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1, COMPANY: MORSK HYDRO

DEPTH	PRE-PICKED LITH			ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION	
	DOC	LS T	SLSST			CLYST
4447				100	CLYST	CLAYSTONE; DK GRY, FRM, MICROMIC, FISS.
4450				100	"	"
4452				100	"	"
4455				"	"	"
4457				"	"	"
4460			20	80	"	"
4462			"	"	"	"
4465			"	"	"	"
4467			"	"	"	"
4470			"	"	"	"
4472			"	"	"	"
4475			"	"	"	"
4477			"	"	"	"
4480			"	"	"	"
4482			"	"	"	"
4485	SSS		"	"	"	"
4487	30	30	40	"	"	"
4490	70	30	TR	SLTST	SILTSTONE; BRN, OCC COY, SGT → FRM, FISS, MICROMIC, V. CALC	
4492	60	20	20	"	"	"
4495		20	80	CLYST	CLAYSTONE; A/A	
4497		40	60	"	"	"
4500		"	"	"	"	"
4502		30	70	"	"	"
4505		20	80	"	"	"
4507		"	"	"	"	"
4510		"	"	"	"	"
4512		"	"	"	"	"
4515		"	"	"	"	"
4517		10	90	"	"	"
4520		"	"	"	"	"
4522		"	"	"	"	"
4525		"	"	"	"	"
4527		"	"	"	"	"
4530		"	"	"	"	"
4532		"	"	"	"	"
4535		"	"	"	"	"
4537		"	"	"	"	"
4540		"	"	"	"	"
4542		"	"	"	"	"
4545		"	"	"	"	"
4547		"	"	"	"	"
4550		"	"	"	"	"
4552				100	"	"
4555			10	90	"	"
4557			"	"	"	"
4560			"	"	"	"
4562			20	80	"	"

} LIGNOSULPHATE MUD ADDITIVE CONTAMINATION

WELL: 2/12-1 , COMPANY: N.HYDRO

DEPTH	PRE-PICKED LITH				ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	Dol	SST	SLTST	CLYST		
4565			20	80	CLYST	CLAYSTONE; DK GY, FRM-HD, FISS,
4567			"	"	"	MICROMIC
4570			"	"	"	"
4572			"	"	"	"
4575			"	"	"	"
4578			"	"	"	"
4580			"	"	"	"
4582			"	"	"	"
4585		30	30	40	"	"
4587		70	30		SST	SILTSTONE; BRN, OCC GY, SFC OCC FRM, FISS
4590		60	20	20	"	MICROMIC
4592		40	20	40	CLYST	CLAYSTONE; A/A.
4595		50	72	50	"	"
4598		30	40	30	"	"
4600		10	20	70	"	"
4602		72	30	70	"	" GRADING SST
4605		20	72	80	"	"
4607		20		80	"	"
4610		80	10	10	"	"
4612		100	72	72	SST	SANDSTONE; LSE, CLR-milky wh, m-Fg, occ
4615		100	72	72	"	v Fg, sub ang - sub rnd, occ rnd, mod
4617		100			"	srted
4620		100	72	72	"	"
4622		100	72	72	"	"
4625		100			"	"
4627		100			"	"
4630		100			"	"
4632		100			"	"
RE#1 4634.76		100			"	SANDSTONE; CLR qtz, vF, subrnd-subang
36.89		100			"	hd-vhd, mod sph, w. srted, poor por
38.97		100			"	"
39.75		100			"	"
41.95		100			"	"
43.71		100			"	"
45.18		100			"	"
46.75		100			"	carb laminae
48.76	coal	100			"	carb. laminae
49.49	100				"	coal
50.19		100			"	carb laminae
CORE#2 52.72	100				coal	coal
55.38		100			"	"
57.39		100			"	"
58.28		100			coal	carb laminae
CORE#3 4662		100			SST	"
63.37	100		Shale		coal	coal
63.73			100		shale	sh; olv gy, mod hd non calc, silty, mica.
64.75			100		"	"



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1, COMPANY: NORSK HYDRO

DEPTH	PRE-PICKED LITH			ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION	
	DOL	LST	SLTST			CLYST
4566			20	80	CLYST	CLAYSTONE; DK GR, FAN-HO, FISS, MICROMIC
4567			20	80	"	"
4570			"	"	"	"
4572			"	"	"	"
4573			"	"	"	"
4577			"	"	"	"
4580			"	"	"	"
4582		SST	"	"	"	"
4585		30	30	40	"	"
4587		70	30		SLTST	SILTSTONE; BRN, OCC GR, SPT OCC FRM, FISS, MICROMIC
4590		60	20	20	"	"
4592		40	20	40	CLYST	CLAYSTONE; A/A
4595		50	TR	50	"	"
4597		30	40	30	"	"
4600		10	20	70	"	"
4602		TR	30	70	"	"
4605		20	TR	80	"	"
4607		20		80	"	" CARBNG → SLTST A/A.
4610		80	10	10		
4612		100	TR	TR		
4615		100	TR	TR		
4617		100				
4620		100	TR	TR	SST	NOT ANALYSED
4622		100	TR	TR		
4625		100				
4627		100	TR			
4630		100				
4632		100				
4635						
4637						
4640						
4642						
4645						
4647						
4650						
4652						
4655						
4657						
4660						



GEOCHEM ANALYSIS SAMPLE LITHOLOGY DATA

WELL: 2/12-1, COMPANY: N. HYDRO

CORE# 3

DEPTH	PRE-PICKED LITH				ANALYZED LITH	ANALYZED LITHOLOGY DESCRIPTION
	SST	CLYST	DOL	LST		
466.35					BRECCIA	dk olv gy, rdd + ang clsts in arg matrix.
67.09					Shale	Shale; dk olv gy, silty med hd, non
69.50					"	calc, micromic.
72.10					"	shale; grn gy, hd, silty, non calc, sl mica.
4675		10		90	LST	LIMESTONE; wh, occ wh gy, hd, blk, microorb.
4677		10		90	LST	occ grn chlorite?
4680			100		DOL	Dolomitic/LIMESTONE; grn brn, occ wh, hd, brit,
4682			100		DOL	blk, occ ang, mic orb, sucrosii
4685		10	90		CLYST	CLAYSTONE; dk gy, fm-mod hd, sbkky
4687	30	10	60		CLYST	plty, sl calc, loc w/ carb. specs.
4690	40	20	40		CLYST	
4692	30	30	40		CLYST	
4695					CLYST	CLAYSTONE a/c occ rd brn (not analysed)
4697	30	40	30			CLAYSTONE TOO FINELY DISEMINATED TO PICK.
4700	20	60	20		CLYST	a/c
4702			80	20	CLYST	
4705	100	R			SST	SANDSTONE; PALE PK-wh, sbkky, Fri, clr, trans
4707	100	R			CLYST.	a/c.