GEOCHEMICAL REPORT

NORWEGIAN GULF EXPLORATION A/S

35/8-3 (PLUS SIDETRACK)

NORTH SEA

NORWAY

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EXPLORATION LOGGING SERVICES

DECEMBER 1988

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INTRODUCTION

Geochemical analyses were performed on the Norwegian Gulf well 35/8-3, located in the northern North Sea, offshore Norway. Geochemical analyses were performed on the interval 900 - 3944m which included rocks of Eocene, Cretaceous and Jurassic age. The well bottomed in the Middle Jurassic, close to the base of the Brent Unit.

Analyses were performed on both the original hole and the sidetrack section; the respective depth intervals are as follows:

Original hole : 900 - 3557m
Sidetrack : 3390 - 3944m

ANALYTICAL PROGRAMME

Cuttings samples for geochemical analysis were collected at fifty mètre intervals to a depth of 2150m. Thereafter the interval was reduced to thirty metres, down to 3300m. From 3300m to total depth, cuttings samples were analysed at ten metre intervals. A set of sidewall cores from the Cretaceous - Jurassic section and conventional cores from the Ness Member were also analysed.

Following sample washing & preparation, the samples were submitted for Total Organic Carbon (TOC) determinations. This was followed by Rock Eval pyrolysis analysis where TOC values exceeded 0.5%. In total 194 TOC and 175 pyrolysis analyses were carried out. After inspection of these data, selected samples were submitted for visual kerogen analysis (including TAI) and vitrinite reflectance determinations. The vitrinite reflectance measurements were made on kerogen isolates.

RESULTS AND INTERPRETATION

ORGANIC FACIES

Rocks with good source potential were penetrated in two sections within the Jurassic. These horizons, which are described as organic facies II and V, approximate to the Kimmeridge Formation and Ness Member. Both facies have good to very good oil/gas generating potential. Generation of oil may have already been initiated in the Ness Member since all the data indicate it to be within the oil window. The Kimmeridge however, is less mature, being marginally mature with respect to oil generation. The lower part of the Heather Formation, described here as facies IV has some source potential, but is not as important as facies II or V.

ORGANIC FACIES I (900-3330M)

Facies I comprises rocks of predominantly Tertiary and Cretaceous age, together with the very uppermost part of the Kimmeridge Clay (as defined by initial strat data). Organic contents of most samples are poor to fair. TOC values range from 0.33 - 3.63%, but in general are less than 1.0 %. Analysis of the two sidewall cores at 3216 m and 3220 m shows the one narrow zone in the Turonian has high organic content (TOC 2.63 - 3.63 %).

Hydrocarbon generating potential is generally poor with most S2 values less than 1 mg/g. Only the two rich sidewall cores have significant generating potential (3.86 - 5.44mg HC/g rock). Hydrogen indices for all samples are generally below 100 mg HC/g TOC) therefore what potential these rocks have is to generate gas.

Vitrinite reflectance and pyrolysis Tmax values indicate the majority of this facies is immature. There has therefore been no reduction of source potential due to maturation.

Low temperature hydrocarbon yields (S1) indicate the presence of minor quantities of free hydrocarbons throughout the interval. The only indication of out of place hydrocarbons is the high S1 value of 1.71mg HC/g rock at 950 m. The high productivity index confirms the material is non-indigenous, though all indications are that if the material is migrated oil, the accumulation is small.

ORGANIC FACIES II (3340 - 3430M)

This section is largely Kimmeridgian, hence TOC values are very high (1.46 - 7.51%). Similarly, source potential is good to very good (S2 3.45 - 17.86mg HC/g). Hydrogen indices in this facies range between 136 & 360, most values being over 200, suggesting a oil and gas prone kerogen. Visual kerogen analysis shows that the organic matter is composed largely of amorphous kerogen (70 - 80 %) with lesser amounts of alginite, exinite, vitrinite, and inertinite. The fact that recognisable algal and exinite/vitrinite macerals are present indicates a mixed marine and terrestrial origin for the organic matter.

This section of the Kimmeridge is noticeably poorer in quality than seen in many parts of the North Sea, and does not appear to be strongly oil prone. As the section is presently only marginaly mature it is not thought that the potential of the section has been reduced by maturation.

Low temperature hydrocarbon yields (S1) indicate the presence of significant quantities of free hydrocarbons. Productivity indices are low, however, and therefore show that the higher S1 results are indigenous source rock bitumens associated with high organic matter levels and are not accumulated free hydrocarbons which have migrated into the interval.

ORGANIC FACIES III (3440 - 3630M)

The organic matter content of this section is reduced compared to the two facies both above and below. TOC values are predominantly fair although some sidewall cores have values as high as 6.88%. Source potential is poor to occasionally fair with most S2 values falling in the range 0.78 - 5.60 mg/g. The organically richer sidewall cores have good generating potential with S2 values as high as 11.96 mg/g. Hydrogen indices vary between 78 and 192; the rocks therefore have modest potential to generate mainly gas. Visual kerogen data indicate that the poor quality of the organic matter is certainly partly due to high inertinite contents (20-35%).

Pyrolysis Tmax data and vitrinite reflectance analysis indicate the samples are marginally mature. Like the overlying facies, the source potential of this interval will not have been reduced as a result of maturation.

ORGANIC FACIES IV (3640 - 3820M)

This facies is completely within the Heather Formation. Organic content is higher in this section, and is predominantly good (TOC 0.78 - 3.91, but mostly around 2.0%). Source potential is mostly fair (S2 0.25 - 5.50mg HC/g rock) with most samples in the 3 to 4 mg HC/g rock range. Hydrogen indices are largely around 200 at the top of the facies; however below 3730m these values drop to approximately 100. Hence the rocks are predominantly gas prone. Maturity data suggest that the samples range from marginally mature to the early stages of oil generation.

ORGANIC FACIES V (3830 - 3846M)

This section was entirely cored and is part of the Ness Member of the Brent Unit. Cuttings data suggest the organic character of this facies is similar to the overlying facies IV. However, analysis of core samples shows that some horizons extremely rich in organic matter exist. The organic matter content of the core samples is good to excellent (TOC 0.97 - 27.26%). Similarly the source potential is good to excellent (maximum S2 - 58.72 mg HC/g rock). Hydrogen indices for the section are generally around 200 (120 - 285) and suggest a mixed gas/oil prone kerogen. The visual kerogen data for the core sample at 3843.5m are particulary interesting as they show the kerogen is composed totally of fluorescing vitrinite. This type of vitrinite, termed desmocollinite, is thought to have potential to generate oil or condensate in addition to gas. The higher quality of the organic matter in these rocks is therefore due to the presence of good quality terrestrial material, rather than the inclusion of marine organic matter.

Vitrinite reflectance data are of particularly good quality in this interval due to the abundance of vitrinite. These data indicate the rocks are in the early stages of the oil window (%Ro 0.68).

As in the other organic-rich sections, low temperature hydrocarbon yields (S1) indicate the presence of significant quantities of free hydrocarbons. Transformation indices are generally low and show that the high S1 values obtained are due to local generation of bitumens, associated with high organic matter levels and are not accumulated free hydrocarbons which have migrated into the section.

ORGANIC FACIES VI (3848 - 3944M)

This facies shows a reduction in organic matter content relative to the overlying facies , although it must be considered this interval has not been investigated as thoroughly as the overlying facies.

TOC values are very variable, ranging from 0.18 % to 4.18 % in sidewall core samples. Cuttings data also indicate the presence of both organic rich and organic lean layers, with TOC values ranging from 0.59 % to 2.70 %.

Source potential is poor to rarely fair (0.38 - 3.46 mg HC/g rock). Hydrogen indices are also low, commonly being below 130, indicating the rocks are only capable of generating modest amounts of gas.

All the maturity data indicate the samples are in the early stages of oil generation. Although generation may have been initiated, there will have been no significant reduction of source potential as a result of maturation.

THERMAL MATURITY

In this well, thermal maturity has been established primarily by vitrinite reflectance, spore and pollen colour analysis and kerogen fluorescence, and secondarily by pyrolysis Tmax.

Samples from 900m to 2050m are shown to be immature by all available maturation indices. Maturation in the interval from 2220m to 3120m is harder to assess. Vitrinite reflectance and spore colour data suggest that these samples are marginally mature with respect to oil generation. we question this for two reasons: i) reflectance and TAI values, and especially fluorescence intensity reveal the interval subjacent to this to be only moderately immature to moderately mature, thus establishing a reverse gradient. Such an occurrence could be explained only by a reverse fault, a localised heat source, reworking, or oxidation. The first two possibilities are not common in the North Sea and the second two are; and ii) pyrolysis Tmax values give every indication of continuing immaturity within this interval. It is therefore thought that re-working and/or oxidation has affected some optical maturity data.

A maturation gradient established using all reflectance data outside of the questionable interval indicates that the top of the oil window (based on an Ro of 0.6%) exists at about 3300m to 3400m. This is generally confirmed by pyrolysis Tmax data.

CONCLUSIONS

There are three zones of particular geochemical interest within the Norwegian Gulf well 35/8-3. These are the Kimmeridge Clay Formation, the lower part of the Heather Formation and the Ness Member.

Facies II, generally the Kimmeridge Clay, has high organic richness and good source potential. The organic matter in this Kimmeridge section shows contributions from both marine and terrestrial precursors and is oil and gas prone. At its present level of maturity it is marginally mature with respect to oil generation.

Facies IV in the lower part of the Heather Formation has moderate richness but is primarily gas prone. While this zone is not as rich as either the Kimmeridge or the Ness, the section is much thicker and therefore it's overall potential is quite important.

Facies V, which is only 16m thick, is within the Ness Member of the Brent Unit. Organically this facies is extremely rich and has very good source potential. Organic matter appears primarily of terrestrial origin and appears to be capable of generating oil/condensate in addition to gas. Maturity data suggest that this facies is within the early stages of oil generation.

The maturity profile derived from vitrinite reflectance, spore and pollen colour analysis, kerogen fluorescence and pyrolysis Tmax suggests that the oil window is reached at around 3400m. The data remains borderline for some distance. By 3800m it seems that the stage of early oil generation has been reached.

No significant amounts of migrated hydrocarbons were noted in the well, except for some possibe small traces in the Upper Eocene sand. Free hydrocarbons were noted in the Kimmeridge Clay Formation and the Ness Member but these are thought to be merely indigenous source rock bitumens associated with the (large) amounts of organic matter

STRATIGRAPHY

The following geological tops were supplied by Norwegian Gulf Exploration A/S, by fax on October 21st 1988:-

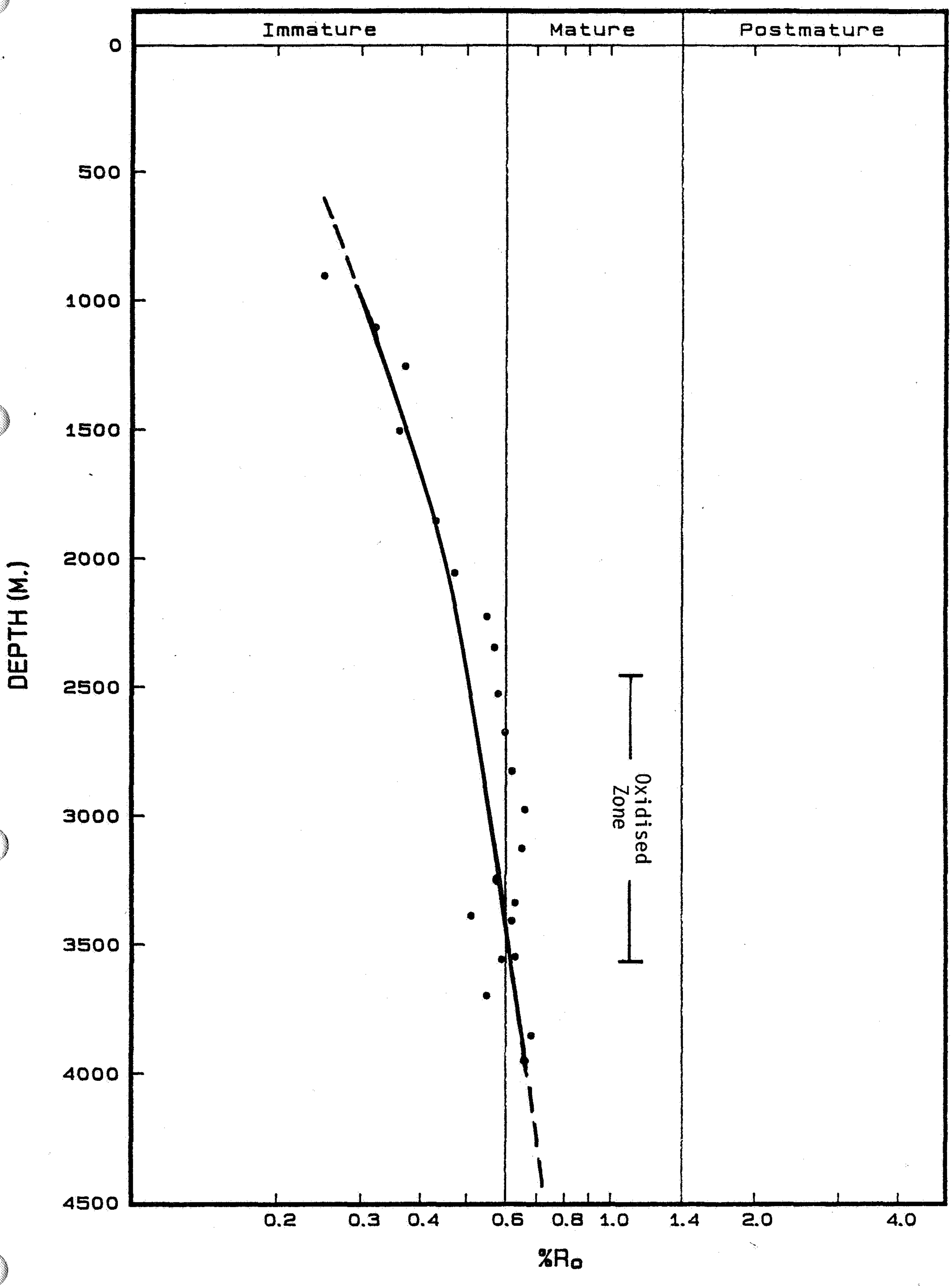
Top Upper Eocene Sand	990m
Top Lower Eocene Sand	1240m
Top Cretaceous	1789m
Top Turonian	2840m
Top Kimmeridge Clay	3315m
Top Heather Sand	3440m
Base Heather Sand	3537m
Top Brent Sand	3810m

TENTATIVE TOPS

Tarbert Member	3810m
Ness Member	3824m
Etive Member	3848m
Rannoch Member	3891m
"Rannoch Shale"	3920m

At the time they were supplied, these tops still had to be confirmed by further Palaeo work.

THERMAL MATURITY PROFILE



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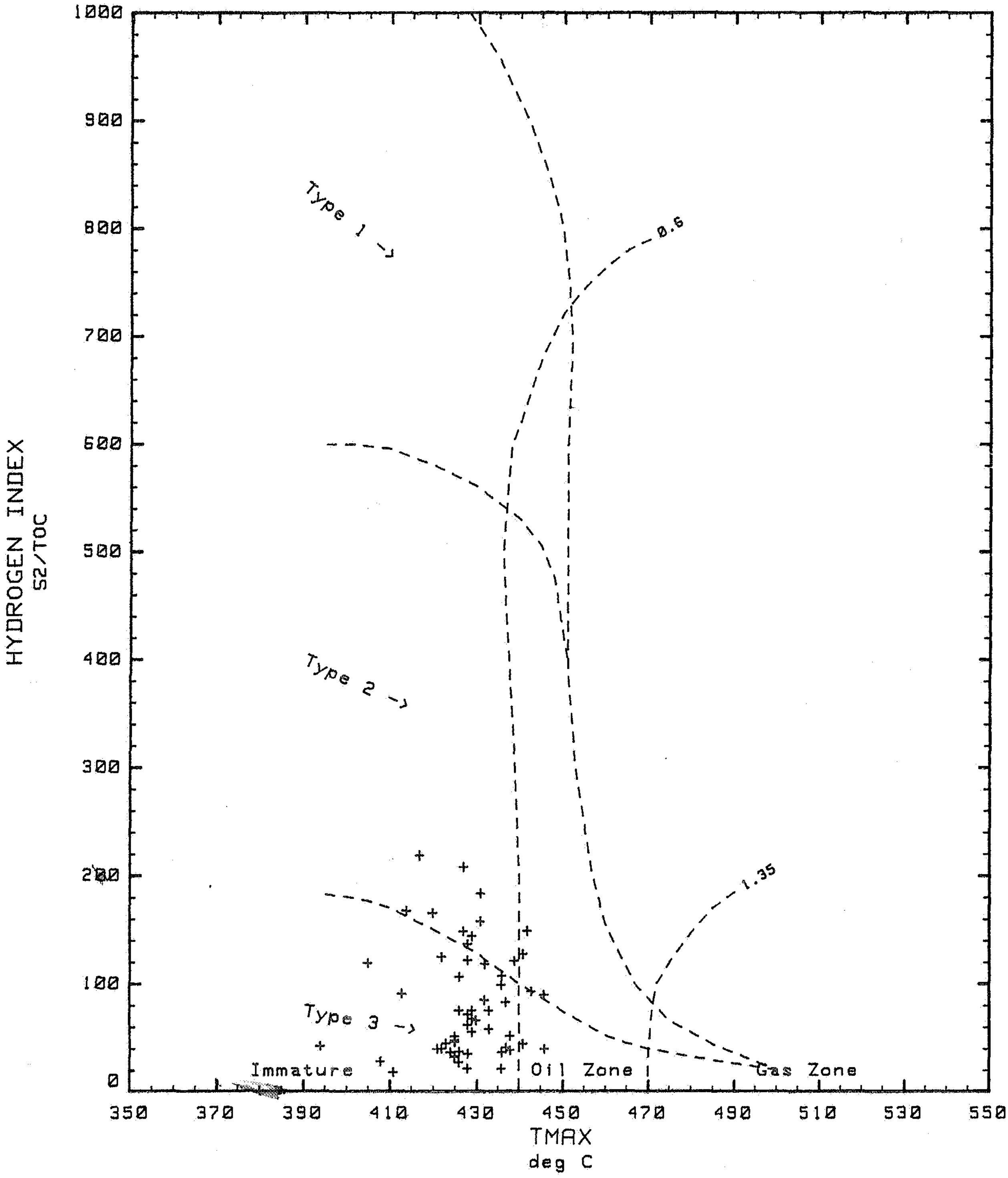
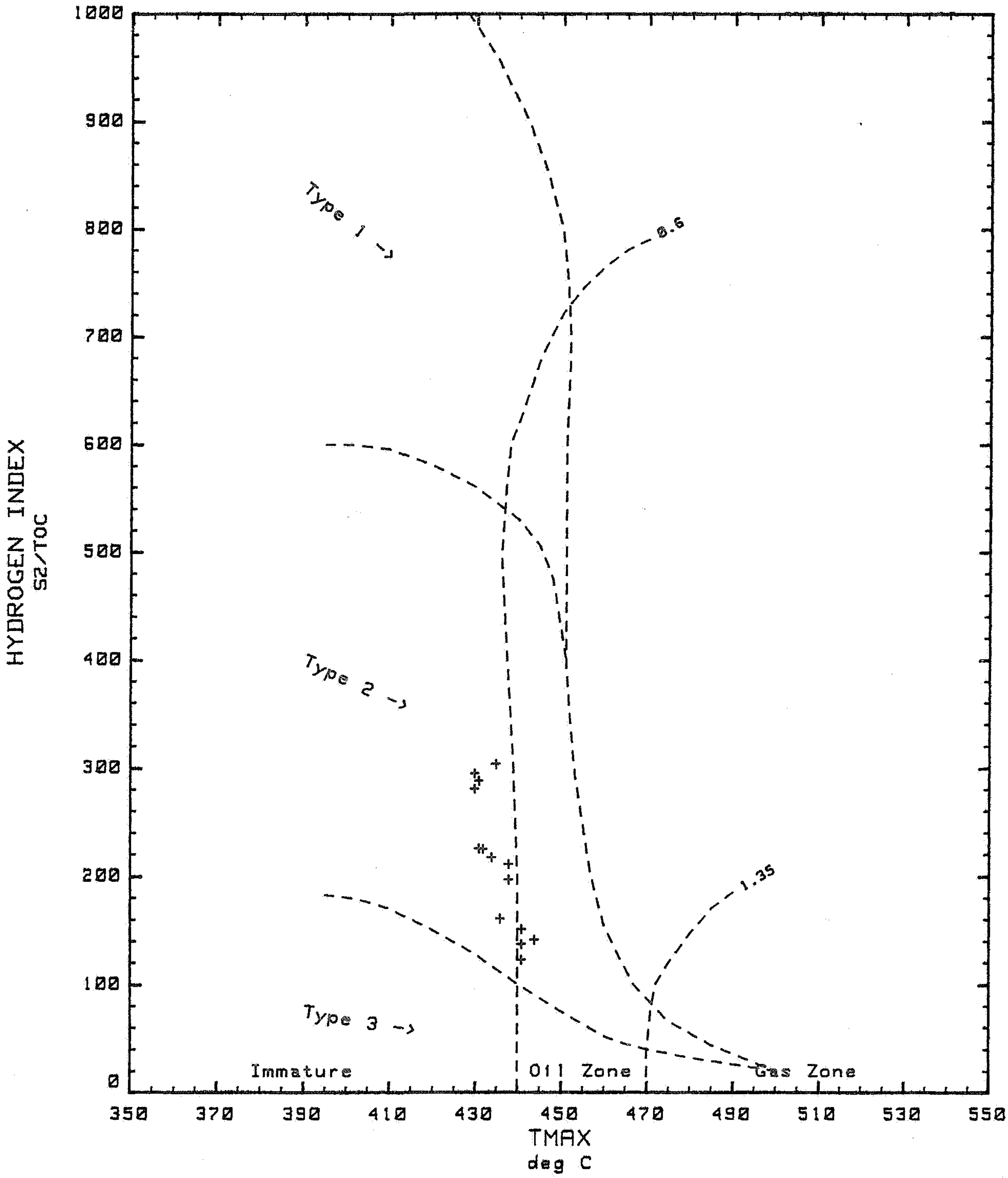
PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3

900 to 3330 m

9 Dec 1988



PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3
3340 to 3430 m
9 Dec 1988



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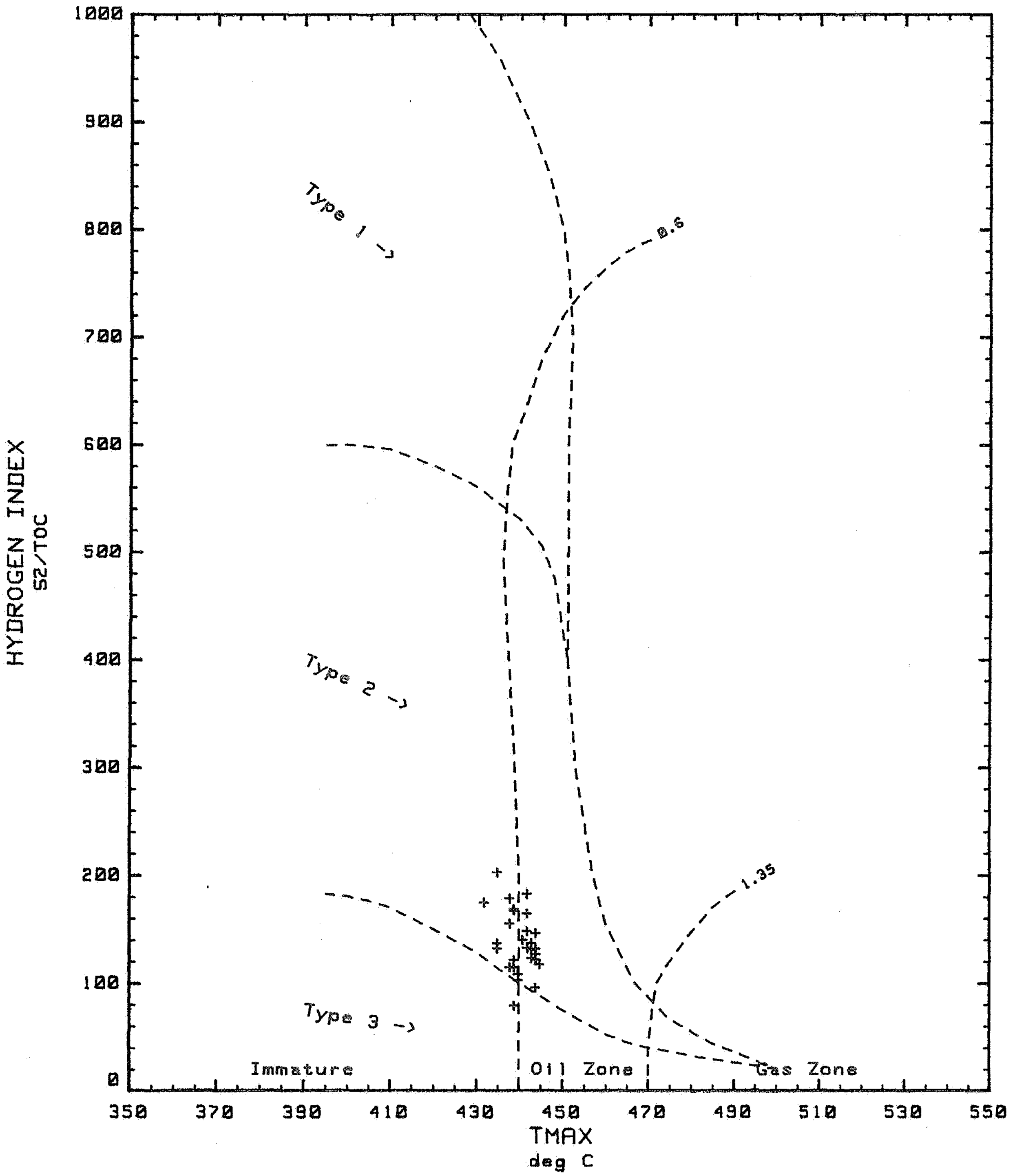
PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3 ORIGINAL HOLE & SIDETRACK

3440 to 3630 m

9 Dec 1988



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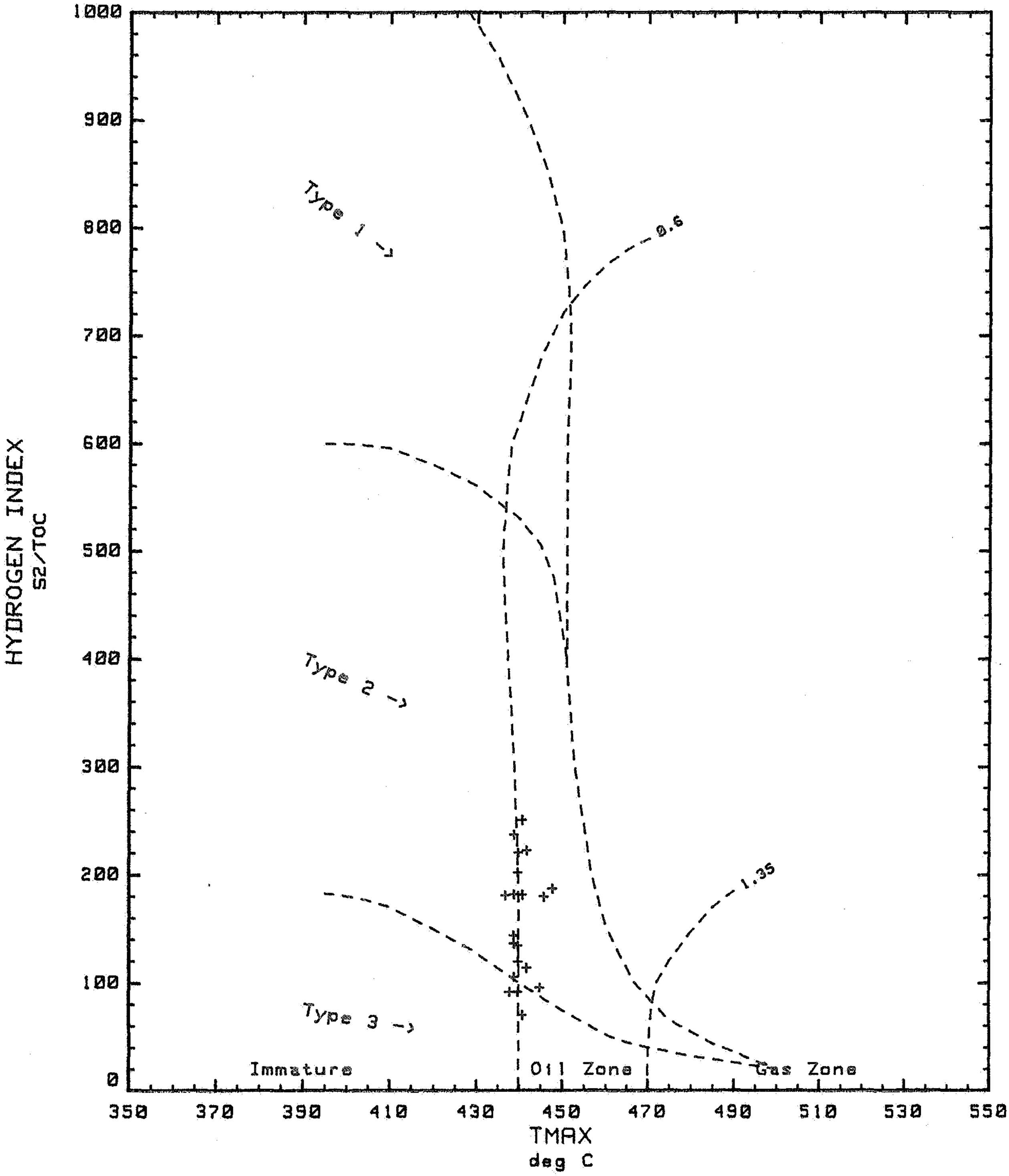
PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3 (SIDETRACK)

3640 to 3820 m

13 Dec 1988



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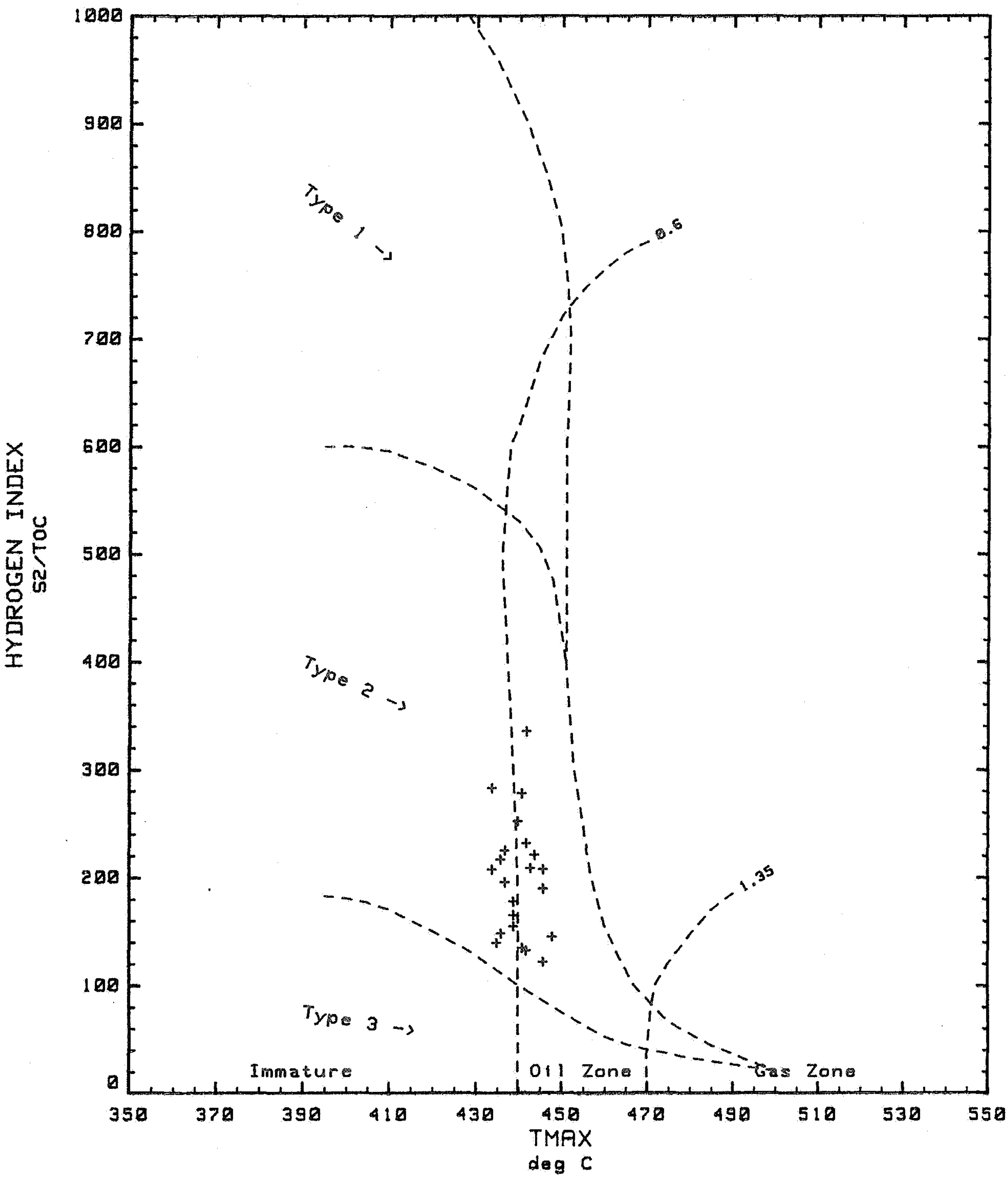
PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3 (SIDETRACK)

3830 to 3848 m

13 Dec 1988



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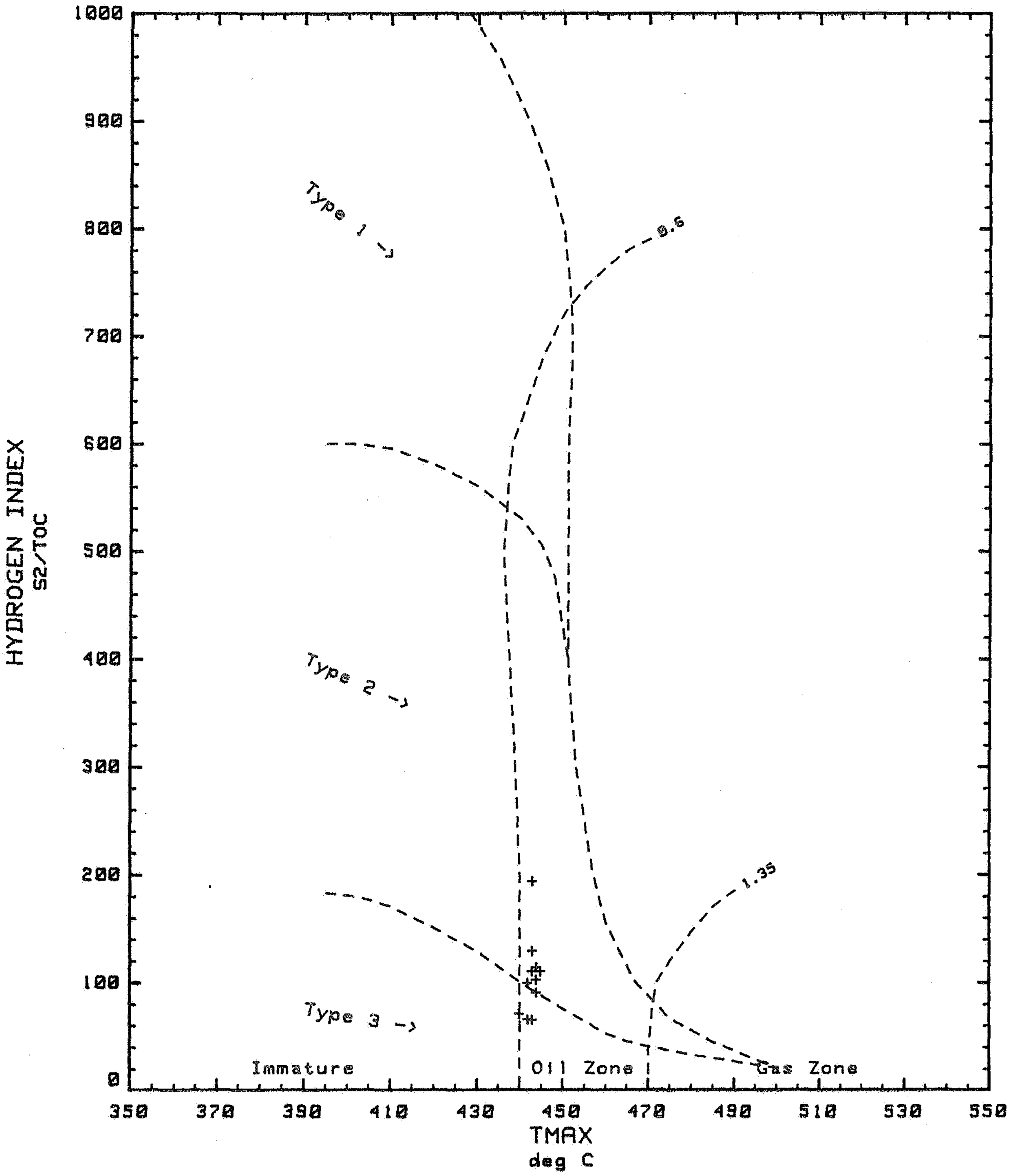
PYRO-ANALYSIS CROSS PLOT
HYDROGEN INDEX vs TMAX
35/8-3 (SIDETRACK)
3848 to 3944 m
13 Dec 1988



APPENDIX I ANALYTICAL DATA TABLES

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO
WELL : 35/8-3

Printed at : 11:49
: 15 Dec 1988

	SOURCE BED EVALUATION							FREE HYDROCARBS	
DEPTH m	TOC %wt	S2 mg/g	T Max deg C	S2/S3 H:O	S2/TOC HI	S3/TOC OI	S3 mg/g	S1 mg/g	S1/(S1+S2)
Cuttings Samples									
900.0	1.67	2.56	417	1.1	153	139	2.32	.51	.17
950.0	1.34	2.92	417	2.0	218	107	1.44	1.71	.37
1000.0	1.58	2.60	420	1.7	165	94	1.49	.90	.26
1050.0	.78	1.30	414	1.4	167	122	.95	.50	.28
1100.0	1.34	1.66	422	1.4	124	89	1.19	.59	.26
1150.0	.98	1.33	428	1.5	136	89	.87	.56	.30
1200.0	.49	0.00	0	0.0	0	0	0.00	0.00	0.00
1250.0	.81	1.48	431	2.0	183	91	.74	.28	.16
1300.0	.40	0.00	0	0.0	0	0	0.00	0.00	0.00
1350.0	.51	.93	0	1.8	182	104	.53	.74	.44
1400.0	.36	0.00	0	0.0	0	0	0.00	0.00	0.00
1450.0	.43	0.00	0	0.0	0	0	0.00	0.00	0.00
1500.0	.78	1.15	427	1.1	147	140	1.09	.37	.24
1550.0	.44	0.00	0	0.0	0	0	0.00	0.00	0.00
1600.0	.36	0.00	0	0.0	0	0	0.00	0.00	0.00
1650.0	.61	.54	446	1.0	89	92	.56	.14	.21
1700.0	.58	.91	431	1.8	157	88	.51	.18	.17
1750.0	.74	.78	426	1.0	105	105	.78	.24	.24
1800.0	.33	0.00	0	0.0	0	0	0.00	0.00	0.00
1850.0	.63	.76	428	.5	121	256	1.61	.16	.17
1900.0	.69	.81	432	.4	117	291	2.01	.24	.23
1950.0	.60	.76	441	.5	127	238	1.43	.13	.15
2000.0	.39	0.00	0	0.0	0	0	0.00	0.00	0.00
2050.0	.51	.73	429	.3	143	453	2.31	.23	.24
2100.0	.59	.71	439	.3	120	393	2.32	.24	.25
2150.0	.66	.78	405	.3	118	412	2.72	.49	.39
2174.0	.68	.61	413	.2	90	390	2.65	.42	.41
2190.0	.60	.26	0	.1	43	413	2.48	.14	.35
2220.0	.58	.28	0	.1	48	412	2.39	.14	.33
2250.0	.54	.18	0	.1	33	424	2.29	.10	.36
2280.0	.70	.27	421	.1	39	380	2.66	.09	.25
2310.0	.77	.47	428	.1	61	431	3.32	.16	.25
2340.0	.96	.64	429	.4	67	190	1.82	.17	.21
2370.0	.85	.60	428	.3	71	247	2.10	.13	.18
2400.0	.92	.50	429	.3	54	174	1.60	.12	.19
2430.0	.75	.49	430	.2	65	393	2.95	.11	.18
2460.0	.67	.50	433	.2	75	428	2.87	.10	.17
2490.0	.64	.29	425	.1	45	334	2.14	.07	.19
2520.0	.68	.32	425	.1	47	322	2.19	.10	.24
2550.0	.75	.33	423	.1	44	323	2.42	.13	.28

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO — Printed at : 13:34
WELL : 35/8-3 — : 15 Dec 1988

DEPTH m	SOURCE BED EVALUATION TOC %wt	S2 mg/g	T Max deg C	S2/S3 H:O	S2/TOC HI	S3/TOC OI	S3 mg/g	FREE HYDROCARBS S1 mg/g	S1/(S1+S2)
Cuttings Samples									
2580.0	.62	.16	0	.1	26	382	2.37	.10	.38
2610.0	.64	.11	411	.1	17	170	1.09	.08	.42
2640.0	.66	.18	408	.1	27	253	1.67	.09	.33
2670.0	.69	.27	422	.2	39	223	1.54	.12	.31
2700.0	.77	.24	425	.1	31	243	1.88	.08	.25
2730.0	.92	.33	424	.2	36	226	2.09	.11	.25
2760.0	.99	.26	426	.1	26	198	1.96	.09	.26
2790.0	.73	.15	428	.1	20	244	1.79	.07	.32
2820.0	.88	.30	428	.1	34	256	2.25	.09	.23
2850.0	.72	.23	425	.1	32	260	1.87	.07	.23
2881.0	.41	0.00	0	0.0	0	0	0.00	0.00	0.00
2910.0	.83	.30	426	.1	36	262	2.18	.10	.25
2940.0	.66	.12	0	.1	18	255	1.67	.06	.33
2970.0	.49	0.00	0	0.0	0	0	0.00	0.00	0.00
3000.0	.48	0.00	0	0.0	0	0	0.00	0.00	0.00
3030.0	.59	.30	438	.2	51	259	1.52	.11	.27
3060.0	.64	.23	436	.1	36	277	1.78	.07	.23
3090.0	.76	.44	433	.3	58	208	1.59	.10	.19
3120.0	.77	.31	437	.2	40	184	1.42	.07	.18
3150.0	.78	.34	441	.2	44	210	1.64	.06	.15
3180.0	.62	.24	446	.1	39	450	2.79	.08	.25
3210.0	.95	.36	438	.2	38	193	1.83	.08	.18
3240.0	1.10	.90	437	.4	82	188	2.06	.10	.10
3270.0	.82	.61	426	.2	74	393	3.23	.12	.16
3300.0	.62	.61	436	.3	98	340	2.11	.09	.13
3310.0	.50	.37	429	.3	74	229	1.14	.08	.18
3320.0	.76	.70	443	.4	92	233	1.77	.12	.15
3330.0	.86	1.28	442	1.0	148	147	1.27	.13	.09
3340.0	3.42	12.34	433	17.9	361	20	.69	1.29	.09
3350.0	3.85	11.64	435	18.2	303	17	.64	1.41	.11
3360.0	3.21	9.44	430	8.3	294	36	1.14	1.43	.13
3370.0	2.60	5.45	438	7.5	210	28	.73	.74	.12
3380.0	2.86	6.20	434	8.2	216	27	.76	1.05	.14
3390.0	3.21	7.19	432	6.1	224	36	1.17	1.32	.16
3400.0	4.55	8.90	438	7.9	196	25	1.12	1.51	.15
3410.0	3.47	4.22	441	2.8	122	44	1.53	1.01	.19
3420.0	3.79	5.32	444	3.7	140	38	1.43	1.25	.19
3430.0	3.45	4.71	441	3.9	136	35	1.22	1.14	.19
3440.0	1.34	1.99	433	2.8	149	54	.72	.58	.23
3450.0	.76	.89	445	1.6	117	72	.55	.26	.23

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

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Printed at : 13:45
: 15 Dec 1988

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Cuttings Samples									
3460.0	1.53	1.98	443	2.6	130	49	.75	.59	.23
3470.0	.84	1.17	441	2.3	139	61	.51	.29	.20
3480.0	.45	0.00	0	0.0	0	0	0.00	0.00	0.00
3490.0	1.08	1.81	439	3.5	168	48	.52	.32	.15
3500.0	1.01	1.49	442	2.4	147	60	.61	.28	.16
3510.0	1.21	2.19	442	5.0	182	37	.44	.51	.19
3520.0	.85	1.16	443	2.9	136	47	.40	.38	.25
3530.0	.99	1.25	444	4.3	126	29	.29	.36	.22
3540.0	1.51	1.83	444	2.5	121	48	.73	.48	.21

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EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO
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Printed at : 14:10
: 15 Dec 1988

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2180.5	.31	0.00	0	0.0	0	0	0.00	0.00	0.00
2207.5	.78	.40	0	.8	51	63	.49	.08	.17
2230.0	.59	.10	0	.2	17	75	.44	.04	.29
2312.5	.76	.34	0	.8	45	57	.43	.07	.17
2353.0	.83	.17	436	.3	21	67	.55	.07	.29
2406.0	.97	.49	425	.6	50	92	.89	.15	.23
2448.5	.97	.82	432	.9	84	96	.93	.19	.19
2536.5	.60	.11	0	.1	18	236	1.43	.11	.50
2800.5	.30	0.00	0	0.0	0	0	0.00	0.00	0.00
3055.0	.49	0.00	0	0.0	0	0	0.00	0.00	0.00
3097.5	.69	.24	0	.2	35	176	1.22	.21	.47
3216.2	2.63	5.44	427	20.9	207	10	.26	.26	.05
3220.0	3.63	3.86	436	4.4	106	24	.87	.28	.07
3275.0	.77	.32	0	.3	42	130	1.00	.33	.51
3353.5	3.88	10.85	430	19.0	280	15	.57	1.68	.13
3388.0	6.22	17.86	431	38.0	287	8	.47	2.42	.12
3393.5	7.51	16.87	431	56.2	225	4	.30	3.51	.17
3401.0	3.18	5.09	436	5.6	160	29	.91	1.29	.20
3463.0	6.88	11.96	432	18.4	174	9	.65	2.66	.18
3511.0	3.82	6.36	439	6.0	167	28	1.06	1.25	.16
3548.0	4.53	9.14	435	12.0	202	17	.76	1.22	.12
3557.0	6.68	8.05	439	8.5	120	14	.95	1.29	.14

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO   Printed at : 10:12
WELL : 35/8-3 (SIDETRACK)   : 15 Dec 1988

DEPTH m	TOC %wt	S2 mg/g	T Max deg C	S2/S3 H:O	S2/TOC HI	S3/TOC OI	S3 mg/g	S1 mg/g	S1/(S1+S2)
	SOURCE BED EVALUATION							FREE HYDROCARBS	
Cuttings Samples									
3380.0	1.46	3.45	442	1.4	236	168	2.46	.56	.14
3410.0	3.72	5.60	441	8.5	150	18	.66	1.28	.19
3450.0	1.62	2.13	435	4.3	131	30	.49	.55	.21
3460.0	2.03	2.76	435	7.7	136	18	.36	.77	.22
3470.0	1.17	2.07	438	2.7	178	66	.77	.81	.28
3500.0	.46	0.00	0	0.0	0	0	0.00	0.00	0.00
3530.0	1.12	1.84	442	5.9	164	28	.31	.64	.26
3540.0	1.35	1.65	443	4.6	122	27	.36	.50	.23
3550.0	2.32	3.04	444	5.3	131	25	.57	.68	.18
3560.0	2.47	2.81	439	4.0	114	29	.71	.52	.16
3570.0	1.44	2.23	438	.7	154	217	3.13	.52	.19
3580.0	1.79	2.36	442	.7	132	186	3.33	.57	.19
3590.0	1.99	1.88	444	.5	95	186	3.70	.46	.20
3600.0	1.27	1.29	440	.3	102	367	4.65	.33	.20
3610.0	1.00	1.14	438	.4	114	290	2.90	.37	.25
3620.0	.94	1.01	440	.5	107	212	2.00	.35	.26
3630.0	1.00	.78	439	.2	78	369	3.69	.27	.26
3640.0	1.73	3.46	440	2.6	201	77	1.32	.73	.17
3650.0	1.90	3.82	440	3.0	201	67	1.27	.82	.18
3660.0	2.14	4.71	440	3.5	220	62	1.33	.91	.16
3670.0	1.98	4.39	442	4.1	222	54	1.06	.87	.17
3680.0	1.44	3.61	441	2.1	250	116	1.68	.77	.18
3690.0	1.84	3.32	441	1.9	181	96	1.76	.71	.18
3700.0	2.06	4.87	439	2.9	236	83	1.70	1.10	.18
3710.0	2.27	4.11	439	2.0	181	92	2.10	.84	.17
3720.0	2.19	3.95	437	2.2	180	82	1.79	.84	.18
3730.0	1.94	2.77	439	1.6	143	88	1.71	.65	.19
3740.0	1.96	2.33	440	1.1	119	108	2.12	.52	.18
3750.0	2.13	1.93	440	1.1	91	81	1.73	.60	.24
3760.0	3.91	5.30	439	1.7	136	80	3.11	.86	.14
3770.0	2.11	2.82	440	1.4	134	98	2.07	.64	.18
3780.0	2.07	2.16	439	1.0	105	106	2.19	.59	.21
3790.0	3.03	2.75	438	.9	91	103	3.11	.66	.19
3800.0	3.69	3.35	440	1.1	91	84	3.11	.80	.19
3810.0	2.15	1.49	441	.6	69	120	2.58	.45	.23
3820.0	.78	.88	442	1.1	113	104	.81	.36	.29
3830.0	1.18	1.49	441	1.7	126	75	.88	.48	.24
3840.0	2.12	2.83	441	2.2	133	61	1.29	.63	.18
3850.0	1.15	1.30	444	1.3	113	85	.98	.17	.12
3860.0	.76	.68	444	1.3	89	68	.52	.11	.14
3870.0	2.70	3.46	443	7.1	128	18	.49	.31	.08
3880.0	1.12	2.16	443	9.4	193	21	.23	.22	.09
3890.0	.59	.58	442	.6	98	176	1.04	.11	.16
3900.0	.85	.93	445	1.5	109	75	.64	.13	.12
3910.0	1.01	1.10	443	1.4	109	81	.81	.14	.11
3920.0	.59	.38	443	.5	64	130	.77	.07	.16
3930.0	.96	.62	442	.5	65	127	1.22	.08	.11
3940.0	1.91	1.33	440	.5	70	127	2.42	.07	.05
3944.0	1.85	1.88	444	1.2	101	83	1.54	.22	.10

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO — Printed at : 10:33
WELL : 35/8-3 (SIDETRACK) — : 15 Dec 1988

	SOURCE BED EVALUATION							FREE HYDROCARBS	
DEPTH m	TOC %wt	S2 mg/g	T Max deg C	S2/S3 H:O	S2/TOC HI	S3/TOC OI	S3 mg/g	S1 mg/g	S1/(S1+S2)
Core Samples									
3830.0	4.75	13.53	440	29.4	285	10	.46	2.04	.13
3831.0	3.01	8.49	434	70.8	282	4	.12	.73	.08
3831.5	1.62	1.95	446	3.2	120	38	.61	.37	.16
3832.0	1.47	2.12	448	11.2	144	13	.19	.34	.14
3833.0	2.28	4.02	439	13.9	177	13	.29	.70	.15
3833.5	6.63	18.34	441	43.7	277	6	.42	2.06	.10
3834.5	1.88	2.60	435	1.4	138	102	1.91	.64	.20
3835.0	3.56	6.93	437	4.2	194	46	1.64	1.17	.14
3835.5	1.55	2.03	442	2.7	131	48	.75	.43	.17
3836.0	2.65	4.35	439	11.4	164	14	.38	.69	.14
3836.5	3.19	4.69	436	16.8	147	9	.28	.85	.15
3837.5	4.21	8.68	434	11.9	206	17	.73	1.43	.14
3838.0	1.05	1.61	439	3.4	154	46	.48	.36	.18
3838.5	3.78	8.72	442	33.5	231	7	.26	1.05	.11
3839.0	5.02	11.03	444	58.1	220	4	.19	1.47	.12
3839.5	3.49	11.65	442	58.3	334	6	.20	1.38	.11
3840.5	4.75	9.81	446	37.7	206	5	.26	1.02	.09
3841.0	14.74	30.59	443	82.7	208	3	.37	3.54	.10
3842.5	13.99	31.34	437	61.5	224	4	.51	4.50	.13
3843.5	27.26	58.72	436	57.6	215	4	1.02	8.31	.12
3844.0	1.22	2.30	446	2.9	189	64	.78	.29	.11
3845.0	.97	1.83	446	10.8	188	17	.17	.33	.15
3846.0	5.82	14.62	440	38.5	251	7	.38	2.42	.14

EXLOG

EXPLORATION LOGGING GEOCHEMICAL DATA PRINT

FOR : NORWEGIAN GULF EXPLORATION CO
WELL : 35/8-3 (SIDETRACK)

Printed at : 14:41
: 20 Dec 1988

	SOURCE BED EVALUATION							FREE HYDROCARBS	
DEPTH m	TOC %wt	S2 mg/g	T Max deg C	S2/S3 H:O	S2/TOC HI	S3/TOC OI	S3 mg/g	S1 mg/g	S1/(S1+S2)
Sidewall Core Samples									
3575.0	2.60	3.78	444	4.8	145	30	.78	.65	.15
3750.0	2.57	4.80	448	15.5	187	12	.31	.94	.16
3775.0	3.07	5.50	446	8.2	179	22	.67	1.16	.17
3800.0	3.46	3.28	445	.5	95	179	6.21	1.01	.24
3818.5	0.00	.25	0	.8	0	0	.30	.47	.65
3850.0	0.00	.38	0	.4	0	0	.89	1.24	.77
3856.5	0.00	.60	0	1.9	0	0	.32	1.64	.73
3862.0	0.00	.18	0	2.6	0	0	.07	.80	.82
3868.0	.18	0.00	0	0.0	0	0	0.00	0.00	0.00
3884.0	.47	0.00	0	0.0	0	0	0.00	0.00	0.00
3886.0	.23	0.00	0	0.0	0	0	0.00	0.00	0.00
3896.5	.31	0.00	0	0.0	0	0	0.00	0.00	0.00
3930.0	1.59	0.00	0	0.0	0	0	0.00	0.00	0.00
3940.0	4.18	0.00	0	0.0	0	0	0.00	0.00	0.00
3942.0	.73	0.00	0	0.0	0	0	0.00	0.00	0.00

Due to lack of sample material TOC determinations were performed at 3818.5 - 3862.0m, and pyrolysis at 3930 - 3942.0m

Sidewall core data

Please note that some of the samples received were extremely small. Hence, in some cases it was not possible to perform both pyrolysis and TOC determinations.

VISUAL KEROGEN ANALYSIS

Depth (m)	Thermal Maturity %Ro	Thermal Maturity TAI	Kerogen Description (% Composition) Amorphous	Alginite	Exinite	Vitrinite	Inertinite	Amount Fluor-escing (%)	Remarks
900	0.25	1.4	90	10	tr	tr	tr	100	
1100	0.32	1.6	85	10	tr	tr	tr	95	
1250	0.37	1.6	85	10	tr	tr	tr	95	
1500	0.36	1.8	65	5	10	5	15	80	
1650	-	2.0	75	tr	5	5	15	80	
1850	0.43	2.0	tr	80	5	10	55	35	

VISUAL KEROGEN ANALYSIS

Depth (m)	Thermal Maturity %Ro	TAI	Kerogen Description (% Composition) Amorphous	Alginite	Exinite	Vitrinite	Inertinite	Amount Fluor-escing (%)	Remarks
2050	0.47	2.0	5	5	10	5	75	20	Vitrinite particles are strongly oxidised
2220	0.55 (?)	2.0	70	10	tr	5	15	10	Abnormally high reflectance values may reflect oxidation
2340	0.57 (?)	2.2	15	20	tr	10	55	20	As above
2520	0.58 (?)	2.2	tr	30	tr	tr	70	30	Abnormally high reflectance values may reflect oxidation
2670	0.60	2.2	5	10	5	tr	80	15	As above
2820	0.62	2.2	tr	25	5	5	65	25	Kerogen is slightly oxidised, reflectance values may not reflect the actual level of maturity

VISUAL KEROGEN ANALYSIS

Depth (m)	Thermal Maturity %Ro	TAI	Kerogen Description (% Composition) Amorphous	Alginite	Exinite	Vitrinite	Inertinite	Amount Fluor-escing (%)	Remarks
2970	0.66 (?)	2.2	70	10	tr	tr	30	10	Abnormally high reflectance values may reflect oxidation
3120	0.65 (?)	2.2	tr	15	tr	tr	85	15	Kerogen is strongly oxidised, reflectance may overestimate actual degree of maturity
3240	0.58	2.2	15	15	5	tr	65	20*	*Observations obscurred by contamination
3330	0.63	-	-	-	-	-	-	-	Sample consists almost entirely of out of place material, either cavings or lignite additive
3380	0.51	2.2	80	5	5	tr	10	90	
3400	0.62	2.2	70	10	tr	5	15	80	

VISUAL KEROGEN ANALYSIS

Depth (m)	Thermal Maturity %Ro	Thermal Maturity TAI	Kerogen Description (% Composition) Amorphous	Alginite	Exinite	Vitrinite	Inertinite	Amount Fluor-escing (%)	Remarks
3540	0.63	-	60	5*	0	10	30	35	*Severly degraded, identification uncertain. Spores/pollen absent; kerogen colour and fluorescence suggest a TAI equivalent ranging from 2.0 - 2.2
3550	0.59	2.2	30	5	15	15	35	20	
3690	0.55	2.2	90	5	tr	5	tr	95	
3843.5	0.68	2.2	0	0	tr	100*	tr	100	*Strongly fluorescent desmocollinite; may have a greater liquid hydrogen generation capacity than more typical vitrinite
3944	0.66	2.4	60	10*	5	15	10	70	*Severely degraded; identifcation uncertain

Vitrinte Reflectance Summary Chart

Sample Number	Depth (m)	No. of Readings	Standard Deviation	Minimum (%Ro)	Maximum (%Ro)	Average (%Ro)
88081 - 001	900	45	0.051	0.15	0.35	0.25*
		5	0.040	0.41	0.52	0.46
88081 - 002	1100	31	0.044	0.24	0.40	0.32*
88081 - 003	1250	50	0.055	0.20	0.47	0.37*
88081 - 004	1500	50	0.039	0.28	0.43	0.36*
88081 - 005	1650	2	-	0.24	0.34	0.29
		3	0.012	0.55	0.58	0.57
88081 - 006	1850	14	0.062	0.33	0.52	0.43*
		2	-	0.67	0.71	0.69
88081 - 007	2050	19	0.049	0.40	0.57	0.47*
		11	0.065	0.60	0.80	0.68
88081 - 008	2220	16	0.041	0.48	0.64	0.55*
		9	0.040	0.65	0.80	0.73
88081 - 009	2340	5	0.029	0.29	0.37	0.34
		48	0.058	0.42	0.64	0.57*
		7	0.077	0.73	0.97	0.79
88081 - 010	2520	6	0.053	0.26	0.39	0.34
		59	0.087	0.41	0.72	0.58*
		5	0.045	0.77	0.91	0.83
88081 - 011	2670	37	0.060	0.45	0.74	0.60*
		4	0.050	0.81	0.94	0.86
88081 - 012	2820	57	0.084	0.46	0.78	0.62*
		3	0.005	0.84	0.85	0.85
88081 - 013	2970	3	0.017	0.35	0.39	0.37
		25	0.104	0.45	0.82	0.66*
		2	-	0.97	1.08	1.03
88081 - 014	3120	18	0.076	0.52	0.79	0.65*
		17	0.106	0.82	1.20	0.96
88081 - 015	3240	48	0.079	0.43	0.74	0.58*
		12	0.059	0.75	0.92	0.81

*Denotes vitrinite population interpreted as indigenous

Vitrinte Reflectance Summary Chart

Sample Number	Depth (m)	No. of Readings	Standard Deviation	Minimum (%Ro)	Maximum (%Ro)	Average (%Ro)
88081 - 016	3330	25	0.056	0.27	0.49	0.39
		39	0.067	0.50	0.77	0.63*
		6	0.062	0.80	0.96	0.87
88081 - 019	3380	48	0.056	0.39	0.63	0.51*
		12	0.065	0.65	0.86	0.73
88081 - 017	3400	7	0.017	0.38	0.43	0.40
		59	0.093	0.45	0.79	0.62*
		4	0.019	0.84	0.89	0.87
88081 - 018	3540	60	0.059	0.51	0.77	0.63*
88081 - 020	3550	60	0.065	0.44	0.71	0.59*
88081 - 021	3690	60	0.073	0.42	0.72	0.55*
88081 - 022	3843.5	43	0.037	0.33	0.53	0.45
		37	0.058	0.55	0.81	0.68*
88081 - 023	3944	13	0.061	0.24	0.43	0.34
		67	0.091	0.46	0.82	0.66*

* Denotes vitrinite population interpreted as indigenous

APPENDIX II

VITRINITE REFLECTANCE HISTOGRAMS

AND ORDERED REFLECTANCE VALUES

VITRINITE REFLECTANCE HISTOGRAMS

NORWEGIAN GULF 35/8-3

```
      ----------------------------------------------------------------------------
      [    X                                                [                     ]
      [    X                                                [ DEPTH:   900        ]
      [    X                                                [                     ]
      [   XX                                                [ POP.    N  MEAN Ro  ]
      [   XX                                                [ (1)    45     0.25* ]
  10%+    XX                                                [ (2)     5     0.46  ]
      [  XXXX                                               [                     ]
      [  XXXX                                               [                     ]
      [  XXXX                                               [                     ]
      [  XXXXX000                                           [                     ]
      +----+----+----+----+----+----+----+----+----+----+----+---------------------
      [      X                                              [                     ]
      [     XX                                              [ DEPTH:   1100       ]
      [     XX                                              [                     ]
      [    XXX                                              [ POP.    N  MEAN Ro  ]
      [    XXX                                              [ (1)    31     0.32* ]
  16%+     XXX                                              [                     ]
      [    XXX                                              [                     ]
      [    XXX                                              [                     ]
      [    XXX                                              [                     ]
      [   XXXXX                                             [                     ]
      +----+----+----+----+----+----+----+----+----+----+----+---------------------
      [       X                                             [                     ]
      [       X                                             [ DEPTH:   1250       ]
R     [       X                                             [                     ]
E     [      XX                                             [ POP.    N  MEAN Ro  ]
L     [      XX                                             [ (1)    50     0.37* ]
A 10%+       XX                                             [                     ]
T     [     XXX                                             [                     ]
I     [     XXX                                             [                     ]
V     [    XXXX                                             [                     ]
E     [   XXXXXX                                            [                     ]
      +----+----+----+----+----+----+----+----+----+----+----+---------------------
F     [     X                                               [                     ]
R     [     X                                               [ DEPTH:   1500       ]
E     [    XX                                               [                     ]
Q     [    XX                                               [ POP.    N  MEAN Ro  ]
U     [    XX                                               [ (1)    50     0.36* ]
E 10%+      XXX                                             [                     ]
N     [     XXX                                             [                     ]
C     [     XXX                                             [                     ]
Y     [     XXX                                             [                     ]
      [    XXXX                                             [                     ]
      +----+----+----+----+----+----+----+----+----+----+----+---------------------
      [                                                     [                     ]
      [                                                     [ DEPTH:   1650       ]
      [                                                     [                     ]
      [                                                     [ POP.    N  MEAN Ro  ]
      [                                                     [ (1)     2     0.29  ]
 N/A+                                                       [ (2)     3     0.57  ]
      [                                                     [                     ]
      [         0                                           [                     ]
      [         0                                           [                     ]
      [   0 0   0                                           [                     ]
      -----+----+----+----+----+----+----+----+----+----+----+---------------------
      [                                                     [                     ]
      [                                                     [ DEPTH:   1850       ]
      [                                                     [                     ]
      [                                                     [ POP.    N  MEAN Ro  ]
      [                                                     [ (1)    14     0.43* ]
  31%+        X                                             [ (2)     2     0.69  ]
      [       X X                                           [                     ]
      [      XX X                                           [                     ]
      [      XX X                                           [                     ]
      [     XXXXX  00                                       [                     ]
      -----+----+----+----+----+----+----+----+----+----+----+---------------------
     0.0       0.5       1.0       1.5       2.0       2.5

                      REFLECTANCE (%Ro)
```

Where less than 10 measurements are present in the modal class width,
absolute frequency is graphed.

X denotes readings interpreted as indigenous.
* - indigenous population

VITRINITE REFLECTANCE HISTOGRAMS

```
        +----+----+----+----+----+----+----+----+----+----+----------------------
        [                                                 [                     ]
        [                                                 [ DEPTH:  2050        ]
        [       X                                         [                     ]
        [       X                                         [ POP.   N  MEAN Ro   ]
        [       X                                         [ (1)   19    0.47*   ]
     16%+       XX  0                                     [ (2)   11    0.68    ]
        [       XXX 0                                     [                     ]
        [       XXX 0                                     [                     ]
        [       XXXX000                                   [                     ]
        [       XXXX00000                                 [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
        [                                                 [                     ]
        [                                                 [ DEPTH:  2220        ]
        [                                                 [                     ]
        [                                                 [ POP.   N  MEAN Ro   ]
        [          X  0                                   [ (1)   16    0.55*   ]
     20%+         XX  0                                   [ (2)    9    0.73    ]
        [         XX  0                                   [                     ]
        [         XXX 0                                   [                     ]
        [        XXXX 0                                   [                     ]
        [        XXXX0000                                 [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
        [          XX                                     [                     ]
        [          XX                                     [ DEPTH:  2340        ]
   R    [          XX                                     [                     ]
   E    [          XX                                     [ POP.   N  MEAN Ro   ]
   L    [          XX                                     [ (1)    5    0.34    ]
   A 8% +          XX                                     [ (2)   48    0.57*   ]
   T    [          XX                                     [ (3)    7    0.79    ]
   I    [         XXX                                     [                     ]
   V    [         XXX                                     [                     ]
   E    [    000XXXXX 000  0                              [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
   F    [          X                                      [                     ]
   R    [          X                                      [ DEPTH:  2520        ]
   E    [          X                                      [                     ]
   Q    [          X                                      [ POP.   N  MEAN Ro   ]
   U    [          X                                      [ (1)    6    0.34    ]
   E 7% +          XXXX                                   [ (2)   59    0.58*   ]
   N    [         XXXXX                                   [ (3)    5    0.83    ]
   C    [       XXXXXXX                                   [                     ]
   Y    [       XXXXXXX                                   [                     ]
   .    [    000XXXXXXX00 0                               [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
        [           X                                     [                     ]
        [           X                                     [ DEPTH:  2670        ]
        [           X                                     [                     ]
        [           X                                     [ POP.   N  MEAN Ro   ]
        [          XX                                     [ (1)   37    0.60*   ]
     12%+          XX                                     [ (2)    4    0.86    ]
        [         XXXX                                    [                     ]
        [         XXXX                                    [                     ]
        [         XXXX                                    [                     ]
        [        XXXXXX 000                               [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
        [           XX                                    [                     ]
        [           XX                                    [ DEPTH:  2820        ]
        [           XX                                    [                     ]
        [           XX                                    [ POP.   N  MEAN Ro   ]
        [          XXX                                    [ (1)   57    0.62*   ]
      8% +       X XXXX                                   [ (2)    3    0.85    ]
        [        X XXXX                                   [                     ]
        [        XXXXXX                                   [                     ]
        [        XXXXXXX                                  [                     ]
        [        XXXXXXX00                                [                     ]
        +----+----+----+----+----+----+----+----+----+----+----------------------
       0.0       0.5       1.0       1.5       2.0       2.5

                     REFLECTANCE (%Ro)
```

Where less than 10 measurements are present in the modal class width, absolute frequency is graphed.

X denotes readings interpreted as indigenous.
* - indigenous population

VITRINITE REFLECTANCE HISTOGRAMS

```
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [                                                  [                     ]
     [            X                                     [ DEPTH:  2970        ]
     [            X                                     [                     ]
     [            X                                     [ POP.    N  MEAN Ro  ]
     [            X                                     [ (1)     3     0.37  ]
  16%+            X                                     [ (2)    25     0.66* ]
     [            X X                                   [ (3)     2     1.03  ]
     [      0     X X                                   [                     ]
     [      0 XXXXXXXX                                  [                     ]
     [      0 XXXXXXXX  0 0                             [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [                                                  [                     ]
     [                                                  [ DEPTH:  3120        ]
     [                                                  [                     ]
     [                                                  [ POP.    N  MEAN Ro  ]
     [                                                  [ (1)    18     0.65* ]
  14%+           X      0                               [ (2)    17     0.96  ]
     [           X X    0                               [                     ]
     [          XXXX  0 0                               [                     ]
     [          XXXXX00000 0                            [                     ]
     [         XXXXXX00000 0 0                          [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [         X                                        [                     ]
     [         X  X                                     [ DEPTH:  3240        ]
R    [         XXXX                                     [                     ]
E    [         XXXX                                     [ POP.    N  MEAN Ro  ]
L    [         XXXX 0                                   [ (1)    48     0.58* ]
A 8% +         XXXX 0                                   [ (2)    12     0.81  ]
T    [         XXXX 0                                   [                     ]
I    [        XXXXX 0                                   [                     ]
V    [        XXXXXX0                                   [                     ]
E    [       XXXXXXX0000                                [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
F    [          X                                       [                     ]
R    [          X                                       [ DEPTH:  3330        ]
E    [          X                                       [                     ]
Q    [          X                                       [ POP.    N  MEAN Ro  ]
U    [          XXX                                     [ (1)    25     0.39  ]
E 7% +       0  XXX                                     [ (2)    39     0.63* ]
N    [     000  XXX                                     [ (3)     6     0.87  ]
C    [     0000 XXXX                                    [                     ]
Y    [     0000XXXXX 0                                  [                     ]
     [    00000XXXXXX00 0                               [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [        X                                         [                     ]
     [        X                                         [ DEPTH:  3380        ]
     [        X X                                       [                     ]
     [        X X                                       [ POP.    N  MEAN Ro  ]
     [        XXX                                       [ (1)    48     0.51* ]
  8% +        XXX                                       [ (2)    12     0.73  ]
     [        XXX                                       [                     ]
     [       XXXX                                       [                     ]
     [       XXXX 00                                    [                     ]
     [      XXXXXX00000                                 [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [           X                                      [                     ]
     [           X                                      [ DEPTH:  3400        ]
     [           X                                      [                     ]
     [           X                                      [ POP.    N  MEAN Ro  ]
     [         X X                                      [ (1)     7     0.40  ]
  7% +         XXX X                                    [ (2)    59     0.62* ]
     [        XXXXXXX                                   [ (3)     4     0.87  ]
     [        XXXXXXX                                   [                     ]
     [      00XXXXXXX 0                                 [                     ]
     [      00XXXXXXXX00                                [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
    0.0       0.5       1.0       1.5       2.0       2.5

                       REFLECTANCE (%Ro)
```

Where less than 10 measurements are present in the modal class width, absolute frequency is graphed.

X denotes readings interpreted as indigenous.
* - indigenous population

VITRINITE REFLECTANCE HISTOGRAMS

```
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [           X                                      [                     ]
     [           X                                      [ DEPTH:  3540        ]
     [           XX                                     [                     ]
     [           XX                                     [ POP.    N  MEAN Ro  ]
     [          XXX                                     [ (1)    60     0.63* ]
 8%  +          XXX                                     [                     ]
     [          XXX                                     [                     ]
     [          XXX                                     [                     ]
     [         XXXXX                                    [                     ]
     [         XXXXXX                                   [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [          XX                                      [                     ]
     [          XX                                      [ DEPTH:  3550        ]
     [          XX                                      [                     ]
     [          XXX                                     [ POP.    N  MEAN Ro  ]
     [          XXX                                     [ (1)    60     0.59* ]
 8%  +         XXXX                                     [                     ]
     [         XXXX                                     [                     ]
R    [         XXXX                                     [                     ]
E    [        XXXXX                                     [                     ]
L    [       XXXXXXX                                    [                     ]
A    +----+----+----+----+----+----+----+----+----+----+-----------------------
T    [         X                                        [                     ]
I    [         X                                        [ DEPTH:  3690        ]
V    [         X                                        [                     ]
E    [         X                                        [ POP.    N  MEAN Ro  ]
     [         XX                                       [ (1)    60     0.55* ]
F 8% +        XXXX                                      [                     ]
R    [        XXXX                                      [                     ]
E    [        XXXXX                                     [                     ]
Q    [       XXXXXX                                     [                     ]
U    [       XXXXXXX                                    [                     ]
E    +----+----+----+----+----+----+----+----+----+----+-----------------------
N    [                                                  [                     ]
C    [        0                                         [ DEPTH:  3843.5      ]
Y    [        0                                         [                     ]
     [        0                                         [ POP.    N  MEAN Ro  ]
     [       00     X                                   [ (1)    43     0.45  ]
 6%  +       00     X                                   [ (2)    37     0.68* ]
     [       00     X                                   [                     ]
     [       00  XXX                                    [                     ]
     [       000 XXX                                    [                     ]
     [     0 000XXXXXX                                  [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
     [             X                                    [                     ]
     [             X                                    [ DEPTH:  3944        ]
     [           XXX                                    [                     ]
     [           XXX                                    [ POP.    N  MEAN Ro  ]
     [           XXX                                    [ (1)    13     0.34  ]
 6%  +          XXXX                                    [ (2)    67     0.66* ]
     [         XXXXXX                                   [                     ]
     [         XXXXXX                                   [                     ]
     [    0000 XXXXXXX                                  [                     ]
     [   00000XXXXXXXX                                  [                     ]
     +----+----+----+----+----+----+----+----+----+----+-----------------------
    0.0       0.5       1.0       1.5       2.0       2.5

                   REFLECTANCE (%Ro)
```

Where less than 10 measurements are present in the modal class width, absolute frequency is graphed.

X denotes readings interpreted as indigenous.
* - indigenous population

ORDERED REFLECTANCE VALUES

DEPTH: 900

0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.20	0.20	0.20
0.21	0.21	0.21	0.22	0.22	0.22	0.23	0.23	0.24	0.24
0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.27
0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.31	0.31	0.31
0.32	0.33	0.33	0.34	0.35	0.41	0.43	0.46	0.49	0.52

DEPTH: 1100

0.24	0.25	0.25	0.26	0.27	0.27	0.28	0.28	0.29	0.30
0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.33	0.33	0.35
0.35	0.35	0.35	0.36	0.37	0.37	0.37	0.38	0.38	0.39
0.40									

DEPTH: 1250

0.20	0.27	0.27	0.28	0.29	0.30	0.31	0.33	0.33	0.33
0.34	0.34	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.36
0.36	0.36	0.37	0.37	0.37	0.38	0.38	0.39	0.39	0.40
0.40	0.40	0.40	0.41	0.42	0.42	0.42	0.42	0.42	0.43
0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.45	0.47

DEPTH: 1500

0.28	0.28	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32
0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.34	0.34
0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.36
0.36	0.36	0.36	0.37	0.37	0.37	0.38	0.38	0.39	0.40
0.40	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.43	0.43

DEPTH: 1650

0.24	0.34	0.55	0.57	0.58

DEPTH: 1850

0.33	0.35	0.37	0.39	0.40	0.41	0.41	0.43	0.44	0.45
0.50	0.52	0.52	0.52	0.67	0.71				

DEPTH: 2050

0.40	0.41	0.42	0.42	0.42	0.42	0.43	0.43	0.48	0.49
0.49	0.49	0.49	0.50	0.50	0.51	0.52	0.55	0.57	0.60
0.61	0.63	0.64	0.64	0.66	0.66	0.70	0.74	0.78	0.80

DEPTH: 2220

0.48	0.49	0.50	0.52	0.53	0.53	0.54	0.55	0.55	0.55
0.56	0.56	0.58	0.60	0.60	0.64	0.65	0.70	0.73	0.73
0.73	0.73	0.74	0.78	0.80					

ORDERED REFLECTANCE VALUES

DEPTH: 2340

0.29	0.34	0.34	0.37	0.37	0.42	0.42	0.44	0.46	0.46
0.49	0.50	0.50	0.51	0.53	0.54	0.54	0.55	0.55	0.55
0.55	0.55	0.56	0.57	0.58	0.58	0.58	0.58	0.59	0.59
0.59	0.59	0.59	0.59	0.59	0.60	0.61	0.61	0.61	0.61
0.61	0.61	0.61	0.61	0.62	0.62	0.62	0.63	0.63	0.63
0.64	0.64	0.64	0.73	0.74	0.75	0.76	0.77	0.81	0.97

DEPTH: 2520

0.26	0.28	0.32	0.38	0.39	0.39	0.41	0.42	0.43	0.44
0.44	0.45	0.45	0.47	0.47	0.48	0.49	0.50	0.51	0.52
0.52	0.52	0.54	0.54	0.55	0.55	0.55	0.56	0.56	0.56
0.56	0.56	0.56	0.57	0.57	0.57	0.57	0.58	0.58	0.59
0.60	0.60	0.61	0.61	0.62	0.63	0.64	0.64	0.65	0.65
0.66	0.68	0.68	0.68	0.68	0.68	0.70	0.70	0.70	0.70
0.70	0.71	0.71	0.71	0.72	0.77	0.82	0.83	0.83	0.91

DEPTH: 2670

0.45	0.50	0.51	0.52	0.52	0.54	0.54	0.55	0.56	0.57
0.57	0.58	0.59	0.59	0.59	0.59	0.60	0.60	0.60	0.60
0.60	0.60	0.60	0.61	0.61	0.61	0.63	0.64	0.64	0.65
0.65	0.66	0.66	0.68	0.69	0.72	0.74	0.81	0.83	0.87
0.94									

DEPTH: 2820

0.46	0.46	0.47	0.47	0.48	0.49	0.49	0.51	0.53	0.53
0.53	0.53	0.55	0.55	0.56	0.56	0.57	0.57	0.57	0.58
0.59	0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.62	0.62
0.63	0.63	0.64	0.64	0.65	0.66	0.66	0.66	0.67	0.67
0.68	0.68	0.68	0.69	0.69	0.69	0.69	0.70	0.70	0.71
0.71	0.73	0.73	0.73	0.76	0.77	0.78	0.84	0.85	0.85

DEPTH: 2970

0.35	0.36	0.39	0.45	0.47	0.50	0.50	0.55	0.57	0.61
0.63	0.65	0.65	0.65	0.65	0.66	0.66	0.67	0.68	0.69
0.71	0.73	0.75	0.78	0.79	0.79	0.82	0.82	0.97	1.08

DEPTH: 3120

0.52	0.56	0.57	0.59	0.60	0.60	0.60	0.61	0.62	0.67
0.67	0.68	0.70	0.71	0.72	0.73	0.79	0.79	0.82	0.83
0.85	0.86	0.87	0.91	0.93	0.95	0.95	0.95	0.96	0.98
1.02	1.03	1.11	1.14	1.20					

ORDERED REFLECTANCE VALUES

DEPTH: 3240

0.43	0.44	0.45	0.46	0.46	0.49	0.50	0.50	0.52	0.52
0.52	0.52	0.52	0.53	0.53	0.54	0.54	0.55	0.56	0.56
0.56	0.56	0.56	0.57	0.58	0.59	0.60	0.60	0.60	0.63
0.63	0.63	0.64	0.64	0.64	0.65	0.65	0.65	0.66	0.66
0.66	0.67	0.68	0.69	0.69	0.71	0.74	0.74	0.75	0.75
0.76	0.76	0.77	0.77	0.79	0.82	0.84	0.88	0.90	0.92

DEPTH: 3330

0.27	0.31	0.31	0.33	0.33	0.34	0.34	0.37	0.37	0.38
0.38	0.39	0.39	0.41	0.41	0.42	0.43	0.43	0.44	0.44
0.45	0.45	0.45	0.47	0.49	0.50	0.53	0.54	0.55	0.55
0.55	0.55	0.56	0.57	0.58	0.58	0.58	0.59	0.59	0.59
0.59	0.60	0.61	0.61	0.62	0.62	0.62	0.62	0.63	0.64
0.66	0.67	0.67	0.68	0.68	0.68	0.69	0.69	0.71	0.73
0.73	0.73	0.75	0.77	0.80	0.82	0.84	0.86	0.95	0.96

DEPTH: 3380

0.39	0.40	0.40	0.42	0.44	0.44	0.45	0.45	0.45	0.46
0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.49	0.49
0.49	0.49	0.50	0.51	0.51	0.52	0.52	0.52	0.52	0.52
0.53	0.54	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56
0.56	0.57	0.57	0.58	0.58	0.59	0.62	0.63	0.65	0.65
0.66	0.69	0.71	0.71	0.72	0.73	0.79	0.80	0.80	0.86

DEPTH: 3400

0.38	0.39	0.39	0.41	0.41	0.42	0.43	0.45	0.45	0.46
0.48	0.49	0.49	0.50	0.51	0.52	0.53	0.53	0.53	0.54
0.54	0.54	0.55	0.56	0.56	0.57	0.57	0.59	0.59	0.59
0.60	0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.62	0.62
0.62	0.62	0.63	0.64	0.64	0.65	0.65	0.65	0.67	0.68
0.69	0.70	0.70	0.71	0.73	0.73	0.73	0.73	0.74	0.76
0.77	0.77	0.78	0.79	0.79	0.79	0.84	0.87	0.88	0.89

DEPTH: 3540

0.51	0.51	0.53	0.54	0.54	0.56	0.56	0.57	0.57	0.57
0.58	0.58	0.58	0.59	0.59	0.59	0.59	0.60	0.60	0.60
0.62	0.62	0.62	0.62	0.62	0.62	0.63	0.63	0.63	0.63
0.63	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.65
0.65	0.66	0.66	0.66	0.67	0.67	0.68	0.68	0.68	0.68
0.69	0.69	0.69	0.70	0.72	0.74	0.74	0.75	0.76	0.77

ORDERED REFLECTANCE VALUES

DEPTH: 3550

0.44	0.44	0.46	0.47	0.47	0.49	0.51	0.52	0.54	0.54
0.54	0.54	0.54	0.54	0.55	0.55	0.56	0.56	0.56	0.56
0.56	0.57	0.57	0.58	0.58	0.58	0.59	0.59	0.59	0.59
0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.62	0.62	0.62
0.62	0.63	0.64	0.64	0.64	0.64	0.65	0.65	0.66	0.66
0.66	0.67	0.67	0.67	0.67	0.68	0.69	0.69	0.70	0.71

DEPTH: 3690

0.42	0.42	0.42	0.44	0.44	0.46	0.46	0.46	0.46	0.47
0.48	0.49	0.49	0.49	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.52	0.52	0.52	0.52	0.53	0.53	0.53	0.53	0.53
0.54	0.54	0.55	0.56	0.56	0.56	0.56	0.56	0.57	0.57
0.58	0.58	0.59	0.59	0.60	0.61	0.62	0.62	0.62	0.63
0.63	0.63	0.63	0.65	0.65	0.67	0.68	0.68	0.69	0.72

DEPTH: 3843.5

0.33	0.40	0.40	0.40	0.41	0.41	0.42	0.42	0.43	0.43
0.43	0.43	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45
0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.47
0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.49	0.50	0.52
0.52	0.52	0.53	0.55	0.55	0.56	0.61	0.61	0.62	0.62
0.63	0.63	0.64	0.65	0.65	0.66	0.67	0.68	0.69	0.69
0.69	0.69	0.70	0.70	0.70	0.70	0.71	0.71	0.71	0.72
0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.75	0.77	0.81

DEPTH: 3944

0.24	0.25	0.29	0.29	0.31	0.31	0.33	0.36	0.36	0.39
0.40	0.43	0.43	0.46	0.48	0.50	0.50	0.50	0.51	0.51
0.52	0.54	0.55	0.55	0.56	0.57	0.57	0.58	0.59	0.59
0.60	0.60	0.60	0.60	0.61	0.61	0.62	0.62	0.62	0.63
0.63	0.63	0.65	0.65	0.65	0.66	0.67	0.68	0.68	0.69
0.69	0.69	0.69	0.69	0.70	0.70	0.70	0.70	0.71	0.71
0.71	0.71	0.72	0.72	0.73	0.73	0.73	0.74	0.74	0.75
0.76	0.77	0.78	0.78	0.78	0.79	0.80	0.80	0.81	0.82

APPENDIX III

GEOCHEMICAL EVALUATION LOGS