

EXXON PRODUCTION RESEARCH COMPANY

16/7-2 WELL, NORWAY:
HYDROCARBON SOURCE ANALYSES OF CANNED CUTTINGS

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Research Application Report

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RESERVOIR EVALUATION DIVISION

M. A. ROGERS
MANAGER

August 23, 1982

Esso Exploration and Production Norway Inc.
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Attn: Mr. J. D. Hedberg

Transmitted are three copies of our report, EPR.181ES.82 entitled "16/7-2 Well, Norway: Hydrocarbon Source Analyses of Canned Cuttings" by R. E. Metter.

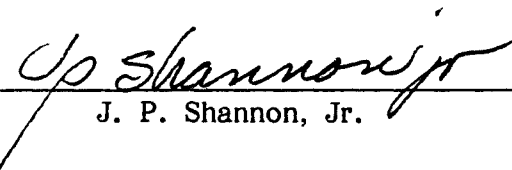
The work discussed in this report was requested in your February 15, 1982 Telex from D. L. Walters for J. N. Thomas. Charges for the work have been billed through our Job No. 16377.

The section at 16/7-2 is rated as immature down through the Triassic. Any reserves of gas in Tertiary sands most likely are not of Tertiary origin.

Some notable potential oil sources were penetrated, even though they are currently immature. The Jurassic shales appear to be typical of Malm oil source beds elsewhere in the North Sea, and some shales from the Miocene and Oligocene are quite rich in oil-prone organic materials. The Permian samples are of special interest for they included some shales that are rated as good, mature sources of oil and gas.

If you have questions regarding these results, please let us know.

M. A. ROGERS

by 
J. P. Shannon, Jr.

REM:sp

Attachment

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EXXON PRODUCTION RESEARCH COMPANY

16/7-2 WELL, NORWAY:
HYDROCARBON SOURCE ANALYSES OF CANNED CUTTINGS

R. E. Metter

Reservoir Evaluation Division

August 1982

EPR.181ES.82

Charges for this work were specifically authorized by Esso Exploration and Production Norway, Inc., and are not covered by production research agreements with Exxon Production Research Company.

16/7-2 WELL, NORWAY:
HYDROCARBON SOURCE ANALYSES OF CANNED CUTTINGS

R. E. Metter

SUMMARY AND CONCLUSIONS

Forty-nine canned cuttings samples from the interval 1250-3146 meters were analyzed routinely for hydrocarbon source characteristics. The results are given in Tables 1 through 8 and in Figures 1 through 26.

The analytical data can be interpreted as follows:

<u>Depth (meters)</u>	<u>Unit</u>	<u>Maturity</u>	<u>Richness</u>	<u>Source Type when Mature</u>
1250	Miocene	Immature	Rich	Oil
1287-1694	Oligocene	"	Rich to Good	Oil
1700	Eocene	"	Good	Gas, Liquids
2204-2470(?)	Paleocene	"	Marginal	Gas, Liquids
2470(?) - 2579	Cretaceous	"	Poor	Minor Gas
2579-2692	Jurassic	"	Good to Rich	Oil
2692-2968	Triassic	"	Poor to Marginal	Minor Gas, Oil
2968-3010	Permo-Trias	"	Fair	Gas, Liquids
3010-3146 T.D.	Permian	<u>Mature</u>	Gray Shales Fair to Good	Oil, Gas

The section is immature through most, if not all, of the Triassic interval. Thus, although the Jurassic shales appear to be typical of much of the prolific oil-prone Malm of the U.K. North Sea, there is little likelihood that they have yet generated much oil in the immediate area of 16/7-2. The rich, oil-prone shales in the Miocene and Oligocene intervals have generated as yet almost no hydrocarbon liquids at all.

The Permian is of particular interest because some of the shales appear to be good hydrocarbon sources. The samples from 3020, 3060 and 3146 meters are rated as good, mature sources of oil and gas, but the low cuttings gas yields from this interval suggest that most of the lighter hydrocarbons have migrated away.

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PROCEDURES

1. C₁-C₄ - Forty-nine canned cuttings samples were analyzed (Table 1). Compositions and concentrations of hydrocarbon gases in the air spaces above the cuttings in the sample cans were determined by gas chromatography. Similar data were obtained on gases released from standard mixtures of cuttings and tap water after two minutes of agitation in a Waring blender. Combined results on the "air space gas" plus the "cuttings gas" were calculated for each sample. The data were plotted graphically to show vertical variations in total gas (C₁-C₄) and a graphical plot was also made of the percent "wet gas" in total gas (Figure 1).
2. C₄-C₇ and T.O.C. - While still wet, chips were "picked" from 28 selected cuttings samples for further analyses (Table 2). We attempted to pick chips of reasonably uniform fine-grained lithologies from the heterogeneous mixtures of cuttings in the original samples. Our routine gas chromatographic procedures were used for determining their light gasoline (C₄-C₇) content. The total organic carbon was determined with a commercial Leco Carbon Analyzer after carbonate was first removed from the samples by use of HCl. These results are given in Tables 2, 3 and 8, and they are plotted graphically in Figure 1.
3. Visual kerogen - Visual kerogen characteristics by transmitted light were determined on 26 of the cuttings samples (Table 4). Determinations were made with a palynological microscope utilizing transmitted light through dispersed organic matter on standard slide mounts. The organic matter was separated from the samples by removing rock matrix materials with HF and HCl. The descriptions were based on the so-called "Staplin" nomenclature. In Table 4 many of the kerogens are shown to contain high percentages of "indeterminate fines". Chemical and lithologic data were used to aid in making our "Best Guesses" as to what the fines probably include.
4. Heavy (C₁₅+) Hydrocarbons - Five gross cuttings samples were analyzed for C₁₅+ compounds. The samples were Soxhlet-extracted with a 9:1 benzene-methanol mixture. After deasphalting the extracts with excess pentane, the pentane-solubles were analyzed by liquid column chromatography (Table 5). Gas chromatograms were obtained for the heavy saturate fractions (Figures 3 through 7).
5. Rock-Eval Pyrolysis - Portions of the rock powders used for 14 of the T.O.C. analyses were analyzed by standard Rock-Eval pyrolysis (Table 6 and Figure 2).
6. Vitrinite R_o - Eighteen samples were sent to Geo-Strat, Inc. of Houston for vitrinite reflectance measurements (Figures 8 through 25). Whole-rock fragments in epoxy plug mounts were used for the measurements. A vertical profile was plotted (Figure 26) using the vitrinite populations interpreted to be most representative of the indigenous organic matter (Table 7).

DISCUSSION

Cuttings Gas (C₁-C₄)

The appreciable yields of methane (Fig. 1 and Table 1) from the Miocene and Oligocene samples are probably indigenous and are consistent with the organic richness of the beds. Conceivably the methane has leaked upward from below, but with the evidence we have here this cannot be determined.

The persistent "wet gas" in all units except Cretaceous is probably due in part to migrated hydrocarbons. The oil-prone Jurassic shales might generate wet gas of this nature in an immature state, but most of the other immature units would more likely be associated with drier gases.

Visual Kerogen

Kerogen alterations (Table 4) do not reach "2+" until below 3000 meters, and are still only "1+" at 2900 meters. This strongly suggests the section is immature down through the Triassic interval.

The kerogen includes high percentages of algal materials throughout the drilled interval, except in Eocene, Paleocene and Cretaceous samples. This suggests that much of the interval would generate oil and light liquids when mature.

Vitrinite Reflectance

Vitrinite reflectance data (Figs. 8-26 and Table 7) support the kerogen alteration data. The material does not appear to reach maturity until below 3100 meters. The vitrinite data are actually rather complex (Figs. 8-25). There are several populations of high reflectance values at shallow depths, but these are believed to represent reworked organic debris. In Figure 26, some of the data believed to represent reworked material has been eliminated.

Heavy Hydrocarbons (C₁₅+)

The gas chromatograms of Figs. 4 and 5 are typical of immature Malm extracts from all over the North Sea. The profiles in Figs. 3 and 6 look more mature and more gas prone. Possibly they include migrated hydrocarbons. The Permian profile of Fig. 7 appears to represent a mature source of oil and gas.

Pyrolysis by Rock-Eval

The data of Table 6 are plotted and given a standard interpretation in Fig. 2. The Jurassic shales are outstanding but immature oil sources according to these data, and are in agreement with our other data. In contrast with our other chemical and kerogen data, pyrolysis suggests all other intervals are gas prone. The temperature data (T-Max.) suggest the entire section is immature, including the Permian. We prefer to rely on heavy hydrocarbon, kerogen, TAI and vitrinite reflectance patterns that suggest the Permian has probably reached maturity.

TABLE 1A
C1-C4 HYDROCARBON ANALYSES - AIR SPACE AT TOP OF CANS

		GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)					GAS COMPOSITION (PERCENT)													
SPL NO	R	DEPTH (M)	METHANE C1	ETHANE C2	PROPANE C3	ISOBUTANE IC4	N-BUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOTAL GAS					WET GAS				
											M	E	P	IB	NB	E	P	IB	NB	
75 02 1A	3	1250	15524.61	60.76	11.48	1.39	1.99	95.62	15620.22	.6122	99	1	0	0	0	85	12	1	2	
75 02 1B	4	1310	5643.36	52.36	7.30	.73	1.43	61.82	5705.20	1.0836	99	1	0	0	0	85	12	1	2	
75 02 1C	4	1370	3223.84	25.64	1.37	.06	.17	27.24	3251.08	.6379	99	1	0	0	0	94	5	0	1	
75 02 1D	4	1430	6856.70	66.30	4.55	.46	.53	71.84	6928.54	1.0369	99	1	0	0	0	92	6	1	1	
75 02 1E	4	1490	10754.48	77.84	5.31	.52	.77	84.44	10838.92	.7790	99	1	0	0	0	92	6	1	1	
75 02 1F	4	1550	6348.80	59.66	15.38	4.72	2.57	82.33	6431.13	1.2802	99	1	0	0	0	72	19	6	3	
75 02 1G	4	1610	9836.17	91.80	29.60	9.53	5.74	136.67	9972.84	1.3704	99	1	0	0	0	67	22	7	4	
75 02 1H	4	1670	6662.46	36.25	43.95	14.72	7.03	101.95	6664.41	1.5298	98	1	1	0	0	36	43	14	7	
75 02 1I	4	1700	2409.48	27.69	17.74	4.37	2.12	51.92	2461.40	2.1094	98	1	1	0	0	54	34	8	4	
75 02 1J	4	2210	1506.85	319.59	143.56	13.75	16.07	492.97	2059.82	23.9327	75	16	7	1	1	65	29	3	3	
75 02 3E	4	2240	4775.81	1154.29	420.91	32.46	42.09	1649.75	6425.56	28.6748	73	18	7	1	1	69	26	2	3	
75 02 1K	4	2270	1960.66	436.61	185.40	18.66	24.19	663.66	2624.52	25.2945	74	17	7	1	1	65	28	3	4	
75 02 3F	4	2300	1211.16	336.74	204.17	21.38	34.95	597.24	1808.40	33.0259	67	19	11	1	2	56	34	4	6	
75 02 1L	4	2330	1808.60	973.66	1839.19	502.37	916.76	4232.00	6040.60	70.0593	31	16	30	8	15	23	43	12	22	
75 02 3G	4	2360	2609.10	1199.34	2817.82	645.54	1094.56	5757.26	8366.36	68.8144	31	14	34	8	13	21	49	11	19	
75 02 1M	4	2390	185.63	131.45	244.70	45.83	81.71	503.69	669.32	73.0706	27	19	35	7	12	26	49	9	16	
75 02 1N	4	2420	662.25	345.72	430.46	66.46	119.31	961.95	1644.20	58.5057	42	21	26	4	7	36	45	7	12	
75 02 1O	4	2440	138.68	99.31	184.32	26.43	50.59	360.65	499.53	72.1979	26	20	37	5	10	28	51	7	14	
75 02 1P	4	2470	162.17	57.28	102.18	15.32	31.22	206.00	368.17	55.9524	44	16	26	4	8	28	50	7	15	
75 02 1Q	4	2500	36.43	17.54	46.04	9.41	17.96	92.97	129.40	71.8470	28	14	37	7	14	19	52	10	19	
75 02 1R	4	2540	5.14	1.46	3.23	1.36	3.26	9.33	14.47	64.4782	36	10	22	9	23	16	34	15	35	
75 02 1S	4	2560	17.96	7.36	41.47	17.49	30.92	97.24	115.20	84.4097	16	6	36	15	27	6	42	18	32	
75 02 3H	4	2570	.00	.00	.00	.00	.00	.00	.00	.0000	0	0	0	0	0	0	0	0	0	*C*
75 02 1I	4	2580	1418.86	3740.12	22768.65	7140.07	10444.60	44113.64	45532.46	96.8839	3	8	50	16	23	6	52	16	24	
75 02 2A	4	2600	5713.92	6875.68	7576.01	740.66	1073.35	16265.72	21979.63	74.0036	26	31	35	3	5	42	46	5	7	
75 02 2B	4	2620	2762.53	2476.25	1539.89	157.73	204.52	4378.39	7140.92	61.3141	38	35	22	2	3	56	35	4	5	
75 02 2C	4	2640	4146.66	3631.15	2691.15	290.16	526.72	7339.18	11486.05	63.8965	36	33	23	3	5	52	37	4	7	
75 02 2D	4	2660	1568.43	952.05	704.04	86.11	141.42	1883.62	3452.65	54.5653	46	28	20	2	4	50	37	5	8	
75 02 2E	4	2680	6862.75	3109.33	2034.19	268.39	372.03	5715.94	14598.69	39.1538	61	21	14	1	3	53	36	4	7	
75 02 2F	4	2700	736.00	637.42	662.84	67.55	162.57	1570.66	2366.68	68.0927	51	28	30	4	7	41	43	6	10	
75 02 2G	4	2730	631.46	994.81	1146.44	118.49	206.50	2466.24	3099.70	79.6264	20	32	37	4	7	40	47	5	8	
75 02 2H	4	2760	424.01	567.59	733.17	83.07	153.87	1557.70	1981.71	78.6038	21	30	37	4	8	36	47	5	10	
75 02 2I	4	2790	120.09	88.69	206.97	37.69	67.76	400.53	520.62	76.9333	23	17	40	7	13	22	52	9	17	
75 02 2J	4	2810	104.61	116.07	260.77	47.20	85.68	509.72	614.33	82.9717	17	19	42	8	14	23	51	9	17	
75 02 2K	4	2840	170.77	238.58	440.97	68.83	125.19	873.57	1044.34	83.6480	16	23	42	7	12	27	51	8	14	
75 02 2L	4	2870	162.97	153.61	306.34	56.19	99.09	609.43	772.40	78.9008	21	20	39	7	13	25	50	9	16	
75 02 2M	4	2900	154.61	140.14	324.32	58.02	112.65	635.33	789.94	80.4276	20	18	41	7	14	22	51	9	16	
75 02 2N	4	2920	.00	.00	.00	.00	.00	.00	.00	.0000	0	0	0	0	0	0	0	0	0	*C*
75 02 3I	4	2930	148.92	268.51	375.69	56.64	110.66	753.72	902.64	83.5017	16	23	43	6	12	28	49	8	15	
75 02 2O	4	2950	187.30	262.29	462.65	67.20	121.23	933.37	1120.67	83.2868	17	25	41	6	11	30	50	7	13	
75 02 2P	4	2970	369.18	510.23	563.23	64.29	119.09	1256.84	1626.02	77.2955	23	31	35	4	7	41	45	5	9	
75 02 2Q	4	3000	85.46	110.49	155.08	26.33	37.35	323.25	406.71	79.0903	21	27	38	5	9	34	46	6	12	
75 02 2R	4	3020	161.53	86.52	150.95	27.49	47.52	314.48	416.01	75.5943	24	21	37	7	11	26	48	9	15	
75 02 2S	4	3050	93.69	179.44	224.40	26.98	52.62	464.84	578.53	83.8055	16	31	39	5	9	37	46	6	11	
75 02 2I	4	3060	60.27	79.37	97.61	13.44	24.40	214.82	275.09	78.0908	22	29	35	5	9	37	46	6	11	
75 02 3A	4	3080	37.72	84.12	190.08	35.25	63.16	372.61	410.33	90.8074	9	21	46	9	15	23	51	9	17	
75 02 3B	4	3100	64.70	162.46	338.04	59.86	150.78	711.19	775.89	91.6612	8	21	44	8	19	23	48	8	21	
75 02 3C	4	3120	126.67	68.40	94.13	25.71	49.26	237.52	364.39	65.1829	34	19	26	7	14	29	39	11	21	
75 02 3D	4	3146	34.72	29.13	33.12	3.93	6.16	74.34	109.06	68.1643	32	27	36	4	7	39	45	5	11	

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

ST = SIDE TRACK SAMPLE

TABLE 1B

C1-C4 HYDROCARBON ANALYSES - CUTTINGS ONLY

GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)										GAS COMPOSITION (PERCENT)									
SPL NO	R	DEPTH (M)	METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOTAL GAS M E P IB NB				WET GAS E P IB NB				
75021A	3	1250	1440.38	17.07	10.37	1.42	3.67	33.13	1473.51	2.2484	98	1	1	0	0	54	31	4	11
75021B	4	1310	773.76	12.54	6.48	.71	2.75	22.48	796.24	2.6233	97	2	1	0	0	56	29	3	12
75021C	4	1370	1380.86	20.16	11.02	.71	2.29	64.16	1445.04	4.4414	96	3	1	0	0	78	17	1	4
75021D	4	1430	1999.87	57.57	11.99	1.24	3.67	74.47	2074.34	3.5901	96	3	1	0	0	77	16	2	5
75021E	4	1490	1857.02	43.32	11.99	1.77	3.67	60.75	1917.77	3.1677	97	2	1	0	0	71	20	3	6
75021F	4	1550	3109.28	64.93	61.56	33.26	28.92	208.69	4017.97	5.1939	94	2	2	1	1	41	29	16	14
75021G	4	1610	1101.12	34.20	49.41	29.20	26.39	139.20	1240.32	11.2229	89	3	4	2	2	25	35	21	19
75021H	4	1670	4823.52	96.90	127.98	65.49	55.68	345.45	4868.97	7.0949	93	2	3	1	1	28	37	19	16
75021I	4	1730	2470.08	74.10	132.84	61.95	48.19	317.08	2787.16	11.3765	88	3	5	2	2	23	42	20	15
75021J	4	2210	1726.08	934.60	1082.16	134.52	266.22	2417.70	4143.78	58.3453	42	23	26	3	6	39	44	6	11
75021K	4	2240	1928.45	1513.92	1202.69	99.12	183.60	2999.33	4927.78	60.8657	39	31	24	2	4	51	40	3	6
75021L	4	2270	448.16	427.56	349.92	40.71	83.77	901.90	1750.06	51.5354	49	24	20	2	5	47	39	5	9
75021M	4	2300	982.08	302.10	330.48	42.48	110.16	785.22	1767.30	44.4305	56	17	19	2	6	38	43	5	14
75021N	4	2330	729.12	299.25	1075.68	431.88	1266.84	3073.65	3802.77	80.8266	19	8	28	11	34	10	35	14	41
75021O	4	2360	982.08	718.20	2851.20	1097.40	2827.44	7494.24	8476.32	88.4138	12	8	34	13	33	10	37	15	36
75021P	4	2390	357.12	76.95	325.62	88.50	270.81	761.88	1119.00	68.0858	32	7	29	8	24	10	42	12	38
75021Q	4	2420	513.36	128.25	372.60	84.96	211.14	796.95	1310.31	60.8215	40	10	28	6	16	16	47	11	26
75021R	4	2440	353.40	19.95	84.24	24.78	61.96	190.93	544.33	35.0761	65	4	15	5	11	10	45	13	32
75021S	4	2470	572.88	19.95	79.38	23.89	55.06	178.30	751.18	23.7360	76	3	11	3	7	11	45	13	31
75021T	4	2500	334.86	11.40	38.88	12.39	32.13	94.80	429.60	22.0670	78	3	9	3	7	12	41	13	34
75021U	4	2540	461.28	4.27	2.02	.66	2.29	9.24	470.52	1.9638	99	1	0	0	0	46	22	7	25
75021V	4	2560	360.84	2.49	5.26	2.65	8.63	18.43	379.27	4.8593	95	1	1	1	2	14	29	14	43
75021W	4	2570	535.68	14.25	93.96	127.44	358.02	593.67	1129.35	52.5674	48	1	8	11	32	2	16	21	61
75021X	4	2580	610.08	1254.00	15663.04	6269.44	19388.16	44774.64	45384.71	98.6558	1	3	35	18	43	3	35	18	44
75021Y	4	2600	1696.32	11126.40	29030.40	3624.96	7931.52	51713.28	53409.58	96.8246	3	21	54	7	15	22	56	7	15
75022A	4	2620	2470.08	7934.40	13374.72	1302.72	3121.20	25733.04	28203.11	91.2419	9	28	47	5	11	31	52	5	12
75022B	4	2640	699.36	1646.86	4095.36	566.40	1466.60	7977.36	8676.72	91.9398	8	21	47	7	17	23	52	7	18
75022C	4	2660	1621.92	3739.20	6376.32	849.60	2056.32	13021.44	14643.36	88.9239	11	26	43	6	14	29	46	7	16
75022D	4	2680	1339.20	1618.60	2260.96	253.20	752.76	4935.72	6274.92	78.6579	21	26	36	5	12	35	46	6	15
75022E	4	2700	386.88	131.10	466.56	88.50	226.32	906.48	1293.36	70.0872	30	10	36	7	17	14	52	10	24
75022F	4	2730	357.12	265.00	1030.32	198.24	514.68	2027.64	2384.76	85.0249	15	12	43	6	22	14	51	10	25
75022G	4	2760	543.12	156.75	563.20	113.28	284.58	1137.81	1680.93	67.8893	32	9	35	7	17	14	51	10	25
75022H	4	2790	379.44	22.86	97.20	31.86	78.63	229.89	609.33	37.7283	62	4	16	5	13	10	42	14	34
75022I	4	2810	580.32	45.60	184.68	60.18	133.11	423.57	1003.89	42.1929	58	5	18	6	13	11	44	14	31
75022J	4	2840	353.40	64.12	213.84	49.56	119.34	446.86	800.26	55.8394	44	8	27	6	15	14	48	11	27
75022K	4	2870	617.52	96.90	333.72	86.50	206.56	725.67	1343.19	54.0259	46	7	25	7	15	13	47	12	26
75022L	4	2900	364.56	27.67	111.78	26.32	74.59	241.76	606.32	39.8733	61	4	18	5	12	11	46	12	31
75022M	4	2920	617.52	56.57	226.80	56.64	146.88	485.89	1103.41	44.0353	56	5	21	5	13	11	47	12	30
75022N	4	2930	297.60	48.45	168.48	42.48	114.75	374.16	671.76	55.6985	45	7	25	6	17	13	45	11	31
75022O	4	2950	394.32	101.17	395.28	88.50	229.50	814.45	1208.77	67.3784	33	8	33	7	19	12	49	11	28
75022P	4	2970	669.60	399.00	913.68	134.52	339.66	1766.66	2466.46	72.7413	27	16	36	5	14	22	51	8	19
75022Q	4	3000	357.12	66.97	173.34	31.86	75.73	347.90	765.02	39.3461	50	9	25	5	11	19	56	9	22
75022R	4	3020	494.76	19.95	66.42	16.81	43.60	146.78	641.54	22.8793	77	3	10	3	7	14	45	11	30
75022S	4	3050	345.96	52.61	127.17	33.89	39.01	242.08	588.04	41.1673	58	9	22	4	7	21	53	10	16
75022T	4	3080	550.56	64.12	162.00	35.40	87.21	346.73	699.29	38.7784	61	7	18	4	10	16	47	10	25
75022U	4	3080	305.04	39.19	165.24	46.32	114.75	365.20	670.24	54.4879	45	6	25	7	17	11	45	13	31
75022V	4	3100	528.24	86.21	382.32	123.90	436.05	1026.48	1556.72	60.0671	33	6	25	8	28	8	37	12	43
75022W	4	3120	405.48	153.90	298.66	56.64	165.24	673.66	1079.34	62.4326	38	14	28	5	15	23	44	8	25
75022X	4	3146	520.80	23.51	56.70	13.27	39.61	132.49	653.29	20.2804	79	4	9	2	6	18	43	10	29

L = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

ST = SIDE TRACK SAMPLE

TABLE C

C1-C4 HYDROCARBON ANALYSES - CUTTINGS AND AIR SPACE

GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)

GAS COMPOSITION (PERCENT)

SPL NO	R	DEPTH (M)	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)					GAS COMPOSITION (PERCENT)											
			METHANE C1	ETHANE C2	PROPANE C3	ISOBUTANE IC4	NBUTANE C4	WEI C2-C4	TOTAL C1-C4	WEI/TOTAL PERCENT	TOTAL GAS M E P IB NB					WET GAS E P IB NB			
75021A	3	1250	16964.99	98.43	21.85	2.81	5.66	126.75	17093.73	.7532	99	1	0	0	0	77	17	2	4
75021B	4	1310	6417.14	64.90	13.78	1.44	4.18	84.30	6501.44	1.2966	99	1	0	0	0	77	16	2	5
75021C	4	1370	4004.70	75.80	12.39	.77	2.46	91.42	4696.12	1.9467	98	2	0	0	0	82	14	1	3
75021D	4	1430	8856.57	123.87	16.54	1.70	4.20	146.31	9002.88	1.6251	99	1	0	0	0	85	11	1	3
75021E	4	1490	12611.50	121.16	17.30	2.29	4.44	145.19	12756.09	1.1381	99	1	0	0	0	83	12	2	3
75021F	4	1550	10158.08	144.59	76.94	38.00	31.49	291.02	10449.10	2.7851	98	1	1	0	0	50	26	13	11
75021G	4	1610	10937.29	126.00	79.01	38.73	32.13	275.87	11213.16	2.4602	98	1	1	0	0	45	29	14	12
75021H	4	1670	11085.98	133.15	171.93	60.21	62.11	447.40	11533.38	3.8792	96	1	1	1	1	30	36	18	14
75021I	4	1700	4879.56	101.79	156.58	66.32	50.31	369.00	5248.56	7.0305	93	2	3	1	1	28	40	18	14
75021J	4	2210	3292.93	1294.39	1225.72	148.27	282.29	2910.67	6203.60	46.9190	53	20	20	2	5	43	42	5	10
75021K	4	2240	6704.26	2668.21	1623.60	131.58	225.69	4649.08	11353.34	40.9490	59	24	14	1	2	57	35	3	5
75021L	4	2270	2808.82	863.11	535.32	59.37	107.96	1565.76	4374.58	35.7922	65	20	12	1	2	55	34	4	7
75021M	4	2300	2193.24	638.84	534.65	63.86	145.11	1382.46	3575.70	38.6626	61	16	15	2	4	46	39	5	10
75021N	4	2330	2537.72	1272.93	2914.87	934.25	2183.60	7305.65	9843.37	74.2190	26	13	30	9	22	17	40	13	30
75021O	4	2360	391.18	1917.54	5609.02	1742.94	3922.00	13251.50	16842.68	78.6781	21	11	35	10	23	14	43	13	30
75021P	4	2390	542.75	208.48	570.32	134.33	352.52	1265.57	1808.32	69.9860	30	12	32	7	19	16	45	11	28
75021Q	4	2420	1195.61	473.97	803.06	151.42	330.45	1758.90	2954.51	59.5327	41	16	27	5	11	27	45	9	19
75021R	4	2440	492.28	119.26	268.56	51.21	112.55	551.58	1043.86	52.8404	47	11	26	3	11	22	49	9	20
75021S	4	2470	735.65	77.23	181.56	39.21	86.30	384.30	1119.35	34.3324	65	7	16	4	8	20	48	10	22
75021T	4	2500	371.23	28.94	66.92	21.80	50.11	167.77	559.00	33.5903	66	5	16	4	9	15	46	12	27
75021U	4	2540	466.42	5.75	5.25	2.02	5.56	18.57	484.99	3.8269	97	1	1	0	1	31	28	11	30
75021V	4	2560	378.80	9.85	46.73	20.14	38.96	115.67	494.47	23.3927	77	2	9	4	8	9	40	17	34
75021W	4	2570	535.68	14.25	93.96	127.44	358.02	593.67	1129.35	52.5674	48	1	8	11	32	2	16	21	61
75021X	4	2580	2028.94	4994.12	38651.69	15409.51	29832.96	8888.28	90917.19	97.7684	2	5	43	17	33	6	43	17	34
75021Y	4	2600	7410.24	18001.48	36607.01	4365.64	9004.87	67979.00	75389.21	90.1707	10	24	48	6	12	26	55	6	13
75021Z	4	2620	5232.61	10410.65	14914.61	1460.45	3325.72	30111.43	35344.03	85.1952	15	29	43	4	9	35	49	5	11
75022A	4	2640	4846.24	5677.95	6786.51	856.56	1995.52	15316.54	20162.77	75.9645	24	26	34	4	10	37	44	6	13
75022B	4	2660	3190.35	4691.25	7080.36	935.71	2197.74	14905.06	18095.41	82.3693	18	26	39	5	12	31	48	6	15
75022C	4	2680	10221.95	4728.13	4315.15	483.59	1124.79	10651.66	20873.61	51.0293	49	23	21	2	5	43	41	5	11
75022D	4	2700	1122.88	768.52	1149.40	176.05	383.19	2477.16	3600.04	66.8892	31	21	32	5	11	31	47	7	15
75022E	4	2730	988.58	1279.81	2176.76	316.73	722.58	4495.88	5484.46	81.9749	16	23	40	6	13	28	49	7	16
75022F	4	2760	967.13	744.34	1316.37	196.35	438.45	2695.51	3662.64	73.5947	26	20	37	5	12	28	49	7	16
75022G	4	2790	499.53	110.89	304.17	69.55	145.81	630.42	1129.95	55.7918	44	10	27	6	13	18	48	11	23
75022H	4	2810	684.93	161.67	445.45	107.38	218.79	933.29	1616.22	57.6739	41	10	28	7	14	17	48	12	23
75022I	4	2840	524.17	362.70	654.51	118.39	244.53	1320.43	1844.60	71.5835	28	16	37	6	13	23	49	9	19
75022J	4	2870	786.49	250.71	634.06	144.69	305.64	1335.10	2115.59	63.1077	37	12	30	7	14	19	47	11	23
75022K	4	2900	519.17	167.21	436.10	86.34	187.44	877.09	1396.26	62.6171	38	12	31	6	13	19	50	10	21
75022L	4	2930	617.52	55.57	226.80	56.64	146.88	485.89	1103.41	44.0353	56	5	21	5	13	11	47	12	30
75022M	4	2930	446.52	256.96	544.17	101.12	225.63	1127.88	1574.40	71.6387	28	16	36	6	14	23	48	9	20
75022N	4	2950	581.62	383.46	857.93	155.70	350.73	1747.82	2329.44	75.0318	25	16	37	7	15	22	49	9	20
75022P	4	2970	1038.78	909.23	1476.91	198.81	458.75	3043.70	4682.48	74.5552	25	22	37	5	11	30	48	7	15
75022Q	4	3000	442.58	177.46	328.42	52.19	113.08	671.15	1113.73	60.2615	40	16	29	5	10	26	49	8	17
75022R	4	3020	596.29	168.47	217.37	44.30	91.12	461.26	1057.55	43.6159	56	10	21	4	9	24	46	10	20
75022S	4	3050	439.65	231.45	351.57	52.87	91.63	726.92	1166.57	62.3126	37	20	30	5	8	32	48	7	13
75022T	4	3060	610.83	143.49	259.61	46.84	111.61	563.55	1174.38	47.9870	52	12	22	4	10	25	46	9	20
75022U	4	3080	342.76	123.31	355.32	61.27	177.91	757.81	1080.57	68.2797	32	11	33	8	16	17	46	11	24
75022V	4	3100	592.94	248.67	720.41	183.76	586.83	1739.67	2332.61	74.5804	25	11	31	8	25	14	41	11	34
75022W	4	3120	532.35	222.30	392.21	82.35	214.52	911.36	1443.73	63.1268	37	15	27	6	15	24	43	9	24
75022X	4	3146	555.52	52.64	89.82	17.20	47.17	206.63	762.35	27.1306	73	7	12	2	6	25	44	8	23

L = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

ST = SIDE TRACK SAMPLE

TABLE ID
CUTTINGS GAS SUMMARY

SAMPLE NO.	DEPTH (M)	TOTAL C1-C4	% WET	% C3+	C3+/C1	C2/C1
75621A	1250	17.094	1		.00	.01
75621B	1310	6.501	1		.00	.01
75621C	1370	4.696	2		.00	.02
75621D	1430	9.003	2		.00	.01
75621E	1490	12.757	1		.00	.01
75621F	1550	10.449	3	1	.01	.01
75621G	1610	11.213	2	1	.01	.01
75621H	1670	11.533	4	3	.03	.01
75621I	1700	5.249	7	5	.05	.02
75621J	2210	6.204	47	27	.50	.38
75621K	2240	11.353	41	17	.30	.40
75621L	2270	4.375	36	16	.25	.31
75621M	2300	3.576	39	21	.34	.29
75621N	2330	9.843	74	61	2.38	.50
75621O	2360	16.843	79	67	3.16	.53
75621P	2390	1.808	70	58	1.95	.38
75621Q	2420	2.955	60	43	1.07	.40
75621R	2440	1.044	53	41	.88	.24
75621S	2470	1.119	34	27	.42	.11
75621T	2500	559	34	28	.43	.08
75621U	2540	485	4	3	.03	.01
75621V	2560	494	23	21	.28	.03
75621W	2570	1.129	53	51	1.08	.03
75621X	2580	90.917	98	92	41.35	2.48
75621Y	2600	75.389	90	66	6.74	2.43
75621Z	2620	35.344	85	56	3.77	1.99
75622A	2640	20.163	76	48	1.99	1.17
75622B	2660	18.095	82	56	3.20	1.47
75622C	2680	20.874	51	28	.58	.46
75622D	2700	3.600	69	47	1.52	.68
75622E	2730	5.484	82	59	3.25	1.29
75622F	2760	3.663	74	53	2.02	.77
75622G	2790	1.130	56	46	1.04	.22
75622H	2810	1.618	58	48	1.13	.24
75622I	2840	1.845	72	55	1.94	.58
75622J	2870	2.116	63	51	1.39	.32
75622K	2900	1.396	63	51	1.37	.32
75622L	2920	1.103	44	39	.70	.09
75622M	2930	1.574	72	55	1.95	.58
75622N	2950	2.329	75	59	2.35	.66
75622O	2970	4.082	75	52	2.05	.88
75622P	3000	1.114	60	44	1.12	.40
75622Q	3020	1.058	44	33	.59	.18
75622R	3050	1.167	62	42	1.13	.53
75622S	3060	1.174	48	38	.89	.23
75622T	3080	1.081	68	57	1.79	.36
75622U	3100	2.333	75	64	2.51	.42
75622V	3120	1.444	63	46	1.29	.42
75622W	3140	762	27	20	.28	.09

b = CUTTINGS NOT ANALYZED

c = AIR SPACE GAS NOT RUN

ST = SIDE TRACK SAMPLE

TABLE 2

DESCRIPTIONS OF "PICKED" SAMPLES
(Lithology by Hahn; TOC by Sikirica)

Depth (meters)	EPR No.	Unit	Gross Lithology	GSA Color Code	Total Organic Carbon (%)
1250	75621-A	Mioc.	Shale, dk. brownish gray, micaceous, v. sl. calc.	5YR 3/1	7.22
1370	-C	Olig.	Shale, dk. brown, silty	5YR 2/4	4.96
1490	-E	"	Shale, greenish gray, silty, sl. calc.	5GY 6/1	2.16
1610	-G	"	Shale, med. olive gray	5Y 5/1	1.95
1700	-I	Eocene	Shale, pale yellowish brown, sl. calc.	10YR 6/2	1.42
2210	-J	Paleoc.	Shale, dk. greenish gray	5G 4/1	.49
2270	-K	"	Shale, med. gray	N5	1.16
2330	-l	"	Shale, med. greenish gray	5G 5/1	.36
2420	-N	"	Shale, med. greenish gray	5GY 5/1	.60
2470	-P	? ↗	75% white chalky limestone, 25% shale	N9	.42
2540	-R	Cret.	Shale, med. gray, limy laminae	N5	.37
2580	-T	"	70% claystone - 30% shale, v. lt. gray, glauc.	N8	.37
2600	75622-A	Jurassic	Shale, olive gray, micaceous, sl. calc.	5Y 4/1	3.82
2620	-B	"	Shale, olive gray, silty, v. sl. calc.	5Y 4/1	3.08
2640	-C	"	Shale, dk. gray, silty	N3	2.88
2660	-D	"	Shale, med. olive gray, micaceous	5Y 4/2	2.50
2680	-E	"	As above	5Y 4/2	3.12
2700	-F	Triassic	Cement?	-	.60
2760	-H	"	Shale, pale reddish brown, micaceous, sl. calc.	10R 5/6	.18
2810	-J	"	Shale, med. reddish brown and light greenish gray, sl. calc.	10R 4/4; 5GY 7/1	.21
2900	-M	"	70% shale - 30% siltstone, med. red	10R 5/6	.39
2950	-O	"	85% shale - 15% siltstone, med. reddish brown	10R 4/6	.44
3000	-Q	Perm./Tr.	As above, micaceous	10R 4/6	.64
3020	-R	Permian	Shale, dk. olive gray	5Y 3/1	1.26
3060	-T	"	Shale, dk. gray	N3	.96
3100	75623-B	"	Shale, mod. reddish orange, sl. calc.	10R 6/6	.11
3120	-C	"	Shale, 85% lt. gray - 15% dk. gray, sl. calc.	N4-N3	.75
3146	-D	"	Shale, olive gray, micaceous	5Y 4/1	1.16

TABLE 3

LIGHT GASOLINES (C₄-C₇) AND ORGANIC CARBON
(C₄-C₇ by Crabtree; TOC by Sikirica)

Depth (feet)	EPR No.	Unit	Total Organic Carbon %	Total C ₄ -C ₇ (ppm)	Correlation Ratios				
					C ₁ /C ₂	A/D ₂	C ₁ /D ₂	CH/MCP	n-Pent/i-Pent
1250	75621-A	Mioc.	7.22	.2	-	-	-	-	1.09
1370	-C	Olig.	4.96	.1	-	-	-	-	2.24
1490	-E	"	2.16	.1	-	-	-	-	1.50
1610	-G	"	1.95	.4	.10	-	-	-	.43
1700	-I	Eocene	1.42	.5	.32	11.16	4.38	.10	.51
2210	-J	Paleoc.	.49	.8	.29	10.42	8.86	.10	.74
2270	-K	"	1.16	2.5	.13	92.06	48.06	.11	.69
2330	-L	"	.36	11.5	1.23	8.69	6.33	.72	1.56
2420	-N	"	.60	8.8	.67	3.92	4.87	.40	1.03
2470	-P	"?	.42	.4	1.48	9.51	10.26	.59	1.24
2540	-R	Cret.	.37	.2	3.15	18.35	11.31	.87	1.17
2580	-T	"	.37	70.4	2.46	5.83	4.80	.87	1.23
2600	75622-A	Jurassic	3.82	137.7	.81	5.39	9.70	.47	.99
2620	-B	"	3.08	38.9	.30	3.58	4.08	.16	.80
2640	-C	"	2.88	60.2	.31	3.22	4.84	.16	.76
2660	-D	"	2.50	33.1	.22	3.90	3.46	.15	.84
2680	-E	"	3.12	54.8	.53	3.69	7.22	.27	.82
2700	-F	Triassic	.60	.9	.31	3.92	4.03	.14	.78
2760	-H	"	.18	7.7	.30	2.90	2.63	.17	.92
2810	-J	"	.21	3.5	.71	4.96	5.70	.31	1.22
2900	-M	"	.39	2.7	.54	3.77	4.87	.33	1.19
2950	-O	"	.44	3.3	.52	3.80	6.19	.22	1.37
3000	-Q	Perm./Tr.	.64	1.1	.70	3.85	6.43	.25	3.64
3020	-R	Permian	1.26	6.8	.37	2.01	2.98	.17	.93
3060	-T	"	.96	.4	.25	9.55	3.35	.11	2.54
3100	75623-B	"	.11	.6	.43	6.03	2.41	.31	2.37
3120	-C	"	.75	2.0	.55	3.46	2.29	.22	1.01
3146	-D	"	1.16	23.9	.33	4.24	1.88	.15	1.03

TABLE 4

VISUAL KEROGEN CHARACTERISTICS
(J. L. Morgan)

Depth (meters)	EPR No.	Unit	Total Organic Carbon (%)	Kerogen Alteration (TAI)	Confidence in TAI (10 max.)	Types of Kerogen (%)*						Kerogen Source Rating		
						Al?	IF	H	W	C	Other	Maturity	Richness	Type When Mature
1250	75621-A	Mioc.	7.22	1+	4	80	20(H,W)					Immature	Rich	Oil
1370	-C	Olig.	4.96	1+	5	70	20(H,W)	tr	tr			"	Rich	"
1490	-E	"	2.16	1+	5	60	20(H,W)	tr	tr	tr		"	Good	"
1610	-G	"	1.95	1+	5	40	50(A1,H,W)	-	tr	tr		"	Good	Oil,Gas
1700	-I	Eocene	1.42	1+	5	10	80(W,H)	tr	tr	tr		"	Good	Gas,Liquids
2210	-J	Paleoc.	.49	1+?	1	-	20(W)	30	20	30		"	Marginal	"
2270	-K	"	1.16	1+	5	-	10(W)	40	20	tr	20A1?	"	Good	"
2330	-L	"	.36	2-	3	-	-	10	40	20	tr M	"	Poor	(Gas)
2420	-N	"	.60	1+	4	60	tr	tr	10	20		"	Marginal	Oil,Gas
2470	-P	"?	.42	1+	5	10	50(W,H)	-	20	20		"	Marginal	Gas,Liquids
2540	-R	Cret.	.37	1+	5	tr	-	tr	30	30	30A1?	"	Poor	(Gas)
2580	-T	"	.37	1+	4	10	-	tr	40	20	20A1?,trM	"	Poor	(Gas)
2600	75622-A	Jurassic	3.82	1+	5	70	20(A1)	-	tr	tr		"	Rich	Oil
2620	-B	"	3.08	1+	5	70	20(A1)	-	tr	tr		"	Rich	"
2640	-C	"	2.88	1+	5	60	30(A1,W)	-	tr	tr		"	Good	"
2660	-D	"	2.50	1+	5	30	50(A1,W,H)	tr	10	tr	tr M	"	Good	"
2680	-E	"	3.12	1+	5	50	20(A1,W)	tr	10	10	tr M	"	Rich	"
2700	-F	Triassic	.60	1+	5	70	tr	tr	10	10		"	Marginal	(Oil)?
2810	-J	"	.21	1+	5	80	-	tr	10	10		"	Poor	Nonsource
2900	-M	"	.39	1+	4	50	-	10	20	20		"	Poor	(Oil,Gas)
3000	-Q	Perm.?Tr.	.64	2	4	30	-	10	30	30		"	Fair	Gas,Liquids
3020	-R	Permian	1.26	2+	4	40	-	10	10	40		"	Good	Oil,Gas
3060	-T	"	.96	2+	4	60	-	10	10	20		"	Good	"
3100	75623-B	"	.11	2	3	70	tr	tr	tr	20		"	Very Poor	Nonsource
3120	-C	"	.75	2+	3	60	10(W)	tr	tr	10	10A1?	"	Fair	Oil
3146	-D	"	1.16	2+	5	50	-	10	-	20	20A1?	"	Good	Oil

*A1 - Algal; W - Woody; M - Microplankton; H - Herbaceous; C - Coaly; IF - Indeterminate Fines; IF(H,W) - Best guess as to IF (Metter).

TABLE 5
HEAVY (C₁₅₊) SOLUBLE ORGANIC MATTER
(Erney)

<u>Depth (meters)</u>	2600 + 20	2640 + 60	2700	2730	3100
<u>EPR No.</u>	75622(A+B)	75622(C+D)	75622-F	75622-G	75623-B
<u>Total Organic Carbon (%)</u>	3.03	2.44	1.09	1.99	.50
<u>Soluble Organic Matter (ppm)</u>	1850	1314	675	1112	362
<u>Composition of S.O.M. (%)</u>					
Saturates*	10.5	9.3	19.6	9.4	13.8
Aromatics	19.5	22.1	23.0	19.2	24.9
Eluted NSO's	28.2	20.5	24.7	26.7	25.1
Noneluted NSO's	4.6	3.0	5.3	2.4	4.1
Asphaltenes	37.3	45.1	27.4	42.3	32.0
<u>Hydrocarbons</u>					
ppm of rock	554	412	287	318	140
% of T.O.C.	1.8	1.7	2.6	1.6	2.8
Sats./Aroms.	.5	.4	.9	.5	.6
<u>C₁₅₊ Source Rating</u>					
Richness	Rich	Good	Good	Good	Fair
Type	Gas, Oil	Oil	Oil	Gas, Oil	Oil, Gas
Maturity	Immature?	Immature	Immature	Immature?	Mature

*See Figs. 3 through 7 for gas chromatograms of saturates.

TABLE 6
 PYROLYSIS BY ROCK-EVAL*
 (Hahn)

<u>Depth (meters)</u>	<u>EPR No.</u>	<u>Total Organic Carbon (%)</u>	<u>S1 mg.HC/g.</u>	<u>S2 mg.HC/g.</u>	<u>S3 mg.HC/g.</u>	<u>S2/S3 mg.HC/g.</u>	<u>Hydrogen Index</u>	<u>Oxygen Index</u>	<u>T-Max (°C)</u>
2540	75621-R	.37	.02	.15	2.58	.06	40	697	-
2580	-T	.37	.04	.20	1.96	.10	54	529	-
2600	75622-A	3.82	.30	20.43	1.74	11.8	534	45	415
2620	-B	3.08	.19	14.07	1.59	8.8	456	51	421
2640	-C	2.88	.18	13.13	1.44	9.1	455	50	418
2660	-D	2.50	.13	8.05	1.22	6.6	322	48	425
2680	-E	3.12	.18	11.06	1.19	9.3	354	38	422
2700	-F	.60	.07	.38	4.19	.09	63	698	459
2900	-M	.39	.03	.26	1.63	.16	66	417	420
3000	-Q	.64	.04	.45	1.74	.26	70	271	425
3020	-R	1.26	.06	1.69	1.57	1.1	134	124	424
3060	-T	.96	.06	1.09	1.33	.8	113	138	422
3120	75623-C	.75	.08	2.39	1.02	2.3	318	136	424
3146	-D	1.16	.09	1.42	.75	1.9	122	64	425

See Fig. 2 for some interpretations.

TABLE 7
VITRINITE REFLECTANCE*
(by Geo-Strat)

<u>Depth (meters)</u>	<u>EPR No.</u>	<u>No. of Readings</u>	<u>R_o Min. (%)</u>	<u>R_o Max. (%)</u>	<u>R_o Ave. (%)</u>
1250	75621-A	65	.20	.34	.27
1370	-C	37	.20	.61	.32
2210	-J	1	-	-	.50
2270	-K	20	.35	1.06	.67
2330	-L	29	.56	1.72	1.18
2420	-N	10	.39	1.70	1.17
2600	75622-A	16	.25	.92	.58
2640	-C	37	.31	1.43	.64
2660	-D	48	.21	1.24	.61
2680	-E	51	.25	1.23	.59
2700	-F	65	1.30	2.65	2.01
2760	-H	6	.27	1.47	.60
3000	-Q	10	.32	1.47	.69
3020	-R	11	.23	1.15	.57
3060	-T	28	.30	1.31	.55
3100	75623-B	32	.33	1.46	.96
3120	-C	51	.30	1.20	.55
3146	-D	83	.26	1.37	.81

*See Fig. 26 for vertical profile.

TABLE 8 — Detailed C₄-C₇ Analyses, 16/7-2 Cuttings
(Crabtree and Fry)

75621A OFFSHORE NORWAY, 16/7-2, 1250 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	11.3	7.19
ETHANE	0.0		112-DMCP	4.6	2.95
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	3.9	2.46	224-TMP	0.0	0.00
NBUTANE	11.1	7.05	NHEPTANE	14.4	9.17
IPENTANE	19.4	12.31	1C2-DMCP	0.0	0.00
NPENTANE	21.1	13.38	MCH	0.0	0.00
22-DMB	0.0	0.00			
CPENTANE	0.7	0.43			
23-DMB	3.3	2.12			
2-MP	15.8	10.04			
3-MP	5.1	3.24			
NHEXANE	18.9	12.02			
MCP	10.0	6.33			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	0.0	0.00			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	5.4	3.43			
3-MHEX	0.0	0.00			
1C3-DMCP	12.4	7.87			

TOTALS	NORM	SIG COMP RATIOS
PPB	PERCENT	
ALL COMP	157.	C1/C2 0.00
GASOLINE	157.	A /D2 999.99
NAFTHENES	39.	24.77
C6-7	77.	48.96
		CH/MCP 0.00
		PENT/IPENT. 1.09

75621E OFFSHORE NORWAY, 16/7-2, 1490 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	0.0	0.00
ETHANE	0.0		112-DMCP	0.0	0.00
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	1.8	1.72	224-TMP	0.0	0.00
NBUTANE	6.5	6.08	NHEPTANE	19.5	18.30
IPENTANE	10.9	10.29	1C2-DMCP	0.0	0.00
NPENTANE	16.4	15.44	MCH	0.0	0.00
22-DMB	0.0	0.00			
CPENTANE	0.0	0.00			
23-DMB	4.6	4.36			
2-MP	17.7	16.65			
3-MP	2.0	1.86			
NHEXANE	21.2	19.94			
MCP	5.7	5.36			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	0.0	0.00			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	0.0	0.00			
3-MHEX	0.0	0.00			
1C3-DMCP	0.0	0.00			

TOTALS	NORM	SIG COMP RATIOS
PPB	PERCENT	
ALL COMP	106.	C1/C2 0.00
GASOLINE	106.	A /D2 999.99
NAFTHENES	6.	5.36
C6-7	46.	43.60
		CH/MCP 0.00
		PENT/IPENT. 1.50

75621C OFFSHORE NORWAY, 16/7-2, 1370 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	0.0	0.00
ETHANE	0.0		112-DMCP	0.0	0.00
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	2.8	3.40	224-TMP	0.0	0.00
NBUTANE	21.3	25.74	NHEPTANE	6.6	8.00
IPENTANE	8.3	10.02	1C2-DMCP	0.0	0.00
NPENTANE	18.5	22.43	MCH	0.0	0.00
22-DMB	0.2	0.18			
CPENTANE	0.0	0.00			
23-DMB	3.9	4.69			
2-MP	8.4	10.11			
3-MP	1.7	2.02			
NHEXANE	11.1	13.42			
MCP	0.0	0.00			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	0.0	0.00			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	0.0	0.00			
3-MHEX	0.0	0.00			
1C3-DMCP	0.0	0.00			

TOTALS	NORM	SIG COMP RATIOS
PPB	PERCENT	
ALL COMP	83.	C1/C2 999.99
GASOLINE	83.	A /D2 999.99
NAFTHENES	0.	0.00
C6-7	18.	21.42
		CH/MCP 999.99
		PENT/IPENT. 2.24

75621G OFFSHORE NORWAY, 16/7-2, 1610 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	7.2	2.03
ETHANE	0.0		112-DMCP	6.4	2.37
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	15.4	4.33	224-TMP	0.0	0.00
NBUTANE	22.6	6.34	NHEPTANE	11.9	3.35
IPENTANE	96.7	27.17	1C2-DMCP	0.0	0.00
NPENTANE	41.8	11.74	MCH	5.9	1.64
22-DMB	3.0	0.83			
CPENTANE	1.4	0.41			
23-DMB	10.3	2.90			
2-MP	47.9	13.44			
3-MP	11.9	3.35			
NHEXANE	29.9	8.41			
MCP	34.7	9.73			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	0.0	0.00			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	0.0	0.00			
3-MHEX	0.0	0.00			
1C3-DMCP	7.0	1.96			

TOTALS	NORM	SIG COMP RATIOS
PPB	PERCENT	
ALL COMP	356.	C1/C2 0.10
GASOLINE	356.	A /D2 999.99
NAFTHENES	45.	18.14
C6-7	105.	29.49
		C1/D2 999.99
		CH/MCP 0.00
		PENT/IPENT. 0.43

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756211 OFFSHORE NORWAY, 16/7-2, 1700 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	9.3	1.72
ETHANE	91.4		1T2-DMCP	9.0	1.67
PROPANE	12.9		3-EPENT	0.0	0.00
IBUTANE	21.6	4.00	224-TMP	0.0	0.00
NBUTANE	29.5	5.46	NHEPTANE	22.0	4.08
IPENTANE	120.3	22.27	1C2-DMCP	0.0	0.00
NPENTANE	41.9	11.47	MCH	15.6	2.93
22-DMB	5.4	1.00			
CPENTANE	4.1	0.76			
23-DMB	12.5	2.32			
2-MP	76.6	14.18			
3-MP	18.9	3.50			
NHEXANE	45.0	8.33			
MCP	53.0	9.81			
22-DMP	0.0	0.00			
24-DMP	0.8	0.15			
223-TMB	0.0	0.00			
CHEXANE	5.2	0.97			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	5.2	0.97			
23-DMP	5.9	1.10			
3-MHEX	4.0	1.11			
1C3-DMCP	11.9	2.21			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	644.		C1/C2 0.32
GASOLINE	540.		A /D2 11.16
NAFTHENES	108.	20.06	C1/D2 4.38
C6-7	189.	35.05	CH/MCP 0.10
			PENT/IPENT. 0.51

75621J OFFSHORE NORWAY, 16/7-2, 2210 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	11.2	1.34
ETHANE	99.2		1T2-DMCP	29.9	3.57
PROPANE	33.4		3-EPENT	0.0	0.00
IBUTANE	51.5	6.13	224-TMP	0.0	0.00
NBUTANE	78.2	9.32	NHEPTANE	34.0	4.06
IPENTANE	130.5	15.56	1C2-DMCP	10.6	1.27
NPENTANE	96.5	11.51	MCH	49.9	5.95
22-DMB	0.0	0.00			
CPENTANE	19.2	2.28			
23-DMB	7.4	0.88			
2-MP	44.6	5.34			
3-MP	28.2	3.36			
NHEXANE	43.5	5.19			
MCP	154.0	18.36			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	16.0	1.91			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	7.4	0.89			
3-MHEX	7.4	0.89			
1C3-DMCP	18.3	2.16			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	971.		C1/C2 0.29
GASOLINE	839.		A /D2 10.42
NAFTHENES	309.	36.87	C1/D2 8.86
C6-7	383.	45.61	CH/MCP 0.10
			PENT/IPENT. 0.74

75621K OFFSHORE NORWAY, 16/7-2, 2270 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	14.5	0.57
ETHANE	0.0		1T2-DMCP	37.4	1.47
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	207.1	8.14	224-TMP	0.0	0.00
NBUTANE	484.9	19.07	NHEPTANE	17.1	0.67
IPENTANE	496.9	19.54	1C2-DMCP	0.0	0.00
NPENTANE	342.0	13.45	MCH	10.7	0.42
22-DMB	0.0	0.00			
CPENTANE	72.9	2.87			
23-DMB	31.9	1.26			
2-MP	155.6	6.12			
3-MP	93.6	3.68			
NHEXANE	101.6	4.00			
MCP	407.3	16.01			
22-DMP	0.0	0.00			
24-DMP	3.4	0.13			
223-TMB	0.0	0.00			
CHEXANE	43.6	1.72			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	7.8	0.30			
23-DMP	12.4	0.49			
3-MHEX	1.3	0.05			
1C3-DMCP	1.0	0.04			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	2543.		C1/C2 0.13
GASOLINE	2543.		A /D2 92.06
NAFTHENES	567.	23.10	C1/D2 48.06
C6-7	656.	25.88	CH/MCP 0.11
			PENT/IPENT. 0.69

75621L OFFSHORE NORWAY, 16/7-2, 2330 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	95.3	0.13
ETHANE	0.0		1T2-DMCP	193.3	1.69
PROPANE	65.7		3-EPENT	0.0	0.00
IBUTANE	175.7	1.53	224-TMP	0.0	0.00
NBUTANE	610.7	7.07	NHEPTANE	490.6	4.28
IPENTANE	1241.8	10.63	1C2-DMCP	12.5	0.11
NPENTANE	1935.6	16.88	MCH	654.3	5.71
22-DMB	23.8	0.21			
CPENTANE	92.0	0.80			
23-DMB	144.5	1.26			
2-MP	1326.6	11.57			
3-MP	578.7	5.05			
NHEXANE	1259.4	13.60			
MCP	811.9	7.08			
22-DMP	0.0	0.00			
24-DMP	30.9	0.27			
223-TMB	3.6	0.03			
CHEXANE	592.5	5.08			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	256.5	2.24			
23-DMP	108.5	0.95			
3-MHEX	235.8	2.06			
1C3-DMCP	100.3	0.88			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	11550.		C1/C2 1.23
GASOLINE	11465.		A /D2 6.69
NAFTHENES	2542.	22.17	C1/D2 6.33
C6-7	5135.	44.79	CH/MCP 0.72
			PENT/IPENT. 1.56

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75621N OFFSHORE NORWAY, 16/7-2, 2420 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	157.9	1.80
ETHANE	81.8		112-DMCP	353.8	4.03
PROPANE	222.4		3-EPENT	0.0	0.00
IBUTANE	315.9	3.60	224-TMP	0.0	0.00
NBUTANE	955.0	11.35	NHEPTANE	336.1	3.83
IPENTANE	987.7	11.26	1C2-DMCP	50.5	0.58
NPENTANE	1018.0	11.61	MCH	641.2	7.31
22-DMB	7.7	0.09			
CPENTANE	148.0	1.69			
23-DMB	79.5	0.91			
2-MP	569.8	6.50			
3-MP	322.8	3.68			
NHEXANE	636.8	7.26			
MCP	1071.4	12.22			
22-DMF	0.0	0.00			
24-DMF	14.3	0.16			
223-TMB	1.8	0.02			
CHEXANE	432.4	4.93			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	134.7	1.54			
23-DMF	78.5	0.90			
3-MHEX	248.0	2.83			
1C3-DMCP	168.0	1.92			

TOTALS	NORM	SIG COMP RATIOS	
PPB	PERCENT		
ALL COMP	9074.	C1/C2	0.67
GASOLINE	8770.	A /D2	3.92
NAFTHENES	3023.	C1/D2	4.87
C6-7	4326.	CH/MCP	0.40
		PENT/IPENT.	1.03

75621R OFFSHORE NORWAY, 16/7-2, 2540 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	0.0	0.00
ETHANE	0.0		112-DMCP	0.0	0.00
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	3.3	1.53	224-TMP	0.0	0.00
NBUTANE	10.3	4.73	NHEPTANE	21.4	9.77
IPENTANE	16.6	7.58	1C2-DMCP	0.0	0.00
NPENTANE	19.5	8.90	MCH	28.7	13.11
22-DMB	0.0	0.00			
CPENTANE	1.4	0.63			
23-DMB	2.1	0.97			
2-MP	15.1	6.92			
3-MP	9.6	4.38			
NHEXANE	54.0	24.70			
MCP	14.7	6.75			
22-DMF	0.0	0.00			
24-DMF	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	12.8	5.88			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	4.9	2.26			
23-DMF	0.0	0.00			
3-MHEX	4.1	1.88			
1C3-DMCP	0.0	0.00			

TOTALS	NORM	SIG COMP RATIOS	
PPB	PERCENT		
ALL COMP	218.	C1/C2	3.15
GASOLINE	218.	A /D2	18.35
NAFTHENES	58.	C1/D2	11.31
C6-7	141.	CH/MCP	0.87
		PENT/IPENT.	1.17

75621P OFFSHORE NORWAY, 16/7-2, 2470 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	0.0	0.00
ETHANE	0.0		112-DMCP	8.7	2.48
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	11.8	3.37	224-TMP	0.0	0.00
NBUTANE	36.2	10.34	NHEPTANE	28.2	8.06
IPENTANE	34.8	9.95	1C2-DMCP	0.0	0.00
NPENTANE	43.3	12.39	MCH	43.7	12.49
22-DMB	0.0	0.00			
CPENTANE	4.9	1.41			
23-DMB	2.1	0.61			
2-MP	21.3	6.08			
3-MP	14.4	4.13			
NHEXANE	34.0	9.71			
MCP	31.8	9.08			
22-DMF	0.0	0.00			
24-DMF	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	18.6	5.32			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	4.7	1.35			
23-DMF	0.0	0.00			
3-MHEX	6.5	1.87			
1C3-DMCP	4.7	1.35			

TOTALS	NORM	SIG COMP RATIOS	
PPB	PERCENT		
ALL COMP	350.	C1/C2	1.48
GASOLINE	350.	A /D2	9.51
NAFTHENES	112.	C1/D2	10.26
C6-7	181.	CH/MCP	0.59
		PENT/IPENT.	1.24

75621T OFFSHORE NORWAY, 16/7-2, 2580 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	640.7	1.19
ETHANE	0.0		112-DMCP	1838.7	2.61
PROPANE	260.0		3-EPENT	0.0	0.00
IBUTANE	260.0	0.37	224-TMP	0.0	0.00
NBUTANE	847.3	1.20	NHEPTANE	10761.4	15.28
IPENTANE	3792.1	5.38	1C2-DMCP	243.0	0.35
NPENTANE	4682.9	6.65	MCH	9927.2	14.09
22-DMB	155.3	0.22			
CPENTANE	149.0	0.21			
23-DMB	722.5	1.03			
2-MP	7781.3	11.05			
3-MP	3215.0	4.56			
NHEXANE	9264.6	13.15			
MCP	3301.7	4.69			
22-DMF	0.0	0.00			
24-DMF	466.6	0.66			
223-TMB	47.2	0.07			
CHEXANE	2876.9	4.08			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	3684.6	5.23			
23-DMF	1665.2	2.36			
3-MHEX	3432.1	4.87			
1C3-DMCP	476.2	0.68			

TOTALS	NORM	SIG COMP RATIOS	
PPB	PERCENT		
ALL COMP	70492.	C1/C2	2.46
GASOLINE	70432.	A /D2	5.83
NAFTHENES	19654.	C1/D2	4.80
C6-7	48826.	CH/MCP	0.67
		PENT/IPENT.	1.23

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75622A OFFSHORE NORWAY, 16/7-2, 2600 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	2045.5	1.48
ETHANE	0.0		112-DMCP	5907.4	4.29
PROPANE	6314.0		3-EPENT	0.0	0.00
IBUTANE	5470.4	3.97	224-TMP	0.0	0.00
NBUTANE	16097.7	11.69	NHEPTANE	4699.9	3.56
IPENTANE	14684.6	10.66	112-DMCP	1406.8	1.02
NPENTANE	14565.0	10.57	MCH	13645.3	9.91
22-DMB	137.1	0.10			
CPENTANE	2539.1	1.84			
23-DMB	1017.9	0.74			
2-MP	8448.6	6.13			
3-MP	4734.0	3.44			
NHEXANE	8255.2	5.99			
MCP	17450.3	12.67			
22-DMP	0.0	0.00			
24-DMP	131.6	0.10			
223-TMB	24.0	0.02			
CHEXANE	8781.7	6.01			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	1745.1	1.27			
23-DMP	1406.8	1.02			
3-MHEX	2439.8	1.77			
113-DMCP	2415.1	1.75			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	144063.		C1/C2 0.81
GASOLINE	137749.		A /D2 5.39
NAFTHENES	53691.	38.98	C1/D2 9.70
C6-7	70055.	50.86	CH/MCP 0.47
			PENT/IPENT. 0.99

75622C OFFSHORE NORWAY, 16/7-2, 2640 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	1068.9	1.81
ETHANE	0.0		112-DMCP	3222.9	5.35
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	2405.3	3.99	224-TMP	0.0	0.00
NBUTANE	7077.9	11.75	NHEPTANE	1170.0	1.94
IPENTANE	6340.2	13.65	112-DMCP	533.6	0.89
NPENTANE	6364.5	10.57	MCH	3126.9	5.19
22-DMB	12.5	0.02			
CPENTANE	1543.7	2.56			
23-DMB	364.9	0.61			
2-MP	3573.4	5.93			
3-MP	2535.2	4.21			
NHEXANE	2438.5	4.05			
MCP	11032.2	18.31			
22-DMP	0.0	0.00			
24-DMP	68.2	0.11			
223-TMB	6.2	0.01			
CHEXANE	1739.9	2.89			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	551.5	0.92			
23-DMP	587.4	0.98			
3-MHEX	1119.1	1.86			
113-DMCP	1335.5	2.22			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	60238.		C1/C2 0.31
GASOLINE	60238.		A /D2 3.22
NAFTHENES	23624.	39.22	C1/D2 4.84
C6-7	28021.	46.52	CH/MCP 0.16
			PENT/IPENT. 0.76

75622B OFFSHORE NORWAY, 16/7-2, 2620 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	734.2	1.89
ETHANE	0.0		112-DMCP	2183.9	5.61
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	622.1	1.60	224-TMP	0.0	0.00
NBUTANE	2599.4	6.68	NHEPTANE	950.7	2.44
IPENTANE	5317.3	13.66	112-DMCP	314.4	0.81
NPENTANE	4259.8	10.95	MCH	1853.5	4.76
22-DMB	17.0	0.05			
CPENTANE	1004.6	2.58			
23-DMB	298.9	0.77			
2-MP	2799.9	7.19			
3-MP	2044.7	5.25			
NHEXANE	2158.3	5.55			
MCP	7817.3	20.09			
22-DMP	0.0	0.00			
24-DMP	56.8	0.15			
223-TMB	4.3	0.01			
CHEXANE	1223.3	3.14			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	469.5	1.21			
23-DMP	454.9	1.17			
3-MHEX	849.5	2.23			
113-DMCP	864.5	2.22			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	38920.		C1/C2 0.30
GASOLINE	38920.		A /D2 3.58
NAFTHENES	15996.	41.10	C1/D2 4.08
C6-7	19955.	51.27	CH/MCP 0.16
			PENT/IPENT. 0.80

75622D OFFSHORE NORWAY, 16/7-2, 2660 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		113-DMCP	1050.1	3.17
ETHANE	0.0		112-DMCP	1107.9	3.35
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	821.1	2.48	224-TMP	0.0	0.00
NBUTANE	2742.0	8.28	NHEPTANE	543.6	1.64
IPENTANE	4489.0	13.56	112-DMCP	64.6	0.20
NPENTANE	3752.3	11.33	MCH	781.0	2.36
22-DMB	6.1	0.02			
CPENTANE	863.9	2.61			
23-DMB	250.0	0.76			
2-MP	2613.3	7.89			
3-MP	1810.2	5.47			
NHEXANE	1980.4	5.98			
MCP	7020.0	21.20			
22-TMP	0.0	0.00			
24-DMP	67.6	0.20			
223-TMB	5.0	0.02			
CHEXANE	1032.6	3.12			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	424.5	1.28			
23-DMP	298.4	0.90			
3-MHEX	647.3	1.96			
113-DMCP	738.5	2.23			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	33109.		C1/C2 0.22
GASOLINE	33109.		A /D2 3.90
NAFTHENES	12659.	38.23	C1/D2 3.46
C6-7	15761.	47.60	CH/MCP 0.15
			PENT/IPENT. 0.84

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75622E OFFSHORE NORWAY, 16/7-2, 2660 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	1246.0	2.27
ETHANE	0.0		1T2-DMCP	3552.8	6.48
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	1729.5	3.16
IPENTANE	7487.1	13.66	1C2-DMCP	603.5	1.10
NPENTANE	6170.3	11.26	MCH	5687.7	10.38
22-DMB	15.2	0.03			
CPENTANE	1457.7	2.66			
23-DMB	424.5	0.77			
2-MP	3862.1	7.05			
3-MP	2661.4	4.86			
NHEXANE	2909.6	5.31			
MCP	10096.2	18.43			
22-DMF	95.6	0.17			
24-DMF	8.7	0.02			
223-TMB	2742.8	5.01			
CHEXANE	0.0	0.00			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	651.1	1.19			
23-DMF	647.4	1.18			
3-MHEX	1257.3	2.29			
1C3-DMCP	1487.3	2.71			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	54796.		C1/C2 0.53
GASOLINE	54796.		A /D2 3.69
NAFTHENES	26876.	49.05	C1/D2 7.22
C6-7	32717.	59.71	CH/MCP 0.27
			PENT/IPENT. 0.82

75622F OFFSHORE NORWAY, 16/7-2, 2700 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	16.4	1.84
ETHANE	0.0		1T2-DMCP	58.1	6.50
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	28.7	3.21
IPENTANE	119.2	13.33	1C2-DMCP	0.0	0.00
NPENTANE	93.3	10.44	MCH	57.2	6.39
22-DMB	0.0	0.00			
CPENTANE	24.4	2.73			
23-DMB	3.9	0.65			
2-MP	61.1	6.83			
3-MP	51.8	5.80			
NHEXANE	64.8	7.24			
MCP	212.8	23.80			
22-DMF	0.0	0.00			
24-DMF	1.6	0.18			
223-TMB	0.0	0.00			
CHEXANE	29.3	3.27			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	9.7	1.09			
23-DMF	9.8	1.10			
3-MHEX	23.9	2.67			
1C3-DMCP	26.2	2.93			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	894.		C1/C2 0.31
GASOLINE	894.		A /D2 3.92
NAFTHENES	424.	47.46	C1/D2 4.03
C6-7	539.	60.22	CH/MCP 0.14
			PENT/IPENT. 0.78

75622H OFFSHORE NORWAY, 16/7-2, 2760 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	39.2		1T3-DMCP	128.3	1.67
ETHANE	69.2		1T2-DMCP	341.9	4.44
PROPANE	93.3		3-EPENT	0.0	0.00
IBUTANE	209.4	2.72	224-TMP	0.0	0.00
NBUTANE	776.0	10.08	NHEPTANE	147.6	1.92
IPENTANE	1109.8	14.41	1C2-DMCP	17.9	0.23
NPENTANE	1018.3	13.22	MCH	259.9	3.37
22-DMB	3.3	0.04			
CPENTANE	150.3	1.95			
23-DMB	56.7	0.74			
2-MP	607.2	7.88			
3-MP	394.1	5.12			
NHEXANE	479.4	6.22			
MCP	1265.6	16.43			
22-DMF	0.0	0.00			
24-DMF	10.2	0.13			
223-TMB	0.0	0.00			
CHEXANE	213.6	2.77			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	96.3	1.25			
23-DMF	67.2	0.87			
3-MHEX	216.4	2.81			
1C3-DMCP	131.9	1.71			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	7903.		C1/C2 0.30
GASOLINE	7701.		A /D2 2.90
NAFTHENES	2509.	32.58	C1/D2 2.63
C6-7	3376.	43.84	CH/MCP 0.17
			PENT/IPENT. 0.92

75622J OFFSHORE NORWAY, 16/7-2, 2810 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	79.6		1T3-DMCP	70.1	2.01
ETHANE	31.5		1T2-DMCP	180.3	5.18
PROPANE	25.0		3-EPENT	0.0	0.00
IBUTANE	33.5	0.96	224-TMP	0.0	0.00
NBUTANE	160.8	4.62	NHEPTANE	177.9	5.11
IPENTANE	320.0	9.19	1C2-DMCP	15.4	0.44
NPENTANE	391.0	11.23	MCH	340.8	9.78
22-DMB	2.9	0.08			
CPENTANE	36.8	1.06			
23-DMB	28.0	0.80			
2-MP	294.9	8.47			
3-MP	178.0	5.11			
NHEXANE	322.5	9.26			
MCP	471.4	13.54			
22-DMF	0.0	0.00			
24-DMF	7.1	0.20			
223-TMB	0.0	0.00			
CHEXANE	145.5	4.18			
33-DMF	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	89.3	2.56			
23-DMF	43.6	1.25			
3-MHEX	100.9	2.90			
1C3-DMCP	72.3	2.08			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	3619.		C1/C2 0.71
GASOLINE	3483.		A /D2 4.96
NAFTHENES	1333.	38.26	C1/D2 5.70
C6-7	2037.	58.49	CH/MCP 0.31
			PENT/IPENT. 1.22

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75622M OFFSHORE NORWAY, 16/7-2, 2900 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	66.3	2.42
ETHANE	0.0		1T2-DMCP	191.1	6.97
PROPANE	20.7		3-EPENT	0.0	0.00
IBUTANE	24.9	0.91	224-TMP	0.0	0.00
NBUTANE	99.5	3.63	NHEPTANE	134.1	4.89
IPENTANE	225.2	8.22	1C2-DMCP	13.4	0.49
NPENTANE	267.9	9.76	MCH	239.5	8.74
22-DMB	2.2	0.08			
CPENTANE	40.4	1.48			
23-DMB	19.2	0.70			
2-MP	102.7	6.67			
3-MP	140.5	5.13			
NHEXANE	209.4	7.64			
MCP	469.9	17.15			
22-DMP	0.0	0.00			
24-DMP	6.0	0.22			
223-TMB	0.0	0.00			
CHEXANE	153.2	5.59			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	50.4	1.84			
23-DMP	40.2	1.47			
3-MHEX	91.0	3.32			
1C3-DMCP	73.6	2.69			

	TOTALS PPB	NORM PERCENT	SIO COMP RATIOS
ALL COMP	2761.		C1/C2 0.54
GASOLINE	2740.		A /D2 3.77
NAFTHENES	1247.	45.53	C1/D2 4.87
C6-7	1738.	63.43	CH/MCP 0.33
			PENT/IPENT. 1.19

75622G OFFSHORE NORWAY, 16/7-2, 3000 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	56.2		1T3-DMCP	43.1	3.96
ETHANE	35.7		1T2-DMCP	105.8	9.77
PROPANE	8.7		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	8.0	0.74	NHEPTANE	65.0	7.85
IPENTANE	25.5	2.35	1C2-DMCP	10.7	0.99
NPENTANE	92.6	8.55	MCH	193.3	17.64
22-DMB	0.0	0.00			
CPENTANE	11.1	1.02			
23-DMB	2.2	0.20			
2-MP	54.0	4.99			
3-MP	42.9	3.96			
NHEXANE	70.3	6.49			
MCP	172.5	15.93			
22-DMP	0.0	0.00			
24-DMP	0.9	0.08			
223-TMB	0.0	0.00			
CHEXANE	43.5	4.02			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	22.6	2.08			
23-DMP	17.9	1.66			
3-MHEX	40.4	3.73			
1C3-DMCP	41.0	3.78			

	TOTALS PPB	NORM PERCENT	SIO COMP RATIOS
ALL COMP	1184.		C1/C2 0.70
GASOLINE	1083.		A /D2 3.85
NAFTHENES	621.	57.92	C1/D2 6.43
C6-7	847.	78.19	CH/MCP 0.25
			PENT/IPENT. 3.64

75622O OFFSHORE NORWAY, 16/7-2, 2950 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	62.6		1T3-DMCP	166.3	5.00
ETHANE	46.0		1T2-DMCP	189.9	5.71
PROPANE	20.0		3-EPENT	0.0	0.00
IBUTANE	39.3	1.18	224-TMP	0.0	0.00
NBUTANE	120.5	3.62	NHEPTANE	156.9	4.72
IPENTANE	249.1	7.49	1C2-DMCP	29.2	0.88
NPENTANE	341.8	10.27	MCH	393.5	11.82
22-DMB	0.0	0.00			
CPENTANE	53.0	1.59			
23-DMB	16.2	0.49			
2-MP	189.4	5.69			
3-MP	139.8	4.20			
NHEXANE	198.2	5.96			
MCP	620.7	18.65			
22-DMP	0.0	0.00			
24-DMP	5.5	0.17			
223-TMB	0.0	0.00			
CHEXANE	135.5	4.07			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	49.1	1.48			
23-DMP	40.1	1.20			
3-MHEX	93.4	2.81			
1C3-DMCP	100.8	3.03			

	TOTALS PPB	NORM PERCENT	SIO COMP RATIOS
ALL COMP	3459.		C1/C2 0.52
GASOLINE	3326.		A /D2 3.80
NAFTHENES	1689.	50.74	C1/D2 6.19
C6-7	2179.	65.47	CH/MCP 0.22
			PENT/IPENT. 1.37

75622R OFFSHORE NORWAY, 16/7-2, 3020 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	48.5		1T3-DMCP	201.1	2.97
ETHANE	34.0		1T2-DMCP	513.0	7.57
PROPANE	20.4		3-EPENT	0.0	0.00
IBUTANE	93.1	1.37	224-TMP	0.0	0.00
NBUTANE	301.6	4.45	NHEPTANE	226.3	3.34
IPENTANE	657.3	9.70	1C2-DMCP	42.2	0.62
NPENTANE	612.7	9.04	MCH	515.1	7.60
22-DMB	2.1	0.03			
CPENTANE	129.3	1.91			
23-DMB	41.0	0.61			
2-MP	409.6	6.04			
3-MP	329.5	4.86			
NHEXANE	359.8	5.31			
MCP	1404.8	20.73			
22-DMP	0.0	0.00			
24-DMP	9.2	0.14			
223-TMB	0.0	0.00			
CHEXANE	239.9	3.54			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	113.5	1.67			
23-TMP	83.1	1.23			
3-MHEX	291.8	4.31			
1C3-DMCP	200.2	2.95			

	TOTALS PPB	NORM PERCENT	SIO COMP RATIOS
ALL COMP	6879.		C1/C2 0.37
GASOLINE	6776.		A /D2 2.01
NAFTHENES	3246.	47.90	C1/D2 2.98
C6-7	4200.	61.98	CH/MCP 0.17
			PENT/IPENT. 0.93

TABLE 8 - PAGE 7

75622T OFFSHORE NORWAY, 16/7-2, 3060 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	45.4		1T3-DMCP	0.0	0.00
ETHANE	25.4		1T2-DMCP	11.9	2.79
PROPANE	9.5		3-EPENT	0.0	0.00
IBUTANE	5.9	1.38	224-THP	0.0	0.00
NBUTANE	27.6	6.50	NHEPTANE	20.9	4.93
IPENTANE	38.5	9.06	1C2-DMCP	0.0	0.00
NPENTANE	97.5	22.98	NCH	12.2	2.87
22-DMB	0.0	0.00			
CPENTANE	7.8	1.84			
23-DMB	0.0	0.00			
2-MP	25.2	5.95			
3-MP	22.0	5.18			
NHEXANE	46.8	11.50			
MCP	80.6	18.99			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	9.0	2.13			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	3.3	0.77			
23-DMP	0.0	0.00			
3-MHEX	7.3	1.72			
1C3-DMCP	6.0	1.42			

TOTALS PPB	NORM PERCENT	SIO COMP RATIOS	
ALL COMP	505.	C1/C2	0.25
GASOLINE	424.	A /D2	9.55
NAPTHENES	127.	C1/D2	3.35
C6-7	200.	CH/MCP	0.11
		PENT/IPENT.	2.54

75623C OFFSHORE NORWAY, 16/7-2, 3120 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	52.7		1T3-DMCP	55.3	2.77
ETHANE	30.2		1T2-DMCP	130.6	6.56
PROPANE	21.7		3-EPENT	0.0	0.00
IBUTANE	15.0	0.76	224-THP	0.0	0.00
NBUTANE	49.5	2.48	NHEPTANE	187.0	9.39
IPENTANE	149.3	7.50	1C2-DMCP	11.2	0.56
NPENTANE	150.2	7.54	NCH	112.9	5.67
22-DMB	0.0	0.00			
CPENTANE	17.5	0.88			
23-DMB	15.9	0.80			
2-MP	222.1	11.15			
3-MP	103.2	5.18			
NHEXANE	195.9	9.83			
MCP	213.2	10.70			
22-DMP	0.0	0.00			
24-DMP	5.8	0.29			
223-TMB	0.0	0.00			
CHEXANE	47.9	2.40			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	92.6	4.65			
23-DMP	52.7	2.65			
3-MHEX	110.7	5.56			
1C3-DMCP	53.7	2.69			

TOTALS PPB	NORM PERCENT	SIO COMP RATIOS	
ALL COMP	2097.	C1/C2	0.55
GASOLINE	1992.	A /D2	3.46
NAPTHENES	642.	C1/D2	2.29
C6-7	1270.	CH/MCP	0.22
		PENT/IPENT.	1.01

75623B OFFSHORE NORWAY, 16/7-2, 3100 METERS

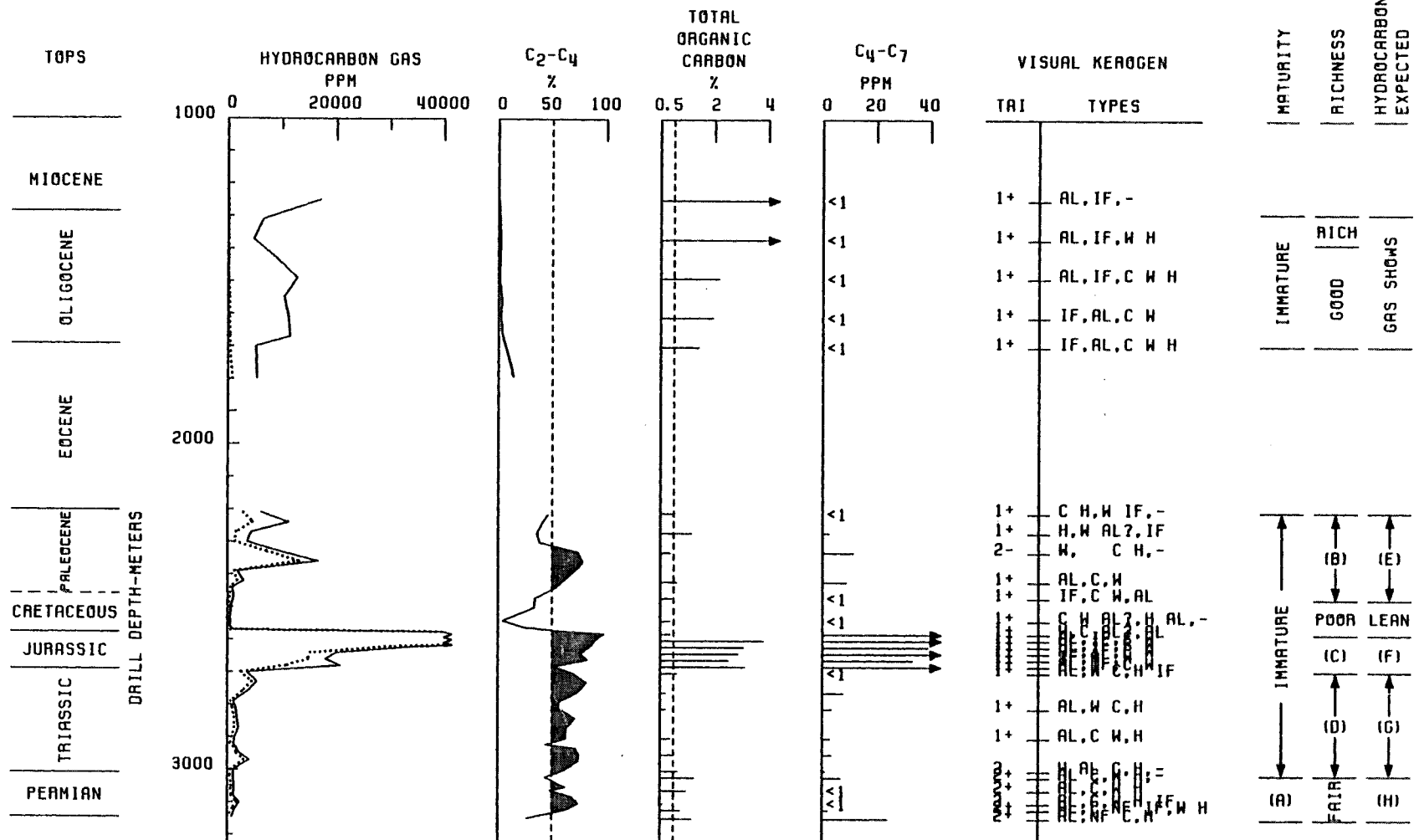
	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	51.6		1T3-DMCP	0.0	0.00
ETHANE	27.4		1T2-DMCP	16.2	2.81
PROPANE	8.9		3-EPENT	0.0	0.00
IBUTANE	5.2	0.90	224-THP	0.0	0.00
NBUTANE	23.8	4.13	NHEPTANE	20.2	3.51
IPENTANE	49.6	8.61	1C2-DMCP	0.0	0.00
NPENTANE	117.6	20.43	NCH	7.2	1.25
22-DMB	0.0	0.00			
CPENTANE	7.0	1.22			
23-DMB	0.0	0.00			
2-MP	60.6	10.54			
3-MP	41.0	7.12			
NHEXANE	65.2	14.81			
MCP	74.6	12.96			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	22.8	3.96			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	12.1	2.10			
23-DMP	8.9	1.55			
3-MHEX	17.5	3.04			
1C3-DMCP	6.1	1.06			

TOTALS PPB	NORM PERCENT	SIO COMP RATIOS	
ALL COMP	663.	C1/C2	0.43
GASOLINE	575.	A /D2	6.03
NAPTHENES	134.	C1/D2	2.41
C6-7	271.	CH/MCP	0.31
		PENT/IPENT.	2.37

75623D OFFSHORE NORWAY, 16/7-2, 3146 METERS

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	83.5		1T3-DMCP	864.4	3.61
ETHANE	122.4		1T2-DMCP	788.1	3.30
PROPANE	516.6		3-EPENT	0.0	0.00
IBUTANE	539.2	2.25	224-THP	0.0	0.00
NBUTANE	1678.5	7.02	NHEPTANE	1125.0	4.70
IPENTANE	2952.1	12.35	1C2-DMCP	90.1	0.38
NPENTANE	3047.0	12.74	NCH	431.2	1.80
22-DMB	17.6	0.07			
CPENTANE	308.6	1.29			
23-DMB	201.5	0.84			
2-MP	2729.9	11.42			
3-MP	1126.9	4.71			
NHEXANE	2474.6	10.35			
MCP	2466.0	10.31			
22-DMP	0.0	0.00			
24-DMP	63.4	0.27			
223-TMB	1.3	0.01			
CHEXANE	378.6	1.58			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	790.5	3.31			
23-DMP	312.8	1.31			
3-MHEX	849.1	3.55			
1C3-DMCP	676.0	2.83			

TOTALS PPB	NORM PERCENT	SIO COMP RATIOS	
ALL COMP	24635.	C1/C2	0.33
GASOLINE	23913.	A /D2	4.24
NAPTHENES	6003.	C1/D2	1.88
C6-7	11311.	CH/MCP	0.15
		PENT/IPENT.	1.03



— C₁-C₄
 C₂-C₄

NF-NONFILAMENTOUS ALGAL?
 AL2-ALGAL?
 AL-ALGAL
 IF-INDETERMINATE FINES
 H-HERBACEOUS
 W-WOODY
 C-COALY

(A) MATURE
 (B) MOSTLY MARGINAL
 (C) GOOD TO RICH
 (D) POOR TO MARGINAL
 (E) MINOR GAS SHOWS
 (F) WET GAS, IMMATURE OIL
 (G) MINOR WET GAS SHOWS
 (H) OIL, GAS

FIG. 1 - GEOCHEMICAL PROFILES. 16/7-2

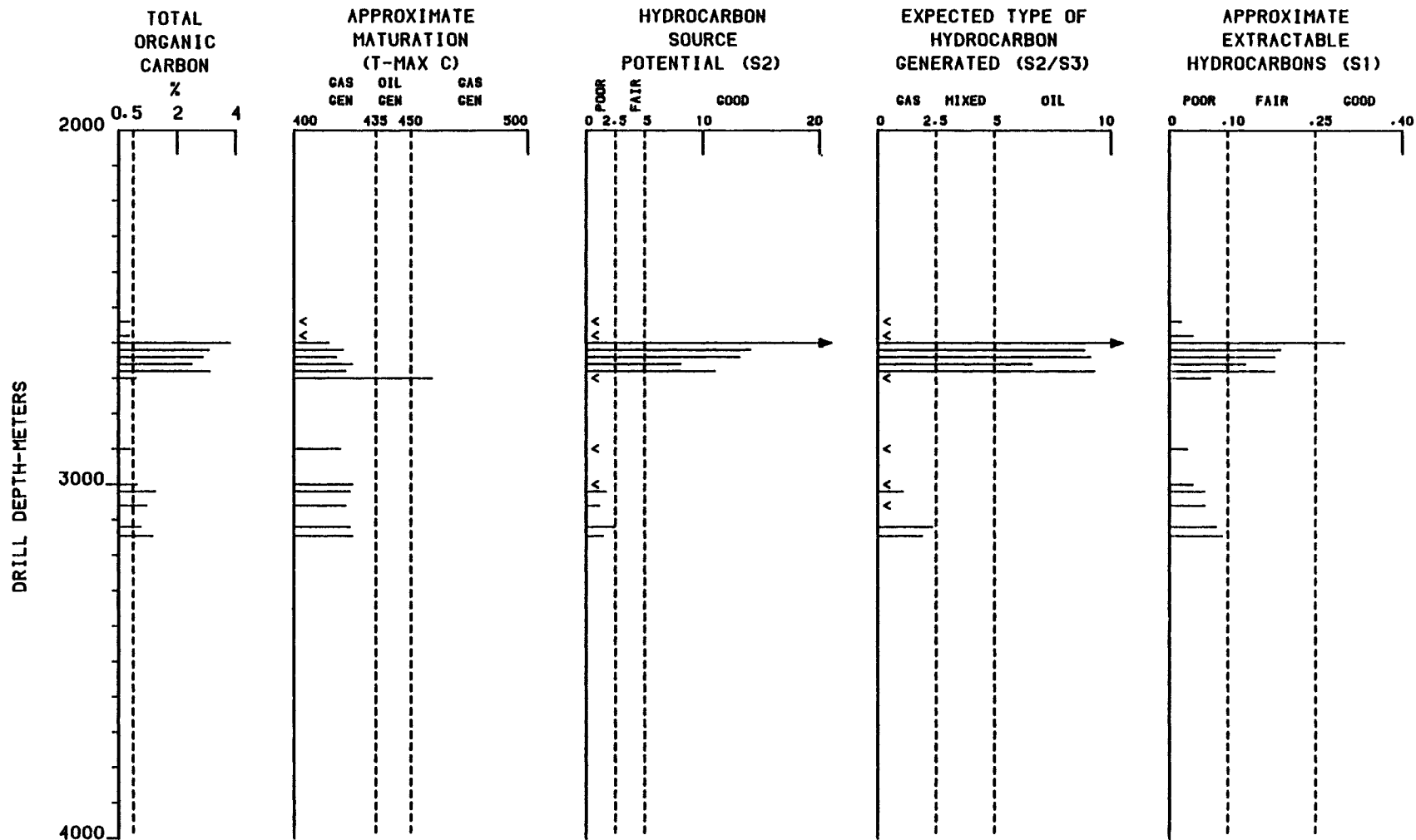


Fig. 2
 EPRCo. ROCK-EVAL PYROLYSIS
 GEOCHEMICAL LOG - 16/7-2

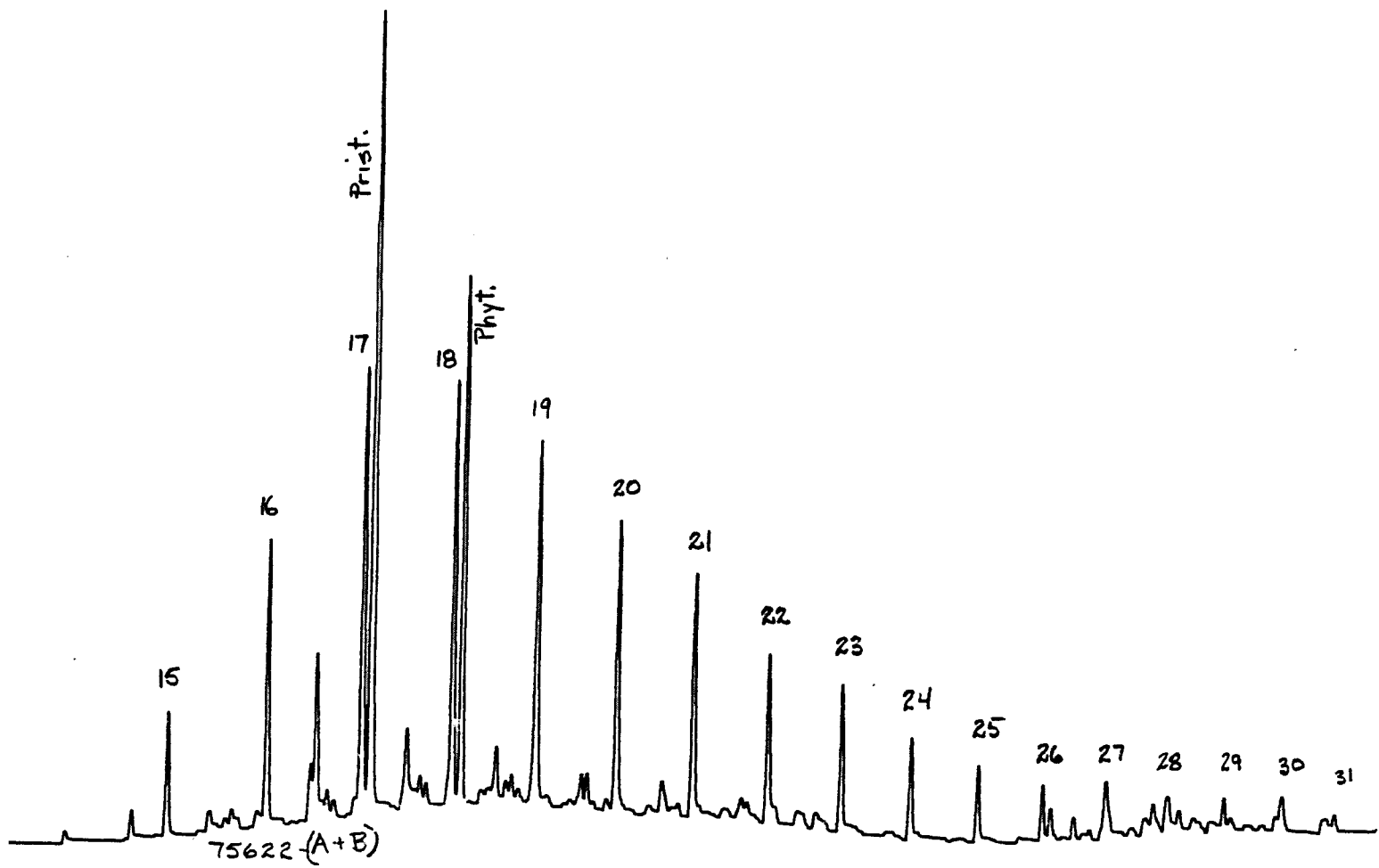


FIGURE 3 — Saturates, Jurassic Cuttings Extract, 2600 & 2620 meters

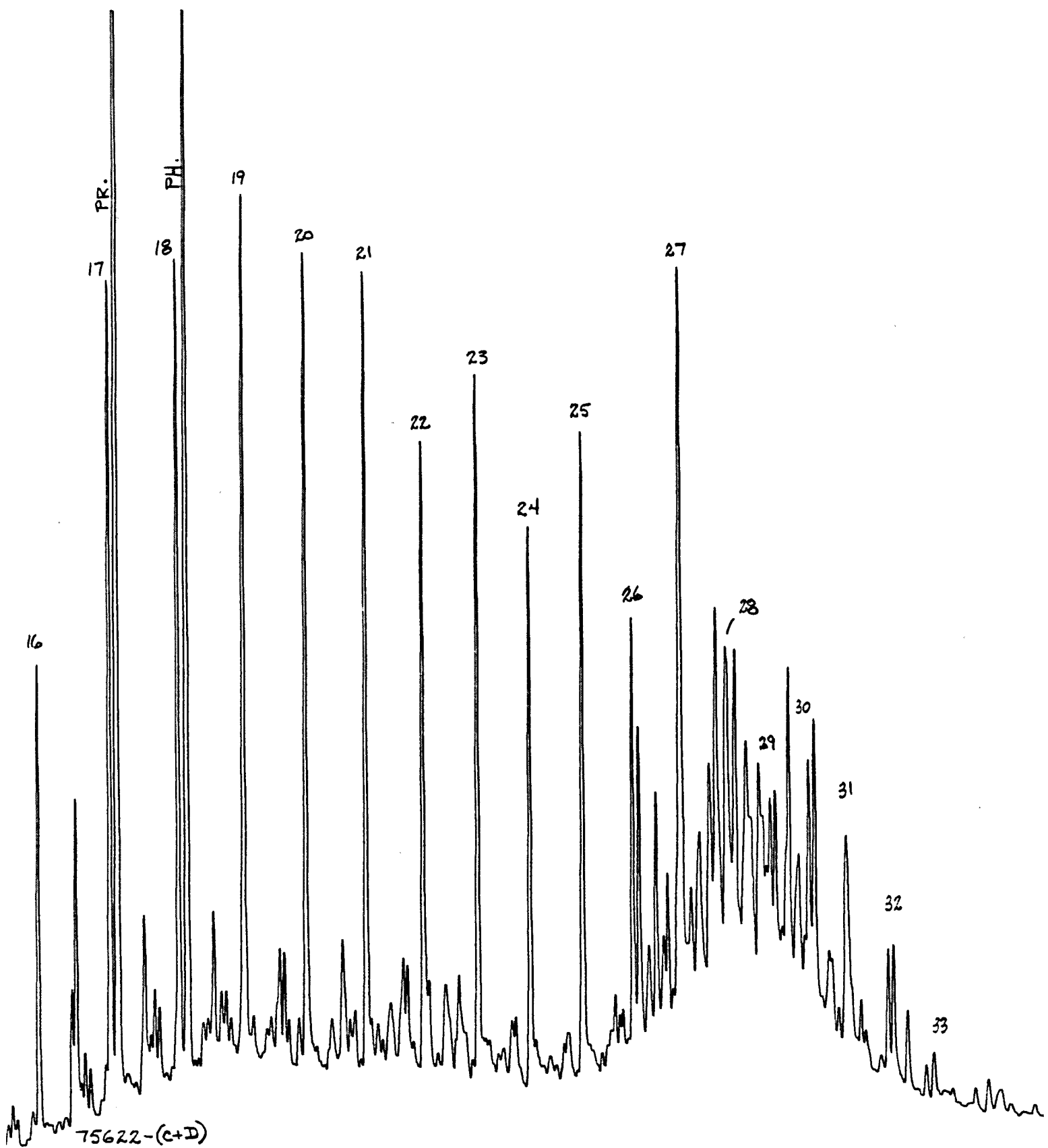


FIGURE 4 — Saturates, Jurassic Cuttings Extract, 2640 & 2660 meters

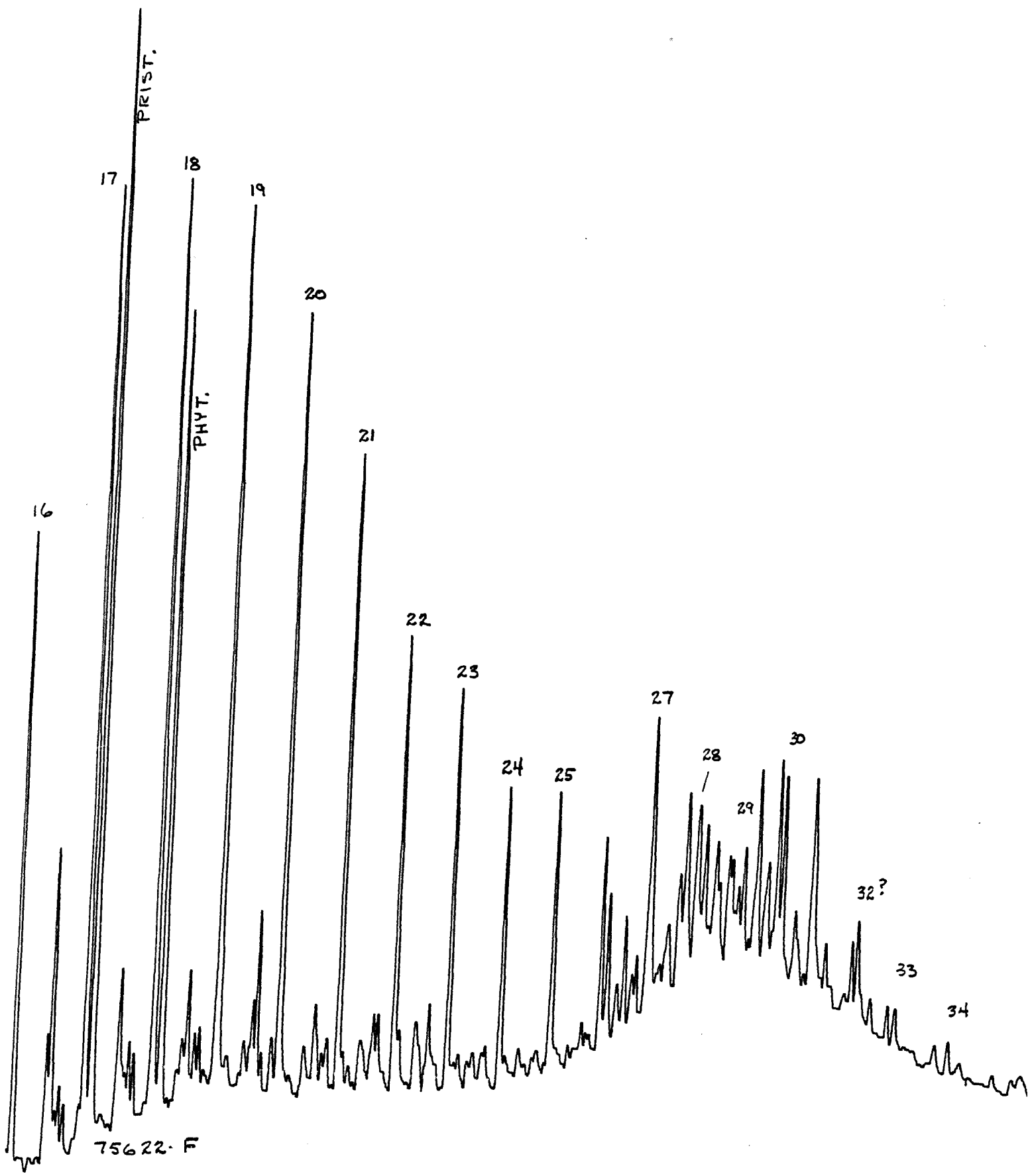


FIGURE 5 - Triassic Cuttings Extract, 2700 meters

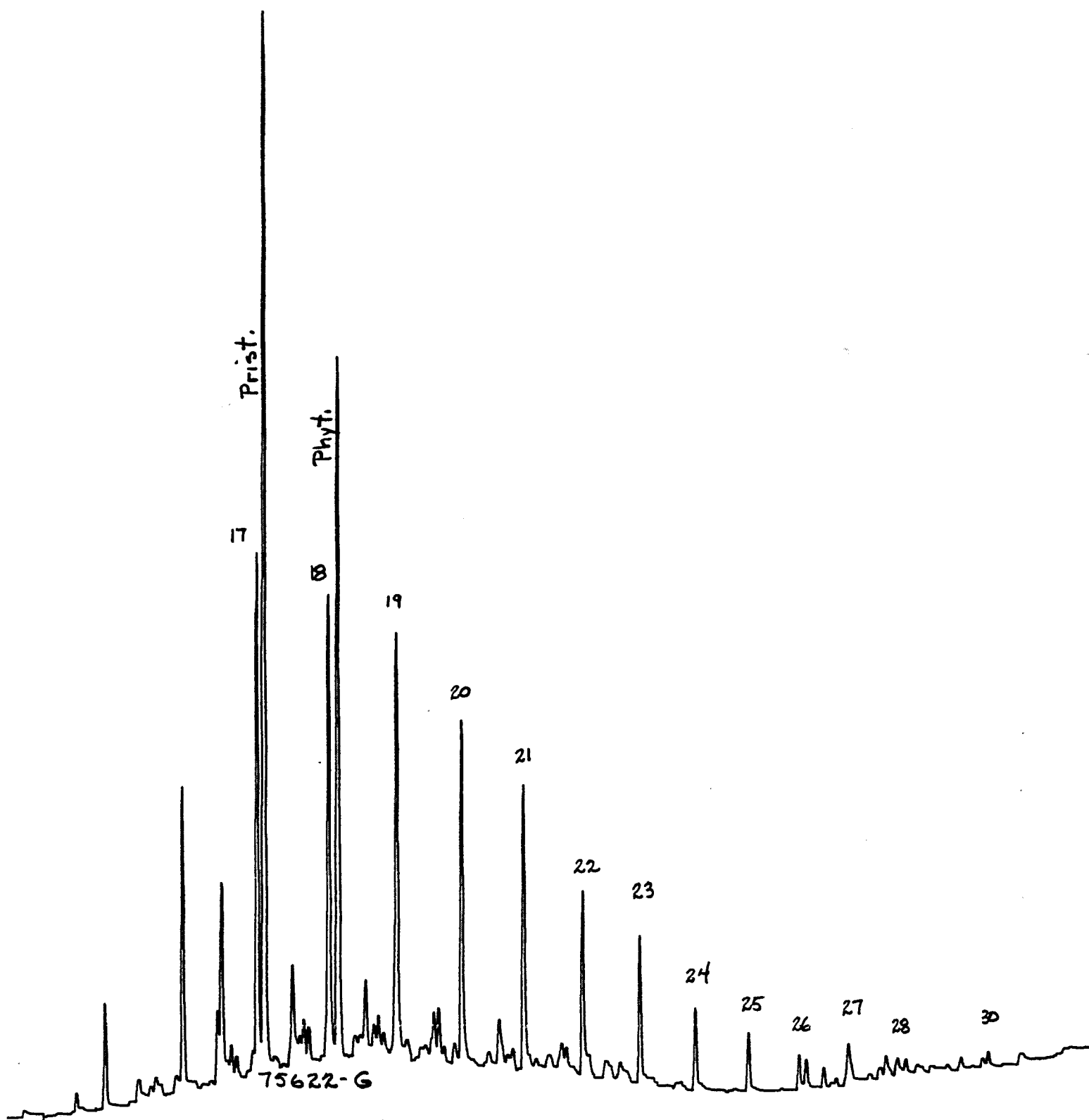


FIGURE 6 — Triassic Cuttings Extract, 2730 meters

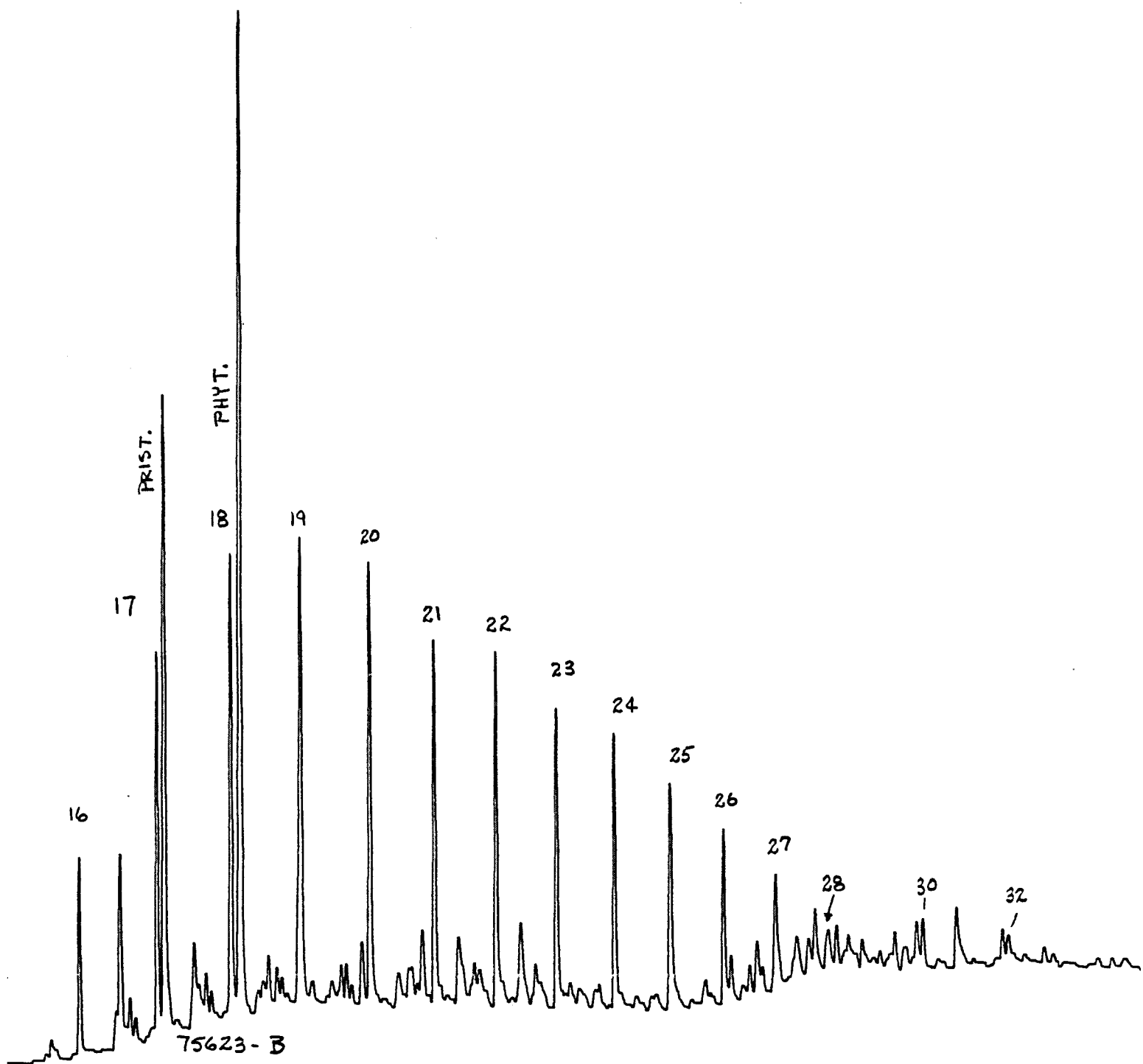
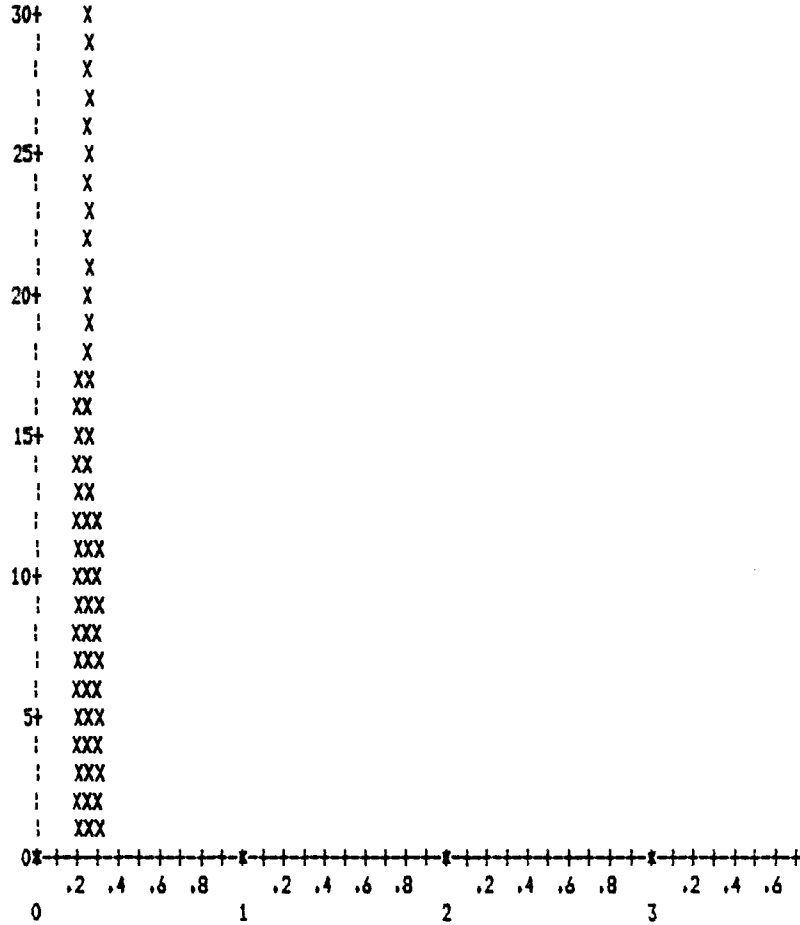


FIGURE 7 — Permian Cuttings Extract, 3100 meters

CLIENT..... EXXON FILE NAME..... 573-001
 DEPTH/SAMPLE NO.. 75421-A, 1,250 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.H. WENGER NO. OF OBSERVATIONS. 65

STANDARD ZR₀ START: 1.01 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.20 MAX. 0.34 AVG. 0.27 STD. DEV. 0.03



VITRINITE REFLECTANCE HISTOGRAM - ZR₀

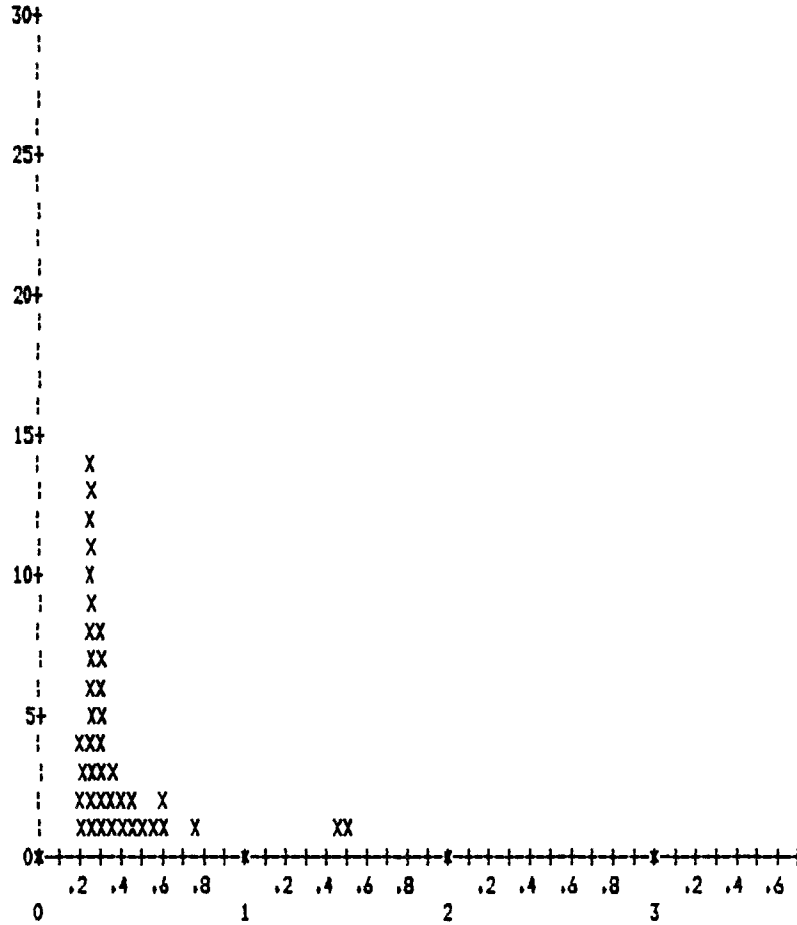
POP.# 1 TOTAL CTS. 65 MIN. 0.20 MAX. 0.34 AVG. 0.27 STD. DEV. 0.03

FIGURE 8 — Rock Chips, 1250 meters

CLIENT..... EXXON FILE NAME..... 573-002
 DEPTH/SAMPLE NO.. 75621-C, 1,370 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.H. WENGER NO. OF OBSERVATIONS. 40

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.20 MAX. 1.54 AVG. 0.40 STD. DEV. 0.28



VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS. 29 MIN. 0.20 MAX. 0.36 AVG. 0.28 STD. DEV. 0.04
 POP.# 2 TOTAL CTS. 8 MIN. 0.41 MAX. 0.61 AVG. 0.51 STD. DEV. 0.08
 POP.# 3 TOTAL CTS. 1 MIN. 0.76 MAX. 0.76 AVG. 0.76 STD. DEV. 0.00
 POP.# 4 TOTAL CTS. 2 MIN. 1.45 MAX. 1.54 AVG. 1.50 STD. DEV. 0.06

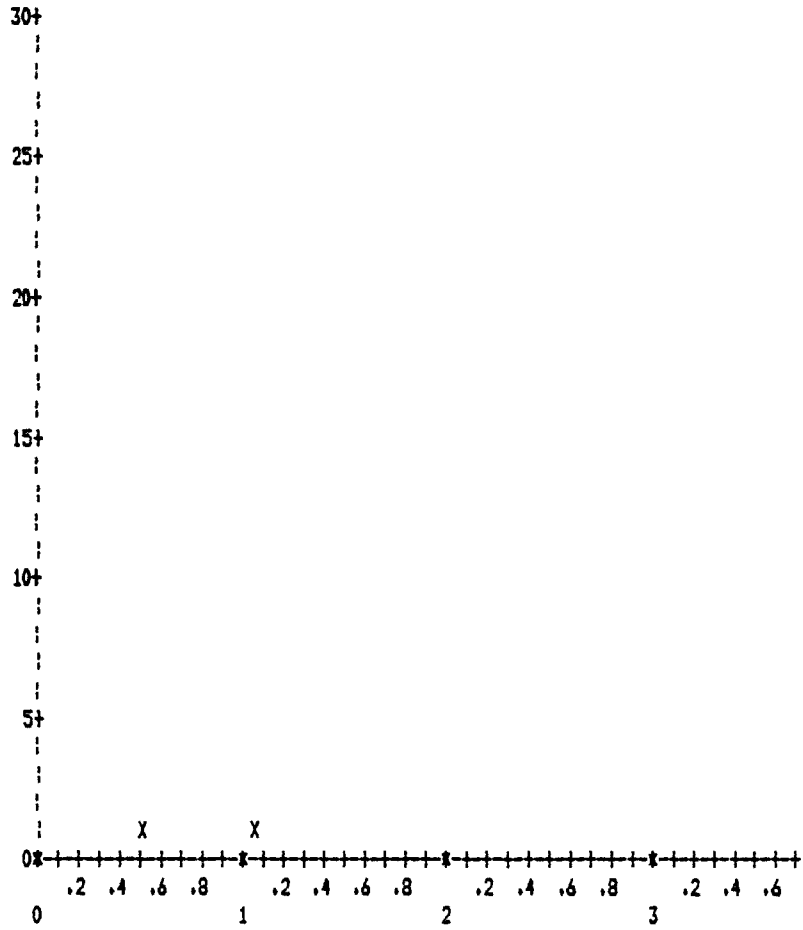
FIGURE 9 — Rock Chips, 1370 meters

CLIENT..... EXXON
 DEPTH/SAMPLE NO.. 75621-J, 2,210 M
 LOCATION..... UNKNOWN
 ANALYST..... L.M. WENGER

FILE NAME..... 573-003
 TYPE OF SAMPLE..... CTGS.
 DATE..... 8-6-82
 NO. OF OBSERVATIONS, 2

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.50 MAX. 1.08 AVG. 0.79 STD. DEV. 0.41



VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS. 1 MIN. 0.50 MAX. 0.50 AVG. 0.50 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 1 MIN. 1.08 MAX. 1.08 AVG. 1.08 STD. DEV. 0.00

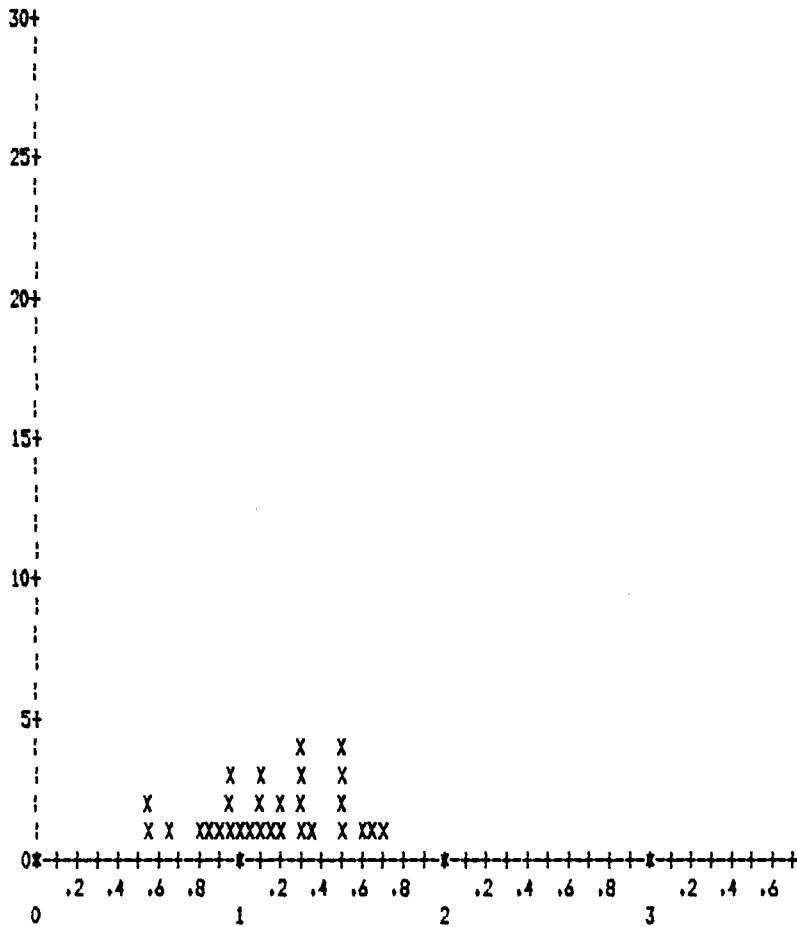
FIGURE 10 — Rock Chips, 2210 meters

CLIENT..... EXXON
 DEPTH/SAMPLE NO.. 75621-L, 2,330 M
 LOCATION..... UNKNOWN
 ANALYST..... L.M. WENGER

FILE NAME..... 573-005
 TYPE OF SAMPLE..... CTGS.
 DATE..... 8-6-82
 NO. OF OBSERVATIONS. 29

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.56 MAX. 1.72 AVG. 1.18 STD. DEV. 0.31



VITRINITE REFLECTANCE HISTOGRAM - ZRo

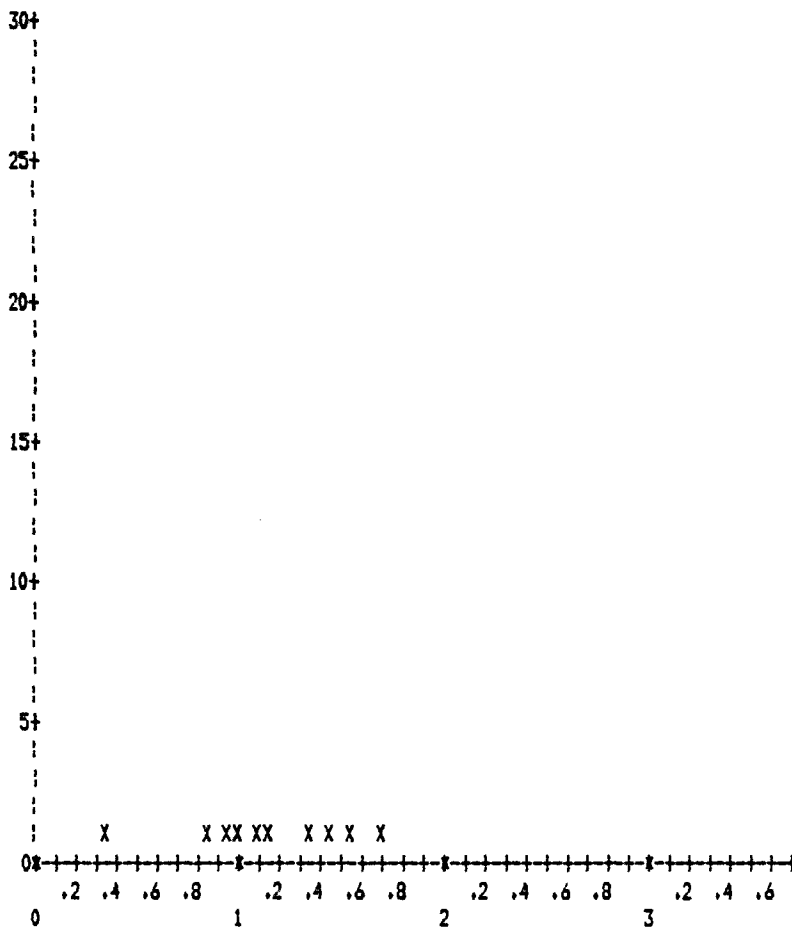
POP.# 1 TOTAL CTS. 3 MIN. 0.56 MAX. 0.69 AVG. 0.61 STD. DEV. 0.07
 POP.# 2 TOTAL CTS. 7 MIN. 0.83 MAX. 1.00 AVG. 0.94 STD. DEV. 0.06
 POP.# 3 TOTAL CTS. 5 MIN. 1.06 MAX. 1.18 AVG. 1.12 STD. DEV. 0.04
 POP.# 4 TOTAL CTS. 7 MIN. 1.23 MAX. 1.37 AVG. 1.30 STD. DEV. 0.05
 POP.# 5 TOTAL CTS. 7 MIN. 1.50 MAX. 1.72 AVG. 1.57 STD. DEV. 0.09

FIGURE 12 — Rock Chips, 2330 meters

CLIENT..... EXXON FILE NAME..... 573-006
 DEPTH/SAMPLE NO., 75621-N, 2,420 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.M. WENGER NO. OF OBSERVATIONS. 10

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.39 MAX. 1.70 AVG. 1.17 STD. DEV. 0.38



VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS. 1 MIN. 0.39 MAX. 0.39 AVG. 0.39 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 5 MIN. 0.86 MAX. 1.17 AVG. 1.03 STD. DEV. 0.12

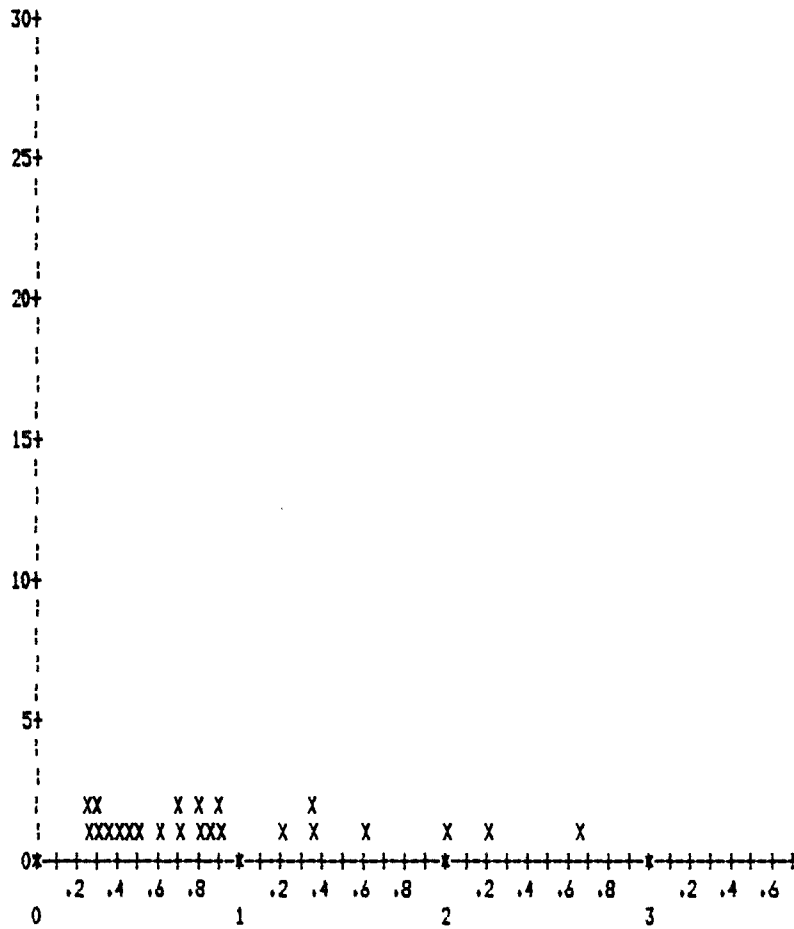
POP.# 3 TOTAL CTS. 4 MIN. 1.37 MAX. 1.70 AVG. 1.53 STD. DEV. 0.15

FIGURE 13 — Rock Chips, 2420 meters

CLIENT..... EXXON FILE NAME..... 573-007
 DEPTH/SAMPLE NO.. 75622-A, 2,600 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.M. WENGER NO. OF OBSERVATIONS. 23

STANDARD ZR_0 START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.25 MAX. 2.66 AVG. 0.95 STD. DEV. 0.66



VITRINITE REFLECTANCE HISTOGRAM - ZR_0

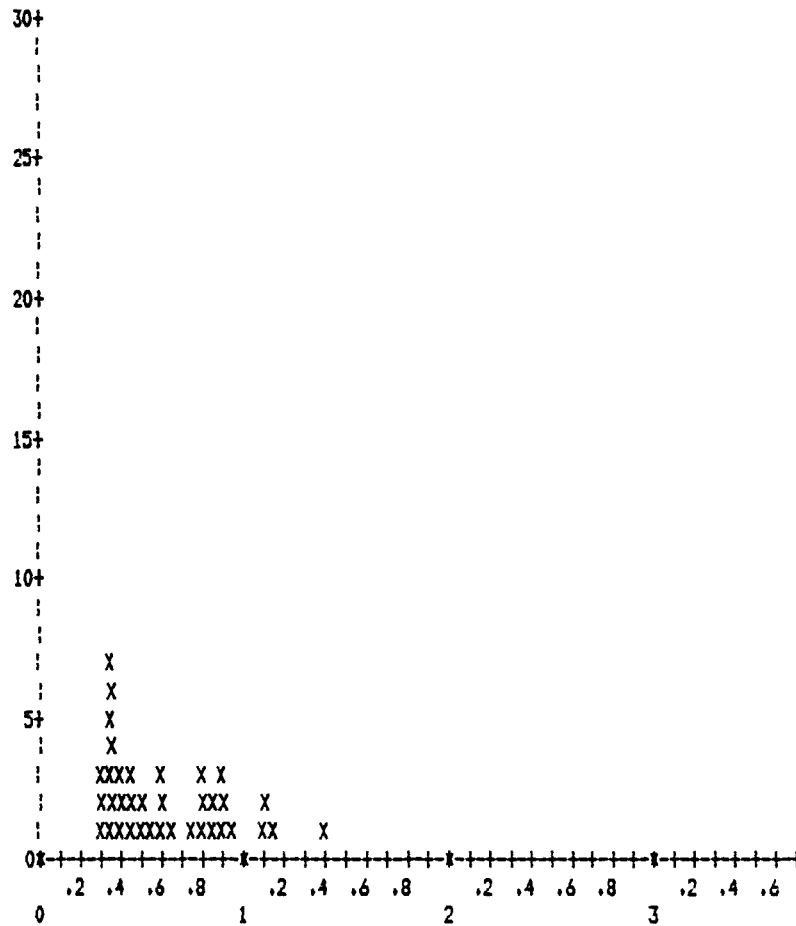
POP. # 1 TOTAL CTS. 8 MIN. 0.25 MAX. 0.53 AVG. 0.36 STD. DEV. 0.10
 POP. # 2 TOTAL CTS. 8 MIN. 0.60 MAX. 0.92 AVG. 0.80 STD. DEV. 0.11
 POP. # 3 TOTAL CTS. 4 MIN. 1.20 MAX. 1.63 AVG. 1.39 STD. DEV. 0.18
 POP. # 4 TOTAL CTS. 3 MIN. 2.03 MAX. 2.66 AVG. 2.31 STD. DEV. 0.32

FIGURE 14 — Rock Chips, 2600 meters

CLIENT..... EXXON FILE NAME..... 573-008
 DEPTH/SAMPLE NO.. 75622-C, 2,640 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L. M. WENGER NO. OF OBSERVATIONS. 37

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.31 MAX. 1.43 AVG. 0.64 STD. DEV. 0.29



VITRINITE REFLECTANCE HISTOGRAM - ZRo

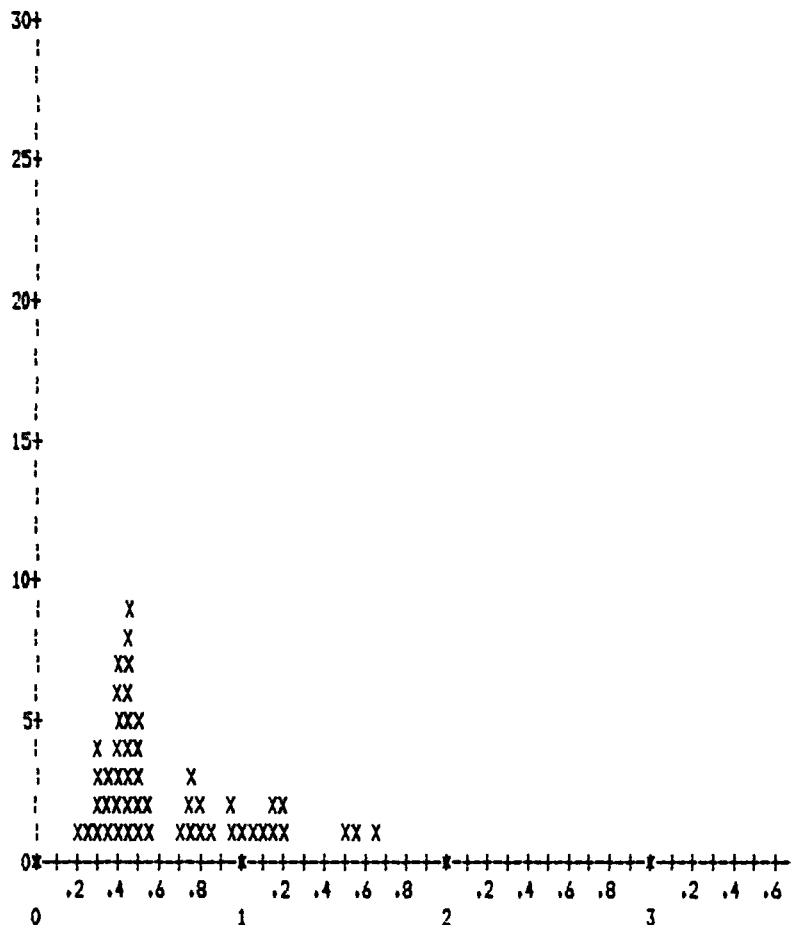
POP.# 1	TOTAL CTS. 18	MIN. 0.31	MAX. 0.52	AVG. 0.40	STD. DEV. 0.06
POP.# 2	TOTAL CTS. 5	MIN. 0.58	MAX. 0.67	AVG. 0.62	STD. DEV. 0.03
POP.# 3	TOTAL CTS. 10	MIN. 0.78	MAX. 0.96	AVG. 0.87	STD. DEV. 0.06
POP.# 4	TOTAL CTS. 3	MIN. 1.12	MAX. 1.16	AVG. 1.13	STD. DEV. 0.02
POP.# 5	TOTAL CTS. 1	MIN. 1.43	MAX. 1.43	AVG. 1.43	STD. DEV. 0.00

FIGURE 15 — Rock Chips, 2640 meters

CLIENT..... EXXON FILE NAME..... 573-009
 DEPTH/SAMPLE NO.. 75622-D, 2,660 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.M. WENGER NO. OF OBSERVATIONS. 51

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.21 MAX. 1.69 AVG. 0.67 STD. DEV. 0.36



VITRINITE REFLECTANCE HISTOGRAM - ZRo

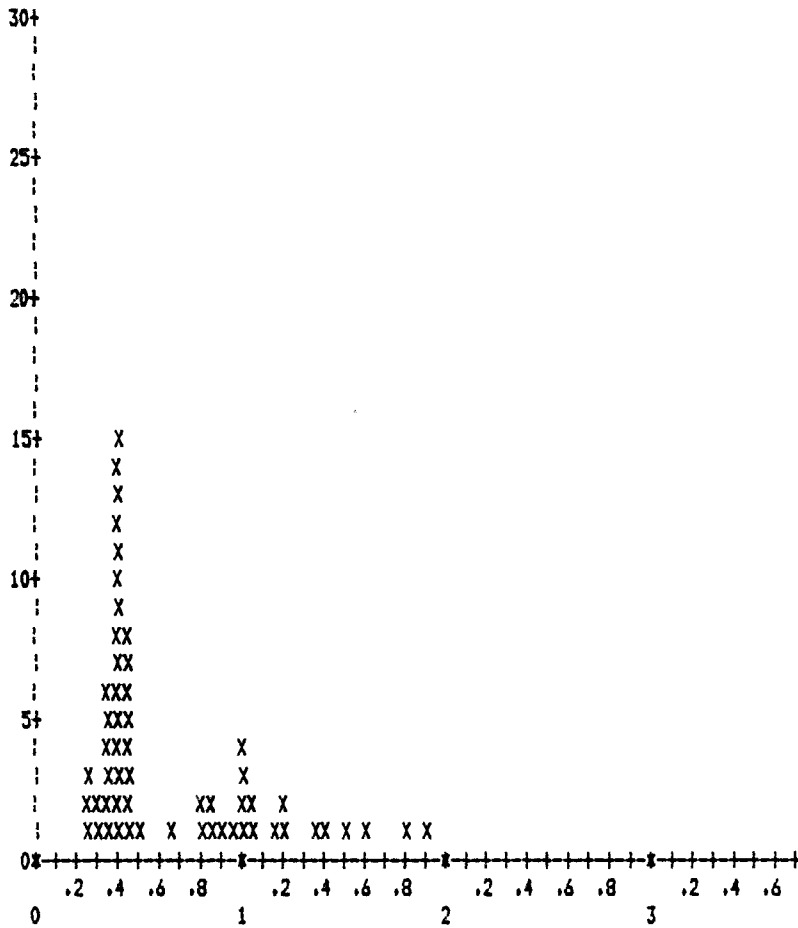
POP.# 1 TOTAL CTS. 32 MIN. 0.21 MAX. 0.58 AVG. 0.43 STD. DEV. 0.09
 POP.# 2 TOTAL CTS. 7 MIN. 0.72 MAX. 0.87 AVG. 0.80 STD. DEV. 0.05
 POP.# 3 TOTAL CTS. 9 MIN. 0.95 MAX. 1.24 AVG. 1.10 STD. DEV. 0.11
 POP.# 4 TOTAL CTS. 3 MIN. 1.52 MAX. 1.69 AVG. 1.59 STD. DEV. 0.09

FIGURE 16 — Rock Chips, 2660 meters

CLIENT..... EXXON FILE NAME..... 573-010
 DEPTH/SAMPLE NO.. 75622-E, 2,680 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-6-82
 ANALYST..... L.M. WENGER NO. OF OBSERVATIONS. 57

STANDARD IRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.25 MAX. 1.92 AVG. 0.69 STD. DEV. 0.42



VITRINITE REFLECTANCE HISTOGRAM - IRo

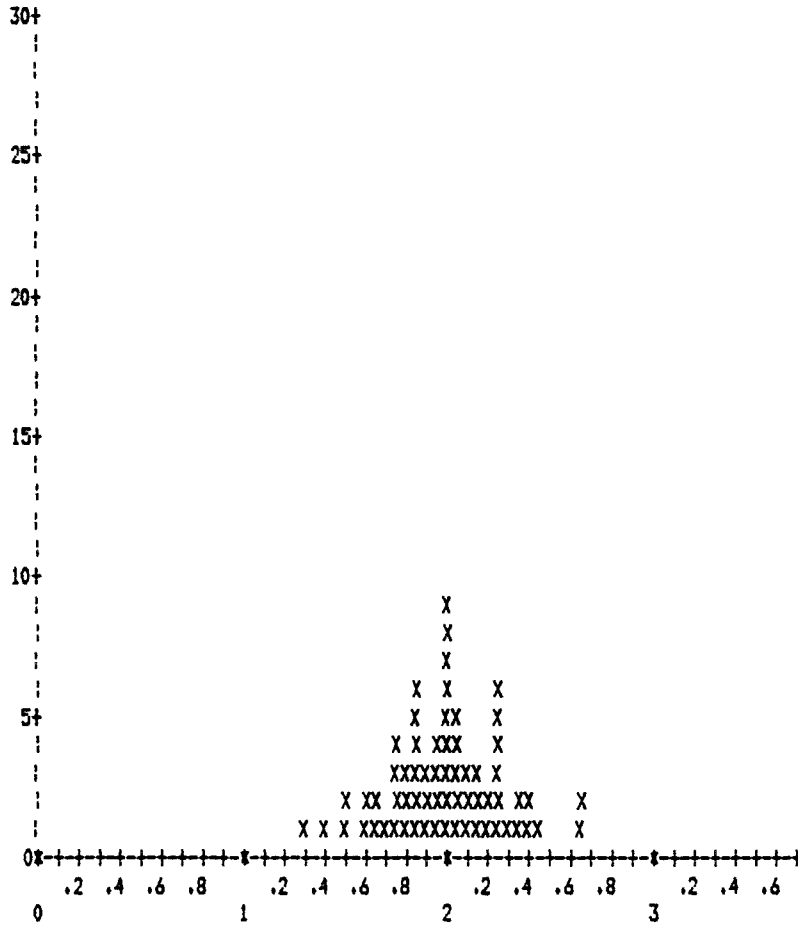
POP.#	TOTAL CTS.	MIN.	MAX.	AVG.	STD. DEV.
1	35	0.25	0.51	0.41	0.06
2	1	0.66	0.66	0.66	0.00
3	15	0.82	1.23	1.00	0.13
4	4	1.38	1.63	1.49	0.11
5	2	1.83	1.92	1.88	0.06

FIGURE 17 — Rock Chips, 2680 meters

CLIENT..... EXXON FILE NAME..... 573-011
 DEPTH/SAMPLE NO.. 75622-F, 2,700 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-9-82
 ANALYST..... L.H. WENGER NO. OF OBSERVATIONS. 65

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.30 MAX. 2.65 AVG. 2.01 STD. DEV. 0.27



VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS. 8 MIN. 1.30 MAX. 1.68 AVG. 1.55 STD. DEV. 0.13
 POP.# 2 TOTAL CTS. 41 MIN. 1.72 MAX. 2.19 AVG. 1.96 STD. DEV. 0.12
 POP.# 3 TOTAL CTS. 14 MIN. 2.24 MAX. 2.48 AVG. 2.32 STD. DEV. 0.08
 POP.# 4 TOTAL CTS. 2 MIN. 2.65 MAX. 2.65 AVG. 2.65 STD. DEV. 0.00

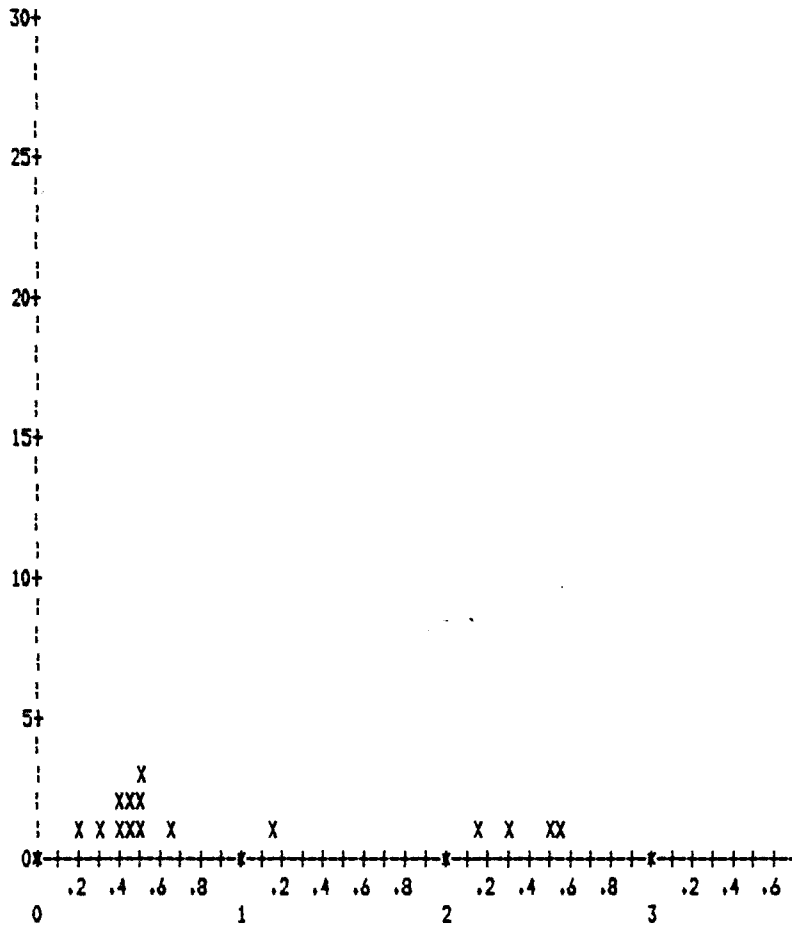
FIGURE 18 — Rock Chips, 2700 meters

CLIENT..... EXXON
 DEPTH/SAMPLE NO.. 75622-R, 3020 M
 LOCATION..... UNKNOWN
 ANALYST..... L.H. WENGER

FILE NAME..... 573-014
 TYPE OF SAMPLE..... CTGS.
 DATE..... 8-9-82
 NO. OF OBSERVATIONS. 15

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.23 MAX. 2.57 AVG. 1.02 STD. DEV. 0.89



VITRINITE REFLECTANCE HISTOGRAM - ZRo

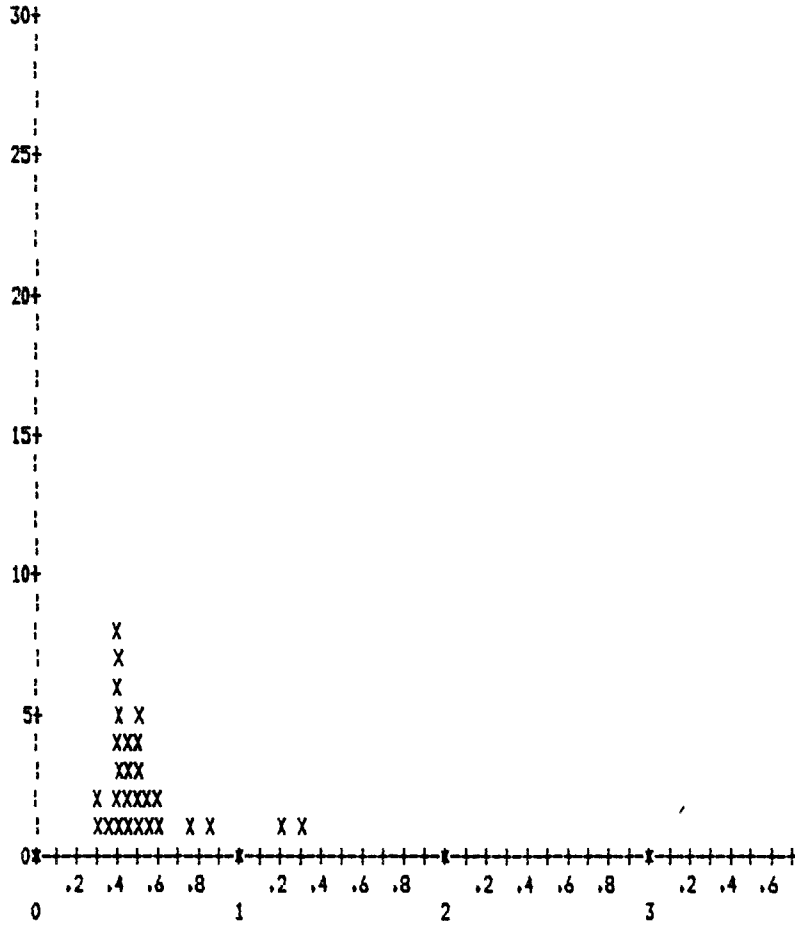
POP. # 1	TOTAL CTS. 2	MIN. 0.23	MAX. 0.30	AVG. 0.27	STD. DEV. 0.05
POP. # 2	TOTAL CTS. 7	MIN. 0.42	MAX. 0.53	AVG. 0.48	STD. DEV. 0.04
POP. # 3	TOTAL CTS. 1	MIN. 0.66	MAX. 0.66	AVG. 0.66	STD. DEV. 0.00
POP. # 4	TOTAL CTS. 1	MIN. 1.15	MAX. 1.15	AVG. 1.15	STD. DEV. 0.00
POP. # 5	TOTAL CTS. 4	MIN. 2.15	MAX. 2.57	AVG. 2.40	STD. DEV. 0.20

FIGURE 21 — Rock Chips, 3020 meters

CLIENT..... EXXON FILE NAME..... 573-015
 DEPTH/SAMPLE NO.. 75622-T, 3,060 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-9-82
 ANALYST..... L.H. WENGER NO. OF OBSERVATIONS. 28

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.30 MAX. 1.31 AVG. 0.55 STD. DEV. 0.23



VITRINITE REFLECTANCE HISTOGRAM - ZRo

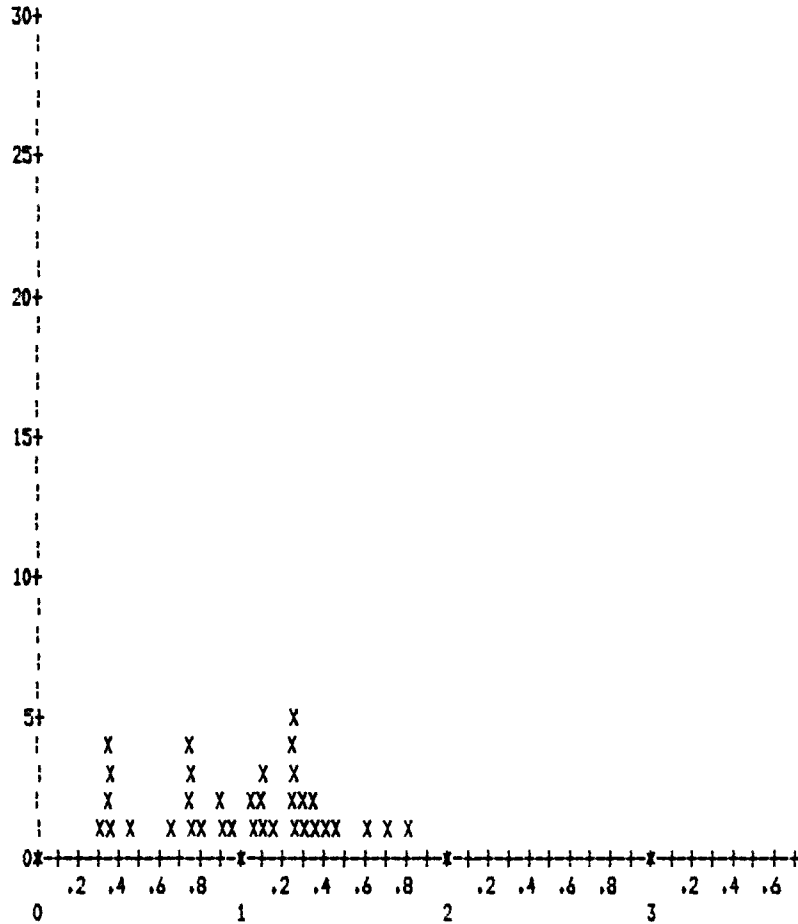
POP.# 1 TOTAL CTS. 24 MIN. 0.30 MAX. 0.63 AVG. 0.47 STD. DEV. 0.08
 POP.# 2 TOTAL CTS. 2 MIN. 0.77 MAX. 0.85 AVG. 0.81 STD. DEV. 0.06
 POP.# 3 TOTAL CTS. 2 MIN. 1.23 MAX. 1.31 AVG. 1.27 STD. DEV. 0.06

FIGURE 22 — Rock Chips, 3060 meters

CLIENT..... EXXON FILE NAME..... 573-016
 DEPTH/SAMPLE NO.. 75423-B, 3,100 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-9-82
 ANALYST..... L.H. WENGER NO. OF OBSERVATIONS. 35

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.33 MAX. 1.82 AVG. 1.03 STD. DEV. 0.40



VITRINITE REFLECTANCE HISTOGRAM - ZRo

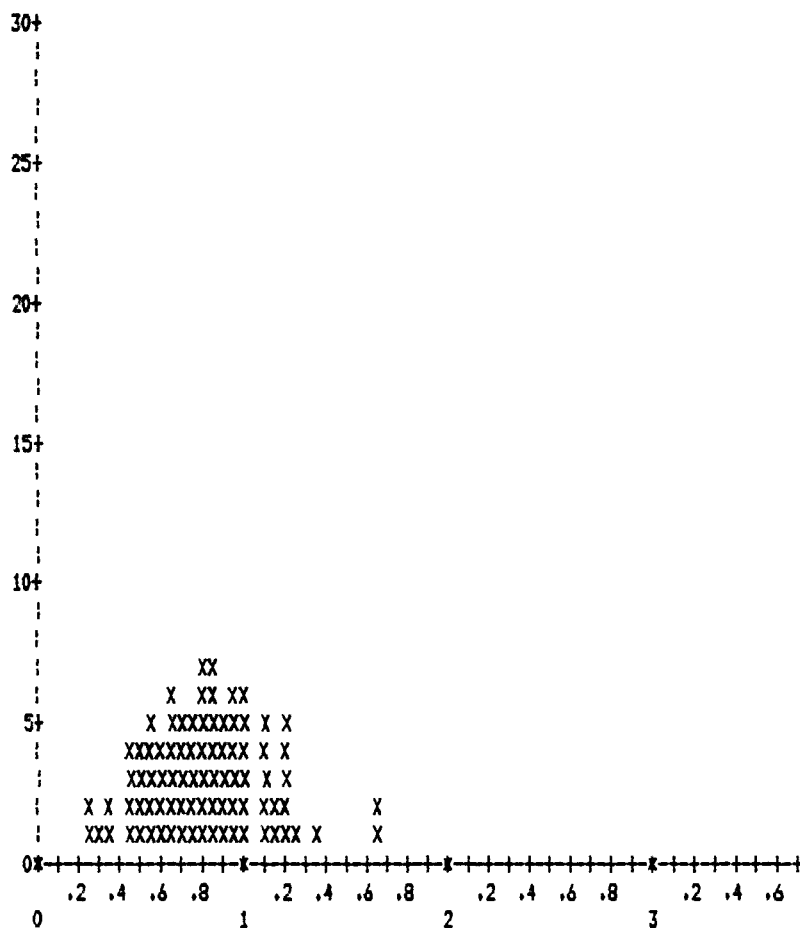
POP.#	TOTAL CTS.	MIN.	MAX.	AVG.	STD. DEV.
1	6	0.33	0.49	0.38	0.06
2	9	0.69	0.95	0.82	0.08
3	6	1.08	1.18	1.12	0.04
4	11	1.27	1.46	1.33	0.07
5	3	1.63	1.82	1.72	0.10

FIGURE 23 — Rock Chips, 3100 meters

CLIENT..... EXXON FILE NAME..... 573-018
 DEPTH/SAMPLE NO.. 75623-D, 3,146 M TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 8-9-82
 ANALYST..... L.M. WENGER NO. OF OBSERVATIONS, 85

STANDARD \bar{X}_{Ro} START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.26 MAX. 1.69 AVG. 0.83 STD. DEV. 0.28



VITRINITE REFLECTANCE HISTOGRAM - \bar{X}_{Ro}

POP.#	TOTAL CTS.	MIN.	MAX.	AVG.	STD. DEV.
1	5	0.26	0.37	0.32	0.05
2	28	0.48	0.74	0.61	0.09
3	36	0.75	1.04	0.90	0.09
4	14	1.10	1.37	1.19	0.07
5	2	1.68	1.69	1.69	0.01

FIGURE 25 — Rock Chips, 3146 meters

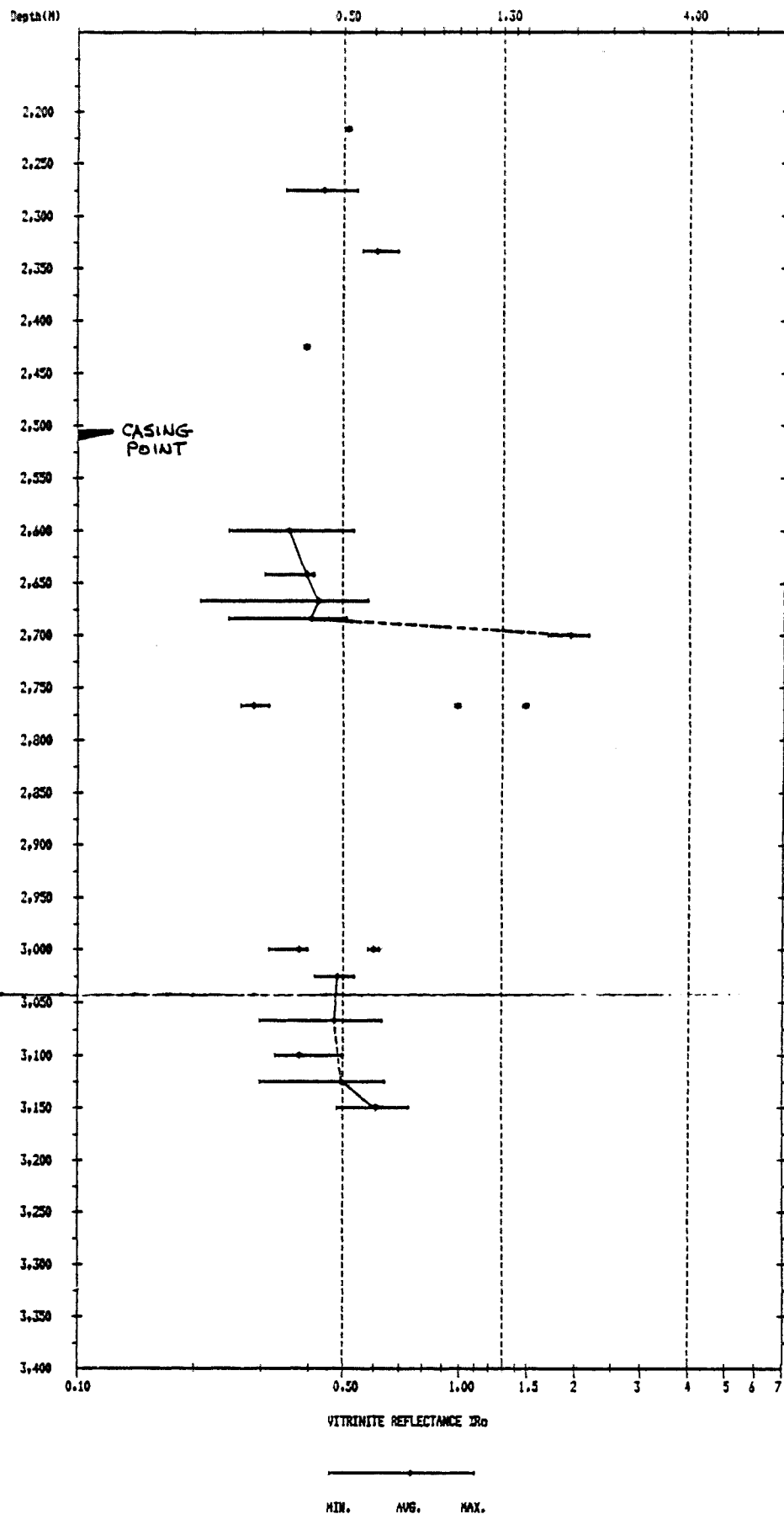


FIGURE 26 - Profile of Reflectance Data
(Geo-Strat) See Table 7