

EXON PRODUCTION RESEARCH COMPANY

WELL 16/7-3, NORWAY:
HYDROCARBON SOURCE ANALYSES

Report by:
R. E. Metter

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Research Application Report

EXXON PRODUCTION RESEARCH COMPANY
POST OFFICE BOX 2189 • HOUSTON, TEXAS 77001

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RESERVOIR EVALUATION DIVISION

M. A. ROGERS
MANAGER

October 20, 1982

Mr. J. D. Hedberg
Esso Exploration and Production Norway, Inc.
Postboks No. 560
4001 Stavanger, Norway

Attention: Mr. S. Horvik

Transmitted are five copies of our report EPR.227ES.82 entitled "Well 16/7-3, Norway: Hydrocarbon Source Analyses" by R. E. Metter.

The work summarized in this report was requested in a June 7, 1982 telex from J. Barrier of Esso Europe in London. Charges for the work have been billed to your No. 0572324 through our Job No. 16878.

The section at 16/7-3 is rated as immature down through the Triassic, and both the Permian and the Triassic samples that we received were almost entirely red beds rating as nonsources of hydrocarbons. The Tertiary shales are potential sources of oil and gas, but they are definitely immature at this location. The rich Malm shales were not represented by our samples.

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

M. A. ROGERS

By: J. P. Shannon, Jr.
J. P. Shannon, Jr.

REM:sp

Attachment

c: Mr. R. M. Meek
Mr. C. R. Evans

EXXON PRODUCTION RESEARCH COMPANY

WELL 16/7-3, NORWAY:
HYDROCARBON SOURCE ANALYSES

R. E. Metter

Reservoir Evaluation Division

October 1982

EPR.227ES.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.

WELL 16/7-3, NORWAY:
HYDROCARBON SOURCE ANALYSES

R. E. Metter

SUMMARY AND CONCLUSIONS

Sixty-four canned cuttings samples from the interval 1250-3140 meters were analyzed routinely for hydrocarbon source characteristics. The results are given in Tables 1 through 7 and in Figures 1 through 11.

The data can be interpreted as follows:

<u>Approximate Depth (meters)</u>	<u>Unit</u>	<u>Maturity</u>	<u>Richness</u>	<u>Source Type When Mature</u>
1250-1270	Miocene	Immature	Rich	Gas, Liquids
1270-1555	Oligocene	"	Good	Oil, Gas
1555-2050	Eocene	"	Good to Marginal	Gas, Liquids
2050-2270	Paleocene	"	Marginal to Good	Oil
2270-2340	Cretaceous	"	Mostly Poor	Nonsource
2340-2390	Jurassic*	"	Fair?	Nonsource?
2390-2800	Triassic	"	Poor	Nonsource
2800-3141(TD)	Permian	Mature	Poor	Mostly Nonsource

*We probably did not have a bona fide Jurassic sample.

Our samples from about 2450 meters to total depth were all red beds, rating as nonsources. Jurassic and younger beds include potential oil and gas sources, but they are all immature at the 16/7-3 location.

The interval identified as "Jurassic" did not provide us with samples of rich dark shale typical of the Malm oil source beds.

A gray "Cretaceous" shale sample from the can labelled "2270 meters" contained 1.59% organic carbon comprised of considerable amounts of "algal" materials, suggesting a good potential oil source rock. The shale probably originated from the Paleocene section instead of the Cretaceous; the shales from the Paleocene interval mostly contained predominantly algal kerogen materials and are rated as potential but currently immature oil sources.

This work was requested in a telex of June 7, 1982 from J. Barrier of Esso Europe in London. Charges for the work have been billed to Esso Exploration and Production Norway No. 0572324 through our EPR Job No. 16878.

PROCEDURES

1. C₁-C₄ - Sixty-four 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 37 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 7, and they are plotted graphically in Figure 1.
3. Visual kerogen - Visual kerogen characteristics by transmitted light were determined on 27 of the samples (Table 4). Determinations were made with a standard 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 - Six gross cuttings samples were analyzed by GeoChem Laboratories for C₁₅+ compounds. The samples were Soxhlet-extracted with a methanol, methylene-chloride 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 6 through 11).
5. Vitrinite R₀ - Four shale samples were sent to Geo-Strat, Inc. of Houston for vitrinite reflectance measurements (Figures 2 through 5, and Table 6). Whole-rock fragments in epoxy plug mounts were used for the measurements.

C1-C4 HYDROCARBON ANALYSES - AIR SPACE AT TOP OF CANS

SPL. NO	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)						GAS COMPOSITION (PERCENT)									
			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		
75764A	0	1250	88.59	2.59	4.88	3.90	1.18	12.55	101.14	12.4085	87.	3.	5.	4.	1.	21.39	31.	9.
75764B	0	1280	345.18	3.04	2.50	0.99	0.61	7.14	352.32	2.0266	98.	1.	1.	0.	0.	42.35	14.	9.
75764C	0	1310	151.15	2.99	8.57	6.85	1.78	20.19	171.34	11.7836	88.	2.	5.	4.	1.	15.42	34.	9.
75764D	0	1340	78.04	6.46	23.33	18.25	4.28	52.32	130.36	40.1350	60.	5.	18.	14.	3.	12.45	35.	8.
75764E	0	1370	281.95	5.29	8.70	7.48	1.99	23.46	305.41	7.6814	92.	2.	3.	2.	1.	23.37	32.	8.
75764F	0	1400	190.15	1.74	12.04	9.54	2.99	26.31	216.46	12.1546	88.	1.	6.	4.	1.	7.46	36.	11.
75764G	0	1430	206.07	2.65	7.79	6.19	3.01	19.64	225.71	8.7014	92.	1.	3.	3.	1.	13.40	32.	15.
75764H	0	1460	616.74	6.43	11.65	8.09	3.01	29.18	645.92	4.5175	96.	1.	2.	1.	0.	22.40	28.	10.
75764I	0	1490	457.07	3.74	7.20	5.27	2.39	18.60	475.67	3.9102	95.	1.	2.	1.	1.	20.39	28.	13.
75764J	0	1520	1314.53	9.28	14.39	8.07	3.63	35.37	1349.90	2.6202	97.	1.	1.	1.	0.	26.41	23.	10.
75764K	0	1550	373.74	5.29	10.51	5.60	2.70	24.10	397.84	6.0577	94.	1.	3.	1.	1.	22.44	23.	11.
75764L	0	1580	512.63	7.09	12.40	6.90	3.43	29.82	542.45	5.4972	95.	1.	2.	1.	1.	24.41	23.	12.
75764M	0	1610	553.28	7.51	12.38	6.82	3.41	30.12	583.40	5.1628	95.	1.	2.	1.	1.	25.41	23.	11.
75764N	0	1640	2266.56	48.84	55.52	20.43	9.56	134.35	2400.91	5.5957	95.	2.	2.	1.	0.	36.42	15.	7.
75764O	0	1670	2630.36	59.81	63.85	21.32	10.05	155.03	2785.39	5.5658	95.	2.	2.	1.	0.	39.41	14.	6.
75764P	0	1700	566.30	25.04	33.28	11.61	5.82	75.75	642.05	11.7981	88.	4.	5.	2.	1.	33.44	15.	8.
75764Q	0	1730	959.17	33.07	35.92	10.15	5.10	84.24	1043.41	8.0735	93.	3.	3.	1.	0.	39.43	12.	6.
75764R	0	1760	1237.35	40.03	39.12	10.68	5.02	94.85	1332.20	7.1198	93.	3.	3.	1.	0.	43.41	11.	5.
75764S	0	1790	1203.12	47.19	45.18	10.97	5.56	108.90	1312.02	8.3002	92.	4.	3.	1.	0.	44.41	10.	5.
75764T	0	1820	679.89	17.79	19.32	5.13	2.81	45.05	724.94	6.2143	94.	2.	3.	1.	0.	39.44	11.	6.
75765A	0	1850	560.47	12.78	14.89	4.37	2.57	34.61	595.08	5.8160	94.	2.	3.	1.	0.	37.43	13.	7.
75765B	0	1880	560.40	15.64	12.28	3.25	2.13	33.30	593.70	5.6088	94.	3.	2.	1.	0.	47.37	10.	6.
75765C	0	1910	667.99	13.98	15.61	4.65	2.97	37.21	705.20	5.2765	95.	2.	2.	1.	0.	38.42	12.	8.
75765D	0	1940	1271.66	12.48	14.87	5.46	2.73	35.54	1307.20	2.7188	98.	1.	1.	0.	0.	35.42	15.	8.
75765E	0	1970	2139.78	21.96	22.63	12.54	4.01	61.14	2200.92	2.7779	97.	1.	1.	1.	0.	36.36	21.	7.
75765F	0	2000	1529.69	19.59	15.61	4.78	2.70	42.68	1572.37	2.7143	98.	1.	1.	0.	0.	46.37	11.	6.
75765G	0	2030	312.05	11.87	11.35	4.05	3.64	30.91	342.96	9.0127	92.	3.	3.	1.	1.	38.37	13.	12.
75765H	0	2060	203.72	9.16	9.18	3.34	3.41	25.09	228.81	10.9654	90.	4.	4.	1.	1.	37.36	13.	14.
75765I	0	2090	668.68	34.90	27.14	8.67	7.62	78.33	747.01	10.4858	89.	5.	4.	1.	1.	44.35	11.	10.
75765J	0	2120	364.27	18.07	15.47	5.11	3.87	42.52	406.79	10.4525	90.	4.	4.	1.	1.	43.36	12.	9.
75765K	0	2150	288.24	13.42	14.31	4.49	3.32	35.54	323.78	10.9766	90.	4.	4.	1.	1.	38.40	13.	9.
75765L	0	2180	237.70	10.34	14.73	5.04	4.10	34.21	271.91	12.5813	87.	4.	5.	2.	2.	30.43	15.	12.

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

C1-C4 HYDROCARBON ANALYSES - AIR SPACE AT TOP OF CANS

SPL NO	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)						GAS COMPOSITION (PERCENT)									
			METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOTAL GAS			WET GAS				
										M	E	P	IB	NB	E	P	IB	NB
75824A	0	2210	485.23	14.04	15.87	3.95	3.04	36.90	522.13	7.0672	92.	3.	3.	1.	1.	38.43	11.	8.
75824B	0	2240	364.64	23.79	53.58	19.29	20.40	117.06	481.70	24.3014	76.	5.	11.	4.	4.	20.47	16.	17.
75824C	0	2270	316.76	18.00	29.44	8.96	9.27	65.67	382.43	17.1717	83.	5.	8.	2.	2.	27.45	14.	14.
75824D	0	2300	70.53	5.36	7.13	1.55	1.54	15.58	86.11	18.0931	82.	6.	8.	2.	2.	34.46	10.	10.
75824E	0	2330	16.36	1.74	1.70	0.86	1.31	5.61	21.97	25.5348	74.	8.	8.	4.	6.	32.30	15.	23.
75824F	0	2360	92.39	9.76	3.92	1.37	2.30	17.35	109.74	15.8101	84.	9.	4.	1.	2.	56.23	8.	13.
75824G	0	2390	17.99	0.55	0.51	0.15	0.74	1.95	19.94	9.7793	89.	3.	3.	1.	4.	28.26	8.	38.
75824H	0	2420	2.47	0.12	0.14	0.05	0.13	0.44	2.91	15.1202	85.	4.	5.	2.	4.	27.32	11.	30.
75824I	0	2450	10.02	0.39	0.40	0.12	0.35	1.26	11.28	11.1702	89.	3.	4.	1.	3.	31.31	10.	28.
75824J	0	2480	5.72	0.23	0.23	0.06	0.27	0.79	6.51	12.1352	87.	4.	4.	1.	4.	29.29	8.	34.
75824K	0	2510	69.65	3.36	1.77	0.13	1.82	7.08	76.73	9.2271	92.	4.	2.	0.	2.	47.25	2.	26.
75824L	0	2550	13.10	0.88	1.14	0.41	0.68	3.11	16.21	19.1857	81.	5.	7.	3.	4.	28.37	13.	22.
75824M	0	2580	4691.65	0.05	1.39	0.53	0.90	2.87	4694.52	0.0611	100.	0.	0.	0.	0.	2.49	18.	31.
75824N	0	2610	3897.60	0.03	1.26	0.33	1.07	2.69	3900.29	0.0689	100.	0.	0.	0.	0.	1.47	12.	40.
75824O	0	2640	4065.05	0.03	0.66	0.08	0.44	1.21	4066.26	0.0297	100.	0.	0.	0.	0.	2.55	7.	36.
75824P	0	2670	3592.26	0.02	0.44	0.13	0.31	0.90	3593.16	0.0250	100.	0.	0.	0.	0.	2.50	14.	34.
75824Q	0	2700	3307.05	0.05	0.33	0.11	0.48	0.97	3308.02	0.0293	100.	0.	0.	0.	0.	5.34	11.	50.
75824R	0	2730	14831.95	0.04	1.04	0.06	0.72	1.86	14833.80	0.0125	100.	0.	0.	0.	0.	2.56	3.	39.
75824S	0	2760	3361.28	0.03	0.35	0.13	0.38	0.89	3362.17	0.0264	100.	0.	0.	0.	0.	3.39	15.	43.
75824T	0	2790	3769.11	0.03	0.48	0.30	0.44	1.25	3770.36	0.0331	100.	0.	0.	0.	0.	2.39	24.	35.
75825A	0	2810	890.88	0.05	0.50	0.11	1.69	2.35	893.23	0.2631	100.	0.	0.	0.	0.	2.21	5.	72.
75825B	0	2840	4774.65	0.05	0.47	0.16	1.27	1.95	4776.60	0.0408	100.	0.	0.	0.	0.	3.24	8.	65.
75825C	0	2870	4187.14	0.04	1.44	0.29	1.09	2.86	4190.00	0.0682	100.	0.	0.	0.	0.	1.51	10.	38.
75825D	0	2900	3017.11	0.02	0.71	0.05	0.49	1.27	3018.38	0.0420	100.	0.	0.	0.	0.	2.55	4.	39.
75825E	0	2930	3996.59	0.05	0.90	0.05	0.53	1.53	3998.12	0.0383	100.	0.	0.	0.	0.	3.59	3.	35.
75825F	0	2960	1696.91	0.07	0.89	0.05	0.52	1.53	1698.44	0.0900	100.	0.	0.	0.	0.	5.58	3.	34.
75825G	0	2990	1781.76	0.06	0.48	0.08	0.55	1.17	1782.93	0.0656	100.	0.	0.	0.	0.	5.41	7.	47.
75825H	0	3020	268.80	1.70	0.77	0.06	0.72	3.25	272.05	1.1946	99.	1.	0.	0.	0.	52.24	2.	22.
75825I	0	3050	60.61	1.91	1.07	0.07	0.81	3.86	64.47	5.9873	94.	3.	2.	0.	1.	49.28	2.	21.
75825J	0	3080	10.19	0.61	0.36	0.06	0.61	1.64	11.83	13.8630	86.	5.	3.	1.	5.	37.22	4.	37.
75825K	0	3110	3266.56	0.06	0.72	0.08	0.45	1.31	3267.87	0.0400	100.	0.	0.	0.	0.	5.55	6.	34.
75825L	0	3140	1959.94	5.86	1.98	0.10	1.18	9.12	1969.06	0.4631	100.	0.	0.	0.	0.	64.22	1.	13.

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

C1-C4 HYDROCARBON ANALYSES - CUTTINGS ONLY

SPL NO	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)					GAS COMPOSITION (PERCENT)									
			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	
75764A	0	1250	249.98	4.42	13.77	13.45	5.51	37.15	287.13	12.9383	84.	2.	5.	5.	2.	12.37.	36.15.
75764B	0	1280	235.10	5.41	5.18	2.30	1.84	14.73	249.83	5.8960	94.	2.	2.	1.	1.	37.35.	16.12.
75764C	0	1310	172.61	2.14	14.90	20.00	6.43	43.47	216.08	20.1175	80.	1.	7.	9.	3.	5.34.	46.15.
75764D	0	1340	178.56	2.85	13.69	17.52	5.74	39.80	218.36	18.2268	82.	1.	6.	8.	3.	7.34.	45.14.
75764E	0	1370	190.46	2.42	8.91	11.77	4.13	27.23	217.69	12.5086	88.	1.	4.	5.	2.	9.33.	43.15.
75764F	0	1400	249.98	1.57	5.83	9.20	4.02	20.62	270.60	7.6201	93.	1.	2.	3.	1.	8.28.	45.19.
75764G	0	1430	366.05	2.85	11.83	15.40	8.72	38.80	404.85	9.5838	90.	1.	3.	4.	2.	7.30.	41.22.
75764H	0	1460	296.11	3.49	15.07	15.93	7.80	42.29	338.40	12.4970	88.	1.	4.	5.	2.	8.36.	38.18.
75764I	0	1490	767.81	5.27	19.28	22.30	12.85	59.70	827.51	7.2144	92.	1.	2.	3.	2.	9.32.	37.22.
75764J	0	1520	714.24	8.41	33.05	37.52	19.28	98.26	812.50	12.0935	88.	1.	4.	5.	2.	9.34.	37.20.
75764K	0	1550	1226.11	11.68	51.19	40.36	24.79	128.02	1354.13	9.4540	90.	1.	4.	3.	2.	9.40.	32.19.
75764L	0	1580	404.74	5.70	27.05	28.14	19.05	79.94	484.68	16.4933	83.	1.	6.	6.	4.	7.34.	35.24.
75764M	0	1610	999.94	11.68	42.77	40.36	27.54	122.35	1122.29	10.9018	89.	1.	4.	4.	2.	10.34.	33.23.
75764N	0	1640	672.58	22.94	65.77	39.65	27.54	155.90	828.48	18.8176	81.	3.	8.	5.	3.	15.42.	25.18.
75764O	0	1670	1071.36	37.33	106.27	52.39	33.05	229.04	1300.40	17.6130	82.	3.	8.	4.	3.	16.47.	23.14.
75764P	0	1700	171.12	17.67	73.87	42.48	29.38	163.40	334.52	48.8461	51.	5.	22.	13.	9.	11.45.	26.18.
75764Q	0	1730	630.91	39.33	108.86	46.73	30.29	225.21	856.12	26.3059	73.	5.	13.	5.	4.	17.49.	21.13.
75764R	0	1760	374.98	33.91	108.86	49.56	33.05	225.38	600.36	37.5408	62.	6.	18.	8.	6.	15.48.	22.15.
75764S	0	1790	464.26	36.48	92.66	29.74	20.20	179.08	643.34	27.8360	72.	6.	14.	5.	3.	20.52.	17.11.
75764T	0	1820	360.10	31.35	71.28	30.44	22.03	155.10	515.20	30.1048	70.	6.	14.	6.	4.	20.46.	20.14.
75765A	0	1850	339.26	8.69	28.51	15.40	13.77	66.37	405.63	16.3622	84.	2.	7.	4.	3.	13.43.	23.21.
75765B	0	1880	535.68	35.91	97.85	36.82	23.87	194.45	730.13	26.6322	74.	5.	13.	5.	3.	18.51.	19.12.
75765C	0	1910	535.68	59.85	160.70	62.30	47.74	330.59	866.27	38.1625	61.	7.	19.	7.	6.	18.49.	19.14.
75765D	0	1940	1354.08	13.25	31.75	14.51	11.02	70.53	1424.61	4.9508	95.	1.	2.	1.	1.	19.44.	21.16.
75765E	0	1970	699.36	13.72	34.22	15.27	12.62	75.83	775.19	9.7821	90.	2.	4.	2.	2.	18.45.	20.17.
75765F	0	2000	1339.20	46.67	98.01	38.05	32.13	214.86	1554.06	13.8257	87.	3.	6.	2.	2.	22.45.	18.15.
75765G	0	2030	349.68	30.49	76.46	38.23	51.41	196.59	546.27	35.9877	64.	6.	14.	7.	9.	16.39.	19.26.
75765H	0	2060	270.82	29.07	92.02	50.98	75.28	247.35	518.17	47.7353	51.	6.	18.	10.	15.	12.37.	21.30.
75765I	0	2090	196.42	25.08	58.32	26.90	32.13	142.43	338.85	42.0333	59.	7.	17.	8.	9.	18.40.	19.23.
75765J	0	2120	410.69	33.06	56.38	24.07	24.79	138.30	548.99	25.1917	75.	6.	10.	4.	5.	24.41.	17.18.
75765K	0	2150	238.08	11.83	22.68	9.56	10.10	54.17	292.25	18.5355	82.	4.	8.	3.	3.	22.41.	18.19.
75765L	0	2180	136.90	6.27	15.55	6.90	6.88	35.60	172.50	20.6377	79.	4.	9.	4.	4.	18.44.	19.19.

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

16/7-3

TABLE 1B

19 AUG 82

C1-C4 HYDROCARBON ANALYSES - CUTTINGS ONLY

SPL NO	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)							GAS COMPOSITION (PERCENT)							
			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	
75824A	0	2210	228.29	8.88	25.65	13.20	14.64	62.37	290.66	21.4580	78.	3.	9.	5.	5.	14.42.	21.23.
75824B	0	2240	222.72	4.88	23.40	12.00	19.28	59.56	282.28	21.0996	79.	2.	8.	4.	7.	8.40.	20.32.
75824C	0	2270	183.74	11.54	36.90	18.60	29.27	96.31	280.05	34.3903	66.	4.	13.	7.	10.	12.39.	19.30.
75824D	0	2300	206.02	5.77	23.40	11.70	15.71	56.58	262.60	21.5461	79.	2.	9.	4.	6.	10.41.	21.28.
75824E	0	2330	150.34	0.44	0.67	0.45	1.25	2.81	153.15	1.8348	99.	0.	0.	0.	1.	16.24.	16.44.
75824F	0	2360	108.58	4.00	5.62	2.55	5.35	17.52	126.10	13.8937	87.	3.	4.	2.	4.	23.31.	15.31.
75824G	0	2390	211.58	3.33	4.27	2.10	13.92	23.62	235.20	10.0425	90.	1.	2.	1.	6.	14.18.	9.59.
75824H	0	2420	128.06	2.05	1.69	0.75	3.03	7.52	135.58	5.5465	94.	2.	1.	1.	2.	27.22.	10.41.
75824I	0	2450	157.30	3.22	1.01	0.45	1.07	5.75	163.05	3.5265	96.	2.	1.	0.	1.	55.18.	8.19.
75824J	0	2480	114.14	0.89	0.56	0.22	0.71	2.38	116.52	2.0425	98.	1.	0.	0.	1.	37.24.	9.30.
75824K	0	2510	428.74	0.44	1.35	0.30	1.78	3.87	432.61	0.8945	100.	0.	0.	0.	0.	11.35.	8.46.
75824L	0	2550	122.50	0.94	2.36	1.20	3.03	7.53	130.03	5.7909	94.	1.	2.	1.	2.	12.31.	16.41.
75824M	0	2580	846.34	1.78	0.90	0.37	0.80	3.85	850.19	0.4528	100.	0.	0.	0.	0.	46.23.	10.21.
75824N	0	2610	690.43	0.22	1.24	0.67	1.96	4.09	694.52	0.5889	100.	0.	0.	0.	0.	5.30.	16.49.
75824O	0	2640	2004.48	0.67	1.35	0.45	1.43	3.90	2008.38	0.1942	100.	0.	0.	0.	0.	17.35.	12.36.
75824P	0	2670	709.92	0.06	0.53	0.15	0.40	1.14	711.06	0.1603	100.	0.	0.	0.	0.	5.47.	13.35.
75824Q	0	2700	1274.56	0.11	0.45	0.07	0.54	1.17	1295.73	0.0903	100.	0.	0.	0.	0.	9.38.	6.47.
75824R	0	2730	1322.40	0.06	1.21	0.37	3.57	5.21	1327.61	0.3924	100.	0.	0.	0.	0.	1.23.	7.69.
75824S	0	2760	2408.16	0.06	0.79	0.15	0.89	1.89	2410.05	0.0784	100.	0.	0.	0.	0.	3.42.	8.47.
75824T	0	2790	396.72	0.11	0.34	0.15	0.36	0.96	397.68	0.2414	100.	0.	0.	0.	0.	11.35.	16.38.
75825A	0	2810	2060.16	0.11	0.45	0.15	1.07	1.78	2061.94	0.0863	100.	0.	0.	0.	0.	6.25.	8.61.
75825B	0	2840	2115.84	0.06	0.56	0.15	0.58	1.35	2117.19	0.0637	100.	0.	0.	0.	0.	4.42.	11.43.
75825C	0	2870	605.52	2.22	4.27	1.27	2.86	10.62	616.14	1.7236	99.	0.	1.	0.	0.	21.40.	12.27.
75825D	0	2900	1030.08	3.11	1.24	0.45	0.98	5.78	1035.86	0.5580	100.	0.	0.	0.	0.	54.21.	8.17.
75825E	0	2930	709.92	2.77	1.46	0.37	0.76	5.36	715.28	0.7493	100.	0.	0.	0.	0.	52.27.	7.14.
75825F	0	2960	925.68	2.66	1.01	0.37	0.80	4.84	930.52	0.5201	100.	0.	0.	0.	0.	54.21.	8.17.
75825G	0	2990	682.08	2.00	0.45	0.15	0.49	3.09	685.17	0.4510	100.	0.	0.	0.	0.	64.15.	5.16.
75825H	0	3020	863.04	2.05	0.62	0.07	0.62	3.36	866.40	0.3878	100.	0.	0.	0.	0.	62.18.	2.18.
75825I	0	3050	275.62	1.55	0.79	0.15	0.62	3.11	278.73	1.1157	99.	1.	0.	0.	0.	50.25.	5.20.
75825J	0	3080	200.45	1.33	0.79	0.22	0.98	3.32	203.77	1.6292	99.	1.	0.	0.	0.	39.24.	7.30.
75825K	0	3110	623.62	2.44	1.46	0.19	0.89	4.98	628.60	0.7922	100.	0.	0.	0.	0.	49.29.	4.18.
75825L	0	3140	623.62	2.11	0.90	0.34	0.98	4.33	627.95	0.6895	100.	0.	0.	0.	0.	48.21.	8.23.

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

C1-C4 HYDROCARBON ANALYSES - CUTTINGS AND AIR SPACE

SPL NO	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)						GAS COMPOSITION (PERCENT)								
			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	
75824A	0	2210	713.52	22.92	41.52	17.15	17.68	99.27	812.79	12.2134	88.	3.	5.	2.	2.	23.42.	17.18.
75824B	0	2240	587.36	28.67	76.98	31.29	39.68	176.62	763.98	23.1184	77.	4.	10.	4.	5.	16.44.	18.22.
75824C	0	2270	500.50	29.54	66.34	27.56	38.54	161.98	662.48	24.4505	76.	4.	10.	4.	6.	18.41.	17.24.
75824D	0	2300	276.55	11.13	30.53	13.25	17.25	72.16	348.71	20.6934	79.	3.	9.	4.	5.	15.43.	18.24.
75824E	0	2330	166.70	2.18	2.37	1.31	2.56	8.42	175.12	4.8081	96.	1.	1.	1.	1.	26.28.	16.30.
75824F	0	2360	200.97	13.76	9.54	3.92	7.65	34.87	235.84	14.7854	85.	6.	4.	2.	3.	40.27.	11.22.
75824G	0	2390	229.57	3.88	4.78	2.25	14.66	25.57	255.14	10.0219	89.	2.	2.	1.	6.	15.19.	9.57.
75824H	0	2420	130.53	2.17	1.83	0.80	3.16	7.96	138.49	5.7477	94.	2.	1.	1.	2.	27.23.	10.40.
75824I	0	2450	167.32	3.61	1.41	0.57	1.42	7.01	174.33	4.0211	96.	2.	1.	0.	1.	52.20.	8.20.
75824J	0	2480	119.86	1.12	0.79	0.28	0.98	3.17	123.03	2.5766	97.	1.	1.	0.	1.	35.25.	9.31.
75824K	0	2510	498.39	3.80	3.12	0.43	3.60	10.95	509.34	2.1498	97.	1.	1.	0.	1.	35.28.	4.33.
75824L	0	2550	135.60	1.82	3.50	1.61	3.71	10.64	146.24	7.2757	93.	1.	2.	1.	3.	17.33.	15.35.
75824M	0	2580	5537.99	1.83	2.29	0.90	1.70	6.72	5544.71	0.1212	100.	0.	0.	0.	0.	27.35.	13.25.
75824N	0	2610	4588.03	0.25	2.50	1.00	3.03	6.78	4594.81	0.1475	100.	0.	0.	0.	0.	4.37.	15.44.
75824O	0	2640	6069.53	0.70	2.01	0.53	1.87	5.11	6074.64	0.0841	100.	0.	0.	0.	0.	14.39.	10.37.
75824P	0	2670	4302.18	0.08	0.97	0.28	0.71	2.04	4304.22	0.0474	100.	0.	0.	0.	0.	4.47.	14.35.
75824Q	0	2700	4601.61	0.16	0.78	0.18	1.02	2.14	4603.75	0.0465	100.	0.	0.	0.	0.	7.36.	8.49.
75824R	0	2730	16154.35	0.10	2.25	0.43	4.29	7.06	16161.41	0.0437	100.	0.	0.	0.	0.	1.32.	6.61.
75824S	0	2760	5769.44	0.09	1.14	0.28	1.27	2.78	5772.22	0.0481	100.	0.	0.	0.	0.	3.41.	10.46.
75824T	0	2790	4165.83	0.14	0.82	0.45	0.80	2.21	4168.04	0.0530	100.	0.	0.	0.	0.	6.38.	20.36.
75825A	0	2810	2951.04	0.16	0.95	0.26	2.76	4.13	2955.17	0.1397	100.	0.	0.	0.	0.	4.23.	6.67.
75825B	0	2840	6890.49	0.11	1.03	0.31	1.85	3.30	6893.79	0.0478	100.	0.	0.	0.	0.	3.31.	9.57.
75825C	0	2870	4792.66	2.26	5.71	1.56	3.95	13.48	4806.14	0.2804	100.	0.	0.	0.	0.	17.42.	12.29.
75825D	0	2900	4047.19	3.13	1.95	0.50	1.47	7.05	4054.24	0.1739	100.	0.	0.	0.	0.	44.28.	7.21.
75825E	0	2930	4706.51	2.82	2.36	0.42	1.29	6.89	4713.40	0.1462	100.	0.	0.	0.	0.	41.34.	6.19.
75825F	0	2960	2622.59	2.73	1.90	0.42	1.32	6.37	2628.96	0.2423	100.	0.	0.	0.	0.	42.30.	7.21.
75825G	0	2990	2463.84	2.06	0.93	0.23	1.04	4.26	2468.10	0.1726	100.	0.	0.	0.	0.	49.22.	5.24.
75825H	0	3020	1131.84	3.75	1.39	0.13	1.34	6.61	1138.45	0.5806	100.	0.	0.	0.	0.	57.21.	2.20.
75825I	0	3050	336.23	3.46	1.86	0.22	1.43	6.97	343.20	2.0309	98.	1.	1.	0.	0.	49.27.	3.21.
75825J	0	3080	210.64	1.94	1.15	0.28	1.59	4.96	215.60	2.3005	97.	1.	1.	0.	1.	39.23.	6.32.
75825K	0	3110	3890.18	2.50	2.18	0.27	1.34	6.29	3896.47	0.1614	100.	0.	0.	0.	0.	40.35.	4.21.
75825L	0	3140	2583.56	7.97	2.88	0.44	2.16	13.45	2597.01	0.5179	100.	0.	0.	0.	0.	60.21.	3.16.

B = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

C1-C4 HYDROCARBON ANALYSES - CUTTINGS AND AIR SPACE

SPL NO	R DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)							GAS COMPOSITION (PERCENT)									
		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			
75764A	0 1250	338.57	7.01	18.65	17.35	6.69	49.70	388.27	12.8003	87.	2.	5.	4.	2.	14.	38.	35.	13.
75764B	0 1280	580.28	8.45	7.68	3.29	2.45	21.87	602.15	3.6320	97.	1.	1.	1.	0.	39.	35.	15.	11.
75764C	0 1310	323.76	5.13	23.47	26.85	8.21	63.66	387.42	16.4318	84.	1.	6.	7.	2.	8.	37.	42.	13.
75764D	0 1340	256.60	9.31	37.02	35.77	10.02	92.12	348.72	26.4166	73.	3.	11.	10.	3.	10.	40.	39.	11.
75764E	0 1370	472.41	7.71	17.61	19.25	6.12	50.69	523.10	9.6903	91.	1.	3.	4.	1.	15.	35.	38.	12.
75764F	0 1400	440.13	3.31	17.87	18.74	7.01	46.93	487.06	9.6353	90.	1.	4.	4.	1.	7.	38.	40.	15.
75764G	0 1430	572.12	5.50	19.62	21.59	11.73	58.44	630.56	9.2679	91.	1.	3.	3.	2.	9.	34.	37.	20.
75764H	0 1460	912.85	9.92	26.72	24.02	10.81	71.47	984.32	7.2608	93.	1.	3.	2.	1.	14.	37.	34.	15.
75764I	0 1490	1224.88	9.01	26.48	27.57	15.24	78.30	1303.18	6.0083	94.	1.	2.	2.	1.	12.	34.	35.	19.
75764J	0 1520	2028.77	17.69	47.44	45.59	22.91	133.63	2162.40	6.1797	94.	1.	2.	2.	1.	13.	36.	34.	17.
75764K	0 1550	1599.85	16.97	61.70	45.96	27.49	152.12	1751.97	8.6828	90.	1.	4.	3.	2.	11.	41.	30.	18.
75764L	0 1580	917.37	12.79	39.45	35.04	22.48	109.76	1027.13	10.6861	90.	1.	4.	3.	2.	12.	36.	32.	20.
75764M	0 1610	1553.22	19.19	55.15	47.18	30.95	152.47	1705.69	8.9389	91.	1.	3.	3.	2.	13.	36.	31.	20.
75764N	0 1640	2939.14	71.78	121.29	60.08	37.10	290.25	3229.39	8.9877	91.	2.	4.	2.	1.	25.	41.	21.	13.
75764O	0 1670	3701.72	97.14	170.12	73.71	43.10	384.07	4085.79	9.4001	91.	2.	4.	2.	1.	25.	45.	19.	11.
75764P	0 1700	737.42	42.71	107.15	54.09	35.20	239.15	976.57	24.4887	75.	4.	11.	6.	4.	18.	44.	23.	15.
75764Q	0 1730	1590.08	72.40	144.78	56.88	35.39	309.45	1899.53	16.2908	83.	4.	8.	3.	2.	23.	48.	18.	11.
75764R	0 1760	1612.33	73.94	147.98	60.24	38.07	320.23	1932.56	16.5702	83.	4.	8.	3.	2.	23.	46.	19.	12.
75764S	0 1790	1667.38	83.67	137.84	40.71	25.76	287.98	1955.36	14.7277	86.	4.	7.	2.	1.	29.	48.	14.	9.
75764T	0 1820	1039.99	49.14	90.60	35.57	24.84	200.15	1240.14	16.1393	84.	4.	7.	3.	2.	25.	45.	18.	12.
75765A	0 1850	899.73	21.47	43.40	19.77	16.34	100.98	1000.71	10.0908	90.	2.	4.	2.	2.	21.	43.	20.	16.
75765B	0 1880	1096.08	51.55	110.13	40.07	26.00	127.75	1323.83	17.2038	83.	4.	8.	3.	2.	23.	48.	18.	11.
75765C	0 1910	1203.67	73.83	176.31	66.95	50.71	367.80	1571.47	23.4048	77.	5.	11.	4.	3.	20.	48.	18.	14.
75765D	0 1940	2625.74	25.73	46.62	19.97	13.75	106.07	2731.81	3.8828	95.	1.	2.	1.	1.	24.	44.	19.	13.
75765E	0 1970	2839.14	35.68	56.85	27.81	16.63	136.97	2976.11	4.6023	95.	1.	2.	1.	1.	26.	42.	20.	12.
75765F	0 2000	2868.87	66.26	113.62	42.83	34.83	257.54	3126.43	8.2375	92.	2.	4.	1.	1.	26.	43.	17.	14.
75765G	0 2030	661.73	42.36	87.81	42.28	55.05	227.50	889.23	25.5839	74.	5.	10.	5.	6.	19.	38.	19.	24.
75765H	0 2060	474.54	38.23	101.20	54.32	78.69	272.44	746.98	36.4722	63.	5.	14.	7.	11.	14.	37.	20.	29.
75765I	0 2090	865.10	59.98	85.46	35.57	39.75	270.76	1085.86	20.3304	79.	6.	8.	3.	4.	27.	39.	16.	18.
75765J	0 2120	774.96	51.13	71.85	29.18	28.66	180.82	955.78	18.9186	81.	5.	8.	3.	3.	28.	40.	16.	16.
75765K	0 2150	526.32	25.25	36.99	14.05	13.42	89.71	616.03	14.5626	86.	4.	6.	2.	2.	28.	41.	16.	15.
75765L	0 2180	374.60	16.61	30.28	11.94	10.98	69.81	444.41	15.7084	84.	4.	7.	3.	2.	24.	43.	17.	16.

R = CUTTINGS NOT ANALYZED

C = AIR SPACE GAS NOT RUN

BC = NO ANALYSES RUN

OFF. NORWAY

TABLE 1D

29 JUL 82

CUTTINGS GAS SUMMARY

SAMPLE NO.	DEPTH	TOTAL C1-C4	% WET	% C3+	C3+/C1	C2/C1
75764A	1250	388.	13.	11.	0.13	0.02
75764B	1280	602.	3.	2.	0.02	0.01
75764C	1310	387.	16.	15.	0.18	0.02
75764D	1340	349.	27.	24.	0.32	0.04
75764E	1370	523.	9.	8.	0.09	0.02
75764F	1400	487.	10.	9.	0.10	0.01
75764G	1430	631.	9.	8.	0.09	0.01
75764H	1460	984.	7.	6.	0.07	0.01
75764I	1490	1303.	6.	5.	0.06	0.01
75764J	1520	2162.	6.	5.	0.06	0.01
75764K	1550	1752.	10.	9.	0.08	0.01
75764L	1580	1027.	10.	9.	0.11	0.01
75764M	1610	1706.	9.	8.	0.09	0.01
75764N	1640	3229.	9.	7.	0.07	0.02
75764O	1670	4086.	9.	7.	0.08	0.03
75764P	1700	977.	25.	21.	0.27	0.06
75764Q	1730	1900.	17.	13.	0.15	0.05
75764R	1760	1933.	17.	13.	0.15	0.05
75764S	1790	1955.	14.	10.	0.12	0.05
75764T	1820	1240.	16.	12.	0.15	0.05
75765A	1850	1001.	10.	8.	0.09	0.02
75765B	1880	1324.	17.	13.	0.16	0.05
75765C	1910	1571.	23.	18.	0.24	0.06
75765D	1940	2732.	5.	4.	0.03	0.01
75765E	1970	2976.	5.	4.	0.04	0.01
75765F	2000	3126.	8.	6.	0.07	0.02
75765G	2030	889.	26.	21.	0.28	0.06
75765H	2060	747.	37.	32.	0.49	0.08
75765I	2090	1086.	21.	15.	0.19	0.07
75765J	2120	956.	19.	14.	0.17	0.07
75765K	2150	616.	14.	10.	0.12	0.05
75765L	2180	444.	16.	12.	0.14	0.04

16/7-3

TABLE 1D

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CUTTINGS GAS SUMMARY

SAMPLE NO.	DEPTH	TOTAL C1-C4	% WET	% C3+	C3+/C1	C2/C1
75824A	2210	813.	12.	9.	0.11	0.03
75824B	2240	764.	23.	19.	0.25	0.05
75824C	2270	662.	24.	20.	0.26	0.06
75824D	2300	349.	21.	18.	0.22	0.04
75824E	2330	175.	4.	3.	0.04	0.01
75824F	2360	236.	15.	9.	0.11	0.07
75824G	2390	255.	11.	9.	0.09	0.02
75824H	2420	138.	6.	4.	0.04	0.02
75824I	2450	174.	4.	2.	0.02	0.02
75824J	2480	123.	3.	2.	0.02	0.01
75824K	2510	509.	3.	2.	0.01	0.01
75824L	2550	146.	7.	6.	0.07	0.01
75824M	2580	5545.	0.	0.	0.00	0.00
75824N	2610	4595.	0.	0.	0.00	0.00
75824O	2640	6075.	0.	0.	0.00	0.00
75824P	2670	4304.	0.	0.	0.00	0.00
75824Q	2700	4604.	0.	0.	0.00	0.00
75824R	2730	16161.	0.	0.	0.00	0.00
75824S	2760	5772.	0.	0.	0.00	0.00
75824T	2790	4168.	0.	0.	0.00	0.00
75825A	2810	2955.	0.	0.	0.00	0.00
75825B	2840	6894.	0.	0.	0.00	0.00
75825C	2870	4806.	0.	0.	0.00	0.00
75825D	2900	4054.	0.	0.	0.00	0.00
75825E	2930	4713.	0.	0.	0.00	0.00
75825F	2960	2629.	0.	0.	0.00	0.00
75825G	2990	2468.	0.	0.	0.00	0.00
75825H	3020	1138.	0.	0.	0.00	0.00
75825I	3050	343.	2.	1.	0.01	0.01
75825J	3080	216.	3.	2.	0.01	0.01
75825K	3110	3896.	0.	0.	0.00	0.00
75825L	3140	2597.	0.	0.	0.00	0.00

TABLE 2

DESCRIPTION OF "PICKED" CUTTINGS
(Lithology by Hahn; T.O.C. by Crabtree)

Depth (meters)	EPR No.	Unit	Gross Lithology	GSA Color Code	Total Organic Carbon (%)
1250	75764-A	Miocene	Shale, med. gray and dk. gray.	N5; N3	3.82
1280	-B	Oligocene	Shale, yellowish gray and dk. brownish gray, micaceous, sl. calc.	5Y 7/2; 5YR 3/1	2.31
1340	-D	"	Shale, dk. brownish gray.	5YR 3/1	2.24
1400	-F	"	Shale, olive gray, micaceous.	5Y 4/1	3.37
1460	-H	"	Shale, dk. brownish gray, sl. calc.	5YR 3/1	1.63
1520	-J	"	Shale, med. olive gray.	5Y 5/1	1.32
1550	-K	"	Shale, med. greenish gray, micaceous.	5GY 5/1	1.50
1610	-M	"	Shale, pale olive gray.	5Y 6/2	1.40
1670	-O	Eocene	Shale, dk. brownish gray.	5YR 3/1	1.52
1700	-P	"	Shale, med. olive gray, micaceous.	5Y 5/1	1.64
1760	-R	"	Shale, olive gray, foss.	5Y 4/1	1.63
1820	-T	"	Shale, med. greenish gray.	5G 5/1	.42
1880	75765-B	"	Shale, med. greenish gray, pyritic.	5GY 5/1	.65
1910	-C	"	Shale, olive gray.	5Y 4/1	.50
1970	-E	"	Shale, med. gray.	N5	.75
2030	-G	"	Shale, olive gray, foss.	5Y 4/1	1.01
2090	-I	Paleocene	Shale, med. dk. gray	N4	1.16
2120	-J	"	Shale, olive gray, micaceous.	5Y 4/1	.99
2180	-L	"	Shale, med. greenish gray.	5GY 5/1	.47
2210	75824-A	"	Shale, med. dk. gray, shell fragments.	N4	.77
2240	-B	"	Shale, dk. gray, well laminated	N3	.60
2270	-C	"(?)	Shale, med. gray and med. dk. gray inter-laminated	N5, N4	1.59
2300	-D	Cretaceous	Limestone, white.	N9	.08
2390	-G	Jurassic	40% med. dk. gray shale - 35% cement - 15% red beds	N4	.80
2420	-H	Triassic	Claystone, v. lt. olive gray, mod. calc.	5Y 7/1	.28
2480	-J	"	Shale, mod. red, mic., mod. calc.	10R 4/4	.17
2550	-L	"	Shale, mod. reddish brown, sl. calc.	10R 5/6	.18
2670	-N	"	As above, micaceous.	10R 5/6	.11
2670	-P	"	Shale, dk. reddish brown, micaceous.	10R 3/4	.08
2730	-R	"	Shale, mod. reddish brown, micaceous.	10R 4/4	.18
2790	-T	"	85% shale - 15% sandstone, dk. reddish brown, micaceous.	10R 3/4	.07

TABLE 2 — PAGE 2

DESCRIPTION OF "PICKED" CUTTINGS
(Lithology by Hahn; T.O.C. by Crabtree)

<u>Depth (meters)</u>	<u>EPR No.</u>	<u>Unit</u>	<u>Gross Lithology</u>	<u>GSA Color Code</u>	<u>Total Organic Carbon (%)</u>
2840	75825-B	Permian	95% shale - 5% sandstone, mod. reddish brown, sl. calc.	10R 4/4	.12
2900	-D	"	70% siltstone - 30% shale, white, sl. calc.	N9	.12
2960	-F	"	Shale, pale reddish brown, silty.	10R 5/4	.09
3020	-H	"	85% shale - 15% siltstone, mod. reddish brown, sl. calc.	10R 4/4	.10
3080	-J	"	As above.	10R 4/4	.13
3140	-L	"	20% shale - 80% sandstone, pale reddish brown, sl. calc.	10R 5/4	.09

TABLE 3
LIGHT GASOLINES (C₄-C₇)*
(Bisotooni)

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	75764-A	Mioc.	3.82	.3	.79	10.55	8.48	0.00	.76
1280	-B	Olig.	2.31	0.0	-	-	-	-	-
1340	-D	"	2.24	.6	.41	13.17	7.88	.13	.56
1400	-F	"	3.37	1.1	.52	11.40	8.09	.16	.55
1460	-H	"	1.63	.8	.63	10.41	7.07	.18	.65
1490	-J	"	1.32	.9	.78	9.29	9.45	.22	.60
1550	-K	"	1.50	1.0	.89	7.79	8.84	.16	.57
1610	-M	"	1.40	1.0	.93	5.82	7.80	.15	.56
1670	-O	Eoc.	1.52	2.0	.85	9.01	8.71	.13	.66
1700	-P	"	1.64	1.0	.74	11.50	10.56	.10	-
1760	-R	"	1.63	.8	.70	10.04	6.97	.15	.73
1820	-T	"	.42	.2	2.44	37.39	15.09	.00	1.56
1880	75765-B	"	.65	1.0	.66	8.00	10.10	.12	3.19
1910	-C	"	.50	.2	2.29	-	-	.00	1.74
1970	-E	"	.75	.4	1.48	14.13	10.35	.11	.92
2030	-G	"	1.01	2.7	.47	10.16	11.37	.12	.66
2090	-I	Paleoc.	1.16	12.8	.40	1.79	5.16	.10	.62
2120	-J	"	.99	6.3	.41	2.15	5.64	.10	.59
2180	-L	"	.47	.5	.74	4.07	8.26	.12	1.10

*See Table for detailed analyses of C₄-C₇.

(Continued)

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LIGHT GASOLINES (C₄-C₇)*
(Bisotooni)

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
2210	75824-A	"	.77	5.7	.43	2.77	5.82	.12	.62
2240	-B	"	.60	.7	1.16	9.68	10.02	.33	1.05
2270	-C	"(?)	1.59	3.7	.86	2.83	5.92	.27	.81
2300	-D	Cret.	.08	0.0	-	-	-	-	-
2390	-G	Juras.	.80	0.0	-	-	-	-	-
2420	-H	Trias.	.28	.9	3.68	6.74	10.37	1.48	1.02
2480	-J	"	.17	0.0	-	-	-	-	-
2550	-L	"	.18	0.0	-	-	-	-	-
2610	-N	"	.11	0.0	-	-	-	-	-
2670	-P	"	.08	0.0	-	-	-	-	-
2730	-R	"	.18	0.0	-	-	-	-	-
2790	-T	"	.07	0.0	-	-	-	-	-
2840	75825-B	Perm.	.12	0.0	-	-	-	-	-
2900	-D	"	.12	0.0	-	-	-	-	-
2960	-F	"	.09	0.0	-	-	-	-	-
3020	-H	"	.10	0.0	-	-	-	-	-
3080	-J	"	.13	0.0	-	-	-	-	-
3140	-L	"	.09	0.0	-	-	-	-	-

*See Table for detailed analyses of C₄-C₇

TABLE 4
VISUAL KEROGEN CHARACTERISTICS
(J. L. Morgan)

Depth (meters)	EPR No.	Unit	Total Organic Carbon (%)	Kerogen Alteration (T.A.I.)	Confidence In T.A.I. (10 max.)	Types of Kerogen*							Kerogen Source Rating		
						Al?	Al	IF	H	W	C	Other	Maturity	Richness	Type When Mature
1250	75764-A	Mioc.	3.82	1+	5	20	-	50(H,W)	tr	20	tr		Immature	Rich	Gas, Oil
1280	-B	Olig.	2.31	1+	5	30	-	30(H)	tr	30	tr		"	Good	Oil, Gas
1340	-D	"	2.24	1+	5	10	-	70(A1,H)	tr	10	tr		"	"	"
1400	-F	"	3.37	2-	3	-	60	20(A1,H)	tr	10	tr		"	Rich	"
1460	-H	"	1.63	1+	5	10	-	70(H,W)	tr	10	tr		"	Good	"
1490	-J	"	1.32	1+	5	-	tr	40(H)	10	40	tr		"	"	Gas,Liquids
1550	-K	"	1.50	1+	5	tr	-	30(H)	tr	60	tr		"	"	"
1610	-M	"	1.40	1+	5	-	-	60(H,W)	tr	20	10		"	"	"
1670	-O	Eocene	1.52	1+	5	-	tr	30(H)	10	50	tr		"	"	"
1700	-P	"	1.64	1+	5	-	-	50(H)	tr	40	tr		"	"	"
1760	-R	"	1.63	1+	5	-	-	40(H,W)	10	50	-		"	"	"
1820	-T	"	.42	1+	4	-	-	20(W)	10	40	20	10M	"	Poor	"
1880	75765-B	"	.65	1+	5	10	10	50(H,W)	10	10	tr	trM	"	Fair	Gas,Oil
1910	-C	"	.50	1+	5	-	-	80(H,W)	tr	10	tr	trM	"	"	Gas,Liquids
1970	-E	"	.75	1+	5	10	tr	40(H,W)	20	20	tr		"	"	"
2030	-G	"	1.01	1+	5	10	10	30(H,W)	20	20	10		"	"	Gas,Oil
2090	-I	Paleoc.	1.16	1+	5	-	50	30(A1,H)	tr	10	tr		"	Good	Oil
2120	-J	"	.99	1+	5	-	40	40(A1,H)	tr	10	tr		"	Fair	"
2180	-L	"	.47	1+	4	-	40	tr	30	20	20	trM	"	Poor	"
2210	75824-A	"	.77	1+	4	10	-	10(A1)	tr	60	10	trM	"	Fair	Oil,Gas
2270	-C	"(?)	1.59	1+	4	-	50	20(A1,W)	tr	10	10	trM	"	Good	Oil
2300	-D	Cret.	.08	1+	3	-	50	-	tr	30	10	trM	"	Very Poor	Nonsource
2420	-H	Triassic	.28	1+	4	40	-	-	10	40	10		"	Poor	(Oil,gas)
2480	-J	"	.17	1+	3	20	-	-	tr	50	20		"	Very Poor	Nonsource
2730	-R	"	.18	1+	3	40	-	-	-	30	30		"	"	"
2840	75825-B	Permian	.12	2+	3	tr	-	-	tr	60	30		Mature	"	"
3140	-L	"	.09	2+?	1	-	-	-	tr	70	30	B?	"	"	"

*Al - algal; H - herbaceous; W - woody; C - coaly; IF - indeterminate fines; (H,W) - best guess as to IF (Metter).

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

<u>Depth (meters)</u>	1760	2060	2210	2270	2300	2330
<u>Unit</u>	Eocene	Paleocene	Paleocene	Paleoc.(?)	Cretaceous	Cretaceous
<u>EPR No.</u>	75764-R	75765-H	75824-A	75824-C	75824-D	75824-E
<u>Total Organic Carbon (%)*</u>	1.6	.91	.44	.52	.23	.29
<u>Soluble Organic Matter (ppm)</u>	726	415	163	168	116	208
<u>Asphaltenes (ppm)</u>	322	256	129	126	76	108
<u>Composition of S.O.M. (%)</u>						
Saturates**	11.5	9.6	-	-	-	24.5
Aromatics	12.3	9.4	-	-	-	13.9
Eluted NSO's	29.6	15.7	-	-	-	8.2
Noneluted NSO's	2.2	3.6	-	-	-	1.4
Asphaltenes	44.4	61.7	79.1	75.0	65.5	51.9
<u>Hydrocarbons</u>						
ppm of rock	173	79	< 30	< 40	< 40	80
% of T.O.C.	1.1	.9	< .7	< .7	< 1.6	2.8
Saturates/Aromatics	.9	1.0	-	-	-	1.8
<u>C₁₅₊ Source Rating</u>						
Richness	Good	Fair	Poor	Poor	Poor	Marginal
Type	Gas, Liquids	Gas, Liquids	Nonsource	Nonsource	Nonsource	Oil, Gas
Maturity	Immature	Immature	Immature	Immature	Immature	Immature

*T.O.C.'s determined at EPR on powders micronized at GeoChem

**See Figures 6-11 for gas chromatograms of saturates.

TABLE 6
VITRINITE REFLECTANCE*
(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>
1400	75764-F	31	.29	.66	.41
2060	75765-H	10	.33	.92	.55
2210	75824-A	9	.83	1.09	.95**
2270	75824-C	9	.83	1.06	.92**

*See Figures 2-5 for histograms

**These "Population 2" data indicate "mature" samples (Figures 4, 5). The kerogen TAI values of 1+ suggest that for both the 2210 m. and the 2270 m. samples the scanty "Population 1" data are the representative particles (Figures 4 and 5) in which case the samples would rate as immature.

TABLE 7 - DETAILED C₄-C₇ ANALYSES
(Fry)

75764A OFF. NORWAY ESSO 16/7-3 1250 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	16.7	4.91
ETHANE	0.0		1T2-DMCP	10.6	3.12
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	35.4	10.39
IPENTANE	45.1	13.22	1C2-DMCP	0.0	0.00
NPENTANE	34.1	10.01	MCH	16.6	4.86
22-DMB	0.0	0.00			
CPENTANE	0.9	0.27			
23-DMB	5.7	1.67			
2-MP	39.7	11.66			
3-MP	7.1	2.10			
NHEXANE	34.4	10.08			
MCP	22.0	6.44			
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 ,	39.5	11.59			
23-DMP ,	4.6	1.34			
3-MHEX ,	6.6	1.94			
1C3-DMCP	21.8	6.40			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	341.		C1/C2	0.79
GASOLINE	341.		A /D2	10.55
NAPHTHENES	89.	26.00	C1/D2	8.48
C6-7	208.	61.07	CH/MCP	0.00
			PENT/IPENT,	0.76

75764D OFF. NORWAY ESSO 16/7-3 1340 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	39.2	7.01
ETHANE	0.0		1T2-DMCP	18.8	3.36
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	27.8	4.98	224-TMP	0.0	0.00
NBUTANE	24.2	4.34	NHEPTANE	45.1	8.08
IPENTANE	83.4	14.93	1C2-DMCP	5.2	0.94
NPENTANE	46.5	8.32	MCH	25.8	4.62
22-DMB	1.0	0.18			
CPENTANE	4.7	0.84			
23-DMB	10.3	1.84			
2-MP	57.9	10.36			
3-MP	9.0	1.60			
NHEXANE	47.0	8.40			
MCP	38.7	6.92			
22-DMP	0.0	0.00			
24-DMP	1.4	0.24			
223-TMB	0.0	0.00			
CHEXANE	5.1	0.91			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	24.2	4.32			
23-DMP ,	5.7	1.02			
3-MHEX ,	7.0	1.25			
1C3-DMCP	31.0	5.55			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	559.		C1/C2	0.41
GASOLINE	559.		A /D2	13.17
NAPHTHENES	169.	30.15	C1/D2	7.88
C6-7	294.	52.62	CH/MCP	0.13
			PENT/IPENT,	0.56

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75764F OFF. NORWAY ESSO 16/7-3 1400 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	70.9	6.73
ETHANE	0.0		1T2-DMCP	35.6	3.38
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	50.5	4.80	224-TMP	0.0	0.00
NBUTANE	34.9	3.31	NHEPTANE	98.3	9.33
IPENTANE	129.0	12.24	1C2-DMCP	10.0	0.94
NPENTANE	71.1	6.74	MCH	71.5	6.79
22-DMB	4.6	0.43			
CPENTANE	5.9	0.56			
23-DMB	17.9	1.70			
2-MP	106.4	10.10			
3-MP	15.4	1.46			
NHEXANE	88.0	8.35			
MCP	75.8	7.19			
22-DMP	0.0	0.00			
24-DMP	3.4	0.32			
223-TMB	3.6	0.34			
CHEXANE	12.0	1.14			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	48.6	4.61			
23-DMP ,	21.5	2.04			
3-MHEX ,	16.3	1.55			
1C3-DMCP	62.7	5.95			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	1054.		C1/C2	0.52
GASOLINE	1054.		A /D2	11.40
NAPHTHENES	344.	32.67	C1/D2	8.09
C6-7	618.	58.67	CH/MCP	0.16
			PENT/IPENT,	0.55

75764H OFF. NORWAY ESSO 16/7-3 1460 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	53.4	6.55
ETHANE	0.0		1T2-DMCP	28.7	3.53
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	100.3	12.32
IPENTANE	85.7	10.53	1C2-DMCP	10.4	1.28
NPENTANE	55.7	6.84	MCH	85.7	10.53
22-DMB	3.4	0.42			
CPENTANE	4.0	0.49			
23-DMB	9.3	1.14			
2-MP	92.3	11.33			
3-MP	17.5	2.15			
NHEXANE	83.2	10.22			
MCP	60.7	7.46			
22-DMP	0.0	0.00			
24-DMP	4.4	0.54			
223-TMB	3.6	0.44			
CHEXANE	10.9	1.33			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	28.1	3.45			
23-DMP ,	16.0	1.96			
3-MHEX ,	17.6	2.17			
1C3-DMCP	43.2	5.31			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	814.		C1/C2	0.63
GASOLINE	814.		A /D2	10.41
NAPHTHENES	297.	36.49	C1/D2	7.07
C6-7	546.	67.10	CH/MCP	0.18
			PENT/IPENT,	0.65

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75764J OFF. NORWAY ESSO 16/7-3 1490 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	56.6	6.36
ETHANE	0.0		1T2-DMCP	30.2	3.40
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	91.2	10.25
IPENTANE	96.1	10.80	1C2-DMCP	10.6	1.20
NPENTANE	57.8	6.49	MCH	109.9	12.35
22-DMB	3.9	0.44			
CPENTANE	4.6	0.51			
23-DMB	11.6	1.31			
2-MP	98.9	11.11			
3-MP	21.3	2.39			
NHEXANE	76.8	8.63			
MCP	77.9	8.75			
22-DMP	0.0	0.00			
24-DMP	2.4	0.27			
223-TMB	3.2	0.36			
CHEXANE	17.1	1.92			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	43.9	4.94			
23-DMP ,	14.2	1.60			
3-MHEX ,	18.1	2.03			
1C3-DMCP	43.6	4.90			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	890.		C1/C2 0.78
GASOLINE	890.		A /D2 9.29
NAPHTHENES	351.	39.39	C1/D2 9.45
C6-7	596.	66.95	CH/MCP 0.22
			PENT/IPENT, 0.60

75764K OFF. NORWAY ESSO 16/7-3 1550 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	53.0	5.29
ETHANE	0.0		1T2-DMCP	37.3	3.73
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	91.5	9.14
IPENTANE	114.2	11.41	1C2-DMCP	12.2	1.22
NPENTANE	64.9	6.48	MCH	136.9	13.67
22-DMB	6.1	0.61			
CPENTANE	3.0	0.30			
23-DMB	14.3	1.43			
2-MP	111.6	11.15			
3-MP	24.5	2.45			
NHEXANE	88.4	8.83			
MCP	82.3	8.22			
22-DMP	0.0	0.00			
24-DMP	5.3	0.53			
223-TMB	4.0	0.39			
CHEXANE	13.1	1.31			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	54.2	5.41			
23-DMP ,	16.7	1.67			
3-MHEX ,	23.1	2.31			
1C3-DMCP	44.6	4.46			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	1001.		C1/C2 0.89
GASOLINE	1001.		A /D2 7.79
NAPHTHENES	382.	38.19	C1/D2 8.84
C6-7	663.	66.18	CH/MCP 0.16
			PENT/IPENT, 0.57

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75765M OFF. NORWAY ESSO 16/7-3 1610 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	65.7	6.59
ETHANE	0.0		1T2-DMCP	47.0	4.72
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	89.7	9.00
IPENTANE	106.6	10.71	1C2-DMCP	14.3	1.43
NPENTANE	59.7	5.99	MCH	168.9	16.95
22-DMB	6.5	0.65			
CPENTANE	3.1	0.31			
23-DMB	16.6	1.66			
2-MP	44.7	4.49			
3-MP	27.2	2.73			
NHEXANE	87.4	8.77			
MCP	78.2	7.85			
22-DMP	0.0	0.00			
24-DMP	4.6	0.46			
223-TMB	3.8	0.38			
CHEXANE	11.5	1.15			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	56.8	5.70			
23-DMP ,	23.5	2.36			
3-MHEX ,	30.4	3.05			
1C3-DMCP	50.1	5.03			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	996.		C1/C2	0.93
GASOLINE	996.		A /D2	5.82
NAPHTHENES	439.	44.05	C1/D2	7.80
C6-7	732.	73.46	CH/MCP	0.15
			PENT/IPENT,	0.56

757640 OFF. NORWAY ESSO 16/7-3 1670 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	92.2	4.60
ETHANE	0.0		1T2-DMCP	53.4	2.66
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	19.6	0.98	224-TMP	0.0	0.00
NBUTANE	43.2	2.16	NHEPTANE	222.2	11.09
IPENTANE	181.3	9.04	1C2-DMCP	27.0	1.35
NPENTANE	120.2	6.00	MCH	267.4	13.34
22-DMB	6.6	0.33			
CPENTANE	7.1	0.36			
23-DMB	24.4	1.22			
2-MP	209.2	10.44			
3-MP	47.7	2.38			
NHEXANE	180.3	8.99			
MCP	205.4	10.25			
22-DMP	0.0	0.00			
24-DMP	6.8	0.34			
223-TMB	9.0	0.45			
CHEXANE	27.0	1.35			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	95.0	4.74			
23-DMP ,	35.4	1.77			
3-MHEX ,	44.7	2.23			
1C3-DMCP	79.0	3.94			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	2004.		C1/C2	0.85
GASOLINE	2004.		A /D2	9.01
NAPHTHENES	758.	37.84	C1/D2	8.71
C6-7	1345.	67.10	CH/MCP	0.13
			PENT/IPENT,	0.66

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75764P OFF. NORWAY ESSO 16/7-3 1700 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	54.2	5.43
ETHANE	0.0		1T2-DMCP	29.6	2.96
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	118.4	11.87
IPENTANE	0.0	0.00	1C2-DMCP	17.6	1.77
NPENTANE	76.2	7.64	MCH	155.7	15.61
22-DMB	1.4	0.14			
CPENTANE	5.6	0.56			
23-DMB	14.4	1.45			
2-MP	118.1	11.84			
3-MP	26.9	2.70			
NHEXANE	103.7	10.39			
MCP	128.4	12.88			
22-DMP	0.0	0.00			
24-DMP	3.0	0.30			
223-TMB	4.2	0.42			
CHEXANE	12.8	1.28			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	35.3	3.54			
23-DMP ,	28.8	2.89			
3-MHEX ,	19.3	1.94			
1C3-DMCP	43.7	4.38			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	997.		C1/C2	0.74
GASOLINE	997.		A /D2	11.50
NAPHTHENES	448.	44.88	C1/D2	10.56
C6-7	755.	75.67	CH/MCP	0.10
			PENT/IPENT,	999.99

75764R OFF. NORWAY ESSO 16/7-3 1760 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	46.8	5.63
ETHANE	0.0		1T2-DMCP	21.6	2.59
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	99.1	11.91
IPENTANE	90.6	10.89	1C2-DMCP	9.1	1.10
NPENTANE	66.5	7.99	MCH	88.7	10.66
22-DMB	1.4	0.17			
CPENTANE	3.6	0.44			
23-DMB	11.6	1.39			
2-MP	101.0	12.14			
3-MP	22.0	2.64			
NHEXANE	84.8	10.19			
MCP	71.4	8.58			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	2.4	0.29			
CHEXANE	10.6	1.27			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	28.3	3.41			
23-DMP ,	20.0	2.40			
3-MHEX ,	18.3	2.20			
1C3-DMCP	34.1	4.10			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	832.		C1/C2	0.70
GASOLINE	832.		A /D2	10.04
NAPHTHENES	286.	34.37	C1/D2	6.97
C6-7	535.	64.34	CH/MCP	0.15
			PENT/IPENT,	0.73

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75765C OFF. NORWAY ESSO 16/7-3 1910 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	0.0	0.00
ETHANE	0.0		1T2-DMCP	0.0	0.00
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	50.2	27.39
IPENTANE	13.4	7.29	1C2-DMCP	0.0	0.00
NPENTANE	23.3	12.72	MCH	13.4	7.29
22-DMB	0.0	0.00			
CPENTANE	0.0	0.00			
23-DMB	0.0	0.00			
2-MP	15.9	8.66			
3-MP	5.2	2.86			
NHEXANE	35.3	19.23			
MCP	12.2	6.63			
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 ,	14.5	7.92			
23-DMP ,	0.0	0.00			
3-MHEX ,	0.0	0.00			
1C3-DMCP	0.0	0.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	183.		C1/C2 2.29
GASOLINE	183.		A /D2 999.99
NAPHTHENES	26.	13.92	C1/D2 999.99
C6-7	126.	68.46	CH/MCP 0.00
			PENT/IPENT, 1.74

75765E OFF. NORWAY ESSO 16/7-3 1970 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	7.6	1.75
ETHANE	0.0		1T2-DMCP	8.1	1.86
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	11.0	2.54	224-TMP	0.0	0.00
NBUTANE	15.5	3.58	NHEPTANE	71.8	16.58
IPENTANE	38.7	8.93	1C2-DMCP	0.0	0.00
NPENTANE	35.6	8.21	MCH	43.5	10.05
22-DMB	0.3	0.07			
CPENTANE	2.4	0.54			
23-DMB	4.9	1.14			
2-MP	38.5	8.88			
3-MP	10.6	2.44			
NHEXANE	45.2	10.44			
MCP	31.2	7.21			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	3.5	0.81			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	38.7	8.93			
23-DMP ,	6.9	1.60			
3-MHEX ,	8.3	1.91			
1C3-DMCP	10.9	2.53			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	433.		C1/C2 1.48
GASOLINE	433.		A /D2 14.13
NAPHTHENES	107.	24.75	C1/D2 10.35
C6-7	276.	63.67	CH/MCP 0.11
			PENT/IPENT, 0.92

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75764T OFF. NORWAY ESSO 16/7-3 1820 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	0.0	0.00
ETHANE	0.0		1T2-DMCP	2.6	1.18
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	55.3	25.37
IPENTANE	15.8	7.25	1C2-DMCP	0.0	0.00
NPENTANE	24.7	11.32	MCH	16.9	7.77
22-DMB	0.0	0.00			
CPENTANE	0.0	0.00			
23-DMB	2.1	0.94			
2-MP	20.8	9.55			
3-MP	5.1	2.33			
NHEXANE	38.5	17.63			
MCP	12.9	5.92			
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 ,	20.9	9.58			
23-DMP ,	0.0	0.00			
3-MHEX ,	2.5	1.15			
1C3-DMCP	0.0	0.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	218.		C1/C2 2.44
GASOLINE	218.		A /D2 37.39
NAPHTHENES	32.	14.88	C1/D2 15.09
C6-7	150.	68.61	CH/MCP 0.00
			PENT/IPENT, 1.56

75765B OFF. NORWAY ESSO 16/7-3 1880 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	27.3	2.64
ETHANE	0.0		1T2-DMCP	54.8	5.31
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	98.5	9.54
IPENTANE	26.4	2.56	1C2-DMCP	38.8	3.75
NPENTANE	84.4	8.17	MCH	148.0	14.34
22-DMB	70.0	6.78			
CPENTANE	9.1	0.88			
23-DMB	9.7	0.93			
2-MP	62.1	6.01			
3-MP	30.8	2.98			
NHEXANE	69.9	6.77			
MCP	152.5	14.77			
22-DMP	0.0	0.00			
24-DMP	1.9	0.18			
223-TMB	0.0	0.00			
CHEXANE	18.9	1.83			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	45.6	4.42			
23-DMP ,	15.9	1.54			
3-MHEX ,	21.1	2.04			
1C3-DMCP	47.0	4.56			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS
ALL COMP	1033.		C1/C2 0.66
GASOLINE	1033.		A /D2 8.00
NAPHTHENES	496.	48.08	C1/D2 10.10
C6-7	740.	71.63	CH/MCP 0.12
			PENT/IPENT, 3.19

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757656 OFF. NORWAY ESSO 16/7-3 2030 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	76.7	2.85
ETHANE	0.0		1T2-DMCP	123.7	4.59
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	86.8	3.22	224-TMP	0.0	0.00
NBUTANE	132.1	4.90	NHEPTANE	204.1	7.58
IPENTANE	292.4	10.86	1C2-DMCP	67.6	2.51
NPENTANE	194.4	7.22	MCH	280.4	10.41
22-DMB	3.3	0.12			
CPENTANE	42.7	1.59			
23-DMB	30.0	1.11			
2-MP	177.2	6.58			
3-MP	67.5	2.51			
NHEXANE	149.6	5.55			
MCP	442.9	16.44			
22-DMP	0.0	0.00			
24-DMP	3.3	0.12			
223-TMB	2.5	0.09			
CHEXANE	54.6	2.03			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	60.6	2.25			
23-DMP ,	37.8	1.40			
3-MHEX ,	34.8	1.29			
1C3-DMCP	128.4	4.77			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	2694.		C1/C2	0.47
GASOLINE	2694.		A /D2	10.16
NAPHTHENES	1217.	45.19	C1/D2	11.37
C6-7	1667.	61.90	CH/MCP	0.12
			PENT/IPENT,	0.66

757651 OFF. NORWAY ESSO 16/7-3 2090 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	613.2	4.77
ETHANE	0.0		1T2-DMCP	1305.3	10.16
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	93.6	0.73	224-TMP	0.0	0.00
NBUTANE	187.6	1.46	NHEPTANE	465.1	3.62
IPENTANE	802.5	6.25	1C2-DMCP	952.7	7.42
NPENTANE	495.1	3.86	MCH	1994.8	15.53
22-DMB	1.9	0.01			
CPENTANE	139.8	1.09			
23-DMB	87.0	0.68			
2-MP	566.9	4.41			
3-MP	427.1	3.33			
NHEXANE	377.9	2.94			
MCP	2496.6	19.44			
22-DMP	0.0	0.00			
24-DMP	17.3	0.13			
223-TMB	1.1	0.01			
CHEXANE	260.9	2.03			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	174.1	1.36			
23-DMP ,	164.7	1.28			
3-MHEX ,	470.5	3.66			
1C3-DMCP	747.8	5.82			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	12844.		C1/C2	0.40
GASOLINE	12844.		A /D2	1.79
NAPHTHENES	8511.	66.27	C1/D2	5.16
C6-7	10042.	78.19	CH/MCP	0.10
			PENT/IPENT,	0.62

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75765J OFF. NORWAY ESSO 16/7-3 2120 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	283.9	4.50
ETHANE	0.0		1T2-DMCP	551.7	8.74
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	104.1	1.65	224-TMP	0.0	0.00
NBUTANE	175.8	2.78	NHEPTANE	224.2	3.55
IPENTANE	520.8	8.25	1C2-DMCP	358.4	5.68
NPENTANE	308.9	4.89	MCH	902.0	14.29
22-DMB	2.7	0.04			
CPENTANE	73.6	1.17			
23-DMB	50.7	0.80			
2-MP	306.8	4.86			
3-MP	219.0	3.47			
NHEXANE	202.6	3.21			
MCP	1185.6	18.78			
22-DMP	0.0	0.00			
24-DMP	9.0	0.14			
223-TMB	0.0	0.00			
CHEXANE	117.6	1.86			
33-IMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	100.6	1.59			
23-DMP ,	78.1	1.24			
3-MHEX ,	198.5	3.14			
1C3-DMCP	339.3	5.37			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	6314.		C1/C2	0.41
GASOLINE	6314.		A /D2	2.15
NAPHTHENES	3812.	60.38	C1/D2	5.64
C6-7	4551.	72.09	CH/MCP	0.10
			PENT/IPENT,	0.59

75765L OFF. NORWAY ESSO 16/7-3 2180 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	13.4	2.66
ETHANE	0.0		1T2-DMCP	36.9	7.33
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	34.5	6.86
IPENTANE	30.2	6.02	1C2-DMCP	21.3	4.23
NPENTANE	33.3	6.62	MCH	90.2	17.95
22-DMB	0.5	0.09			
CPENTANE	2.2	0.44			
23-DMB	2.7	0.54			
2-MP	29.0	5.78			
3-MP	20.5	4.08			
NHEXANE	28.6	5.68			
MCP	73.9	14.70			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	9.0	1.80			
33-IMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	28.8	5.73			
23-DMP ,	4.8	0.95			
3-MHEX ,	15.5	3.08			
1C3-DMCP	27.4	5.44			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	503.		C1/C2	0.74
GASOLINE	503.		A /D2	4.07
NAPHTHENES	274.	54.55	C1/D2	8.26
C6-7	384.	76.43	CH/MCP	0.12
			PENT/IPENT,	1.10

TABLE 7 -- PAGE 10

75824A OFF. NORWAY ESSO 16/7-3 2210 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	218.3	3.84
ETHANE	125.4		1T2-DMCP	445.6	7.83
PROPANE	71.9		3-EPENT	0.0	0.00
IBUTANE	96.1	1.69	224-TMP	0.0	0.00
NBUTANE	172.0	3.02	NHEPTANE	264.2	4.64
IPENTANE	448.2	7.88	1C2-DMCP	315.2	5.54
NPENTANE	279.8	4.92	MCH	803.7	14.12
22-DMB	4.7	0.08			
CPENTANE	85.1	1.50			
23-DMB	47.6	0.84			
2-MP	259.9	4.57			
3-MP	170.8	3.00			
NHEXANE	221.3	3.89			
MCP	1114.6	19.59			
22-DMP	0.0	0.00			
24-DMP	7.1	0.12			
223-TMB	0.3	0.01			
CHEXANE	128.7	2.26			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	86.3	1.52			
23-DMP ,	75.5	1.33			
3-MHEX ,	175.1	3.08			
1C3-DMCP	270.7	4.76			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	5888.		C1/C2	0.43
GASOLINE	5691.		A /D2	2.77
NAPHTHENES	3382.	59.43	C1/D2	5.82
C6-7	4127.	72.51	CH/MCP	0.12
			PENT/IPENT,	0.62

75824B OFF. NORWAY ESSO 16/7-3 2240 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	9.1	1.24
ETHANE	0.0		1T2-DMCP	15.5	2.10
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	41.5	5.63	224-TMP	0.0	0.00
NBUTANE	65.7	8.91	NHEPTANE	61.9	8.39
IPENTANE	80.2	10.88	1C2-DMCP	10.1	1.37
NPENTANE	84.1	11.41	MCH	67.0	9.08
22-DMB	0.0	0.00			
CPENTANE	5.9	0.80			
23-DMB	2.4	0.32			
2-MP	39.7	5.38			
3-MP	21.4	2.90			
NHEXANE	66.2	8.98			
MCP	66.1	8.97			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	22.0	2.99			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	43.5	5.91			
23-DMP ,	7.8	1.06			
3-MHEX ,	13.2	1.79			
1C3-DMCP	13.8	1.87			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	737.		C1/C2	1.16
GASOLINE	737.		A /D2	9.68
NAPHTHENES	210.	28.43	C1/D2	10.02
C6-7	396.	53.76	CH/MCP	0.33
			PENT/IPENT,	1.05

TABLE 7 - PAGE 11

75824C OFF. NORWAY ESSO 16/7-3 2270 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	165.9	4.52
ETHANE	0.0		1T2-DMCP	334.8	9.12
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	25.6	0.70	224-TMP	0.0	0.00
NBUTANE	61.9	1.69	NHEPTANE	374.2	10.19
IPENTANE	142.7	3.88	1C2-DMCP	252.0	6.86
NPENTANE	115.7	3.15	MCH	877.2	23.89
22-DMB	0.0	0.00			
CPENTANE	25.7	0.70			
23-DMB	17.9	0.49			
2-MP	122.6	3.34			
3-MP	70.1	1.91			
NHEXANE	139.6	3.80			
MCP	310.3	8.45			
22-DMP	0.0	0.00			
24-DMP	3.7	0.10			
223-TMB	0.0	0.00			
CHEXANE	84.1	2.29			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	112.4	3.06			
23-DMP ,	71.6	1.95			
3-MHEX ,	181.3	4.94			
1C3-DMCP	182.6	4.97			

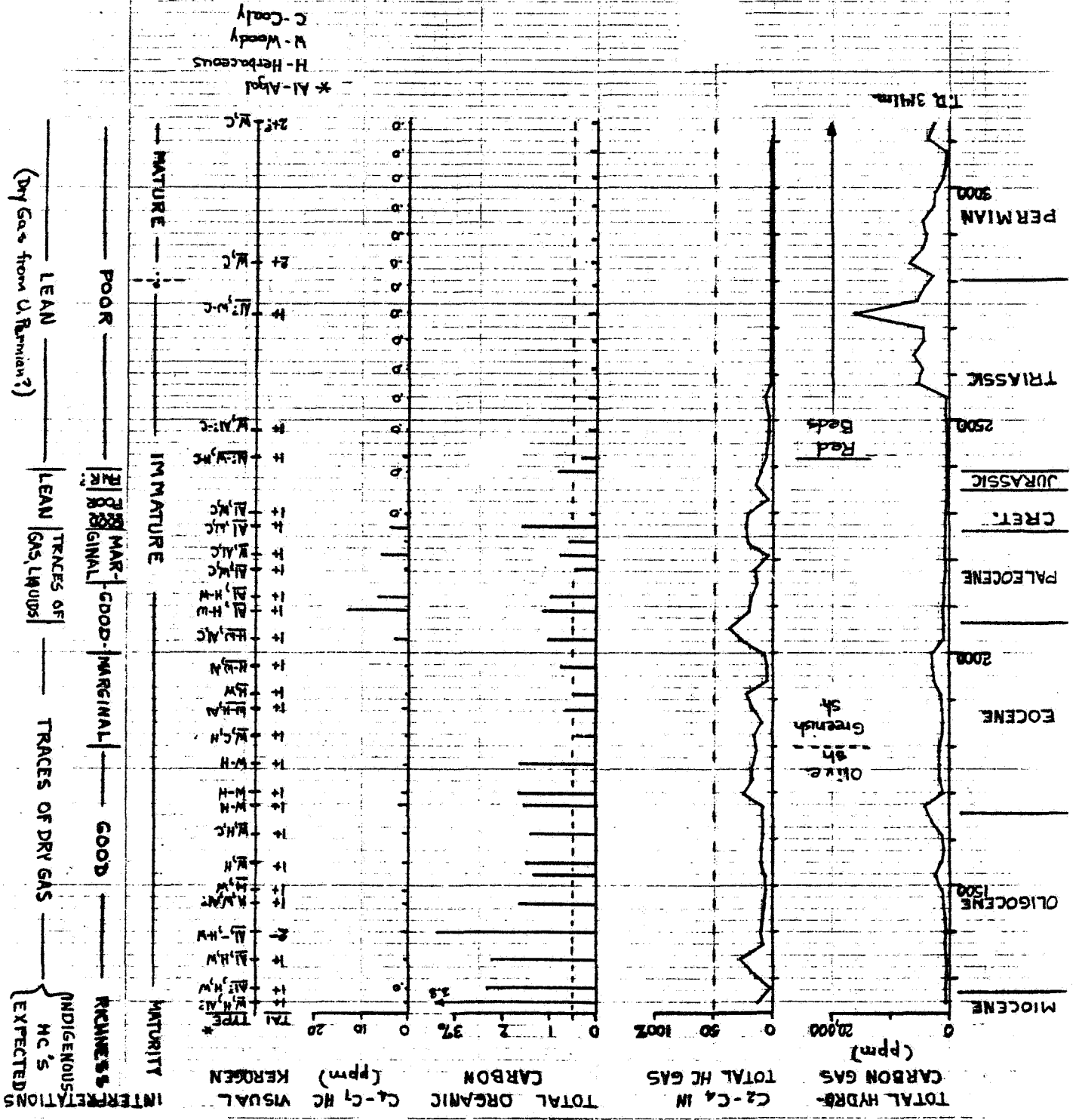
	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	3672.		C1/C2	0.86
GASOLINE	3672.		A /D2	2.83
NAPHTHENES	2233.	60.80	C1/D2	5.92
C6-7	3090.	84.15	CH/MCP	0.27
			PENT/IPENT,	0.81

75824H OFF. NORWAY ESSO 16/7-3 2420 M

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	5.5	0.60
ETHANE	0.0		1T2-DMCP	15.9	1.74
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	36.6	4.00	224-TMP	0.0	0.00
NBUTANE	11.6	1.27	NHEPTANE	122.8	13.43
IPENTANE	53.3	5.82	1C2-DMCP	0.0	0.00
NPENTANE	54.2	5.92	MCH	168.6	18.43
22-DMB	0.4	0.04			
CPENTANE	9.1	1.00			
23-DMB	5.7	0.62			
2-MP	39.5	4.32			
3-MP	28.8	3.15			
NHEXANE	89.8	9.82			
MCP	58.4	6.38			
22-DMP	0.0	0.00			
24-DMP	3.0	0.33			
223-TMB	0.0	0.00			
CHEXANE	86.1	9.41			
33-DMP ,	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX ,	72.4	7.92			
23-DMP ,	12.4	1.35			
3-MHEX ,	31.5	3.45			
1C3-DMCP	9.0	0.99			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	915.		C1/C2	3.68
GASOLINE	915.		A /D2	6.74
NAPHTHENES	353.	38.55	C1/D2	10.37
C6-7	676.	73.85	CH/MCP	1.48
			PENT/IPENT,	1.02

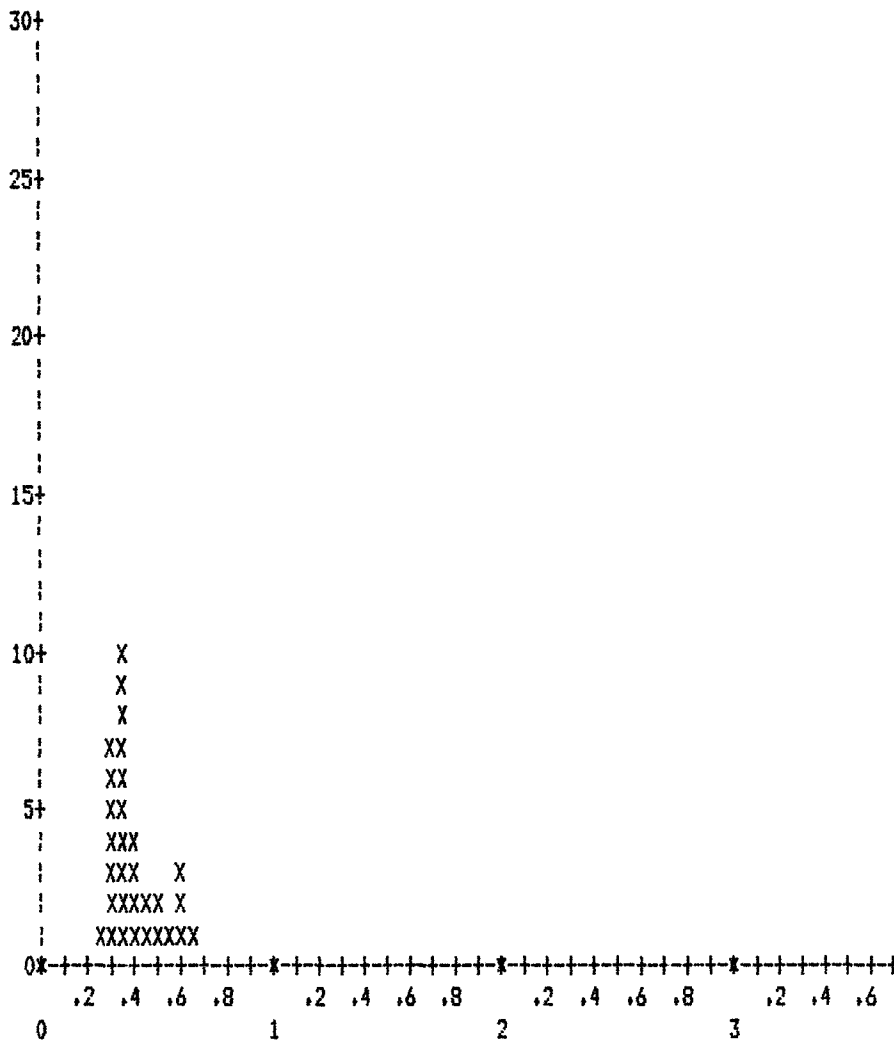
Figure 1 Geochemical Profiles: 16/7-3



CLIENT..... EXXON FILE NAME..... E-576-3
 DEPTH/SAMPLE NO., 75764 F TYPE OF SAMPLE..... CT6S.
 LOCATION..... UNKNOWN DATE..... 9-16-82
 ANALYST..... K. W. SCHWAB NO. OF OBSERVATIONS, 31

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.29 MAX. 0.66 AVG. 0.41 STD. DEV. 0.11



VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS. 22 MIN. 0.29 MAX. 0.44 AVG. 0.35 STD. DEV. 0.04

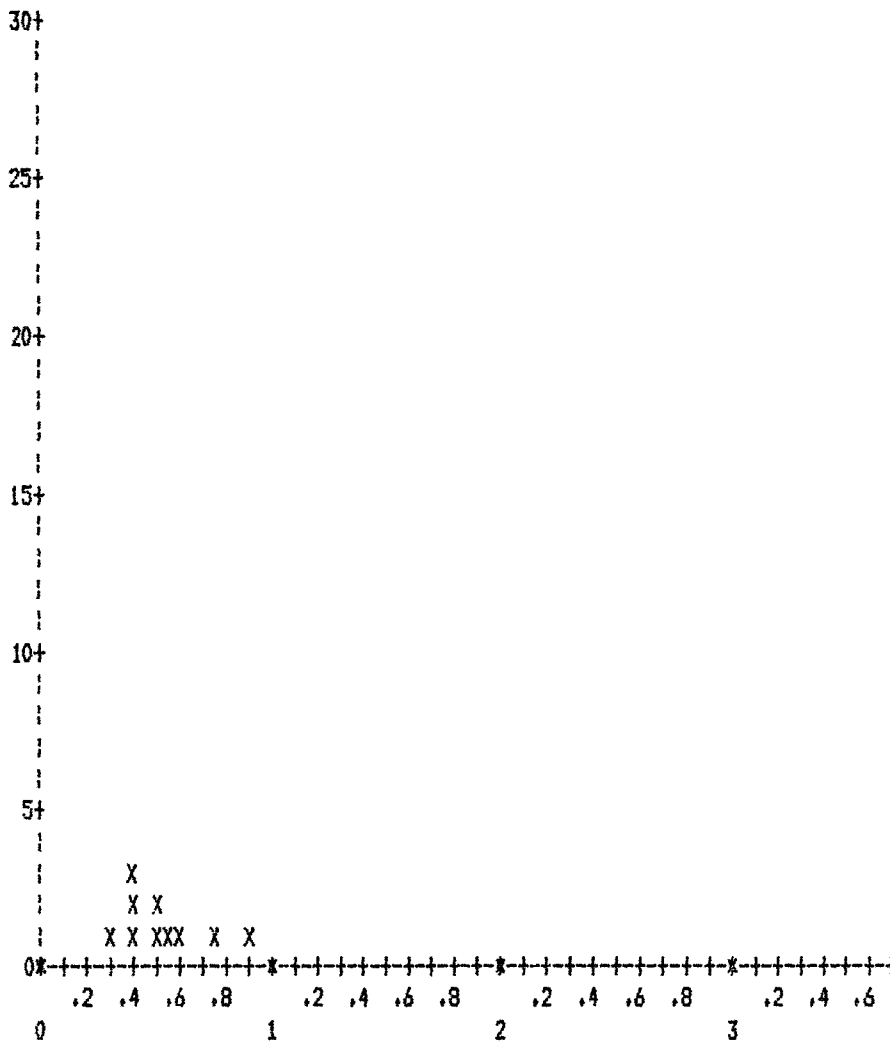
POP.# 2 TOTAL CTS. 9 MIN. 0.45 MAX. 0.66 AVG. 0.56 STD. DEV. 0.07

FIGURE 2 - Shale, 1400 meters

CLIENT..... EXXON FILE NAME..... E-576-4
 DEPTH/SAMPLE NO., 75765 H TYPE OF SAMPLE..... CTGS.
 LOCATION..... UNKNOWN DATE..... 9-16-82
 ANALYST..... K. W. SCHWAB NO. OF OBSERVATIONS, 10

STANDARD ZRo START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN, 0.33 MAX, 0.92 AVG, 0.55 STD, DEV, 0.18

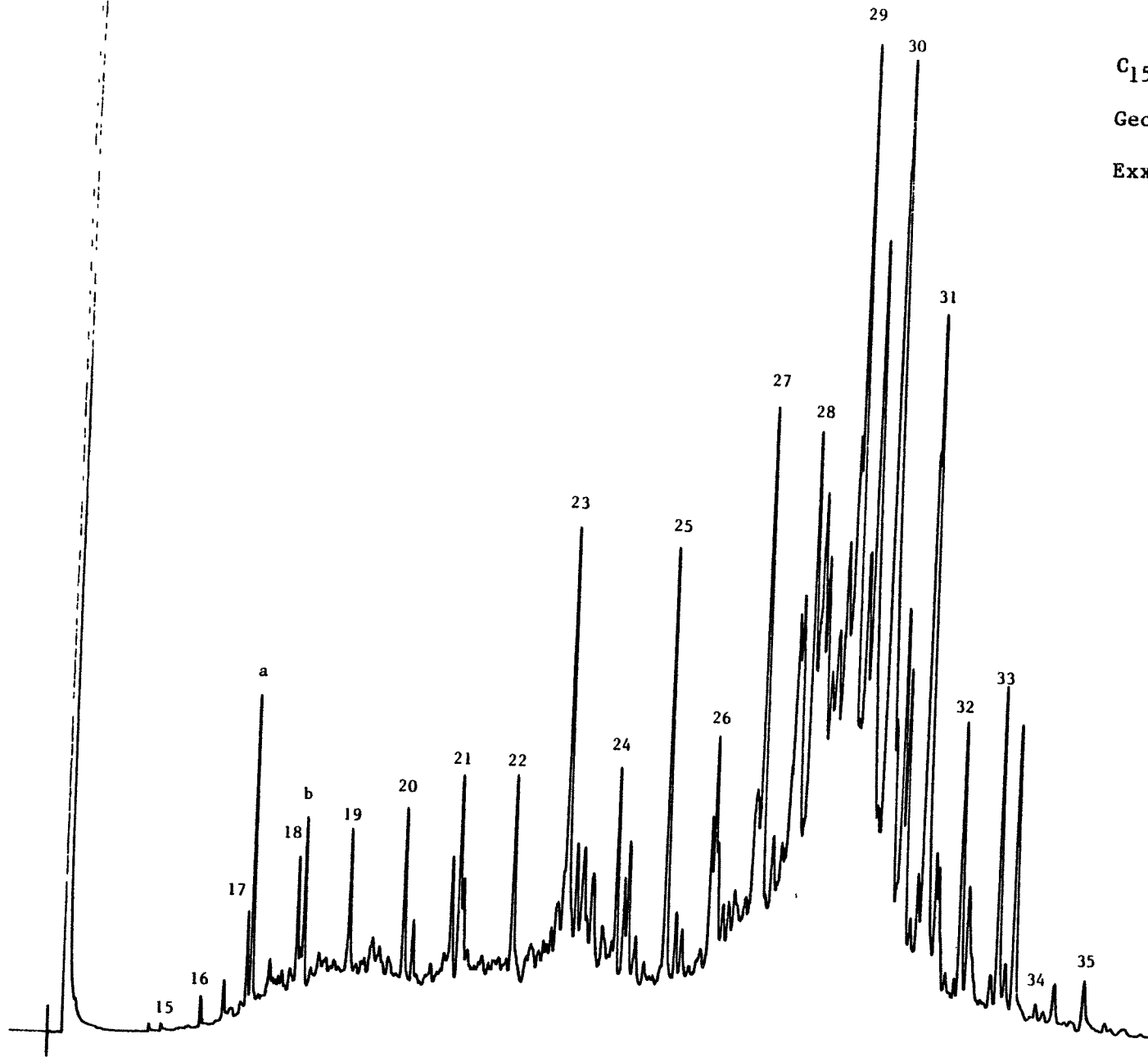


VITRINITE REFLECTANCE HISTOGRAM - ZRo

POP.# 1 TOTAL CTS, 8 MIN, 0.33 MAX, 0.61 AVG, 0.48 STD, DEV, 0.10

POP.# 2 TOTAL CTS, 2 MIN, 0.77 MAX, 0.92 AVG, 0.85 STD, DEV, 0.11

FIGURE 3 - Shale, 2060 meters



C₁₅₊ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-001

Exxon Identification No. 75764-R

FIGURE 6 - Cuttings Extract, 1760 meters

C₁₅₊ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-002

Exxon Identification No. 75765-H

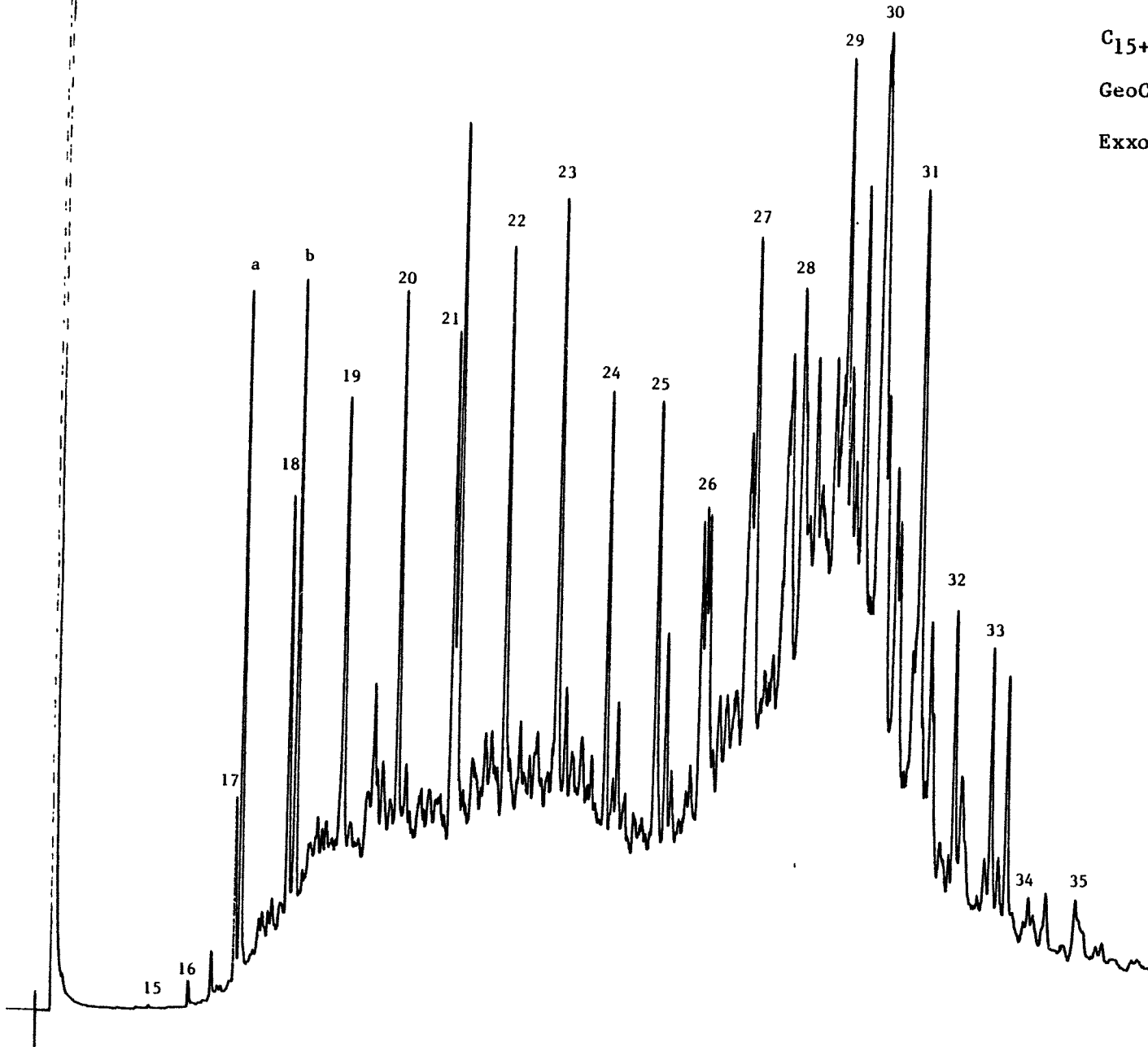


FIGURE 7 - Cuttings Extract, 2060 meters

C₁₅₊ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-003

Exxon Identification No. 75824-A

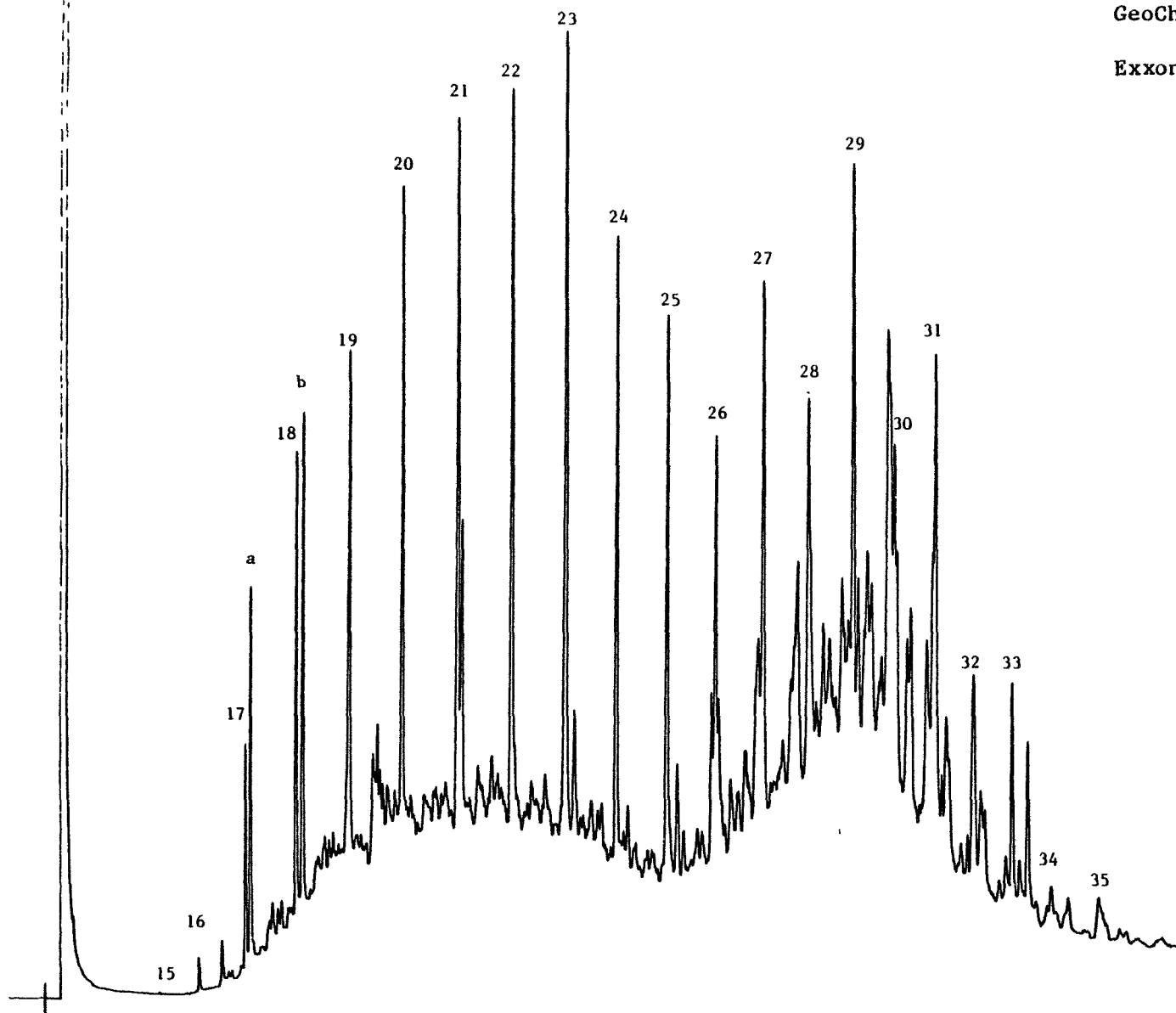


FIGURE 8 - Cuttings Extract, 2210 meters

C₁₅₊ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-004

Exxon Identification No. 75824-C

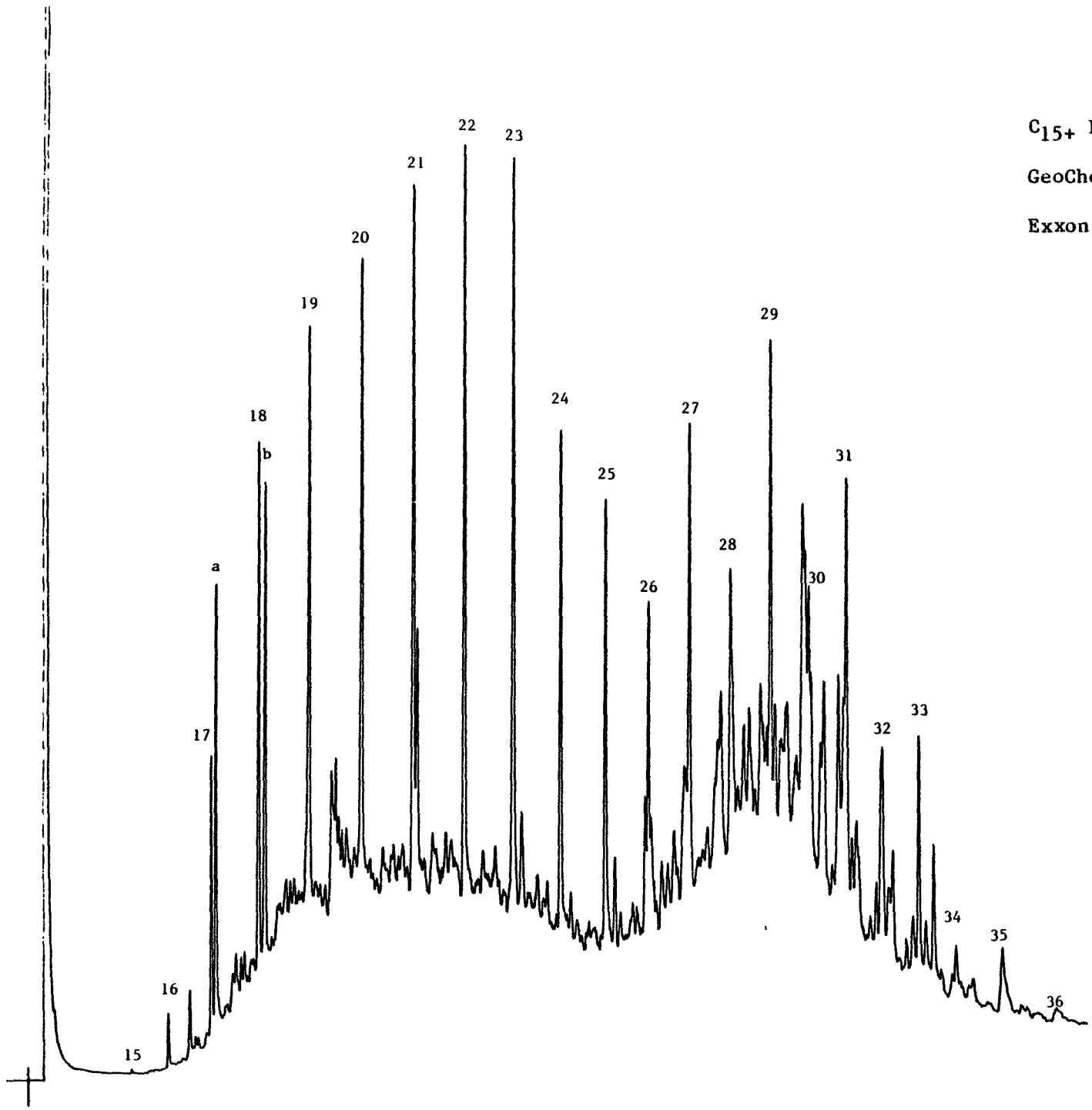


FIGURE 9 - Cuttings Extract, 2270 meters

C15+ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-005

Exxon Identification No. 75824-D

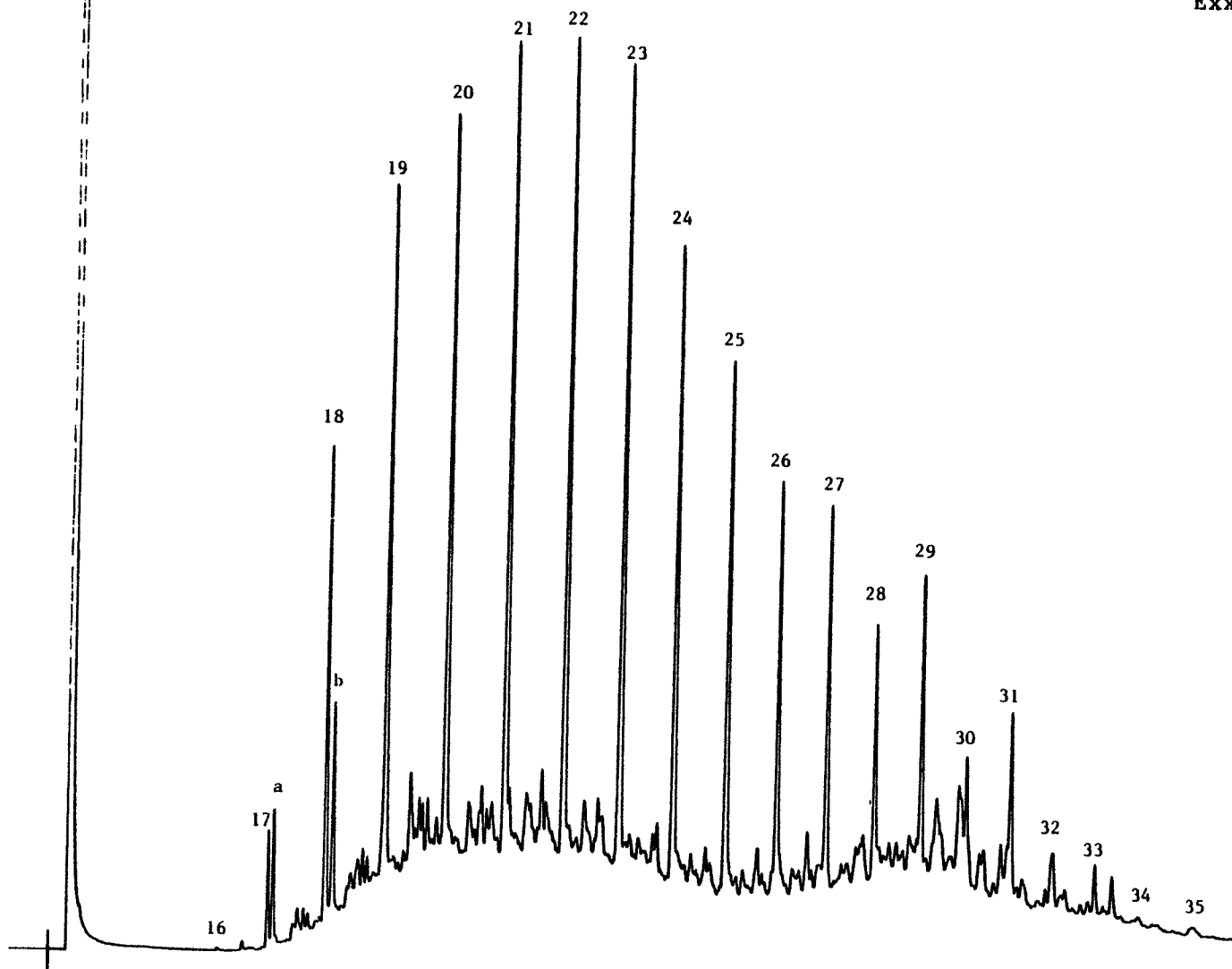


FIGURE 10 - Cuttings Extract, 2300 meters

C₁₅₊ Paraffin-Naphthene Hydrocarbons

GeoChem Sample No. E535-006

Exxon Identification No. 75824-E

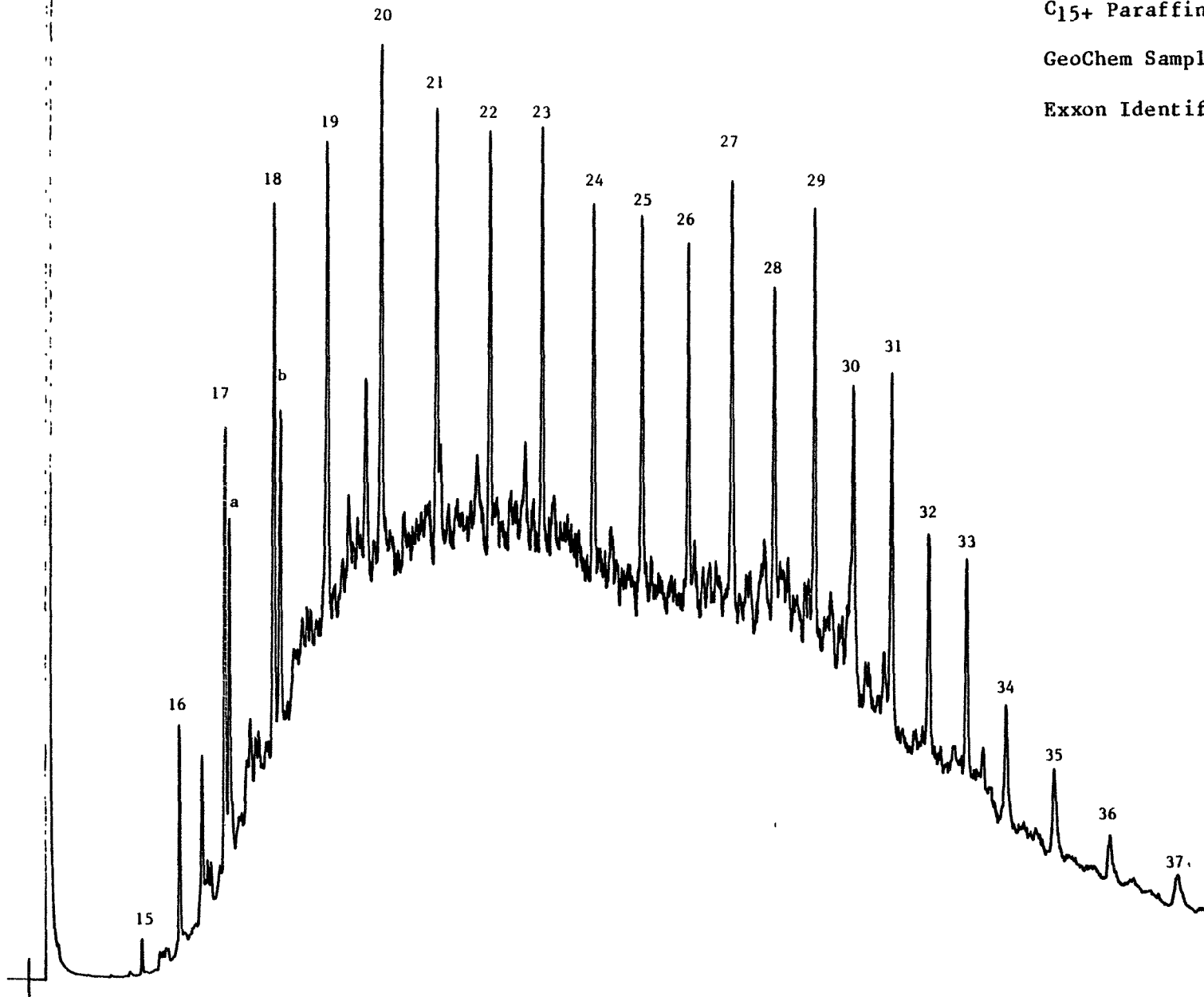


FIGURE 11 - Cuttings Extract, 2330 meters

