New Mexico Bureau of Mines & Mineral Resources
Socorro, NM 87801

A DIVISION OF
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OPEN-FILE REPORT 301

GEOCHEMICAL ANALYSES OF HYDROCARBONS, CUTTINGS, AND CUTTINGS HEADSPACE GAS, MAR OIL AND GAS NO. 1 ESTES WELL, TORRANCE COUNTY, NEW MEXICO

By Brown & Ruth Laboratories, Inc.,
Geochem Laboratories, Inc.
and Precision Service, Inc.

June 18, 1987

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

JUN 18 1987

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

WAIVER OF CONFIDENTIALITY

RE: MAR OIL AND GAS
Estes Well No. 1
Sec. 35, T-5-N, R-8-E,
Torrance County, New Mexico
API #30-057-20022

The enclosed reports GeoChem Laboratories Inc., Jobs Numbers 3181 and 3230 and Brown and Ruth Laboratories Inc. Job Number 1939 should be placed into the New Mexico Bureau of Mines Open-File System and be made available to the general public.

JACEK GAWRON
Agent for Gila Exploration, Inc.

BROWN & RUTH LABORATORIES, INC.
1790 WEST BELT NORTH, HOUSTON, TEXAS 77043 (713) 464-3284

November 27, 1985

Gila Exploration, Inc.
839 Paseo de Peralta
Suite J
Santa Fe, New Mexico 87501

Attention: Robert G. McKinney

Gentlemen:

Four canned samples containing water and hydrocarbons recovered during drilling from the Estes Project were submitted for analysis. In addition, a sample of rig diesel was also analyzed. It was requested that the hydrocarbon fluids be topped, deasphalted, and subjected to liquid and gas chromatography in an effort to determine whether the hydrocarbon fluids were related to the diesel.

Topping showed the fluids from zone B and one of the cans marked "zone C" to contain 30%-45% volatile hydrocarbons. The nonvolatile fraction of both samples consists of 60%-73% hydrocarbons, with saturates and aromatics present in nearly equal concentrations. Only very small quantities of asphaltenes are present (3%-6%).

Gas chromatography proves that the fluids from zone B and the above-mentioned sample (1939-003) from zone C are identical with the rig diesel. The material in the other can from zone C (sample 1939-005) is different, however. Liquid chromatography yielded only small amounts of hydrocarbons after removal of about 70% asphaltenes. Gas chromatography of the saturated hydrocarbons shows that this sample is not identical with the rig diesel. The distributions of n-alkanes having fewer than about 23 carbon atoms are very similar to the diesel sample, but sample 1939-005 also contains a small amount of heavier material (unlike the diesel sample). It is thus apparent that sample 1939-005 represents a mixture of rig diesel with other organic matter.

The organic matter indigenous to sample 1939-005 is rather rich in asphaltic components and poor in hydrocarbons. These results tentatively suggest that it is either immature material or a tar or solidified bitumen of some sort. It is

unlikely that this material represents a crude oil, although heavy, asphaltic oils are common in some areas. Further analyses on uncontaminated samples might be helpful in establishing the nature of the indigenous organic matter.

We appreciate the opportunity to be of service to Gila Exploration. If you have any questions regarding these data, then please contact us.

Very truly yours,

BROWN & RUTH LABORATORIES, INC.

Stephen W. Brown

Stephen W. Brown

SWB/cah/C14
Enclosures

TABLE I-A

Results of C15+ Liquid Chromatography

Sample Number	Client I.D.	% Volitiles	.....Hydrocarbons..... Saturates (%)	Aromatics (%)	Total (%)	Sat/Arom	.....Nonhydrocarbons..... Asphaltene (%)	NSO'S (%)	Non-Eluted NSO's (%)	Total (%)
1939-002A	Zone B	30.7	41.2	31.8	73.0	1.29	3.6	2.9	20.5	27.0
1939-003A	Zone C	43.0	30.2	35.6	65.8	0.85	5.6	5.1	23.5	34.2
1939-005A	Zone C	6.1	*Partial Chromatography			---	67.9	---	---	---

*Amount of hydrocarbon insufficient for complete liquid chromatography. Partial separation carried out in order to obtain saturate fraction for G.C. analysis.

TABLE I-B

Summary Table for C15+ Extract Analysis

Sample Number	Client I.D.	Extract / TOC	CPI	Pristane / Phytane	Pristane / n-C17	Phytane / n-C18
1939-002A	Zone B	---	---	1.13	0.73	0.70
1939-003A	Zone C	---	---	1.13	0.78	0.72
1939-005A	Zone C	---	1.05	1.40	0.46	0.35

TABLE I-C

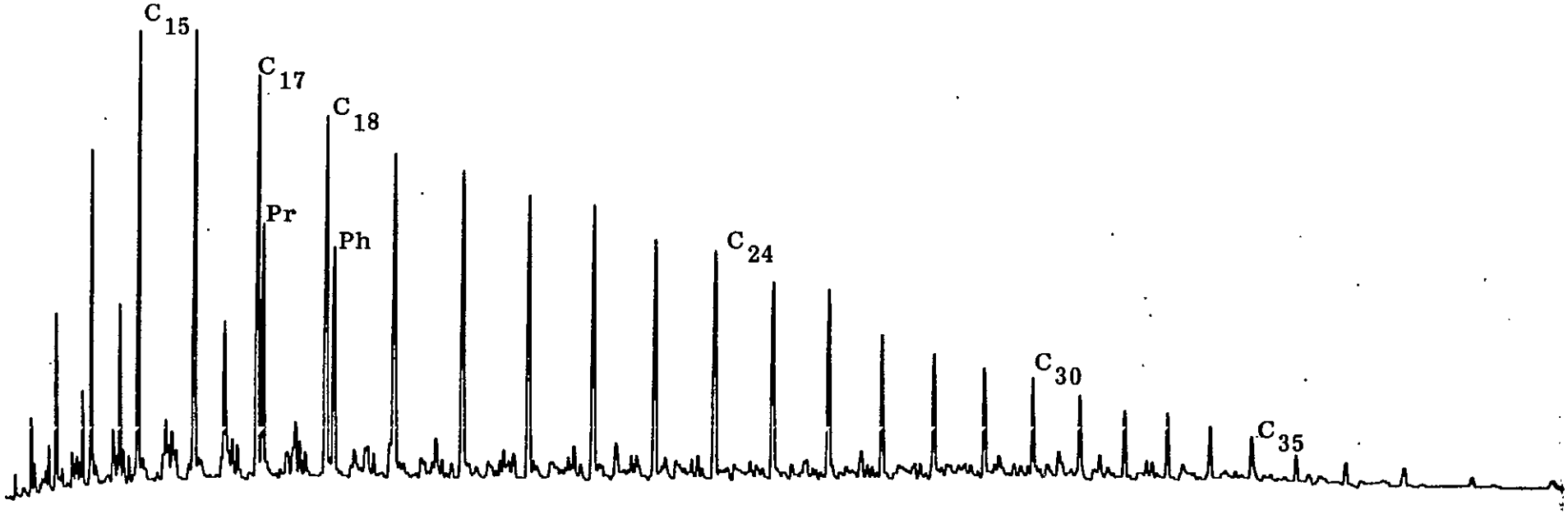
C_{15+} Saturate Hydrocarbon Analysis

Normal Paraffin Distribution

Sample Number	Client I.D.	C15 (%)	C16 (%)	C17 (%)	ipC19 (%)	C18 (%)	ipC20 (%)	C19 (%)	C20 (%)	C21 (%)	C22 (%)	C23 (%)	C24 (%)	C25 (%)	C26 (%)	C27 (%)	C28 (%)	C29 (%)	C30 (%)	C31 (%)	C32 (%)	C33 (%)	C34 (%)	C35 (%)
1939-002A	Zone B	16.8	15.8	12.8	9.4	12.0	8.3	10.0	7.0	4.3	2.1	0.9	0.4	0.2	---	---	---	---	---	---	---	---	---	---
1939-003A	Zone C	7.6	16.7	13.9	10.9	13.4	9.6	11.1	8.1	4.6	2.5	1.0	0.4	0.2	---	---	---	---	---	---	---	---	---	---
1939-005A	Zone C	8.5	12.4	13.9	6.3	12.9	4.5	11.0	8.1	5.5	3.6	2.4	1.9	1.6	1.1	1.1	0.9	0.8	0.7	0.7	0.5	0.5	0.7	0.4

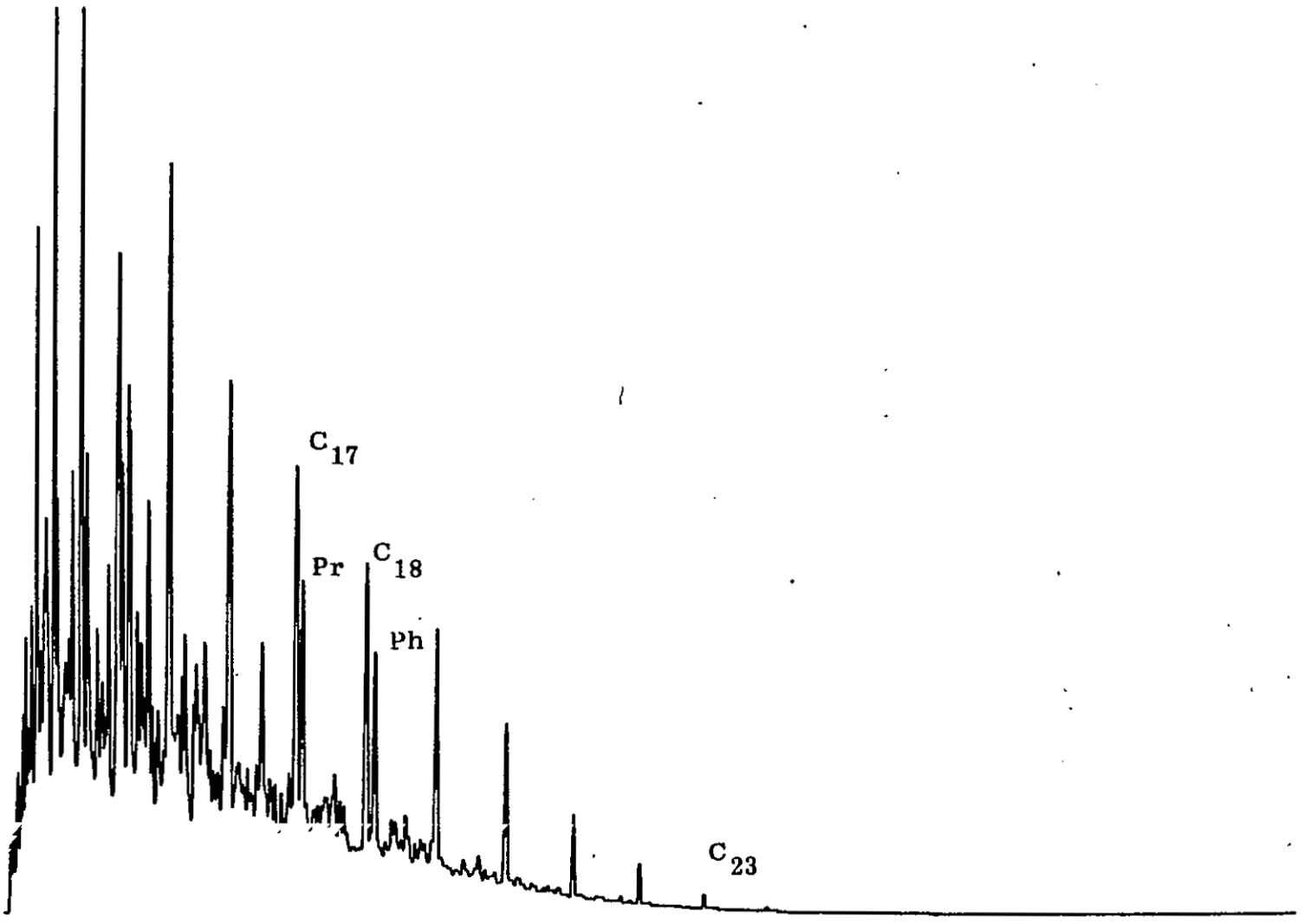
C15+ SATURATED HYDROCARBON FRACTION

Standard



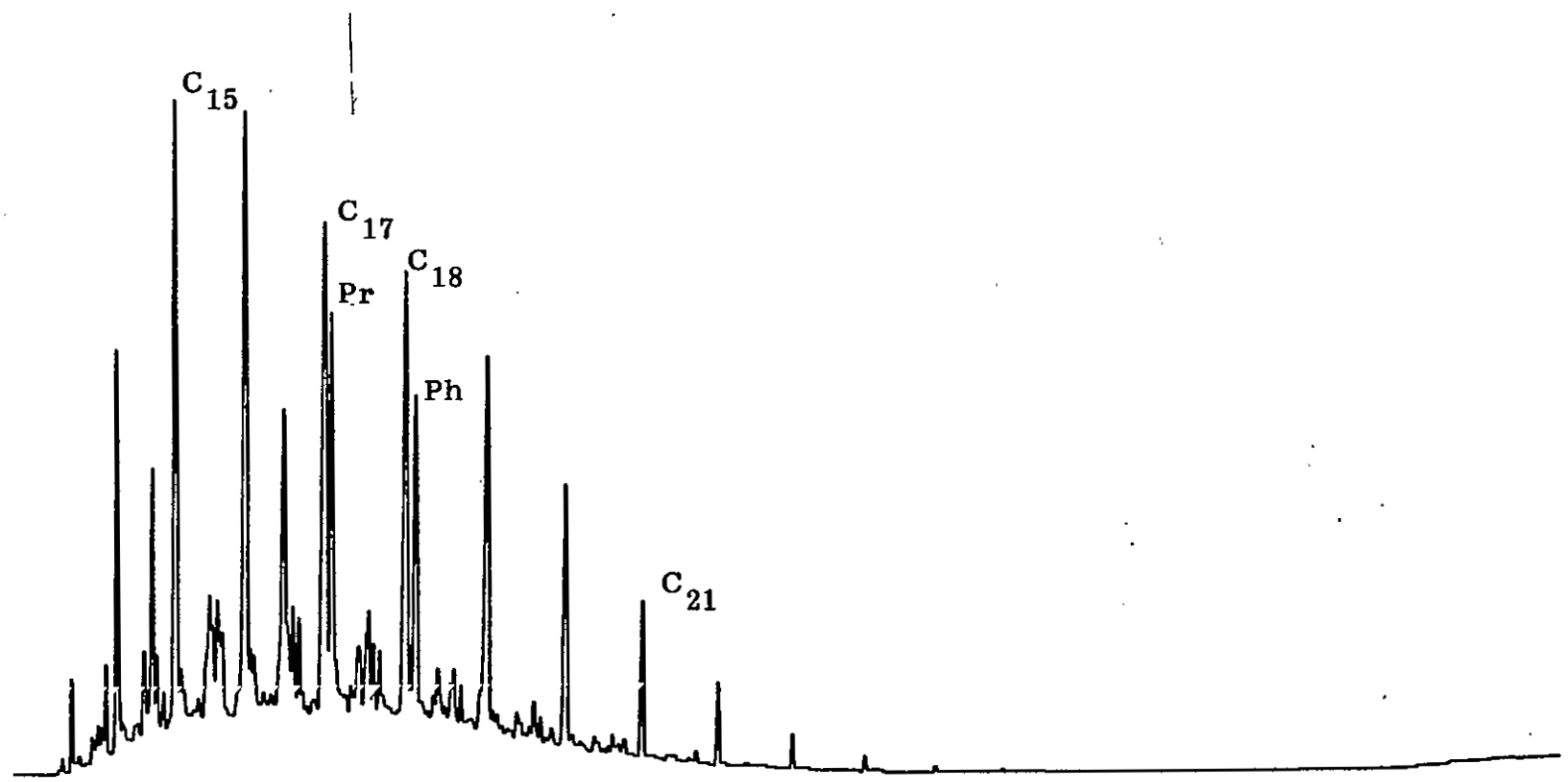
C15+ SATURATED HYDROCARBON FRACTION

Sample 1939-001
Rig Diesel



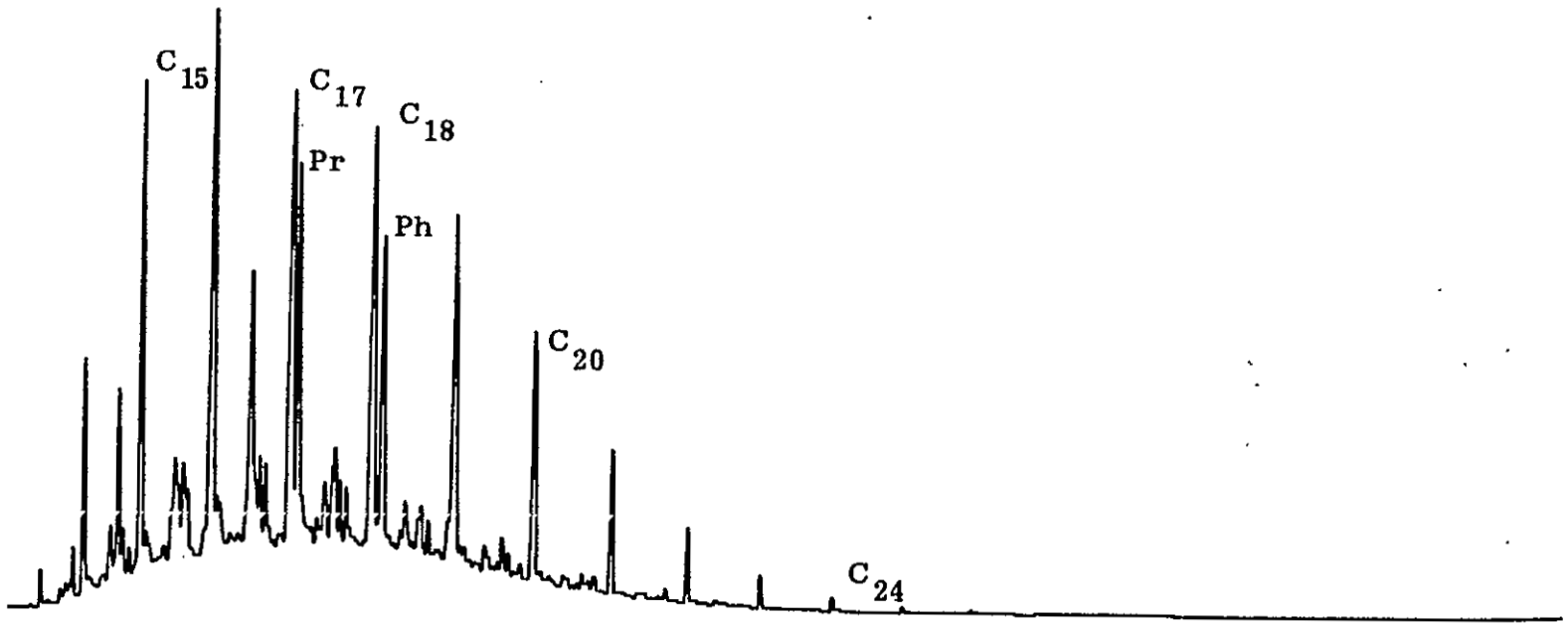
C15+ SATURATED HYDROCARBON FRACTION

Sample 1939-002 A
Zone "B"



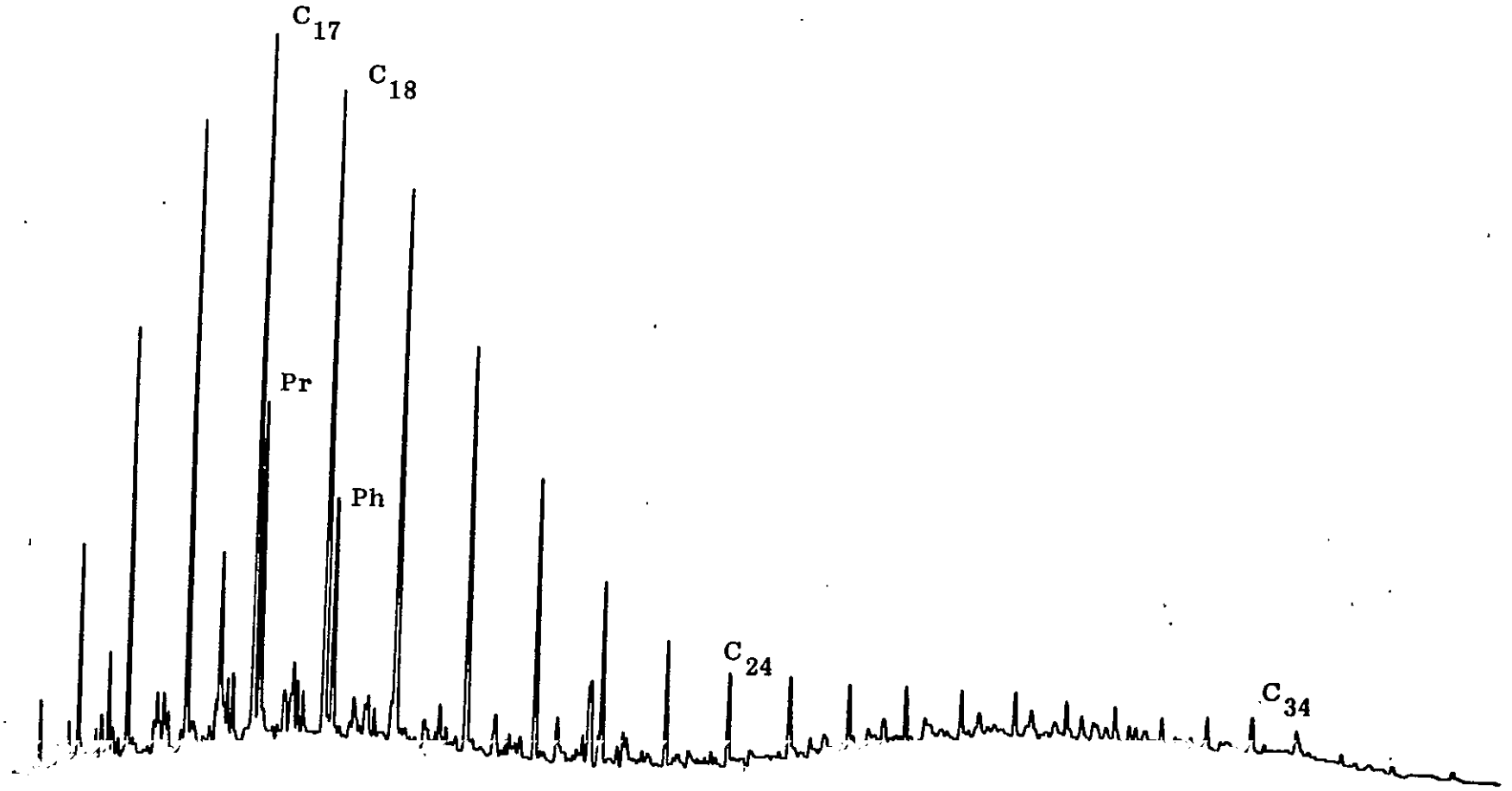
C15+ SATURATED HYDROCARBON FRACTION

Sample 1939-003A
Zone "C"



C15+ SATURATED HYDROCARBON FRACTION

Sample 1939-005A
Zone "C"



GeoChem Laboratories, Inc.

GEOCHEMICAL ANALYSES
SOURCE ROCK EVALUATION

CRUDE OIL—SOURCE ROCK CORRELATION

CRUDE OIL CHARACTERIZATION
GEOCHEMICAL PROSPECTING

1143-C BRITTMOORE ROAD • HOUSTON, TEXAS 77043-5094 • 713/467-7011

August 12, 1985

GILA EXPLORATION COMPANY
839 Paseo de Peralta
Suite J
Santa Fe, New Mexico 87501

RE: GeoChem Job No. 3181
MAR OIL & GAS #1 ESTES

Attention: Mr. Jack J. Gawron

Dear Jack:

The results of the C1-C7 analyses performed on the three (3) canned samples are enclosed. The results were also given to Bob over the phone on July 23, 1985. We also discussed the condition of the samples and the soil types found in the cans. The invoice is also included.

Please call if we can assist you further.

Sincerely,

Donald L. Davis
Manager - Technical Services
GEOCHEM LABORATORIES, INC.

lf

Enclosures

TABLE I-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3181-001	197-200	138.07	38.87	16.97	9.72	8.43	1.12	5.25	15.62
3181-002	220-225	11.02	2.41	1.22	0.96	0.74	0.06	0.27	0.82
3181-003	310-311	265.30	32.16	93.57	5.10	28.06	0.74	1.36	22.64

TABLE II-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS	
3181-001	197-200	193.06	54.98	2.29	1.15	0.21	2.84	28.47	
3181-002	220-225	14.74	3.72	1.97	1.28	0.22	3.25	25.24	SANDY
3181-003	310-311	304.68	39.38	0.34	0.18	0.54	7.11	12.92	

TABLE I-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3181-001	197-200	1356.90	1.35	1.32	0.87	0.76	0.18	0.35	7.43
3181-002	220-225	1140.92	3.49	2.21	1.56	1.40	0.18	0.49	6.78
3181-003	310-311	1412.03	3.39	3.99	1.51	1.24	0.35	0.58	7.06

TABLE II-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3181-001	197-200	1359.67	2.77	1.02	1.14	0.51	606.82	0.20
3181-002	220-225	1146.66	5.74	1.57	1.11	0.37	225.40	0.50
3181-003	310-311	1417.88	5.84	0.84	1.21	0.59	287.80	0.41

TABLE I-C
COMBINED DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3181-001	197-200	1494.98	40.22	18.29	10.60	9.19	1.30	5.61	23.05
3181-002	220-225	1151.94	5.91	3.44	2.53	2.14	0.24	0.77	7.60
3181-003	310-311	1677.34	35.55	97.56	6.61	29.31	1.10	1.95	29.71

TABLE II-C
COMBINED DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3181-001	197-200	1552.73	57.75	2.19	1.15	0.23	29.41	3.71
3181-002	220-225	1161.41	9.46	1.71	1.17	0.31	136.42	0.81
3181-003	310-311	1722.57	45.22	0.36	0.22	0.56	39.77	2.62

TABLE I-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-001	660	55.72	5.38	2.62	3.39	3.36	0.46	0.71	79.29
3230-002	700	8.71	0.74	0.74	2.19	0.45	0.06	0.12	10.69
3230-003	820	43.59	6.62	4.27	5.51	2.67	0.25	0.98	23.71
3230-004	900	50.43	8.37	5.01	16.39	3.45	0.49	1.37	45.75
3230-005	1000	133.44	23.31	12.67	23.02	9.18	0.92	3.70	16.14
3230-006	1100	39.31	6.55	4.61	5.72	2.91	0.29	1.13	7.05
3230-007	1200	27.05	4.42	3.00	4.08	2.14	0.20	0.78	1.05
3230-008	1300	23.62	2.38	0.83	3.24	0.43	0.31	0.71	4.28
3230-009	1400	107.95	12.79	1.54	12.32	0.82	14.72	18.44	165.04
3230-010	1500	22.70	3.01	1.18	2.64	0.70	0.75	1.39	15.89
3230-011	1600	19.59	8.37	2.41	3.36	0.74	0.16	0.45	3.13
3230-012	1700	37.24	8.84	1.65	4.62	0.45	0.62	1.20	6.34
3230-013	1800	40.42	5.57	0.77	7.84	0.30	1.47	2.44	40.87
3230-014	1900	29.52	5.90	2.95	30.08	1.29	0.40	1.15	10.50
3230-015	2000	87.47	7.69	3.01	17.88	1.78	2.74	6.81	8.58
3230-016	2100A	49.86	102.92	371.64	15.53	14.07	4.43	18.22	105.35
3230-017	2100B	95.87	9.26	1.88	22.58	1.08	2.17	2.49	20.38
3230-018	2255	1989.74	176.34	2.79	5.94	0.58	0.52	0.84	9.21
3230-019	2300	412.59	36.63	2.23	8.66	1.31	0.90	1.53	13.06
3230-020	2400	1570.19	60.29	1.10	9.71	0.83	0.80	1.11	10.35
3230-021	2500	291.10	13.28	0.60	12.32	0.38	3.89	2.23	6.70
3230-022	2600	123.30	37.69	3.04	20.21	1.08	0.97	1.26	10.48
3230-023	2700	78.06	42.84	2.98	23.44	1.16	1.40	1.75	16.69

TABLE I-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-024	2800	411.61	24.93	1.30	36.26	0.80	0.42	0.75	6.29

TABLE II-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-001	660	65.69	9.96	2.04	1.00	0.65	6.34	15.17
3230-002	700	11.84	3.12	1.00	4.77	0.47	2.96	26.38
3230-003	820	56.97	13.38	1.55	2.05	0.25	3.59	23.49
3230-004	900	77.07	26.63	1.66	4.75	0.35	2.03	34.55
3230-005	1000	184.41	50.96	1.83	2.50	0.25	2.88	27.63
3230-006	1100	53.03	13.72	1.42	1.96	0.26	3.20	25.87
3230-007	1200	36.55	9.50	1.47	1.90	0.25	3.17	25.99
3230-008	1300	30.28	6.66	2.87	7.53	0.43	4.19	21.99
3230-009	1400	166.24	58.28	8.28	15.01	0.79	4.29	35.05
3230-010	1500	30.49	7.79	2.54	3.76	0.54	4.01	25.57
3230-011	1600	31.95	12.35	3.46	4.49	0.35	1.66	38.67
3230-012	1700	52.54	15.30	5.35	10.24	0.51	2.76	29.12
3230-013	1800	57.75	17.33	7.16	25.69	0.60	3.01	30.00
3230-014	1900	67.08	37.55	2.00	23.17	0.35	0.82	55.98
3230-015	2000	122.60	35.13	2.55	10.03	0.40	3.41	28.65
3230-016	2100A	190.99	141.12	0.27	1.10	0.24	0.42	73.89
3230-017	2100B	132.39	36.52	4.92	20.79	0.87	3.01	27.58
3230-018	2255	2173.39	183.65	63.20	10.23	0.62	10.91	8.45
3230-019	2300	460.34	47.74	16.37	6.59	0.58	9.10	10.37
3230-020	2400	1642.12	71.93	54.35	11.63	0.71	22.42	4.38
3230-021	2500	322.85	31.74	22.13	32.35	1.74	11.36	9.83
3230-022	2600	183.44	60.14	12.38	18.58	0.77	2.12	32.78
3230-023	2700	147.50	69.43	14.36	20.14	0.79	1.17	47.07

TABLE II-A
AIRSPACE DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-024	2800	473.99	62.38	19.14	45.19	0.56	6.72	13.16

TABLE I-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-001	660	1796.38	9.96	0.58	4.13	0.10	1.02	1.14	10.44
3230-002	700	307.75	1.51	0.62	0.34	0.13	0.10	0.11	0.35
3230-003	820	1713.95	2.67	0.88	0.72	0.19	0.22	0.25	0.88
3230-004	900	1782.08	1.72	0.83	0.82	0.14	0.24	0.24	3.21
3230-005	1000	1897.98	1.21	0.81	0.58	0.19	0.14	0.18	4.10
3230-006	1100	1608.77	1.68	0.97	0.86	0.18	0.27	0.35	4.79
3230-007	1200	1486.27	0.74	0.92	0.29	0.17	0.07	0.11	3.44
3230-008	1300	1736.17	3.29	0.75	1.30	0.07	0.48	0.57	4.47
3230-009	1400	1882.42	30.55	1.56	12.77	0.12	8.42	13.77	197.08
3230-010	1500	1462.42	3.86	0.76	1.85	0.18	0.67	0.97	9.96
3230-011	1600	1476.97	1.10	0.85	0.78	0.14	0.16	0.27	5.62
3230-012	1700	1615.46	4.71	0.71	2.97	0.07	1.00	1.57	9.25
3230-013	1800	1308.84	1.13	0.73	1.24	0.12	0.32	0.75	10.28
3230-014	1900	844.05	0.70	0.56	0.56	0.13	0.12	0.40	5.74
3230-015	2000	1298.59	2.92	0.63	1.39	0.13	0.68	1.36	4.37
3230-016	2100A	1855.57	6.63	15.51	2.64	0.59	2.30	3.29	33.54
3230-017	2100B	2108.69	5.92	0.65	3.73	0.16	4.80	5.29	46.34
3230-018	2255	1927.16	90.28	1.37	4.44	0.14	0.40	0.65	4.88
3230-019	2300	1778.57	11.60	0.46	5.67	0.05	4.59	4.30	4.83
3230-020	2400	1324.46	18.21	0.89	3.72	0.09	1.18	1.42	8.97
3230-021	2500	875.49	18.04	0.94	6.47	0.07	4.96	3.40	11.43
3230-022	2600	1321.72	7.73	0.38	2.91	0.10	1.30	1.21	11.79
3230-023	2700	1172.39	6.59	0.32	2.02	0.09	0.39	0.47	1.13

TABLE I-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-024	2800	1012.07	6.48	0.35	1.28	0.07	0.21	0.34	4.13

TABLE II-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-001	660	1812.65	16.26	17.11	38.64	0.89	127.45	0.89
3230-002	700	309.83	2.07	2.41	2.57	0.88	165.58	0.66
3230-003	820	1717.83	3.88	3.01	3.82	0.87	503.76	0.22
3230-004	900	1785.11	3.03	2.06	5.73	0.99	696.96	0.17
3230-005	1000	1900.10	2.12	1.48	3.03	0.75	1057.19	0.11
3230-006	1100	1611.96	3.18	1.73	4.69	0.78	629.65	0.19
3230-007	1200	1487.50	1.22	0.80	1.67	0.63	1432.21	0.08
3230-008	1300	1741.82	5.64	4.35	18.48	0.83	377.92	0.32
3230-009	1400	1947.94	65.52	19.51	98.87	0.61	43.44	3.36
3230-010	1500	1469.80	7.37	5.05	9.99	0.69	255.70	0.50
3230-011	1600	1479.29	2.32	1.29	5.37	0.59	780.63	0.15
3230-012	1700	1625.73	10.26	6.58	38.28	0.64	210.16	0.63
3230-013	1800	1312.31	3.46	1.53	10.09	0.43	548.82	0.26
3230-014	1900	845.85	1.80	1.25	4.25	0.30	662.66	0.21
3230-015	2000	1304.97	6.38	4.60	10.41	0.50	300.01	0.48
3230-016	2100A	1870.46	14.88	0.42	4.47	0.69	199.99	0.79
3230-017	2100B	2128.45	19.76	9.09	23.34	0.90	218.16	0.92
3230-018	2255	2022.95	95.79	65.75	29.88	0.62	20.34	4.73
3230-019	2300	1804.75	26.17	25.01	96.04	1.06	102.94	1.45
3230-020	2400	1349.01	24.54	20.38	39.51	0.83	60.37	1.81
3230-021	2500	908.38	32.88	19.13	81.34	1.46	35.70	3.62
3230-022	2600	1334.89	13.16	20.10	27.52	1.07	124.08	0.98
3230-023	2700	1181.87	9.48	20.25	20.59	0.84	136.12	0.80

TABLE II-B
CUTTINGS DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-024	2800	1020.39	8.31	18.37	17.08	0.61	130.32	0.81

TABLE I-C
COMBINED DATA

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-001	660	1852.11	15.35	3.21	7.53	3.47	1.48	1.85	89.73
3230-002	700	316.47	2.25	1.37	2.53	0.59	0.16	0.24	11.05
3230-003	820	1757.54	9.30	5.16	6.23	2.86	0.48	1.24	24.59
3230-004	900	1832.51	10.09	5.85	17.22	3.59	0.73	1.61	48.96
3230-005	1000	2031.42	24.52	13.49	23.60	9.37	1.07	3.88	20.24
3230-006	1100	1648.08	8.24	5.58	6.59	3.10	0.57	1.49	11.84
3230-007	1200	1513.32	5.17	3.92	4.37	2.32	0.27	0.90	4.50
3230-008	1300	1759.80	5.67	1.58	4.54	0.50	0.79	1.29	8.76
3230-009	1400	1990.37	43.34	3.10	25.09	0.94	23.15	32.22	362.13
3230-010	1500	1485.12	6.87	1.94	4.49	0.88	1.43	2.37	25.85
3230-011	1600	1496.57	9.48	3.26	4.15	0.89	0.32	0.72	8.76
3230-012	1700	1652.71	13.56	2.36	7.59	0.52	1.62	2.77	15.59
3230-013	1800	1349.27	6.70	1.51	9.09	0.42	1.79	3.19	51.15
3230-014	1900	873.57	6.61	3.51	30.64	1.43	0.52	1.56	16.25
3230-015	2000	1386.06	10.62	3.64	19.28	1.91	3.42	8.18	12.96
3230-016	2100A	1905.44	109.56	387.15	18.17	14.66	6.74	21.52	138.89
3230-017	2100B	2204.56	15.19	2.53	26.32	1.24	6.98	7.78	66.73
3230-018	2255	3916.90	266.63	4.16	10.38	0.72	0.93	1.50	14.09
3230-019	2300	2191.17	48.23	2.70	14.34	1.37	5.50	5.84	17.89
3230-020	2400	2894.65	78.50	2.00	13.44	0.92	1.98	2.54	19.32
3230-021	2500	1166.60	31.33	1.54	18.80	0.46	8.86	5.63	18.14
3230-022	2600	1445.02	45.43	3.42	23.12	1.19	2.28	2.47	22.28
3230-023	2700	1250.45	49.43	3.30	25.46	1.26	1.80	2.22	17.83

GEOCHEM ID	DEPTHS	METHANE	ETHANE	ETHYLENE	PROPANE	PROPYLENE	ISOBUTANE	N BUTANE	C5-C7
3230-024	2800	1423.68	31.41	1.65	37.54	0.87	0.64	1.09	10.43

TABLE II-C
COMBINED DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-001	660	1878.34	26.22	4.77	2.16	0.80	80.94	1.39
3230-002	700	321.67	5.19	1.64	4.28	0.67	66.00	1.61
3230-003	820	1774.81	17.27	1.80	2.17	0.38	113.07	0.97
3230-004	900	1862.19	29.67	1.72	4.79	0.45	67.05	1.59
3230-005	1000	2084.51	53.08	1.81	2.51	0.27	42.20	2.54
3230-006	1100	1664.99	16.90	1.47	2.12	0.38	111.06	1.01
3230-007	1200	1524.05	10.73	1.31	1.88	0.30	158.46	0.70
3230-008	1300	1772.11	12.30	3.58	9.07	0.61	172.13	0.69
3230-009	1400	2114.18	123.80	13.93	26.42	0.71	29.08	5.85
3230-010	1500	1500.30	15.17	3.53	5.06	0.60	130.60	1.01
3230-011	1600	1511.25	14.68	2.90	4.63	0.44	109.78	0.97
3230-012	1700	1678.28	25.56	5.73	14.35	0.58	78.10	1.52
3230-013	1800	1370.07	20.79	4.42	21.19	0.56	85.37	1.51
3230-014	1900	912.93	39.35	1.88	21.42	0.33	23.44	4.31
3230-015	2000	1427.58	41.51	2.91	10.06	0.41	46.34	2.90
3230-016	2100A	2061.45	156.01	0.28	1.23	0.31	14.91	7.56
3230-017	2100B	2260.84	56.28	5.99	21.12	0.89	53.10	2.48
3230-018	2255	4196.35	279.44	64.09	14.23	0.62	14.13	6.65
3230-019	2300	2265.09	73.92	17.86	10.44	0.94	35.01	3.26
3230-020	2400	2991.13	96.48	39.20	14.46	0.78	31.48	3.22
3230-021	2500	1231.23	64.63	20.30	40.81	1.57	23.26	5.24
3230-022	2600	1518.34	73.31	13.25	19.37	0.92	21.07	4.82
3230-023	2700	1329.38	78.92	14.94	20.17	0.80	16.69	5.93

TABLE II-C
COMBINED DATA

GEOCHEM ID	DEPTHS	C1-C4	C2-C4	C2/C2=	C3/C3=	IC4/NC4	C1/(C2+C3)	%WETNESS
3230-024	2800	1494.38	70.70	18.97	42.79	0.58	20.64	4.73

TABLE III

CARBON DIOXIDE ANALYSIS RESULTS

GEO CHEM NUMBER	WELL DEPTH	CARBON DIOXIDE, MOL. %
3230-001	600	0.168
3230-002	700	2.946
3230-003	820	4.786
3230-004	900	3.665
3230-005	1000	3.237
3230-006	1100	4.621
3230-007	1200	4.998
3230-008	1300	4.317
3230-009	1400	3.405
3230-010	1500	11.442
3230-011	1600	10.197
3230-012	1700	6.969
3230-013	1800	11.567
3230-014	1900	7.616
3230-015	2000	7.117
3230-016	2100A	5.794
3230-017	2100B	3.721
3230-018	2255	4.528
3230-019	2300	4.886
3230-020	2400	5.581
3230-021	2500	3.441
3230-022	2600	3.894
3230-023	2700	2.765
3230-024	2800	5.665

Flow Measurement Engineers
Analysis Results Summary
Casper, WY 82601

Run No. 1207-1
Date Run 12/07/85
Date Sampled 12/05/85

Analysis For: GILA EXPLORATION
Well: #1 Estes Zones C & D — Producer: Mar Oil & Gas
Location: Wildcat — County: Torrence — State: New Mexico
Purpose: New Well — Sampled By:
Sampling Temp. 60 °F — Atmos Temp. °F
Volume/day — Formation: Zones C & D
Pressure on Bomb 102 — PSIG; Line Pressure: 115.2 PSIG

GAS COMPONENT Analysis

Press. Base: 14.73

	Mol. %	Liq. %	GPM Per MCF
Carbon Dioxide CO_2	75.075		
Oxygen O_2			
Nitrogen N_2	20.967		
Hydrogen Sulfide H_2S			
Argon Ar	0.418		
Helium	1.121		
Methane C1	1.888		.320
Ethane C2	0.248		.066
Propane C3	0.059		.016
Iso-Butane IC4			
Nor-Butane NC4			
Iso-Pentane IC5			
Nor-Pentane NC5			
Hexanes C6			
Heptanes Plus C7+			
Total	100.001		0.402
Butane + G.P.M.			

PROPANE + GPM 0.016

BTU Dry 25.80
BTU Wet 25.35
Calc. Specific Gravity 1.369

@ Std. Press. 14.696
BTU Dry 25.74
BTU Wet 25.29

Calc. Vap. Press. #/Sq.In.
Reid Vap. Press. #/Sq.In.

Z Factor .9972

Run by Jeffrey A. Propp
Calculated By Jeffrey A. Propp

ETHANE + GPM 0.082

Distribution:

PRECISION SERVICE INC.
Flow Measurement Engineers
Analysis Results Summary
Casper, WY 82601

Run No. 1028-1
Date Run 10/28/85
Date Sampled 10/24/85

nalysis For: GILA EXPLORATION
ease: #1 Estes Zone C — Producer Mar Oil & Gas
ocation Wildcat — County Torrence — State New Mexico
urpose New Well — Sampled By
ampling Temp. 60 °F — Atmos Temp. °F
olume/day — Formation Zone C
ressure on Bomb 0 PSIG; Line Pressure PSIG

Gas Component Analysis — Press. Base 14.73

	Mol. %	Liq. %	GPM Per MCF
arbon Dioxide CO_2	81.258		
xygen O_2			
itrogen N_2	10.717		
ydrogen Sulfide H_2S			
Argon	1.560		
ethane C1	.037		.006
thane C2	.110		.029
ropane C3	.083		.023
o-Butane IC4	.018		.006
or-Butane NC4	.040		.013
o-Pentane IC5	.003		.001
or-Pentane NC5	.002		.001
Hexanes +	6.172		2.847
exanes C6			
eptanes Plus C7+			
otal	100.000		2.926
entane + G.P.M.			2.849
Propane + G.P.M.			2.891

BTU Dry	349
BTU Wet	343
Calc. Specific Gravity	1.585

@ Std. Press. 14.696

BTU Dry	348
BTU Wet	342
Calc. Vap. Press. #/Sq.In.	
Reid Vap. Press. #/Sq.In.	
Z Factor	.9949

Run by Jeffrey A. Propp
Calculated By Jeffrey A. Propp

Ethane + G.P.M. 2.920

istribution:

PRECISION SERVICE INC.

Flow Measurement Engineers
Analysis Results Summary
Casper, WY 82601

Run No. 1028-2
Date Run 10/28/85
Date Sampled 10/24/85

Analysis For: GILA EXPLORATION
Lease: #1 Estes Zone D — Producer Mar Oil & Gas
Location Wildcat — County Torrence — State New Mexico
Purpose New Well — Sampled By
Sampling Temp. 60 °F — Atmos Temp. °F
Volume/day — Formation Zone D
Pressure on Bomb 0 — PSIG: Line Pressure PSIG

Gas Component Analysis — Press. Base 14.73

	Mol. %	Liq. %	GPM Per MCF
Carbon Dioxide CO_2	18.487		
Oxygen O_2			
Nitrogen N_2	67.934		
Hydrogen Sulfide H_2S			
Argon	2.271		
Methane C1	.052		.009
Ethane C2	.018		.005
Propane C3	.044		.012
Iso-Butane IC4	.006		.002
Nor-Butane NC4	.094		.030
Iso-Pentane IC5	.004		.001
Nor-Pentane NC5	.005		.002
Hexanes +	11.084		5.113
Hexanes C6			
Heptanes Plus C7+			
Total	100.000		5.174
Pentane + G.P.M.			5.116
Propane + G.P.M.			5.160

BTU Dry 619
BTU Wet 608
Calc. Specific Gravity 1.359

@ Std. Press. 14.696

BTU Dry 617
BTU Wet 607

Calc. Vap. Press. #/Sq.In.
Reid Vap. Press. #/Sq.In.

Z Factor .9970

Run by Jeffrey A. Propp
Calculated By Jeffrey A. Propp

Ethane + G.P.M. 5.165

Distribution:

GiLa
EXPLORATION

July 24, 1985

Mr. Leon A. Romero
MAR Oil & Gas Corp.,Inc.
P.O. Box 5155
Santa Fe, NM 87502

RE: MAR O & G #1 Estes
Torrance County, New Mexico

Dear Leon:

At your request we sent three canned samples from the referenced well to Geochem, Inc. in Houston for headspace and cuttings gas analysis for hydrocarbons. You will receive a written report from Geochem in two weeks, but we thought you might want a summary of their findings as given to me over the telephone yesterday by Don Davis. A summary of their analyses is attached.

The data show that hydrocarbon shows you have encountered while drilling are:

1. Live shows,

2. Oil shows in samples 1 and 3, and gas shows in sample 2, and

3. There is good evidence to support the contention that these hydrocarbons did not originate in the formations in which they now reside.

Therefore, your objective of an oil reservoir at depth seems reinforced by these shows. Sample 3 has a $(C_5X\ 1000)/C_1$ ratio of 87, which compares favorably with surface geochemical anomalies we mapped on this prospect which led to the drilling of the well. Recall that any ratio greater than 80 indicates an oil prone source.

The driller has reported hole deviation problems in association with these shows which suggests that the hydrocarbons are coming from fractures associated with faulting, and that the source of the oil noted on the pits at 310' is a reservoir at depth. The dissimilarity between headspace and cuttings gas for sample 3 tends to confirm this.

From other studies we have made in the Estancia Basin the most likely oil prone source associated with this structure is a gray shale to siltstone interval just above the Sandia sandstone. All other intervals are either immature, lacking in source material, or are gas prone. This analysis should help you find a partner for the completion of this well.

Yours truly,

Robert G. McKinney

839 Paseo de Peralta, Suite J · Santa Fe, N.M. 87501 · 505/984-2646

Analysis of Canned Samples: MAR O & G #1 Estes

Geochem, Inc., Houston

Sample number	1	2	3
Depth	197 - 200'	220 - 225'	310 - 311'
	Headspace Gas (ppm)		
methane	138	11	265
ethane	39	2	32
ethylene	17	1	94
propane	10	1	5
propylene	8	1	28
iso-butane	1	.35	.35
normal butane	1	.27	1
pentane	5	1	23
	Cuttings Gas (ppm)		
methane	1,356	1,148	1,412
ethane	1	4	3
ethylene	1	2	4
propane	1	2	2
propylene	1	1	.5
iso-butane	1	1	.35
normal butane	.35	.5	1
pentane	7	0	7

TABLE I

CARBON DIOXIDE ANALYSIS

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	CARBON DIOXIDE	NITROGEN OXYGEN ARGON
3230-001	660	0.17	99.83
3230-002	700	2.95	97.05
3230-003	820	4.79	95.21
3230-004	900	3.67	96.33
3230-005	1000	3.24	96.76
3230-006	1100	4.62	95.38
3230-007	1200	5.00	95.00
3230-008	1300	4.32	95.68
3230-009	1400	3.40	96.60
3230-010	1500	11.44	88.56
3230-011	1600	10.20	89.80
3230-012	1700	6.97	93.03
3230-013	1800	11.57	88.43
3230-014	1900	7.62	92.38
3230-015	2000	7.11	92.89
3230-016	2100A	5.79	94.21
3230-017	2100B	3.72	96.28
3230-018	2255	4.53	95.47
3230-019	2300	4.89	95.11
3230-020	2400	5.58	94.42
3230-021	2500	3.44	96.56
3230-022	2600	3.89	96.11
3230-023	2700	2.76	97.24
3230-024	2800	5.66	94.34