New Mexico Bureau of Mines and Mineral Resources
Open File Report No. OF-237

ORGANIC GEOCHEMICAL ANALYSIS, PLYMOUTH OIL CO. NO. 1 FEDERAL WELL, OTERO COUNTY, NEW MEXICO

by Stephen R. Jacobson, James S. Rankin
and James D. Saxton
Chevron U.S.A., Inc.
Denver, Colorado

and Gary W. Ruth
Brown and Ruth Laboratories, Inc.
Houston, Texas

May 11, 1984

Chevron U.S.A. Inc.
700 South Colorado Blvd., P. O. Box 599, Denver, CO 80201

May 11, 1984

Mr. S. Thompson III
New Mexico Bureau of
Mines and Mineral Resources
Socorro, NM 87801

Dear Mr. Thompson:

Enclosed please find the completed results of the organic geochemical analyses performed on samples from the Gulf #1 Sierra State "K", 35-12S-1W, Sierra Co., and the Plymouth #1 Federal, 15-20S-9E, Otero Co. Enclosed also is the corrected report for the Houston Oil and Minerals well. As you may recall there was a mix-up with the samples, and we actually analyzed the #2 Lewelling (10-12S-9E, Otero Co.), rather than the #1 Lewelling (12-12S-9E).

Sincerely,

J. S. Vietti
District Geologist

Enclosures

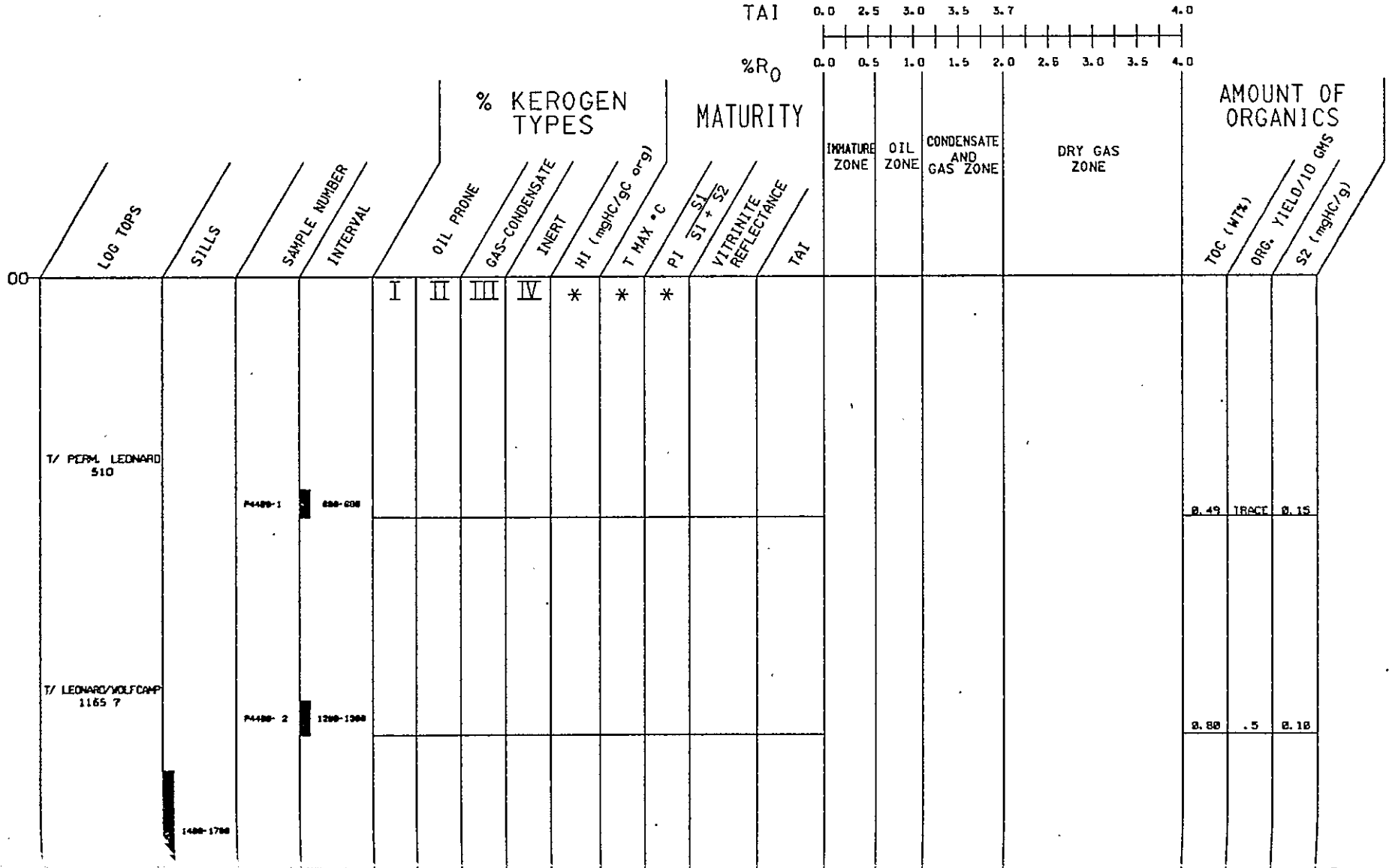
PLYMOUTH # 1 FEDERAL

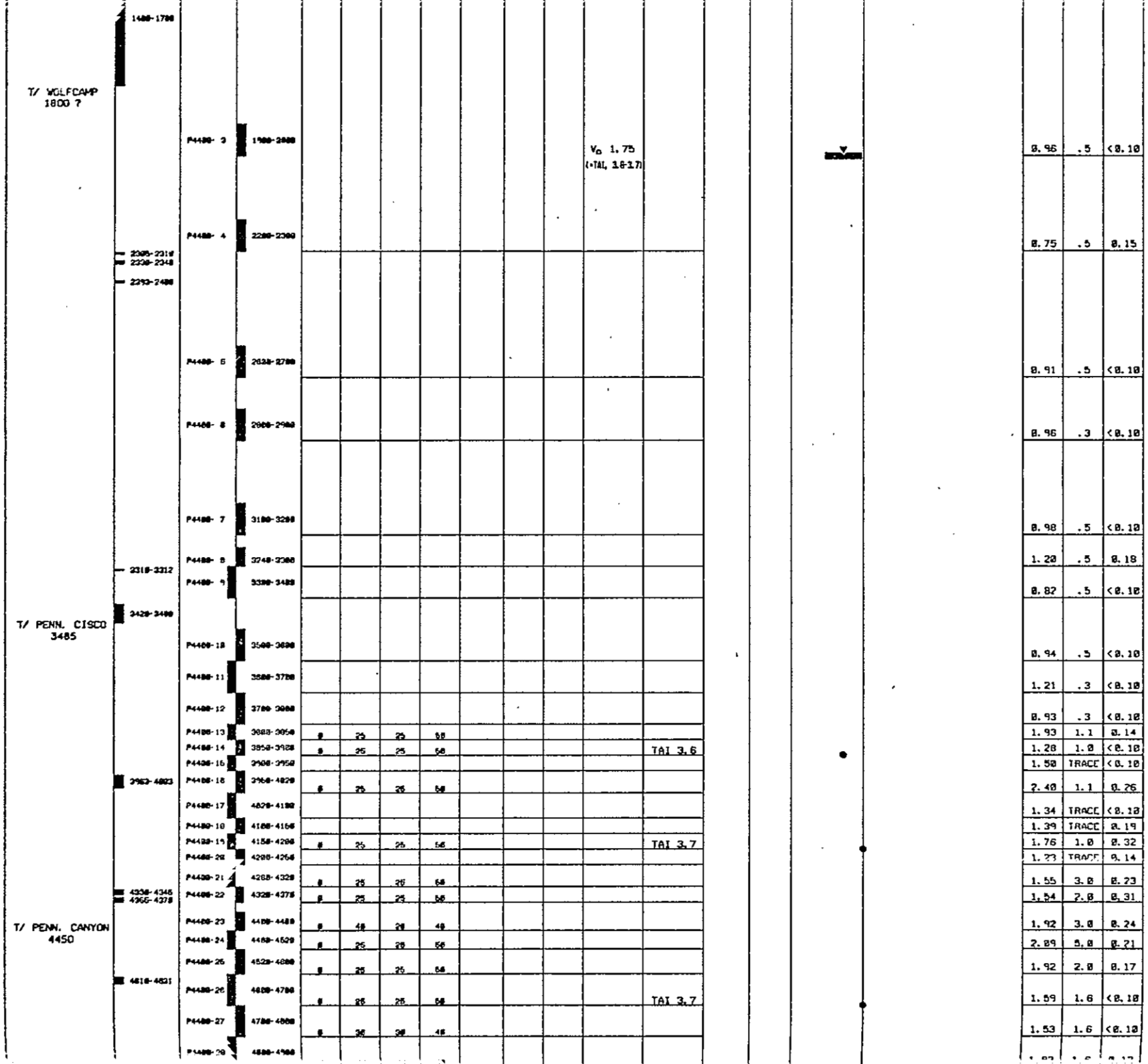
SEC. 15- T20S- R9E

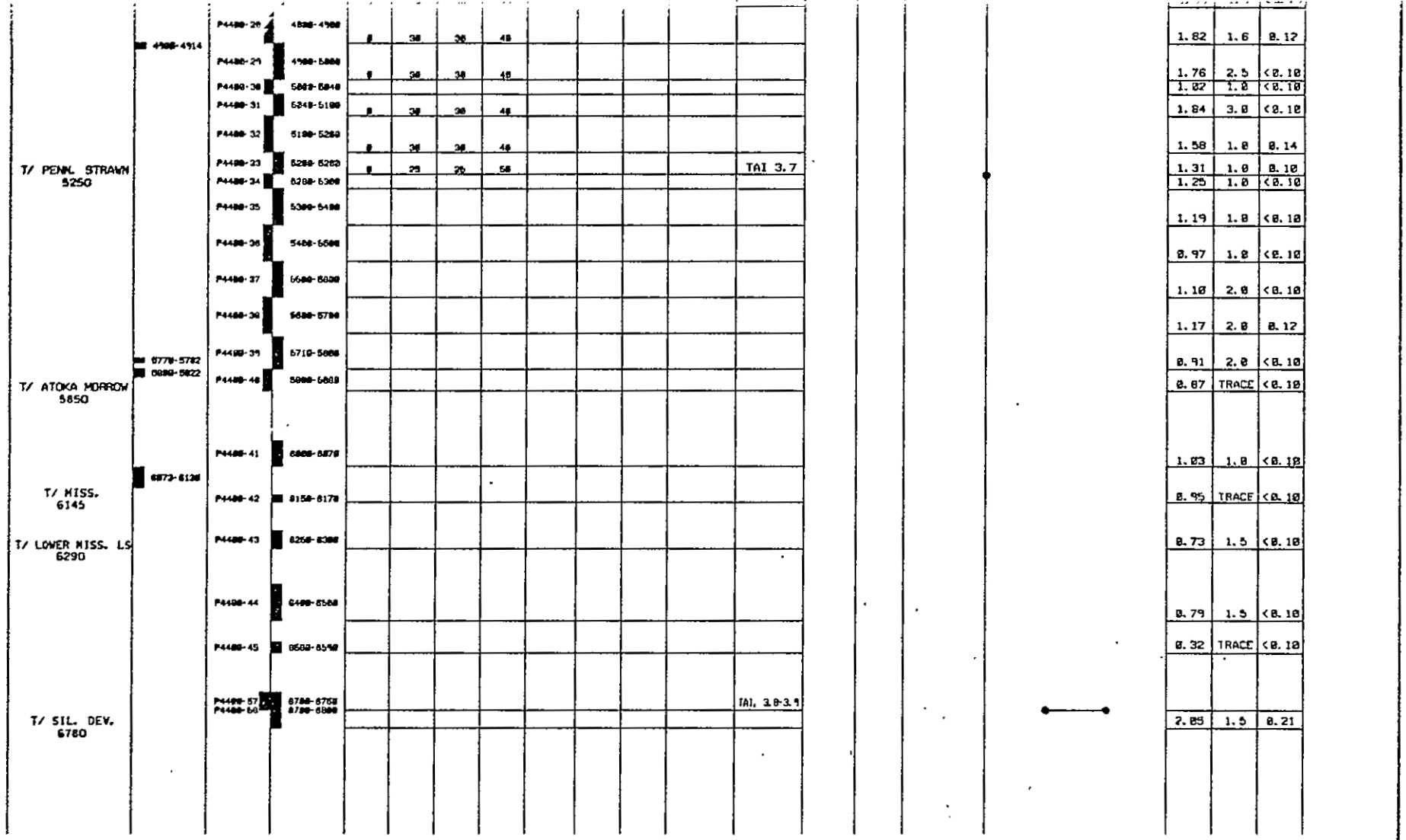
OTERO CO., NEW MEXICO

HYDROCARBON GENERATION ZONES

BIOSTUDY NO. 1249




1480-1700
T/ WOLFCAMP 1800 ?
P4480- 3 1900-2000
V_D 1.75 (+TAI, 1.6-1.7)
P4480- 4 2200-2300
2305-2318
2330-2340
2393-2400
P4480- 6 2630-2700
P4480- 8 2900-2980
P4480- 7 3180-3200
P4480- 5 3240-3300
2310-3312
P4480- 9 3330-3400
3420-3480
T/ PENN. CISCO 3485
P4480-10 3500-3600
P4480-11 3580-3700
P4480-12 3700-3800
P4480-13 3800-3850
P4480-14 3850-3920
P4480-16 3900-3950
3960-4020
P4480-18 3960-4020
P4480-17 4020-4100
P4480-10 4100-4150
P4480-15 4150-4200
P4480-20 4200-4250
P4480-21 4200-4320
4330-4345
4360-4370
P4480-22 4320-4375
P4480-23 4400-4480
T/ PENN. CANYON 4450
P4480-24 4460-4520
P4480-25 4520-4600
4610-4631
P4480-26 4600-4700
P4480-27 4700-4800
P4480-28 4800-4900
0 25 25 50
TAI 3.6
TAI 3.7
TAI 3.7
0.96 .5 <0.10
0.75 .5 0.15
0.91 .5 <0.10
0.96 .3 <0.10
0.98 .5 <0.10
1.20 .5 0.18
0.82 .5 <0.10
0.94 .5 <0.10
1.21 .3 <0.10
0.93 .3 <0.10
1.93 1.1 0.14
1.20 1.0 <0.10
1.50 TRACE <0.10
2.40 1.1 0.26
1.34 TRACE <0.10
1.39 TRACE 0.19
1.76 1.0 0.32
1.23 TRACE 0.14
1.55 3.0 0.23
1.54 2.0 0.31
1.92 3.0 0.24
2.89 5.0 0.21
1.92 2.0 0.17
1.59 1.6 <0.10
1.53 1.6 <0.10



* RESULTS ARE OMITTED, PROBABLY ERRONEOUS BECAUSE OF LOW S_2 VALUES.

V_0 DATA
TAI DATA

BIOSTUDY 1249
J.D. SAXTON D7-9058
04/64 DO-8249

COMPUTER DRAFTED

Biostrdy 1294

GEOCHEMICAL REPORT

Plymouth #1 Federal Well
Sec. 15-T20S-R9E
Otero Co., New Mexico
(600 to 6800 ft)
f-4400

Rick -

no Tmax values can be considered valid as S_2 values are so low; the pyrograms show a very low flat character. S_2 values are also low (PI very high) suggesting a real possibility that these rocks have been heated beyond oil generation

SFJ 1/10/83

BROWN & RUTH LABORATORIES, INC.
10690 Shadow Wood, Suite 130
Houston, Texas 77043
713/464-3284

BROWN & RUTH LABORATORIES, INC.
10690 SHADOW WOOD DRIVE, SUITE 130, HOUSTON, TEXAS 77043 ▫ (713) 464-3284

December 30, 1983

Chevron U.S.A. Inc.
Central Region
P.O. Box 599
Denver, Colorado 80201

Attention: S. R. Jacobson

Gentlemen:

Attached are the results of our analysis of 46 samples from the Plymouth #1 Federal Well, Otero, New Mexico. The work was authorized by your Work Order No. CMEN 2100 of Decmeber 2, 1983.

All unused sample material is being returned under separate cover.

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

Very truly yours,

BROWN & RUTH LABORATORIES, INC.

Gary W. Ruth

GWR/kr/1
Enclosures

GEOCHEMICAL REPORT - 934

CLIENT: CHEVRON U.S.A., INC.
P.O. Box 599
Denver, Colorado 80201

WELL: Plymouth #1 Federal

LOCATION: Sec. 15-T20S-R9E
Otero County, New Mexico

SAMPLE MATERIAL:

A total of 46 samples of cuttings were received. Each was in good condition, and no evidence of contamination was apparent.

SAMPLE PREPARATION:

Prior to analysis, each sample was visually examined for contaminants. Splits of the samples were taken, ground to a fine powder, and then analyzed.

DATA PRESENTATION:

The results of the analyses are presented in the attached Table I. The following criteria are suggested for interpreting the pyrolysis data:

SOURCE POTENTIAL	PETROLEUM TYPE		THERMAL MATURITY
S_2	HYDROGEN INDEX	S_2/S_3	T_{max}
<2.0 POOR	<200 GAS PRONE	<2.5 DRY GAS	<440 IMMATURE
2.0-5.0 MARGINAL	200-300 MIXED	2.5-5.0 WET GAS	440-470 OIL
>5.0 GOOD	>300 OIL PRONE	>5.0 OIL	>470 GAS

TABLE I

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Client I.D.	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	S2/S3	Hydrogen Index	Oxygen Index
934-001 Penn Yost Fm	P4400-1 600-680	0.49 Fair	<0.10	0.15	0.46	422	---	0.34	31	94
934-002 Penn. Alto Fm	P4400-2 1200-1300	0.80 Fair	0.12	0.10	0.32	375	0.55	0.32	13	40
934-003 Penn Williamsport	P4400-3 1900-2000	0.96 Fair-Good	<0.10	<0.10	0.31	**	---	---	---	33
934-004 WC.	P4400-4 2200-2300	0.75 Fair	0.16	0.15	0.43	372	0.53	0.34	19	57
934-005 WC.	P4400-5 2600-2700	0.91 Fair	<0.10	<0.10	0.42	451	---	---	---	46
934-006 WC.	P4400-6 2800-2900	0.96 Fair-Good	0.10	<0.10	0.44	**	---	---	---	46
934-007 WC.	P4400-7 3100-3200	0.98 Good	0.10	<0.10	0.48	**	---	---	---	49
934-008 WC.	P4400-8 3240-3300	1.20 Good	0.23	0.18	0.48	367	0.56	0.37	15	40
934-009 W.C	P4400-9 3300-3400	0.82 Fair	<0.10	<0.10	0.39	**	---	---	---	48
934-010 Penn Cisco - Partial Sip	P4400-10 3500-3600	0.94 Fair	0.12	<0.10	0.40	**	---	---	---	42
934-011 PS.	P4400-11 3600-3700	1.21 Good	<0.10	<0.10	0.48	**	---	---	---	39
934-012	P4400-12 3700-3800	0.93 Fair	<0.10	<0.10	0.54	**	---	---	---	58

TABLE I

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Client I.D.	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	S2/S3	Hydrogen Index	Oxygen Index
934-013 P.S.	P4400-13 3800-3850	1.93 Good	0.25	0.14	0.49	**	0.64	0.28	7	25
934-014 P.S	P4400-14 3850-3900	1.28 Good	0.13	<0.10	0.42	**	---	---	---	33
934-015 P.S	P4400-15 3900-3950	1.50 Good	0.16	<0.10	0.45	**	---	---	---	30
934-016 P.S.	P4400-16 3950-4020	2.40 V. Good	0.39	0.26	0.53	351	0.60	0.49	11	22
934-017 P.S.	P4400-17 4020-4100	1.34 Good	0.13	<0.10	0.48	**	---	---	---	36
934-018 P.S	P4400-18 4100-4150	1.39 Good	0.26	0.19	0.55	367	0.58	0.34	14	39
934-019 P.S.	P4400-19 4150-4200	1.76 Good	0.55	0.32	0.43	359	0.64	0.73	18	25
934-020 P.S.	P4400-20 4200-4250	1.23 Good	0.27	0.14	0.49	376	0.66	0.29	11	40
934-021 P.S	P4400-21 4260-4320	1.55 Good	0.50	0.23	0.49	343	0.68	0.48	15	31
934-022 P.S.	P4400-22 4320-4370	1.54 Good	0.49	0.31	0.41	353	0.61	0.75	20	27
934-023 P.S	P4400-23 4400-4460	1.92 Good	0.50	0.24	0.34	357	0.68	0.69	12	18
934-024 Coal-Carbon	P4400-24 4460-4520	2.09 V. Good	0.47	0.21	0.56	351	0.69	0.37	10	27

TABLE I

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Client I.D.	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	S2/S3	Hydrogen Index	Oxygen Index
934-025 Cam.	P4400-25 4520-4600	1.92 GOOD	0.43	0.17	0.41	354	0.72	0.42	9	21
934-026 Cam	P4400-26 4600-4700	1.59 GOOD	0.37	<0.10	0.39	362	---	---	---	25
934-027 Cam.	P4400-27 4700-4800	1.53 GOOD	0.30	<0.10	0.38	**	---	---	---	25
934-028 Cam.	P4400-28 4800-4900	1.82 GOOD	0.47	0.12	0.43	340	0.79	0.29	7	23
934-029 Cam.	P4400-29 4900-5000	1.76 GOOD	0.46	<0.10	0.27	346	---	---	---	15
934-030 Cam.	P4400-30 5000-5040	1.02 GOOD	0.28	<0.10	0.28	368	---	---	---	27
934-031 Cam.	P4400-31 5040-5100	1.84 GOOD	0.46	<0.10	0.28	357	---	---	---	15
934-032 Cam	P4400-32 5100-5200	1.58 GOOD	0.29	0.14	0.29	359	0.69	0.47	9	18
934-033 Cam.	P4400-33 5200-5260	1.31 GOOD	0.25	0.10	0.29	362	0.71	0.35	8	22
934-034 Penn - Shawn	P4400-34 5260-5300	1.25 GOOD	0.17	<0.10	0.33	**	---	---	---	26
934-035 STR.	P4400-35 5300-5400	1.19 GOOD	0.22	<0.10	0.32	356	---	---	---	27
934-036 STR.	P4400-36 5400-5500	0.97 FAIR - GOOD	0.15	<0.10	0.27	**	---	---	---	28

TABLE I

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Client I.D.	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	S2/S3	Hydrogen Index	Oxygen Index
934-037 STR.	P4400-37 5500-5600	1.10 GOOD	0.19	<0.10	0.33	**	---	---	---	30
934-038 STR	P4400-38 5600-5700	1.17 GOOD	0.28	0.12	0.39	366	0.69	0.32	11	34
934-039 STR	P4400-39 5710-5800	0.91 FAIR	0.22	<0.10	0.32	**	---	---	---	36
934-040 STR - Atoka	P4400-40 5800-5860	0.87 FAIR	0.12	<0.10	0.24	**	---	---	---	27
934-041 Atoka	P4400-41 6000-6070	1.03 GOOD	0.14	<0.10	0.34	370	---	---	---	33
934-042 Atoka?	P4400-42 6150-6170	0.95 FAIR	0.26	<0.10	0.42	**	---	---	---	44
934-043 Morrow?	P4400-43 6250-6300	0.73 FAIR	0.20	<0.10	0.35	350	---	---	---	48
934-044 Miss LS	P4400-44 6400-6500	0.79 FAIR	0.19	<0.10	0.35	**	---	---	---	44
934-045 Miss - LS	P4400-45 6560-6590	0.32 POOR	0.12	<0.10	0.29	**	---	---	---	90
934-046 Miss - Sil ?	P4400-46 PF45 6700-6800	2.05 V. GOOD	0.57	0.21	0.49	360	0.73	0.43	10	24

**Unable to determine due to insufficient S2 yield, multiple peaks, etc.