

New Mexico Bureau of Mines and Mineral Resources
Open File Report No. OF-206

ORGANIC GEOCHEMICAL ANALYSIS, HOUSTON OIL AND MINERALS
NO. 2 LEWELLING WELL, OTERO COUNTY, NEW MEXICO

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

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

September 2, 1983



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,

A handwritten signature in cursive script, appearing to read "J. S. Vietti".

J. S. Vietti
District Geologist

Enclosures



Chevron U.S.A. Inc.

700 South Colorado Blvd., P. O. Box 599, Denver, CO 80201

September 2, 1983

Mr. Clayton S. Valder
Marshall R. Young Oil Co.
750 West Fifth Street
Fort Worth, TX 76102

Dear Mr. Valder:

Enclosed please find results of the organic geochemical analyses performed on samples from the Houston Oil & Minerals #2 Lewelling well, located in Section 10, T12S-R9E, Otero Co., New Mexico.

The analyses include the following tests:

1. Total Organic Carbon (TOC)
2. Rock Eval (Pyrolysis)
3. Microscopic Organic Analysis (MOA)
4. Vitrinite Reflectance (R_o) and Thermal Alteration Index (TAI)

Sincerely,

A handwritten signature in cursive script that reads "M. I. Roberson".

M. I. Roberson

RHF

Enclosure

Discussion of Results:

A total of 23 shale samples were taken for analysis including: 7 from the Permian Abo Fm. (3750'-5400'), 13 from Permian Wolfcampian age rocks (5400'-6700'), 2 from the Mississippian (8670'-8730'), and 1 from the Devonian Woodford Formation (8800'-8860').

I. Thermal Maturity

Based on vitrinite reflectance and TAI data the Permian section is in the condensate and dry gas to dry gas zone. Several values reflect a higher thermal maturity ranging into the dry gas zone (P4080-23, P4080-24). This is attributed to intrusive activity as noted in the description of the cuttings. Lower thermal maturity is indicated by Tmax values, however, these Tmax data are considered less reliable due to very small S-2 peaks.

The Mississippian and Devonian sections are of somewhat higher thermal maturity than the Permian, and are in the dry gas zone.

II. Organic Richness and Type

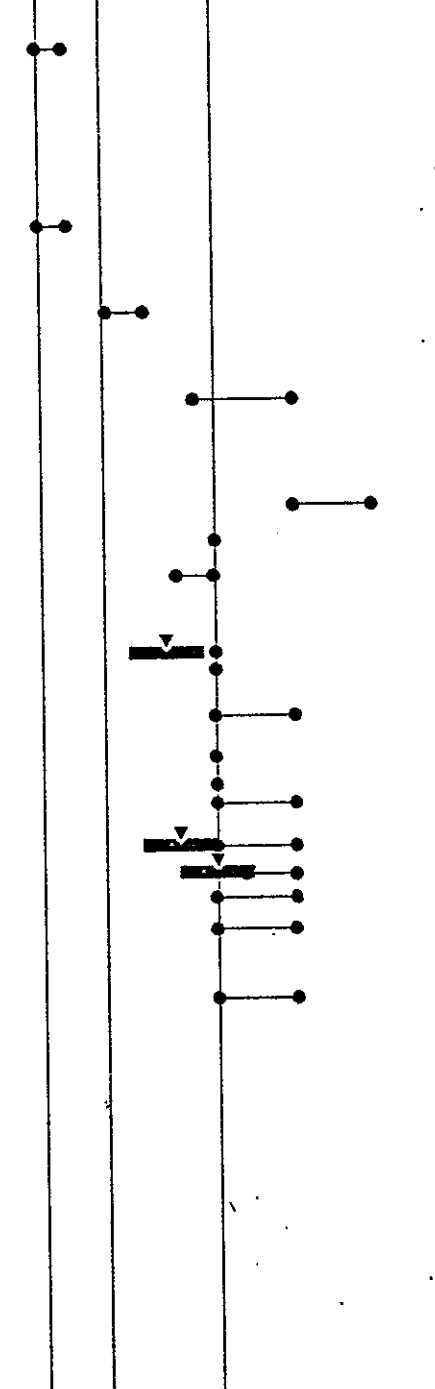
Organic richness of samples from the Permian section range from poor to very good (0.19 to 6.63 wt. % TOC). The majority, 18 of 20 data values, fall in the good (1-2 wt. %) to very good (2+) range. Organic type, as indicated by MOA, tends to be more inert or gas prone (up to 70% type III kerogen type).

Mississippian and Devonian samples have fair to good organic richness, and are somewhat more oil prone as indicated by MOA (50% oil prone type).

ALLUVIUM
TERTIARY UNDEF.
CRET. UNDEF.
K-JAYSTA FM.
TRIASSIC UNDEF.
TRI. BERNAL
PER. SAN ANTONIO
DESOM. YESO FM.

PA080-1	3750-4000
PA080-2	4000-4500
PA080-3	4500-4750
PA080-4	4760-5000
PA080-23	5140-5200
PA080-24	5200-5300
PA080-25	5340-5400
PA080-26	5400-5500
PA080-27	5500-5700
PA080-28	5700-5750
PA080-29	5850-5900
PA080-30	5950-6000
PA080-31	6070-6100
PA080-32	6100-6130
PA080-33	6230-6270
PA080-34	6270-6330
PA080-35	6340-6400
PA080-36	6430-6500
PA080-37	6550-6600
PA080-38	6600-6700
PA080-42	6930-6940
PA080-43	7040-7100
PA080-44	7500-7600
PA080-45	7700-7780

	2.6-2.7
	2.6-2.7
	3.2-3.4
	3.6-3.8
	4.0
	3.8-3.9
	3.7
	3.6-3.7
1.65 (=TAI, 3.5-3.6)	3.7
	3.7
	3.7-3.8
	3.7
	3.7
	3.7-3.8
	3.7-3.8
	3.7-3.8
1.7 (=TAI, 3.6-3.7)	3.7-3.8
1.75-2.25 (=TAI, 3.6-3.8)	3.7-3.8
	3.7-3.8
	3.7-3.8
	3.7-3.8
	3.7-3.8
	3.7-3.8
	3.7-3.8

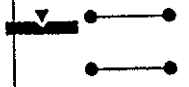


									0.19	0.5				
									0.79	0.8	?			
						80	455		3.66	0.8	2.93			
						16?			6.63	1.0	FLAT			
						6?			2.00	0.6	FLAT			
						0	10	70	20	2.59	2.0	FLAT		
						0	10	70	20	2.89	2.5	FLAT		
						0	10	70	20	1.90	2.0	FLAT		
									12?	1.43	0.8	?		
									33?	1.20	0.8	?		
									44	1.24	0.6	0.55		
									78	1.24	1.2	0.96		
						0	10	70	20	87	1.76	1.0	1.52	
						0		10	70	20	108	1.41	1.5	1.52
						0					81	1.77	0.8	1.43
						0		70			62	1.76	1.2	1.09
						0		70			50	1.66	1.2	0.84
						0		70			17?	1.68	2.5	?
											68	1.33	1.6	0.91
											75	1.59	1.6	1.19
						0		70			110	2.75	2.0	3.02
						0		70			87	1.72	2.2	1.50
											114?	1.39	1.6	?
												0.99	2.0	?

PERM. YESO
FM

PAGE-44	7500-7600
PAGE-45	7700-7790
PAGE-39 PAGE-40	8670-8700 8700-8730
PAGE-41	8800-8840

	3.8-3.9
2.24(=TAI, 3.7-3.8)	3.8-3.9



									0.99	2.0	>
									0.69	TRACE	FLAT
									1.31	1.2	FLAT
									1.42	TRACE	FLAT

PRE-CAMBRIAN

TD

● TAI DATA
 ▼ V₀ DATA

BIOSU
 J.D. SAX
 5-84

CDM

GEOCHEMICAL REPORT P4080

T.O.C./Pyrolysis Results

Houston Oil & Minerals #1 J.M.
Lewelling Well, Otero County, N.M.
10-12S-9E

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

May 17, 1983

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

Attention: Dr. S. R. Jacobson

Gentlemen:

Attached are the results of our analysis of four (4) samples from the well Houston Oil & Minerals #2 J.M. Lewelling, Otero County, New Mexico. The work was authorized by your Requisition No. CMEN2100 of April 27, 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 the data, then please contact me.

Very truly yours,

BROWN & RUTH LABORATORIES, INC.

Gary W. Ruth

GWR/kr
Enclosures

GEOCHEMICAL REPORT - 633

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

SAMPLES: Houston Oil & Minerals #2 J.M. Lewelling,
 Otero County, New Mexico

SAMPLE DESCRIPTIONS:

A total of four (4) samples were received from the well interval 3750 - 5000 feet. The samples were clean cuttings in good condition, and no evidence of contamination was apparent.

SAMPLE PREPARATION:

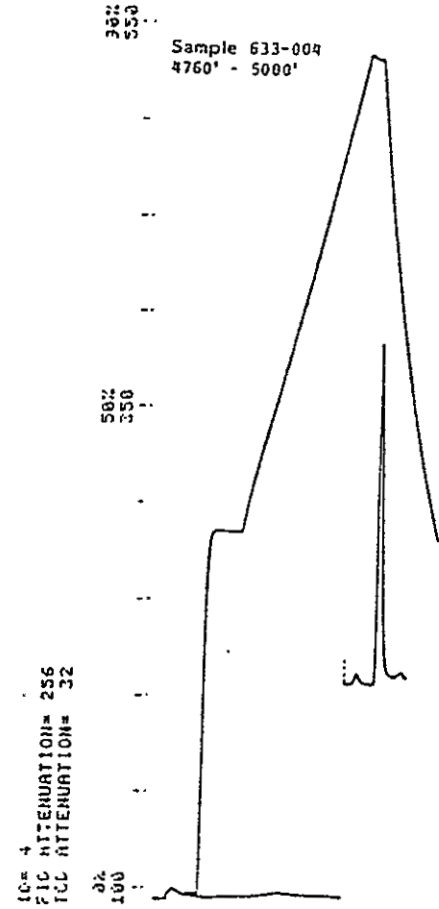
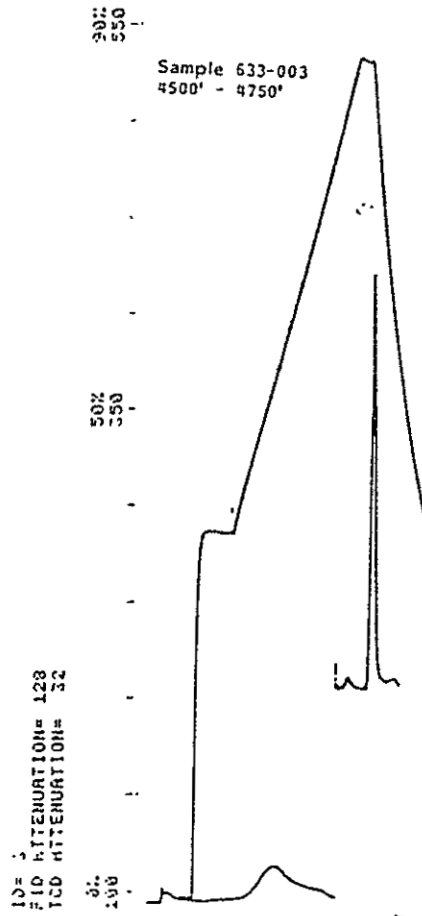
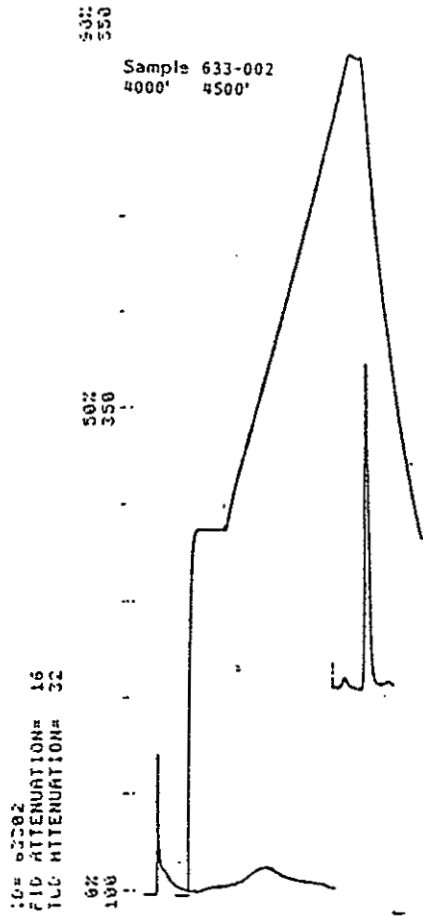
Each sample was examined using a binocular microscope in order to ascertain if contaminants were present. The samples were then ground to a fine powder and analyzed on a Leco Carbon Analyzer and a Geocom Rock-Eval II.

DATA EVALUATION:

The results of the analyses are tabulated in Tables I. The pyrograms have been included as requested. The following criteria are suggested for interpreting the 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

ROCK-EVAL PYROGRAMS



Addendum # 1172
GEOCHEMICAL REPORT

T.O.C./Pyrolysis Results

Houston Oil & Minerals No. 2
J. M. Lewelling, Otero Co., N.M.
Sec. 10, T12S, R9E

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) 661-3251

June 23, 1983

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

Attention: S. R. Jacobson

Gentlemen:

Attached are the results of our analysis of nineteen (19) samples from the well Houston Oil & Minerals No. 2 J. M. Lewelling, Otero County, New Mexico. The work was authorized under your Work No. CMEN 2100 of June 7, 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 the data, then please contact us.

Very truly yours,

BROWN & RUTH LABORATORIES, INC.

Gary W. Ruth
Gary W. Ruth

GWR/kr/4
Enclosures

GEOCHEMICAL REPORT - 665

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

WELL: Houston Oil & Minerals #1
J. M. Lewelling

LOCATION: Otero County, New Mexico
Sec. 12, T12S, R9E

SAMPLE MATERIAL:

A total of nineteen (19) samples were received from the well interval 5140-8860 feet. Each appeared in reasonably good condition, and no evidence of major contamination was apparent.

SAMPLE PREPARATION:

Each sample was visually examined for contaminants (paint, walnut shells, metal, etc.) and the contaminants were removed when present. Splits of the samples were taken, ground to a fine powder, and then analyzed.

DATA EVALUATION:

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

Chevron U.S.A. Inc.
Houston Oil & Minerals #2 J.M.
Lewelling, Otero County, N.M.

File No. 633
May 17, 1983

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft.)	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	$\frac{S2}{S3}$	Hydrogen Index	Oxygen Index
<i>Abo Wolf</i> 633-001	3750-4000	0.19	---	---	---	---	---	---	---	---
<i>Abo Wolf</i> 633-002	4000-4500	0.79	<0.10	0.13	0.59	439	---	0.21	16	75
<i>Abo Wolf</i> 633-003	4500-4750	3.66	0.21	2.93	0.82	455	0.07	3.59	80	22
<i>Abo Wolf</i> 633-004	4760-5000	6.63	0.49	1.06	0.65	450	0.31	1.63	16	10

TABLE I

Chevron U.S.A. Inc.
Houston Oil & Minerals J.M. Lewelling
Otero Co., New Mexico

File No. 665
June 20, 1983

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft) & Client ID	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	$\frac{S2}{S3}$	Hydrogen Index	Oxygen Index
665-001	5140-5200 P4080-23	2.00	0.50	0.12	0.38	**	0.81	0.30	6	19
665-002	5200-5300 P4080-24	2.59	0.34	<0.10	0.42	**	---	---	---	16
665-003	5340-5400 P4080-25	2.89	0.25	<0.10	0.37	**	---	---	---	13
665-004	5400-5500 P4080-26	1.90	0.20	<0.10	0.34	**	---	---	---	18
665-005	5500-5700 P4080-27	1.43	0.13	0.17	0.36	470	0.43	0.48	12	25
665-006	5700-5750 P4080-28	1.20	<0.10	0.39	0.38	448	---	1.04	33	32
665-007	5850-5900 P4080-29	1.24	0.14	0.55	0.47	445	0.20	1.16	44	38
665-008	5950-5600 P4080-30	1.24	0.15	0.96	0.46	442	0.13	2.10	78	37
665-009	6070-6100 P4080-31	1.76	0.24	1.52	0.22	442	0.14	6.84	87	13
665-010	6100-6130 P4080-32	1.41	0.21	1.52	0.42	440	0.12	3.61	108	30
665-011	6230-6270 P4080-33	1.77	0.19	1.43	0.32	444	0.12	4.43	81	18
665-012	6270-6330 P4080-34	1.76	0.21	1.09	0.43	443	0.16	2.55	62	24

TABLE I

Chevron U.S.A. Inc.
Houston Oil & Minerals J.M. Lewelling
Otero Co., New Mexico

File No. 665
June 20, 1983

Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft) & Client ID	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index $\frac{S1}{S2}$	$\frac{S2}{S3}$	Hydrogen Index	Oxygen Index
665-013	6340-6400 P4080-35	1.66	0.22	0.84	0.39	442	0.21	2.13	50	24
665-014	6430-6500 P4080-36	1.68	0.13	0.28	0.42	440	0.32	0.67	17	25
665-015	6500-6600 P4080-37	1.33	0.11	0.91	0.60	440	0.11	1.51	68	45
665-016	6600-6700 P4080-38	1.59	0.17	1.19	0.43	440	0.13	2.77	75	27
665-017	8670-8700 P4080-39	0.69	< 0.10	< 0.10	0.59	**	---	---	---	86
665-018	8700-8730 P4080-40	1.31	< 0.10	< 0.10	0.73	**	---	---	---	56
665-019	8800-8860 P4080-41	1.42	< 0.10	< 0.10	0.74	**	---	---	---	52

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