New Mexico Bureau of Mines and Mineral Resources
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ORGANIC GEOCHEMICAL ANALYSES OF THE SANTA FE ENERGY OPERATING PARTNERS NO. 1 ROHMER WELL, EDDY COUNTY, NEW MEXICO

By Geoffrey S. Bayliss
GeoChem Laboratories, Inc.
Houston, Texas

April 30, 1987

Revised January 1988

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION PROJECT

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
SOUTHEAST AREA
GEOCHEM JOB NO. 3514

Prepared

for

PROGRAM PARTICIPANTS

by

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CONFIDENTIAL
APRIL 1987

REVISED/ADDITIONS
JANUARY 1988

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

WELL NAME: SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
API NO.: 30-015-25722
AREA: SOUTHEAST
LOCATION: EDDY COUNTY, NEW MEXICO SEC.23, T22S, R27E
GEOCHEM JOB NO.: 3514
TOTAL DEPTH: 12,350 ft.
INTERVAL SAMPLED: 2500-12300 ft.
TOTAL NUMBER OF SAMPLES: 99

GEOCHEM SAMPLE NUMBER	SAMPLE DEPTH	STRATIGRAPHIC INTERVAL	ANALYSES					
			LITHO	TOC	ROCK-EVAL	KEROGEN	C1-C7	COMPUTER INTERPRET
3514-001	2500	Bell Canyon	X	X			X	X
3514-002	2600	Bell Canyon	X	X	X	X	X	X
3514-003	2700	Bell Canyon	X	X			X	X
3514-004	2800	Bell Canyon	X	X	X	X	X	X
3514-005	2900	Bell Canyon	X	X			X	X
3514-006	3000	Cherry Canyon	X	X			X	X
3514-007	3100	Cherry Canyon	X	X	X	X	X	X
3514-008	3200	Cherry Canyon	X	X			X	X
3514-009	3300	Cherry Canyon	X	X	X	X	X	X
3514-010	3400	Cherry Canyon	X	X			X	X
3514-011	3500	Cherry Canyon	X	X			X	X
3514-012	3600	Cherry Canyon	X	X			X	X
3514-013	3700	Cherry Canyon	X	X	X	X	X	X
3514-014	3800	Cherry Canyon	X	X			X	X
3514-015	3900	Cherry Canyon	X	X			X	X
3514-016	4000	Brushy Canyon	X	X	X	X	X	X
3514-017	4100	Brushy Canyon	X	X	X	X	X	X
3514-018	4200	Brushy Canyon	X	X	X	X	X	X
3514-019	4300	Brushy Canyon	X	X			X	X
3514-020	4400	Brushy Canyon	X	X	X	X	X	X
3514-021	4500	Brushy Canyon	X	X			X	X
3514-022	4600	Brushy Canyon	X	X	X	X	X	X
3514-023	4700	Brushy Canyon	X	X			X	X
3514-024	4800	Brushy Canyon	X	X			X	X
3514-025	4900	Brushy Canyon	X	X	X	X	X	X
3514-026	5000	Brushy Canyon	X	X			X	X
3514-027	5100	Brushy Canyon	X	X			X	X
3514-028	5200	Brushy Canyon	X	X	X	X	X	X
3514-029	5300	Brushy Canyon	X	X			X	X
3514-030	5400	Brushy Canyon	X	X			X	X

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			LITHO	TOC	ROCK-EVAL	KEROGEN	C1-C7	COMPUTER INTERPRET
3514-031	5500	Bone Springs	X	X	X	X	X	X
3514-032	5600	Bone Springs	X	X	X	X	X	X
3514-033	5700	Bone Springs	X	X			X	X
3514-034	5800	Bone Springs	X	X			X	X
3514-035	5900	Bone Springs	X	X	X	X	X	X
3514-036	6000	Bone Springs	X	X			X	X
3514-037	6100	Bone Springs	X	X			X	X
3514-038	6200	Bone Springs	X	X	X	X	X	X
3514-039	6300	Bone Springs	X	X	X	X	X	X
3514-040	6400	Bone Springs	X	X			X	X
3514-041	6500	Bone Springs	X	X			X	X
3514-042	6600	Bone Springs/1st Sand	X	X	X	X	X	X
3514-043	6700	Bone Springs/1st Sand	X	X	X	X	X	X
3514-044	6800	Bone Springs/1st Sand	X	X			X	X
3514-045	6900	Bone Springs/1st Sand	X	X	X	X	X	X
3514-046	7000	Bone Springs/1st Sand	X	X	X	X	X	X
3514-047	7100	Bone Springs/1st Sand	X	X			X	X
3514-048	7200	Bone Springs/1st Sand	X	X	X	X	X	X
3514-049	7300	Bone Springs/2nd Sand	X	X			X	X
3514-050	7400	Bone Springs/2nd Sand	X	X			X	X
3514-051	7500	Bone Springs/2nd Sand	X	X			X	X
3514-052	7600	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-053	7700	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-054	7800	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-055	7900	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-056	8000	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-057	8100	Bone Springs/2nd Sand	X	X			X	X
3514-058	8200	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-059	8300	Bone Springs/2nd Sand	X	X			X	X
3514-060	8400	Bone Springs/2nd Sand	X	X			X	X

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GEOCHEM SAMPLE NUMBER	SAMPLE DEPTH	STRATIGRAPHIC INTERVAL	ANALYSES					
			LITHO	TOC	ROCK-EVAL	KEROGEN	C1-C7	COMPUTER INTERPRET.
3514-061	8500	Bone Springs/2nd Sand	X	X	X	X	X	X
3514-062	8600	Bone Springs/3rd Sand	X	X			X	X
3514-063	8700	Bone Springs/3rd Sand	X	X	X	X	X	X
3514-064	8800	Bone Springs/3rd Sand	X	X			X	X
3514-065	8900	Wolfcamp	X	X			X	X
3514-066	9000	Wolfcamp	X	X	X	X	X	X
3514-067	9100	Wolfcamp	X	X			X	X
3514-068	9200	Wolfcamp	X	X	X	X	X	X
3514-069	9300	Wolfcamp	X	X	X	X	X	X
3514-070	9400	Wolfcamp	X	X	X	X	X	X
3514-071	9500	Wolfcamp	X	X	X	X	X	X
3514-072	9600	Wolfcamp	X	X			X	X
3514-073	9700	Wolfcamp	X	X	X	X	X	X
3514-074	9800	Wolfcamp	X	X	X	X	X	X
3514-075	9900	Wolfcamp	X	X	X	X	X	X
3514-076	10000	Wolfcamp	X	X			X	X
3514-077	10100	Upper Pennsylvanian	X	X	X	X	X	X
3514-078	10200	Upper Pennsylvanian	X	X	X	X	X	X
3514-079	10300	Upper Pennsylvanian	X	X	X	X	X	X
3514-080	10400	Strawn	X	X			X	X
3514-081	10500	Strawn	X	X	X	X	X	X
3514-082	10600	Strawn	X	X	X	X	X	X
3514-083	10700	Strawn	X	X	X	X	X	X
3514-084	10800	Atoka	X	X	X	X	X	X
3514-085	10900	Atoka	X	X	X	X	X	X
3514-086	11000	Atoka	X	X	X	X	X	X
3514-087	11100	Atoka	X	X	X	X	X	X
3514-088	11200	Atoka	X	X	X	X	X	X
3514-089	11300	Morrow Lime	X	X			X	X
3514-090	11400	Morrow Lime	X	X			X	X

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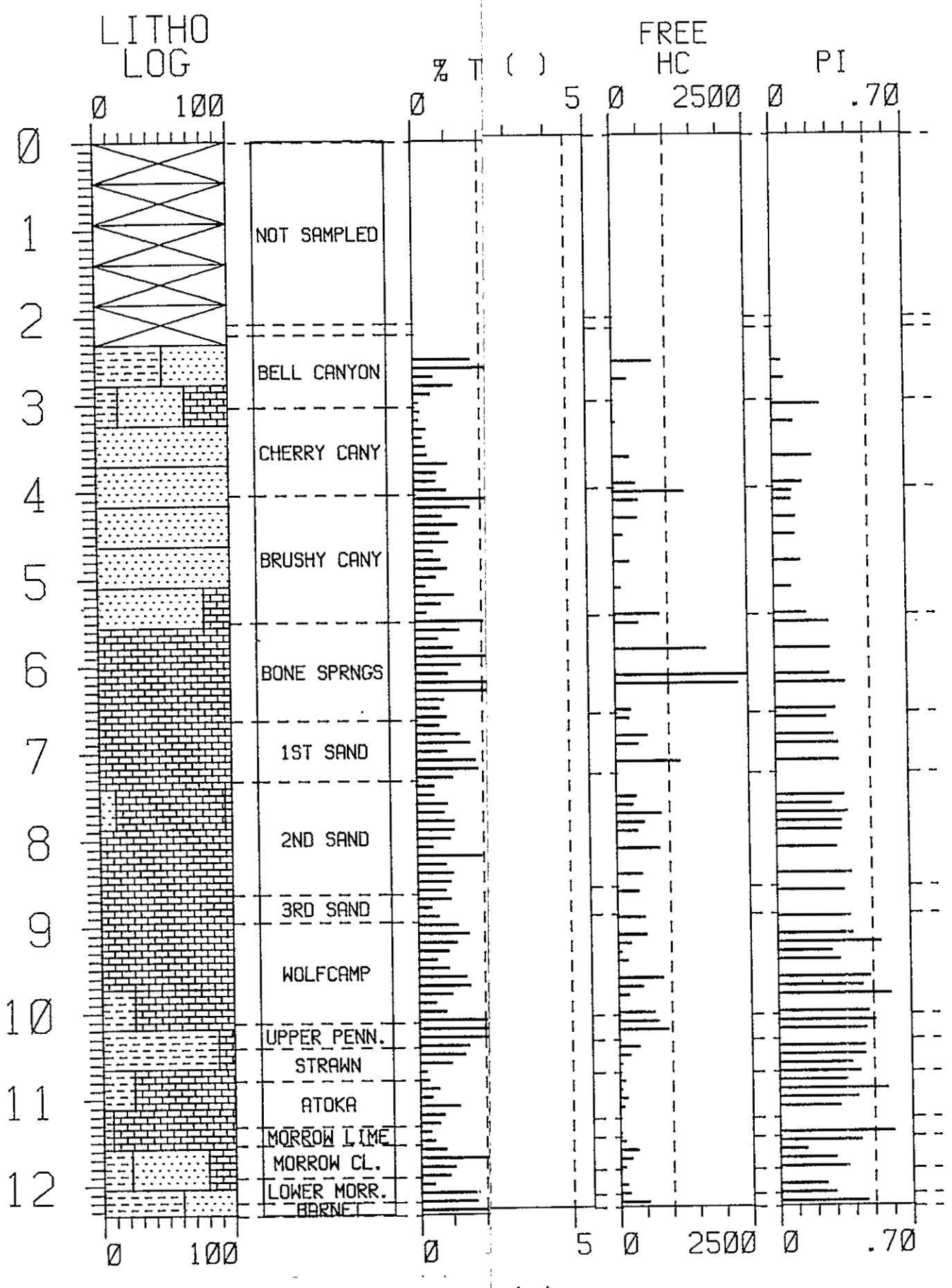
			LITHO	TOC	ROCK-EVAL	KEROGEN	C1-C7	COMPUTER INTERPRET
3514-091	11500	Morrow Clastics	X	X	X	X	X	X
3514-092	11600	Morrow Clastics	X	X	X	X	X	X
3514-093	11700	Morrow Clastics	X	X	X	X	X	X
3514-094	11800	Morrow Clastics	X	X	X	X	X	X
3514-095	11900	Lower Morrow	X	X	X	X	X	X
3514-096	12000	Lower Morrow	X	X			X	X
3514-097	12100	Lower Morrow	X	X	X	X	X	X
3514-098	12200	Barnet	X	X	X	X	X	X
3514-099	12300	Barnet	X	X	X	X	X	X

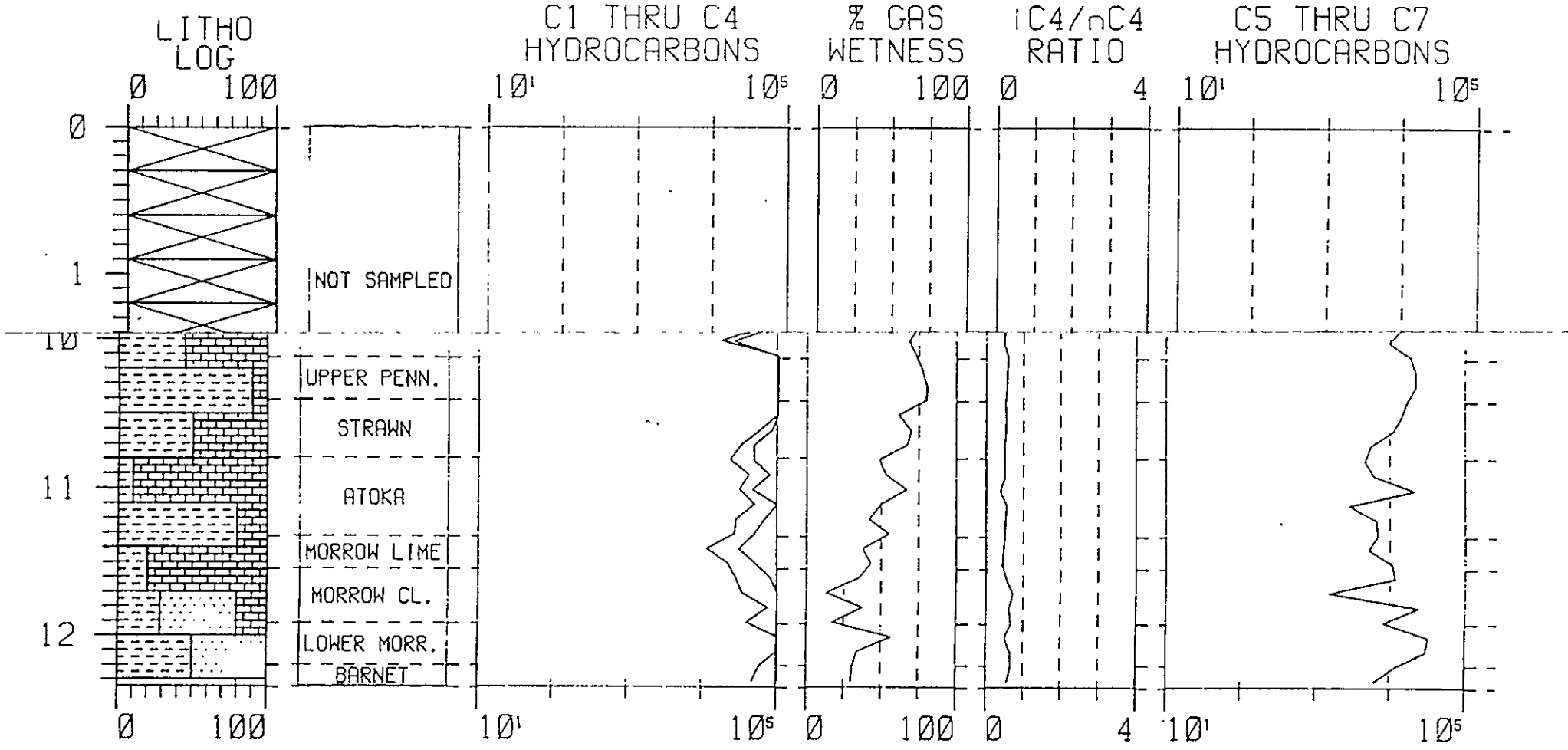
SANTA FE ROHMER #1
JOB NUMBER 3514



(*)

SANTA FE ROHMER #1
JOB NUMBER 3514

FIGURE 1
SUMMARY OF GEOCHEMICAL ANALYSES
C1-C7 HYDROCARBONS



△PPM C1-C4 HYDROCARBONS
✱PPM C2-C4 HYDROCARBONS

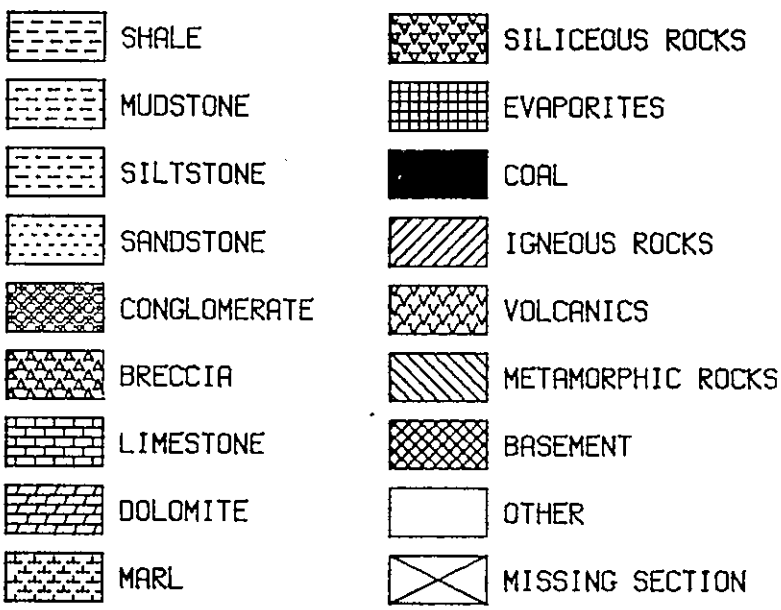
PPM VALUES EXPRESSED AS VOLUME OF GAS PER MILLION VOLUMES OF SED

PPM VALUES EXPRESSED AS VOLUMES OF GAS PER MILLION VOLUMES OF SED

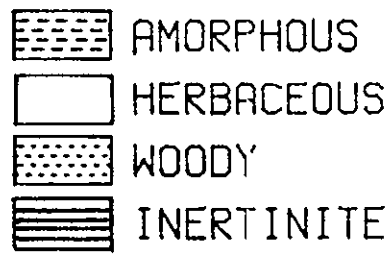
LEGEND FOR SUMMARY DIAGRAM

DEPTH:	in feet
LITHO LOG:	see lithology symbols
STRATIGRAPHY:	by age
% TOC:	percent total organic carbon
HI:	Rock-Eval, Hydrocarbon Index = 100 S2(0/00 Wt)/TOC
OI:	Rock-Eval, Oxygen Index = 100 S3 (0/00 Wt)/TOC
HC YIELD:	Rock-Eval, S2 peak (ppm)
S2/S3:	Rock-Eval, Ratio of S2 to S3 peak
KEROGEN:	see Kerogen symbols
T-MAX:	Rock-Eval, maximum temperature of S2 peak, in degrees Centigrade
%RO (△):	Vitrinite Reflectance (scale 0 to 5)
TAI (*):	Thermal Alteration Index (Scale 1 to 5)
FREE HC:	Rock-Eval, S1 peak (ppm)
PI:	Rock-Eval, Productivity Index = S1/(S1+S2)

LITHOLOGIES



KEROGEN TYPES



COMPUTERIZED GEOCHEMICAL SOURCE ROCK EVALUATION

INTERPRETATIVE CRITERIA

Simplified Flow Diagram

STEP I/DATA INPUT

1. Sample ID
2. Depth
3. Lithology
   a. % Sandstone (Ss)
   b. % Siltstone (St)
   c. % Shale (Sh)
   d. % Carbonate (Cb)
   e. % Evaporite (E)
   f. % Coal (C)
   g. % Other (Ot)
   h. % Metamorphic (M)
4. Geochemical parameters
   a. Pyrolysis data
      1. Volatile hydrocarbon (S1)
      2. Generated hydrocarbon (S2)
      3. Temperature (°C) of S2 peak (Tmax)
   b. Total organic carbon (TOC)
   c. Kerogen type
      1. % Amorphous (Am)
      2. % Herbaceous (H)
      3. % Woody (W)
      4. % Coaly (C)
   d. Thermal Maturity indicators
      1. Thermal alteration index (TAI)
      2. Vitrinite reflectance (%Ro)

Output

- Formations
- Table III
- Samples:
- Table VI
- Fig. 1
- Fig. 2

STEP II/LITHOLOGY CHECK

If the sample is uninterpretable because it contains coal, mud additives, or metamorphics, a statement is printed to that effect. If a significant portion of the sample is composed of "other" lithologies, the interpretation is referred to a footnote. If the sample is composed of 60% or more of either source rocks (shale and/or carbonate) or nonsource rocks (siltstones and/or sandstones) the sample is interpreted in Step III below.

STEP III/INTERPRETATION PROCEDURES

Interpretations are based on the following parameters:

1. Lithology
2. Thermal maturity using TAI
3. Total organic carbon (TOC)
4. Volatile hydrocarbon (S1)
5. Kerogen type

If a particular sample lacks only a TAI value, a TAI value is taken from a three term moving average curve (Figure 1). The descriptive terminology used relative to the parameter values is given below.

Output

- Formations
- Table I
- Table II
- Samples
- Table IV
- Table V

INTERPRETIVE DESCRIPTIVE TERMINOLOGY

Thermal Alteration Index (TAI)

Value	Descriptive Terminology
1.0 - 1.7	Immature
1.8 - 2.1	Moderately Immature
2.2 - 2.5	Moderately Mature
2.6 - 3.5	Mature
3.6 - 4.1	Very Mature
4.2 - 4.9	Severely Altered
$\geq$ 5.00	Metamorphosed

Value	Associated Hydrocarbon Type
1.3 - 1.5	Biogenic Gas
1.5 - 2.2	Biogenic Gas and Immature Oil
2.2 - 2.5	Immature Heavy Oil
2.5 - 3.2	Mature Oil
3.2 - 3.4	Mature Oil, Condensate, and Wet Gas
3.4 - 3.8	Condensate and Wet Gas
$\geq$ 3.8	Petrogenic Methane Gas

Total Organic Carbon (TOC)

	Descriptive Terminology	
Value in %	Shale	Carbonate
$\leq$ 0.12	Poor	Poor
0.13 - 0.25	Poor	Fair
0.26 - 0.50	Poor	Good
0.51 - 1.00	Fair	Very Good
1.01 - 2.00	Good	Excellent
2.01 - 4.00	Very Good	Excellent
$\geq$ 4.00	Excellent	Excellent

Volatile Hydrocarbon (S1)

Value in ppm	Descriptive Terminology
$\leq$ 200	Very poor
201 - 400	Poor
401 - 800	Fair
801 - 1600	Good
1601 - 3200	Very Good
$\geq$ 3200	Excellent

Kerogen Oil/Gas Factor

% Oil = (% Am) + 0.6 (% H) + 0.3 (% W) + 0.1 (% C)

% Gas = 100 - % Oil

Vitrinite Reflectance (%Ro)

Value	Descriptive Terminology
0.0 - 0.42	Immature
0.43 - 0.55	Moderately Immature
0.56 - 0.80	Moderately Mature
0.81 - 1.62	Mature
1.63 - 2.37	Very Mature
2.38 - 4.50	Severely Altered
$\geq$ 4.50	Metamorphosed

Value	Associated Hydrocarbon Type
0.30 - 0.35	Biogenic Gas
0.35 - 0.60	Biogenic Gas and Immature Oil
0.60 - 0.80	Immature Heavy Oil
0.80 - 1.20	Mature Oil
1.20 - 1.50	Mature Oil, Condensate and Wet Gas
1.50 - 2.00	Condensate and Wet Gas
$\geq$ 2.00	Petrogenic Methane Gas

TABLE I

FORMATION INTERPRETATION

This table gives a formation by formation interpretation based on the following parameters:

(1) Lithology
(2) Thermal alteration index (TAI)
(3) Total organic carbon (TOC)
(4) Volatile hydrocarbon (S1)
(5) Kerogen type

If a TAI value is lacking for an otherwise interpretable sample, a TAI value is taken from a three term moving average plot of all the TAI data for this well (see Figure 1).

The kerogen type oil/gas factor expressed as a percentage should be used as a modifier to the interpretation; i.e., a high oil factor will enhance the oil quality of the sample whereas correspondingly, a high gas factor will enhance the gas ratio of the sample and diminish the oil prospectiveness.

TABLE II

FORMATION SUMMARY INTERPRETATION

This table gives a formation by formation interpretation of each parameter used in Table I. The descriptive terminology used for each parameter is listed in the introduction.

TABLE III

FORMATION SUMMARY OF GEOCHEMICAL DATA

This table gives a formation by formation listing of the data used in the computerized interpretations. The information given for each formation is as follows:

(1) Sample number
(2) Depth
(3) Lithology
(4) Volatile hydrocarbon (S1, ppm)
(5) Generated hydrocarbon (S2, ppm)
(6) Maximum temperature of S2 peak
(7) Total organic carbon (TOC %)
(8) Kerogen composition (amorphous (Am), herbaceous (H), woody (W), and coaly (C))
(9) Thermal alteration index (TAI)
(10) Vitrinite reflectance (%Ro)

TABLE IV

SAMPLE INTERPRETATION

This table gives a sample by sample interpretation based on the following parameters:

(1) Lithology
(2) Thermal alteration index (TAI)
(3) Total organic carbon (TOC)
(4) Volatile hydrocarbon (S1)
(5) Kerogen type

If a TAI value is lacking for an otherwise interpretable sample, a TAI value is taken from a three term moving average plot of all the TAI data for this well (see Figure 1).

The kerogen type oil/gas factor expressed as a percentage should be used as a modifier to the interpretation; i.e., a high oil factor will enhance the oil quality of the sample whereas correspondingly, a high gas factor will enhance the gas ratio of the sample and diminish the oil prospectiveness.

TABLE V

SAMPLE SUMMARY INTERPRETATION

This table gives a sample by sample interpretation of each parameter used in Table IV. This descriptive terminology used for each parameter is listed in the introduction.

TABLE VI

SAMPLE SUMMARY OF GEOCHEMICAL DATA

This table gives a sample by sample listing of the data used in the computerized interpretations. The information given for each formation is as follows:

(1) Sample number
(2) Depth
(3) Lithology
(4) Volatile hydrocarbon (S1, ppm)
(5) Generated hydrocarbon (S2, ppm)
(6) Maximum temperature of S2 peak
(7) Total organic carbon (TOC %)
(8) Kerogen composition (amorphous (Am), herbaceous (H), woody (W), and coaly (C))
(9) Thermal alteration index (TAI)
(10) Vitrinite reflectance (%Ro)

The TAI and %Ro values are plotted on Figures 1 and 2 respectively; values of TAI or %Ro indicated with an asterisk (*) are taken from the three term moving average plot of the respective parameter. Sample types are indicated by "blank" (cuttings), "C" (conventional core) and "S" (sidewall core). Casing points and the tops of all formations penetrated by the well are displayed on all tables with associated depths.

FIGURE 1

THERMAL MATURITY PROFILE

USING THE THERMAL ALTERATION INDEX (TAI)

This figure displays a thermal maturity profile for the well using the thermal alteration index (TAI). The raw data plot displays the TAI values of individual samples plotted versus depth (150 foot intervals). Within a particular interval an "A" indicates one TAI values and a "B" indicates two TAI determinations of the same value, etc. The "AVG" gives the average TAI value for that interval.

The three term moving average plot displays a TAI profile smoothed by a three term moving average. The "AVG" gives the average for the particular interval. When a sample lacks a TAI value for interpretation, a TAI value is taken from this smoothed curve for that sample depth.

The descriptive terminology used to define thermal maturity, the associated hydrocarbon type, and the numerical values of TAI corresponding to this terminology is given below.

TAI Value	Descriptive Terminology	TAI Value	Associated Hydrocarbon Type
1.0 - 1.7	Immature (I)	1.3 - 1.5	Biogenic Gas
1.8 - 2.1	Moderately Immature (MI)	1.5 - 2.2	Biogenic Gas and Immature Oil
2.2 - 2.5	Moderately Mature (MM)		
2.6 - 3.5	Mature (M)	2.2 - 2.5	Immature Heavy Oil
3.6 - 4.1	Very Mature (VM)	2.5 - 3.2	Mature Oil
4.2 - 4.9	Severely Altered (SA)	3.2 - 3.4	Mature Oil, Condensate and Wet Gas
$\geq$ 5.0	Metamorphosed		
		$\geq$ 3.8	Petrogenic Methane Gas

Tops are shown by a dashed line (---) and the names are indicated along the right hand margin. The exact depth of the tops are given in the Introduction. Total well depth is indicated and labeled with appropriate depth.

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE I
FORMATION INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
	0		---------- NOT SAMPLED ----------
	2085		---------- LAMAR LIME ----------
	2208		---------- BELL CANYON ----------
03SH	2208-	3036	TAI SHALE: MODERATELY MATURE VERY GOOD BIOGENIC GAS SOURCE - VERY GOOD POTENTIAL FOR OIL AND GAS KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%
03NS	2208-	3036	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - POSSIBLE TRACE OF IMMATURE OR BIODEGRADED HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 66% GAS TYPE 33%
	3036		---------- CHERRY CANY ----------
04CB	3036-	4038	TAI CARB : MODERATELY MATURE POOR IMMATURE OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
04NS	3036-	4038	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - POSSIBLE TRACE OF IMMATURE OR BIODEGRADED HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
	4038		---------- BRUSHY CANY ----------
05NS	4038-	5498	TAI SAND : NONSOURCE - FAIR TRACE OF RESERVOIRED IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%
	5498		---------- BONE SPRNGS ----------
06CB	5498-	6628	TAI CARB : MATURE VERY GOOD OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 78% GAS TYPE 21%
	6628		---------- 1ST SAND ----------
07CB	6628-	7325	TAI CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	7325		---------- 2ND SAND ----------

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE I
FORMATION INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
08CB	7325- 8630	TAI	CARB : MATURE FAIR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 78% GAS TYPE 21%
	8630		---------- 3RD SAND ----------
09CB	8630- 8950	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	8950		---------- WOLFCAMP ----------
10SH	8950-10116	TAI	SHALE: MATURE FAIR OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 58% GAS TYPE 41%
10CB	8950-10116	TAI	CARB : MATURE POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 64% GAS TYPE 35%
	10116		---------- UPPER PENN. ----------
11SH	10116-10402	TAI	SHALE: MATURE GOOD OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 49% GAS TYPE 50%
	10402		---------- STRAWN ----------
12SH	10402-10786	TAI	SHALE: MATURE POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 44% GAS TYPE 55%
12CB	10402-10786	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 57% GAS TYPE 42%
	10786		---------- ATOKA ----------
13SH	10786-11316	TAI	SHALE: MATURE VERY POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 37% GAS TYPE 62%
13CB	10786-11316	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 56% GAS TYPE 43%
	11316		---------- MORROW LIME ----------

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE I
FORMATION INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
14CB	11316-11536	TAI	CARB : MATURE POOR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 46% GAS TYPE 53%
	11536		---------- MORROW CL. ----------
15SH	11536-11909	TAI	SHALE: MATURE POOR OIL SOURCE - EXCELLENT GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 39% GAS TYPE 60%
15CB	11536-11909	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 34% GAS TYPE 65%
15NS	11536-11909	TAI	SAND : NONSOURCE - NO EVIDENCE OF LIGHT OIL - POSSIBLE TRACE OF HEAVY OR BIODEGRADED OIL OR PYROBITUMEN KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 45% GAS TYPE 54%
	11909		---------- LOWER MORR. ----------
16NS	11909-12195	TAI	SAND : NONSOURCE - NO EVIDENCE OF LIGHT OIL - FAIR TRACE OF HEAVY OR BIODEGRADED OIL OR PYROBITUMEN KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 44% GAS TYPE 55%
	12195		---------- BARNET ----------
17SH	12195-12350	TAI	SHALE: MATURE POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 34% GAS TYPE 65%
	12350		---------- TOTAL DEPTH ----------

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE II
FORMATION SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
	0	---------- NOT SAMPLED ----------							
	2085	---------- LAMAR LIME ----------							
	2208	---------- BELL CANYON ----------							
03SH	2208- 3036	SHALE	MM		VERY GOOD	FAIR	0.05	72	27
03NS	2208- 3036	SAND	MM		FAIR	POOR	0.06	66	33
	3036	---------- CHERRY CANY ----------							
04CB	3036- 4038	CARB	MM		FAIR	VERY POOR	0.25	80	19
04NS	3036- 4038	SAND	MM		FAIR	POOR	0.17	71	28
	4038	---------- BRUSHY CANY ----------							
05NS	4038- 5498	SAND	MM		GOOD	FAIR	0.10	72	27
	5498	---------- BONE SPRNGS ----------							
06CB	5498- 6628	CARB	M		EXCELLENT	VERY GOOD	0.29	78	21
	6628	---------- 1ST SAND ----------							
07CB	6628- 7325	CARB	M		EXCELLENT	FAIR	0.32	80	19
	7325	---------- 2ND SAND ----------							
08CB	7325- 8630	CARB	M		VERY GOOD	FAIR	0.35	78	21
	8630	---------- 3RD SAND ----------							
09CB	8630- 8950	CARB	M		VERY GOOD	POOR	0.35	80	19
	8950	---------- WOLFCAMP ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE II
FORMATION SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
10SH	8950-10116	SHALE	M		VERY GOOD	FAIR	0.48	58	41
10CB	8950-10116	CARB	M		EXCELLENT	POOR	0.43	64	35
	10116	---------- UPPER PENN. ----------							
11SH	10116-10402	SHALE	M		VERY GOOD	GOOD	0.48	49	50
	10402	---------- STRAWN ----------							
12SH	10402-10786	SHALE	M		GOOD	POOR	0.45	44	55
12CB	10402-10786	CARB	M		VERY GOOD	VERY POOR	0.44	57	42
	10786	---------- ATOKA ----------							
13SH	10786-11316	SHALE	M		GOOD	VERY POOR	0.41	37	62
13CB	10786-11316	CARB	M		VERY GOOD	VERY POOR	0.37	56	43
	11316	---------- MORROW LIME ----------							
14CB	11316-11536	CARB	M		GOOD	VERY POOR	0.60	46	53
	11536	---------- MORROW CL. ----------							
15SH	11536-11909	SHALE	M		EXCELLENT	POOR	0.14	39	60
15CB	11536-11909	CARB	M		VERY GOOD	VERY POOR	0.43	34	65
15NS	11536-11909	SAND	M		FAIR	VERY POOR	0.36	45	54
	11909	---------- LOWER MORR. ----------							
16NS	11909-12195	SAND	M		GOOD	VERY POOR	0.25	44	55
	12195	---------- BARNET ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE II
FORMATION SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
17SH	12195-12350	SHALE	M		GOOD	POOR	0.40	34	65
	12350	---------- TOTAL DEPTH ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: BELL CANYON (2208- 3036)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(2/ 33)													
AVG		750.	14460.	470.	433	2.25	2.3	----	38	50	12	0	71	28
MIN		750.	14460.	470.	433	1.73	2.3	----						
MAX		750.	14460.	470.	433	2.77	2.3	----						
CARBONATE SOURCE	(1/ 17)													
AVG		-------	-------	-------	---	0.15	2.4	----	---	---	---	---	---	---
MIN		-------	-------	-------	---	0.15	2.4	----						
MAX		-------	-------	-------	---	0.15	2.4	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	(3/ 50)													
AVG		270.	4190.	370.	432	0.77	2.4	----	25	63	12	0	66	33
MIN		270.	4190.	370.	432	0.51	2.3	----						
MAX		270.	4190.	370.	432	1.20	2.4	----						

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: CHERRY CANY (3036- 4038)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(1/ 10)													
AVG		10.	30.	200.	436	0.19	2.4	----	50	50	0	0	80	20
MIN		10.	30.	200.	436	0.19	2.4	----						
MAX		10.	30.	200.	436	0.19	2.4	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	(9/ 90)													
AVG		260.	1300.	300.	438	0.54	2.4	----	28	72	0	0	71	28
MIN		50.	410.	40.	436	0.15	2.4	----						
MAX		420.	2300.	490.	441	1.01	2.4	----						

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: BRUSHY CANY (4038- 5498)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	NOT PRESENT IN THIS FORMATION													
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	(14/100)													
AVG		470.	4025.	322.	438	1.01	2.5	----	31	66	2	0	71	28
MIN		120.	1170.	270.	435	0.32	2.4	----						
MAX		1330.	11990.	470.	442	3.08	2.5	----						

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: BONE SPRNGS (5498- 6628)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(12/100)													
AVG		1720.	4275.	615.	444	1.82	2.6	----	45	54	0	0	78	21
MIN		280.	600.	310.	437	0.68	2.5	----						
MAX		4710.	11690.	990.	449	6.04	2.6	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: 1ST SAND (6628- 7325)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(7/100)													
AVG		618.	1325.	320.	447	1.32	2.7	----	50	50	0	0	80	20
MIN		250.	680.	240.	446	0.69	2.6	----						
MAX		1210.	2430.	430.	449	1.86	2.7	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: 2ND SAND (7325- 8630)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(12/100)													
AVG		529.	1000.	364.	453	0.97	2.7	----	47	49	1	1	77	22
MIN		310.	660.	200.	450	0.47	2.7	----						
MAX		840.	1740.	600.	456	1.94	2.8	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: 3RD SAND (8630- 8950)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(3/100)													
AVG		400.	730.	310.	452	0.67	2.8	----	50	50	0	0	80	20
MIN		400.	730.	310.	452	0.41	2.8	----						
MAX		400.	730.	310.	452	0.99	2.8	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: WOLFCAMP (8950-10116)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(1/ 8)													
AVG		670.	740.	230.	451	2.06	3.0	----	26	42	16	16	57	42
MIN		670.	740.	230.	451	2.06	3.0	----						
MAX		670.	740.	230.	451	2.06	3.0	----						
CARBONATE SOURCE	(11/ 92)													
AVG		376.	491.	356.	432	1.05	2.9	----	29	50	7	12	63	36
MIN		60.	130.	200.	372	0.51	2.8	----						
MAX		840.	890.	870.	457	1.55	2.9	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: UPPER PENN. (10116-10402)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(3/100)													
AVG		835.	895.	285.	459	2.11	3.1	----	22	29	24	24	49	50
MIN		750.	720.	220.	458	1.50	3.1	----						
MAX		920.	1070.	350.	460	2.53	3.1	----						
CARBONATE SOURCE	NOT PRESENT IN THIS FORMATION													
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: STRAWN (10402-10786)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(1/ 33)													
AVG		380.	460.	210.	458	1.38	3.2	----	15	31	23	31	43	56
MIN		380.	460.	210.	458	1.38	3.2	----						
MAX		380.	460.	210.	458	1.38	3.2	----						
CARBONATE SOURCE	(2/ 67)													
AVG		125.	160.	190.	450	0.58	3.2	----	28	35	12	20	55	44
MIN		50.	80.	180.	438	0.20	3.2	----						
MAX		200.	240.	200.	462	0.97	3.2	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: ATOKA (10786-11316)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(1/ 17)													
AVG		140.	200.	230.	487	1.20	3.2	----	9	25	33	33	37	62
MIN		140.	200.	230.	487	1.20	3.2	----						
MAX		140.	200.	230.	487	1.20	3.2	----						
CARBONATE SOURCE	(5/ 83)													
AVG		63.	105.	205.	419	0.51	3.2	----	23	41	21	14	56	43
MIN		30.	30.	80.	327	0.27	3.2	----						
MAX		100.	180.	300.	493	0.73	3.2	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: MORROW LIME (11316-11536)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	(2/100)													
AVG		30.	20.	350.	382	0.38	3.2	----	10	50	10	30	46	54
MIN		30.	20.	350.	382	0.32	3.2	----						
MAX		30.	20.	350.	382	0.44	3.2	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Keroger Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: MORROW CL. (11536-11909)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(1/ 33)													
AVG		340.	2050.	500.	489	4.85	3.3	----	0	50	20	30	39	61
MIN		340.	2050.	500.	489	4.85	3.3	----						
MAX		340.	2050.	500.	489	4.85	3.3	----						
CARBONATE SOURCE	(1/ 33)													
AVG		90.	120.	720.	496	0.78	3.2	----	0	36	28	36	33	66
MIN		90.	120.	720.	496	0.78	3.2	----						
MAX		90.	120.	720.	496	0.78	3.2	----						
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	(1/ 33)													
AVG		90.	160.	250.	475	0.89	3.3	----	10	40	30	20	45	55
MIN		90.	160.	250.	475	0.89	3.3	----						
MAX		90.	160.	250.	475	0.89	3.3	----						

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: LOWER MORR. (11909-12195)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	NOT PRESENT IN THIS FORMATION													
CARBONATE SOURCE	NOT PRESENT IN THIS FORMATION													
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	(2/100)													
AVG		130.	400.	840.	515	1.03	3.4	----	15	31	23	31	43	56
MIN		130.	400.	840.	515	0.40	3.4	----						
MAX		130.	400.	840.	515	1.66	3.4	----						

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE III
FORMATION SUMMARY OF GEOCHEMICAL DATA

FORMATION NAME: BARNET (12195-12350)

SEDIMENT FACIES	(NO/ %)	PYROLYSIS DATA (PPM) S1	S2	S3	TMAX	TOC	MATURITY TAI	%RO	KEROGEN TYPE %AM	%H	%W	%C	%OIL FACTOR	%GAS FACTOR
SHALE SOURCE	(2/100)													
AVG		350.	515.	1580.	491	1.86	3.4	-----	4	26	34	34	34	65
MIN		170.	410.	1420.	472	1.70	3.4	-----						
MAX		530.	620.	1740.	511	2.02	3.4	-----						
CARBONATE SOURCE	NOT PRESENT IN THIS FORMATION													
SILICEOUS SOURCE	NOT PRESENT IN THIS FORMATION													
EVAPORITE SOURCE	NOT PRESENT IN THIS FORMATION													
SAND/SILT NON-SOURCE	NOT PRESENT IN THIS FORMATION													

Maturity Parameters Taken from a 3-Term Running Average for All Values.
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	INTERPRETATION
	0	---------- NOT SAMPLED ----------
	2085	---------- LAMAR LIME ----------
	2208	---------- BELL CANYON ----------
002	2600	TAI SHALE: MODERATELY MATURE VERY GOOD BIOGENIC GAS SOURCE - VERY GOOD POTENTIAL FOR OIL AND GAS KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%
004	2800	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - FAIR POSSIBILITY OF IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 66% GAS TYPE 33%
	3036	---------- CHERRY CANY ----------
007	3100	TAI CARB : MODERATELY MATURE POOR IMMATURE OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
009	3300	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED HYDROCARBON KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
013	3700	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - FAIR POSSIBILITY OF IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
016	4000	TAI SAND : NONSOURCE - MINOR TRACE OF RESERVOIRED IMMATURE OR BIODEGRADED HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
	4038	---------- BRUSHY CANY ----------
017	4100	TAI SAND : NONSOURCE - GOOD SHOW OF RESERVOIRED HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
018	4200	TAI SAND : NONSOURCE - FAIR TRACE OF RESERVOIRED IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%
020	4400	TAI SAND : NONSOURCE - FAIR TRACE OF RESERVOIRED IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
022	4600	TAI SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - FAIR POSSIBILITY OF IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 66% GAS TYPE 33%

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
025	4900	TAI	SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - POSSIBLE TRACE OF IMMATURE OR BIODEGRADED HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
028	5200	TAI	SAND : NONSOURCE - NO EVIDENCE OF RESERVOIRED LIGHT OIL - FAIR POSSIBILITY OF IMMATURE HEAVY OIL KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 71% GAS TYPE 28%
	5498		---------- BONE SPRNGS ----------
031	5500	TAI	CARB : MODERATELY MATURE GOOD IMMATURE OIL AND ASSOCIATED GAS SOURCE - VERY GOOD BIOGENIC GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
032	5600	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 75% GAS TYPE 24%
035	5900	TAI	CARB : MODERATELY MATURE VERY GOOD IMMATURE OIL AND ASSOCIATED GAS SOURCE - VERY GOOD BIOGENIC GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
038	6200	TAI	CARB : MATURE EXCELLENT OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 77% GAS TYPE 22%
039	6300	TAI	CARB : MATURE VERY GOOD OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 77% GAS TYPE 22%
042	6600	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	6628		---------- 1ST SAND ----------
043	6700	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
045	6900	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
046	7000	TAI	CARB : MATURE FAIR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
048	7200	TAI	CARB : MATURE GOOD OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	7325	---------- 2ND SAND ----------	
052	7600	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 77% GAS TYPE 22%
053	7700	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
054	7800	TAI	CARB : MATURE GOOD OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
055	7900	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
056	8000	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 78% GAS TYPE 21%
058	8200	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 69% GAS TYPE 30%
061	8500	TAI	CARB : MATURE FAIR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	8630	---------- 3RD SAND ----------	
063	8700	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 80% GAS TYPE 19%
	8950	---------- WOLFCAMP ----------	
066	9000	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 75% GAS TYPE 24%
068	9200	TAI	CARB : MATURE FAIR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 77% GAS TYPE 22%

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
069	9300	TAI	CARB : MATURE POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 64% GAS TYPE 35%
070	9400	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 43% GAS TYPE 56%
071	9500	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 55% GAS TYPE 44%
073	9700	TAI	CARB : MATURE GOOD OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 65% GAS TYPE 34%
074	9800	TAI	CARB : MATURE FAIR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%
075	9900	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 58% GAS TYPE 41%
077	10100	TAI	SHALE: MATURE FAIR OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 58% GAS TYPE 41%
	10116		---------- UPPER PENN. ----------
078	10200	TAI	SHALE: MATURE FAIR OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 43% GAS TYPE 56%
079	10300	TAI	SHALE: MATURE GOOD OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 57% GAS TYPE 42%
	10402		---------- STRAWN ----------
081	10500	TAI	SHALE: MATURE POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 44% GAS TYPE 55%
082	10600	TAI	CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 45% GAS TYPE 54%
083	10700	TAI	CARB : MATURE POOR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 72% GAS TYPE 27%

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	INTERPRETATION
	10786	---------- ATOKA ----------
084	10800	TAI CARB : MATURE POOR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 46% GAS TYPE 53%
085	10900	TAI CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 61% GAS TYPE 38%
086	11000	TAI CARB : MATURE POOR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 70% GAS TYPE 29%
087	11100	TAI SHALE: MATURE VERY POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 37% GAS TYPE 62%
088	11200	TAI CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 47% GAS TYPE 52%
	11316	---------- MORROW LIME ----------
091	11500	TAI CARB : MATURE POOR OIL AND ASSOCIATED GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 46% GAS TYPE 53%
	11536	---------- MORROW CL. ----------
092	11600	TAI CARB : MATURE VERY POOR TO POOR OIL SOURCE - FAIR GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 34% GAS TYPE 65%
093	11700	TAI SHALE: MATURE POOR OIL SOURCE - EXCELLENT GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 39% GAS TYPE 60%
094	11800	MIXED SOURCE NON-SOURCE LITHOLOGIES
095	11900	TAI SAND : NONSOURCE - NO EVIDENCE OF LIGHT OIL - POSSIBLE TRACE OF HEAVY OR BIODEGRADED OIL OR PYROBITUMEN KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 45% GAS TYPE 54%
	11909	---------- LOWER MORR. ----------

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE IV
SAMPLE INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH		INTERPRETATION
097	12100	TAI	SAND : NONSOURCE - NO EVIDENCE OF LIGHT OIL - FAIR TRACE OF HEAVY OR BIODEGRADED OIL OR PYROBITUMEN KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 44% GAS TYPE 55%
	12195		---------- BARNET ----------
098	12200	TAI	SHALE: MATURE VERY POOR OIL SOURCE - GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 31% GAS TYPE 68%
099	12300	TAI	SHALE: MATURE FAIR OIL SOURCE - VERY GOOD GAS SOURCE KEROGEN TYPE OIL/GAS FACTOR: OIL TYPE 37% GAS TYPE 62%
	12350		---------- TOTAL DEPTH ----------

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
Maturity Parameters: (V) - Vitrinite Reflectance Used, (T) TAI Used

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE V
SAMPLE SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
	0	---------- NOT SAMPLED ----------							
	2085	---------- LAMAR LIME ----------							
	2208	---------- BELL CANYON ----------							
002	2600	SHALE	MM		VERY GOOD	FAIR	0.05	72	27
004	2800	SAND	MM		GOOD	POOR	0.06	66	33
	3036	---------- CHERRY CANY ----------							
007	3100	CARB	MM		FAIR	VERY POOR	0.25	80	19
009	3300	SAND	MM		POOR	VERY POOR	0.11	71	28
013	3700	SAND	MM		GOOD	POOR	0.21	71	28
016	4000	SAND	MM		FAIR	FAIR	0.15	71	28
	4038	---------- BRUSHY CANY ----------							
017	4100	SAND	MM		VERY GOOD	GOOD	0.10	71	28
018	4200	SAND	MM		GOOD	FAIR	0.09	72	27
020	4400	SAND	MM		GOOD	FAIR	0.12	80	19
022	4600	SAND	MM		GOOD	VERY POOR	0.11	66	33
025	4900	SAND	MM		FAIR	POOR	0.14	71	28
028	5200	SAND	MM		GOOD	VERY POOR	0.09	71	28
	5498	---------- BONE SPRNGS ----------							
031	5500	CARB	MM		EXCELLENT	GOOD	0.17	80	19

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE V
SAMPLE SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY		TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
			TAI	%RO					
032	5600	CARB	M		EXCELLENT	FAIR	0.29	75	24
035	5900	CARB	MM		EXCELLENT	VERY GOOD	0.29	80	19
038	6200	CARB	M		EXCELLENT	EXCELLENT	0.29	77	22
039	6300	CARB	M		EXCELLENT	VERY GOOD	0.37	77	22
042	6600	CARB	M		VERY GOOD	POOR	0.32	80	19
	6628	---------- 1ST SAND ----------							
043	6700	CARB	M		VERY GOOD	POOR	0.27	80	19
045	6900	CARB	M		EXCELLENT	FAIR	0.31	80	19
046	7000	CARB	M		VERY GOOD	FAIR	0.33	80	19
048	7200	CARB	M		EXCELLENT	GOOD	0.33	80	19
	7325	---------- 2ND SAND ----------							
052	7600	CARB	M		VERY GOOD	POOR	0.36	77	22
053	7700	CARB	M		VERY GOOD	POOR	0.29	80	19
054	7800	CARB	M		EXCELLENT	GOOD	0.38	80	19
055	7900	CARB	M		EXCELLENT	FAIR	0.34	80	19
056	8000	CARB	M		VERY GOOD	POOR	0.34	78	21
058	8200	CARB	M		EXCELLENT	FAIR	0.31	69	30
061	8500	CARB	M		VERY GOOD	FAIR	0.39	80	19
	8630	---------- 3RD SAND ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE V
SAMPLE SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
063	8700	CARB	M		VERY GOOD	POOR	0.35	80	19
	8950	---------- WOLFCAMP ----------							
066	9000	CARB	M		EXCELLENT	FAIR	0.38	75	24
068	9200	CARB	M		EXCELLENT	FAIR	0.40	77	22
069	9300	CARB	M		VERY GOOD	POOR	0.55	64	35
070	9400	CARB	M		VERY GOOD	VERY POOR	0.29	43	56
071	9500	CARB	M		VERY GOOD	VERY POOR	0.33	55	44
073	9700	CARB	M		EXCELLENT	GOOD	0.49	65	34
074	9800	CARB	M		VERY GOOD	FAIR	0.45	72	27
075	9900	CARB	M		VERY GOOD	VERY POOR	0.59	58	41
077	10100	SHALE	M		VERY GOOD	FAIR	0.48	58	41
	10116	---------- UPPER PENN. ----------							
078	10200	SHALE	M		VERY GOOD	FAIR	0.51	43	56
079	10300	SHALE	M		VERY GOOD	GOOD	0.46	57	42
	10402	---------- STRAWN ----------							
081	10500	SHALE	M		GOOD	POOR	0.45	44	55
082	10600	CARB	M		VERY GOOD	VERY POOR	0.45	45	54
083	10700	CARB	M		FAIR	VERY POOR	0.38	72	27
	10786	---------- ATOKA ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE V
SAMPLE SUMMARY INTERPRETATION

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	THERMAL MATURITY TAI	THERMAL MATURITY %RO	TOC RICHNESS	HC RICHNESS	PRODUCTIVITY INDEX	%OIL FACTOR	%GAS FACTOR
084	10800	CARB	M		GOOD	VERY POOR	0.43	46	53
085	10900	CARB	M		VERY GOOD	VERY POOR	0.36	61	38
086	11000	CARB	M		GOOD	VERY POOR	0.57	70	29
087	11100	SHALE	M		GOOD	VERY POOR	0.41	37	62
088	11200	CARB	M		VERY GOOD	VERY POOR	0.32	47	52
	11316	---------- MORROW LIME ----------							
091	11500	CARB	M		GOOD	VERY POOR	0.60	46	53
	11536	---------- MORROW CL. ----------							
092	11600	CARB	M		VERY GOOD	VERY POOR	0.43	34	65
093	11700	SHALE	M		EXCELLENT	POOR	0.14	39	60
094	11800	MIXED SOURCE NON-SOURCE LITHOLOGIES							
095	11900	SAND	M		FAIR	VERY POOR	0.36	45	54
	11909	---------- LOWER MORR. ----------							
097	12100	SAND	M		GOOD	VERY POOR	0.25	44	55
	12195	---------- BARNET ----------							
098	12200	SHALE	M		GOOD	VERY POOR	0.29	31	68
099	12300	SHALE	M		VERY GOOD	FAIR	0.46	37	62
	12350	---------- TOTAL DEPTH ----------							

Rating Parameters as Defined in GeoChem's Source Rock Reference Manual
Thermal Maturity Abbreviations: I-Immature, MI-Moderately Immature, M-Mature
MM-Moderately Mature, VM-Very Mature
SA-Severly Altered, MT-Metamorphosed
Sample Types: Blank-Cuttings, C-Core, S-Sidewall Core
** Value Taken from a 3-Term Running Average of this Parameter

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM) TMAX	S1	S2	S3	TOC	KEROGEN TYPE %Am	%H	%W	%C	THERMAL MATURITY TAI	%RO
	0	---------- NOT SAMPLED ----------											
	2085	---------- LAMAR LIME ----------											
	2208	---------- BELL CANYON ----------											
001	2500	60Sh 40Ss	---	--------	--------	--------	1.73	--	--	--	--	---	----
002	2600	60Sh 40Ss	433	750	14460	470	2.77	38	50	12	0	2.3	----
003	2700	70Ss 30Sh	---	--------	--------	--------	0.61	--	--	--	--	---	----
004	2800	60Ss 40Sh	432	270	4190	370	1.20	25	63	12	0	2.4	----
005	2900	70Ss 30Sh	---	--------	--------	--------	0.51	--	--	--	--	---	----
006	3000	75Lm 20Ss 5Sh	---	--------	--------	--------	0.15	--	--	--	--	---	----
	3036	---------- CHERRY CANY ----------											
007	3100	90Lm 5Sh 5Ss	436	10	30	200	0.19	50	50	0	0	2.4	----
008	3200	95Ss 5Sh	---	--------	--------	--------	0.15	--	--	--	--	---	----
009	3300	100Ss	441	50	410	40	0.38	28	72	0	0	2.4	----
010	3400	100Ss	---	--------	--------	--------	0.26	--	--	--	--	---	----
011	3500	100Ss	---	--------	--------	--------	0.35	--	--	--	--	---	----
012	3600	100Ss	---	--------	--------	--------	0.40	--	--	--	--	---	----

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
013	3700	100Ss	439	310	1190	490	1.01	28	72	0	0	2.4	-----
014	3800	100Ss	---	-------	-------	-------	0.67	--	--	---	--	---	----
015	3900	100Ss	---	-------	-------	-------	0.65	--	--	--	--	---	----
016	4000	100Ss	436	420	2300	370	0.98	28	72	0	0	2.4	----
	4038	---------- BRUSHY CANY ----------											
017	4100	100Ss	437	1330	11990	470	3.08	28	72	0	0	2.5	----
018	4200	100Ss	435	460	4520	320	1.67	38	50	12	0	2.4	----
019	4300	100Ss	---	-------	-------	-------	0.83	--	--	--	--	---	----
020	4400	100Ss	437	450	3380	280	1.30	50	50	0	0	2.4	----
021	4500	100Ss	---	-------	-------	-------	0.75	--	--	--	--	---	----
022	4600	100Ss	439	170	1330	270	1.01	16	84	0	0	2.5	----
023	4700	100Ss	---	-------	-------	-------	0.55	--	--	--	--	---	----
024	4800	100Ss	---	-------	-------	-------	0.78	--	--	--	--	---	----
025	4900	100Ss	439	290	1760	320	0.98	28	72	0	0	2.5	----
026	5000	100Ss	---	-------	-------	-------	0.63	--	--	--	--	---	----
027	5100	100Ss	---	-------	-------	-------	0.32	--	--	--	--	---	----

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
028	5200	100Ss	442	120	1170	270	1.16	28	72	0	0	2.5	----
029	5300	100Ss	---	-------	-------	-------	0.78	--	--	--	--	---	----
030	5400	100Ss	---	-------	-------	-------	0.34	--	--	--	--	---	----
	5498	---------- BONE SPRNGS ----------											
031	5500	100Lm	437	850	4150	450	2.05	50	50	0	0	2.5	----
032	5600	100Lm	446	450	1110	310	1.33	38	62	0	0	2.6	----
033	5700	100Lm	---	-------	-------	-------	0.68	--	--	--	--	---	----
034	5800	100Lm	---	-------	-------	-------	1.12	--	--	--	--	---	----
035	5900	100Lm	445	1720	4160	690	2.86	50	50	0	0	2.5	----
036	6000	100Lm	---	-------	-------	-------	1.36	--	--	--	--	---	----
037	6100	100Lm	---	-------	-------	-------	0.96	--	--	--	--	---	----
038	6200	100Lm	448	4710	11690	990	6.04	43	57	0	0	2.6	----
039	6300	100Lm	449	2310	3940	790	3.04	43	57	0	0	2.6	----
040	6400	100Lm	---	-------	-------	-------	0.84	--	--	--	--	---	----
041	6500	100Lm	---	-------	-------	-------	0.70	--	--	--	--	---	----
042	6600	100Lm	442	280	600	460	0.91	50	50	0	0	2.6	----
	6628	---------- 1ST SAND ----------											

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
043	6700	90Lm 10Ev	447	250	680	270	0.69	50	50	0	0	2.6	----
044	6800	100Lm	---	-------	-------	-------	1.31	--	--	--	--	---	----
045	6900	100Lm	446	590	1340	340	1.62	50	50	0	0	2.7	----
046	7000	100Lm	449	420	850	240	0.92	50	50	0	0	2.6	----
047	7100	100Lm	---	-------	-------	-------	1.78	--	--	--	--	---	----
048	7200	100Lm	447	1210	2430	430	1.86	50	50	0	0	2.7	----
049	7300	100Lm	---	-------	-------	-------	1.09	--	--	--	--	---	----
	7325	---------- 2ND SAND ----------											
050	7400	60Lm 20Ss 20Ev	---	-------	-------	-------	0.52	--	--	--	--	---	----
051	7500	50Ss 30Lm 20Ev	---	-------	-------	-------	0.51	--	--	--	--	---	----
052	7600	100Lm	455	370	660	340	0.92	43	57	0	0	2.7	----
053	7700	100Lm	453	310	750	200	0.82	50	50	0	0	2.7	----
054	7800	100Lm	453	840	1390	600	1.11	50	50	0	0	2.7	----
055	7900	100Lm	450	520	990	300	1.12	50	50	0	0	2.7	----
056	8000	100Lm	456	390	750	290	0.99	44	56	0	0	2.7	----
057	8100	100Lm	---	-------	-------	-------	0.47	--	--	--	--	---	----

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
058	8200	100Lm	454	800	1740	460	1.94	44	34	11	11	2.8	----
059	8300	100Lm	---	-------	-------	-------	0.86	--	--	--	--	---	----
060	8400	100Lm	---	-------	-------	-------	1.07	--	--	--	--	---	----
061	8500	100Lm	450	470	720	360	1.00	50	50	0	0	2.8	----
062	8600	100Lm	---	-------	-------	-------	0.84	--	--	--	--	---	----
	8630	---------- 3RD SAND ----------											
063	8700	100Lm	452	400	730	310	0.99	50	50	0	0	2.8	----
064	8800	100Lm	---	-------	-------	-------	0.41	--	--	--	--	---	----
065	8900	100Lm	---	-------	-------	-------	0.62	--	--	--	--	---	----
	8950	---------- WOLFCAMP ----------											
066	9000	100Lm	457	510	820	310	1.19	37	63	0	0	2.8	----
067	9100	100Lm	---	-------	-------	-------	1.53	--	--	--	--	---	----
068	9200	100Lm	455	540	820	240	1.16	43	57	0	0	2.8	----
069	9300	100Lm	372	240	200	870	0.91	25	63	0	12	2.8	----
070	9400	100Lm	413	60	150	410	0.55	10	40	20	30	2.9	----
071	9500	100Lm	456	170	350	270	0.91	20	50	10	20	2.9	----

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
072	9600	100Lm	---	-------	-------	-------	1.44	--	--	--	--	---	----
073	9700	100Lm	450	840	890	330	1.55	34	44	11	11	2.9	----
074	9800	100Lm	452	460	570	200	1.00	44	44	0	12	2.9	----
075	9900	100Lm	406	190	130	220	0.51	26	42	16	16	2.9	----
076	10000	100Lm	---	-------	-------	-------	0.82	--	--	--	--	---	----
077	10100	90Sh 10Lm	451	670	740	230	2.06	26	42	16	16	3.0	----
	10116	---------- UPPER PENN. ----------											
078	10200	90Sh 10Lm	458	750	720	350	2.30	17	23	30	30	3.1	----
079	10300	90Sh 10Lm	460	920	1070	220	2.53	28	36	18	18	3.1	----
080	10400	90Sh 10Lm	---	-------	-------	-------	1.50	--	--	--	--	---	----
	10402	---------- STRAWN ----------											
081	10500	90Sh 10Lm	458	380	460	210	1.38	15	31	23	31	3.2	----
082	10600	50Sh 50Lm	462	200	240	200	0.97	17	30	23	30	3.2	----
083	10700	90Lm 10Sh	438	50	80	180	0.20	40	40	1	10	3.2	----
	10786	---------- ATOKA ----------											
084	10800	90Lm 10Sh	327	30	40	280	0.27	17	30	30	23	3.2	----

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
085	10900	90Lm 10Sh	489	100	180	160	0.58	26	50	12	12	3.2	----
086	11000	90Lm 10Sh	370	40	30	300	0.36	40	40	20	0	3.2	----
087	11100	80Sh 20Lm	487	140	200	230	1.20	9	25	33	33	3.2	----
088	11200	90Lm 10Sh	493	80	170	80	0.73	12	44	22	22	3.2	----
089	11300	90Lm 10Sh	---	-------	-------	-------	0.59	--	--	--	--	---	----
	11316	---------- MORROW LIME ----------											
090	11400	90Lm 10Sh	---	-------	-------	-------	0.32	--	--	--	--	---	----
091	11500	100Lm	382	30	20	350	0.44	10	50	10	30	3.2	----
	11536	---------- MORROW CL. ----------											
092	11600	40Ss 40Lm 20Sh	496	90	120	720	0.78	0	36	28	36	3.2	----
093	11700	35Sh 30Ss 30Lm 5C	489	340	2050	500	4.85	0	50	20	30	3.3	----
094	11800	45Ss 30Sh 25Lm	444	220	520	720	1.04	9	33	25	33	3.4	----
095	11900	75Ss 20Sh 5Lm	475	90	160	250	0.89	10	40	30	20	3.3	----
	11909	---------- LOWER MORR. ----------											
096	12000	95Ss 5Sh	---	-------	-------	-------	0.40	--	--	--	--	---	----
097	12100	80Ss 20Sh	515	130	400	840	1.66	15	31	23	31	3.4	----
	12195	---------- BARNET ----------											

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

TABLE VI: SAMPLE SUMMARY OF GEOCHEMICAL DATA

GEOCHEM SAMPLE NUMBER	DEPTH	LITHOLOGY	PYROLYSIS DATA (PPM)					KEROGEN TYPE				THERMAL MATURITY	
			TMAX	S1	S2	S3	TOC	%Am	%H	%W	%C	TAI	%RO
098	12200	80Sh 20Ss	511	170	410	1740	1.70	0	28	36	36	3.4	----
099	12300	80Sh 20Ss	472	530	620	1420	2.02	9	25	33	33	3.4	----
	12350	---------- TOTAL DEPTH ----------											

* Value taken from a 3 term smoothing for this parameter.
Lithologies: Sh-Shale, St-Siltstone, Ss-Sandstone, Cg-Conglomerate, Lm-Limestone, Do-Dolomite, Si-Siliceous Rocks
Ev-Evaporite, C-Coal, Ig-Igneous Rocks, Vo-Volcanics, Mt-Metamorphics, Bs-Basement, Ot-Other
Md-Mudstone, Br-Breccia, Mr-Marl
Sample Type: Blank-Cuttings, C-Conventional Core, S-Sidewall Core
Kerogen Type: Am-Amorphous/Sapropel, H-Herbaceous, W-Woody, C-Coaly/Inertinite

FIGURE 1 : TAI MATURITY PROFILE

JOB NUMBER: 3514
WELL NAME: SANTA FE ROHMER #1

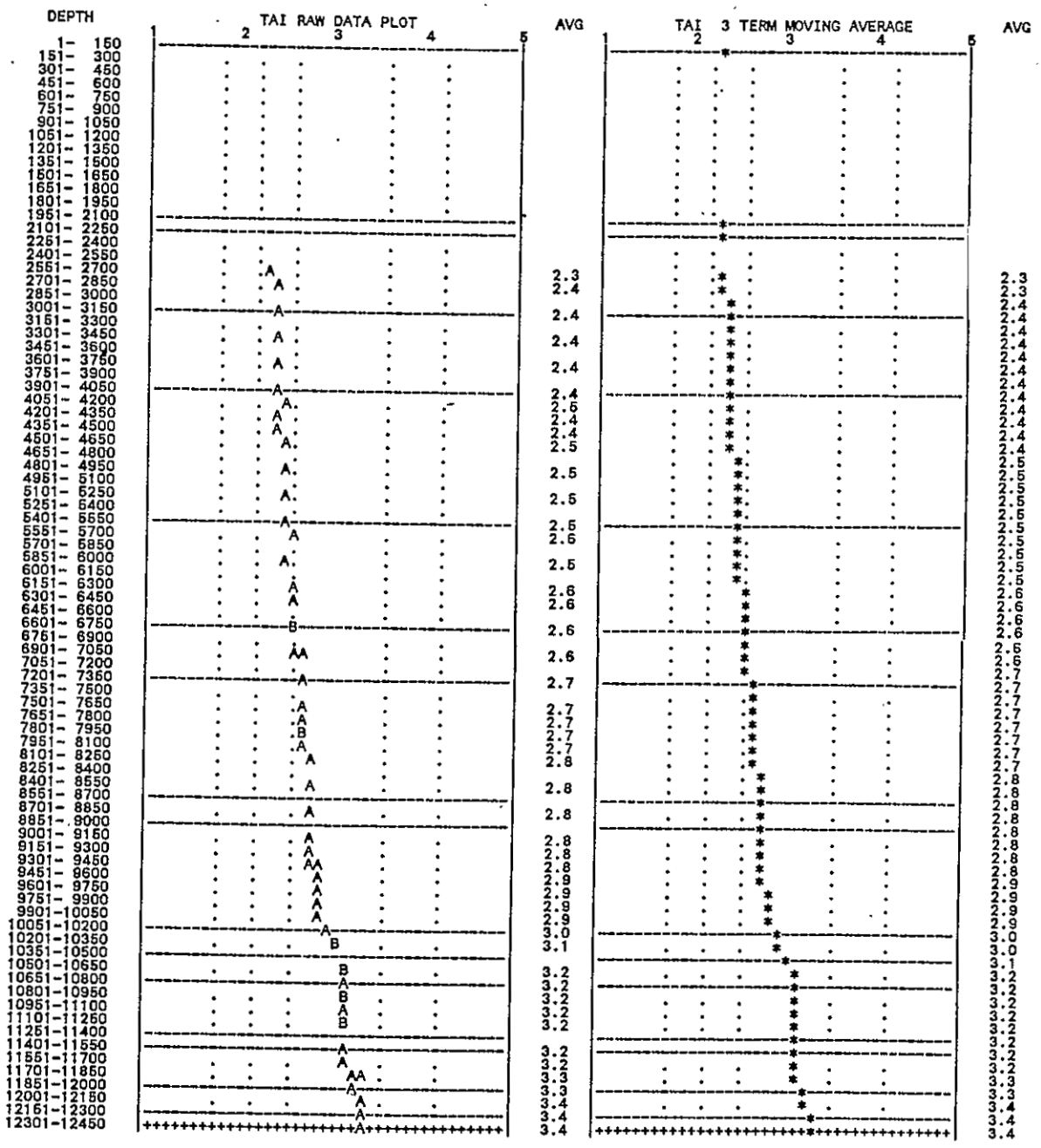


TABLE I

RESULTS OF TOTAL ORGANIC CARBON

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER WELL NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON (% of Rock)
3514-001	2500	1.73
3514-002	2600	2.77
3514-003	2700	0.61
3514-004	2800	1.20/1.17
3514-005	2900	0.51
3514-006	3000	0.15
3514-007	3100	0.19
3514-008	3200	0.15
3514-009	3300	0.38
3514-010	3400	0.26
3514-011	3500	0.35
3514-012	3600	0.40/0.40
3514-013	3700	1.01
3514-014	3800	0.67
3514-015	3900	0.65
3514-016	4000	0.98
3514-017	4100	3.08
3514-018	4200	1.67
3514-019	4300	0.83
3514-020	4400	1.30/1.27
3514-021	4500	0.75
3514-022	4600	1.01
3514-023	4700	0.55
3514-024	4800	0.78
3514-025	4900	0.98
3514-026	5000	0.63
3514-027	5100	0.32
3514-028	5200	1.16/1.15
3514-029	5300	0.78
3514-030	5400	0.34
3514-031	5500	2.05
3514-032	5600	1.33/1.33
3514-033	5700	0.68
3514-034	5800	1.12
3514-035	5900	2.86
3514-036	6000	1.36
3514-037	6100	0.96/0.93
3514-038	6200	6.04
3514-039	6300	3.04
3514-040	6400	0.84

TABLE I (continued)

RESULTS OF TOTAL ORGANIC CARBON

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER WELL NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON (% of Rock)
3514-041	6500	0.70
3514-042	6600	0.91
3514-043	6700	0.69
3514-044	6800	1.31
3514-045	6900	1.62/1.55
3514-046	7000	0.92
3514-047	7100	1.78
3514-048	7200	1.86
3514-049	7300	1.09
3514-050	7400	0.52
3514-051	7500	0.51/0.54
3514-052	7600	0.92
3514-053	7700	0.82
3514-054	7800	1.11
3514-055	7900	1.12
3514-056	8000	0.99
3514-057	8100	0.47
3514-058	8200	1.94
3514-059	8300	0.86
3514-060	8400	1.07/1.08
3514-061	8500	1.00
3514-062	8600	0.84
3514-063	8700	0.99
3514-064	8800	0.41
3514-065	8900	0.62
3514-066	9000	1.19
3514-067	9100	1.53
3514-068	9200	1.16
3514-069	9300	0.91/0.91
3514-070	9400	0.55
3514-071	9500	0.91
3514-072	9600	1.44
3514-073	9700	1.55
3514-074	9800	1.00
3514-075	9900	0.51
3514-076	10000	0.82
3514-077	10100	2.06
3514-078	10200	2.30
3514-079	10300	2.53
3514-080	10400	1.50

TABLE I (continued)

RESULTS OF TOTAL ORGANIC CARBON

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER WELL NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON (% of Rock)
3514-081	10500	1.38
3514-082	10600	0.97
3514-083	10700	0.20
3514-084	10800	0.27
3514-085	10900	0.58
3514-086	11000	0.36
3514-087	11100	1.20
3514-088	11200	0.73
3514-089	11300	0.59
3514-090	11400	0.32
3514-091	11500	0.44
3514-092	11600	0.78
3514-093	11700	4.85
3514-094	11800	1.04
3514-095	11900	0.89
3514-096	12000	0.40
3514-097	12100	1.66/1.65
3514-098	12200	1.70
3514-099	12300	2.02

TABLE I-A

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-001	-2500	75.1	167.1	174.7	297.4	429.2	1088.7	1143.7	1068.6	93.4	0.69
3514-002	-2600	151.1	329.8	1057.4	409.3	797.7	982.2	2745.5	2594.4	94.5	0.51
3514-003	-2700	48.1	87.4	203.0	107.5	223.7	609.0	670.0	621.8	92.8	0.48
3514-004	-2800	93.6	149.9	579.2	259.6	528.6	945.1	1611.1	1517.5	94.2	0.49
3514-005	-2900	108.0	155.6	628.8	236.0	481.0	1059.5	1609.6	1501.5	93.3	0.49
3514-006	-3000	146.2	203.6	309.4	127.8	278.6	1209.3	1065.8	919.6	86.3	0.46
3514-007	-3100	70.0	88.4	118.3	59.9	150.2	1101.3	487.0	417.0	85.6	0.40
3514-008	-3200	74.9	202.2	177.1	167.1	242.9	1234.7	864.3	789.4	91.3	0.69
3514-009	-3300	138.8	575.6	639.3	595.0	459.2	2286.8	2408.1	2269.2	94.2	1.30
3514-010	-3400	158.8	535.1	823.9	508.9	956.6	3688.1	2983.4	2824.5	94.7	0.53
3514-011	-3500	176.4	498.1	868.0	577.0	677.8	3903.5	2797.5	2621.1	93.7	0.85
3514-012	-3600	308.4	925.2	2247.0	908.3	1676.6	3612.4	6065.8	5757.4	94.9	0.54
3514-013	-3700	630.7	1402.3	4864.9	1916.1	4005.2	7116.3	12819.4	12188.7	95.1	0.48
3514-014	-3800	648.9	949.3	3183.3	1340.5	3101.5	8361.9	9223.7	8574.7	93.0	0.43
3514-015	-3900	467.7	552.4	1554.5	718.2	1578.1	4143.0	4871.2	4403.5	90.4	0.46
3514-016	-4000	988.8	1580.6	5014.3	1451.5	3524.9	6255.4	12560.2	11571.4	92.1	0.41
3514-017	-4100	5862.3	12963.4	24827.3	3502.7	8014.9	6340.7	55170.7	49308.3	89.4	0.44
3514-018	-4200	2765.6	4568.0	13988.8	2841.7	7173.5	8454.2	31337.8	28572.1	91.2	0.40
3514-019	-4300	1311.8	1131.3	3812.1	1162.7	3312.7	6930.2	10730.8	9419.0	87.8	0.35
3514-020	-4400	2776.5	2019.4	6801.4	2106.3	5590.0	11349.1	19293.7	16517.2	85.6	0.38
3514-021	-4500	1751.1	1033.9	2972.6	1383.2	3714.1	12677.3	10855.2	9104.0	83.9	0.37
3514-022	-4600	1469.9	1049.2	2921.6	1098.1	2849.8	9011.1	9388.7	7918.8	84.3	0.39
3514-023	-4700	898.2	696.7	1774.4	641.5	1687.7	6029.1	5698.7	4800.4	84.2	0.38
3514-024	-4800	1145.4	708.0	1921.2	847.1	2244.9	7467.8	6866.8	5721.4	83.3	0.38
3514-025	-4900	1723.3	1208.0	3507.5	1224.6	3166.4	6722.0	10829.9	9106.6	84.1	0.39
3514-026	-5000	2301.5	1227.5	2764.5	1252.6	3360.1	11203.2	10906.5	8604.9	78.9	0.37
3514-027	-5100	3238.6	1246.2	2358.1	1049.4	3117.9	8310.4	11010.5	7771.8	70.6	0.34
3514-028	-5200	3161.9	1614.5	3906.6	1451.7	4397.9	7623.7	14532.8	11370.9	78.2	0.33
3514-029	-5300	4122.5	1341.3	2402.9	976.1	2876.4	9271.3	11719.5	7596.9	64.8	0.34
3514-030	-5400	7519.1	7870.6	12384.1	4676.4	5386.0	6790.3	37836.4	30317.3	80.1	0.87
3514-031	-5500	9070.6	23724.8	24286.3	5723.2	6661.3	9248.3	69466.3	60395.7	86.9	0.86
3514-032	-5600	6509.1	11952.2	14727.6	4121.5	4850.6	5008.3	42161.2	35652.0	84.6	0.85
3514-033	-5700	5275.2	4528.1	3617.8	1816.1	2028.5	3333.6	17265.9	11990.6	69.4	0.90
3514-034	-5800	4193.2	11456.7	12572.6	3567.0	3663.9	4589.9	35453.6	31260.3	88.2	0.97
3514-035	-5900	13402.6	23245.8	8555.9	1823.8	1614.6	1608.7	48643.0	35240.3	72.4	1.13
3514-036	-6000	6346.1	13281.2	8851.2	2870.6	2793.9	3000.8	34143.2	27797.0	81.4	1.03
3514-037	-6100	5706.6	10824.0	9143.7	3514.4	3366.6	4459.3	32555.6	26848.9	82.5	1.04
3514-038	-6200	28953.9	58570.8	24075.6	4960.0	4261.7	4159.5	120822.3	91868.3	76.0	1.16
3514-039	-6300	9047.0	34725.6	19896.9	5619.9	4832.3	4508.3	74121.9	65074.8	87.8	1.16
3514-040	-6400	5072.8	7987.0	7292.5	2159.5	2098.0	3216.8	24609.9	19537.1	79.4	1.03
3514-041	-6500	7591.0	6031.5	5500.6	2676.9	2921.9	5421.3	24722.0	17131.0	69.3	0.92
3514-042	-6600	6144.2	5377.3	5850.2	1785.3	1825.9	3192.8	20983.2	14838.9	70.7	0.98
3514-043	-6700	4093.1	4439.9	5668.2	1926.9	2090.1	3979.2	18218.5	14125.3	77.5	0.92
3514-044	-6800	7085.2	12543.8	16114.8	4724.8	5055.6	7988.1	45524.4	38439.1	84.4	0.93
3514-045	-6900	6673.3	10645.8	12544.2	3613.7	3575.7	5210.6	37053.0	30379.6	82.0	1.01
3514-046	-7000	8534.2	9388.8	13490.3	4925.8	4735.0	8741.9	41074.3	32540.1	79.2	1.04
3514-047	-7100	14265.4	21624.3	27080.1	7005.2	6532.8	7501.3	76508.0	62242.5	81.4	1.07
3514-048	-7200	12885.9	25071.1	21380.3	7286.2	6231.3	5582.5	72855.0	59969.0	82.3	1.17

TABLE I-A

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-049	-7300	8013.7	10077.7	10432.8	4141.1	3750.9	4354.2	36416.4	28402.7	78.0	1.10
3514-050	-7400	1810.9	5263.0	7698.7	2327.1	2306.1	3787.7	19406.0	17595.0	90.7	1.01
3514-051	-7500	1617.4	5026.1	7325.9	1973.5	2121.6	3831.8	18064.7	16447.2	91.0	0.93
3514-052	-7600	4657.2	12463.3	11935.5	2178.0	2055.7	2692.3	33290.0	28632.7	86.0	1.06
3514-053	-7700	5338.5	12131.7	10955.6	1943.4	1847.7	2606.2	32217.1	26878.5	83.4	1.05
3514-054	-7800	4185.9	9080.8	6926.4	1350.3	1409.4	3481.6	22953.0	18767.0	81.8	0.96
3514-055	-7900	8032.3	24337.6	24551.6	4518.8	4529.6	7285.4	65970.2	57937.8	87.8	1.00
3514-056	-8000	5525.2	22604.9	27247.4	5950.7	5813.6	8393.3	67142.0	61616.7	91.8	1.02
3514-057	-8100	4542.3	13932.4	18069.4	3824.5	4081.2	5656.4	44450.1	39907.7	89.8	0.94
3514-058	-8200	6839.8	12803.9	31590.7	6553.6	16230.0	8857.2	74018.3	67178.4	90.8	0.40
3514-059	-8300	5986.0	5272.8	12085.2	2578.6	7010.4	4944.5	32933.2	26947.1	81.8	0.37
3514-060	-8400	6599.2	7347.3	19487.2	3908.6	11641.0	9620.6	48983.5	42384.2	86.5	0.34
3514-061	-8500	5987.5	5799.8	14045.8	2746.6	7799.7	7328.8	36379.7	30392.1	83.5	0.35
3514-062	-8600	6483.2	5201.1	14757.4	3606.1	10879.8	10817.9	40927.7	34444.4	84.2	0.33
3514-063	-8700	5780.4	6728.7	19035.3	4309.8	12562.7	8830.6	48417.1	42636.6	88.1	0.34
3514-064	-8800	2819.3	1756.9	5213.0	1841.9	5557.6	8681.3	17188.9	14369.5	83.6	0.33
3514-065	-8900	3683.5	3484.1	9876.6	2327.8	6501.3	5983.4	25873.5	22189.9	85.8	0.36
3514-066	-9000	7928.1	10990.4	33257.2	7003.8	19498.5	15980.3	78678.2	70750.1	89.9	0.36
3514-067	-9100	6295.6	11249.8	31673.9	5707.2	14736.6	9566.9	69663.3	63367.7	91.0	0.39
3514-068	-9200	5471.9	6939.1	19849.3	3820.3	10158.5	7025.2	46239.4	40767.4	88.2	0.38
3514-069	-9300	4889.8	4924.6	12812.1	2644.3	7164.1	6082.7	32435.2	27545.3	84.9	0.37
3514-070	-9400	2002.7	1408.3	3073.4	677.7	1745.4	1586.4	8907.7	6904.9	77.5	0.39
3514-071	-9500	5561.2	5676.1	11136.2	1998.9	4915.5	16929.0	29288.2	23726.9	81.0	0.41
3514-072	-9600	7661.8	9966.3	21541.8	3865.8	8685.5	5825.2	51721.5	44059.6	85.2	0.45
3514-073	-9700	8896.7	13887.5	26618.6	4361.5	10036.4	6854.8	63800.9	54904.2	86.1	0.43
3514-074	-9800	16083.2	18748.7	26107.4	4500.0	9227.0	6850.8	74666.5	58583.3	78.5	0.49
3514-075	-9900	21888.3	22531.8	25453.6	4203.5	8400.3	6221.2	82477.7	60589.3	73.5	0.50
3514-076	-10000	3105.9	3734.7	5762.4	1334.4	2881.3	4397.7	16818.9	13713.0	81.5	0.46
3514-077	-10100	69689.9	67807.7	47362.1	6267.5	10676.3	6676.0	201803.6	132113.7	65.5	0.59
3514-078	-10200	48326.6	55783.6	48068.6	6873.2	12233.5	8168.7	171285.8	122959.1	71.8	0.56
3514-079	-10300	40266.9	50254.9	43037.0	6155.1	10923.9	6173.4	150638.1	110371.2	73.3	0.56
3514-080	-10400	21923.4	27233.2	22024.9	3025.7	5835.4	4497.5	80042.7	58119.3	72.6	0.52
3514-081	-10500	71584.7	54381.6	32552.3	4222.5	7561.6	6605.5	170302.9	98718.1	58.0	0.56
3514-082	-10600	21320.7	17192.6	11588.0	1788.1	3260.0	3227.8	55149.5	33828.8	61.3	0.55
3514-083	-10700	13746.0	12168.7	11728.3	1785.9	3726.0	3244.5	43155.1	29409.1	68.1	0.48
3514-084	-10800	20395.1	10442.2	6378.7	1089.0	2221.3	2780.4	40526.5	20131.3	49.7	0.49
3514-085	-10900	34082.5	20445.2	10821.8	1680.4	3187.9	4239.9	70218.1	36135.5	51.5	0.53
3514-086	-11000	12142.6	8360.1	7849.9	2239.0	5981.8	10637.9	36573.5	24430.9	66.8	0.37
3514-087	-11100	44956.1	23436.1	8227.4	1038.8	1760.1	796.0	79418.6	34462.5	43.4	0.59
3514-088	-11200	35186.7	14424.1	5776.8	1141.2	2145.7	3344.6	58674.7	23488.0	40.0	0.53
3514-089	-11300	17917.4	12311.0	5470.4	887.3	1674.9	3724.4	38261.2	20343.8	53.2	0.53
3514-090	-11400	14310.4	4962.1	2263.3	405.0	806.2	2495.7	22747.3	8436.8	37.1	0.50
3514-091	-11500	24452.3	9003.2	4500.5	865.6	1919.2	5623.6	40741.0	16288.6	40.0	0.45
3514-092	-11600	46536.0	13606.7	4191.1	842.2	1439.8	5032.8	66615.9	20079.9	30.1	0.58
3514-093	-11700	121365.7	15665.5	3126.5	371.2	556.3	1323.4	141085.4	19719.7	14.0	0.67
3514-094	-11800	110096.7	25278.9	16993.5	3940.8	6530.3	8781.0	162840.4	52743.7	32.4	0.60
3514-095	-11900	165880.1	22100.4	5037.7	948.2	1338.8	3412.6	195305.5	29425.3	15.1	0.71
3514-096	-12000	82539.3	40010.6	27589.6	4689.1	9300.7	12140.5	164129.4	81590.1	49.7	0.50

TABLE I-A

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-097	-12100	177523.5	42501.4	20641.0	5660.1	8503.0	13133.9	254829.3	77305.7	30.3	0.67
3514-098	-12200	111102.2	24962.6	8693.3	1923.3	2797.3	5030.8	149478.9	38376.6	25.7	0.69
3514-099	-12300	89325.1	20989.4	5597.9	891.5	1395.6	2032.9	118199.7	28874.5	24.4	0.64

PPM values expressed as volumes of gas per million volumes of cuttings

TABLE I-B

C1-C7 HYDROCARBON ANALYSES OF CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-001	-2500	3122.9	38.6	86.4	217.5	353.9	710.0	3819.5	696.5	18.2	0.61
3514-002	-2600	3040.8	44.4	347.0	199.6	452.4	732.7	4084.4	1043.5	25.5	0.44
3514-003	-2700	2784.4	12.9	36.1	30.6	80.0	319.1	2944.2	159.8	5.4	0.38
3514-004	-2800	2306.4	18.1	113.8	84.7	209.6	514.1	2732.9	426.4	15.6	0.40
3514-005	-2900	2817.3	17.2	60.4	41.5	106.1	471.3	3042.6	225.3	7.4	0.39
3514-006	-3000	2835.2	23.4	22.6	14.1	29.1	386.7	2924.6	89.3	3.1	0.48
3514-007	-3100	2484.9	12.9	6.5	4.4	10.0	382.1	2518.8	33.9	1.3	0.44
3514-008	-3200	1934.0	15.5	13.0	14.0	27.3	662.9	2004.0	69.9	3.5	0.51
3514-009	-3300	2298.8	23.1	31.0	52.8	55.1	1275.8	2461.0	162.1	6.6	0.96
3514-010	-3400	2618.6	25.8	47.5	48.5	110.3	1764.8	2850.9	232.2	8.1	0.44
3514-011	-3500	2540.6	53.1	109.3	108.3	144.5	2892.8	2956.0	415.3	14.1	0.75
3514-012	-3600	2513.7	65.0	243.3	191.2	424.7	2530.8	3438.0	924.3	26.9	0.45
3514-013	-3700	2682.4	59.3	377.0	316.8	847.7	5090.3	4283.3	1600.9	37.4	0.37
3514-014	-3800	2264.3	29.7	150.2	127.7	390.1	4403.6	2962.2	697.8	23.6	0.33
3514-015	-3900	2838.6	234.4	164.4	127.7	364.1	3867.8	3729.4	890.8	23.9	0.35
3514-016	-4000	1655.4	65.1	361.5	211.9	622.2	3350.0	2916.4	1261.0	43.2	0.34
3514-017	-4100	2434.0	1377.6	17546.3	2232.7	5764.9	9442.4	29355.8	26921.7	91.7	0.39
3514-018	-4200	2090.5	348.0	2085.8	907.1	2783.1	7571.3	8214.7	6124.1	74.6	0.33
3514-019	-4300	1254.4	61.1	305.0	183.6	646.8	4576.9	2451.0	1196.6	48.8	0.28
3514-020	-4400	1532.9	194.9	997.2	638.5	2003.8	9467.9	5367.5	3834.5	71.4	0.32
3514-021	-4500	908.3	39.4	144.8	153.9	560.6	4406.4	1807.2	898.8	49.7	0.27
3514-022	-4600	1830.1	70.1	370.1	306.6	979.6	10001.6	3556.6	1726.4	48.5	0.31
3514-023	-4700	1995.3	49.3	168.0	120.6	389.8	4840.5	2723.1	727.8	26.7	0.31
3514-024	-4800	1759.3	77.3	315.5	181.6	564.0	7877.3	2898.0	1138.6	39.3	0.32
3514-025	-4900	1505.2	97.1	456.2	305.2	982.4	7336.7	3346.3	1841.1	55.0	0.31
3514-026	-5000	1848.5	76.3	273.6	250.3	838.3	12071.4	3287.2	1438.6	43.8	0.30
3514-027	-5100	1894.1	97.6	246.1	202.4	769.7	12150.7	3210.1	1316.0	41.0	0.26
3514-028	-5200	1282.3	95.7	341.3	229.2	870.3	7175.6	2818.9	1536.6	54.5	0.26
3514-029	-5300	1881.7	114.4	322.0	193.9	710.1	10756.9	3222.3	1340.6	41.6	0.27
3514-030	-5400	1314.8	144.5	485.3	432.8	1527.0	15388.9	3904.6	2589.7	66.3	0.28
3514-031	-5500	2100.6	661.7	2393.2	1214.1	4123.8	10991.0	10493.7	8393.0	80.0	0.29
3514-032	-5600	2630.5	728.1	1655.0	1063.2	3637.3	14151.3	9714.3	7083.7	72.9	0.29
3514-033	-5700	594.0	154.3	229.4	111.0	332.1	2217.9	1421.1	827.0	58.2	0.33
3514-034	-5800	3182.9	995.2	2050.1	1141.8	3261.8	11643.3	10632.0	7449.1	70.1	0.35
3514-035	-5900	3915.3	4442.1	14603.4	4294.7	10858.4	10108.5	38114.1	34198.7	89.7	0.40
3514-036	-6000	4101.5	1664.9	3387.9	1794.4	4610.0	7933.7	15558.9	11457.3	73.6	0.39
3514-037	-6100	4126.4	1586.1	2521.1	1282.4	3764.8	13825.8	13281.0	9154.5	68.9	0.34
3514-038	-6200	4697.2	6104.2	26661.6	9246.6	21308.6	19627.5	68018.4	63321.2	93.1	0.43
3514-039	-6300	3627.3	2377.4	11041.8	5093.8	13464.5	19348.8	35605.1	31977.8	89.8	0.38
3514-040	-6400	5850.9	1842.6	2086.5	1031.6	2650.0	10578.0	13461.9	7610.9	56.5	0.39
3514-041	-6500	3792.5	741.4	713.0	343.6	1027.5	5087.8	6618.2	2825.7	42.7	0.33
3514-042	-6600	4296.5	923.1	1116.5	546.0	1688.0	5429.4	8570.4	4273.8	49.9	0.32
3514-043	-6700	2716.5	377.1	668.2	457.1	1444.8	7434.2	5663.8	2947.3	52.0	0.32
3514-044	-6800	2219.9	433.6	1820.5	1344.3	4210.3	15953.5	10028.7	7808.7	77.9	0.32
3514-045	-6900	3025.8	713.4	1922.1	1329.1	3865.9	13811.3	10856.5	7830.7	72.1	0.34
3514-046	-7000	4273.5	1321.0	1426.2	968.0	2806.0	17467.6	10794.8	6521.3	60.4	0.34
3514-047	-7100	3443.8	1452.2	4723.2	3356.8	9473.1	21486.5	22449.3	19005.5	84.7	0.35
3514-048	-7200	3706.7	2034.4	8616.6	6593.7	17478.1	35072.2	38429.7	34722.9	90.4	0.38

TABLE I-B

C1-C7 HYDROCARBON ANALYSES OF CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-049	-7300	3053.5	985.7	3187.0	2669.4	7785.5	27474.3	17681.4	14627.8	82.7	0.34
3514-050	-7400	2040.0	254.8	922.7	797.6	2275.9	10630.5	6291.2	4251.2	67.6	0.35
3514-051	-7500	1996.4	191.9	822.3	743.2	2269.4	11090.4	6023.5	4027.0	66.9	0.33
3514-052	-7600	3330.9	860.0	3055.5	1966.5	5577.0	13804.8	14790.1	11459.1	77.5	0.35
3514-053	-7700	5167.6	1122.6	3067.3	2121.4	5572.9	12897.8	17051.9	11884.2	69.7	0.38
3514-054	-7800	4908.4	848.5	1860.9	1277.5	3438.8	11016.2	12334.4	7425.9	60.2	0.37
3514-055	-7900	3973.7	516.4	1532.6	1366.2	3785.5	10827.6	11174.6	7200.9	64.4	0.36
3514-056	-8000	3998.5	518.8	1823.9	1759.2	5001.7	15215.4	13102.3	9103.8	69.5	0.35
3514-057	-8100	5020.1	462.0	420.9	423.6	1346.8	11412.1	7673.6	2653.5	34.6	0.31
3514-058	-8200	3758.4	3589.5	21374.0	8885.3	22831.7	21139.4	60439.1	56680.7	93.8	0.39
3514-059	-8300	6070.3	1471.7	5427.2	3075.8	8848.9	15414.5	24894.1	18823.7	75.6	0.35
3514-060	-8400	6120.9	1224.3	4927.4	3006.4	8643.9	15953.2	23923.1	17802.2	74.4	0.35
3514-061	-8500	7230.1	2171.3	11098.9	6093.2	17656.4	27140.2	44250.1	37020.0	83.7	0.35
3514-062	-8600	7895.4	1321.4	3454.3	2443.5	7329.0	18087.7	22443.9	14548.5	64.8	0.33
3514-063	-8700	4813.4	895.1	3432.2	2088.9	6530.4	16495.9	17760.2	12946.7	72.9	0.32
3514-064	-8800	2319.4	147.3	666.5	655.5	2162.6	11631.4	5951.6	3632.1	61.0	0.30
3514-065	-8900	3043.2	539.9	3701.6	2927.0	8692.7	20570.8	18904.5	15861.3	83.9	0.34
3514-066	-9000	3211.9	977.3	7074.4	4592.1	13778.9	25544.5	29634.8	26422.9	89.2	0.33
3514-067	-9100	3653.2	2335.1	19431.2	9761.2	26121.0	31308.8	61301.9	57648.7	94.0	0.37
3514-068	-9200	3443.1	1322.4	8658.1	4736.6	13032.1	20703.1	31192.5	27749.4	89.0	0.36
3514-069	-9300	3734.9	670.1	3693.6	2433.0	6814.8	14875.5	17346.5	13611.6	78.5	0.36
3514-070	-9400	3196.7	346.1	1070.1	565.5	1713.6	4731.5	6892.3	3695.5	53.6	0.33
3514-071	-9500	2993.5	1107.4	5612.7	2561.9	6872.2	12526.1	19147.9	16154.4	84.4	0.37
3514-072	-9600	3625.5	2169.3	3322.8	7092.1	16583.4	21288.3	32793.4	29167.8	88.9	0.43
3514-073	-9700	7175.1	6526.6	43653.9	18381.8	40197.9	35647.1	115935.4	108760.3	93.8	0.46
3514-074	-9800	4945.9	3836.6	19278.1	7663.3	16998.5	15181.3	52722.5	47776.6	90.6	0.45
3514-075	-9900	3624.7	1014.8	3049.9	1476.0	3700.1	7426.6	12865.6	9240.9	71.8	0.40
3514-076	-10000	5297.7	630.3	1205.8	505.4	1321.7	4784.5	8961.2	3663.5	40.9	0.38
3514-077	-10100	6247.2	13128.9	30354.6	8246.7	14773.2	11386.5	72750.8	66503.6	91.4	0.56
3514-078	-10200	5037.9	8234.9	22195.6	6727.2	13056.4	13198.2	55252.3	50214.3	90.9	0.52
3514-079	-10300	6200.3	12384.7	31882.1	8878.8	16734.4	15223.6	76080.4	69880.1	91.9	0.53
3514-080	-10400	5678.5	7675.4	20902.4	5861.7	11992.8	11858.4	52111.0	46432.5	89.1	0.49
3514-081	-10500	5956.5	4834.6	8773.7	2283.5	4917.0	7370.9	26765.5	20809.0	77.7	0.46
3514-082	-10600	4884.6	5112.4	10072.3	2973.0	6092.4	7485.5	29134.9	24250.3	83.2	0.49
3514-083	-10700	2547.4	361.6	1022.9	403.4	962.4	2073.1	5297.9	2750.4	51.9	0.42
3514-084	-10800	4684.6	1087.6	1080.9	238.6	608.6	1725.4	7700.6	3015.9	39.2	0.39
3514-085	-10900	2865.8	1732.0	1602.9	345.8	900.8	1705.5	7447.5	4581.6	61.5	0.38
3514-086	-11000	3382.4	1224.4	1740.4	827.3	2250.6	10305.1	9425.5	6043.0	64.1	0.37
3514-087	-11100	6104.4	7354.2	4398.6	637.9	1361.9	1964.3	19857.2	13752.8	69.3	0.47
3514-088	-11200	3850.0	1915.0	1046.9	212.7	552.5	3071.7	7577.4	3727.3	49.2	0.38
3514-089	-11300	3706.8	2630.3	1878.5	360.4	903.0	2925.9	9479.1	5772.3	60.9	0.40
3514-090	-11400	4848.3	1226.3	870.0	161.6	456.7	2500.7	7563.1	2714.8	35.9	0.35
3514-091	-11500	4723.9	2195.2	1559.3	336.1	970.9	4654.2	9785.6	5061.6	51.7	0.35
3514-092	-11600	6779.4	4156.2	1813.7	434.1	980.4	6327.8	14164.0	7384.6	52.1	0.44
3514-093	-11700	118387.5	12163.4	1017.5	82.0	88.7	109.5	131739.4	13351.8	10.1	0.92
3514-094	-11800	15282.6	5989.9	5752.3	3167.8	5573.6	14682.0	35766.4	20483.8	57.3	0.57
3514-095	-11900	25912.5	6200.0	1386.7	297.5	580.4	4380.1	34377.2	8464.7	24.6	0.51
3514-096	-12000	6859.6	6319.1	12750.6	4435.6	9678.4	19089.1	40043.5	33183.9	82.9	0.46

TABLE I-B

C1-C7 HYDROCARBON ANALYSES OF CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-097	-12100	17990.2	8810.6	5030.1	2344.1	4104.2	15375.3	38279.4	20289.1	53.0	0.57
3514-098	-12200	21626.8	12532.7	4075.3	955.9	1734.7	6608.2	40925.7	19298.8	47.2	0.55
3514-099	-12300	22421.2	11603.1	3455.4	710.1	1509.5	4042.3	39699.5	17278.2	43.5	0.47

PPM values expressed as volumes of gas per million volumes of cuttings

TABLE I-C

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE AND CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-001	-2500	3198.1	205.7	261.1	515.0	783.2	1798.7	4963.2	1765.1	35.6	0.66
3514-002	-2600	3192.0	374.2	1404.4	609.0	1250.2	1715.0	6830.0	3637.9	53.3	0.49
3514-003	-2700	2832.5	100.4	239.2	138.2	303.8	928.2	3614.2	781.7	21.6	0.46
3514-004	-2800	2400.1	168.0	693.0	344.4	738.3	1459.2	4344.1	1943.9	44.7	0.47
3514-005	-2900	2925.3	172.8	689.2	277.5	587.1	1530.8	4652.2	1726.8	37.1	0.47
3514-006	-3000	2981.5	227.1	332.0	141.9	307.8	1596.0	3990.5	1009.0	25.3	0.46
3514-007	-3100	2554.9	101.4	124.8	64.3	160.3	1483.5	3005.9	451.0	15.0	0.40
3514-008	-3200	2008.9	217.7	190.2	181.1	270.2	1897.7	2868.3	859.4	30.0	0.67
3514-009	-3300	2437.7	598.7	670.4	647.8	514.3	3562.7	4869.1	2431.4	49.9	1.26
3514-010	-3400	2777.5	560.9	871.4	557.4	1067.0	5452.9	5834.3	3056.8	52.4	0.52
3514-011	-3500	2717.0	551.2	977.4	685.3	822.4	6796.4	5753.5	3036.4	52.8	0.83
3514-012	-3600	2822.1	990.3	2490.4	1099.5	2101.4	6143.3	9503.9	6681.7	70.3	0.52
3514-013	-3700	3313.1	1461.6	5242.0	2233.0	4852.9	12206.7	17102.8	13789.7	80.6	0.46
3514-014	-3800	2913.2	979.0	3333.6	1468.2	3491.6	12765.5	12185.9	9272.6	76.1	0.42
3514-015	-3900	3306.3	786.9	1719.0	845.9	1942.3	8010.9	8600.6	5294.3	61.6	0.44
3514-016	-4000	2644.2	1645.8	5375.8	1663.5	4147.2	9605.4	15476.7	12832.4	82.9	0.40
3514-017	-4100	8296.4	14341.0	42373.7	5735.4	13779.9	15783.2	84526.5	76230.1	90.2	0.42
3514-018	-4200	4856.2	4916.1	16074.6	3748.9	9956.6	16025.6	39552.5	34696.3	87.7	0.38
3514-019	-4300	2566.2	1192.5	4117.1	1346.3	3959.6	11507.1	13181.9	10615.7	80.5	0.34
3514-020	-4400	4309.4	2214.3	7798.6	2744.8	7593.8	20817.1	24661.2	20351.8	82.5	0.36
3514-021	-4500	2659.5	1073.4	3117.5	1537.1	4274.7	17083.7	12662.5	10002.9	79.0	0.36
3514-022	-4600	3300.0	1119.3	3291.8	1404.7	3829.4	19012.7	12945.4	9645.3	74.5	0.37
3514-023	-4700	2893.5	746.1	1942.4	762.1	2077.5	10869.7	8421.8	5528.3	65.6	0.37
3514-024	-4800	2904.7	785.4	2236.8	1028.7	2808.9	15345.2	9764.8	6860.0	70.3	0.37
3514-025	-4900	3228.6	1305.2	3963.7	1529.9	4148.8	14058.7	14176.3	10947.7	77.2	0.37
3514-026	-5000	4150.1	1303.9	3038.1	1503.0	4198.4	23274.6	14193.7	10043.5	70.8	0.36
3514-027	-5100	5132.8	1343.9	2604.3	1251.9	3887.7	20461.1	14220.7	9087.8	63.9	0.32
3514-028	-5200	4444.2	1710.3	4248.0	1680.9	5268.2	14799.3	17351.8	12907.5	74.4	0.32
3514-029	-5300	6004.2	1455.8	2725.0	1170.0	3586.6	20028.3	14941.8	8937.6	59.8	0.33
3514-030	-5400	8834.0	8015.2	12869.5	5109.2	6913.0	22179.3	41741.0	32907.0	78.8	0.74
3514-031	-5500	11171.2	24386.6	26679.5	6937.4	10785.2	20239.3	79960.1	68788.8	86.0	0.64
3514-032	-5600	9139.6	12680.3	16382.7	5184.7	8487.9	19159.6	51875.5	42735.8	82.4	0.61
3514-033	-5700	5869.3	4682.5	3847.3	1927.2	2360.6	5551.5	18687.1	12817.7	68.6	0.82
3514-034	-5800	7376.1	12451.9	14622.7	4708.9	6925.7	16233.3	46085.6	38709.4	84.0	0.68
3514-035	-5900	17318.0	27687.9	23159.4	6118.5	12473.1	11717.2	86757.2	69439.1	80.0	0.49
3514-036	-6000	10447.7	14946.1	12239.1	4665.0	7404.0	10934.5	49702.1	39254.4	79.0	0.63
3514-037	-6100	9833.1	12410.2	11664.8	4796.8	7131.5	18285.1	45836.6	36003.5	78.5	0.67
3514-038	-6200	33651.1	64675.0	50737.3	14206.6	25570.4	23787.1	188840.7	155189.5	82.2	0.56
3514-039	-6300	12674.4	37103.1	30938.8	10713.8	18296.9	23857.2	109727.1	97052.7	88.4	0.59
3514-040	-6400	10923.8	9829.6	9379.1	3191.2	4748.0	13794.8	38071.9	27148.1	71.3	0.67
3514-041	-5500	11333.5	5772.9	6213.7	3020.5	3949.5	10509.2	31340.2	19956.7	63.7	0.76
3514-042	-6600	10440.8	6300.5	6966.7	2331.3	3514.0	8622.3	29553.6	19112.7	64.7	0.66
3514-043	-6700	6809.7	4817.0	6336.5	2384.1	3535.0	11413.5	23882.4	17072.7	71.5	0.67
3514-044	-6800	9305.2	12977.4	17935.3	6069.2	9265.9	23941.6	55553.1	46247.9	83.2	0.65
3514-045	-6900	9699.2	11359.3	14466.4	4942.9	7441.7	19021.9	47909.6	38210.3	79.8	0.66
3514-046	-7000	12807.7	10709.9	14916.6	5893.8	7541.1	26209.5	51869.2	39061.5	75.3	0.78
3514-047	-7100	17709.3	23076.6	31803.3	10362.1	16006.0	28987.8	98957.4	81248.1	82.1	0.65
3514-048	-7200	16592.7	27105.6	29996.9	13880.0	23709.4	40654.7	111284.8	94692.0	85.1	0.59

TABLE I-C

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE AND CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-049	-7300	11067.2	11063.4	13619.9	6810.6	11536.5	31828.5	54097.8	43030.6	79.5	0.59
3514-050	-7400	3851.0	5517.8	8621.4	3124.8	4582.0	14418.3	25697.2	21846.2	85.0	0.68
3514-051	-7500	3613.8	5218.1	8148.2	2716.8	4391.1	14922.2	24088.2	20474.3	85.0	0.62
3514-052	-7600	7988.2	13323.3	14991.0	4144.6	7632.8	16497.2	48080.1	40091.9	83.4	0.54
3514-053	-7700	10506.2	13254.3	14022.9	4064.8	7420.6	15504.0	49269.0	38762.8	78.7	0.55
3514-054	-7800	9094.4	9929.3	8787.3	2627.9	4848.3	14497.8	35287.4	26193.0	74.2	0.54
3514-055	-7900	12006.0	24854.1	26084.2	5885.1	8315.2	18113.0	77144.9	65138.8	84.4	0.71
3514-056	-8000	9523.8	23123.7	29071.4	7709.9	10815.3	23608.7	80244.4	70720.5	88.1	0.71
3514-057	-8100	9562.4	14394.5	18490.4	4248.2	5428.1	17068.6	52123.8	42561.3	81.7	0.78
3514-058	-8200	10598.2	16393.5	52964.8	15439.0	39061.7	29996.6	134457.4	123859.2	92.1	0.40
3514-059	-8300	12056.4	6744.6	17512.4	5654.5	15859.3	20359.1	57827.3	45770.9	79.2	0.36
3514-060	-8400	12720.2	8571.7	24414.6	6915.0	20284.9	25573.9	72906.6	60186.4	82.6	0.34
3514-061	-8500	13217.7	7971.1	25144.8	8839.9	25456.2	34469.1	80629.9	67412.2	83.6	0.35
3514-062	-8600	14378.6	6522.6	18211.8	6049.6	18208.8	28905.6	63371.6	48993.0	77.3	0.33
3514-063	-8700	10593.9	7623.9	22467.5	6398.7	19093.1	25326.6	66177.4	55583.4	84.0	0.34
3514-064	-8800	5138.7	1904.3	5879.5	2497.4	7720.2	20312.7	23140.5	18001.7	77.8	0.32
3514-065	-8900	6726.8	4024.0	13578.3	5254.9	15194.0	26554.2	44778.1	38051.3	85.0	0.35
3514-066	-9000	11140.0	11967.7	40331.6	11596.0	33277.5	41524.8	108313.1	97173.0	89.7	0.35
3514-067	-9100	9948.8	13585.0	51105.1	15468.4	40857.7	40875.8	130965.3	121016.4	92.4	0.38
3514-068	-9200	8915.1	8261.5	28507.5	8557.0	23190.6	27728.4	77432.0	68516.9	88.5	0.37
3514-069	-9300	8624.8	5594.7	16505.7	5077.4	13979.0	20958.3	49781.8	41157.0	82.7	0.36
3514-070	-9400	5199.5	1754.5	4143.6	1243.3	3459.1	6318.0	15800.1	10600.5	67.1	0.36
3514-071	-9500	8554.8	6783.5	16749.0	4560.9	11787.7	29455.1	48436.2	39881.3	82.3	0.39
3514-072	-9600	11287.4	12135.7	24864.7	10958.0	25268.9	27113.5	84514.9	73227.5	86.6	0.43
3514-073	-9700	16071.8	20414.1	70272.5	22743.4	50234.3	42501.9	179736.4	163664.5	91.1	0.45
3514-074	-9800	21029.1	22585.4	45385.6	12163.3	26225.5	22032.2	127389.1	106359.9	83.5	0.46
3514-075	-9900	25513.1	23546.6	28503.5	5679.6	12100.4	13647.9	95343.3	69830.2	73.2	0.47
3514-076	-10000	8403.7	4365.1	6968.2	1839.9	4203.1	9182.2	25780.2	17376.5	67.4	0.44
3514-077	-10100	75937.1	80936.6	77716.7	14514.2	25449.6	18062.6	274554.5	198617.3	72.3	0.57
3514-078	-10200	53364.6	64018.6	70264.3	13600.5	25289.9	21367.0	226538.1	173173.5	76.4	0.54
3514-079	-10300	46467.3	62639.7	74919.1	15034.0	27658.3	21397.1	226718.6	180251.3	79.5	0.54
3514-080	-10400	27601.9	34908.6	42927.4	8887.4	17828.3	16355.9	132153.8	104551.8	79.1	0.50
3514-081	-10500	77541.3	59216.2	41326.1	6506.0	12478.7	13976.4	197068.4	119527.1	60.7	0.52
3514-082	-10600	26205.3	22305.0	21660.4	4761.1	9352.4	10713.4	84284.5	58079.1	68.9	0.51
3514-083	-10700	16293.5	12530.3	12751.3	2189.3	4688.5	5317.6	48453.1	32159.5	66.4	0.47
3514-084	-10800	25079.8	11529.8	7459.7	1327.6	2830.0	4505.9	48227.1	23147.3	48.0	0.47
3514-085	-10900	36948.3	22177.3	12424.7	2026.2	4088.8	5945.5	77665.6	40717.2	52.4	0.50
3514-086	-11000	15525.0	9584.6	9590.4	3066.3	8232.5	20943.0	45999.1	30474.0	66.2	0.37
3514-087	-11100	51060.6	30790.3	12626.0	1676.8	3122.0	2760.3	99275.9	48215.3	48.6	0.54
3514-088	-11200	39036.7	16339.2	6823.8	1354.0	2698.2	6416.3	66252.1	27215.4	41.1	0.50
3514-089	-11300	21624.2	14941.3	7348.9	1247.7	2578.0	6650.3	47740.3	26116.1	54.7	0.48
3514-090	-11400	19158.8	6188.5	3133.3	566.6	1263.0	4996.4	30310.4	11151.6	36.8	0.45
3514-091	-11500	29176.3	11198.4	6059.9	1201.7	2890.1	10277.9	50526.6	21350.3	42.3	0.42
3514-092	-11600	53315.4	17763.0	6004.8	1276.3	2420.3	11360.6	80780.0	27464.5	34.0	0.53
3514-093	-11700	239753.2	27829.0	4144.0	453.2	645.1	1433.0	272824.8	33071.5	12.1	0.70
3514-094	-11800	125379.3	31268.9	22745.8	7108.7	12104.0	23463.0	198606.9	73227.5	36.9	0.59
3514-095	-11900	191792.6	28300.4	6424.5	1245.8	1919.2	7792.8	229682.7	37890.0	16.5	0.65
3514-096	-12000	89398.9	46329.7	40340.3	9124.8	18979.2	31229.6	204173.0	114774.1	56.2	0.48

TABLE I-C

C1-C7 HYDROCARBON ANALYSES OF AIR SPACE AND CUTTINGS GAS

GeoChem Sample Number	Well Interval*	Methane C1 PPM	Ethane C2 PPM	Propane C3 PPM	Isobutane iC4 PPM	Butane nC4 PPM	Total C5-C7 PPM	Total C1-C4 PPM	Total C2-C4 PPM	Gas Wetness %	iC4/nC4
3514-097	-12100	195513.8	51312.1	25671.1	8004.2	12607.3	28509.2	293108.7	97594.9	33.3	0.63
3514-098	-12200	132729.1	37495.4	12768.7	2879.2	4532.0	11639.0	190404.6	57675.4	30.3	0.64
3514-099	-12300	111746.4	32592.6	9053.3	1601.6	2905.1	6075.3	157899.2	46152.7	29.2	0.55

PPM values expressed as volumes of gas per million volumes of cuttings

NOTE on Lithologic Descriptions

This report summarized the analyses carried out on this well in April of 1987 as well as the analyses completed in January 1988. There is a minor reevaluation of the lithologic descriptions as discussed below.

First, it should be stated that the cuttings from this well were uniformly very fine grained (about 0.30 to 0.40mm) which made lithologic descriptions quite difficult. The lithologic descriptions that were made in April 1987 (sample numbers 31,32,38,43,46,55,61,68 to 71,74,75,77,78,79,81 to 84,86,87,91 to 95,97, 98 and 99) remain unchanged. The lithologic descriptions that were made in January 1988 show a minor change in interpretation which is shown below. The lithologic description for samples -031 and -032 (described in April 1987) reads as follows:

60% Limestone, cryptocrystalline,
white to pale brown.
40% Limestone, clayey, carbonaceous,
dolomitic?, cryptocrystalline,
brownish black.

The lithologic description for sample -033 (described in January 1988) reads as follows:

100% Limestone, cryptocrystalline,
white to pale brown, about
40% of cuttings are stained
brownish black with heavy
hydrocarbons or dead oil
(shows cut flourescence).

Due to the small size of the cuttings it is difficult to evaluate the black material in these samples but because of the cut flourescence, we have interpreted the black material to be stained with dead oil or heavy hydrocarbons rather than being a separate highly carbonaceous lithologic type.

TABLE II

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-001	2500			2.05
-A		60% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
-B		40% Sandstone, very fine grained, calcareous, clear to white.	N9	
3514-002	2600			2.77
-A		60% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
-B		40% Sandstone, very fine grained, calcareous, clear to white.	N9	
3514-003	2700			0.61
-A		70% Sandstone, very fine grained, calcareous, clear to white.	N9	
-B		30% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
3514-004	2800			1.20/1.17
-A		60% Sandstone, very fine grained, calcareous, clear to white.	N9	
-B		40% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
3514-005	2900			0.51
-A		70% Sandstone, very fine grained, calcareous, clear to white.	N9	
-B		30% Shale, very silty, very micaceous, carbonanceous, brownish black.	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-006	3000			0.15
-A		75% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		20% Sandstone, very fine grained, calcareous, clear to white.	N9	
-C		5% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
3514-007	3100			0.19
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		5% Sandstone, very fine grained, calcareous, clear to white.	N9	
-C		5% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
3514-008	3200			0.15
-A		95% Sandstone, very fine grained, calcareous, clear to white.	N9	
-B		5% Shale, very silty, very micaceous, carbonaceous, brownish black.	5YR-2/1	
3514-009	3300			0.38
-A		100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-010 -A	3400	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.26
3514-011 -A	3500	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.35
3514-012 -A	3600	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence) Trace black shale.	N9	0.40/0.40
3514-013 -A	3700	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	1.01
3514-014 -A	3800	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.67
3514-015 -A	3900	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.65

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-016 -A	4000	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.98
3514-017 -A	4100	100% Sandstone, calcareous, very fine grained, clear to white. 40-50% of cuttings show dead oil (shows cut flourescence)	N9	3.08
3514-018 -A	4200	100% Sandstone, calcareous, very fine grained, clear to white. 30-40% of cuttings show dead oil (shows cut flourescence)	N9	1.67
3514-019 -A	4300	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.83
3514-020 -A	4400	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	1.30/1.27
3514-021 -A	4500	100% Sandstone, calcareous, very fine grained, clear to white. 10-15% of cuttings show dead oil (shows cut flourescence)	N9	0.75

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-022 -A	4600	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	1.01
3514-023 -A	4700	100% Sandstone, calcareous, very fine grained, clear to white. Trace of cuttings showing dead oil	N9	0.55
3514-024 -A	4800	100% Sandstone, calcareous, very fine grained, clear to white. Trace of cuttings showing dead oil	N9	0.78
3514-025 -A	4900	100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	0.98
3514-026 -A	5000	100% Sandstone, calcareous, very fine grained, clear to white. 10-15% of cuttings show dead oil (shows cut flourescence)	N9	0.63
3514-027 -A	5100	100% Sandstone, calcareous, very fine grained, clear to white. Trace of cuttings showing dead oil	N9	0.32

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-028	5200			1.16/1.15
-A		100% Sandstone, calcareous, very fine grained, clear to white. 20-25% of cuttings show dead oil (shows cut flourescence)	N9	
3514-029	5300			0.78
-A		100% Sandstone, calcareous, very fine grained, clear to white. 5-10% of cuttings show dead oil (shows cut flourescence)	N9	
3514-030	5400			0.34
-A		100% Sandstone, fine grained, clear to white.	N9	
3514-031	5500			2.05
-A		60% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		40% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-032	5600			1.33/1.33
-A		60% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		40% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-033	5700			0.68
-A		100% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		About 40% of cuttings are stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-034	5800			1.12
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		70-80% of cuttings are stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-035	5900			2.86
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		70-80% of cuttings are stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-036	6000			1.36
-A		100% Limestone, cryuptocrystalline, pale brown.	5YR-5/2	
		90% of cuttings stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence)	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-037	6100			0.96/0.93
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		70% of cuttings stained brownish black heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-038	6200			6.04
-A		90% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
-B		10% Limestone, cryptocrystalline, white to pale brown. Trace of pyrite.	N9 to 5YR-5/2	
3514-039	6300			3.04
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		90% of cuttings stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence)	5YR-2/1	
3514-040	6400			0.84
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		50% of cuttings stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-041	6500			0.70
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		50% of cuttings stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-042	6600			0.91
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		50% of cuttings stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-043	6700			0.69
-A		75% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		15% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
-C		10% Anhydrite? cryptocrystalline, white stricked with dark gray.	N9	
3514-044	6800			1.31
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		About 30% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-045	6900			1.62/1.55
-A		100% Limestone, cryptocrystalline, pale brown. About 50% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-5/2 5YR-2/1	
3514-046	7000			0.92
-A		80% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		20% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-047	7100			1.78
-A		100% Limestone, cryptocrystalline, pale brown. About 70% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescene)	5YR-5/2 5YR-2/1	
3514-048	7200			1.86
-A		100% Limestone, cryptocrystalline, pale brown. About 70% stained brownish black with heavy hydrocarbons or dead-oil (shows cut flourescence)	5YR-5/2	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-049	7300			1.09
-A		100% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		About 50% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-050	7400			0.52
-A		60% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		About 20% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
-B		20% Anhydrite? cryptocrystalline, white with grey streaks.	N9	
-C		20% Sandstone, very fine grained, white.	N9	
3514-051	7500			0.51/0.54
-A		50% Sandstone, very fine grained, white.	N9	
-B		20% Anhydrite? cryptocrystalline, white with grey streaks.	N9	
-C		30% Limestone, cryptocrystalline, pale brown.	5YR-5/2	
		About 10% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-052 -A	7600	100% Limestone, cryptocrystalline, pale brown. About 30% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence) Trace anhydrite?	5YR-5/2 5YR-2/1	0.92
3514-053 -A	7700	100% Limestone, cryptocrystalline, pale brown. About 30% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence) Trace anhydrite?	5YR-5/2 5YR-2/1	0.82
3514-054 -A	7800	100% Limestone, cryptocrystalline, pale brown. About 30% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence) Trace anhydrite?	5YR-5/2 5YR-2/1	1.11
3514-055 -A	7900	100% Limestone, clayey, carbonaceous, pale brown to brownish black.	5YR-5/2 to 5YR-2/1	1.12
3514-056 -A	8000	100% Limestone, cryptocrystalline, pale yellowish, About 50% stained brownish black with heavy hydrocarbon on dead oil (shows cut flourescence). Trace sandstone.	10YR-6/2 5YR-2/1	0.99

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-057 -A	8100	100% Limestone, cryptocrystalline, pale yellowish brown, about 50% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence). Trace sandstone.	10YR-6/2 5YR-2/1	0.47
3514-058 -A	8200	100% Limestone, cryptocrystalline, pale yellowish brown, about 50% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	1.94
3514-059 -A	8300	100% Limestone, cryptocrystalline, pale yellowish brown, about 50% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence). Trace sandstone.	10YR-6/2 5YR-2/1	0.86
3514-060 -A	8400	100% Limestone, cryptocrystalline, pale yellowish brown, about 50% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	1.07/1.08

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-061	8500			1.00
-A		70% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		30% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-062	8600			0.84
-A		100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	
3514-063	8700			0.99
-A		100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	
3514-064	8800			0.41
-A		100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-065 -A	8900	100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon on dead oil (shows cut flourescene).	10YR-6/2 5YR-2/1	0.62
3514-066 -A	9000	100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon on dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	1.19
3514-067 -A	9100	100% Limestone, cryptocrystalline, pale yellowish brown, about 50% stained brownish black with heavy hydrocarbon on dead oil (shows cut flourescence).	10YR-6/2 5YR-2/1	1.53

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-068	9200			1.16
-A		60% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		40% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-069	9300			0.91/0.91
-A		70% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		30% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-070	9400			0.55
-A		90% Limestone, cryptocrystalline, very light gray to medium gray.	N8 to N5	
-B		10% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-071	9500			0.91
-A		80% Limestone, cryptocrystalline, very light gray to medium gray.	N8 to N5	
-B		20% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-072	9600			1.44
-A		100% Limestone, cryptocrystalline, pale yellowish brown.	10YR-6/2	
		About 20% stained brownish black with heavy hydrocarbons or dead oil (shows cut (flourescence)	5YR-2/1	
3514-073	9700			1.55
-A		100% Limestone, cryptocrystalline, pale yellowish brown.	10YR-6/2	
		About 40% stained brownish black with heavy hydrocarbons or dead oil (shows cut flourescence)	5YR-2/1	
3514-074	9800			1.00
-A		60% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		40% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-075	9900			0.51
-A		60% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		40% Limestone, clayey, carbonaceous, dolomitic?, cryptocrystalline, brownish black.	5YR-2/1	
3514-076	10000			0.82
-A		100% Limestone, cryptocrystalline, pale yellowish brown, about 30% stained brownish black with heavy hydrocarbon or dead oil (shows cut flourescence).	N9 to 5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-077	10100			2.06
-A		90% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		10% Limestone, cryptocrystalline, white to pale brown. Trace pyrite.	N9 to 5YR-5/2	
3514-078	10200			2.30
-A		90% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		10% Limestone, cryptocrystalline, white to pale brown. Trace pyrite.	N9 to 5YR-5/2	
3514-079	10300			2.53
-A		90% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		10% Limestone, cryptocrystalline, white to pale brown. Trace pyrite.	N9 to 5YR-5/2	
3514-080	10400			1.50
-A		100% Shale, calcareous, carbonaceous, brownish black (shows very faint cut flourescene). Trace limestone.	5YR-2/1	
3514-081	10500			1.38
-A		90% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		10% Limestone, cryptocrystalline, white to pale brown. Trace pyrite.	N9 to 5YR-5/2	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-082	10600			0.97
-A		50% Limestone, cryptocrystalline, very light gray to medium gray.	N8 to N5	
-B		50% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-083	10700			0.20
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-084	10800			0.27
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-085	10900			0.58
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-086	11000			0.36
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-087	11100			1.20
-A		80% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		20% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
3514-088	11200			0.73
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-089	11300			0.59
-A		90% Limestone, crypotocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-090	11400			0.32
-A		90% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-B		10% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-091	11500			0.44
-A		100% Limestone, clayey, carbonaceous, pale brown to brownish black.	5YR-5/2 to 5YR-2/1	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-092	11600			0.78
-A		60% Limestone, cryptocrystalline, carbonaceous, brownish black.	5YR-2/1	
-B		40% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
3514-093	11700			4.85
-A		35% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		30% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
-C		30% Sandstone, calcareous, very fine grained, very light gray to clear.	N8	
-D		5% Coal, black.	N1	
3514-094	11800			1.04
-A		45% Sandstone, calcareous, very fine grained, very light gray to clear.	N8	
-B		30% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-C		25% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	
3514-095	11900			0.89
-A		75% Sandstone, calcareous, very fine grained, very light gray to clear.	N8	
-B		20% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-C		5% Limestone, cryptocrystalline, white to pale brown.	N9 to 5YR-5/2	

TABLE II (continued)

LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

SANTA FE ENERGY OPERATING PARTNERS, ROHMER #1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	LITHO DESCRIPTION	GSA NO.	ORGANIC CARBON (wt.%)
3514-096	12000			0.40
-A		95% Sandstone, calcareous, very fine grained, white to clear.	N9	
-B		5% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
3514-097	12100			1.66/1.65
-A		80% Sandstone, calcareous, very fine grained, very light gray to clear.	N8	
-B		20% Shale, calcareous, carbonaceous, brownish black. Trace of limestone.	5YR-2/1	
3514-098	12200			1.70
-A		80% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		20% Sandstone, calcareous, very fine grained, very light gray to clear. Trace limestone, pyrite.	N8	
3514-099	12300			2.02
-A		80% Shale, calcareous, carbonaceous, brownish black.	5YR-2/1	
-B		20% Sandstone, calcareous, very fine grained, very light gray to clear. Trace limestone, pyrite.	N8	

TABLE III

RESULTS OF ROCK-EVAL PYROLYSIS ANALYSIS

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	WELL INTERVAL (feet)	TMAX (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt.%)	HYDROGEN INDEX	OXYGEN INDEX
3514-001	2500	NOT ANALYZED								
3514-002	2600	433	0.75	14.46	0.47	0.05	1.26	2.77	522	16
3514-003	2700	NOT ANALYZED								
3514-004	2800	432	0.27	4.19	0.37	0.06	0.37	1.19	352	31
3514-005	2900	NOT ANALYZED								
3514-006	3000	NOT ANALYZED								
3514-007	3100	436	0.01	0.03	0.20	0.25	0.00	0.19	15	105
3514-008	3200	NOT ANALYZED								
3514-009	3300	441	0.05	0.41	0.04	0.11	0.03	0.38	107	10
3514-010	3400	NOT ANALYZED								
3514-011	3500	NOT ANALYZED								
3514-012	3600	NOT ANALYZED								
3514-013	3700	439	0.31	1.19	0.49	0.21	0.12	1.01	117	48
3514-014	3800	NOT ANALYZED								
3514-015	3900	NOT ANALYZED								
3514-016	4000	436	0.42	2.30	0.37	0.15	0.22	0.98	234	37
3514-017	4100	437	1.33	11.99	0.47	0.10	1.11	3.08	389	15
3514-018	4200	435	0.46	4.52	0.32	0.09	0.41	1.67	270	19
3514-019	4300	NOT ANALYZED								
3514-020	4400	437	0.45	3.38	0.28	0.12	0.31	1.29	262	21

T.O.C. = Total organic carbon, wt.%
S1 = Free hydrocarbons, mg Hc/g of rock
S2 = Residual hydrocarbon potential (mg HC/g or rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/S1 + S2
TMAX = Temperature Index, degrees C.

TABLE III (continued)

RESULTS OF ROCK-EVAL PYROLYSIS ANALYSIS

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	WELL INTERVAL (feet)	TMAX (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt.%)	HYDROGEN INDEX	OXYGEN INDEX
3514-021	4500	NOT ANALYZED								
3514-022	4600	439	0.17	1.33	0.27	0.11	0.12	1.01	131	26
3514-023	4700	NOT ANALYZED								
3514-024	4800	NOT ANALYZED								
3514-025	4900	439	0.29	1.76	0.32	0.14	0.17	0.98	179	32
3514-026	5000	NOT ANALYZED								
3514-027	5100	NOT ANALYZED								
3514-028	5200	442	0.12	1.17	0.27	0.09	0.10	1.16	100	23
3514-029	5300	NOT ANALYZED								
3514-030	5400	NOT ANALYZED								
3514-031	5500	437	0.85	4.15	0.45	0.17	0.41	2.05	202	21
3514-032	5600	446	0.45	1.11	0.31	0.29	0.13	1.33	83	23
3514-033	5700	NOT ANALYZED								
3514-034	5800	NOT ANALYZED								
3514-035	5900	445	1.72	4.16	0.69	0.29	0.49	2.86	145	24
3514-036	6000	NOT ANALYZED								
3514-037	6100	NOT ANALYZED								
3514-038	6200	448	4.71	11.69	0.99	0.29	1.36	6.04	193	16
3514-039	6300	449	2.31	3.94	0.79	0.37	0.52	3.04	129	25
3514-040	6400	NOT ANALYZED								

T.O.C. = Total organic carbon, wt.%
S1 = Free hydrocarbons, mg Hc/g of rock
S2 = Residual hydrocarbon potential (mg HC/g or rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/S1 + S2
TMAX = Temperature Index, degrees C.

TABLE III (continued)

RESULTS OF ROCK-EVAL PYROLYSIS ANALYSIS

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	WELL INTERVAL (feet)	TMAX - (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt.%)	HYDROGEN INDEX	OXYGEN INDEX
3514-041	6500	NOT ANALYZED								
3514-042	6600	442	0.28	0.60	0.46	0.32	0.07	0.91	65	50
3514-043	6700	447	0.25	0.68	0.27	0.27	0.07	0.69	98	39
3514-044	6800	NOT ANALYZED								
3514-045	6900	446	0.59	1.34	0.34	0.31	0.16	1.58	84	21
3514-046	7000	449	0.42	0.85	0.24	0.33	0.10	0.92	92	26
3514-047	7100	NOT ANALYZED								
3514-048	7200	447	1.21	2.43	0.43	0.33	0.30	1.86	130	23
3514-049	7300	NOT ANALYZED								
3514-050	7400	NOT ANALYZED								
3514-051	7500	NOT ANALYZED								
3514-052	7600	455	0.37	0.66	0.34	0.36	0.08	0.92	71	36
3514-053	7700	453	0.31	0.75	0.20	0.29	0.08	0.82	91	24
3514-054	7800	453	0.84	1.39	0.60	0.38	0.18	1.11	125	54
3514-055	7900	450	0.52	0.99	0.30	0.35	0.12	1.12	88	26
3514-056	8000	456	0.39	0.75	0.29	0.34	0.09	0.99	75	29
3514-057	8100	NOT ANALYZED								
3514-058	8200	454	0.80	1.74	0.46	0.31	0.21	1.98	87	23
3514-059	8300	NOT ANALYZED								
3514-060	8400	NOT ANALYZED								

T.O.C. = Total organic carbon, wt.%
S1 = Free hydrocarbons, mg Hc/g of rock
S2 = Residual hydrocarbon potential (mg HC/g or rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/S1 + S2
TMAX = Temperature Index, degrees C.

TABLE III (continued)

RESULTS OF ROCK-EVAL PYROLYSIS ANALYSIS

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	WELL INTERVAL (feet)	TMAX (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt.%)	HYDROGEN INDEX	OXYGEN INDEX
3514-061	8500	450	0.47	0.72	0.36	0.40	0.09	1.00	72	36
3514-062	8600	NOT ANALYZED								
3514-063	8700	452	0.40	0.73	0.31	0.36	0.09	0.99	73	31
3514-064	8800	NOT ANALYZED								
3514-065	8900	NOT ANALYZED								
3514-066	9000	457	0.51	0.82	0.31	0.39	0.11	1.19	68	26
3514-067	9100	NOT ANALYZED								
3514-068	9200	455	0.54	0.82	0.24	0.40	0.11	1.16	70	20
3514-069	9300	372	0.24	0.20	0.87	0.55	0.03	0.91	21	95
3514-070	9400	413	0.06	0.15	0.41	0.30	0.01	0.55	27	74
3514-071	9500	456	0.17	0.35	0.27	0.33	0.04	0.91	38	29
3514-072	9600	NOT ANALYZED								
3514-073	9700	450	0.84	0.89	0.33	0.49	0.14	1.55	57	21
3514-074	9800	452	0.46	0.57	0.20	0.45	0.08	1.00	57	20
3514-075	9900	406	0.19	0.13	0.22	0.59	0.02	0.51	25	43
3514-076	10000	NOT ANALYZED								
3514-077	10100	451	0.67	0.74	0.23	0.48	0.11	2.06	35	11
3514-078	10200	458	0.75	0.72	0.35	0.51	0.12	2.30	31	15
3514-079	10300	460	0.92	1.07	0.22	0.46	0.16	2.53	42	8
3514-080	10400	NOT ANALYZED								

T.O.C. = Total organic carbon, wt.%
S1 = Free hydrocarbons, mg Hc/g of rock
S2 = Residual hydrocarbon potential (mg HC/g or rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/S1 + S2
TMAX = Temperature Index, degrees C.

TABLE III (continued)

RESULTS OF ROCK-EVAL PYROLYSIS ANALYSIS

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	WELL INTERVAL (feet)	TMAX (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt.%)	HYDROGEN INDEX	OXYGEN INDEX
3514-081	10500	458	0.38	0.46	0.21	0.45	0.07	1.38	33	15
3514-082	10600	462	0.20	0.24	0.20	0.45	0.03	0.97	24	20
3514-083	10700	438	0.05	0.08	0.18	0.42	0.01	0.20	40	90
3514-084	10800	327	0.03	0.04	0.28	0.50	0.00	0.27	14	103
3514-085	10900	489	0.10	0.18	0.16	0.36	0.02	0.58	31	27
3514-086	11000	370	0.04	0.03	0.30	0.67	0.00	0.36	8	83
3514-087	11100	487	0.14	0.20	0.23	0.41	0.02	1.20	16	19
3514-088	11200	493	0.08	0.17	0.08	0.33	0.02	0.73	23	10
3514-089	11300	NOT ANALYZED								
3514-090	11400	NOT ANALYZED								
3514-091	11500	382	0.03	0.02	0.35	0.75	0.00	0.44	4	79
3514-092	11600	496	0.09	0.12	0.72	0.45	0.01	0.78	15	92
3514-093	11700	489	0.34	2.05	0.50	0.14	0.19	4.85	42	10
3514-094	11800	444	0.22	0.52	0.72	0.30	0.06	1.04	50	69
3514-095	11900	475	0.09	0.16	0.25	0.37	0.02	0.89	17	28
3514-096	12000	NOT ANALYZED								
3514-097	12100	515	0.13	0.40	0.84	0.25	0.04	1.65	24	50
3514-098	12200	511	0.17	0.41	1.74	0.29	0.04	1.70	24	102
3514-099	12300	472	0.53	0.62	1.42	0.46	0.09	2.02	30	70

T.O.C. = Total organic carbon, wt.%
S1 = Free hydrocarbons, mg Hc/g of rock
S2 = Residual hydrocarbon potential (mg HC/g or rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/S1 + S2
TMAX = Temperature Index, degrees C.

TABLE IV

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
3514-001	2500	1.73	Not Analyzed							
3514-002	2600	2.77	H*;Am;W	0	38	50	12	0	2 to 2+	2.3
3514-003	2700	0.61	Not Analyzed							
3514-004	2800	1.20/1.17	H;Am;W	0	25	63	12	0	2 to 2+	2.4
3514-005	2900	0.51	Not Analyzed							
3514-006	3000	0.15	Not Analyzed							
3514-007	3100	0.19	Am-H*;-;-	0	50	50	0	0	2 to 2+	2.4
3514-008	3200	0.15	Not Analyzed							
3514-009	3300	0.38	H*;Am;-	0	28	72	0	0	2 to 2+	2.4
3514-010	3400	0.26	Not Analyzed							
3514-011	3500	0.35	Not Analyzed							
3514-012	3600	0.40/0.40	Not Analyzed							
3514-013	3700	1.01	H*;Am;-	0	28	72	0	0	2 to 2+	2.4
3514-014	3800	0.67	Not Analyzed							
3514-015	3900	0.65	Not Analyzed							
3514-016	4000	0.98	H*;Am;-	0	28	72	0	0	2 to 2+	2.4
3514-017	4100	3.08	H*;Am;-	0	28	72	0	0	2 to 2+	2.5
3514-018	4200	1.67	H*;Am;W	0	38	50	12	0	2 to 2+	2.4
3514-019	4300	0.83	Not Analyzed							
3514-020	4400	1.30/1.27	Am-H*;-;-	0	50	50	0	0	2 to 2+	2.4
3514-021	4500	0.75	Not Analyzed							
3514-022	4600	1.01	H;-;Am	0	16	84	0	0	2 to 2+	2.5
3514-023	4700	0.55	Not Analyzed							

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
60-100%	20-40%	0-20%

Al = Algal
Am = Amorphous-Sapropel
Am** = Relic Amorphous-Sapropel
H = Herbaceous-Spore/Pollen
H* = Degraded Herbaceous
W = Woody-Structured
U = Unidentified Material
I = Inertinite
C = Coaly

TABLE IV (continued)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
3514-024	4800	0.78	Not Analyzed							
3514-025	4900	0.98	H;Am;-	0	28	72	0	0	2 to 2+	2.5
3514-026	5000	0.63	Not Analyzed							
3514-027	5100	0.32	Not Analyzed							
3514-028	5200	1.16/1.15	H;Am;-	0	28	72	0	0	2 to 2+	2.5
3514-029	5300	0.78	Not Analyzed							
3514-030	5400	0.34	Not Analyzed							
3514-031	5500	2.05	Am-H*;-;-	0	50	50	0	0	2 to 2+	2.5
3514-032	5600	1.33/1.33	H*;Am;-	0	38	62	0	0	2+	2.6
3514-033	5700	0.68	Not Analyzed							
3514-034	5800	1.12	Not Analyzed							
3514-035	5900	2.86	Am-H*;-;-	0	50	50	0	0	2 to 2+	2.5
3514-036	6000	1.36	Not Analyzed							
3514-037	6100	0.96/0.93	Not Analyzed							
3514-038	6200	6.04	H*;Am;-	0	43	57	0	0	2+	2.6
3514-039	6300	3.04	H*;Am;-	0	43	57	0	0	2+	2.6
3514-040	6400	0.84	Not Analyzed							
3514-041	6500	0.70	Not Analyzed							
3514-042	6600	0.91	Am-H*;-;-	0	50	50	0	0	2+	2.6
3514-043	6700	0.69	Am-H*;-;-	0	50	50	0	0	2+	2.6
3514-044	6800	1.31	Not Analyzed							
3514-045	6900	1.62/1.55	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.7
3514-046	7000	0.92	Am-H*;-;-	0	50	50	0	0	2+	2.6

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
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TABLE IV (continued)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
3514-047	7100	1.78	Not Analyzed							
3514-048	7200	1.86	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.7
3514-049	7300	1.09	Not Analyzed							
3514-050	7400	0.52	Not Analyzed							
3514-051	7500	0.51/0.54	Not Analyzed							
3514-052	7600	0.92	H*;Am;-	0	43	57	0	0	2+ to 3-	2.7
3514-053	7700	0.82	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.7
3514-054	7800	1.11	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.7
3514-055	7900	1.12	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.7
3514-056	8000	0.99	H*;Am;-	0	44	56	0	0	2+ to 3-	2.7
3514-057	8100	0.47	Not Analyzed							
3514-058	8200	1.94	Am;H;W-I	0	45	33	11	11	2+ to 3-	2.8
3514-059	8300	0.86	Not Analyzed							
3514-060	8400	1.07/1.08	Not Analyzed							
3514-061	8500	1.00	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.8
3514-062	8600	0.84	Not Analyzed							
3514-063	8700	0.99	Am-H*;-;-	0	50	50	0	0	2+ to 3-	2.8
3514-064	8800	0.41	Not Analyzed							
3514-065	8900	0.62	Not Analyzed							
3514-066	9000	1.19	H*;Am;-	0	37	63	0	0	2+ to 3-	2.8
3514-067	9100	1.53	Not Analyzed							
3514-068	9200	1.16	H*;Am;-	0	43	57	0	0	2+ to 3-	2.8
3514-069	9300	0.91/0.91	H*;Am;I	0	25	63	0	12	2+ to 3-	2.8

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
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H* = Degraded Herbaceous
W = Woody-Structured
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C = Coaly

TABLE IV (continued)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
3514-070	9400	0.55	H;I;W(Am)	0	10	40	20	30	2+ to 3-	2.9
3514-071	9500	0.91	H*;Am-I;W	0	20	50	10	20	2+ to 3-	2.9
3514-072	9600	1.44	Not Analyzed							
3514-073	9700	1.55	H*;Am;W-I	0	34	44	11	11	2+ to 3-	2.9
3514-074	9800	1.00	Am-H*;-;I	0	44	44	0	12	2+ to 3-	2.9
3514-075	9900	0.51	H*;Am;W-I	0	26	42	16	16	2+ to 3-	2.9
3514-076	10000	0.82	Not Analyzed							
3514-077	10100	2.06	H*;Am;W-I	0	26	42	16	16	3-	3.0
3514-078	10200	2.30	W-I;H;Am	0	17	23	30	30	3- to 3	3.1
3514-079	10300	2.53	H*;Am;W-I	0	28	36	18	18	3- to 3	3.1
3514-080	10400	1.50	Not Analyzed							
3514-081	10500	1.38	H-I;W;Am	0	15	31	23	31	3- to 3	3.2
3514-082	10600	0.97	Am-H*;I;-	0	17	30	23	30	3- to 3	3.2
3514-083	10700	0.20	Am-H*;-;W-I	0	40	40	10	10	3- to 3	3.2
3514-084	10800	0.27	H-W;I;Am	0	17	30	30	23	3- to 3	3.2
3514-085	10900	0.58	H*;Am;W-I	0	26	50	12	12	3- to 3	3.2
3514-086	11000	0.36	Am-H*;W;-	0	40	40	20	0	3- to 3	3.2
3514-087	11100	1.20	W-I;H;Am	0	9	25	33	33	3- to 3	3.2
3514-088	11200	0.73	H;W-I;Am	0	12	44	22	22	3- to 3	3.2
3514-089	11300	0.59	Not Analyzed							
3514-090	11400	0.32	Not Analyzed							
3514-091	11500	0.44	H;I;Am-W	0	10	50	10	30	3- to 3	3.2
3514-092	11600	0.78	H-I;W;-	0	0	36	28	36	3- to 3	3.2

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
60-100%	20-40%	0-20%

Al = Algal
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H = Herbaceous-Spore/Pollen
H* = Degraded Herbaceous
W = Woody-Structured
U = Unidentified Material
I = Inertinite
C = Coaly

TABLE IV (continued)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

SANTA FE ENERGY OPERATING PARTNERS, ROHMER NO.1
SEC.23, T22S, R27E, EDDY COUNTY, NEW MEXICO
API #30-015-25722

GEOCHEM SAMPLE NUMBER	DEPTH INTERVAL (feet)	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
3514-093	11700	4.85	H;I;W	0	0	50	20	30	3- to 3	3.3
3514-094	11800	1.04	H-I;W;Am	0	9	33	25	33	3	3.4
3514-095	11900	0.89	H;W;I(Am)	0	10	40	30	20	3- to 3	3.3
3514-096	12000	0.40	Not Analyzed							
3514-097	12100	1.66/1.65	H-I;W;Am	0	15	31	23	31	3	3.4
3514-098	12200	1.70	W-I;H;-	0	0	28	36	36	3	3.4
3514-099	12300	2.02	W-I;H;Am	0	9	25	33	33	3	3.4

LEGEND:

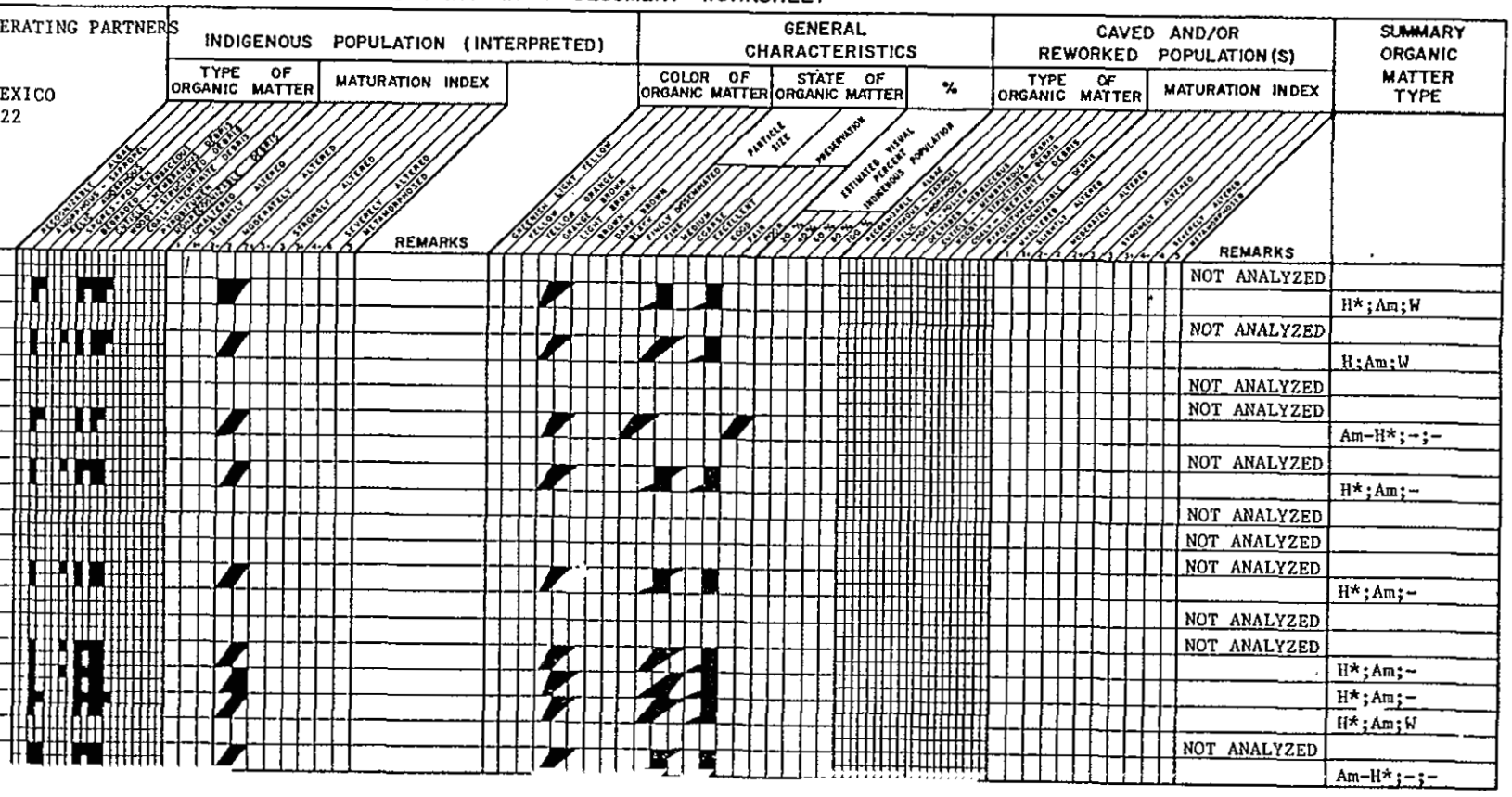
KEROGEN KEY

Predominant;	Secondary;	Trace
60-100%	20-40%	0-20%

Al = Algal
Am = Amorphous-Sapropel
Am** = Relic Amorphous-Sapropel
H = Herbaceous-Spore/Pollen
H* = Degraded Herbaceous
W = Woody-Structured
U = Unidentified Material
I = Inertinite
C = Coaly

TABLE V
VISUAL KEROGEN ASSESSMENT WORKSHEET

SANTA FE ENERGY OPERATING PARTNERS
ROHMER WELL NO.1
SEC.23, T22S, R27E
EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
T.D. 12,350'



GEOCHEM No	DEPTH	REMARKS	SUMMARY ORGANIC MATTER TYPE
3514-001	2500	NOT ANALYZED	
3514-002	2600		H*;Am;W
3514-003	2700	NOT ANALYZED	
3514-004	2800		H;Am;W
3514-005	2900	NOT ANALYZED	
3514-006	3000	NOT ANALYZED	
3514-007	3100		Am-H*;-;-
3514-008	3200	NOT ANALYZED	
3514-009	3300		H*;Am;-
3514-010	3400	NOT ANALYZED	
3514-011	3500	NOT ANALYZED	
3514-012	3600	NOT ANALYZED	
3514-013	3700		H*;Am;-
3514-014	3800	NOT ANALYZED	
3514-015	3900	NOT ANALYZED	
3514-016	4000		H*;Am;-
3514-017	4100		H*;Am;-
3514-018	4200		H*;Am;W
3514-019	4300	NOT ANALYZED	
3514-020	4400		Am-H*;-;-

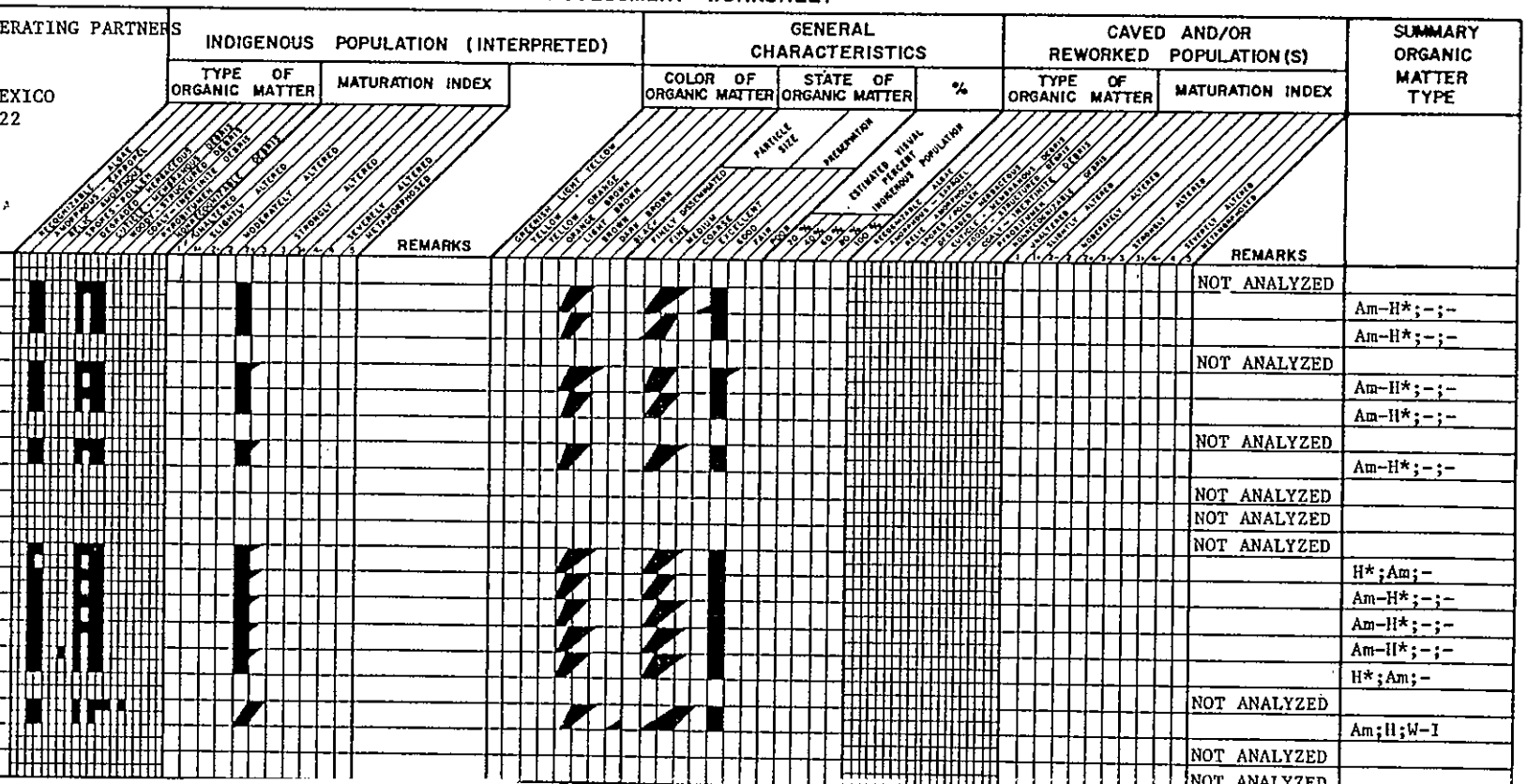
TABLE V
VISUAL KEROGEN ASSESSMENT WORKSHEET

SANTA FE ENERGY OPERATING PARTNERS
ROHMER WELL NO.1
SEC.23, T22S, R27E
EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
T.D. 12,350'

GEOCHEM No	DEPTH	INDIGENOUS POPULATION (INTERPRETED) TYPE OF ORGANIC MATTER	INDIGENOUS POPULATION (INTERPRETED) MATURATION INDEX	REMARKS	GENERAL CHARACTERISTICS COLOR OF ORGANIC MATTER	GENERAL CHARACTERISTICS STATE OF ORGANIC MATTER	GENERAL CHARACTERISTICS %	CAVED AND/OR REWORKED POPULATION(S) TYPE OF ORGANIC MATTER	CAVED AND/OR REWORKED POPULATION(S) MATURATION INDEX	REMARKS	SUMMARY ORGANIC MATTER TYPE
3514-021	4500									NOT ANALYZED	
3514-022	4600	I, II									H;-;Am
3514-023	4700									NOT ANALYZED	
3514-024	4800									NOT ANALYZED	
3514-025	4900	I, II									H;Am;-
3514-026	5000									NOT ANALYZED	
3514-027	5100									NOT ANALYZED	
3514-028	5200	I, II									H;Am;-
3514-029	5300									NOT ANALYZED	
3514-030	5400									NOT ANALYZED	
3514-031	5500	I, II									Am-H*;-;-
3514-032	5600										H*;Am;-
3514-033	5700									NOT ANALYZED	
3514-034	5800									NOT ANALYZED	
3514-035	5900	I, II									Am-H*;-;-
3514-036	6000									NOT ANALYZED	
3514-037	6100									NOT ANALYZED	
3514-038	6200	II, III									H*;Am;-
3514-039	6300										H*;Am;-
3514-040	6400									NOT ANALYZED	

TABLE V
VISUAL KEROGEN ASSESSMENT WORKSHEET

SANTA FE ENERGY OPERATING PARTNERS
ROHMER WELL NO.1
SEC.23, T22S, R27E
EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
T.D. 12,350'



GEOCHEM No	DEPTH	REMARKS	SUMMARY ORGANIC MATTER TYPE
3514-041	6500	NOT ANALYZED	
3514-042	6600		Am-H*;-;-
3514-043	6700		Am-H*;-;-
3514-044	6800	NOT ANALYZED	
3514-045	6900		Am-H*;-;-
3514-046	7000		Am-H*;-;-
3514-047	7100	NOT ANALYZED	
3514-048	7200		Am-H*;-;-
3514-049	7300	NOT ANALYZED	
3514-050	7400	NOT ANALYZED	
3514-051	7500	NOT ANALYZED	
3514-052	7600		H*;Am;-
3514-053	7700		Am-H*;-;-
3514-054	7800		Am-H*;-;-
3514-055	7900		Am-H*;-;-
3514-056	8000		H*;Am;-
3514-057	8100	NOT ANALYZED	
3514-058	8200		Am;H;W-I
3514-059	8300	NOT ANALYZED	
3514-060	8400	NOT ANALYZED	

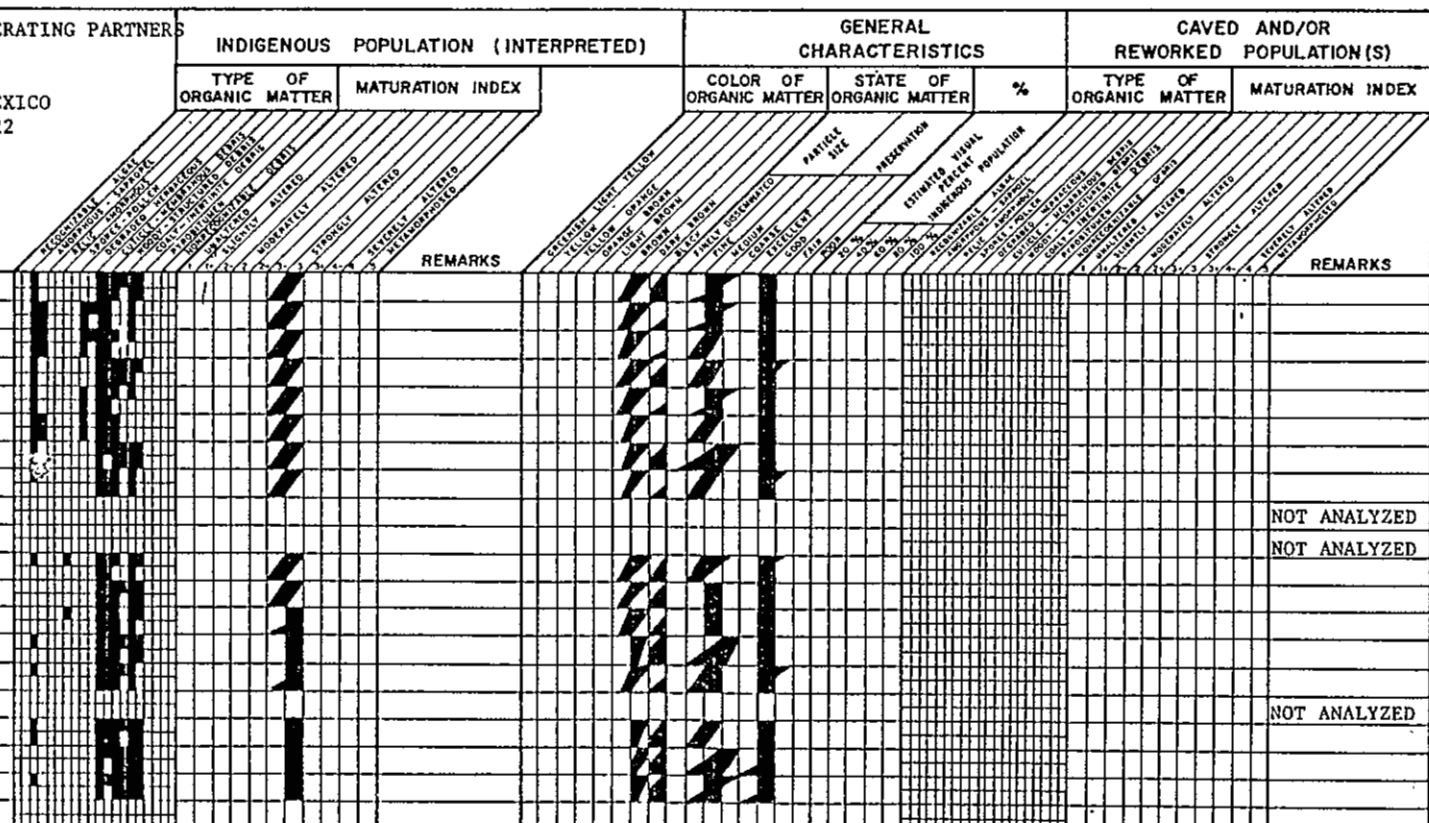
TABLE V
VISUAL KEROGEN ASSESSMENT WORKSHEET

SANTA FE ENERGY OPERATING PARTNERS
ROHMER WELL NO.1
SEC.23, T22S, R27E
EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
T.D. 12,350'

		INDIGENOUS POPULATION (INTERPRETED)		GENERAL CHARACTERISTICS			CAVED AND/OR REWORKED POPULATION(S)		SUMMARY ORGANIC MATTER TYPE
		TYPE OF ORGANIC MATTER	MATURATION INDEX	COLOR OF ORGANIC MATTER	STATE OF ORGANIC MATTER	%	TYPE OF ORGANIC MATTER	MATURATION INDEX	
GEOCHEM No	DEPTH							REMARKS	
3514-061	8500								Am-H*;-;-
3514-062	8600							NOT ANALYZED	
3514-063	8700								Am-H*;-;-
3514-064	8800							NOT ANALYZED	
3514-065	8900							NOT ANALYZED	
3514-066	9000								H*;Am;-
3514-067	9100							NOT ANALYZED	
3514-068	9200								H*;Am;-
3514-069	9300								H*;Am;I
3514-070	9400								H;I;W(Am)
3514-071	9500								H*;Am-I;W
3514-072	9600							NOT ANALYZED	
3514-073	9700								H*;Am;W-I
3514-074	9800								Am-H*;-;I
3514-075	9900								H*;Am;W-I
3514-076	10000							NOT ANALYZED	
3514-077	10100								H*;Am;W-I
3514-078	10200								W-I;H;Am
3514-079	10300								H*;Am;W-I
3514-080	10400							NOT ANALYZED	

TABLE V
VISUAL KEROGEN ASSESSMENT WORKSHEET

SANTA FE ENERGY OPERATING PARTNERS
ROHMER WELL NO.1
SEC.23, T22S, R27E
EDDY COUNTY, NEW MEXICO
API NO. 30-015-25722
T.D. 12,350'



GEOCHEM No.	DEPTH	REMARKS	SUMMARY ORGANIC MATTER TYPE
3514-081	10500		H-I;W;Am
3514-082	10600		Am-H*;I;-
3514-083	10700		Am-H*;-;W-I
3514-084	10800		H-W;I;Am
3514-085	10900		H*;Am;W-I
3514-086	11000		Am-H*;W;-
3514-087	11100		W-I;H;Am
3514-088	11200		H;W-I;Am
3514-089	11300	NOT ANALYZED	
3514-090	11400	NOT ANALYZED	
3514-091	11500		H;I;Am-W
3514-092	11600		H-I;W;-
3514-093	11700		H;I;W
3514-094	11800		H-I;W;Am
3514-095	11900		H;W;I(Am)
3514-096	12000	NOT ANALYZED	
3514-097	12100		H-I;W;Am
3514-098	12200		W-I;H;-
3514-099	12300		W-I;H;Am

APPENDIX A

Brief Description of Organic Geochemical analyses Carried Out by GeoChem

C_1-C_7 Hydrocarbon

The C_1-C_7 hydrocarbon content and composition of sediments reflects source type, source quality and thermal maturity.

The C_1-C_7 hydrocarbon content of well cuttings is determined by analyzing both a sample of the cuttings and the air space at the top of the can. The results of the two analyses are summed to give an inventory of the C_1-C_7 hydrocarbon content of the well cuttings prior to any losses from the cuttings during the lapsed time period between collection at the wellsite and laboratory analysis.

The air space C_1-C_7 hydrocarbon analysis involves taking a measured volume of the air space gas out of the can with a syringe and injecting same into a gas chromatograph. GeoChem uses a Varian Aerograph Model 1400 instrument equipped with a Porapec Q column. The gas sample is taken through the column by a carrier gas and before reaching the detector is separated into its various C_1 (methane), C_2 (ethane), C_3 (propane), iC_4 (isobutane), nC_4 (normal butane), and C_5, C_6, C_7 hydrocarbon components.

This particular analysis gives a complete separation of the C_1-C_4 gas-range hydrocarbons and a partial separation of the C_5-C_7 gasoline-range hydrocarbons. (A detailed C_4-C_7 analysis, to be discussed later, involving a capillary column, effects a complete separation of this molecular range into its several individual molecular species.)

The electrical response of the various hydrocarbons as they reach the detector is recorded on a paper strip chart as a peak. This response is simultaneously fed to an integrator which computes the area of each peak. The concentration of C_1-C_7 hydrocarbons in the air space, expressed as volumes of gas per million volumes of cuttings, is determined by a calculation involving the volume of cuttings, volume of air space in the can, volume of sample injected, volume of standard gas sample used in the calibration, calibration factor for C_1, C_2, C_3, etc. determined by gc analysis of a standard gas sample, and the gc peak response.

The C_1-C_7 hydrocarbon content of the cuttings is determined by degasification of a measured volume of cuttings (in a medium of a measured volume of water) in a closed blender, sampling of the air space at the top of the blender, and injection of a measured volume of gas into the gas chromatograph.

The C_1-C_7 hydrocarbon data from the air space and cuttings gas analyses are summed to give a "restored" C_1-C_7 hydrocarbon content of the cuttings.

Sample Washing and Hand-Picking of Uncaved Lithology Samples

The cuttings samples are washed to remove all drilling mud from the cuttings. Care is taken in the washing procedure not to remove any soft clays, claystones, etc. and any loose fine sand and silt. The washed cuttings are usually kept under water cover until picked, to prevent loss of any gasoline-range hydrocarbons. Using the C_1-C_7 hydrocarbon data profile and the electrical well log supplied to us and our visual examination of the cuttings material under the binocular microscope, we carefully hand-pick and describe a suite of uncaved lithologies representative of the various stratigraphic zones penetrated by the well. The lithological data is used to compile a gross litho percentage log which is shown on all Figures. The 2-4 gram picked lithology samples are stored under water in small glass vials in those instances where we wish to run detailed C_4-C_7 hydrocarbon analyses. This sample set is used not only for the C_4-C_7 hydrocarbon analysis, but also for the visual kerogen and total organic carbon analyses. All remaining cuttings material is dried and packaged in labelled plastic bags for possible C_{15+} soxhlet extraction and/or eventual return to the client. Sample material from this study will be retained at GeoChem until advised of disposition.

Detailed C_4-C_7 Hydrocarbon

The C_4-C_7 gasoline-range hydrocarbon content of sediments reflects source quality, thermal maturation and organic facies. Compositional data can be used in crude oil-parent rock correlation work.

The C_4-C_7 hydrocarbon content and detailed molecular composition of hydrocarbon, in hand-picked lithologies, is determined by a gc analysis of the light hydrocarbon extracted from 1-2 gram cuttings samples macerated in a microblender. A measured volume of sample is placed in a sealed microblender along with a measured volume of hot water. The rock sample is pulverized by the blades of the blender. A sample of the liberated light hydrocarbons which collect in the air space at the top of the blender is injected into our Varian Aerograph 1400 gc unit which is equipped with a capillary column. Data recording, computations, etc. are comparable to those used for the C_1-C_7 analysis discussed previously in this report. Hydrocarbon concentration is expressed as volume gas per million volumes of cuttings.

Organic Carbon

The total organic carbon content of a rock is a measure of its total organic richness. This data is used, in conjunction with visual kerogen and C_1-C_4, C_4-C_7 and C_{15+} hydrocarbon content of a rock, to indicate the hydrocarbon source quality of rocks.

The procedure for determining the total organic carbon content of a rock involves drying the sample, grinding to a powder, weighing out 0.2729 gram sample into a crucible, acidizing with hot and cold hydrochloric acid to remove calcium and magnesium carbonate, and carbon analysis by combustion in a Leco carbon analyzer.

We run several blank crucibles, standards (iron rings of known carbon content) and duplicate rock samples in this analysis at no additional charge to the client for purposes of data quality control.

C_{15+} Soxhlet Extraction, Deasphaltening and Chromatographic Separation

The amount and composition of the organic matter which can be solvent-extracted from a rock reflects source quality and source type. C^{13}/C^{12} carbon isotopic, high mass spectrometric and gc analyses of the paraffin-naphthene and aromatic hydrocarbon fractions of the soluble extract gives data which is used in crude oil-parent rock correlations.
This analysis involves grinding of a dry rock sample to a powder and removal of the soluble organic matter by soxhlet extraction using a co-distilled toluene-methanol azeotrope solvent. Where the amount of available sample material permits, we like to use at least 100 grams of rock for this analysis.

The extracted bitumen is separated into an asphaltene (ASPH) and a pentane soluble fraction by normal pentane precipitation. The pentane soluble components are separated into a C_{15+} paraffin-naphthene (P-N) hydrocarbon, C_{15+} aromatic hydrocarbon (AROM) and C_{15+} nitrogen-sulfur-oxygen containing fraction (NSO) by adsorption chromatography on a silica gel-alumina column using pentane, toluene and toluene-methanol azeotrope eluants.

GC Analysis of C_{15+} Paraffin-Naphthene (P-N) Hydrocarbons

The content and molecular composition of the heavy C_{15+} paraffin-naphthene (P-N) hydrocarbons of rocks, as determined by gc analysis, reflects source quality, source type and degree of thermal maturation.

In this analysis, we subject a very small fraction of the total amount of the P-N fraction extracted from a rock sample to gc analysis. The gas chromatograph is a Varian Aerograph Model 1400 equipped with a solid rod injection system and a eutectic column.

The calculated C.P.I. (carbon preference index) values for the normal paraffin data is defined as the mean of two ratios which are determined by dividing the sum of concentrations of odd-carbon numbered n-paraffins by the sum of even-carbon numbered n-paraffins. The C.P. Indices A and B were obtained by the formulas:

$$\text{C.P. Index A} = \frac{\frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}}}{2} \qquad \text{C.P. Index B} = \frac{\frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}}}{2}$$

Visual Kerogen

A visual study of kerogen, the insoluble organic matter in rocks, can indicate the relative abundance, size, and state of preservation of the various recognizable kerogen types and thereby indicate the hydrocarbon source character of a rock. The color of the kerogen can be used to indicate the state of thermal maturity of the sediments (i.e. their time-temperature history). Thermal maturation plays an important role in the generation of hydrocarbons from organic matter, and also affects the composition of reservoired hydrocarbons.

Our procedure for visual kerogen slide preparation involves isolation of the organic matter of a rock by removal of the rock material with hydrochloric and hydrofluoric acid treatment and heavy liquid separation. This procedure is comparable to that used by the palynologist except it does not include an oxidation stage. (The oxidation treatment is deleted from our procedure because it removes a great deal of kerogen and blanches any remaining kerogen to an extent whereby it is useless for our kerogen color observations.) The kerogen residue is mounted on a glass slide and is examined visually under a high power microscope.

Vitrinite Reflectance

Measurement of the reflectivity of vitrinite particles ($\%R_o$) present in the kerogen isolated from sedimentary rocks provides a method of determining the state of maturation, and the diagenetic (time-temperature) history of the organic matter present in the sediments.

The kerogen, obtained from a 25 gram aliquot of crushed rock by the acid procedure previously discussed, is dried and embedded in a Bioplastic plug. The surface of the plug is polished using 0.05 micron alumina and the reflectivity determined under oil using a Zeiss high resolution microscope. A minimum of 40 values are required to adequately determine the Maturation Rank.

Fluorescence Spectrophotometric Analysis

Fluorescence spectrophotometry can be used to characterize and fingerprint crude oils, establish crude oil-source rock relationships, and to measure the hydrocarbon source potential of fine-grained sediments.

A one (1) microliter aliquot of either (i) a crude oil or (ii) the solvent extractable rock bitumen, is passed through an alumina silica gel micro column and the C_{10+} aromatic hydrocarbons isolated. The aromatic hydrocarbon is diluted and the emission and excitation spectra determined at 240 nm and 420 nm using a Perkin-Elmer Model 512 Double Beam Fluorescence Spectrophotometer.

GEOTHERMAL DIAGENETIC CRITERIA

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