

New Mexico Bureau of Mines and Mineral Resources  
Open File Report No. OF-205

ORGANIC GEOCHEMICAL ANALYSIS, PURE NO. 1 FEDERAL H  
WELL, DOÑA ANA COUNTY, NEW MEXICO

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

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

May 31, 1983



**Chevron U.S.A. Inc.**

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

May 31, 1983

OF 235

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

Dear Mr. Valder:

Enclosed please find results of the organic geochemical analyses performed on samples from the Pure #1-H Federal well, located in Section 24, T28S-R2W, Dona Ana Co., New Mexico.

The analyses includes the following tests:

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

Yours truly,

A handwritten signature in dark ink that reads "M. I. Roberson". The signature is written in a cursive, slightly slanted style.

M. I. Roberson  
District Geologist

JSR

Enclosures

## Discussion of Results:

The Pure No. 1-H Federal well was air drilled, resulting in a very small average cuttings size. Over some intervals the sample size was very small, possibly causing either sampling and/or analytical problems. Through other intervals, however, such as part of the organically rich (TOC = 3.55) Percha shale section (3990-4010 ft.) the sample size was adequate and the geochemical results should be reliable.

### I. Thermal Maturity:

Although the thermal results are based on "background material", which consists of unrecognizable organic residue, the verdict that the entire section cut by this well is thermally overmature appears to be justified. That recognizable palynomorphs are absent,  $S_2$  values are very low, Hydrogen indices are low, all suggest overmaturity.

### II. Organic Richness and Type:

Organic richness throughout the section is poor, except for one fair value (0.61 wt. %) in the lower part of the Penn section, one fair (0.64) and one very good (3.55) sample in the Devonian Percha shale interval. The organic remains were too highly altered to allow typing of the kerogen.

BIOSTRATIGRAPHIC STUDY NO. 1135  
PALYNOLOGY REPORT  
P4016

LOCATION: Pure Oil 1-H Federal  
Sec. 24-28S-2W  
Dona Ana Co., New Mexico

PROBLEM: Cuttings samples submitted by Jim Rankin for determination of maturity (TAI - Vo) and microscopic organic analysis (MOA) indices.

RESULTS:

Note: Microscopic organic analysis (MOA) was not attempted because the kerogen is highly altered even to the point of having a mineral-like appearance. The vitrinite plugs were not useful in identifying the kerogen types either.

The TAI indices are not based on palynomorphs, as the entire suite of samples is apparently barren, but on the back-ground material. Using the back-ground organic debris, although less reliable, seems justified when maturity indices are post mature. Laboratory flow sheets state these samples were very difficult to process because oxidation was not possible. This might imply the organic fraction was already oxidized.

Data

Sample  
P4016-23,1  
(800-900)

Kerogen Types (MOA)  
no data.

Maturity  
Tmax low S2 yield.  
Vo -  
TAI 4.0 post mature.

Amount (of organics)  
Wt % TOC .39 poor.  
Organic yield .2 ml. / 10 grams.

1980' Top Permian

Sample  
P4016-24,2  
(2250-2300)

Kerogen Types (MOA)  
no data.

Maturity

Tmax low S2 yield.  
Vo plug not useful.  
TAI 4.0 + post mature.

Amount

WT % TOC .30 poor.  
Organic yield .3 ml. / 10 grams.

2250' Top Hueco -  
Wulfcamp (Permian)

Sample  
P4016-25,3  
(2710-2780)

Kerogen Types  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

WT % TOC .15 poor.  
Organic yield .2 ml. / 10 grams.

3215' Top Penn.

Sample  
P4016 26,4  
(3240-3290)

Kerogen Types  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

WT % TOC .35 poor.  
Organic yield .2 ml. / 10 grams.

Sample  
P4016-27,5  
(3320-3390)

Kerogen Types  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

Wt % TOC .33 poor.  
Organic yield .2 ml. / 10 grams.

Sample  
P4016-28,6  
(3390-3500)

Kerogen Type  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

WT % TOC .33 poor.  
Organic yield .2 ml. / 10 grams

Sample  
P4016-29,7  
(3620-3700)

Kerogen Type  
no data.

Maturity

Tmax low S2 yield.  
Vo plug not useful.  
TAI 4.0 + post mature.

Amount

WT % TOC .61 fair.  
Organic yield .3 ml. / 10 grams.

3850' ? Top Percha  
(Devonian)

Sample  
P4016-30,8  
(3860-3910)

Kerogen Type  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

Wt % TOC .64 fair.  
Organic yield .2 ml. / 10 grams.

Sample  
P4016-31,9  
(3990-4030)

Kerogen Type  
no data.

Maturity

Tmax low S2 yield.  
Vo plug not useful.  
TAI 4.0 + post mature.

Amount

Wt % TOC 3.55 very good.  
Organic yield 1.2 ml. / 10 grams.

4060' ? Top Fusselman  
(Silurian)

Sample  
P4016-32,10  
(5390-5460)

Kerogen Type  
no data.

Maturity

Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount

Wt % TOC .26 poor.  
Organic yield, trace.



Sample  
P4016-33,11  
(6210-6290)

Kerogen Type  
no data.

Maturity  
Tmax low S2 yield.  
Vo -  
TAI 4.0 + post mature.

Amount  
Wt % TOC .27 poor.  
Organic yield, trace.

Attachments: Brown-Ruth Geochemical Report 432  
Fig. 1

*JDS*  
May 18, 1983  
J. D. SAXTON

# PURE OIL 1-H FED.

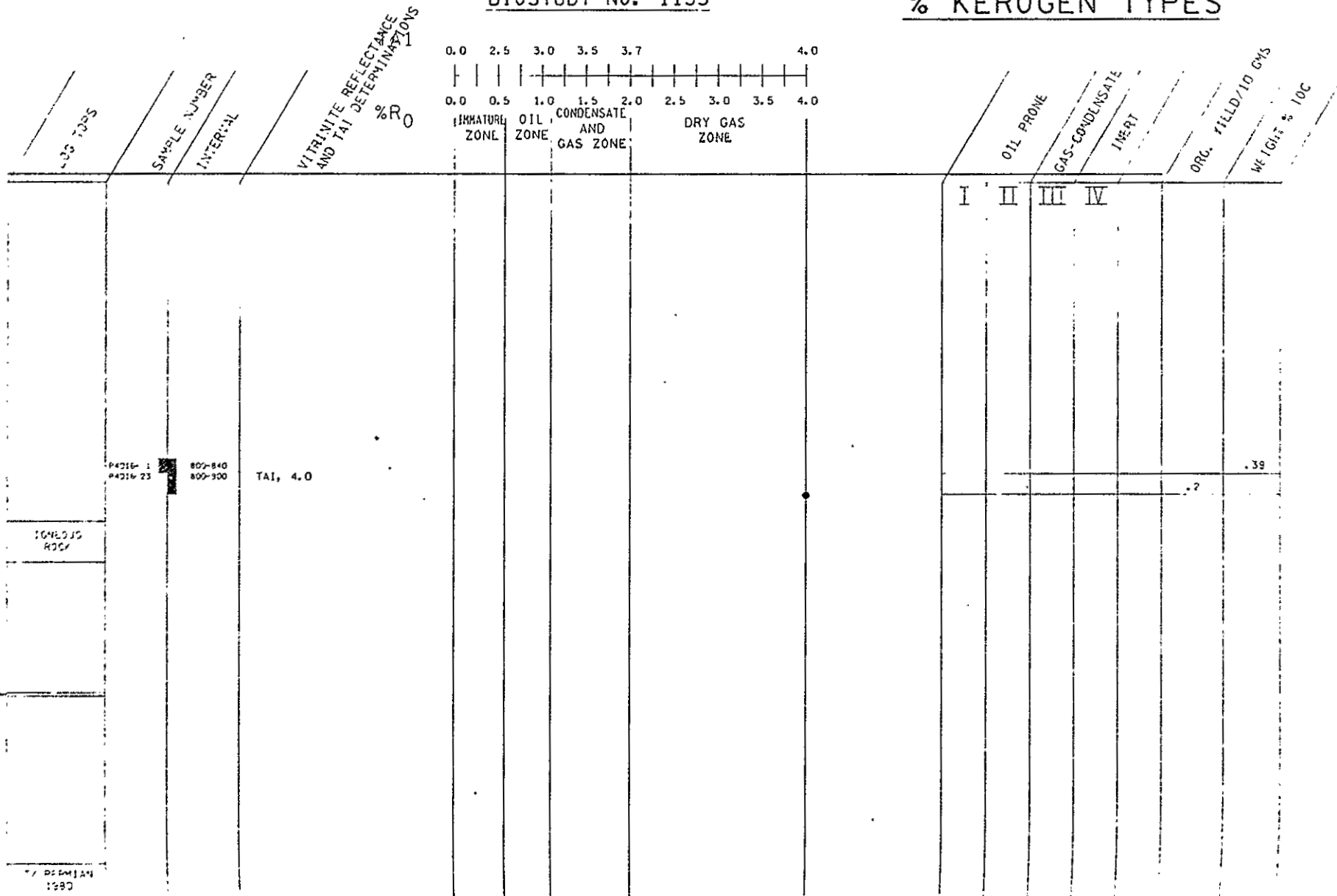
## SEC. 24 - 28S - 2W

DONA ANA CO., NEW MEXICO

### HYDROCARBON GENERATION ZONES

BIOSTUDY NO. 1135

% KEROGEN TYPES







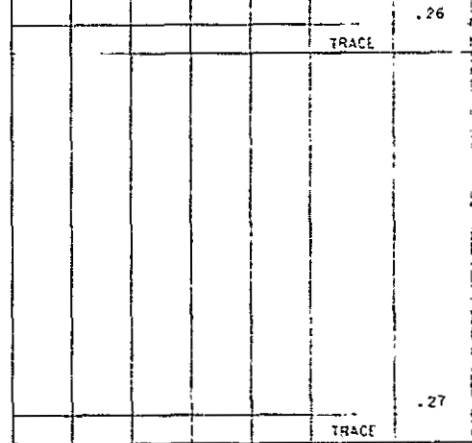
P4016-10 5390-5400  
P4016-32 5409-5460

TAI, 4.0

P4016-11 6210-6230  
P4016-33 6210-6290

TAI, 4.0

CONGLOMERATE  
DIORITE



NMBM LMR

GEOCHEMICAL REPORT

Total Organic Carbon & Rock-Eval Evaluation

Pure Oil Co. No. 1-H Federal  
Dona Ana County, New Mexico  
SEC 24-28S-2W

P4016



**BROWN & RUTH LABORATORIES, INC.**

10690 SHADOW WOOD DRIVE, SUITE 130, HOUSTON, TEXAS 77043 □ (713) 464-3284

December 22, 1982

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

Attention: Dr. Stephen R. Jacobson

Gentlemen:

Attached please find the results of geochemical analyses performed on eleven (11) cuttings samples from the Pure Oil Co. No. 1-H Federal Well, Dona Ana County, New Mexico. Authorization and analytical instructions were contained in Work Order CMEN-2100.

The limited amount of sample material not used in the analyses will be returned under separate cover.

We appreciate the opportunity to be of service to Chevron. If we can be of additional assistance, please contact us.

Very truly yours,

BROWN & RUTH LABORATORIES, INC.



Stephen W. Brown

SWB/kr

Enclosures

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

WELL: Pure Oil Co. No. 1-H Federal, Dona Ana County, New Mexico

AUTHORIZATION: Dr. Stephen R. Jacobson

SAMPLE DESCRIPTION:

Eleven (11) cuttings samples were received from the Pure Oil Co. No. 1-H Federal, Dona Ana County, New Mexico. The project was authorized as Work Order CMEN-2100. The samples appeared to be in good condition and free of any type of contamination.

SAMPLE PREPARATION:

Following a thorough visual examination, the samples were ground for analysis. No special preparation was necessary.

ANALYTICAL DETERMINATIONS:

As per the instructions contained in the Work Order, total organic carbon (T.O.C.) determinations and Rock-Eval pyrolysis was performed on each of the samples. The tabulated results from both these analyses are presented in Table I. The Rock-Eval pyrograms are plotted in Figures I-A, I-B, and I-C.

Although the total organic carbon content of the samples ranges from low, to in one case, very good, none of the samples appear to be capable of generating significant quantities of oil or gas. Based on the physical appearance of the samples and on the limited S<sub>2</sub> yields, we conclude that the section represented by these samples has probably experienced a moderate to extreme thermal history. No T<sub>max</sub> values were obtainable from any of the samples, due to the low S<sub>2</sub> yields.

One sample in particular appears to best demonstrate the effect of the probable thermal influence. Sample P-4016-9 has an extremely high total organic carbon content (3.55%) but has very negligible S<sub>2</sub> yield and a very small Hydrogen Index. Apparently, any hydrocarbon that could have been produced from this organic facies has already been generated and released.



TABLE I

Chevron U.S.A. (Denver)  
 Pure Oil Co. No. 1-H Federal  
 Dona Ana County, New Mexico

File No. 432  
 December 22, 1982

## Results of Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Client I.D.	T.O.C. (% Wt.)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	S2/S3	Hydrogen Index	Oxygen Index
432-001	P-4016-1 800-840	0.39	<0.10	<0.10	0.23	**	---	---	---	59
432-002	P-4016-2 2250-60	0.30	<0.10	<0.10	0.31	**	---	---	---	104
432-003	P-4016-3 2750-60	0.15	<0.10	<0.10	0.29	**	---	---	---	197
432-004	P-4016-4 3240-3290	0.35	0.10	<0.10	0.32	**	---	---	---	91
432-005	P-4016-5 3320-3330	0.33	0.10	0.12	0.30	**	0.46	0.39	35	91
432-006	P-4016-6 3390-3410	0.33	<0.10	0.10	0.27	**	---	0.35	29	82
432-007	P-4016-7 3620-3630	0.61	<0.10	0.11	0.53	**	---	0.21	18	86
432-008	P-4016-8 3860-3890	0.64	0.10	0.11	0.21	**	0.46	0.53	18	33
432-009	P-4016-9 3990-4010	3.55	0.18	0.16	0.19	**	0.53	0.86	5	5
432-010	P-4016-10 5390-5400	0.26	<0.10	0.10	0.42	**	---	0.24	39	161
432-011	P-4016-11 6210-6230	0.27	<0.10	0.15	0.51	**	---	0.29	56	190

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

FIGURE 1-A  
ROCK-EVAL PYROGRAMS

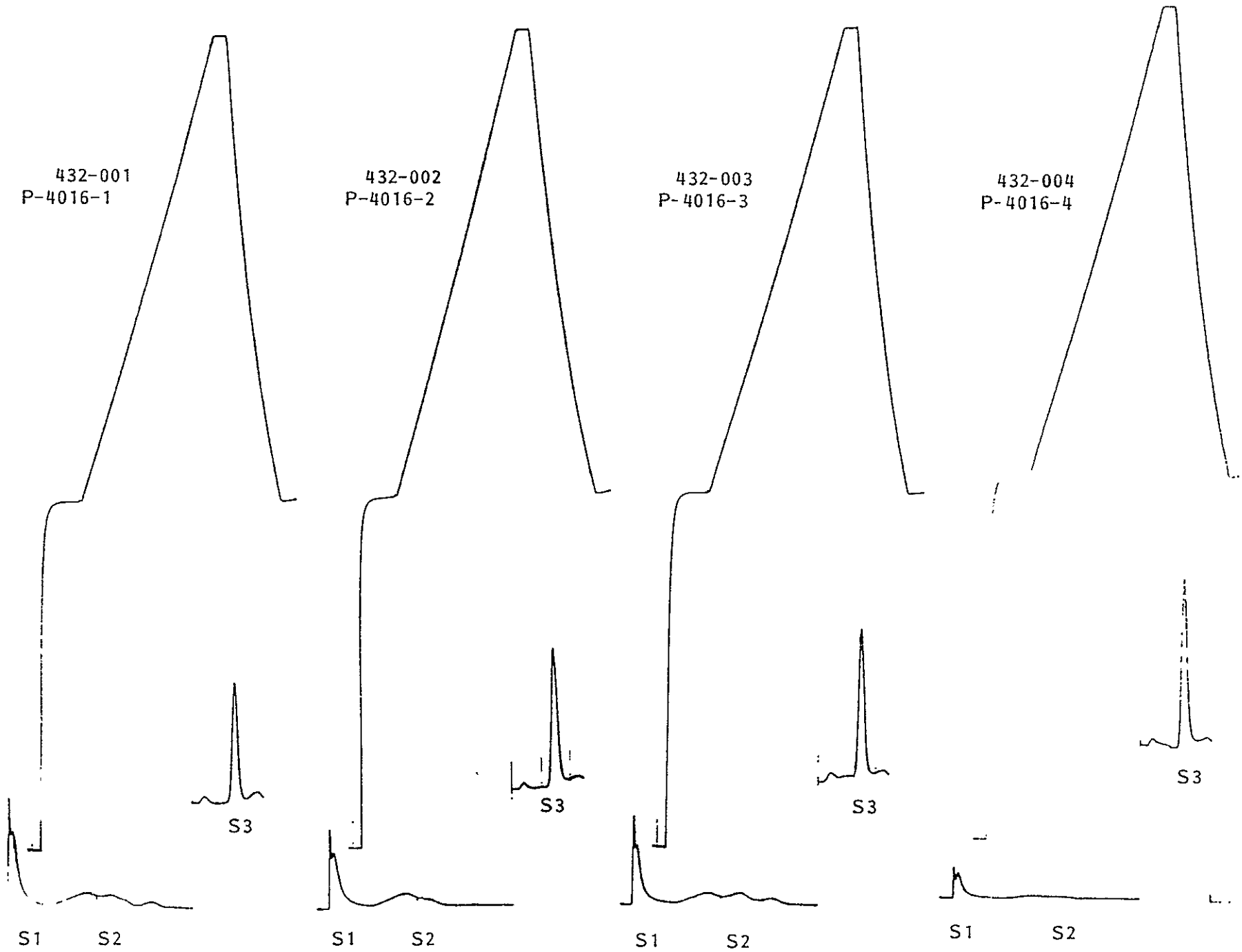


FIGURE I-B  
ROCK-EVAL PYROGRAMS

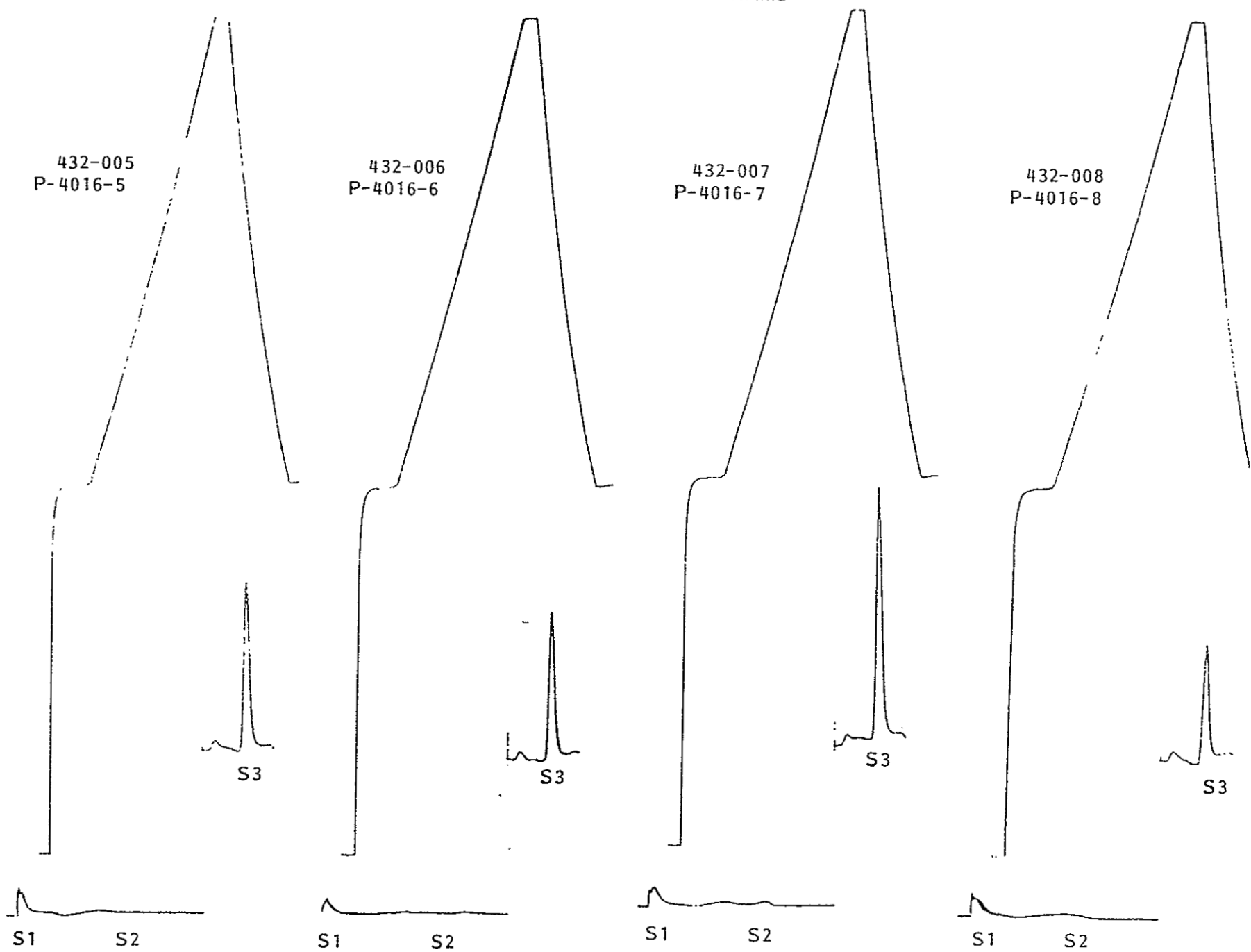


FIGURE 1-C  
ROCK-EVAL PYROGRAMS

