GEOCHEMICAL ANALYSIS PROCEDURES

Source Rock Richness Study

To evaluate the organic richness of the ditch samples, we determined both their organic carbon (Corg or non-carbonate carbon, NCC), and the effective carbon (Ceff) contents. Organic carbon, or acid-insoluble carbon, represents the total amount of organic matter in the rock, and it is determined by measuring the total amount of carbon dioxide evolved during combustion of an acid-treated sample.

On the other hand, effective carbon reflects the fraction of organic carbon which is thermally convertible to petroleum. As estimates of effective carbon, we used two laboratory pyrolysis procedures. One method, pyrolysis-fluorescence (PF) is a rapid means of evaluating the petroleum generating potential, by measuring (in arbitrary PF units) the amount of fluorescing bitumen generated on heating. PF values in rocks can range from zero to several thousand units. For additional data, refer to Heacock and Hood (1970). The second method, pyrolysis-FID (P-FID) provides a measure of the amount of organic matter which can be converted thermally to hydrocarbons. A small amount of sample (less than 200 milligrams) is heated in a flowing stream of pure nitrogen at temperatures increasing from room temperature to 750°C at a rate of 25°C per minute. The volatile organic compounds are distilled at temperatures less than about 300°C. At higher temperatures nonvolatile organic matter is pyrolyzed for form volatile hydrocarbons. The distillation (D) and pyrolysis (P) products are carried (by nitrogen) to a hydrogen flame ionization detector (FID). The FID signal can be converted to percent hydrocarbons or percent carbon by calibration with a petroleum wax. For further data on the method and instrumentation see Eggertsen and Stross (1972).

Thermal History

Some of the methods used to determine the burial metamorphic history are summarized in the attached table taken from a publication by Hood and Castano. These methods are related through the use of the LOM (Level of Organic Metamorphism) scale reported by Hood et al in the AAPG Bulletin. The techniques for measuring the level of organic metamorphism reflect the irreversible effects of temperature and time, hence, of thermal history. Therefore, the reflectance data can be tied readil y into the LOM or coal rank scales.

Vitrinite Reflectance Study

A number of ditch samples were prepared for vitrinite reflectance study. For the shale samples, the vitrinite was concentrated by non-oxidative acid solution of the inorganic matrix. Standard A.S.T.M. procedures are followed for polishing and examining the specimens. For coals, the samples were prepared with acid maceration.

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The results of the study are summarized on the individual histograms and on the depth-reflectance plot. On the histograms, each vitrinite reflectance reading is shown to the nearest 0.01% reflectance in oil (%Ro), and the values are summed up for each 0.1% Ro group. In the tables, the (arithmetic) mean Ro is given with the limits of uncertainty calculated for 95% confidence limits. All of the measurements are random Ro readings.

Visual Kerogen Analysis (VKA)

Visual kerogen analysis (an abbreviated form of maceral analysis) is run in conjunction with the vitrinite reflectance study. VKA consists of estimating the percentage of the major kinds of organic matter that are present in a sample. The percentages refer only to the relative proportions of the several kerogen types, and do not carry any implications as to organic richness.

Visual kerogen analysis is especially valuable in relating optical methods of describing organic matter to organic geochemical analyses. VKA is also useful in identifying solid hydrocarbons, and high LOM "burned-out" source rocks. And, as lipid rich macerals can be identified readily up to LOM 11.5 or so, optical analysis can be used as a supplement to chemical typing methods. VKA affords a means of classifying organic rich rocks, and should enable us to map particular source rock facies.

Five major subdivisions are used; they are:

- **Amorphous.** Many palynologists prefer to call amorphous kerogen structureless organic matter (SOM). Amorphous kerogen is lipid-rich, and it is the dominant component of most oil source rocks.

- **Liptinite.** In this category we have included all of the structured, lipid-rich macerals. The main ones are: exinite (spores and pollen), algae, plant cuticles, and resins. At LOM's of 11.5-12 liptinite loses its fluorescence, and attains a reflectance similar to that of vitrinite. As a result, liptinite cannot be distinguished from vitrinite at LOM's above 11.5-12.

- **Bitumens.** Often called solid hydrocarbons. At low LOM's bitumens fluoresce and have reflectivities lower than that of vitrinite. At LOM's of about 11, the solid hydrocarbons lose their fluorescence and attain a reflectance similar to that of vitrinite. At high LOM's, morphology and the typical grainy texture help the identification.

- **Vitrinite.** We have also used the term humic (reactive) for the vitrinite group, as vitrinite is the principal component of reactive humic matter. Vitrinite can be subdivided into sub-macerals such as ulminite, corpohumite, telinite, etc., but these refinements are not normally of importance to us.

- **Inertinite.** In this category are included all of the macerals which are essentially inert or non-reactive. The inert category includes fusinite, semi-fusinite, altered vitrinite, reworked vitrinite, pseudo-vitrinite, sclerotinite and micrinite.
Figure VII-12. Principal organic-metamorphic stages of petroleum generation (Hood et al., in press).
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**Analyses**

- **Visual Examinations**
  - **Micrite**
    - **Description**: Micrite
    - **Remarks**: None
  - **Calcite Precipitates**
    - **Description**: Calcite Precipitates
    - **Remarks**: None
- **Remains**
  - **Description**: Remains
  - **Remarks**: None

**Appendix**

- **Additional Data**
  - **Lithofacies**
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### Visual Kerogen Analysis

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**Notes:**
- Mean reflectance values are given with 95% confidence limits.
- LOM: Light Oil Mode.
- Remarks include source and formation details.
## Reflectance Analysis

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<th>Depth or Sample No.</th>
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Liptinite attains a reflectance similar to that of vitrinite at around LOM 11.5-12 and can no longer be distinguished from vitrinite.

Visual kerogen analysis refers to the relative amounts of each type of kerogen to the total kerogen. It does not indicate quantitatively the amount of kerogen in the sample.

Where two or more values are presented, the A mean is preferred and the X group refers to the entire spread of vitrinite values seen in the sample.
Four different types of sample preparation were analysed for this study. They include:

- **Float fraction** - light material (predominantly coal) separated from the bulk cuttings by heavy liquid separation ($\rho < 2.0$).
- **Sink fraction** - heavy material (shales, etc.) which was separated from the bulk cuttings by heavy liquid separation ($\rho > 2.0$) and acid macerated to obtain a kerogen concentrate.
- **Ditch** - a bulk cuttings sample, acid macerated.
- **Picked coal** - hand picked to obtain the in situ material.

The samples at 1980-2160 and 5930-5980 contained coked vitrinite. This implies that they have been altered (naturally coked) by a thermal anomaly, such as an igneous intrusion. Furthermore, the reflectance of the sample at 1980-2160 is anomalously high, relative to the overall reflectance-depth trend.

There is a significant change in the reflectance-depth gradient, changing from a rather high gradient above ~8250' (Tertiary and Upper Cretaceous) to virtually no gradient below ~8250' (Lower Cretaceous and Jurassic).

---

JRC/AKK/PRJ:pv
Attachments

cc: J. R. Castano (w/attachments)
Well File (w/attachments)
Regional Geochemistry File (w/attachments)
P. Herr (w/attachments)
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Heavy liquid has specific gravity of 2.0
Picked coal - coal physically concentrated by hand
Pellet = coal was crushed to <250 micrometer

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**BIG RIVER**

**AKA** Location 15 49 B 66 W 7

**PLOT TYPE** = VITRINITE

**PERCENT REFLECTANCE**

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<td>1.78</td>
<td>1.78</td>
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</table>

**REM.**

- **REMARKED VIT**: 1
- **STDV LO'M**: 0.037
- **REM.**: 4.00
- **MIN**: 0.00
- **MAX**: 2.00
- **RANGE**: 0.00
- **MEAN**: 0.00
- **STDV**: 0.00
- **LO'M**: 0.00
- **REM.**: 0.00

**OTHER MACERALS**

- **REMARKED VIT**: 2
- **STDV LO'M**: 0.037
- **REM.**: 4.00
- **MIN**: 0.00
- **MAX**: 2.00
- **RANGE**: 0.00
- **MEAN**: 0.00
- **STDV**: 0.00
- **LO'M**: 0.00
- **REM.**: 0.00

**REM.**

- **REMARKED VIT**: 3
- **STDV LO'M**: 0.037
- **REM.**: 4.00
- **MIN**: 0.00
- **MAX**: 2.00
- **RANGE**: 0.00
- **MEAN**: 0.00
- **STDV**: 0.00
- **LO'M**: 0.00
- **REM.**: 0.00
PHILLIPS PETROLEUM CO.

BIG RIVER

AKA LOCATION 15 49 36 68 W 7 TOP 00990.00 BOT 01050.00 FT

PLOT TYPE = VITRINITE

N MAX MIN RANGE MEAN CONF STDV LOW
51 0.70 0.28 0.42 0.45 ± 0.027 0.09 7.34

OTHER MACERALS

PLOT TYPE = VITRINITE

SCLEROTINITE 1 0.75 0.75

SHELL DEVELOPMENT REFLECTANCE PLOT

VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.
BIG RIVER

A-1

AKA LOCATION 15 49 68 W 7 TOP 01980.00 BDT 02160.00 FT

PLOT TYPE = DOKED VITRIN
VITRINITE 50 0.54 0.96

N MAX MIN MEAN CONF STDV
50 4.49 1.27 3.16 2.03 ± 0.165 0.52

OTHER MACERALS

VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.

BIG RIVER

AKA LOCATION 15 49B 68 W 7 TOP 01980.00 BOT 02160.00 FT

PLOT TYPE = VITRINITE

OTHER MACERALS

50 1.02 0.70 0.32 0.63 ± 0.022 0.07 10.00

1AK0712829001 VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.

BIG RIVER  A-1

AKA LOCATION 15 49 B 68 W 7  TOP 04850.00  BT 04820.00 FT

PLOT TYPE = VITRINITE

OTHER MACERALS

N  MIN  MAX

FUSINITE  1  1.04  1.94

SO  1.00  1.04  0.46  1.32  0.027  0.09  1.04

1AK071282V002 VITAL VERSION 1.11
VITRINITE SNELL DEVELOPMENT REFLECTANCE PLOT

PHILLIPS PETROLEUM CO.

BIG RIVER
AKA LOCATION 15A-1 49° 60.0 W 7 8020.00 80340.00 FT
PLOT TYPE = VITRINITE

N  MAX  MIN  RANG  MEAN  CONF  STDV  LOM
65  1.53  1.04  0.54  1.33  ±0.025  0.10  11.96

1AK071252Y004 VITAL VERSION 1.11
### Sample Data

**Variables**
- **Petroleum**
- **Location**
- **Vitrinite Type**
- **Other Macerals**

**Data Summary**

<table>
<thead>
<tr>
<th>Plot Type</th>
<th>MIN</th>
<th>MAX</th>
<th>Mean</th>
<th>Std Dev</th>
<th>LOM</th>
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<tbody>
<tr>
<td>Vitrinite</td>
<td>0.88</td>
<td>1.08</td>
<td>0.90</td>
<td>0.043</td>
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**Other Macerals**

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<tbody>
<tr>
<td>Other Macerals</td>
<td>1.4</td>
<td>1.6</td>
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</table>

**Plot Details**

- **PHILLIPS PETROLEUM Co.**
- **BIG RIVER**
- **LOCATION 15**
- **TOP 05980.00**
- **BOT 05980.00 FT**
- **N**

**Graph**

- **Reflectance Plot**
- **Per Cent Reflectance**
- **YOS047002**
- **SNE£L**
- **LEVEL**
- **RELECTANCE**
- **PL&T**
- **Radian 102512000100**

**Graph Details**

- **Big River A-1**
- **Min 0.88**
- **Max 1.08**
- **Mean 0.90**
- **Std Dev 0.043**
- **LOM 0.16**

**ID.N.D.**

- **1A001282V006**
- **VITAL VERSION** 1.11
BID RIVER
A-1
49 B 68 W 7
TOP 06470.00 BOT 06510.00 FT

N 50
MIN 2.03 0.00
MAX 1.23 0.80
MEAN 1.62
STDV 0.043
LGM 0.14

OTHER MACERALS
N 1
MIN 4.01
MAX 4.01

PHILLIPS PETROLEUM CO.

VITRINITE

SHELL DEVELOPMENT REFLECTANCE PLOT

ID.NO. 502512000100

VITAL VERSION 1.1
PHILLIPS PETROLEUM CO.

SHELL DEVELOPMENT REFLECTANCE PLOT

PLOT TYPE: VITRINITE

VITAL VERSION 1.11

ID.NO. 502512000100

PHILLIPS PETROLEUM CO.

RIO RIVER

AKE LOCATION 15

TOP 06900 DOT 06940 FT

PLOT TYPE: VITRINITE

N MIN MAX

80 2.07 3.32 0.76 1.30 1.04 0.046 0.16 13.00

OTHER MASTERS

FUSINITE 1 2.48 2.48

FT

MIN MAX RANG MEAN CONF STDW LOM

N 0.75 1.70 4.046 0.16 13.00
VOS0051001  PLOT TYPE = VITRINITE  SHELL DEVELOPMENT REFLECTANCE PLOT  ID.NO. SUBS12000100  22.

1.0  1.2  1.4  1.6  1.8  2.0  2.2  2.4  2.6  2.8  3.0

PHILLIPS PETROLEUM CO.  A-1
BID RIVER  AKA LOCATION 14  49B 68W 7  TOP 06900.00  BOT 06940.00 FT
PERCENT REFLECTANCE

PLOT TYPE = VITRINITE
OTHER MACERALS

N  MIN  MAX
N  MAX  MIN  RANG  MEAN  CONF  STDV  LOM
52  2.13  1.61  0.52  1.83 ± 0.036  0.12  13.22

LAK071292V006  VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.

BIG RIVER

A-1

LOCAIION 15 49° 68' W 7 TDr 07310.00 DTT 07390.00 FT

PLTT TYPE = VITRINITE

MIN 

MAX 

SMF

STDV

LM

60 2.46 1.32 0.94 2.10 ± 0.060 0.18 14.38

OTHER MACERALS

FUSINITE

2 2.29 ± 0.67

19571282V099 VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.

BID RIVER

AREA LOCATION 15 49 B 68 W 7 TOP 07710.00 BOT 07720.00 FT

PLOT TYPE = VITRINITE

SUM DEVELOPMENT REFLECTANCE PLOT

ID NO: 50012000100

PERCENT REFLECTANCE

0 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

PHILLIPS PETROLEUM CO.

PLOT TYPE = VITRINITE

OTHER MINERALS

N MAX MIN RANG MEAN STDEV LOM

59 2.62 1.52 1.10 2.02 ±0.058 0.20 15.99

1AK0712829010 VITAL VERSION 1.11
VITRINITE

PHILLIPS PETROLEUM CO.

BIG RIVER

A-1

LOCATION 15 49 36 W 7

TOP 08290.00 BOT 00000.00 FT

PLOT TYPE = VITRINITE

PETRACE

PERCENT REFLECTANCE

1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

PHILLIPS PETROLEUM CO.

BIG RIVER

A-1

LOCATION 15 49 36 W 7

TOP 08290.00 BOT 00000.00 FT

PLOT TYPE = VITRINITE

PETRACE

PERCENT REFLECTANCE

1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

PLOT TYPE = VITRINITE

SHELL DEVELOPMENT REFLECTANCE PLOT

ID NO. 6029112000100

N MIN MAX

5.4 3.4 8.4

N MAX MIN RANG MEAN CONV STDV LOM

5.4 2.8 1.8 1.9 0.97 2.44 ± 0.059 0.20 16.03

VITAL VERSION 1.11
PHILLIPS PETROLEUM CO.

BIG RIVER

A15A LOCATION 49 8 62 W 7 TDP 08960.00 BOT 08970.00 FT

PLOT TYPE = VITRINITE FUSINITE

N MAX MIN RANG MEAN CONF STDV LOM

RS 2.91 1.99 0.98 2.43 ± 0.056 0.19 16.00

OTHER MACERALS

VITAL VERSION 1.11
VOS00E8001  PLOT TYPE = VITRINITE

PHILLIPS PETROLEUM CO.

BIO RIVER

ACA LOCATION 15 49 B 66 W 7 TOP 09360.00 BOT 09480.00 FT

PLOT TYPE = VITRINITE

N  MAX  MIN  RANG  MEAN  CONF  BTDV  LOM

65  2.91  1.74  1.17  2.40 ± 0.069  0.23  15.86
1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

PERCENT REFLECTANCE

PHILLIPS PETROLEUM CO.

BIO RIVER LOCATION 15 49° 28' 7" 7 TOP 10000 BOT 10050 FT

PLOT TYPE = VITRINITE

OTHER MACERALS

STANIUKICH-NAKNEK/JURASSIC

N MAX MIN RANG MEAN CONF STDV LOM
69 2.58 1.85 0.73 2.26 ± 0.049 0.15 15.19
PHILLIPS PETROLEUM CO.

BIG RIVER

AKA LOCATION 15 49° 68 W 7 TOP 10000.00 EAST 10000.00 FT

PLOT TYPE = VITRINITE

N MAX MIN RANG MEAN CONF STDV LOM

51 2.68 1.87 0.81 2.44 ± 0.046 0.15 16.07

SHELL DEVELOPMENT REFLECTANCE PLOT

ID.NO. SB2512000100

PLOT TYPE = VITRINITE

SHELL DEVELOPMENT REFLECTANCE PLOT

ID.NO. SB2512000100
PHILLIPS PETROLEUM CO.

BIG RIVER A-1

LOCATION 15 49 3 60 W 7 TOP 11000.00 BOT 11050.00 FT

PLOT TYPE = VITRINITE

N  MAX  MIN  RANG  MEAN  CONF  STDV  LOM
50  2.70  1.60  1.10  2.14  0.072  0.24  14.59
<table>
<thead>
<tr>
<th>Depth Ft.</th>
<th>Lab No.</th>
<th>Sample Type, Lithology</th>
<th>Formation, Age</th>
<th>D/F Ratio</th>
<th>Total HC Yield wt %</th>
<th>LOM</th>
<th>VRE</th>
<th>ORGANIC CARBON NCC wt %</th>
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<tbody>
<tr>
<td>390-420</td>
<td>AKA-S-1944 FZ20888</td>
<td>D, gry mudstone</td>
<td>Oligocene</td>
<td>0.029</td>
<td>0.045</td>
<td>&lt;1.1</td>
<td>&lt;1.05</td>
<td>0.92</td>
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<td>420-450</td>
<td>AKA-S-1945 FZ20889</td>
<td>&quot; &quot; Stepovak, Olig-Eoc.</td>
<td>0.287</td>
<td>0.010</td>
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<td>ND</td>
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<td>1020-50</td>
<td>AKA-S-1946 FZ20890</td>
<td>&quot; &quot; shale</td>
<td>&quot; &quot;</td>
<td>0.092</td>
<td>0.041</td>
<td>&lt;1.1</td>
<td>&lt;1.05</td>
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<td>1980-2040</td>
<td>AKA-S-1947 FZ20891</td>
<td>&quot; coal</td>
<td>Tolstoi, Eocene</td>
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<td>10.010</td>
<td>&lt;1.1</td>
<td>&lt;1.05</td>
<td>44.7</td>
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<td>2040-70</td>
<td>AKA-S-1948 FZ20892</td>
<td>&quot; &quot; brown-shale</td>
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<td>5930-80</td>
<td>AKA-S-1949 FZ20897</td>
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<td>6.063</td>
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<td>6470-6510</td>
<td>AKA-S-1950 FZ20898</td>
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<td>6470-6510</td>
<td>AKA-S-1951 FZ20899</td>
<td>&quot; brown-shale</td>
<td>&quot; &quot;</td>
<td>0.070</td>
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<td>13.9</td>
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<td>6900-40</td>
<td>AKA-S-1952 FZ20900</td>
<td>&quot; &quot; coal</td>
<td>&quot; &quot;</td>
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<td>13.7</td>
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<td>37.0</td>
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<tr>
<td>7310-30</td>
<td>AKA-S-1953 FZ20901</td>
<td>&quot; &quot; Chignik, UK</td>
<td>&quot; &quot;</td>
<td>0.029</td>
<td>1.089</td>
<td>15.2</td>
<td>2.25</td>
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<td>7710-20</td>
<td>AKA-S-1954 FZ20902</td>
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<td>0.023</td>
<td>0.811</td>
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<td>2.20</td>
<td>33.3</td>
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<tr>
<td>8290-8300</td>
<td>AKA-S-1955 FZ20903</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>0.009</td>
<td>0.944</td>
<td>16.9</td>
<td>2.67</td>
<td>71.8</td>
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<td>8360-70</td>
<td>AKA-S-1956 FZ20904</td>
<td>&quot; &quot; from HLS</td>
<td>&quot; &quot;</td>
<td>0.014</td>
<td>0.690</td>
<td>16.6</td>
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<tr>
<td>9370-90</td>
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<td>&quot; gry shale</td>
<td>Stanikovitch Naknek, Jur.</td>
<td>0.970</td>
<td>0.010</td>
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<td>ND</td>
<td>0.48</td>
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### PYROLYSIS FID Analysis

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<th>Depth Ft.</th>
<th>Lab No.</th>
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<th>Formation, Age</th>
<th>D/P Ratio</th>
<th>HC Yield wt %</th>
<th>LOI wt %</th>
<th>VRE wt %</th>
<th>NCC wt %</th>
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<tr>
<td>9690-9720</td>
<td>AXA-S-1958</td>
<td>D, osly shale</td>
<td>Staniukovich</td>
<td>0.291</td>
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<td>9690-9720</td>
<td>AXA-S-1959</td>
<td>&quot; coal</td>
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<td>0.019</td>
<td>0.358</td>
<td>17.0</td>
<td>2.71</td>
<td>*34.1</td>
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<td>0.849</td>
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<td>AXA-S-1963</td>
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* The samples was limited so that elemental carbon analysis was run rather than NCC. The analysis was run on the leached sample of AKA-S-1945 but the data is reported on the basis of the original sample. The leaching factor is 0.8148. The analysis was run on the leached coal AKA-S-1959.

Pyrolysis-fluorescence was run on the bulk ditch samples from the interval 34-11370 ft; the source rock log is attached.

Refer to BRC Request Nos. 23604 & 23605.

J. R. CASTANO

---

**JRC/MLM: pv**

**Sample Type**

- C= Core
- D= Picked Ditch
- M= Mine
- O= Outcrop
- S= Sidewall Core
- UD= Unpicked ditch
- X= Extracted
- HLS= Heavy liquid separation

**Kerogen Type**

- I, Lipid
- II, Lipid
- III, Humic
- IV, Inert
- E= Excellent
- F= Fair
- G= Good
- M= Marginal
- N= Non Source
- NA= Not applicable
- ND= No determination

**Source Rock Qual.**

- cc: J. R. Castano (w/attachments)
- Well File (w/attachments)
- Regional Geochemistry File (w/attachments)
- P. Herr (w/attachments)
<table>
<thead>
<tr>
<th>STATE OR PROV</th>
<th>Phillips COMPANY</th>
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<tbody>
<tr>
<td>Alaska</td>
<td>Big River</td>
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<tr>
<td>COUNTY</td>
<td>NO. A-1</td>
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<td>T. R.</td>
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### SURVEY BLK.

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<th>COMM.</th>
<th>COMP.</th>
<th>SEC.</th>
<th>BLK.</th>
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### T.D.

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<th>RADIOACTIVE MICROLOG LATEROLOG</th>
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</table>

**REMARKS**

Std. 36 ± 2 units. Scale is 1" = 100'. Zero to five is plotted as five by plotter.

**SAMPLED BY:**

**DATE**

**ANALYZED BY:** F. Della-Rose, R. Rios

**DATE** 5/20/82

**PLOTTED BY:** P. Valentine & N. West

**DATE** 7/82

### DEPTH AND REMARKS

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<tr>
<th>LITHOLOGY</th>
<th>TOTAL FLUORESCENT UNITS SCALE</th>
<th>DEPTH AND REMARKS</th>
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**TOTAL FLUORESCENT UNITS SCALE**

- 0
- 100
- 200
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<tbody>
<tr>
<td>NCC%</td>
<td>1.46 (corr.)</td>
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<tr>
<td>RC YIELD</td>
<td>0.013%</td>
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<tr>
<td>NCC%</td>
<td>0.39</td>
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</table>

<table>
<thead>
<tr>
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<td>11400</td>
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SHELL DEV. DEPTH-REFLECTANCE PLOT
PRODUCED BY DEPTH PROGRAM VERSION 2.01

API NO. 502512000100  AKA PHILLIPS PETROLEUM CO.  BIG RIVER  A=1
LOCATION 15 49 3 68 W 7  LAT. 49 S 8'N  LONS. 7
AREA ALEUTIAN BASIN  DATE 7/13/82
ELEV. 261 ft  T.D. 11370
REMARKS O=E=OLIGOCENE-EOCENE STEPOVAK  E=E=EOCENE TOLSTOI  UK=U.CRETACEOUS OHIONIK
LKH=L.CRETACEOUS HERENDEEN  JU=JURASSIC STANIUKOVICH-NAKNEK

PLOTTING SYMBOLS

MEAN = ------------------
VIT  =  [ ]
FID  =  [ ]

BAR = BARREN  [ ]
NO = NO DETERMINATION  [-CONF]  [+CONF]

DEPTH IN FEET

...