Enlcosures 7 through 11: Source rock screening analyses, evaluation, palynology, visual kerogen, and TAI analysis, in Krass, V.A., and Amoco Oil Co., 1987 Alaska fieldwork, De Long Mountains, Brooks Range, Alaska

Krass, V.A., and Amoco Oil Co.

GMC DATA REPORT 460D

This GMC data report from the Amoco Heritage collection has been made available through funding from the FY2018 USGS National Geological and Geophysical Data Preservation Program, Grant Number G18AP00054. This project report is presented in its original format and has not been reviewed for technical content or for conformity to the editorial standards of DGGS. It should not be used or cited as reviewed data.

2019
State of Alaska
Department of Natural Resources
Division of Geological & Geophysical Surveys
GEOLOGIC MATERIALS CENTER

ENCL. 7
NO-09-89R
KRASS

EXLOG/BROWN & RUTH LABORATORIES, INC.
8985 EAST NICHOLS AVENUE, SUITE 300, ENGLEWOOD, COLORADO 80112

September 28, 1987

Ms. Valerie A. Krass
Amoco Production Company
P.O. Box 800
Denver, Colorado 80201

Dear Ms. Krass:

Attached are the results of our analysis of the 61 outcrop samples submitted with your letter of September 4, 1987. All unused sample material is being retained pending further instructions.

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

Very truly yours,

EXLOG/BROWN & RUTH LABORATORIES, INC.

G. W. Ruth

Gary W. Ruth

GWR/pw

cc: Mr. Peter K.H. Groth
Geological Associate - Special Projects

CF8800007

7.

Results of Total Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft)	TOC (Wt.%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	Hydrogen Index	Oxygen Index
6338-001	87-22-2	1.99	0.11	3.91	0.45	436	0.03	197	23
6338-002	87-22-3	0.58	<0.10	<0.10	0.35	**	---	---	61
6338-003	87-22-4A	0.91	0.28	0.87	0.43	452	0.25	95	48
6338-004	87-23-1	1.75	<0.10	<0.10	0.73	**	---	---	41
6338-005	87-23-2	1.19	<0.10	<0.10	1.26	**	---	---	106
6338-006	87-23-3	1.41	<0.10	<0.10	0.98	**	---	---	70
6338-007	87-23-4	0.57	<0.10	<0.10	0.44	**	---	---	77
6338-008	87-23-5	4.70	<0.10	<0.10	0.81	**	---	---	17
6338-009	87-23-7	0.18	---	---	---	---	---	---	---
6338-010	87-23-8	0.15	---	---	---	---	---	---	---
6338-011	87-23-9	0.98	<0.10	<0.10	<0.10	**	---	---	---
6338-012	87-23-9B	1.05	<0.10	0.26	0.11	**	---	25	10
6338-013	87-23-11	0.15	---	---	---	---	---	---	---
6338-014	87-23-13	0.53	<0.10	0.28	<0.10	**	---	53	---
6338-015	87-23-14	0.86	<0.10	0.10	0.14	**	---	12	16
6338-016	87-24-1A	1.64	<0.10	0.62	0.16	441	---	38	10
6338-017	87-24-1B	0.78	0.16	0.48	0.10	443	0.25	61	13
6338-018	87-24-1C	0.65	<0.10	0.14	0.22	448	---	21	34
6338-019	87-24-1E	0.84	<0.10	<0.10	0.12	**	---	---	14
6338-020	87-24-1F	0.86	<0.10	0.19	0.11	455	---	22	12
6338-021	87-24-1G	0.25	---	---	---	---	---	---	---
6338-022	87-24-2A	1.33	<0.10	0.77	0.11	446	---	58	9
6338-023	87-24-2B	1.28	0.13	0.88	0.12	444	0.13	69	9
6338-024	87-24-3	1.14	0.11	0.41	0.24	455	0.21	36	21
6338-025	87-24-3B	1.49	0.27	1.11	0.18	453	0.20	74	12
6338-026	87-24-4A	1.44	0.10	0.55	0.10	456	0.16	38	7
6338-027	87-24-4B	1.06	<0.10	0.40	0.11	451	---	37	10
6338-028	87-24-5	2.26	0.91	2.42	0.18	455	0.27	107	8
6338-029	87-24-6	0.50	<0.10	0.27	0.10	**	---	55	21
6338-030	87-24-7	0.99	0.26	0.45	0.63	459	0.36	46	64
6338-031	87-26-1	0.70	<0.10	0.16	0.33	480	---	22	48
6338-032	87-26-1A	7.81	0.21	7.81	0.23	449	0.03	100	3
6338-033	87-26-2	0.17	---	---	---	---	---	---	---
6338-034	87-26-3	10.24	0.83	5.73	0.20	474	0.13	56	2
6338-035	87-26-3B	5.74	0.18	1.41	0.33	474	0.11	26	6
6338-036	87-26-4	0.22	---	---	---	---	---	---	---
6338-037	87-26-5	0.78	<0.10	<0.10	<0.10	526	---	---	---
6338-038	87-26-6	6.24	0.26	2.32	0.55	460	0.10	37	9
6338-039	87-26-7	0.18	---	---	---	---	---	---	---
6338-040	87-26-8	2.89	0.13	1.09	1.10	489	0.10	38	38
6338-041	87-27-2	15.08	0.33	7.18	1.29	456	0.04	48	9
6338-042	87-27-3A	1.14	0.11	0.19	0.25	466	0.36	17	22
6338-043	87-27-3C	6.90	0.82	3.38	0.98	466	0.20	49	14
6338-044	87-27-4	0.25	---	---	---	---	---	---	---
6338-045	87-27-5	0.26	---	---	---	---	---	---	---

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

Results of Total Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft)	TOC (Wt.%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	Hydrogen Index	Oxygen Index
6338-046	87-27-6	22.14	1.05	40.13	1.02	446	0.03	181	5
6338-047	87-27-7	3.78	0.43	1.65	0.33	465	0.21	44	9
6338-048	87-27-8	10.55	0.28	4.64	1.75	464	0.06	44	17
6338-049	87-28-6	0.18	---	---	---	---	---	---	---
6338-050	87-28-7A	8.41	0.31	2.80	0.50	480	0.10	33	6
6338-051	87-29-1A	0.37	---	---	---	---	---	---	---
6338-052	87-29-2A	1.56	0.64	1.75	0.20	445	0.27	112	13
6338-053	87-29-2B	2.21	0.73	2.26	0.23	448	0.24	103	11
6338-054	87-29-3A	2.10	<0.10	3.44	0.16	439	---	---	8
6338-055	87-29-4A	0.91	<0.10	0.31	0.24	459	---	34	26
6338-056	87-29-5A	35.34	1.61	111.33	0.38	452	0.01	315	1
6338-057	87-29-6A	0.39	---	---	---	---	---	---	---
6338-058	87-29-7A	27.72	2.76	84.25	0.81	443	0.03	304	3
6338-059	87-29-8A	1.73	<0.10	0.75	0.28	449	0.09	43	16
6338-060	87-29-9A	0.35	---	---	---	---	---	---	---
6338-061	87-29-9C	1.44	<0.10	0.21	0.58	505	0.21	15	40

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

ENCL 8
NO-09-89R
KRASS

88173ART0265

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

SOURCE ROCK EVALUATION

Western Brooks Range Outcrops, Alaska

Geochemistry Services Group

R. J. Harwood

Technical Service 879284CR
Requested by V. A. Krass
DENVER NORTHERN RLHarwood (7/5/88)

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92-0663859-013

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Subject: Western Brooks Range Outcrops, Alaska (Figure 1)

INTRODUCTION

A total of sixty-one outcrop samples from several different formations in the western Brooks Range were collected by Denver geologists and submitted to Exlog (Denver) for total organic carbon and RockEval screening (Table 6). The samples were collected from the Cretaceous Fortress Mountain, Jurassic-Cretaceous Ipewik, Lower Cretaceous Okpirkruak, Permian-Triassic Etivluk, Permian Siksikpuk, Mississippian-Pennsylvanian Kuna, Triassic-Jurassic Otuk, and in a few cases from unknown formations and of unknown age to help determine the prospects for petroleum accumulations in this area. These samples were collected in response to the favorable results from a preliminary set of outcrop samples reported under technical service 865233, which have sample numbers R-4278 to R-4285 on the location map, Figure 1.

Thirty-three of the samples analyzed by Exlog had over 1.0% TOC (Figure 6), and were sent to Tulsa Research for complete analysis. These samples tend to be from four areas which are designated as the Central, NE, SE, and NW areas for purposes of discussion. The results of the Amoco Rock-Eval and TOC analyses, not the Exlog RockEval and TOC data are reported in Table 2. The data tables for these analyses are organized by formation.

CONCLUSIONS

(1) Most samples that passed screening have good and excellent petroleum generation ratings, and contain oil type kerogens.

(2) Levels of thermal maturity range from early oil generation to advanced maturity. The highest levels of maturity occur in the NE and SE areas. More moderate maturity levels occur in the NW area, and lower levels of maturity occur in the Central area.

(3) Correlation of these source rocks with oils from the North Slope was not possible because of the unusual general deficiency of biomarker compounds in the rock extracts.

RECOMMENDATION

The high frequency of excellent quality oil prone source beds in this sample suite suggests that this area has excellent exploration potential. We recommend that additional samples be collected to refine our understanding of the organic facies and thermal maturity distributions.

SOURCE ROCK EVALUATION

These samples mostly have moderate to large amounts of oil type kerogen. Based on total organic carbon contents these samples have the following petroleum generation ratings: Etivluk 1 good 9 excellent, Fortress Mountain 1 excellent, Ipewik 2 marginal 5 good, Kuna 3 excellent, Okpirkruak 1 marginal 1 good, Otuk 3 good 4 excellent, and Siksikpuk 1 good (Table 1). The maximum TOC contents in these samples by formation are: Etivluk 32.7%, Fortress Mountain 10.1%, Ipewik 1.4%, Kuna 6.0%, Okpirkruak 1.8%, Otuk 8.1%, and Siksikpuk 1.7% (Table 2). In all cases where thermal maturity was sufficiently low to determine the kerogen type using convertibility on pyrolysis, elemental H/C ratios, and FTIR (Fourier Transform Infrared) data, the kerogens are identified as oil type (Tables 2 and 5, Enclosure 1). Stated another way, oil type kerogens were identified in all of the above formations except the samples from the Okpirkruak and Siksikpuk, where the kerogen types could not be determined.

Many of these samples have several percent TOC, but especially notable are Etivluk samples 4474, 4481, and 4482 with 23.3%, 32.7%, and 26.3% TOC. Also, the Fortress Mountain sample 4476 has 10.1% TOC. These samples are in the NE and Central areas.

Two Etivluk samples (4481 and 4482) have especially rich type I oil generating kerogens. These samples have very high 1.27 and 1.43 H/C ratios and very high convertibilities on pyrolysis of 0.48 and 0.41.

Comparison of the Amoco and Exlog screening results shows generally good correspondence, especially considering that these analyses were done on different sample aliquots and with different analytical instruments. The higher TOC samples tended to have the larger discrepancies. However, almost all of these variations are unimportant in the interpretations.

The levels of thermal maturity are the most subjective and difficult of the interpretations. These interpretations are made from the vitrinite reflectance values, elemental H/C ratios, convertibilities on pyrolysis, Tmax temperatures, and especially important the appearance of the bitumen chromatograms showing the development of normal paraffin peaks (Tables 2, 4, and 5, Figure 2, and Enclosure 2). Using these criteria the Etivluk is interpreted as ranging from early oil to past peak oil-peak gas generation, Fortress Mountain past peak oil-peak gas generation, Ipewik early oil to late peak oil generation, Kuna past peak oil-peak gas to advanced maturity, Okpirkruak past peak oil-late gas to advanced maturity, Otuk early peak oil to past peak oil-peak gas generation, and Siksikpuk advanced maturity. The older samples tend to be at higher levels of thermal maturity, but with exceptions.

Plots of the H/C versus O/C data (Figure 3) and H/C versus vitrinite reflectance data (Figure 4) show normal kerogen thermal maturation trends. (Note: in the H/C ratio versus vitrinite reflectance plot the data are

compared to those for Devonian samples from the the Northwest Territories of Canada.)

A better way to compare thermal maturities appears to be according to the geographic areas. These comparisons suggest that kerogens in the NW area range from early oil to late peak oil stages of generation. The samples in the Central area range from early oil to late peak oil stages of generation with most samples in early oil and early peak oil stages of generation. In the NE area levels of maturity range from early peak oil to past peak oil-peak gas stages of generation with most samples in the past peak oil-peak gas stage of generation. In the SE area the kerogens range from past peak oil-peak gas to advanced maturity; three of the five samples are in advanced maturity. The results suggest that the NW and Central areas are more favorable for oil preservation and the SE area is least favorable.

These levels of thermal maturity can be illustrated more clearly by plotting the relevant kerogen analysis data on maps. The map of the vitrinite reflectance values in Figure 5 shows the ranges for the five areas: NW 0.57%-1.07%, Central 0.45%-1.67%, NE 0.56%-1.51%, and SE 1.23%-2.12%. The elemental H/C ratios on Figure 6 tend to show the same pattern by area: NW 0.48-0.67, Central 0.38-1.43, NE 0.42-0.87, and SE 0.21-0.26. A note, both Figures 5 and 6 include data from technical service 865233.

In some instances the H/C ratios probably were lowered by oxidation associated with weathering. As with all outcrop samples weathering can reduce the amounts and quality of the kerogens leading to a less favorable interpretation than the area warrants. FTIR did identify slight to strong weathering and oxidation of the kerogens in samples 4451, 4453, and 4467 (Enclosure 1), but other kerogens may also have been somewhat oxidized and be at positions on the FTIR plot where interpretation of the degree of oxidation is difficult.

Information about correlation of these oil source beds with the North Slope oil types could be useful. The only practical method to make such a correlation is with gas chromatography-mass spectrometry analysis (GC-MS) of the bitumens and comparison of specific ion chromatograms and peak ratios. However, most of the bitumens for the current samples are largely deficient in biomarker compounds on GC-MS analysis (Figures 7, 8, 9, and 10), so correlation with the North Slope oils, or even among the current samples by this means is not possible. Pyrolysis of two of the samples was tried to generate biomarker compounds, but no significant changes in biomarker quantities were detected.

Etivluk samples 4478 and 4464 from the current set are from the same survey sections respectively as samples 4279 and 4282 in technical service 865233. The data and interpretations are similar for these two sets of corresponding samples.

These results show the presence of rich oil sources that have generated petroleum and show that the Central and NW areas could contain indigenous or migrated oil. These data are favorable for petroleum exploration.

Robert J. Harwood

R. J. Harwood

RJH

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

OFFICE DENVER DISTRICT NORTHERN
AUTHORIZED BY V. A. KRASS
TECHNICAL SERVICE NUMBER 879284

SOURCE ROCK SUMMARY
TABLE 1A.
DATE 06/10/88

SAMPLE NUMBER	SMPL TYPE	FORMATION	AGE	LITHOLOGY	AREA	PETROLEUM GENERATION		
						CAPABILITY	TYPE	STAGE
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION NE/4 SEC: 28 T: 32N R: 18W				API 500739980060
OPERATOR		LEASE OT87-23-9B						
R-4455	OT	NOT KNOWN	NOT KNOWN	SH	SE	MARGINAL	NOT KNOWN	PAST PEAK OIL-LATE GAS
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION SE/4 SEC: 1 T: 12S R: 47W				API 500739980061
OPERATOR		LEASE OT 87-26-3B						
R-4466	OT	NOT KNOWN	NOT KNOWN	SH	NE	EXCELLENT	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION NE/4 SEC: 6 T: 12S R: 46W				API 500739980045
OPERATOR		LEASE OT 87-26-6						
R-4467	OT	ETIVLUK	PERM-TRIA	SH	NE	EXCELLENT	OIL*	PAST PEAK OIL-PEAK GAS
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION S/2 SEC: 7 T: 11S R: 46W				API 500739980022
OPERATOR		LEASE OT 87-22-2						
R-4449	OT	ETIVLUK	PERM-TRIA	SH	NE	EXCELLENT	OIL	EARLY PEAK OIL
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION NE/4 SEC: 21 T: 12S R: 50W				API 500739980033
OPERATOR		LEASE OT 87-24-5						
R-4463	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL	PEAK OIL
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION SW/4 SEC: 23 T: 10S R: 45W				API 500739980050
OPERATOR		LEASE OT 87-27-6						
R-4474	OT	ETIVLUK	PERM-TRIA	SH	NE	EXCELLENT	OIL	EARLY PEAK OIL?
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W				API 502059980039
OPERATOR		LEASE OT 87-29-2A						
R-4478	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	GOOD	OIL	EARLY PEAK-PEAK OIL
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W				API 502059980047
OPERATOR		LEASE OT 87-29-2B						
R-4479	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL	EARLY PEAK-PEAK OIL

*OXIDIZED KEROGEN

NOTE: THERMAL MATURITY DATA OFTEN ARE CONFLICTING. SOME MATURITY INTERPRETATIONS ARE TENUOUS.

AMOCO PRODUCTION COMPANY
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SOURCE ROCK SUMMARY
TABLE 1B.
DATE 06/10/88

SAMPLE NUMBER	SMPL TYPE	FORMATION	AGE	LITHOLOGY	AREA	PETROLEUM GENERATION		
						CAPABILITY	TYPE	STAGE
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-3A		WELL LOCATION SW/4 SEC: 9 T: 33N R: 23W			API 500739980053
R-4480	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL	EARLY PEAK OIL
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-5A		WELL LOCATION SE/4 SEC: 9 T: 33N R: 23W			API 500739980055
R-4481	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL (TYPE I)	EARLY OIL
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-7A		WELL LOCATION W/2 SEC: 36 T: 32N R: 23W			API 500739980057
R-4482	OT	ETIVLUK	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL (TYPE I)	EARLY OIL
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-26-1A		WELL LOCATION NW/4 SEC: 6 T: 33N R: 22W			API 500739980040
R-4464	OT	ETIVLUK ?	PERM-TRIA	SH	CENTRAL	EXCELLENT	OIL	LATE PEAK OIL
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-8		WELL LOCATION SW/4 SEC: 12 T: 11S R: 45W			API 500739980052
R-4476	OT	FT. MTN.	CRETACEOUS	SH	NE	EXCELLENT	GAS-OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-1A		WELL LOCATION NE/4 SEC: 6 T: 10S R: 52W			API 502059980033
R-4456	OT	IPEWIK	JUR-CRET	SH	NW	GOOD	OIL*	EARLY PEAK OIL
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-2A		WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W			API 502059980034
R-4457	OT	IPEWIK	JUR-CRET	SH	NW	GOOD	OIL*	EARLY OIL
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-2B		WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W			API 502059980045
R-4458	OT	IPEWIK	JUR-CRET	SH	NW	GOOD	OIL*	EARLY PEAK OIL

*KEROGEN MAY BE OXIDIZED.

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SOURCE ROCK SUMMARY
TABLE 1C.
DATE 06/10/88

SAMPLE NUMBER	SMPL TYPE	FORMATION	AGE	LITHOLOGY	AREA	PETROLEUM GENERATION		
						CAPABILITY	TYPE	STAGE
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W				API 502059980036
OPERATOR		LEASE OT 87-24-4A						
R-4461	OT	IPEWIK	JUR-CRET	SH	NW	GOOD	OIL	PEAK OIL
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W				API 502059980037
OPERATOR		LEASE OT 87-24-4B						
R-4462	OT	IPEWIK	JUR-CRET	SH	NW	MARGINAL	OIL	PEAK OIL
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W				API 502059980035
OPERATOR		LEASE OT 87-24-3						
R-4459	OT	IPEWIK ?	JUR-CRET	SH	NW	MARGINAL	NOT KNOWN	LATE PEAK OIL
STATE ALASKA		COUNTY POINT HOPE		WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W				API 502059980046
OPERATOR		LEASE OT 87-24-3B						
R-4460	OT	IPEWIK ?	JUR-CRET	SH	NW	GOOD	OIL	PEAK OIL
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION N/2 SEC: 11 T: 31N R: 19W				API 500739980029
OPERATOR		LEASE OT 87-23-5						
R-4453	OT	KUNA	MISS-PENN	SH	SE	EXCELLENT	NOT KNOWN *	ADVANCED
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION SE/4 SEC: 6 T: 12S R: 46W				API 500739980047
OPERATOR		LEASE OT 87-26-8						
R-4469	OT	KUNA	MISS-PENN	SH	NE	EXCELLENT	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA		COUNTY MISHEGUK MTN		WELL LOCATION SEC: 20 T: 10S R: 41W				API 501719980009
OPERATOR		LEASE OT 87-28-7A						
R-4477	OT	KUNA ?	MISS-PENN	SH	NE	EXCELLENT	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA		COUNTY DE LONG MTS		WELL LOCATION SEC: 25 T: 31N R: 19W				API 500739980026
OPERATOR		LEASE OT 87-23-2						
R-4451	OT	OKPIRKRUAK	L CRET	SH	SE	MARGINAL	NOT KNOWN *	PAST PEAK OIL-LATE GAS

*OXIDIZED KEROGEN

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

OFFICE DENVER DISTRICT NORTHERN
AUTHORIZED BY V. A. KRASS
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SOURCE ROCK SUMMARY
TABLE 1D.
DATE 06/10/88

SAMPLE NUMBER	SMPL TYPE	FORMATION	AGE	LITHOLOGY	AREA	PETROLEUM GENERATION		
						CAPABILITY	TYPE	STAGE
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-23-1		WELL LOCATION NE/4 SEC: 3 T: 30N R: 19W			API 500739980025
R-4450	OT	OKPIRKRUAK ?	L CRET	SH	SE	GOOD	NOT KNOWN	ADVANCED
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-26-3		WELL LOCATION SE/4 SEC: 1 T: 12S R: 47W			API 500739980042
R-4465	OT	OTUK	TRIA-JUR	SH	NE	EXCELLENT	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-2		WELL LOCATION NW/4 SEC: 36 T: 10S R: 44W			API 500739980048
R-4470	OT	OTUK	TRIA-JUR	SH	NE	EXCELLENT	OIL	LATE PEAK OIL-PEAK GAS
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-7		WELL LOCATION NW/4 SEC: 13 T: 11S R: 45W			API 500739980051
R-4475	OT	OTUK	TRIA-JUR	SH	NE	EXCELLENT	OIL*	EARLY PEAK OIL?
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-3A		WELL LOCATION NW/4 SEC: 2 T: 11S R: 44W			API 500739980049
R-4472	OT	OTUK ?	TRIA-JUR	SH	NE	GOOD	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-3C		WELL LOCATION NW/4 SEC: 2 T: 11S R: 44W			API 500739980062
R-4473	OT	OTUK ?	TRIA-JUR	SH	NE	EXCELLENT	OIL	PAST PEAK OIL-PEAK GAS
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-8A		WELL LOCATION SW/4 SEC: 29 T: 32N R: 22W			API 500739980058
R-4483	OT	OTUK ?	TRIA-JUR	SH	CENTRAL	GOOD	OIL*	EARLY PEAK OIL
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-9C		WELL LOCATION NW/4 SEC: 32 T: 32N R: 22W			API 500739980063
R-4484	OT	OTUK ?	TRIA-JUR	SH	CENTRAL	GOOD	OIL*	PEAK OIL?
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-23-3		WELL LOCATION S/2 SEC: 11 T: 30N R: 19W			API 500739980027
R-4452	OT	SIKSIKPUK	PERMIAN	SH	SE	GOOD	NOT KNOWN	ADVANCED

*KEROGEN MAY BE OXIDIZED

AMOCO PRODUCTION COMPANY
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ROCKEVAL PYROLYSIS DATA
TABLE 2A.
DATE 06/10/88

SAMPLE NUMBER	TOP OF INTERVAL FEET	FORMATION	TOTAL ORGANIC CARBON WT% ROCKEVAL TOC	PPM VOLATILE HYDROCARBONS (S1 X 1000)	VOL/ TOC	PPM GENERATED HYDROCARBONS (S2 X 1000)	GEN/ TOC	TEMP OF MAX GEN	VOL/ VOL + GEN	BROWN AND RUTH TOC	BROWN AND RUTH S2PPM	BROWN AND RUTH S2/TOC
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT87-23-9B		WELL LOCATION NE/4	SEC: 28 T: 32N R: 18W					API	500739980060
R-4455	NOT KNOWN	0.6	10	< 0.01	20	< 0.01	NR	0.33	1.1	260		0.03
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT 87-26-3B		WELL LOCATION SE/4	SEC: 1 T: 12S R: 47W					API	500739980061
R-4466	NOT KNOWN	5.3	80	< 0.01	1120	0.02	477	0.07	5.7	1410		0.03
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT 87-26-6		WELL LOCATION NE/4	SEC: 6 T: 12S R: 46W					API	500739980045
R-4467	ETIVLUK	5.6	160	< 0.01	1210	0.02	492	0.12	6.2	2320		0.04
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT 87-22-2		WELL LOCATION S/2	SEC: 7 T: 11S R: 46W					API	500739980022
R-4449	ETIVLUK	2.1	130	0.01	5020	0.24	445	0.03	2.0	3910		0.20
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT 87-24-5		WELL LOCATION NE/4	SEC: 21 T: 12S R: 50W					API	500739980033
R-4463	ETIVLUK	2.1	760	0.04	2330	0.11	463	0.25	2.3	2420		0.11
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	OT 87-27-6		WELL LOCATION SW/4	SEC: 23 T: 10S R: 45W					API	500739980050
R-4474	ETIVLUK	23.3	1070	< 0.01	39240	0.17	453	0.03	22.1	40130		0.18
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	OT 87-29-2A		WELL LOCATION SE/4	SEC: 20 T: 33N R: 23W					API	502059980039
R-4478	ETIVLUK	1.5	490	0.03	1560	0.11	452	0.24	1.6	1750		0.11
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	OT 87-29-2B		WELL LOCATION SE/4	SEC: 20 T: 33N R: 23W					API	502059980047
R-4479	ETIVLUK	2.1	540	0.03	2460	0.12	455	0.18	2.2	2260		0.10

NR indicates "not reliable"

AMOCO PRODUCTION COMPANY
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OFFICE DENVER DISTRICT NORTHERN
TECHNICAL SERVICE NUMBER 879284

ROCKEVAL PYROLYSIS DATA
TABLE 2B.
DATE 06/10/88

SAMPLE NUMBER	TOP OF INTERVAL FEET	FORMATION	TOTAL ORGANIC CARBON WT% ROCKEVAL TOC	PPM VOLATILE HYDROCARBONS (S1 X 1000)	VOL/ TOC	PPM GENERATED HYDROCARBONS (S2 X 1000)	GEN/ TOC	TEMP OF MAX GEN	VOL/ VOL + GEN	BROWN AND RUTH TOC	BROWN AND RUTH S2 PPM	BROWN AND RUTH S2/TOC
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-3A			WELL LOCATION SW/4 SEC: 9 T: 33N R: 23W					API	500739980053
R-4480		ETIVLUK	2.0	50	< 0.01	3680	0.19	444	0.01	2.1	3440	(0.16)
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-5A			WELL LOCATION SE/4 SEC: 9 T: 33N R: 23W					API	500739980055
R-4481		ETIVLUK	32.7	1130	< 0.01	157570	0.48	452	0.01	35.3	111330	0.32
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-29-7A			WELL LOCATION W/2 SEC: 36 T: 32N R: 23W					API	500739980057
R-4482		ETIVLUK	26.3	2280	0.01	109230	0.41	451	0.02	27.7	84250	0.30
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-26-1A			WELL LOCATION NW/4 SEC: 6 T: 33N R: 22W					API	500739980040
R-4464		ETIVLUK ?	8.2	330	< 0.01	6280	0.08	466	0.05	7.8	7810	0.10
STATE ALASKA OPERATOR			COUNTY DE LONG MTS LEASE OT 87-27-8			WELL LOCATION SW/4 SEC: 12 T: 11S R: 45W					API	500739980052
R-4476		FT. MTN.	10.1	400	< 0.01	3850	0.04	470	0.09	10.6	4640	0.04
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-1A			WELL LOCATION NE/4 SEC: 6 T: 10S R: 52W					API	502059980033
R-4456		IPEWIK	1.4	40	< 0.01	650	0.05	446	0.06	1.6	620	0.04
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-2A			WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W					API	502059980034
R-4457		IPEWIK	1.1	50	< 0.01	550	0.05	448	0.08	1.3	770	0.06
STATE ALASKA OPERATOR			COUNTY POINT HOPE LEASE OT 87-24-2B			WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W					API	502059980045
R-4458		IPEWIK	1.1	50	< 0.01	510	0.05	446	0.09	1.3	880	0.07

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ROCKEVAL PYROLYSIS DATA
TABLE 2C.
DATE 06/10/88

SAMPLE NUMBER	TOP OF INTERVAL FEET	FORMATION	TOTAL ORGANIC CARBON WT% ROCKEVAL TOC	PPM VOLATILE HYDROCARBONS (S1 X 1000)	VOL/ TOC	PPM GENERATED HYDROCARBONS (S2 X 1000)	GEN/ TOC	TEMP OF MAX GEN	VOL/ VOL + GEN	BROWN AND RUTH TOC	BROWN AND RUTH S2 PPM	BROWN AND RUTH S2/TOC
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	WELL LOCATION NE/4 OT 87-24-4A		SEC: 9 T: 9S R: 55W						API 502059980036	
R-4461	IPEWIK	1.3	110	0.01	860	0.07	454	0.11	1.4	550	0.04	
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	WELL LOCATION NE/4 OT 87-24-4B		SEC: 9 T: 9S R: 55W						API 502059980037	
R-4462	IPEWIK	0.9	60	0.01	480	0.05	NR	0.11	1.1	400	0.04	
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	WELL LOCATION NE/4 OT 87-24-3		SEC: 10 T: 9S R: 55W						API 502059980035	
R-4459	IPEWIK ?	0.9	90	0.01	420	0.05	NR	0.18	1.1	410	0.04	
STATE ALASKA OPERATOR		COUNTY POINT HOPE LEASE	WELL LOCATION NE/4 OT 87-24-3B		SEC: 10 T: 9S R: 55W						API 502059980046	
R-4460	IPEWIK ?	1.3	180	0.01	670	0.05	454	0.21	1.50	1110	0.07	
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	WELL LOCATION N/2 OT 87-23-5		SEC: 11 T: 31N R: 19W						API 500739980029	
R-4453	KUNA	4.3	< 10	< 0.01	< 10	< 0.01	NR	< 0.01	4.7	< 100		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	WELL LOCATION SE/4 OT 87-26-8		SEC: 6 T: 12S R: 46W						API 500739980047	
R-4469	KUNA	2.4	90	< 0.01	570	0.02	394	0.14	2.9	1090	0.40	
STATE ALASKA OPERATOR		COUNTY MISHEGUK MTN LEASE	WELL LOCATION OT 87-28-7A		SEC: 20 T: 10S R: 41W						API 501719980009	
R-4477	KUNA ?	6.0	280	< 0.01	1530	0.03	508	0.15	8.4	2800	0.03	
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE	WELL LOCATION OT 87-23-2		SEC: 25 T: 31N R: 19W						API 500739980026	
R-4451	OKPIRKRUAK	0.8	< 10	< 0.01	10	< 0.01	NR	< 0.01	1.2	< 100		

NR indicates "not reliable"

AMOCO PRODUCTION COMPANY
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OFFICE DENVER DISTRICT NORTHERN
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ROCKEVAL PYROLYSIS DATA
TABLE 2D.
DATE 06/10/88

SAMPLE NUMBER	TOP OF INTERVAL FEET	FORMATION	TOTAL ORGANIC CARBON WT% ROCKEVAL TOC	PPM VOLATILE HYDROCARBONS (S1 X 1000)	VOL/ TOC	PPM GENERATED HYDROCARBONS (S2 X 1000)	GEN/ TOC	TEMP OF MAX GEN	VOL/ VOL + GEN	BROWN AND RUTH TOC	BROWN AND RUTH S2 PPM	BROWN AND RUTH S2/TOC
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-23-1						WELL LOCATION NE/4 SEC: 3 T: 30N R: 19W			API 500739980025	
R-4450	OKPIRKRUAK ?	1.8	10	< 0.01	70	< 0.01	NR	0.13	1.8	< 100		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-26-3						WELL LOCATION SE/4 SEC: 1 T: 12S R: 47W			API 500739980042	
R-4465	OTUK	4.6	350	0.01	1870	0.04	501	0.16	10.2	5730		0.06
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-2						WELL LOCATION NW/4 SEC: 36 T: 10S R: 44W			API 500739980048	
R-4470	OTUK	8.1	160	< 0.01	3080	0.04	469	0.05	15.1	7180		0.05
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-7						WELL LOCATION NW/4 SEC: 13 T: 11S R: 45W			API 500739980051	
R-4475	OTUK	2.5	210	0.01	630	0.03	482	0.25	3.8	1650		0.04
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-3A						WELL LOCATION NW/4 SEC: 2 T: 11S R: 44W			API 500739980049	
R-4472	OTUK ?	1.5	160	0.01	720	0.05	475	0.18	1.1	190		0.02
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-3C						WELL LOCATION NW/4 SEC: 2 T: 11S R: 44W			API 500739980062	
R-4473	OTUK ?	4.7	630	0.01	1440	0.03	496	0.30	6.9	3380		0.05
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-29-8A						WELL LOCATION SW/4 SEC: 29 T: 32N R: 22W			API 500739980058	
R-4483	OTUK ?	1.0	70	0.01	300	0.03	NR	0.19	1.7	750		0.04
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-29-9C						WELL LOCATION NW/4 SEC: 32 T: 32N R: 22W			API 500739980063	
R-4484	OTUK ?	1.0	30	< 0.01	230	0.02	NR	0.12	1.4	210		0.02
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-23-3						WELL LOCATION S/2 SEC: 11 T: 30N R: 19W			API 500739980027	
R-4452	SIKSIKPUK	1.7	< 10	< 0.01	30	< 0.01	NR	< 0.01	1.4	< 100		

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AMOCO PRODUCTION COMPANY
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SOURCE ROCK DATA
TABLE 3A.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	TOTAL ORG C WT%	BITUMEN BBL/AF	BITUMEN PPM	SAT HC BBL/AF	SAT HC PPM	SAT HC/ BITUMEN	BIT/ TOC	NC17/ PR	NC18/ PH	CPI BITUMEN	PR/ PH
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT87-23-9B	NE/4	SEC: 28 T: 32N R: 18W						API 500739980060		
R-4455	NOT KNOWN	0.6	0	23				<0.01	2.97	3.40		0.61	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT 87-26-3B	SE/4	SEC: 1 T: 12S R: 47W						API 500739980061		
R-4466	NOT KNOWN	5.3	2	130				<0.01	4.70	2.91		0.48	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT 87-26-6	NE/4	SEC: 6 T: 12S R: 46W						API 500739980045		
R-4467	ETIVLUK	5.6	5	288				0.01	2.18	3.24	1.22	1.32	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT 87-22-2	S/2	SEC: 7 T: 11S R: 46W						API 500739980022		
R-4449	ETIVLUK	2.1	15	825				0.04	1.25	3.77	1.05	3.14	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT 87-24-5	NE/4	SEC: 21 T: 12S R: 50W						API 500739980033		
R-4463	ETIVLUK	2.1	23	1265				0.06	3.14	3.97	1.01	1.29	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE		WELL LOCATION OT 87-27-6	SW/4	SEC: 23 T: 10S R: 45W						API 500739980050		
R-4474	ETIVLUK	23.3	141	7850				0.03					
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE		WELL LOCATION OT 87-29-2A	SE/4	SEC: 20 T: 33N R: 23W						API 502059980039		
R-4478	ETIVLUK	1.5	17	935				0.06	2.38	2.84	0.93	1.18	
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE		WELL LOCATION OT 87-29-2B	SE/4	SEC: 20 T: 33N R: 23W						API 502059980047		
R-4479	ETIVLUK	2.1	13	742				0.04	3.45	4.42	0.95	1.30	

AMOCO PRODUCTION COMPANY
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OFFICE DENVER DISTRICT NORTHERN
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SOURCE ROCK DATA
TABLE 3B.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	TOTAL ORG C WT%	BITUMEN BBL/AF	BITUMEN PPM	SAT HC BBL/AF	SAT HC PPM	SAT HC/ BITUMEN	BIT/ TOC	NC17/ PR	NC18/ PH	CPI BITUMEN	PR/ PH
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	SW/4	SEC: 9 T: 33N R: 23W					API 500739980053		
OPERATOR	LEASE OT 87-29-3A												
R-4480	ETIVLUK	2.0	16	902					0.05	1.30	2.23	0.97	1.77
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	SE/4	SEC: 9 T: 33N R: 23W					API 500739980055		
OPERATOR	LEASE OT 87-29-5A												
R-4481	ETIVLUK	32.7	256	14209					0.04				
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	W/2	SEC: 36 T: 32N R: 23W					API 500739980057		
OPERATOR	LEASE OT 87-29-7A												
R-4482	ETIVLUK	26.3	16	907					<0.01				
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	NW/4	SEC: 6 T: 33N R: 22W					API 500739980040		
OPERATOR	LEASE OT 87-26-1A												
R-4464	ETIVLUK ?	8.2	27	1522					0.02	1.68	3.86	1.05	2.18
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	SW/4	SEC: 12 T: 11S R: 45W					API 500739980052		
OPERATOR	LEASE OT 87-27-8												
R-4476	FT. MTN.	10.1	9	493					<0.01	1.53	2.98	0.95	1.70
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	NE/4	SEC: 6 T: 10S R: 52W					API 502059980033		
OPERATOR	LEASE OT 87-24-1A												
R-4456	IPEWIK	1.4	11	587					0.04	2.23	3.67	1.07	1.59
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	SW/4	SEC: 31 T: 9S R: 52W					API 502059980034		
OPERATOR	LEASE OT 87-24-2A												
R-4457	IPEWIK	1.1	7	375					0.03	4.30	3.91	0.98	0.95
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	SW/4	SEC: 31 T: 9S R: 52W					API 502059980045		
OPERATOR	LEASE OT 87-24-2B												
R-4458	IPEWIK	1.1	5	281					0.03	3.33	3.41	1.13	0.71

AMOCO PRODUCTION COMPANY
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SOURCE ROCK DATA
TABLE 3C.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	TOTAL ORG C WT%	BITUMEN BBL/AF	BITUMEN PPM	SAT HC BBL/AF	SAT HC PPM	SAT HC/ BITUMEN	BIT/ TOC	NC17/ PR	NC18/ PH	CPI BITUMEN	PR/ PH
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	NE/4	SEC: 9 T: 9S R: 55W					API 502059980036		
OPERATOR	LEASE OT 87-24-4A												
R-4461	IPEWIK	1.3	11	618					0.05	3.77	3.86	1.07	1.11
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	NE/4	SEC: 9 T: 9S R: 55W					API 502059980037		
OPERATOR	LEASE OT 87-24-4B												
R-4462	IPEWIK	0.9	7	373					0.04	3.72	4.50	1.06	1.23
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	NE/4	SEC: 10 T: 9S R: 55W					API 502059980035		
OPERATOR	LEASE OT 87-24-3												
R-4459	IPEWIK ?	0.9	6	350					0.04	3.09	5.04	1.07	1.42
STATE ALASKA	COUNTY POINT HOPE			WELL LOCATION	NE/4	SEC: 10 T: 9S R: 55W					API 502059980046		
OPERATOR	LEASE OT 87-24-3B												
R-4460	IPEWIK ?	1.3	11	612					0.05	1.83	3.59	1.06	1.71
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	N/2	SEC: 11 T: 31N R: 19W					API 500739980029		
OPERATOR	LEASE OT 87-23-5												
R-4453	KUNA	4.3	0	25					<0.01				
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION	SE/4	SEC: 6 T: 12S R: 46W					API 500739980047		
OPERATOR	LEASE OT 87-26-8												
R-4469	KUNA	2.4	2	136					0.01				
STATE ALASKA	COUNTY MISHEGUK MTN			WELL LOCATION		SEC: 20 T: 10S R: 41W					API 501719980009		
OPERATOR	LEASE OT 87-28-7A												
R-4477	KUNA ?	6.0	4	235					<0.01	2.38	4.09	0.95	1.73
STATE ALASKA	COUNTY DE LONG MTS			WELL LOCATION		SEC: 25 T: 31N R: 19W					API 500739980026		
OPERATOR	LEASE OT 87-23-2												
R-4451	OKPIRKRUAK	0.8	1	62					0.01	2.52	2.56		0.43

AMOCO PRODUCTION COMPANY
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SOURCE ROCK DATA
TABLE 3D.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	TOTAL ORG C WT%	BITUMEN BBL/AF	BITUMEN PPM	SAT HC BBL/AF	SAT HC PPM	SAT HC/ BITUMEN	BIT/ TOC	NC17/ PR	NC18/ PH	CPI BITUMEN	PR/ PH
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NE/4	SEC: 3 T: 30N R: 19W					API 500739980025		
OPERATOR	LEASE OT 87-23-1												
R-4450	OKPIRKRUAK ?	1.8	0	20				<0.01	2.28	2.32		0.50	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION SE/4	SEC: 1 T: 12S R: 47W					API 500739980042		
OPERATOR	LEASE OT 87-26-3												
R-4465	OTUK	4.6	3	194				<0.01					
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NW/4	SEC: 36 T: 10S R: 44W					API 500739980048		
OPERATOR	LEASE OT 87-27-2												
R-4470	OTUK	8.1	10	548				0.01					
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NW/4	SEC: 13 T: 11S R: 45W					API 500739980051		
OPERATOR	LEASE OT 87-27-7												
R-4475	OTUK	2.5	3	163				0.01	5.34	6.08	0.96	1.14	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W					API 500739980049		
OPERATOR	LEASE OT 87-27-3A												
R-4472	OTUK ?	1.5	3	162				0.01	3.93	4.27	0.98	1.11	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W					API 500739980062		
OPERATOR	LEASE OT 87-27-3C												
R-4473	OTUK ?	4.7	11	587				0.01	3.02	3.95	1.01	1.51	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION SW/4	SEC: 29 T: 32N R: 22W					API 500739980058		
OPERATOR	LEASE OT 87-29-8A												
R-4483	OTUK ?	1.0	3	167				0.02	3.67	6.93	1.27	1.86	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION NW/4	SEC: 32 T: 32N R: 22W					API 500739980063		
OPERATOR	LEASE OT 87-29-9C												
R-4484	OTUK ?	1.0	2	126				0.01	3.56	5.78	1.16	1.45	
STATE ALASKA	COUNTY DE LONG MTS				WELL LOCATION S/2	SEC: 11 T: 30N R: 19W					API 500739980027		
OPERATOR	LEASE OT 87-23-3												
R-4452	SIKSIKPUK	1.7	1	44				<0.01	2.06	1.45	0.89	0.36	

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

OFFICE DENVER DISTRICT NORTHERN
TECHNICAL SERVICE NUMBER 879284

VISUAL AND VITRINITE REFLECTANCE
TABLE 4A.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	VIT REFLECTANCE %RO	VIT REFLECTANCE COUNTS	VISUAL SCALE	KEROGEN DESCRIPTION	VIT REFLECTANCE TS 865233
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION NE/4 SEC: 28 T: 32N R: 18W API 500739980060 OPERATOR LEASE OT87-23-9B							
R-4455		NOT KNOWN	1.53	70			
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SE/4 SEC: 1 T: 12S R: 47W API 500739980061 OPERATOR LEASE OT 87-26-3B							
R-4466		NOT KNOWN	1.37	79			
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION NE/4 SEC: 6 T: 12S R: 46W API 500739980045 OPERATOR LEASE OT 87-26-6							
R-4467		ETIVLUK	1.26	71			
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION S/2 SEC: 7 T: 11S R: 46W API 500739980022 OPERATOR LEASE OT 87-22-2							
R-4449		ETIVLUK	0.56	36			
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION NE/4 SEC: 21 T: 12S R: 50W API 500739980033 OPERATOR LEASE OT 87-24-5							
R-4463		ETIVLUK	0.82	80			
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SW/4 SEC: 23 T: 10S R: 45W API 500739980050 OPERATOR LEASE OT 87-27-6							
R-4474		ETIVLUK	0.67	80			
STATE ALASKA COUNTY POINT HOPE WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W API 502059980039 OPERATOR LEASE OT 87-29-2A							
R-4478		ETIVLUK	0.45	26			0.81
STATE ALASKA COUNTY POINT HOPE WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W API 502059980047 OPERATOR LEASE OT 87-29-2B							
R-4479		ETIVLUK	0.48	27			0.81

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OFFICE DENVER DISTRICT NORTHERN
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VISUAL AND VITRINITE REFLECTANCE
TABLE 4B.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	VIT REFLECTANCE %RO	VIT REFLECTANCE COUNTS	VISUAL SCALE	KEROGEN DESCRIPTION	VITRINITE REFLECTANCE TS 865233
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-29-3A		WELL LOCATION SW/4	SEC: 9 T: 33N R: 23W		API 500739980053	
R-4480		ETIVLUK	0.54	82			
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-29-5A		WELL LOCATION SE/4	SEC: 9 T: 33N R: 23W		API 500739980055	
R-4481		ETIVLUK	0.56	75			
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-29-7A		WELL LOCATION W/2	SEC: 36 T: 32N R: 23W		API 500739980057	
R-4482		ETIVLUK	0.54	75			
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-26-1A		WELL LOCATION NW/4	SEC: 6 T: 33N R: 22W		API 500739980040	
R-4464		ETIVLUK ?	1.01	77		0.93	
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-27-8		WELL LOCATION SW/4	SEC: 12 T: 11S R: 45W		API 500739980052	
R-4476		FT. MTN.	1.19	71			
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-1A		WELL LOCATION NE/4	SEC: 6 T: 10S R: 52W		API 502059980033	
R-4456		IPEWIK	0.75	80			
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-2A		WELL LOCATION SW/4	SEC: 31 T: 9S R: 52W		API 502059980034	
R-4457		IPEWIK	0.57	31			
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-2B		WELL LOCATION SW/4	SEC: 31 T: 9S R: 52W		API 502059980045	
R-4458		IPEWIK	0.73	56			

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OFFICE DENVER DISTRICT NORTHERN
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VISUAL AND VITRINITE REFLECTANCE
TABLE 4C.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	VIT REFLECTANCE %RO	VIT REFLECTANCE COUNTS	VISUAL SCALE	KEROGEN DESCRIPTION
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-4A		WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W			API 502059980036
R-4461		IPEWIK	0.81	80		
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-4B		WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W			API 502059980037
R-4462		IPEWIK	0.90	80		
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-3		WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W			API 502059980035
R-4459		IPEWIK ?	1.07	60		
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-24-3B		WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W			API 502059980046
R-4460		IPEWIK ?	0.83	85		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-23-5		WELL LOCATION N/2 SEC: 11 T: 31N R: 19W			API 500739980029
R-4453		KUNA	2.07	70		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-26-8		WELL LOCATION SE/4 SEC: 6 T: 12S R: 46W			API 500739980047
R-4469		KUNA	1.34	68		
STATE ALASKA OPERATOR	COUNTY MISHEGUK MTN LEASE OT 87-28-7A		WELL LOCATION SEC: 20 T: 10S R: 41W			API 501719980009
R-4477		KUNA ?	1.51	69		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-23-2		WELL LOCATION SEC: 25 T: 31N R: 19W			API 500739980026
R-4451		OKPIRKRUAK	1.23	22		

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OFFICE DENVER DISTRICT NORTHERN
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VISUAL AND VITRINITE REFLECTANCE
TABLE 4D.
DATE 06/10/88

SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	VIT REFLECTANCE %RO	VIT REFLECTANCE COUNTS	VISUAL SCALE	KEROGEN DESCRIPTION
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-23-1			WELL LOCATION NE/4	SEC: 3 T: 30N R: 19W API 500739980025
R-4450		OKPIRKRUAK ?	2.12	75		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-26-3			WELL LOCATION SE/4	SEC: 1 T: 12S R: 47W API 500739980042
R-4465		OTUK	1.46	75		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-2			WELL LOCATION NW/4	SEC: 36 T: 10S R: 44W API 500739980048
R-4470		OTUK	1.04	77		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-7			WELL LOCATION NW/4	SEC: 13 T: 11S R: 45W API 500739980051
R-4475		OTUK	0.62	59		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-3A			WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W API 500739980049
R-4472		OTUK ?	1.40	70		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-27-3C			WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W API 500739980062
R-4473		OTUK ?	1.23	65		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-29-8A			WELL LOCATION SW/4	SEC: 29 T: 32N R: 22W API 500739980058
R-4483		OTUK ?	0.72	70		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-29-9C			WELL LOCATION NW/4	SEC: 32 T: 32N R: 22W API 500739980063
R-4484		OTUK ?	0.97	84		
STATE ALASKA OPERATOR		COUNTY DE LONG MTS LEASE OT 87-23-3			WELL LOCATION S/2	SEC: 11 T: 30N R: 19W API 500739980027
R-4452		SIKSIKPUK	2.02	69		

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OFFICE DENVER DISTRICT NORTHERN
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KEROGEN DATA
TABLE 5A.
DATE 06/10/88

LAB SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	NORM. ELEMENTAL ANALYSIS, WT. % CARBON	HYDROGEN	OXYGEN	NITROGEN	% REC	SULFUR WT. %	ASH WT. %	ATOMIC RATIO O/C	ATOMIC RATIO H/C	CARBON ISOTOPE KEROGEN	H/C 865233
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT87-23-9B	WELL LOCATION NE/4 SEC: 28 T: 32N R: 18W										API 500739980060	
R-4455		NOT KNOWN	91	1.6	6.0	1.6	59			0.05	0.21		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-26-3B	WELL LOCATION SE/4 SEC: 1 T: 12S R: 47W										API 500739980061	
R-4466		NOT KNOWN	90	3.2	4.9	2.2	90			0.04	0.43		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-26-6	WELL LOCATION NE/4 SEC: 6 T: 12S R: 46W										API 500739980045	
R-4467		ETIVLUK	86	3.2	7.9	2.4	88			0.07	0.44		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-22-2	WELL LOCATION S/2 SEC: 7 T: 11S R: 46W										API 500739980022	
R-4449		ETIVLUK	87	6.4	5.1	1.9	90			0.04	0.87		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-24-5	WELL LOCATION NE/4 SEC: 21 T: 12S R: 50W										API 500739980033	
R-4463		ETIVLUK	90	4.1	3.7	2.0	67			0.03	0.55		
STATE ALASKA OPERATOR	COUNTY DE LONG MTS LEASE OT 87-27-6	WELL LOCATION SW/4 SEC: 23 T: 10S R: 45W										API 500739980050	
R-4474		ETIVLUK	86	6.0	5.1	2.8	92			0.04	0.83		
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-29-2A	WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W										API 502059980039	
R-4478		ETIVLUK	88	4.4	4.9	2.4	68			0.04	0.60		0.70
STATE ALASKA OPERATOR	COUNTY POINT HOPE LEASE OT 87-29-2B	WELL LOCATION SE/4 SEC: 20 T: 33N R: 23W										API 502059980047	
R-4479		ETIVLUK	88	4.4	5.1	2.3	65			0.04	0.59		0.70

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KEROGEN DATA
TABLE 5B.
DATE 06/10/88

LAB SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	NORM. ELEMENTAL ANALYSIS, WT. % CARBON	HYDROGEN	OXYGEN	NITROGEN	% REC	SULFUR WT. %	ASH WT. %	ATOMIC RATIO O/C	ATOMIC RATIO H/C	CARBON ISOTOPE KEROGEN
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SW/4 SEC: 9 T: 33N R: 23W API 500739980053												
OPERATOR		LEASE OT 87-29-3A										
R-4480		ETIVLUK	86	6.7	4.9	2.4	87			0.04	0.93	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SE/4 SEC: 9 T: 33N R: 23W API 500739980055												
OPERATOR		LEASE OT 87-29-5A										
R-4481		ETIVLUK	85	9.1	4.1	1.5	95			0.04	1.27	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION W/2 SEC: 36 T: 32N R: 23W API 500739980057												
OPERATOR		LEASE OT 87-29-7A										
R-4482		ETIVLUK	82	9.9	5.4	2.3	74			0.05	1.43	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION NW/4 SEC: 6 T: 33N R: 22W API 500739980040												
OPERATOR		LEASE OT 87-26-1A										
R-4464		ETIVLUK ?	90	4.0	4.3	1.9	95			0.04	0.52	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SW/4 SEC: 12 T: 11S R: 45W API 500739980052												
OPERATOR		LEASE OT 87-27-8										
R-4476		FT. MTN.	86	3.9	7.2	3.0	92			0.06	0.54	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION NE/4 SEC: 6 T: 10S R: 52W API 502059980033												
OPERATOR		LEASE OT 87-24-1A										
R-4456		IPEWIK	86	4.9	6.4	2.2	82			0.06	0.67	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W API 502059980034												
OPERATOR		LEASE OT 87-24-2A										
R-4457		IPEWIK	89	3.8	5.3	1.5	77			0.04	0.51	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION SW/4 SEC: 31 T: 9S R: 52W API 502059980045												
OPERATOR		LEASE OT 87-24-2B										
R-4458		IPEWIK	89	3.9	5.7	1.5	67			0.05	0.52	

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KEROGEN DATA
TABLE 5C.
DATE 06/10/88

LAB SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	NORM. ELEMENTAL ANALYSIS, WT. % CARBON	HYDROGEN	OXYGEN	NITROGEN	% REC	SULFUR WT. %	ASH WT. %	ATOMIC RATIO O/C	ATOMIC RATIO H/C	CARBON ISOTOPE KEROGEN
STATE ALASKA COUNTY POINT HOPE WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W API 502059980036 OPERATOR LEASE OT 87-24-4A												
R-4461	IPEWIK	90	4.8	4.1	1.3	82				0.03	0.64	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION NE/4 SEC: 9 T: 9S R: 55W API 502059980037 OPERATOR LEASE OT 87-24-4B												
R-4462	IPEWIK	90	4.3	4.2	1.5	78				0.03	0.57	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W API 502059980035 OPERATOR LEASE OT 87-24-3												
R-4459	IPEWIK ?	90	3.6	4.7	1.6	86				0.04	0.48	
STATE ALASKA COUNTY POINT HOPE WELL LOCATION NE/4 SEC: 10 T: 9S R: 55W API 502059980046 OPERATOR LEASE OT 87-24-3B												
R-4460	IPEWIK ?	90	4.2	4.4	1.3	73				0.04	0.56	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION N/2 SEC: 11 T: 31N R: 19W API 500739980029 OPERATOR LEASE OT 87-23-5												
R-4453	KUNA	87	1.5	9.1	2.1	86				0.08	0.20	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SE/4 SEC: 6 T: 12S R: 46W API 500739980047 OPERATOR LEASE OT 87-26-8												
R-4469	KUNA	89	3.2	4.8	2.7	86				0.04	0.42	
STATE ALASKA COUNTY MISHEGUK MTN WELL LOCATION SEC: 20 T: 10S R: 41W API 501719980009 OPERATOR LEASE OT 87-28-7A												
R-4477	KUNA ?	89	3.5	4.9	2.4	89				0.04	0.47	
STATE ALASKA COUNTY DE LONG MTS WELL LOCATION SEC: 25 T: 31N R: 19W API 500739980026 OPERATOR LEASE OT 87-23-2												
R-4451	OKPIRKRUAK	87	1.6	10.0	1.2	89				0.09	0.21	

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KEROGEN DATA
TABLE 5D.
DATE 06/10/88

LAB SAMPLE NUMBER	FIELD NO. OR DEPTH FEET TOP***BOTTOM	FORMATION	NORM. ELEMENTAL ANALYSIS, WT. % CARBON	HYDROGEN	OXYGEN	NITROGEN	% REC	SULFUR WT. %	ASH WT. %	ATOMIC RATIO O/C	ATOMIC RATIO H/C	CARBON ISOTOPE KEROGEN
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NE/4	SEC: 3 T: 30N R: 19W							API	500739980025
OPERATOR		LEASE OT 87-23-1										
R-4450	OKPIRKRUAK ?		91	1.9	5.8	1.4	84			0.05	0.25	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION SE/4	SEC: 1 T: 12S R: 47W							API	500739980042
OPERATOR		LEASE OT 87-26-3										
R-4465	OTUK		91	4.1	3.5	1.5	91			0.03	0.54	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NW/4	SEC: 36 T: 10S R: 44W							API	500739980048
OPERATOR		LEASE OT 87-27-2										
R-4470	OTUK		87	4.0	6.2	3.1	92			0.05	0.56	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NW/4	SEC: 13 T: 11S R: 45W							API	500739980051
OPERATOR		LEASE OT 87-27-7										
R-4475	OTUK		88	3.7	5.9	2.2	84			0.05	0.50	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W							API	500739980049
OPERATOR		LEASE OT 87-27-3A										
R-4472	OTUK ?		91	3.2	4.3	1.8	72			0.04	0.42	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NW/4	SEC: 2 T: 11S R: 44W							API	500739980062
OPERATOR		LEASE OT 87-27-3C										
R-4473	OTUK ?		89	3.5	5.5	1.8	84			0.05	0.47	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION SW/4	SEC: 29 T: 32N R: 22W							API	500739980058
OPERATOR		LEASE OT 87-29-8A										
R-4483	OTUK ?		89	3.9	6.0	1.3	89			0.05	0.52	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION NW/4	SEC: 32 T: 32N R: 22W							API	500739980063
OPERATOR		LEASE OT 87-29-9C										
R-4484	OTUK ?		90	2.9	5.7	1.4	82			0.05	0.38	
STATE ALASKA		COUNTY DE LONG MTS	WELL LOCATION S/2	SEC: 11 T: 30N R: 19W							API	500739980027
OPERATOR		LEASE OT 87-23-3										
R-4452	SIKSIKPUK		89	1.9	6.9	2.6	70			0.06	0.26	

Brown & Ruth Screening

879284CR

Results of Total Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft)	TOC (Wt.%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	Hydrogen Index	Oxygen Index
6338-001	87-22-2	1.99	0.11	3.91	0.45	436	0.03	197	23
6338-002	87-22-3	0.58	<0.10	<0.10	0.35	**	---	---	61
6338-003	87-22-4A	0.91	0.28	0.87	0.43	452	0.25	95	48
6338-004	87-23-1	1.75	<0.10	<0.10	0.73	**	---	---	41
6338-005	87-23-2	1.19	<0.10	<0.10	1.26	**	---	---	106
6338-006	87-23-3	1.41	<0.10	<0.10	0.98	**	---	---	70
6338-007	87-23-4	0.57	<0.10	<0.10	0.44	**	---	---	77
6338-008	87-23-5	4.70	<0.10	<0.10	0.81	**	---	---	17
6338-009	87-23-7	0.18	---	---	---	---	---	---	---
6338-010	87-23-8	0.15	---	---	---	---	---	---	---
6338-011	87-23-9	0.98	<0.10	<0.10	<0.10	**	---	---	---
6338-012	87-23-9B	1.05	<0.10	0.26	0.11	**	---	25	10
6338-013	87-23-11	0.15	---	---	---	---	---	---	---
6338-014	87-23-13	0.53	<0.10	0.28	<0.10	**	---	53	---
6338-015	87-23-14	0.86	<0.10	0.10	0.14	**	---	12	16
6338-016	87-24-1A	1.64	<0.10	0.62	0.16	441	---	38	10
6338-017	87-24-1B	0.78	0.16	0.48	0.10	443	0.25	61	13
6338-018	87-24-1C	0.65	<0.10	0.14	0.22	448	---	21	34
6338-019	87-24-1E	0.84	<0.10	<0.10	0.12	**	---	---	14
6338-020	87-24-1F	0.86	<0.10	0.19	0.11	455	---	22	12
6338-021	87-24-1G	0.25	---	---	---	---	---	---	---
6338-022	87-24-2A	1.33	<0.10	0.77	0.11	446	---	58	9
6338-023	87-24-2B	1.28	0.13	0.88	0.12	444	0.13	69	9
6338-024	87-24-3	1.14	0.11	0.41	0.24	455	0.21	36	21
6338-025	87-24-3B	1.49	0.27	1.11	0.18	453	0.20	74	12
6338-026	87-24-4A	1.44	0.10	0.55	0.10	456	0.16	38	7
6338-027	87-24-4B	1.06	<0.10	0.40	0.11	451	---	37	10
6338-028	87-24-5	2.26	0.91	2.42	0.18	455	0.27	107	8
6338-029	87-24-6	0.50	<0.10	0.27	0.10	**	---	55	21
6338-030	87-24-7	0.99	0.26	0.45	0.63	459	0.36	46	64
6338-031	87-26-1	0.70	<0.10	0.16	0.33	480	---	22	48
6338-032	87-26-1A	7.81	0.21	7.81	0.23	449	0.03	100	3
6338-033	87-26-2	0.17	---	---	---	---	---	---	---
6338-034	87-26-3	10.24	0.83	5.73	0.20	474	0.13	56	2
6338-035	87-26-3B	5.74	0.18	1.41	0.33	474	0.11	26	6
6338-036	87-26-4	0.22	---	---	---	---	---	---	---
6338-037	87-26-5	0.78	<0.10	<0.10	<0.10	526	---	---	---
6338-038	87-26-6	6.24	0.26	2.32	0.55	460	0.10	37	9
6338-039	87-26-7	0.18	---	---	---	---	---	---	---
6338-040	87-26-8	2.89	0.13	1.09	1.10	489	0.10	38	38
6338-041	87-27-2	15.08	0.33	7.18	1.29	456	0.04	48	9
6338-042	87-27-3A	1.14	0.11	0.19	0.25	466	0.36	17	22
6338-043	87-27-3C	6.90	0.82	3.38	0.98	466	0.20	49	14
6338-044	87-27-4	0.25	---	---	---	---	---	---	---
6338-045	87-27-5	0.26	---	---	---	---	---	---	---

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

879284CR

Results of Total Organic Carbon Analysis and Rock-Eval Pyrolysis

Sample Number	Depth (ft)	TOC (Wt.%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	Production Index	Hydrogen Index	Oxygen Index
6338-046	87-27-6	22.14	1.05	40.13	1.02	446	0.03	181	5
6338-047	87-27-7	3.78	0.43	1.65	0.33	465	0.21	44	9
6338-048	87-27-8	10.55	0.28	4.64	1.75	464	0.06	44	17
6338-049	87-28-6	0.18	---	---	---	---	---	---	---
6338-050	87-28-7A	8.41	0.31	2.80	0.50	480	0.10	33	6
6338-051	87-29-1A	0.37	---	---	---	---	---	---	---
6338-052	87-29-2A	1.56	0.64	1.75	0.20	445	0.27	112	13
6338-053	87-29-2B	2.21	0.73	2.26	0.23	448	0.24	103	11
6338-054	87-29-3A	2.10	<0.10	3.44	0.16	439	---	---	8
6338-055	87-29-4A	0.91	<0.10	0.31	0.24	459	---	34	26
6338-056	87-29-5A	35.34	1.61	111.33	0.38	452	0.01	315	1
6338-057	87-29-6A	0.39	---	---	---	---	---	---	---
6338-058	87-29-7A	27.72	2.76	84.25	0.81	443	0.03	304	3
6338-059	87-29-8A	1.73	<0.10	0.75	0.28	449	0.09	43	16
6338-060	87-29-9A	0.35	---	---	---	---	---	---	---
6338-061	87-29-9C	1.44	<0.10	0.21	0.58	505	0.21	15	40

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

THERMAL MATURITY PARAMETERS

217 Ion, Steranes

Peak Identifier	Compound Name
A	5α(H)-Pregnane
B	5α(H)-Bisnorcholane
26	C_{29}ααS-Cholestane
27	C_{29}ββR-Cholestane
28	C_{29}ββS-Cholestane
29	C_{29}ααR-Cholestane

231 Ion, Triaromatic Steranes

Peak Identifier	Compound Name
A	C_{20} Triaromatic Sterane
B	C_{21} Triaromatic Sterane
C	C_{26} S-Triaromatic Sterane
D	C_{26}R + C_{27}S Triaromatic Steranes
E	C_{28} S-Triaromatic Sterane
F	C_{27} R-Triaromatic Sterane
G	C_{28} R-Triaromatic Sterane

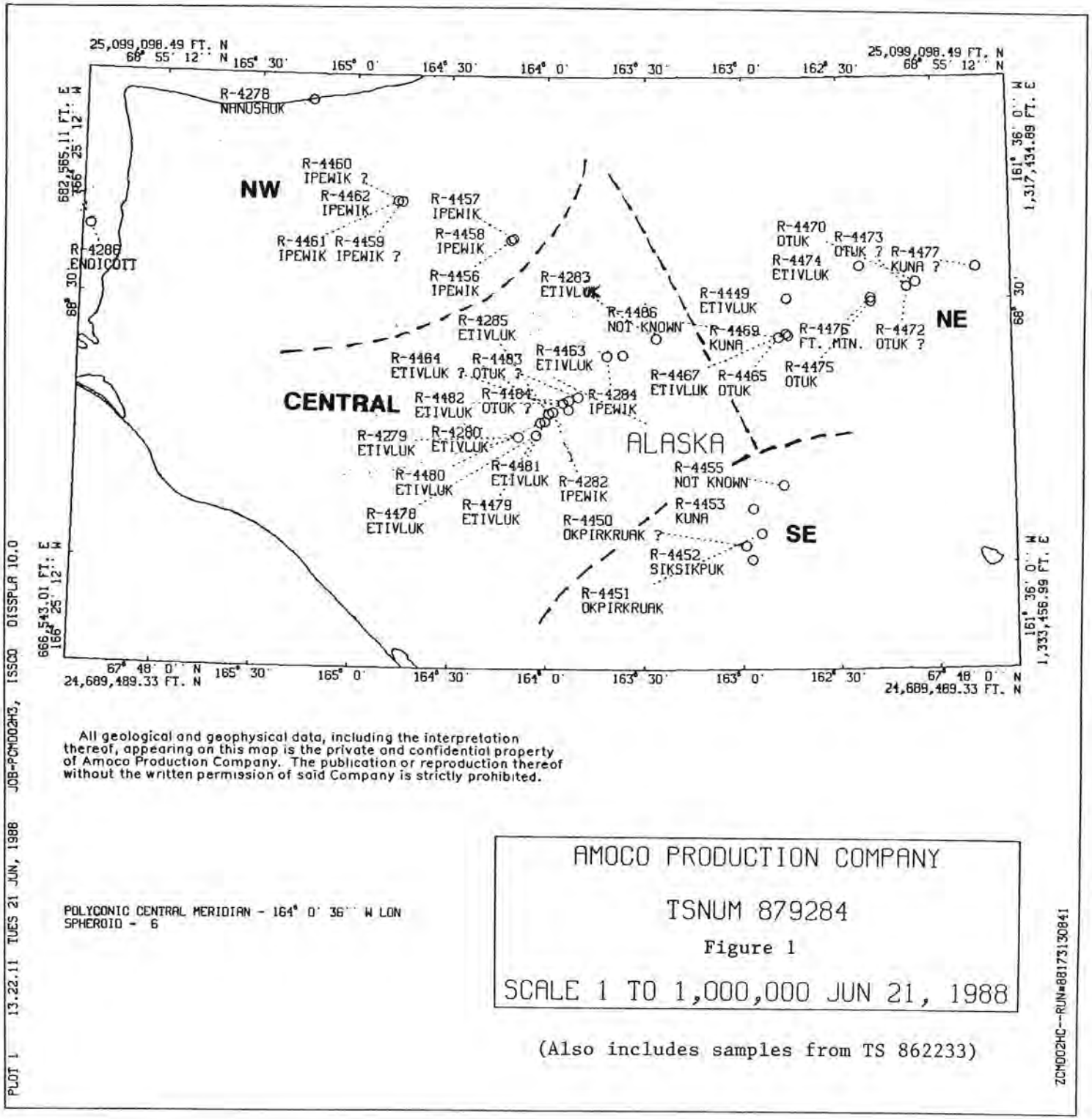
Thermal Maturity Ratios

217 Ion: Isomerization: 26/26+29

Thermal Cracking: A+B/A+B+26+27+28+29

231 Ion: Thermal Cracking: A+B/A+B+C+D+E+F+G

TS879284
Table 7



POLYCONIC CENTRAL MERIDIAN - 164° 0' 36" W LON
SPHEROID - 6

AMOCO PRODUCTION COMPANY

TSNUM 879284

Figure 1

SCALE 1 TO 1,000,000 JUN 21, 1988

(Also includes samples from TS 862233)

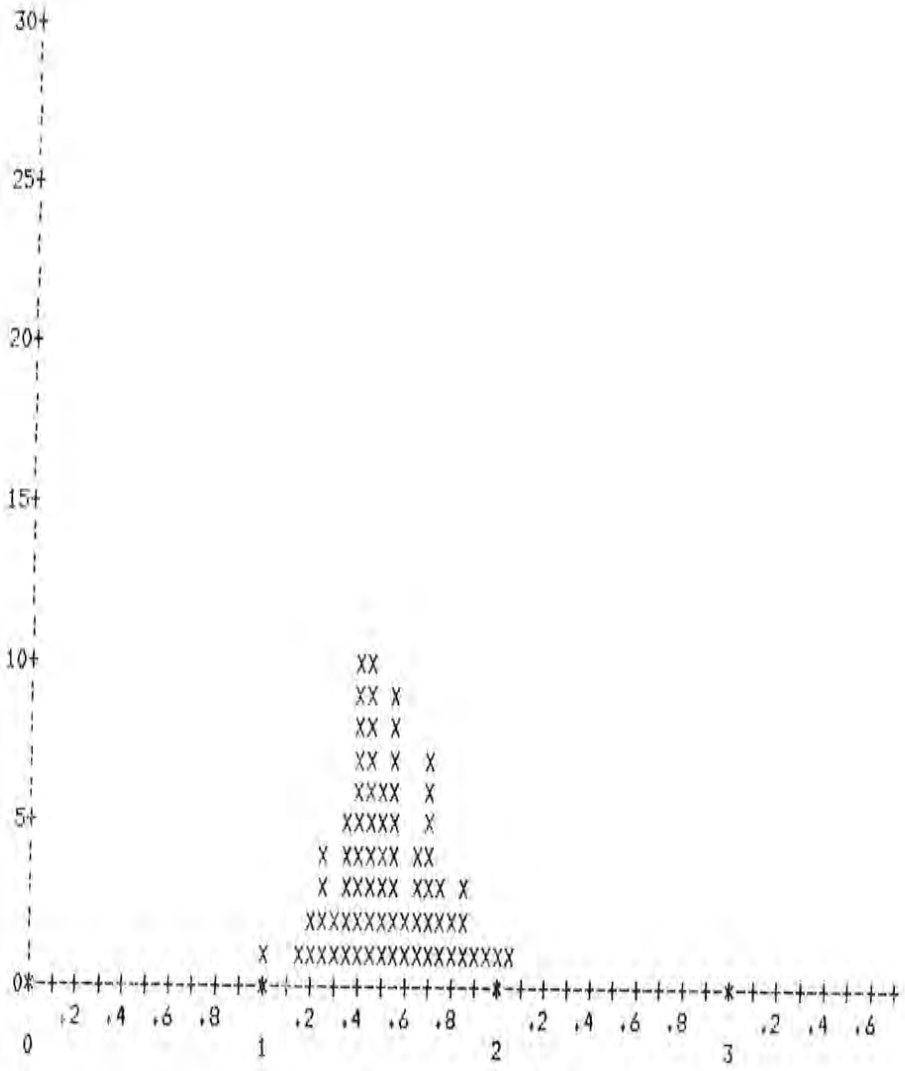
PLOT 1 13.22.11 TUES 21 JUN, 1988 JOB-PCM002H3, ISSCO DISSPLA 10.0

ZCM002HC--RUN=881731308A1

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4455
DEPTH/SAMPLE NO..R-4455 TYPE OF SAMPLE.....OUTCROP
LOCATION.....OT 87-23-9B, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.00 MAX. 2.05 AVG. 1.55 STD. DEV. 0.20



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 1.00 MAX. 1.00 AVG. 1.00 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 70 MIN. 1.18 MAX. 1.88 AVG. 1.53 STD. DEV. 0.17 +

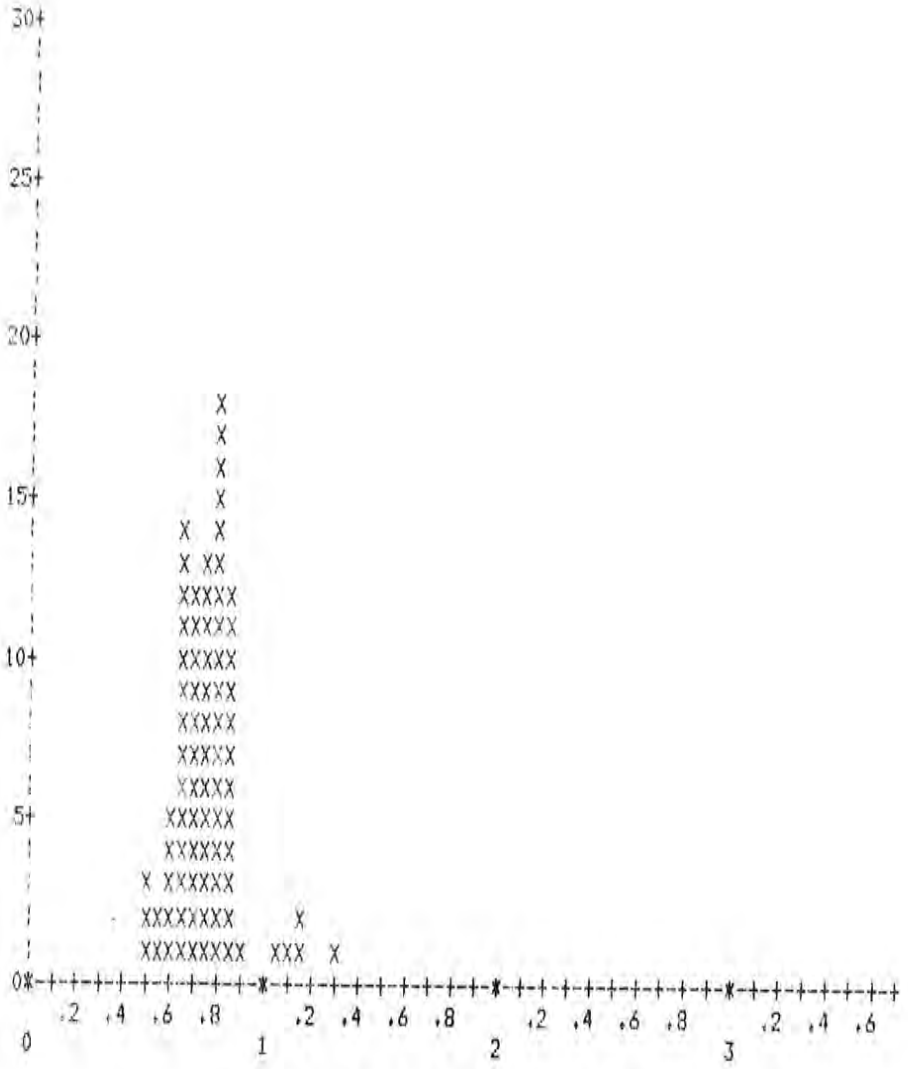
POP.# 3 TOTAL CTS. 4 MIN. 1.90 MAX. 2.05 AVG. 1.98 STD. DEV. 0.07

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4456
DEPTH/SAMPLE NO..R-4456 TYPE OF SAMPLE.....OC; IPEWIK FM.
LOCATION.....OT 87-24-1A, ALASKA DATE.....2-16-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.53 MAX. 1.31 AVG. 0.77 STD. DEV. 0.14



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 80 MIN. 0.53 MAX. 0.94 AVG. 0.75 STD. DEV. 0.09 +

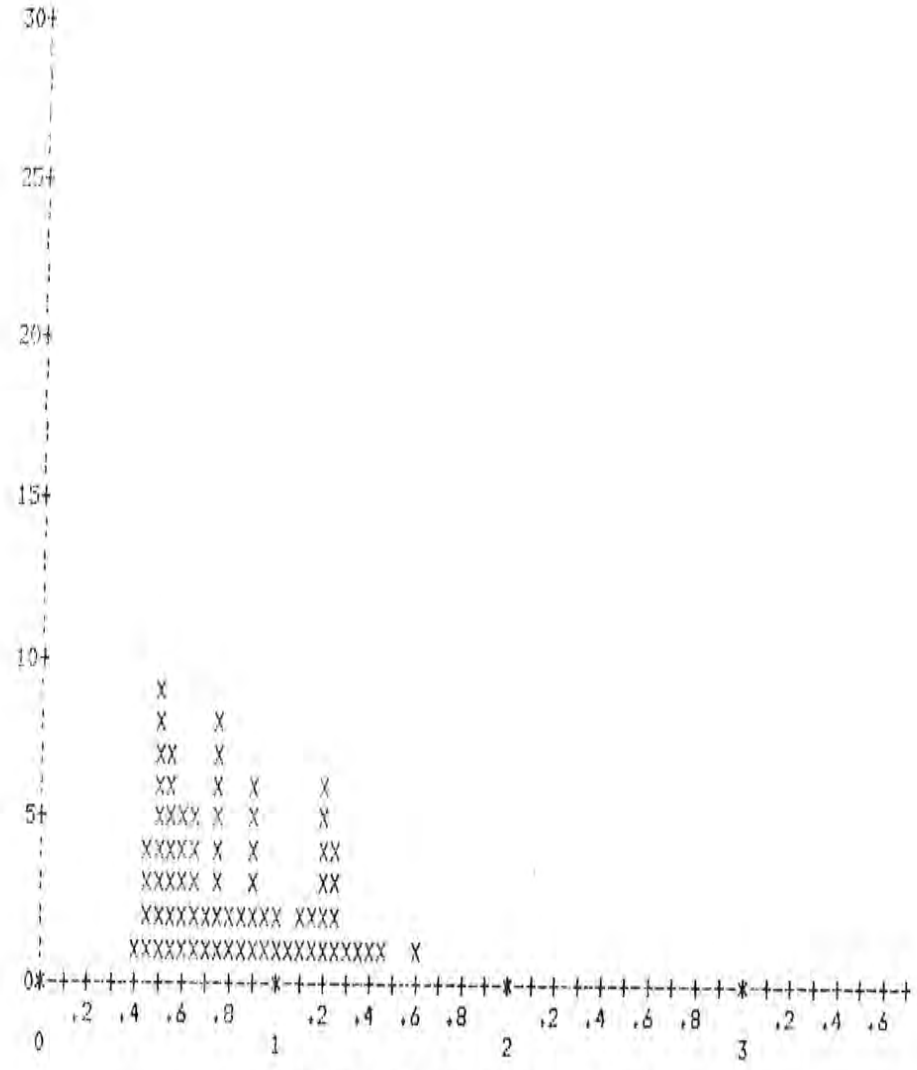
POP.# 2 TOTAL CTS. 5 MIN. 1.07 MAX. 1.31 AVG. 1.17 STD. DEV. 0.09

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4457
DEPTH/SAMPLE NO..R-4457 TYPE OF SAMPLE.....OC; IPEWIK FM.
LOCATION.....OT 87-24-2A, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS, 75

STANDARD %Ro START; 1.02 FINISH; 1.02

REFLECTANCE DATA; MIN. 0.44 MAX. 1.60 AVG. 0.84 STD. DEV. 0.30



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 31 MIN. 0.44 MAX. 0.69 AVG. 0.57 STD. DEV. 0.07 +

POP.# 2 TOTAL CTS. 25 MIN. 0.72 MAX. 1.06 AVG. 0.86 STD. DEV. 0.10

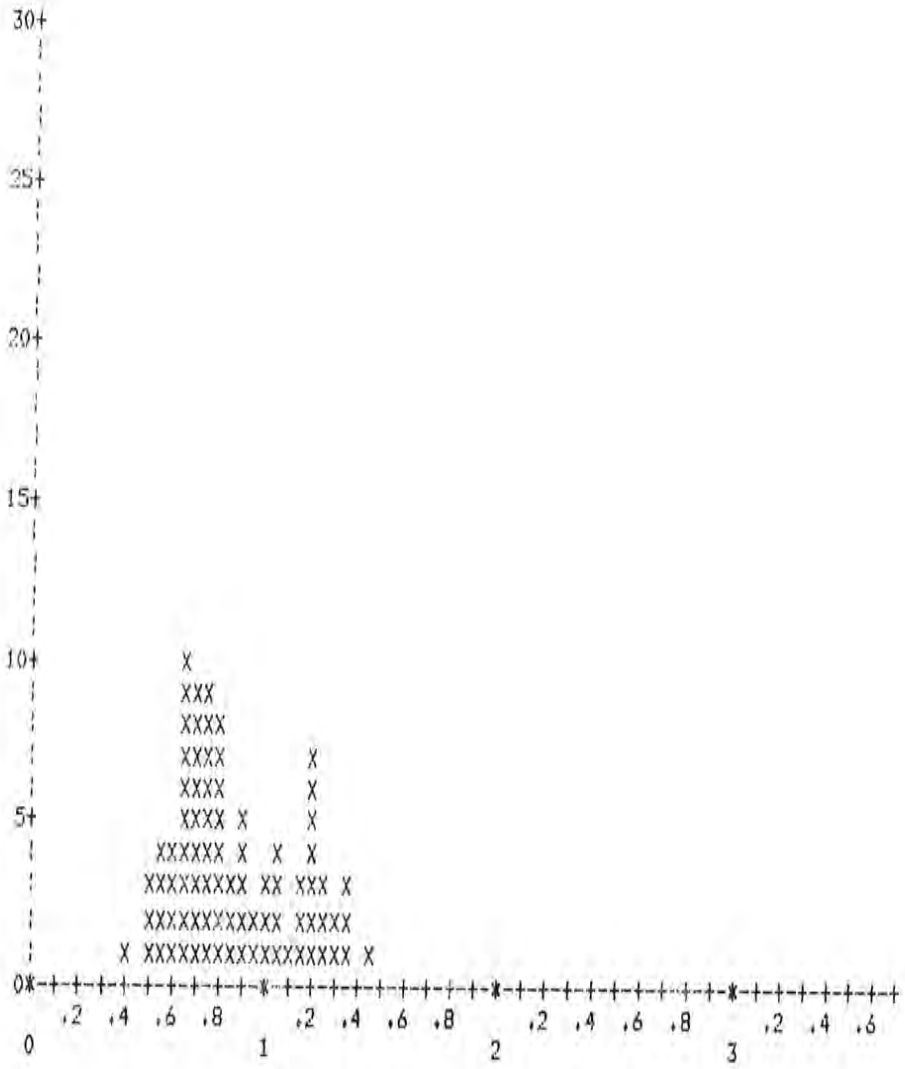
POP.# 3 TOTAL CTS. 19 MIN. 1.13 MAX. 1.60 AVG. 1.27 STD. DEV. 0.12

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4458
DEPTH/SAMPLE NO..R-4458 TYPE OF SAMPLE.....OC; IPEWIK FM.
LOCATION.....OT 87-24-2B, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.44 MAX. 1.45 AVG. 0.88 STD. DEV. 0.25



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 56 MIN. 0.44 MAX. 0.94 AVG. 0.73 STD. DEV. 0.12 +

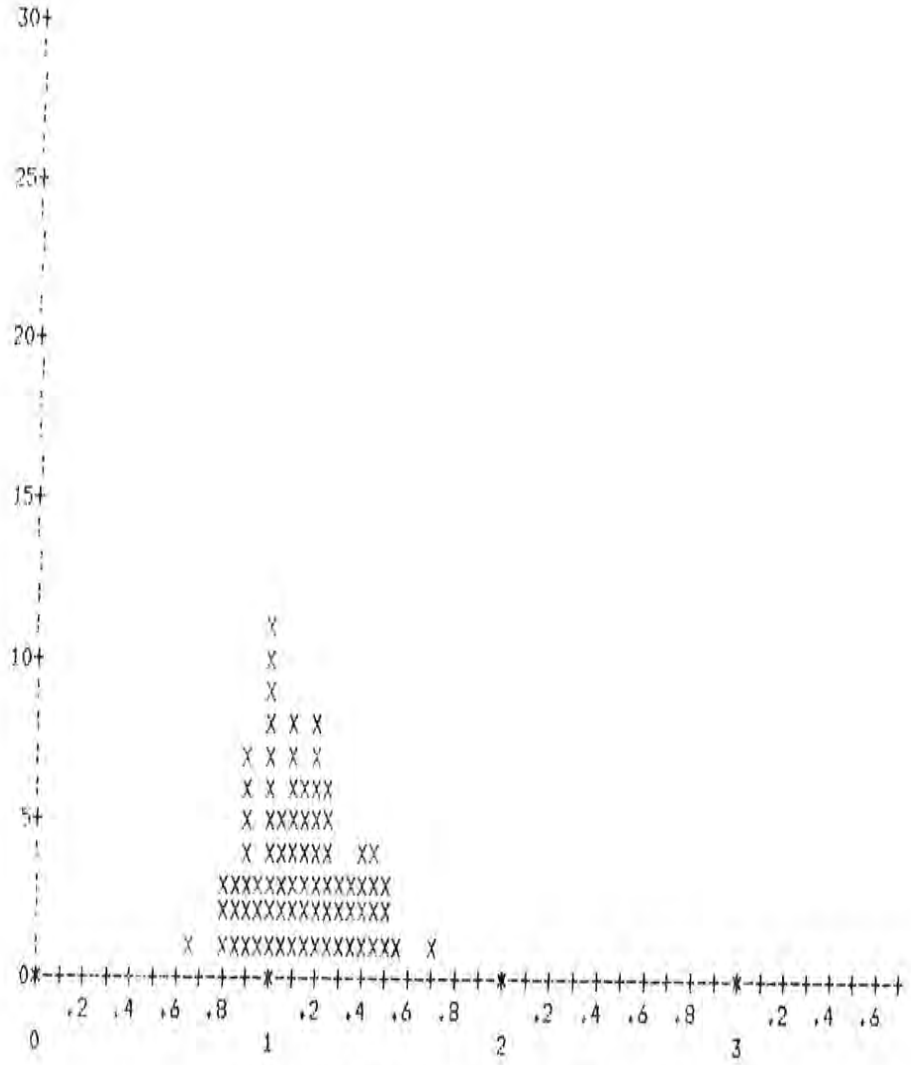
POP.# 2 TOTAL CTS. 29 MIN. 0.98 MAX. 1.45 AVG. 1.19 STD. DEV. 0.13

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4459
DEPTH/SAMPLE NO.,R-4459 TYPE OF SAMPLE.....OC; ?IPEWIK FM.
LOCATION.....OT 87-24-3, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS, 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.66 MAX. 1.74 AVG. 1.16 STD. DEV. 0.21



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.66 MAX. 0.66 AVG. 0.66 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 60 MIN. 0.80 MAX. 1.29 AVG. 1.07 STD. DEV. 0.13 +

POP.# 3 TOTAL CTS. 18 MIN. 1.31 MAX. 1.57 AVG. 1.43 STD. DEV. 0.07

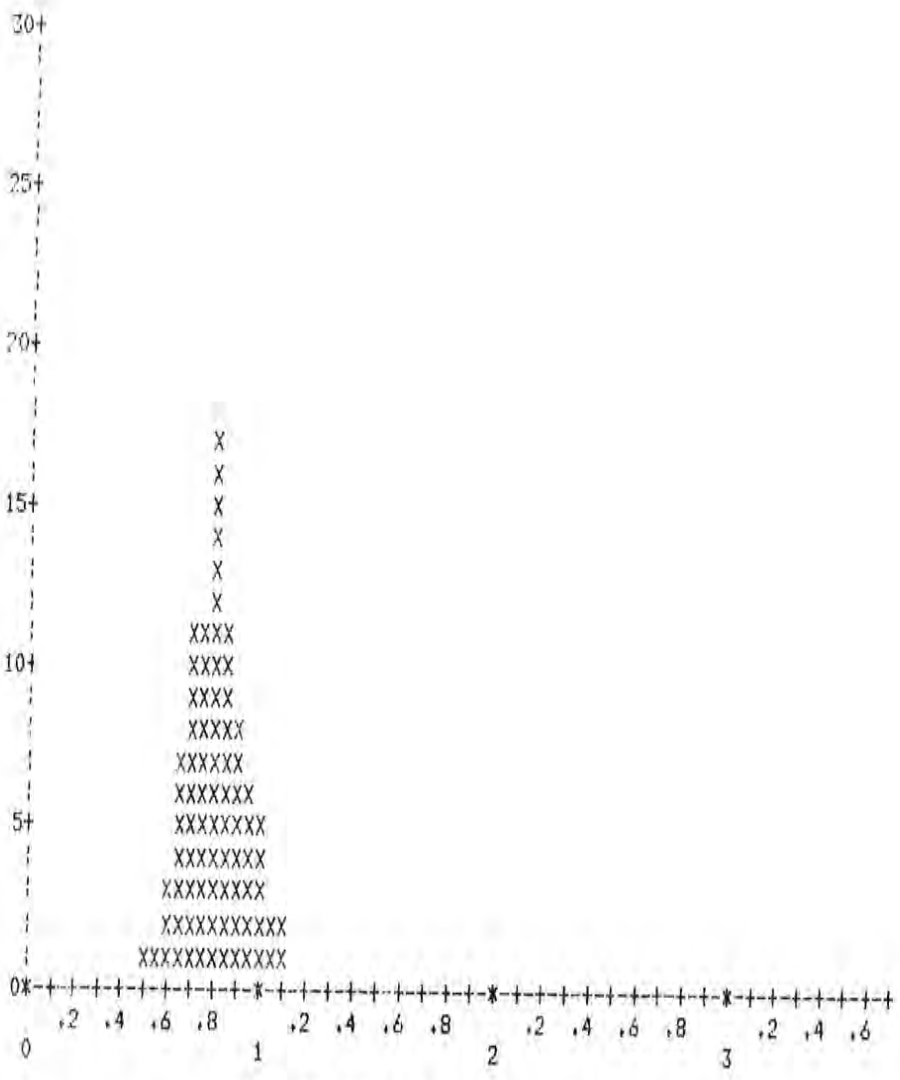
POP.# 4 TOTAL CTS. 1 MIN. 1.74 MAX. 1.74 AVG. 1.74 STD. DEV. 0.00

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4460
DEPTH/SAMPLE NO..R-4460 TYPE OF SAMPLE.....OC; TIPEWIK FM.
LOCATION.....OT 87-24-3B, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.51 MAX. 1.14 AVG. 0.83 STD. DEV. 0.12



VITRINITE REFLECTANCE HISTOGRAM - %Ro

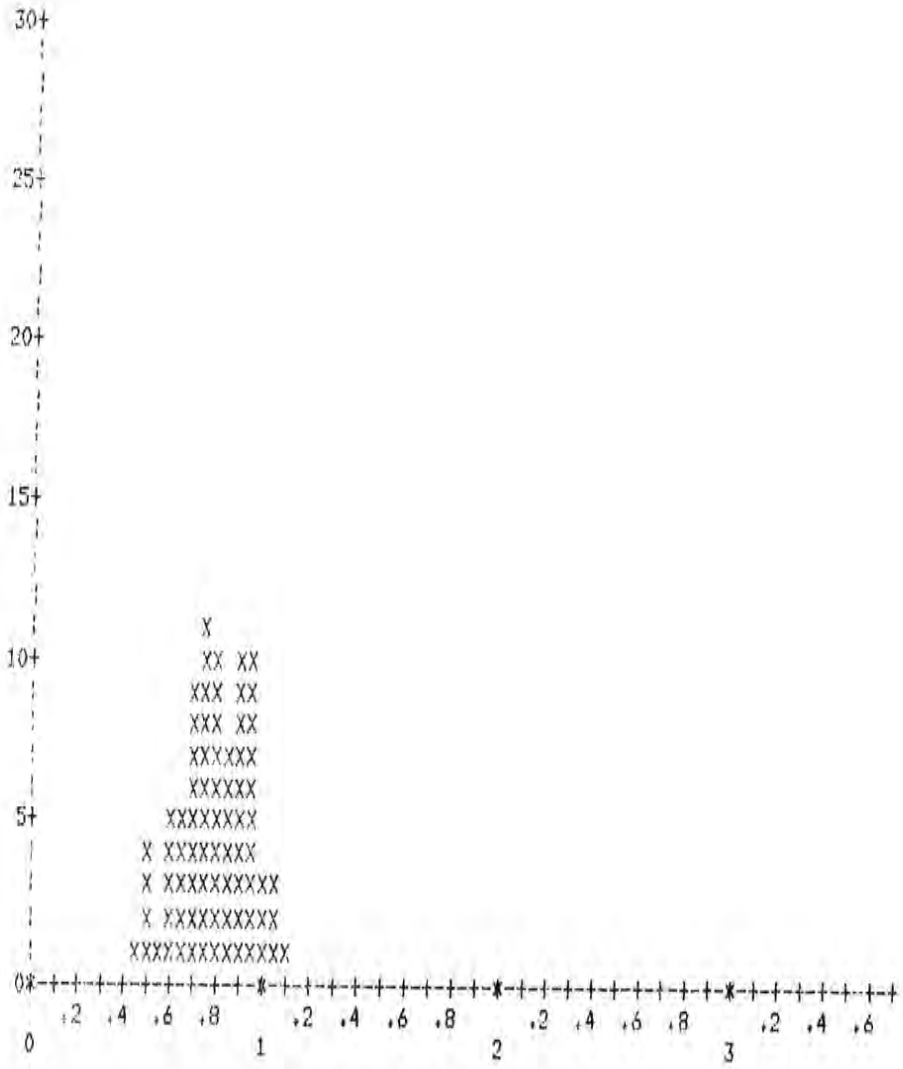
POP.# 1 TOTAL CTS. 85 MIN. 0.51 MAX. 1.14 AVG. 0.83 STD. DEV. 0.12 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4461
DEPTH/SAMPLE NO..R-4461 TYPE OF SAMPLE.....OC; IPEWIK FM.
LOCATION.....OT 87-24-4A, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.47 MAX. 1.14 AVG. 0.81 STD. DEV. 0.15



VITRINITE REFLECTANCE HISTOGRAM - %Ro

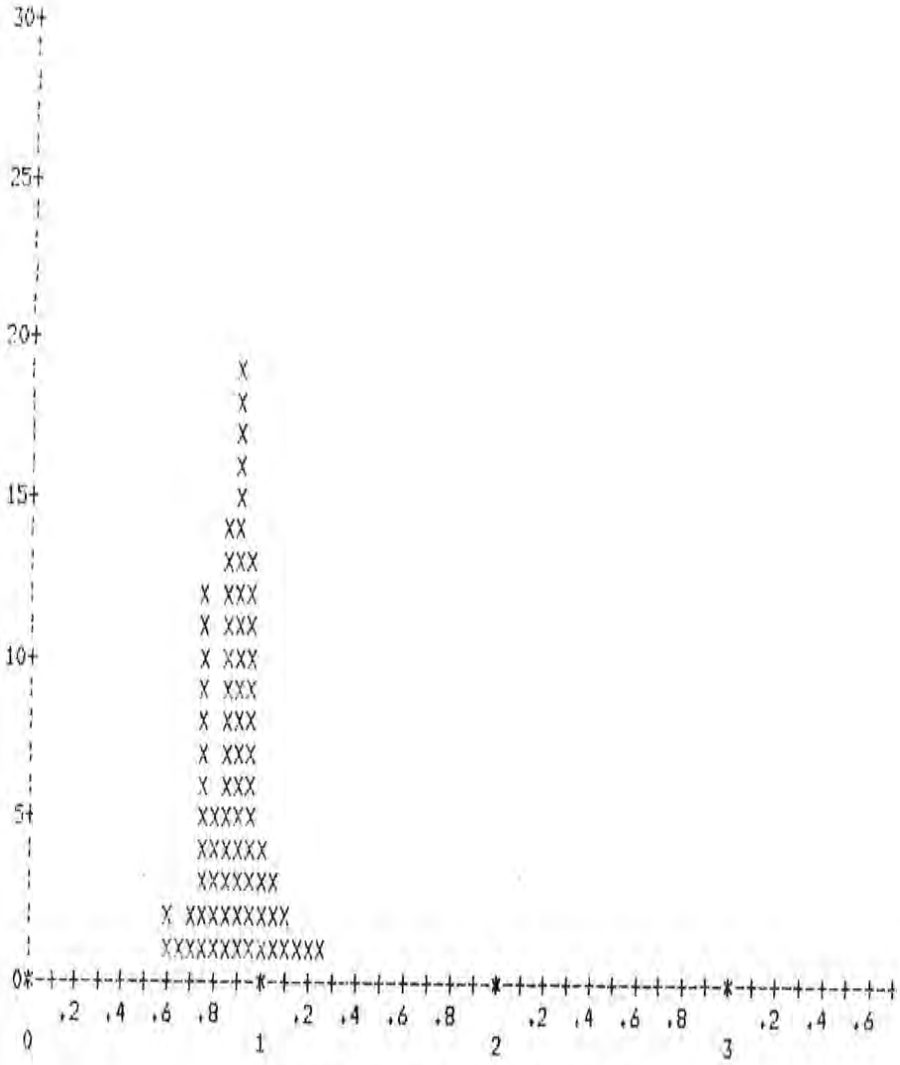
POP.# 1 TOTAL CTS. 80 MIN. 0.47 MAX. 1.14 AVG. 0.81 STD. DEV. 0.15 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4462
DEPTH/SAMPLE NO..R-4462 TYPE OF SAMPLE.....OC; IPEWIK FM.
LOCATION.....OT 87-24-4B, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.63 MAX. 1.29 AVG. 0.90 STD. DEV. 0.12



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 80 MIN. 0.63 MAX. 1.29 AVG. 0.90 STD. DEV. 0.12 +

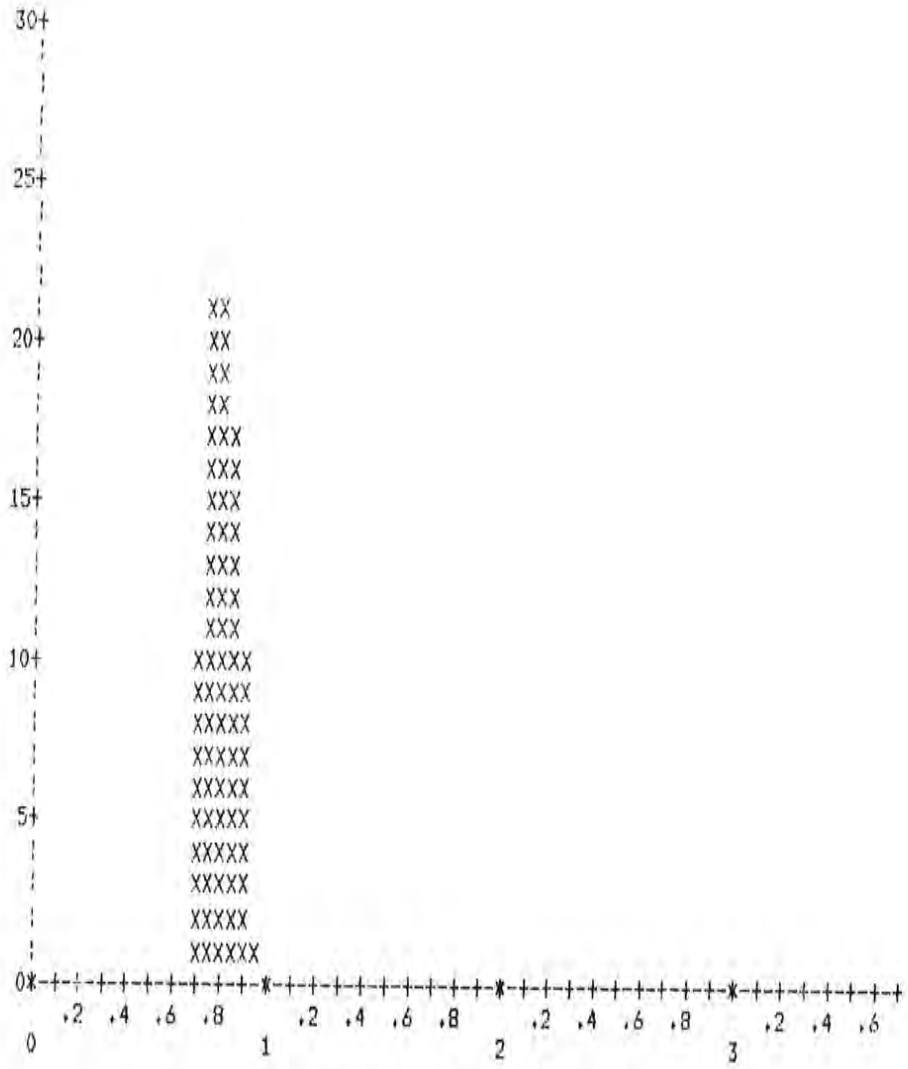
+ POPULATION CONSIDERED TO BE IN SITU

PAGE ONE OF TWO

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4463
DEPTH/SAMPLE NO..R-4463 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-24-5, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.70 MAX. 0.95 AVG. 0.82 STD. DEV. 0.06



VITRINITE REFLECTANCE HISTOGRAM - %Ro

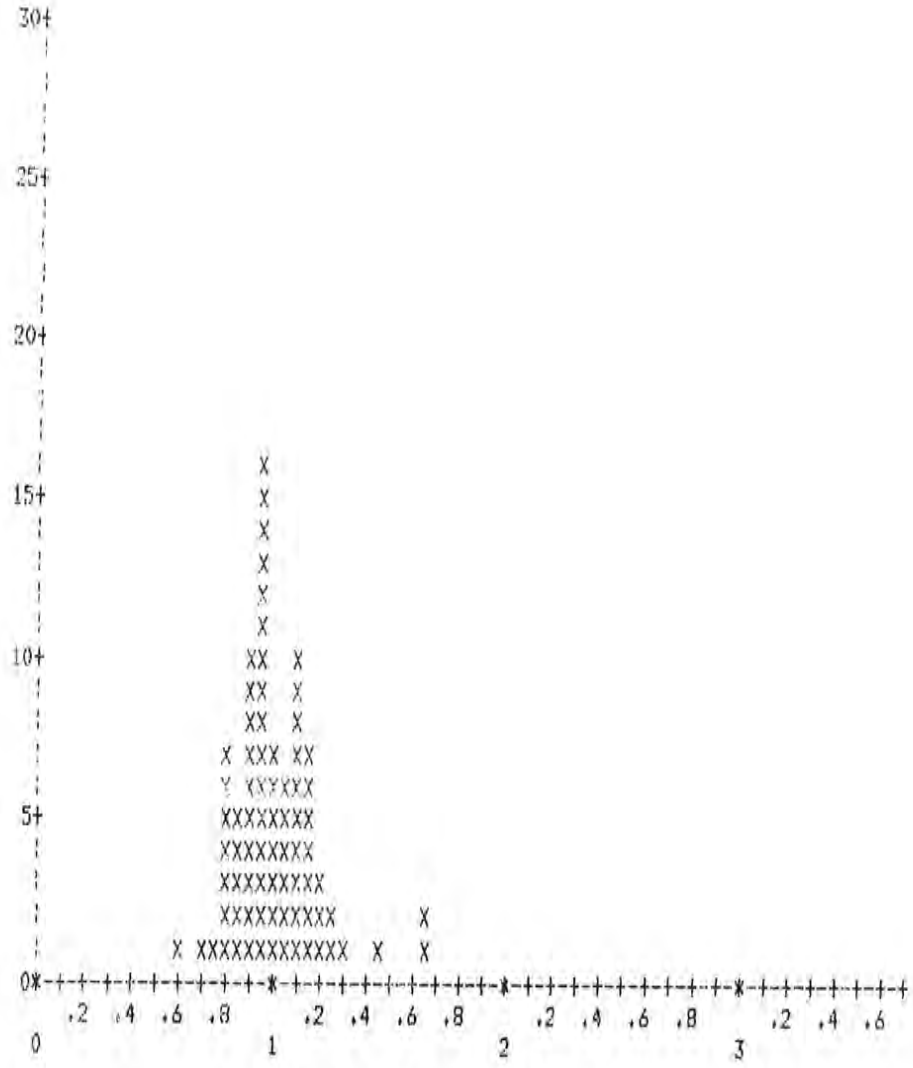
POP.# 1 TOTAL CTS. 80 MIN. 0.70 MAX. 0.95 AVG. 0.82 STD. DEV. 0.06 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4464
DEPTH/SAMPLE NO..R-4464 TYPE OF SAMPLE.....DC; TETIVLUK FM.
LOCATION.....OT 87-26-1A, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.63 MAX. 1.67 AVG. 1.03 STD. DEV. 0.18



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 77 MIN. 0.63 MAX. 1.31 AVG. 1.01 STD. DEV. 0.13 +

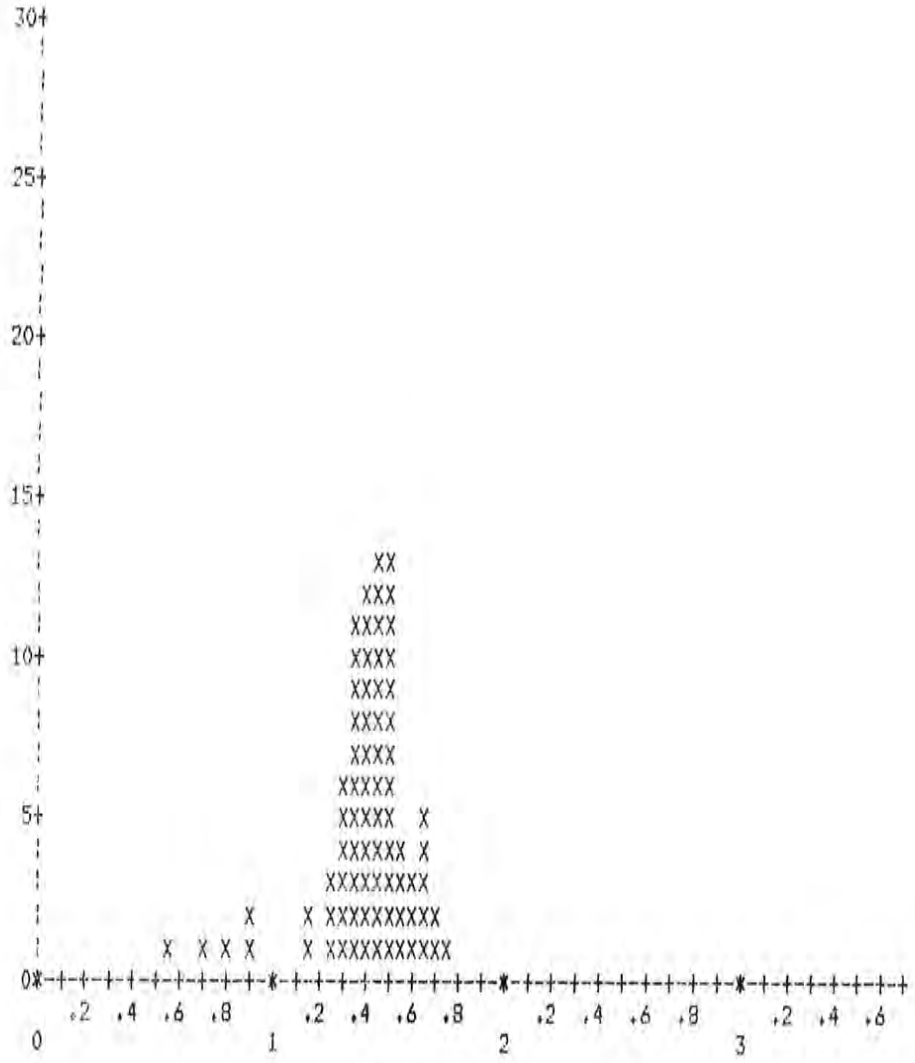
POP.# 2 TOTAL CTS. 3 MIN. 1.47 MAX. 1.67 AVG. 1.60 STD. DEV. 0.11

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4465
DEPTH/SAMPLE NO..R-4465 TYPE OF SAMPLE.....OC; OTUK FM.
LOCATION.....OT 87-26-3, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.56 MAX. 1.77 AVG. 1.42 STD. DEV. 0.20



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 5 MIN. 0.56 MAX. 0.93 AVG. 0.79 STD. DEV. 0.16

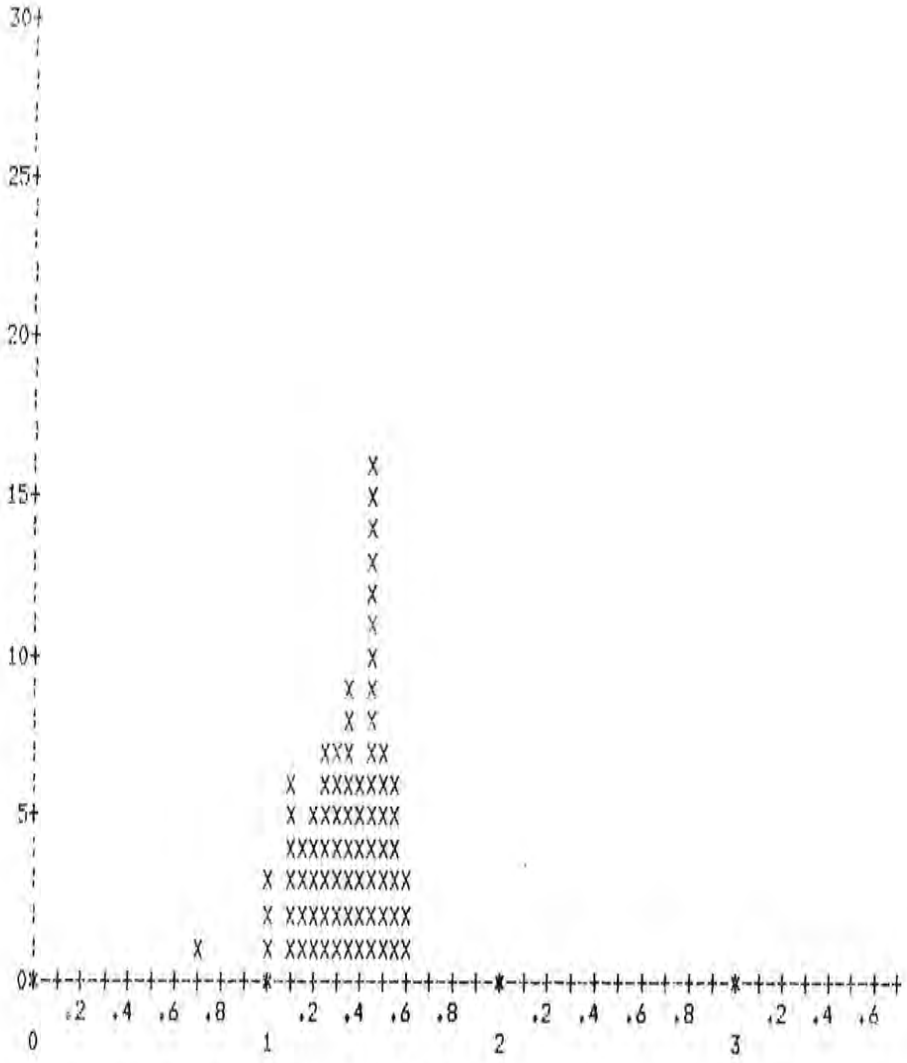
POP.# 2 TOTAL CTS. 75 MIN. 1.16 MAX. 1.77 AVG. 1.46 STD. DEV. 0.12 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4466
DEPTH/SAMPLE NO..R-4466 TYPE OF SAMPLE.....OUTCROP
LOCATION.....OT 87-26-3B, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.73 MAX. 1.60 AVG. 1.36 STD. DEV. 0.16



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.73 MAX. 0.73 AVG. 0.73 STD. DEV. 0.00

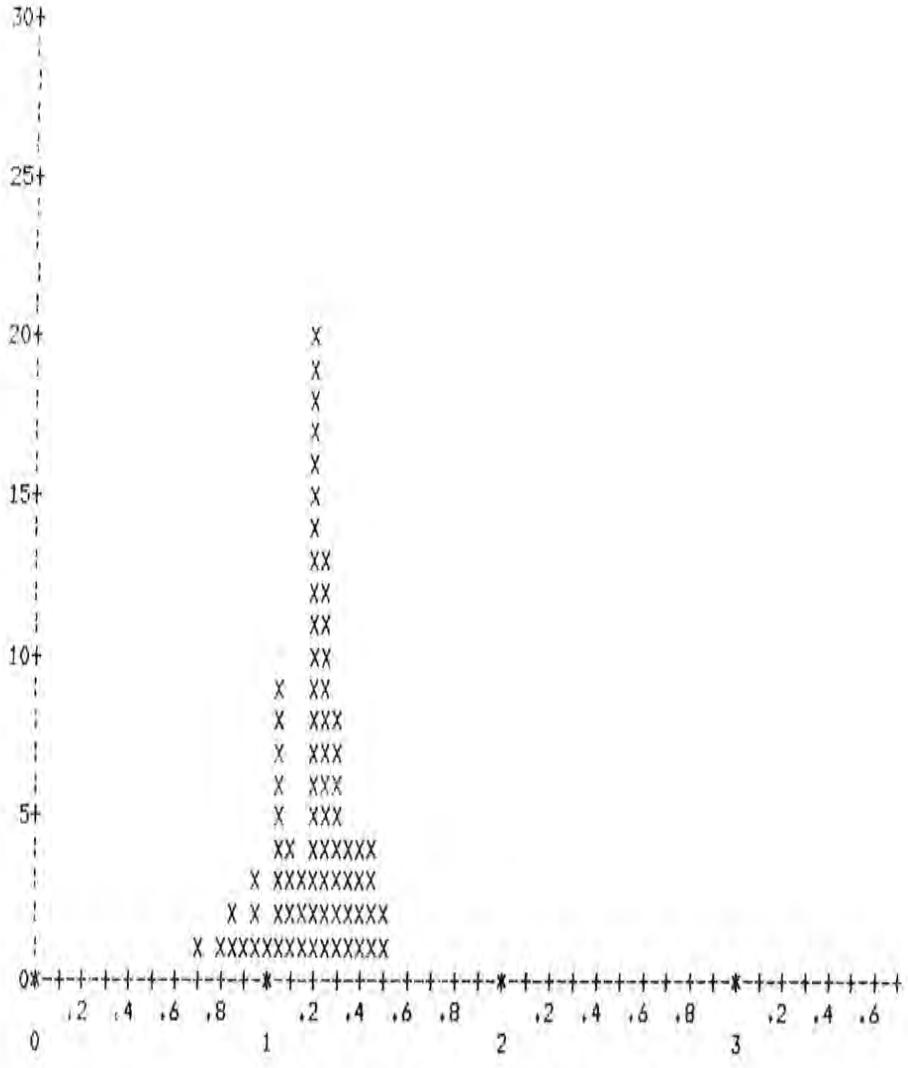
POP.# 2 TOTAL CTS. 79 MIN. 1.03 MAX. 1.60 AVG. 1.37 STD. DEV. 0.15 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4467
DEPTH/SAMPLE NO..R-4467 TYPE OF SAMPLE.....OC; ETIVLIK FM.
LOCATION.....OT 87-26-6, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.74 MAX. 1.53 AVG. 1.22 STD. DEV. 0.16



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 9 MIN. 0.74 MAX. 1.00 AVG. 0.90 STD. DEV. 0.09

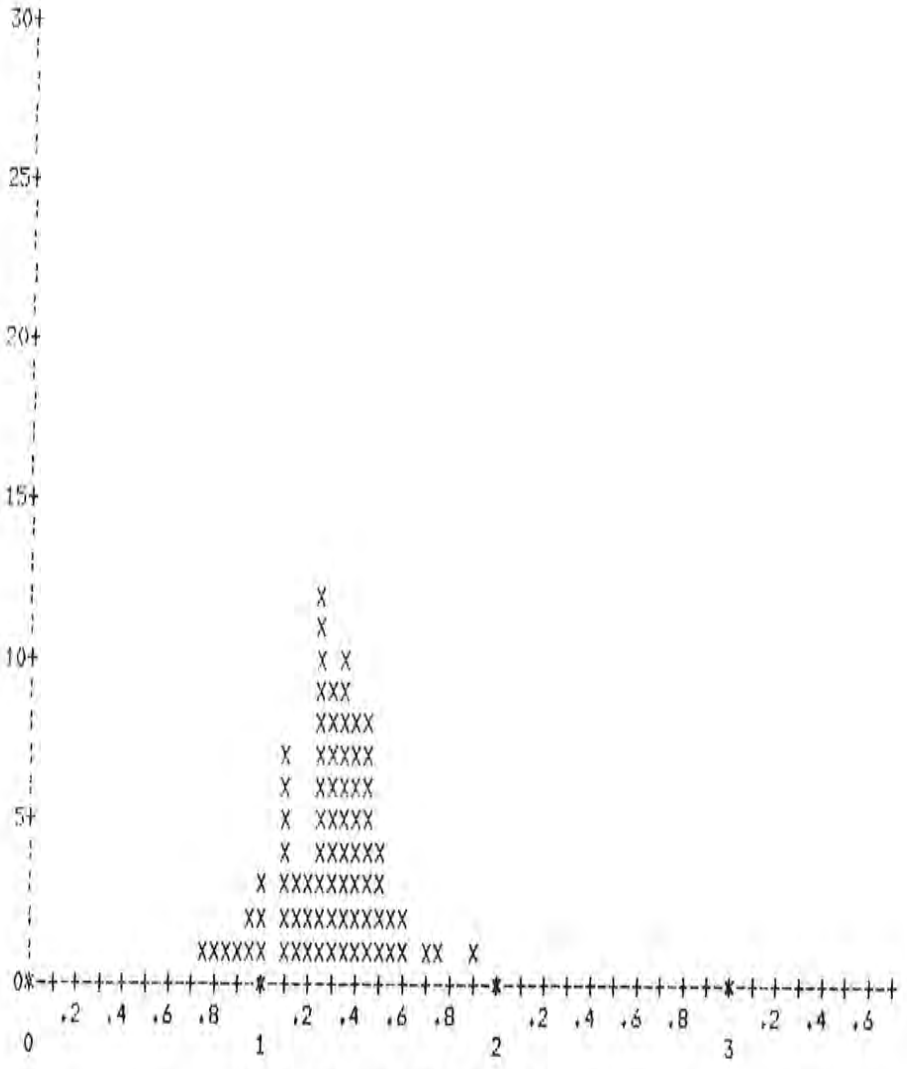
POP.# 2 TOTAL CTS. 71 MIN. 1.05 MAX. 1.53 AVG. 1.26 STD. DEV. 0.11 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT:.....AMOCO PROD. COMPANY FILE NAME.....R-4469
DEPTH/SAMPLE NO..R-4469 TYPE OF SAMPLE.....OC; KUNA FM.
LOCATION.....OT 87-26-8, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.76 MAX. 1.91 AVG. 1.31 STD. DEV. 0.20



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 9 MIN. 0.76 MAX. 1.02 AVG. 0.93 STD. DEV. 0.09

POP.# 2 TOTAL CTS. 68 MIN. 1.10 MAX. 1.63 AVG. 1.34 STD. DEV. 0.13 +

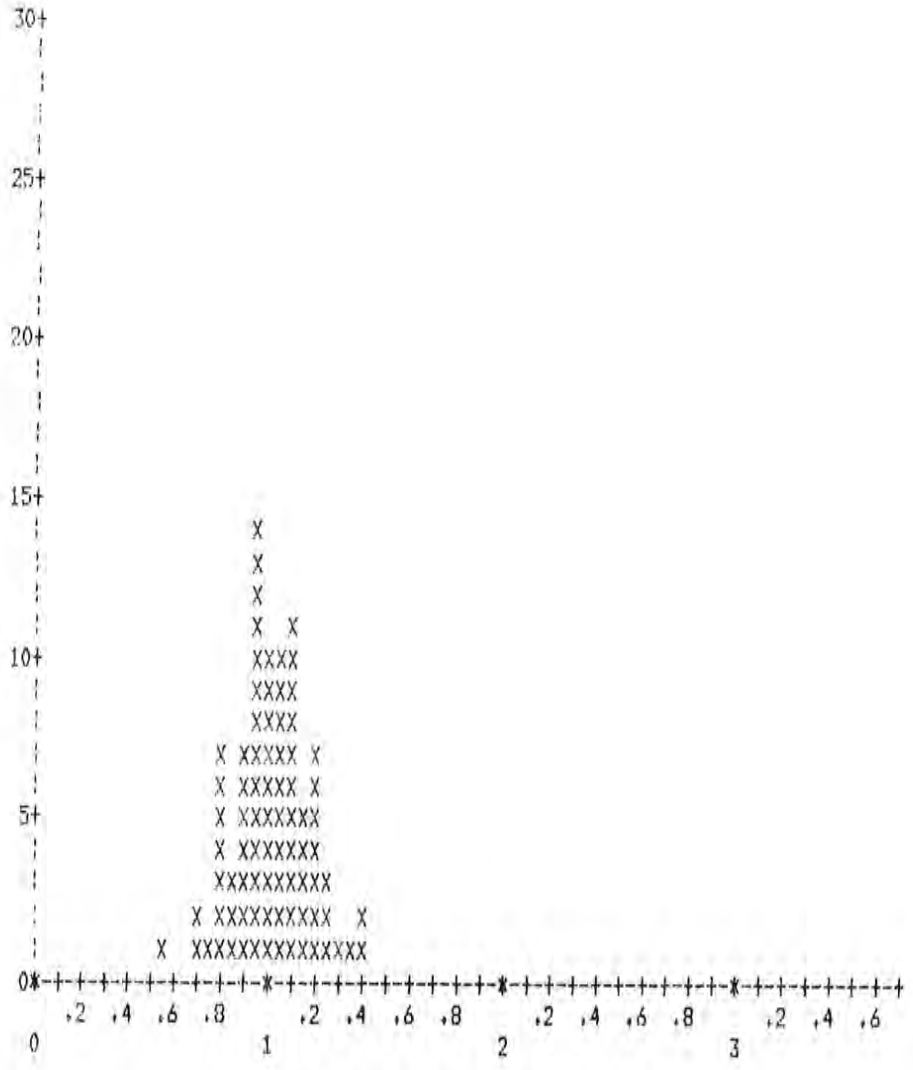
POP.# 3 TOTAL CTS. 3 MIN. 1.70 MAX. 1.91 AVG. 1.79 STD. DEV. 0.11

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4470
DEPTH/SAMPLE NO..R-4470 TYPE OF SAMPLE.....OC; OTUK FM.
LOCATION.....OT 87-27-2, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.59 MAX. 1.42 AVG. 1.04 STD. DEV. 0.16



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 4 MIN. 0.59 MAX. 0.79 AVG. 0.71 STD. DEV. 0.09

POP.# 2 TOTAL CTS. 77 MIN. 0.80 MAX. 1.29 AVG. 1.04 STD. DEV. 0.12 +

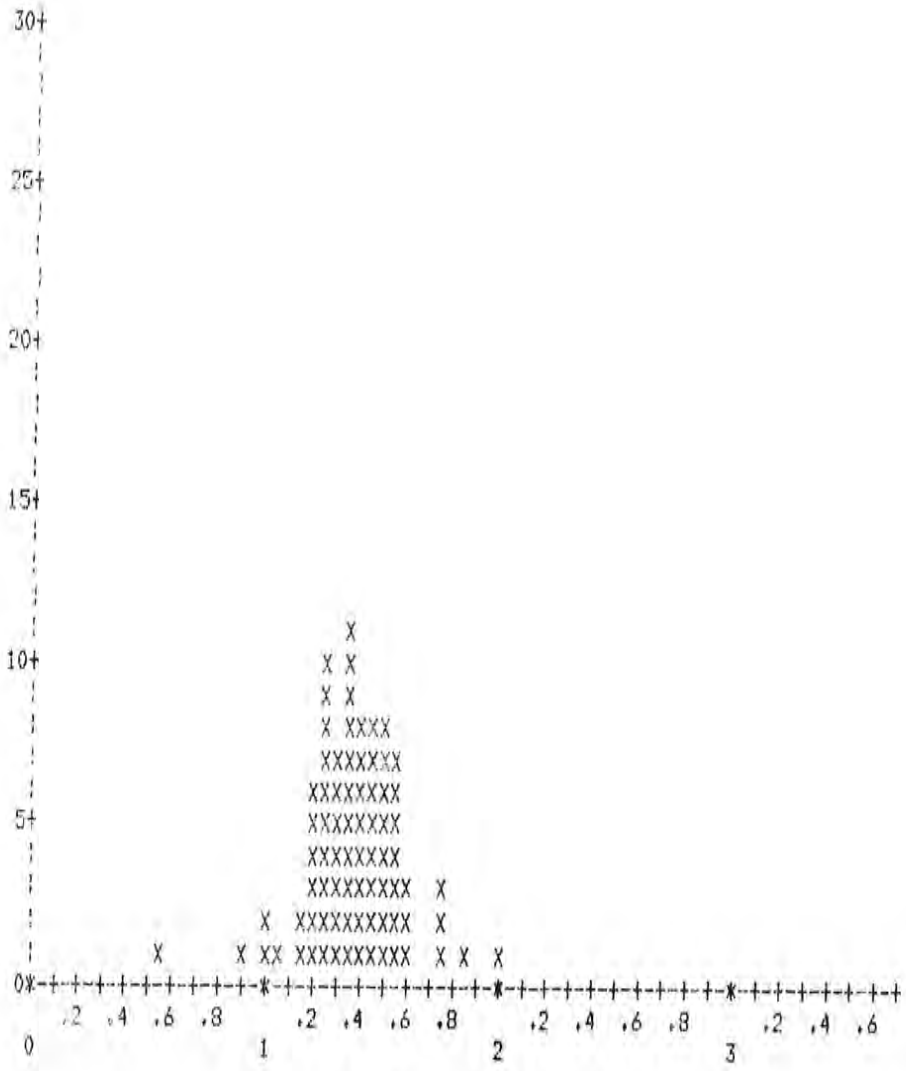
POP.# 3 TOTAL CTS. 4 MIN. 1.30 MAX. 1.42 AVG. 1.37 STD. DEV. 0.06

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4472
DEPTH/SAMPLE NO..R-4472 TYPE OF SAMPLE.....OC; ?OTUK FM.
LOCATION.....OT 37-27-3A, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 30

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.59 MAX. 2.02 AVG. 1.39 STD. DEV. 0.21



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.59 MAX. 0.59 AVG. 0.59 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 4 MIN. 0.91 MAX. 1.06 AVG. 1.00 STD. DEV. 0.07

POP.# 3 TOTAL CTS. 70 MIN. 1.16 MAX. 1.62 AVG. 1.40 STD. DEV. 0.12 +

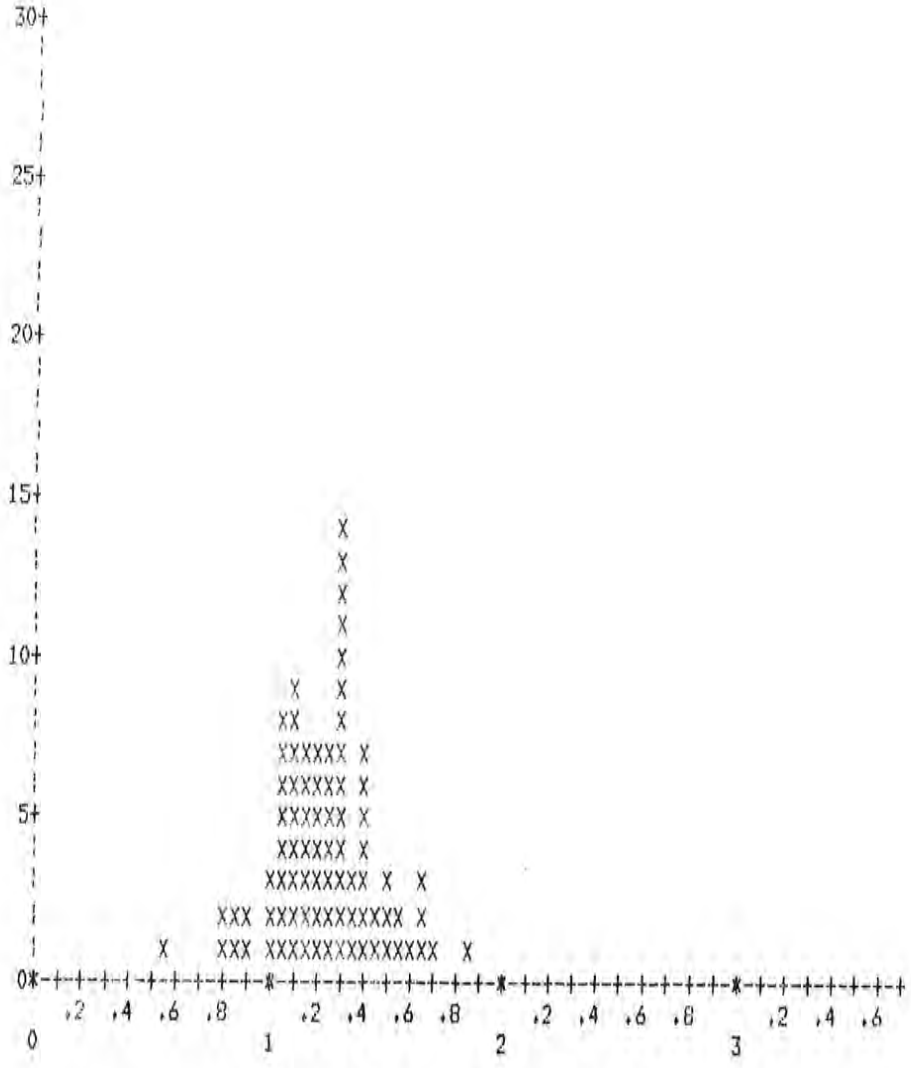
POP.# 4 TOTAL CTS. 5 MIN. 1.75 MAX. 2.02 AVG. 1.84 STD. DEV. 0.11

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4473
DEPTH/SAMPLE NO..R-4473 TYPE OF SAMPLE.....OC; POTUK FM.
LOCATION.....OT 87-27-3C, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.58 MAX. 1.88 AVG. 1.26 STD. DEV. 0.22



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.58 MAX. 0.58 AVG. 0.58 STD. DEV. 0.00

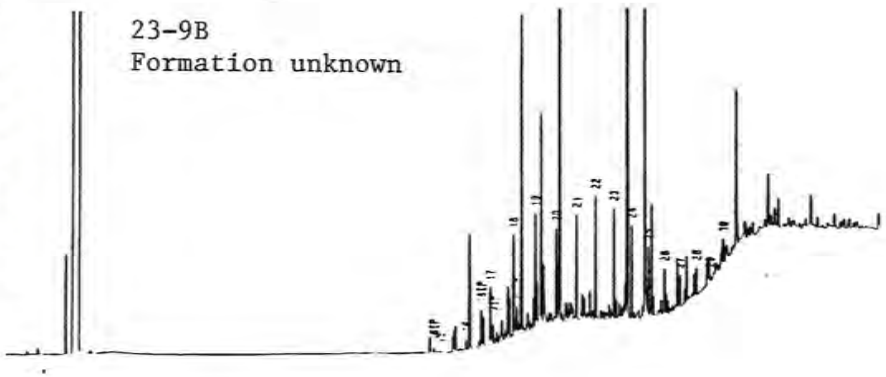
POP.# 2 TOTAL CTS. 6 MIN. 0.82 MAX. 0.94 AVG. 0.88 STD. DEV. 0.05

POP.# 3 TOTAL CTS. 65 MIN. 1.00 MAX. 1.44 AVG. 1.23 STD. DEV. 0.12 +

POP.# 4 TOTAL CTS. 13 MIN. 1.45 MAX. 1.88 AVG. 1.60 STD. DEV. 0.12

+ POPULATION CONSIDERED TO BE IN SITU

R-4455X.



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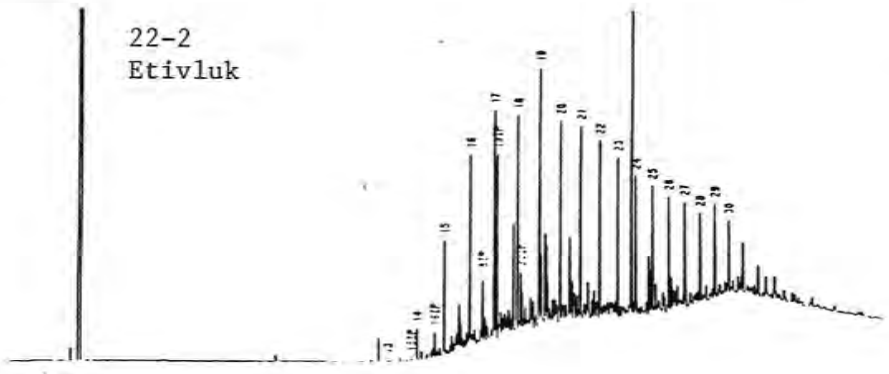
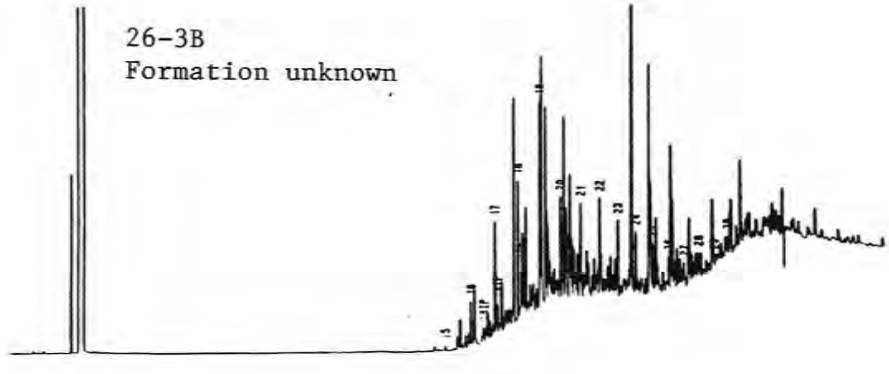
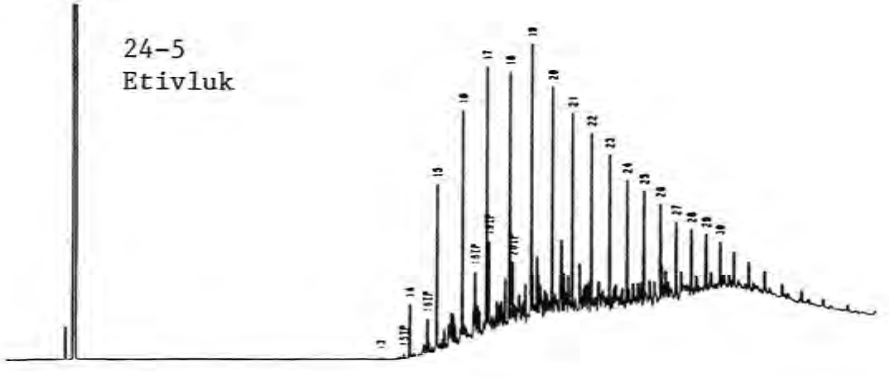


R-4466X.



R-4463X.



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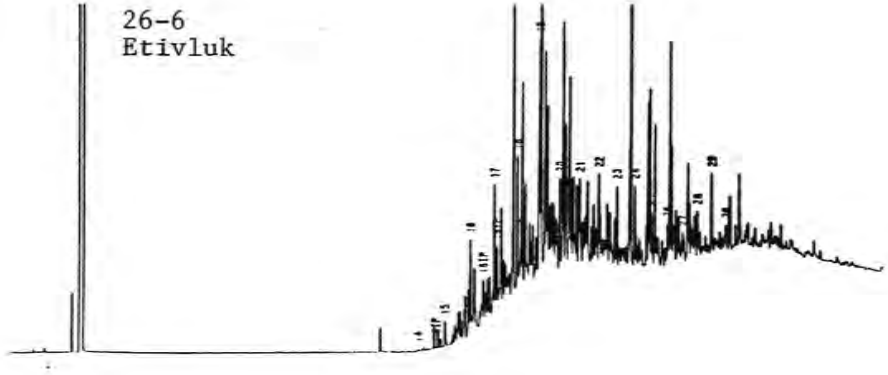
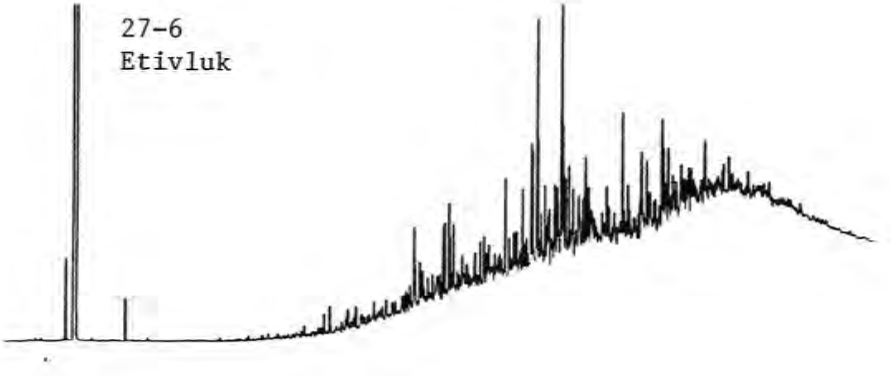


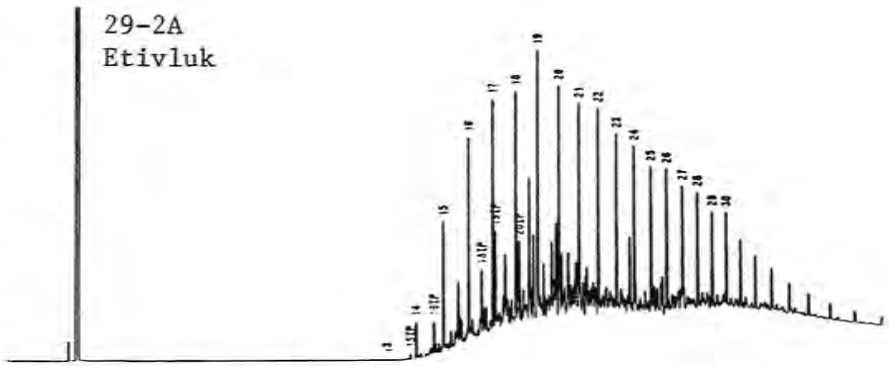
R-4474X.



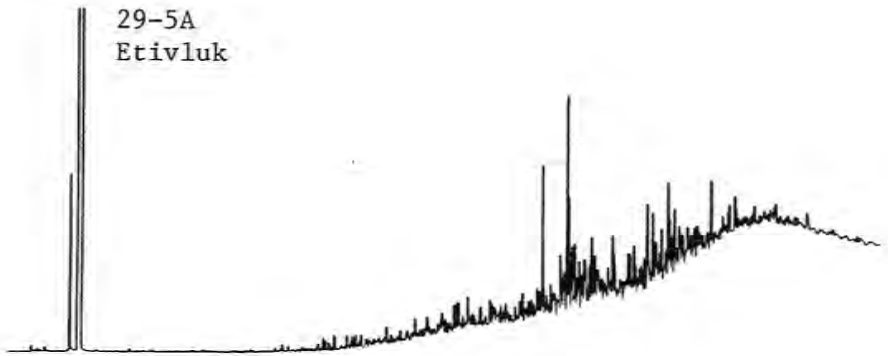
Bitumen Chromatograms

TS 879286
Figure 2a

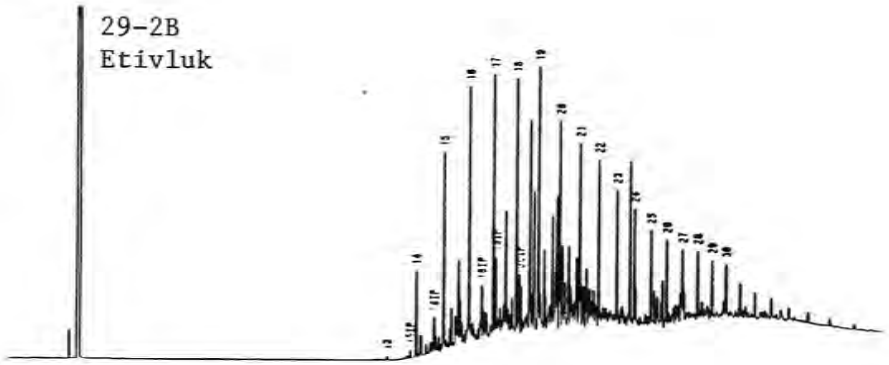
R-4478X.



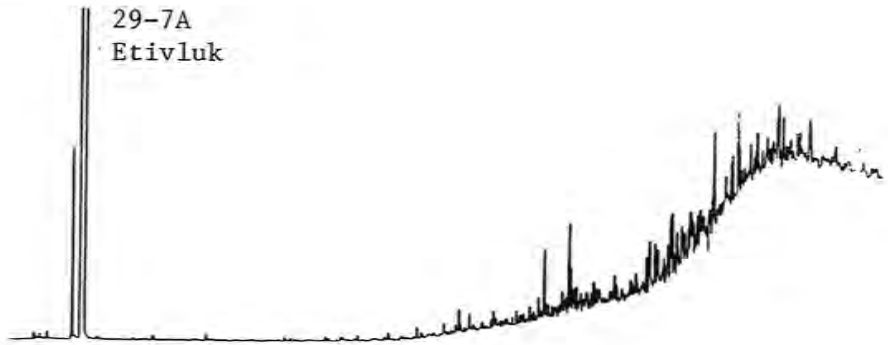
R-4481X.



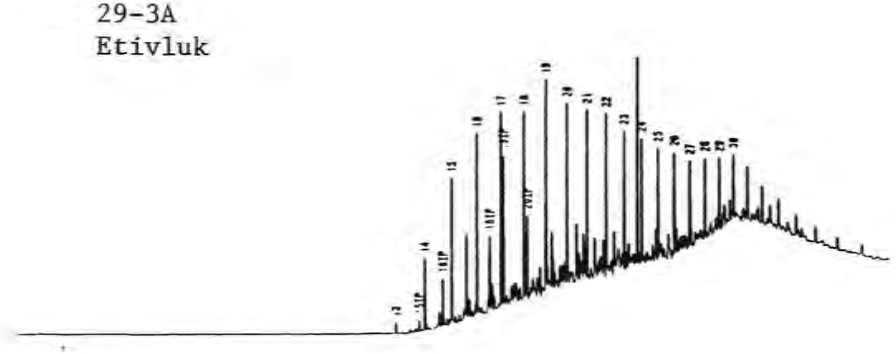
R-4479X.



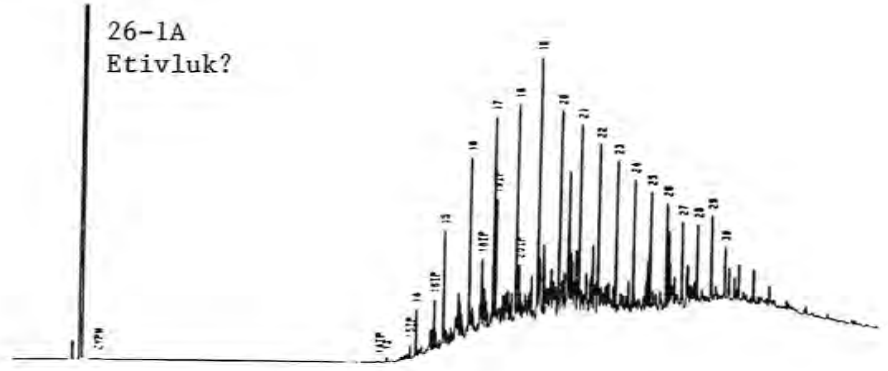
R-4482X.



R-4480X



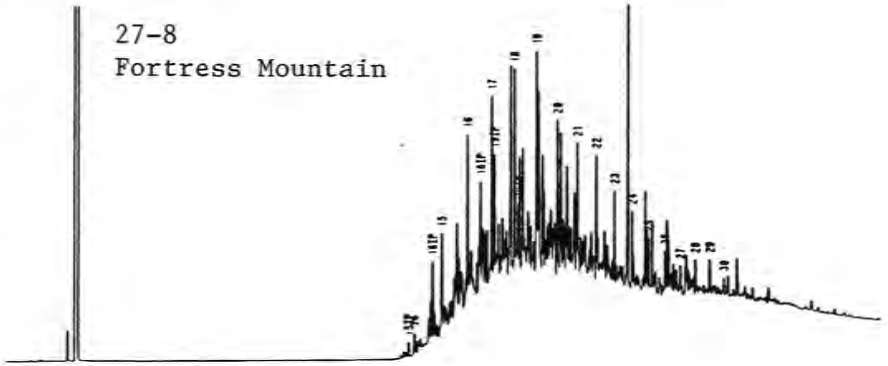
R-4464X.



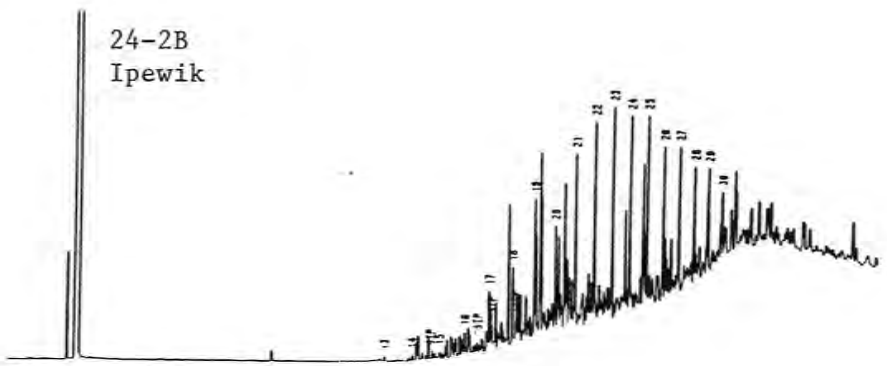
Bitumen Chromatograms

TS 879286
Fibure 2b

R-4476X.



R-4458X.



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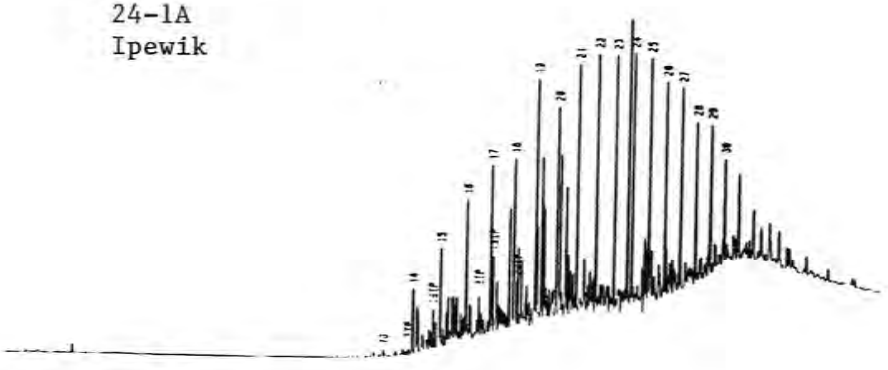
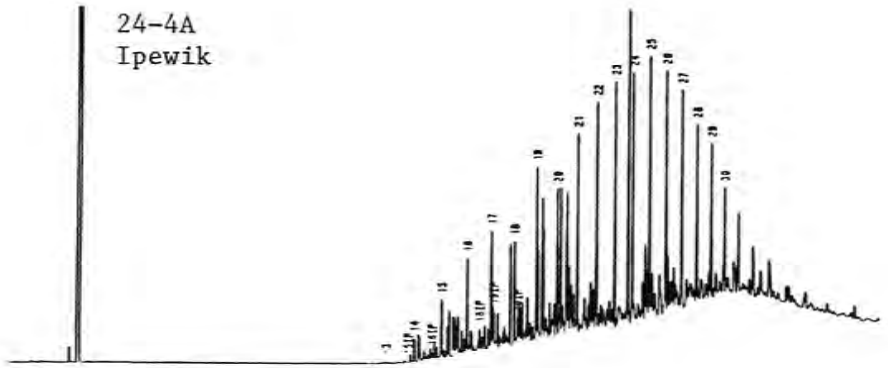
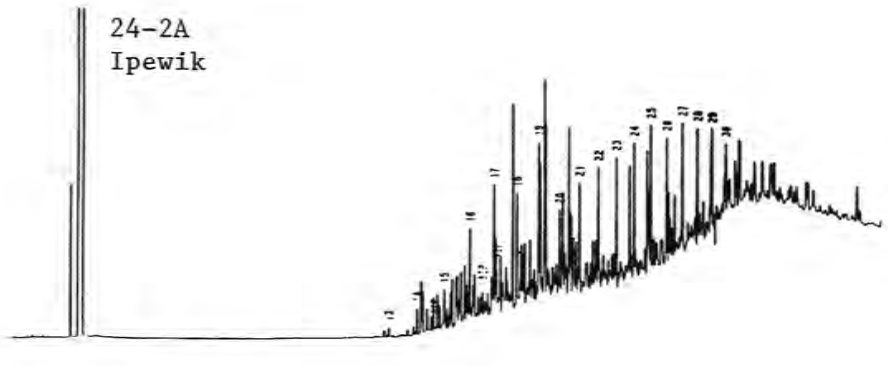


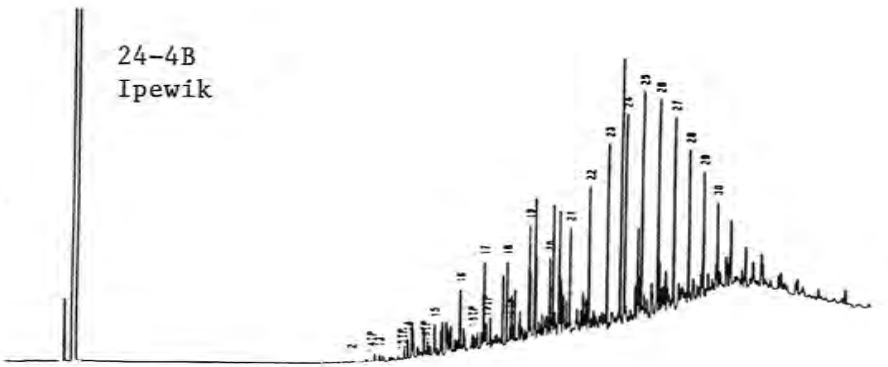
R-4461X.



R-4457X.



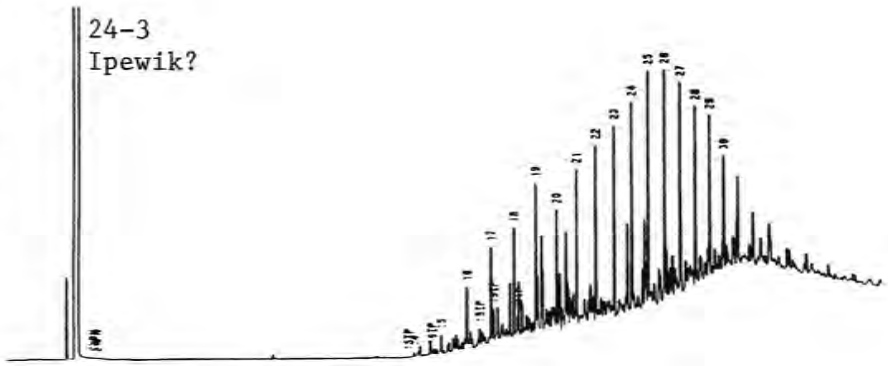
R-4462X.



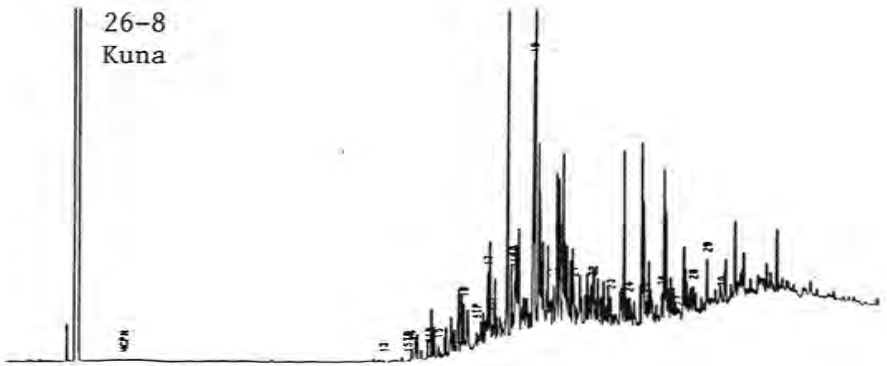
Bitumen Chromatograms

TS 879286
Figure 2c

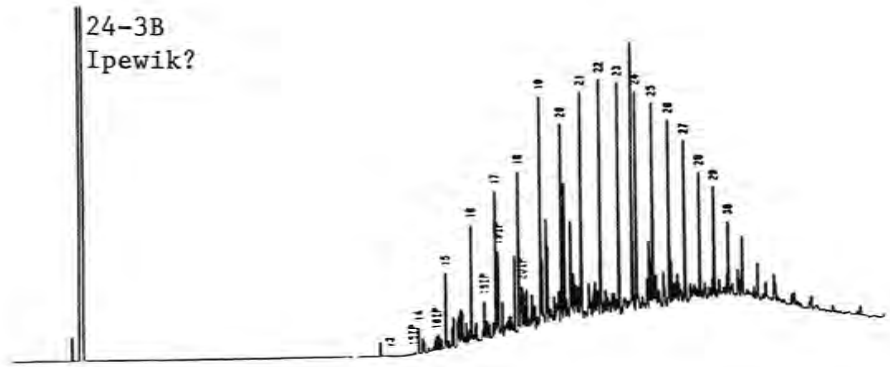
R-4459X.



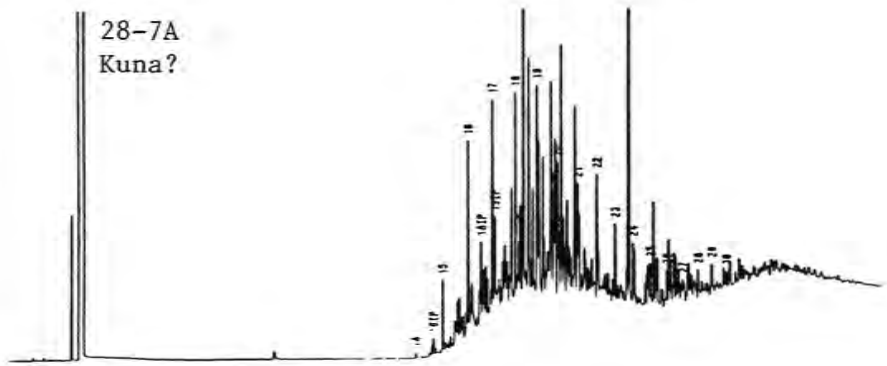
R-4469X.



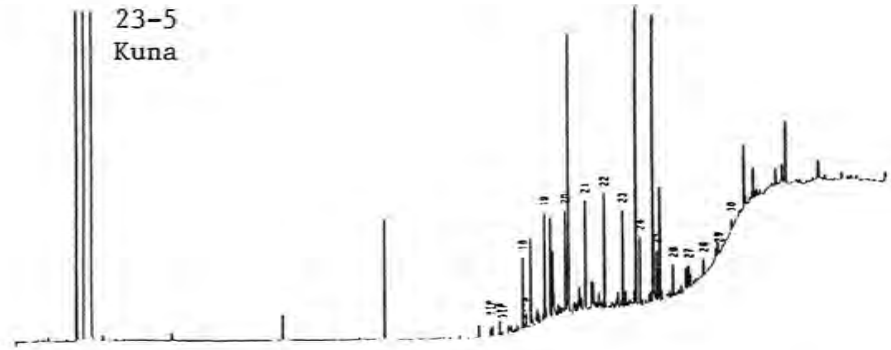
R-4460X.



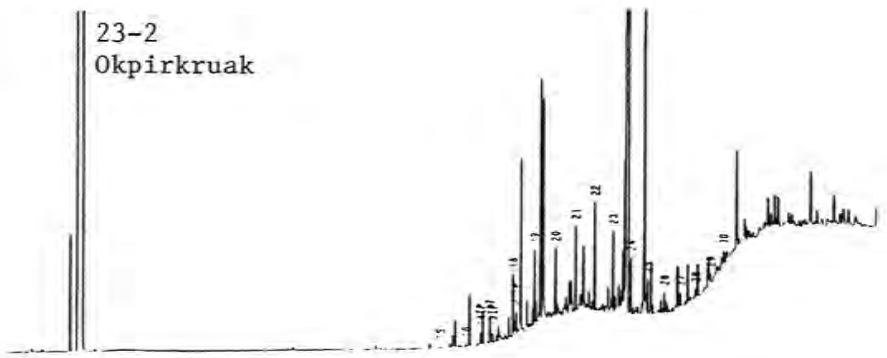
R-4477X.



R-4453X.



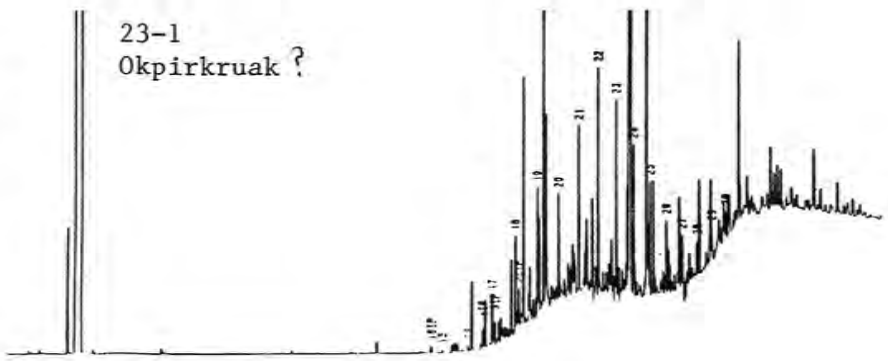
R-4451X.



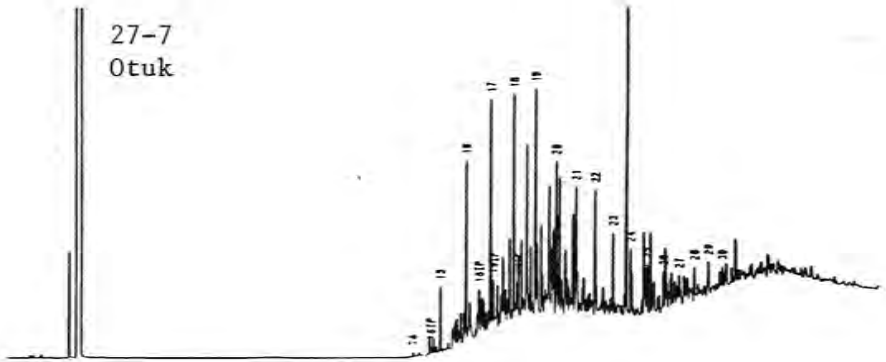
Bitumen Chromatograms

TS 879286
Figure 2d

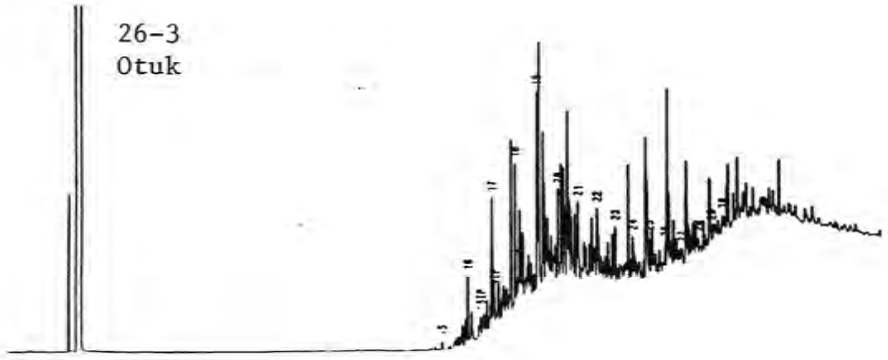
R-4450X.



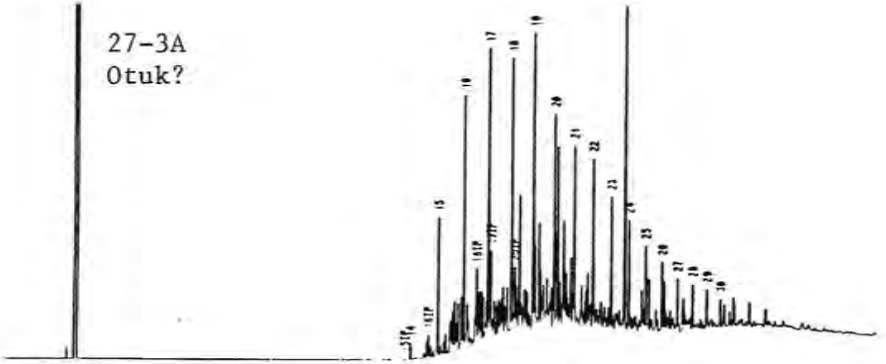
R-4475X.



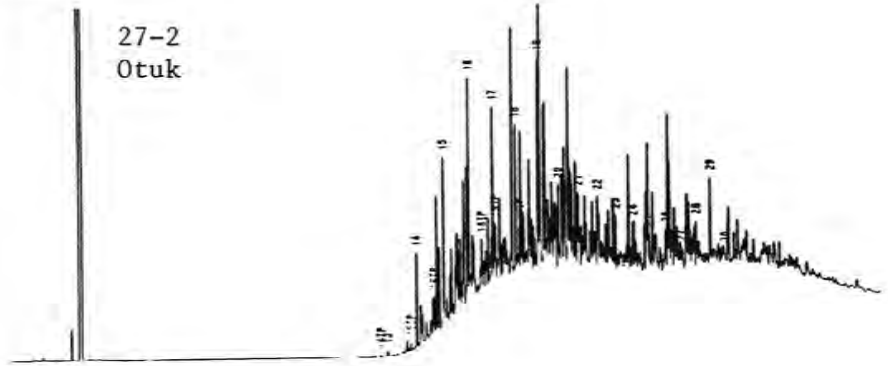
R-4465X.



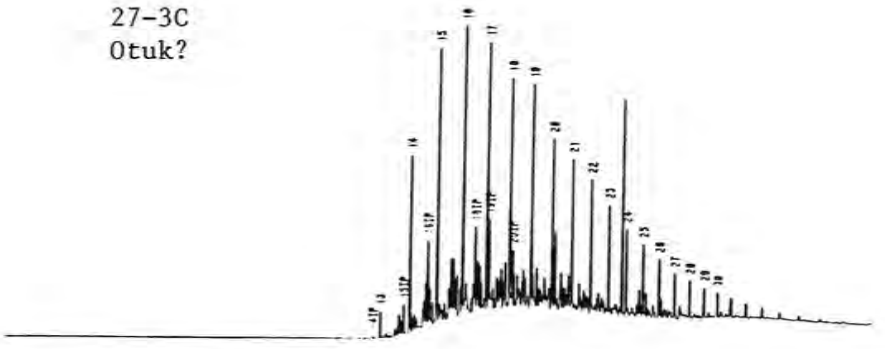
R-4472X.



R-4470X.



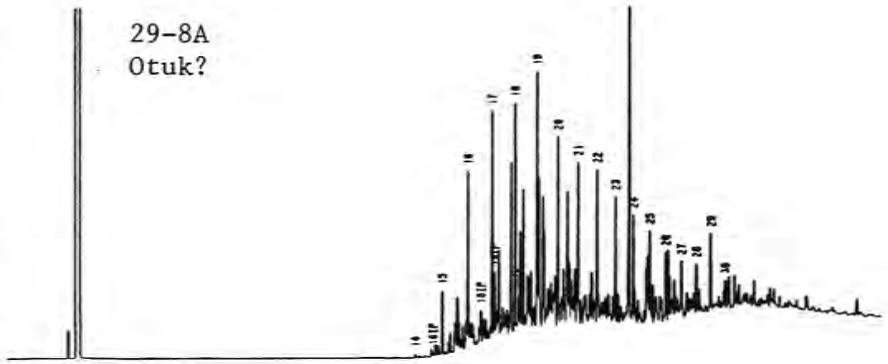
R-4473X.



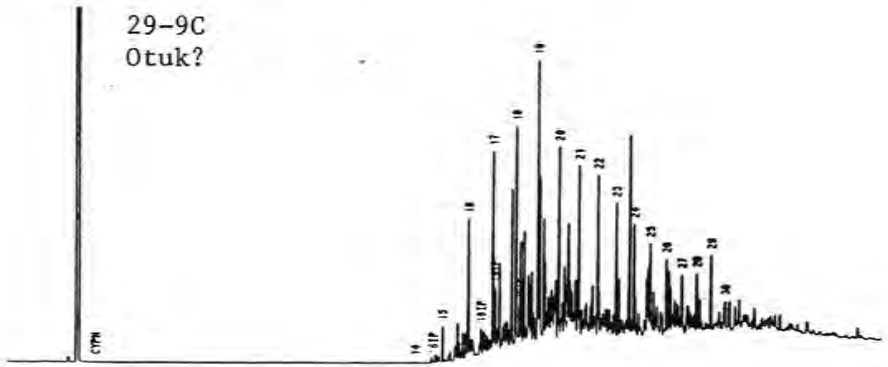
Bitumen Chromatograms

TS 879286
Figure 2e

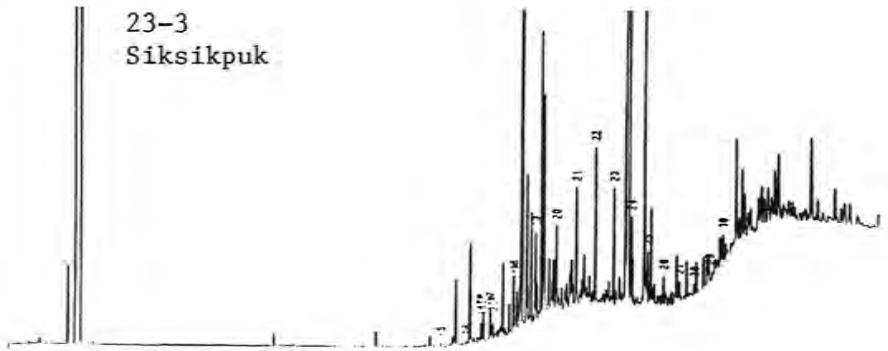
R-4483X.



R-4484X.

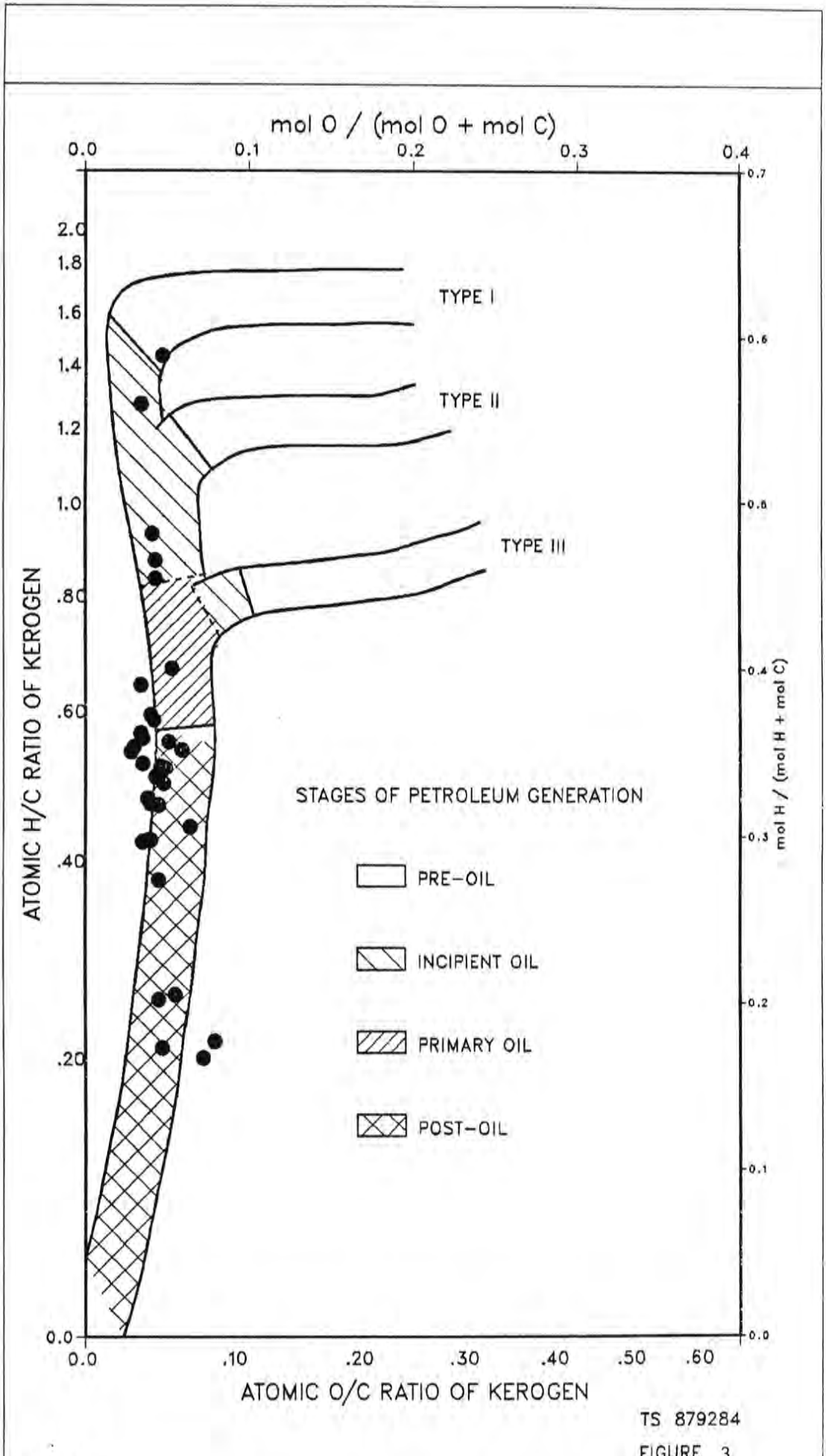


R-4452X.



Bitumen Chromatrograms

TS 879286
Figure 2f



TS 879284

FIGURE 3

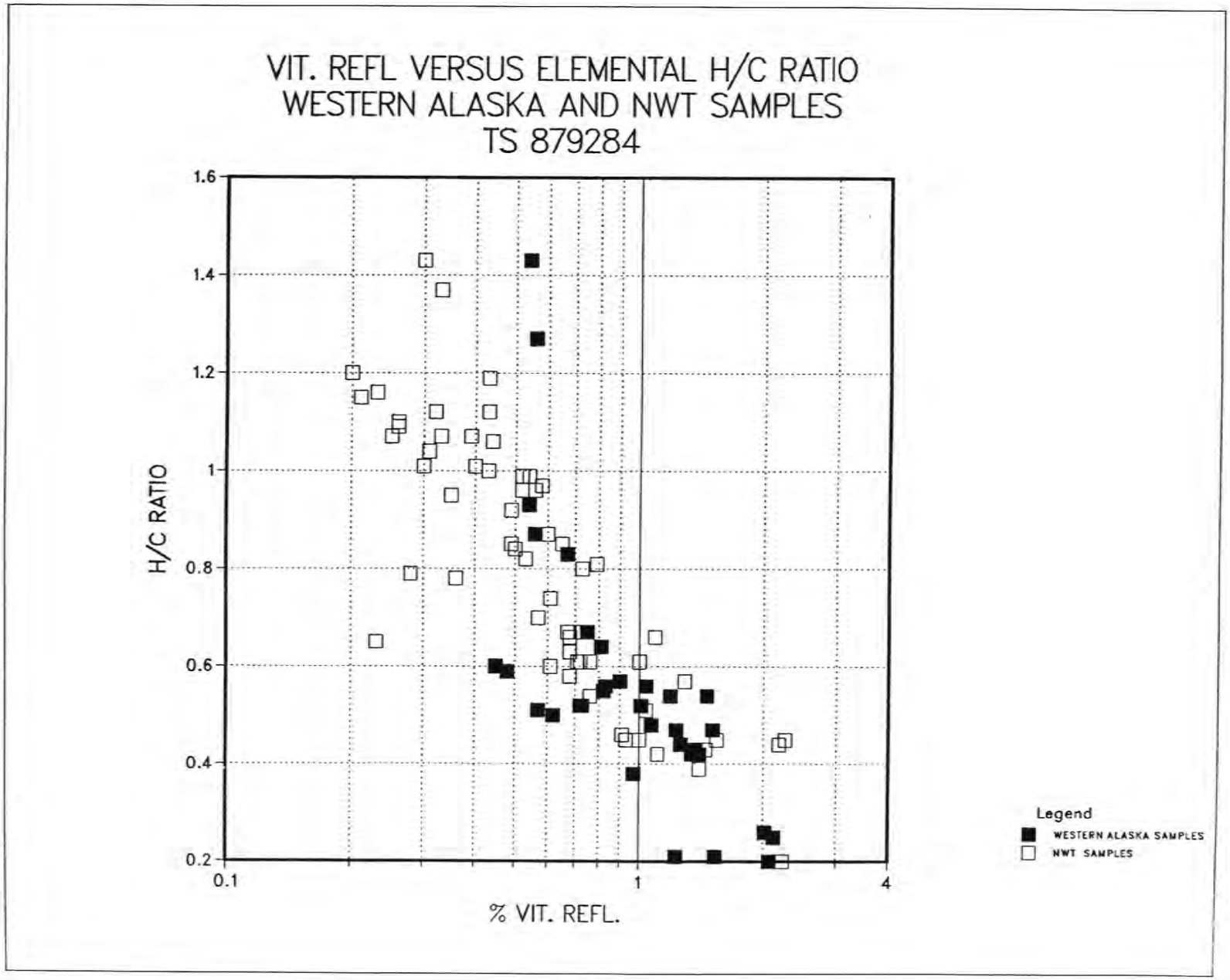
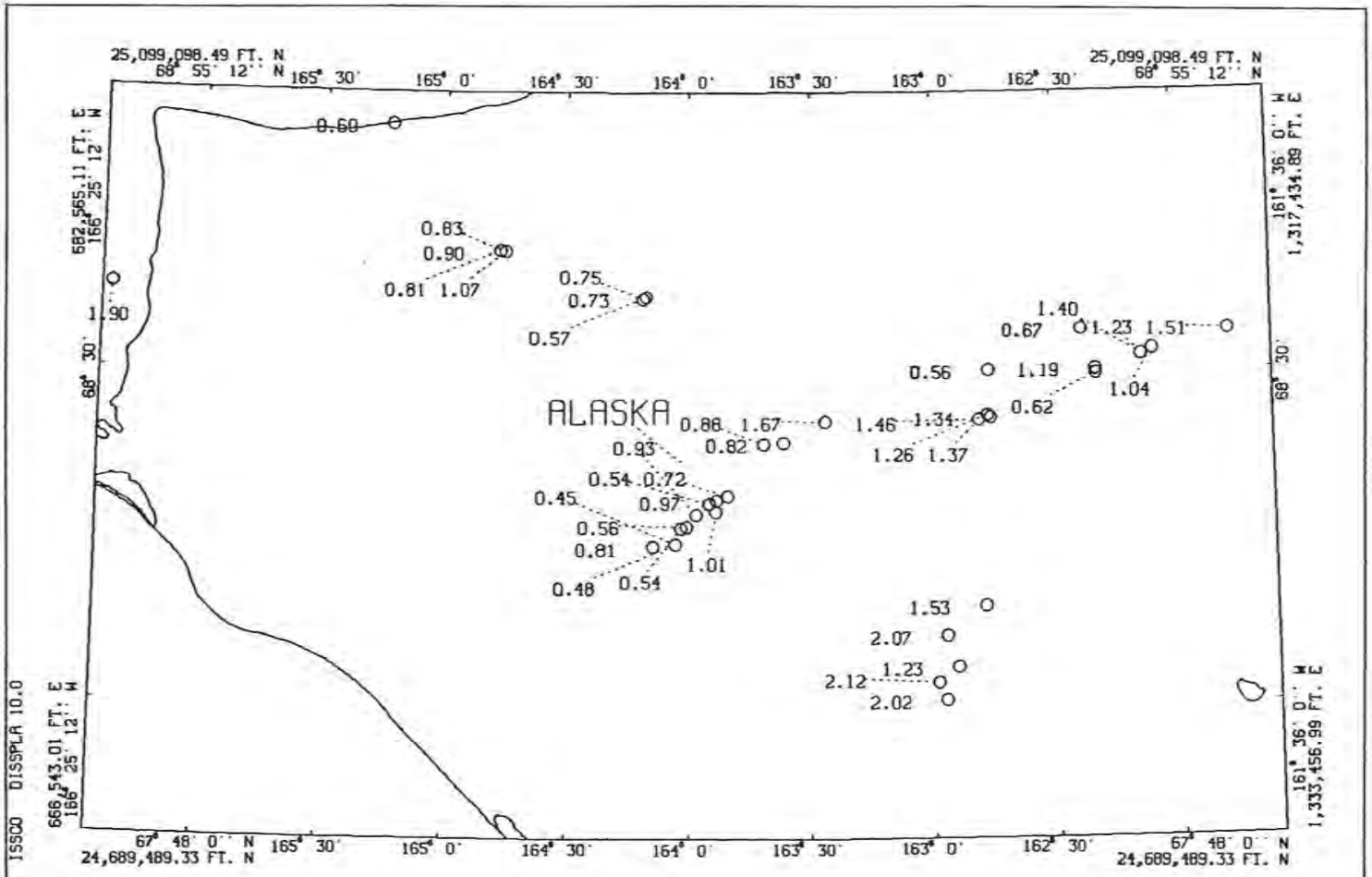


Figure 4



POLYCONIC CENTRAL MERIDIAN - 164° 0' 36" W LON
SPHEROID - 6

AMOCO PRODUCTION COMPANY

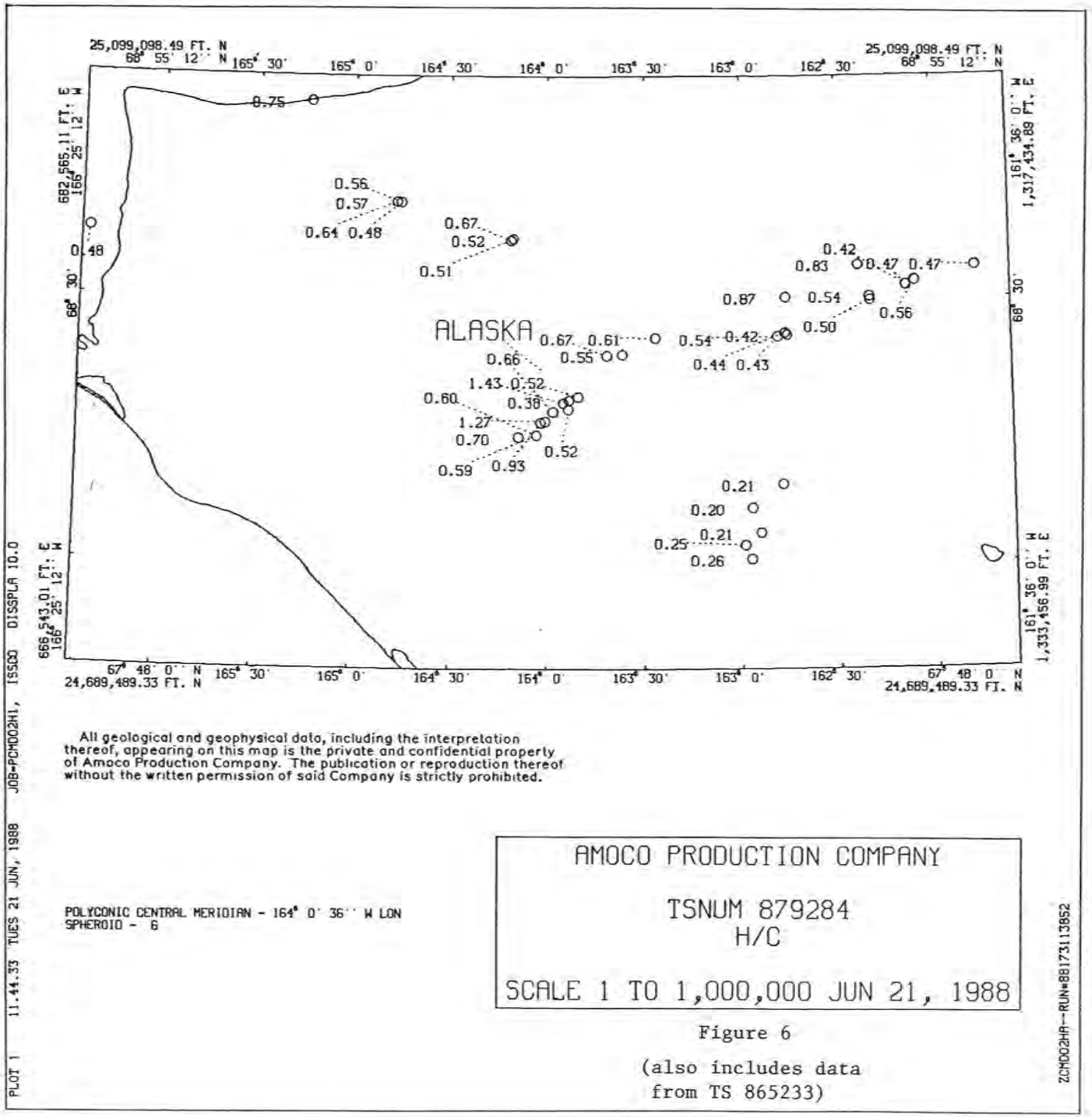
TSNUM 879284
VRAVGI

SCALE 1 TO 1,000,000 JUN 21, 1988

Figure 5

(also includes data from TS 865233)

PLOT 1 11.45.08 TUES 21 JUN, 1988 JOB-PCMDO2H2, ISSCO DISSPLA 10.0
ZCMDO2HB--RUN=881731138 45



POLYCONIC CENTRAL MERIDIAN - 164° 0' 36" W LON
SPHEROID - 6

AMOCO PRODUCTION COMPANY

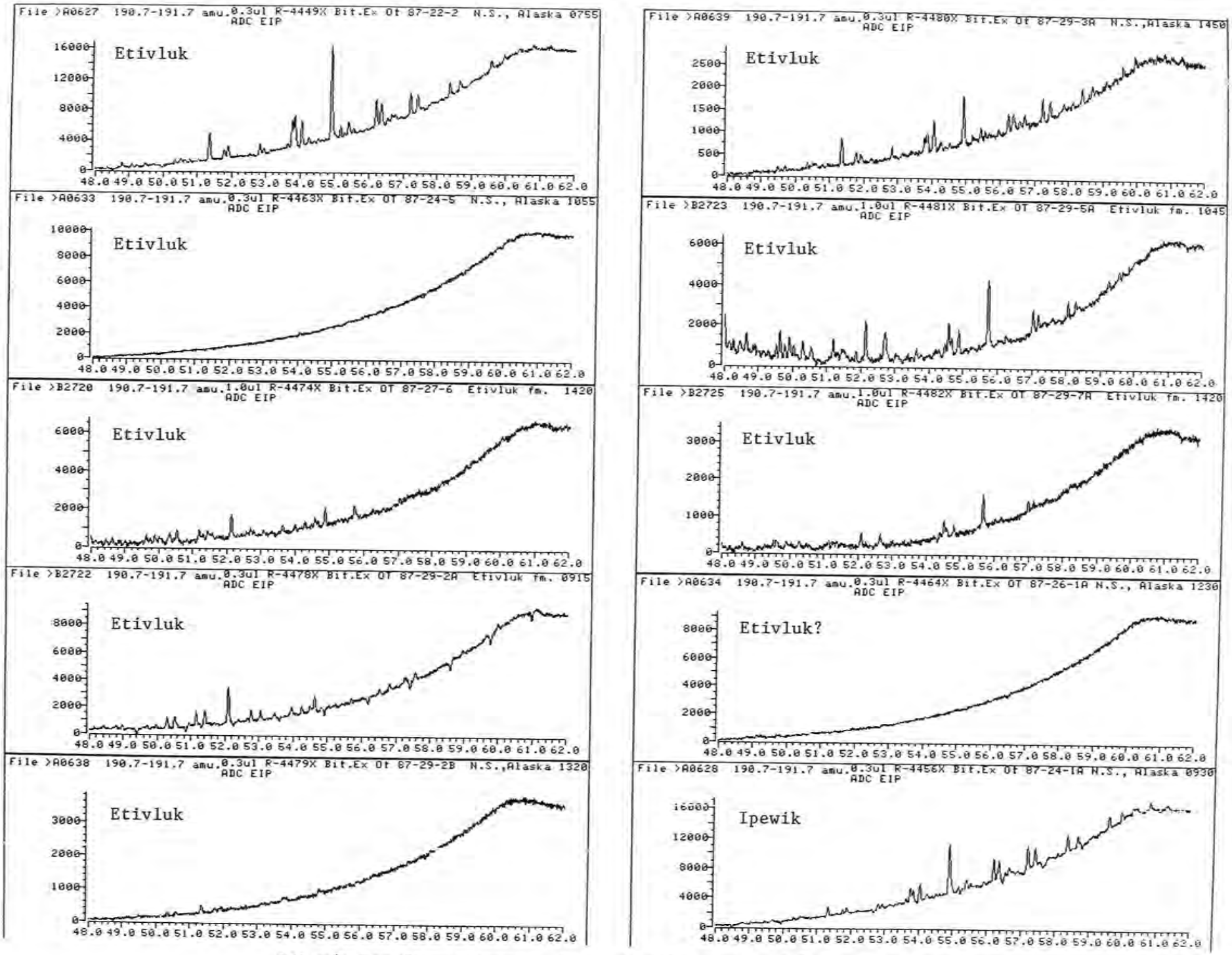
TSNUM 879284
H/C

SCALE 1 TO 1,000,000 JUN 21, 1988

Figure 6

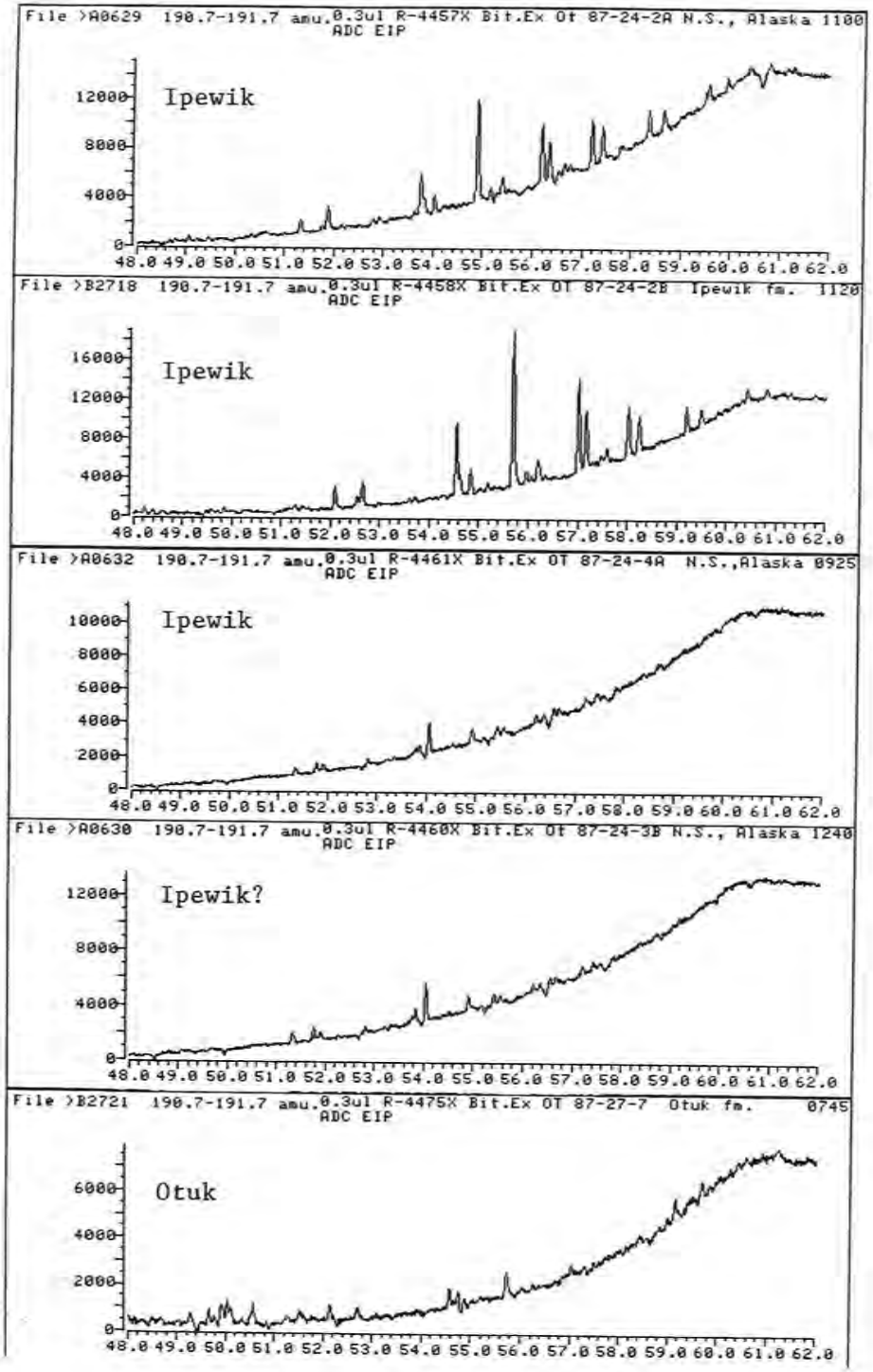
(also includes data from TS 865233)

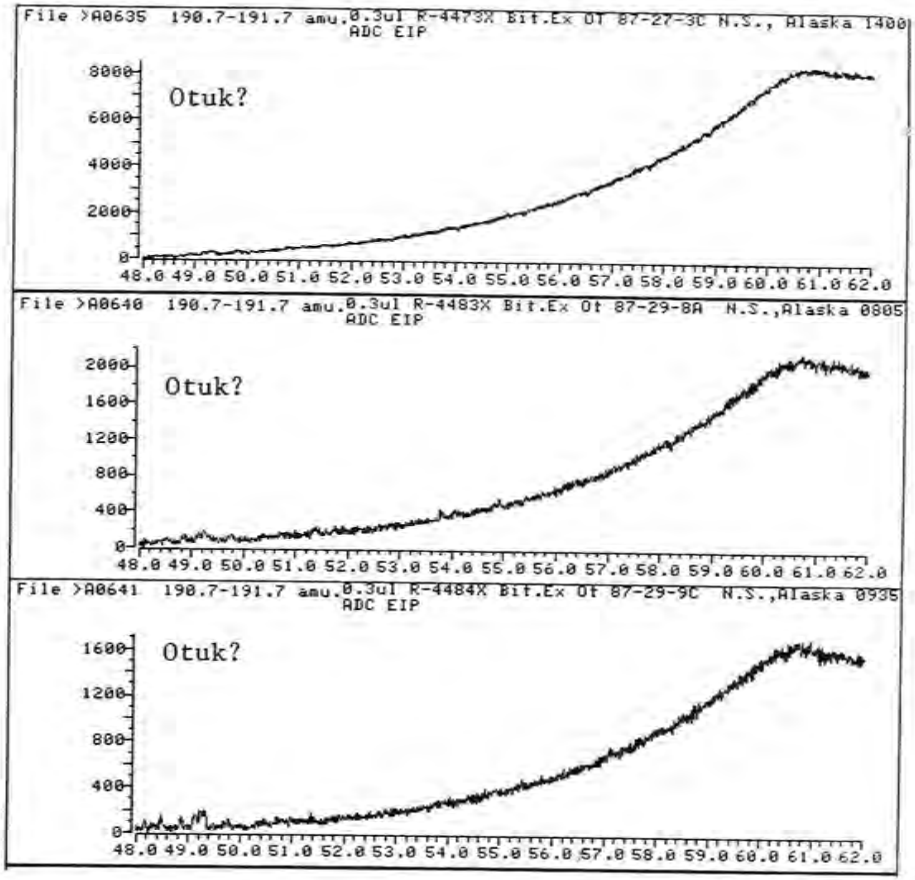
PLOT 1 11.44.33 TUES 21 JUN, 1988 JOB=PCH002H1, ISSUE DISSPLA 10.0
ZCH002HA--RUN=881731138S2



191 m/z Ion Chromatograms, Tricyclic Terpanes and Triterpanes
(Note retention time shift between A and B GC-MS instruments)

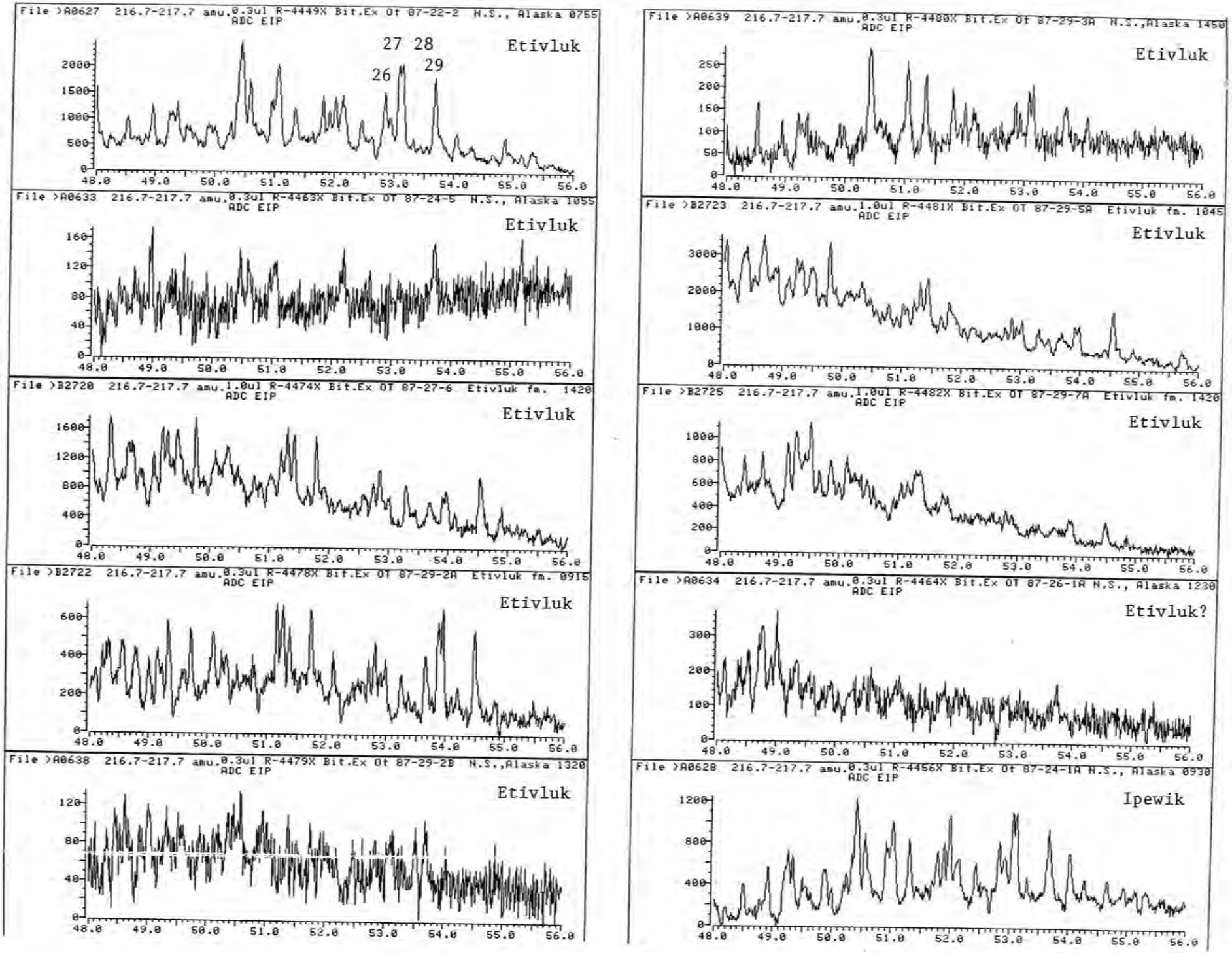
TS 879284
Figure 7a





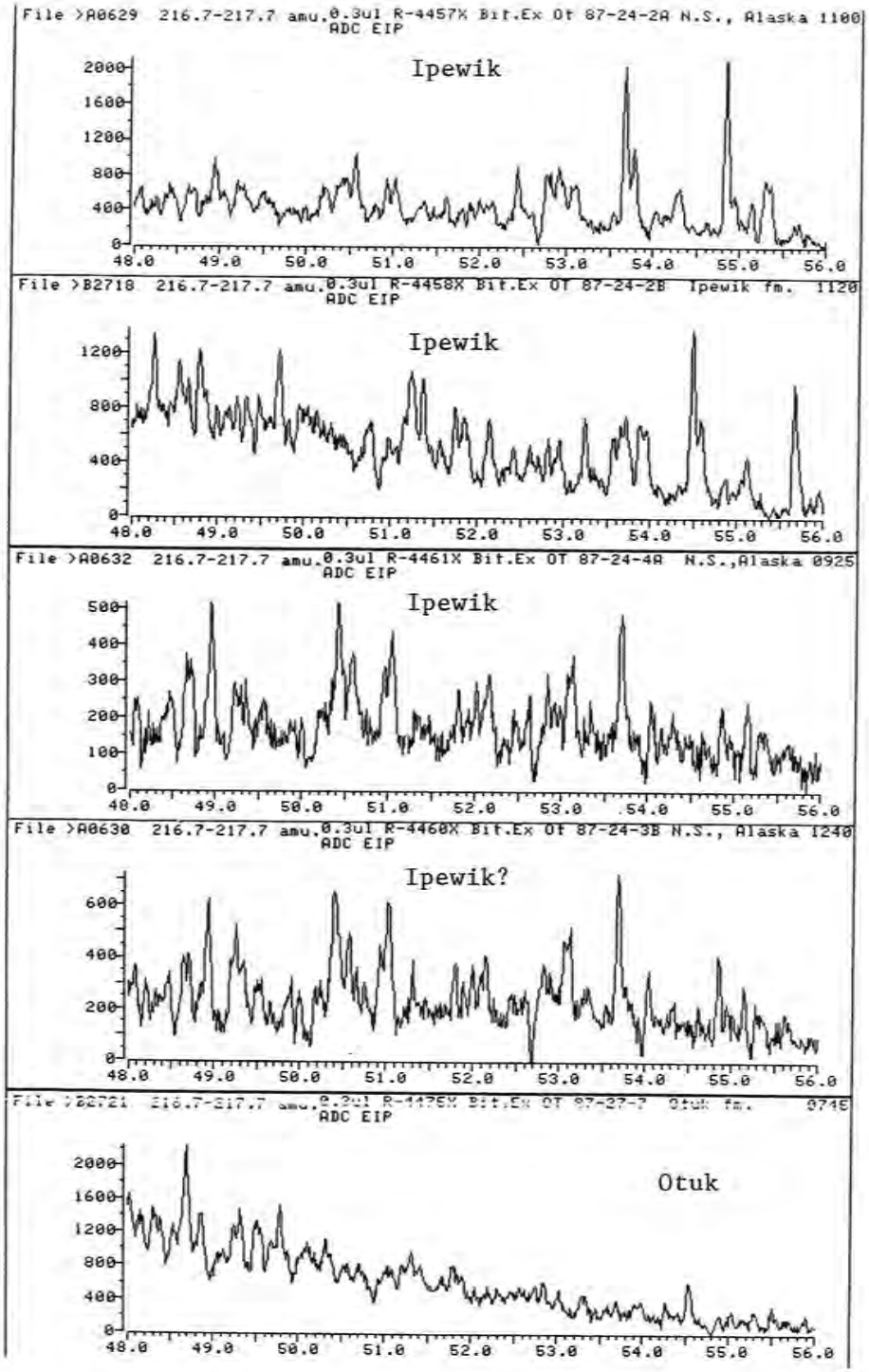
191 m/z Ion Chromatograms, Tricyclic Terpanes and Triterpanes
(Note retention time shift between A and B GC-MS instruments)

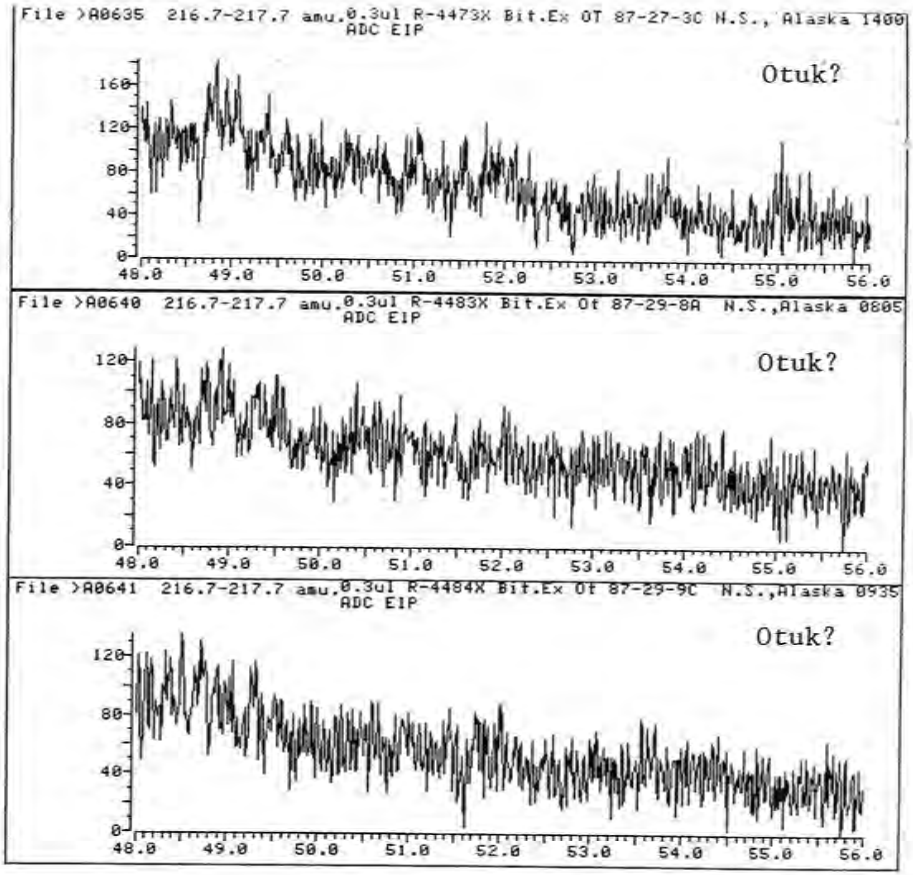
TS 879284
Figure 7b



217 m/z Ion Chromatograms, Steranes
(Note retention time shift between A and B GC-MS instruments)

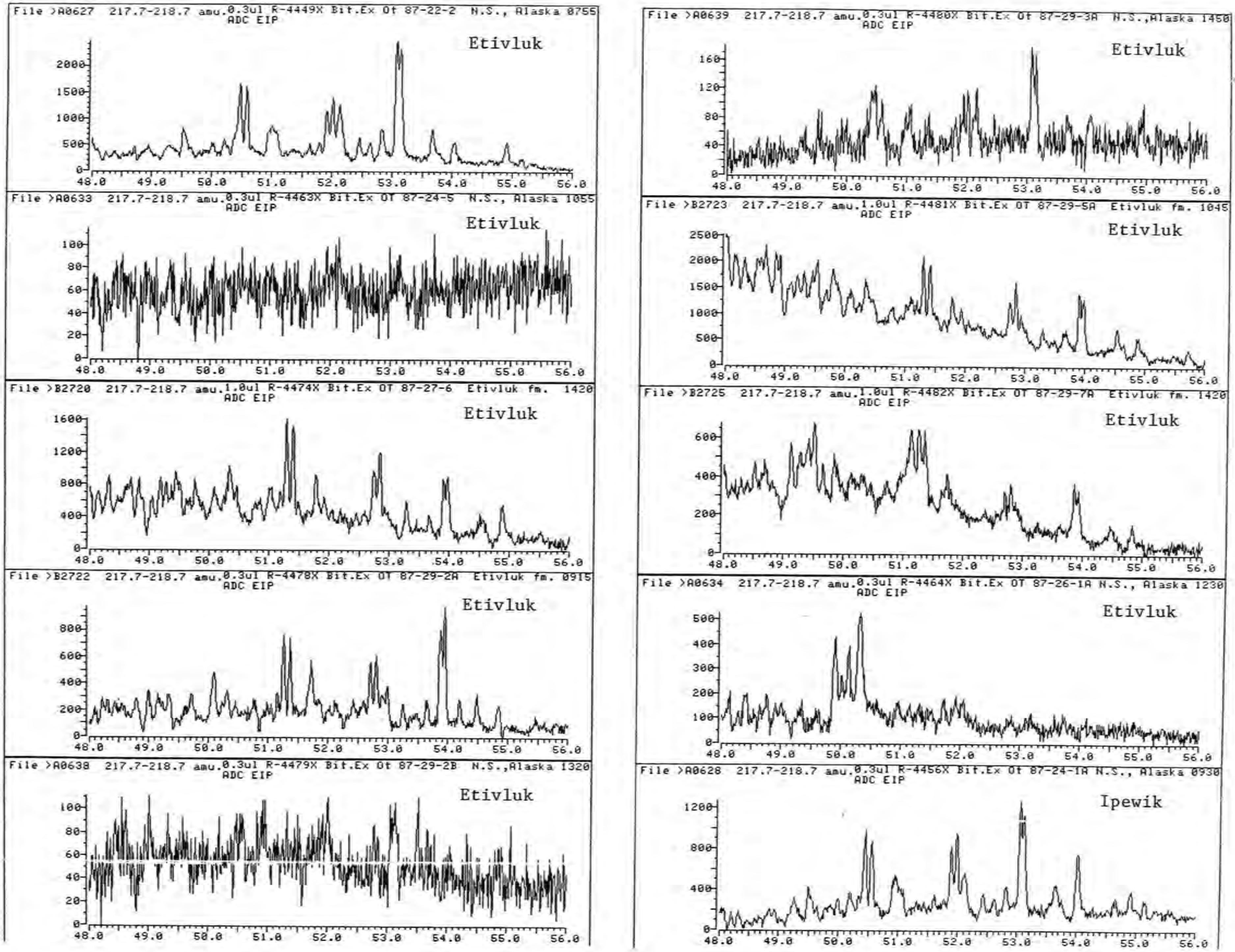
TS 879284
Figure 8a





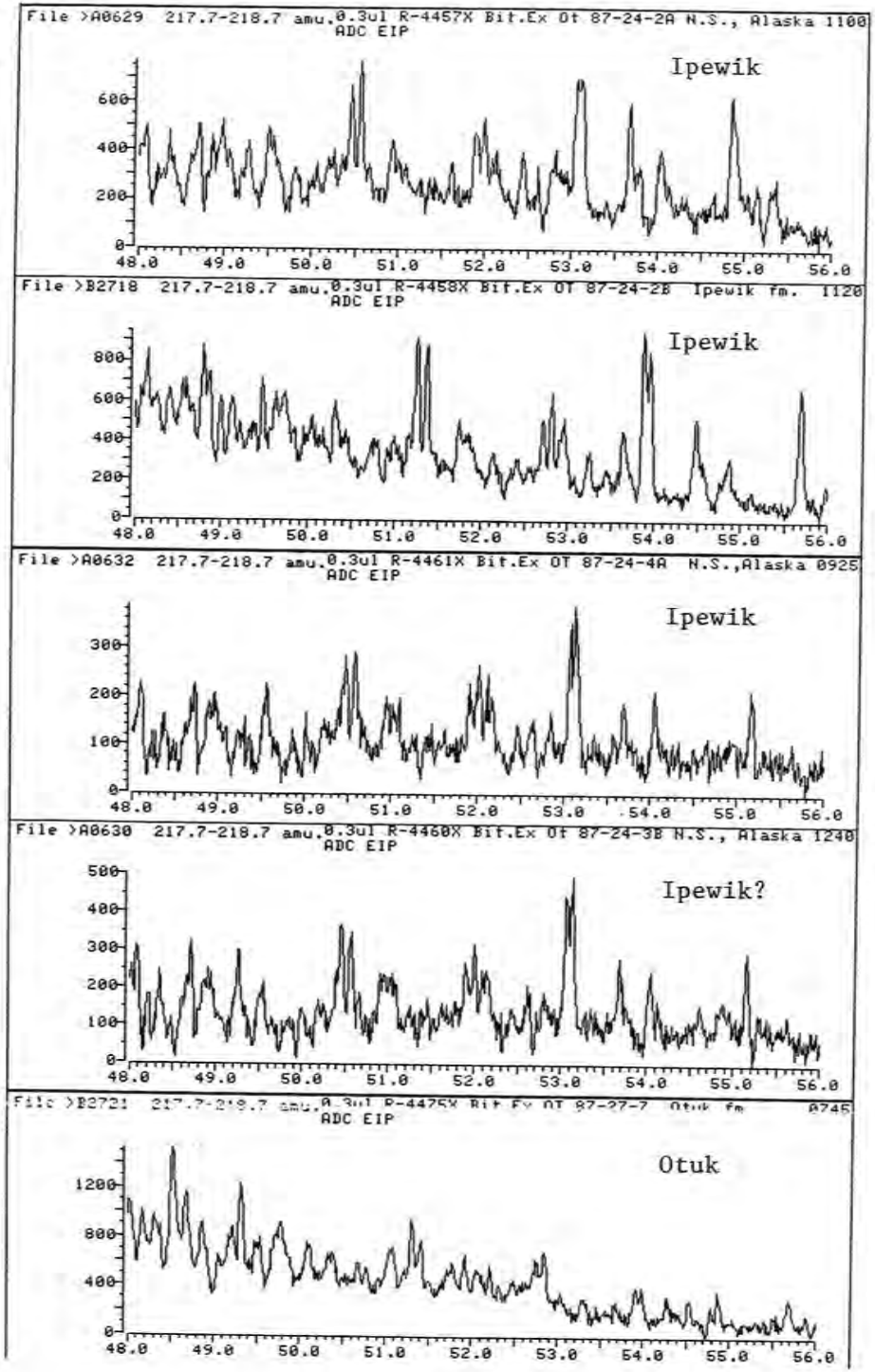
217 m/z Ion Chromatograms, Steranes
(Note retention time shift between A and B GC-MS instruments)

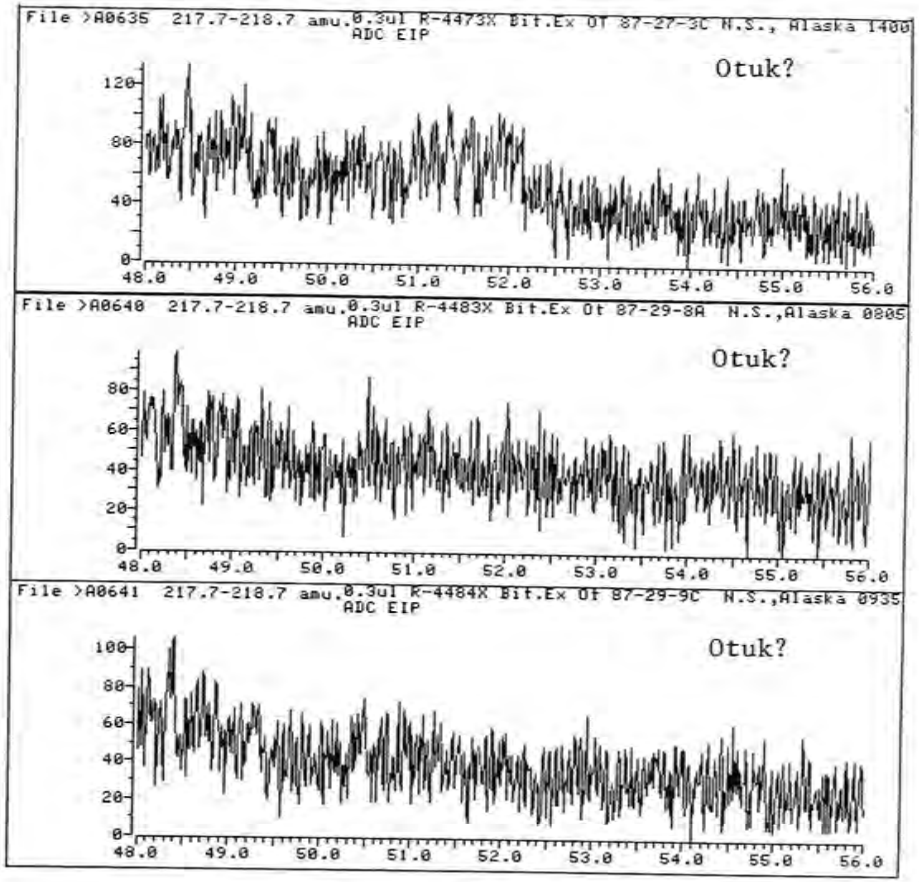
TS 879284
Figure 8b



218 m/z Ion Chromatograms, Steranes
(Note retention time shift between A and B GC-MS instruments)

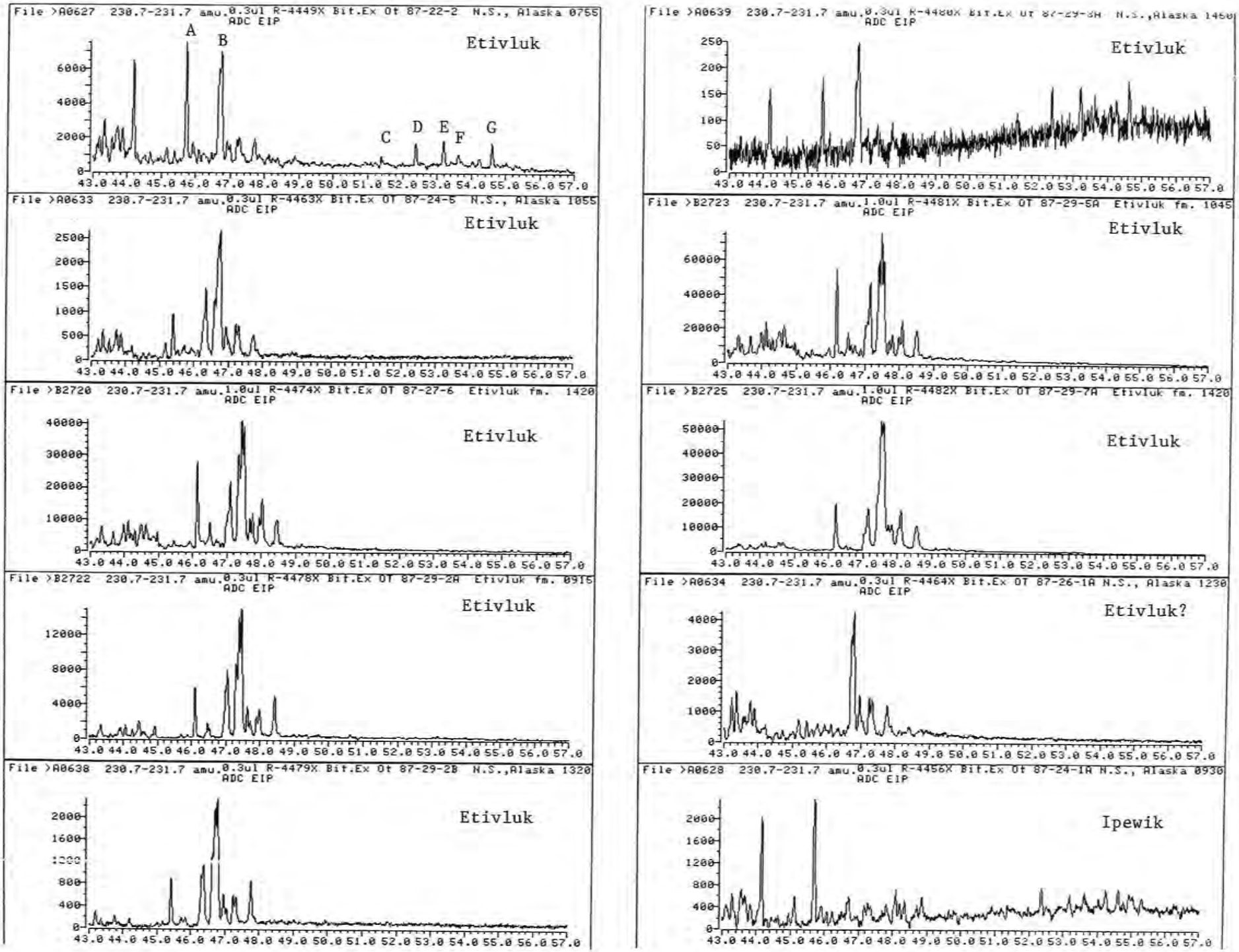
TS 879284
Figure 9a





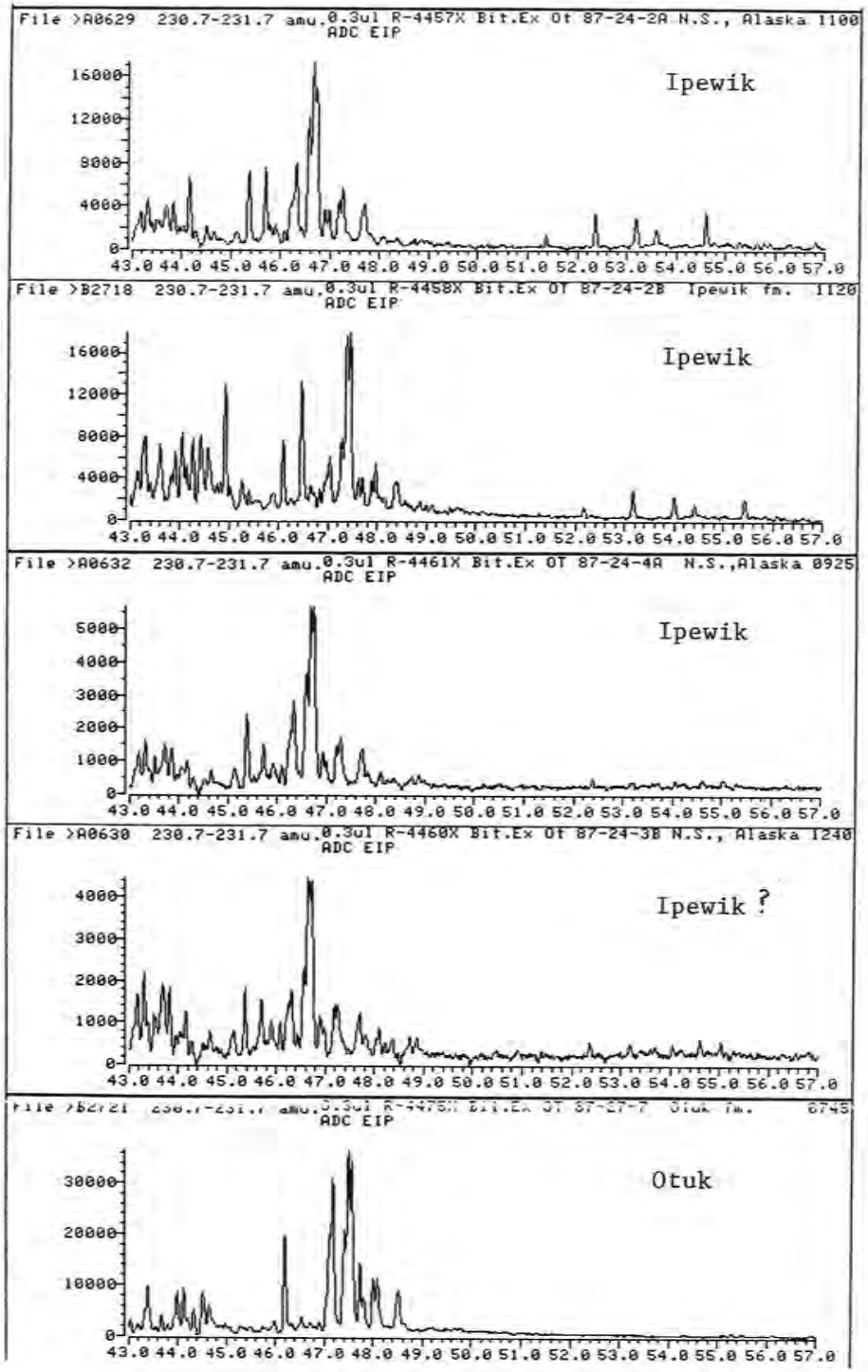
218 m/z Ion Chromatograms, Steranes
(Notes retention time shift between A and B GC-MS instruments)

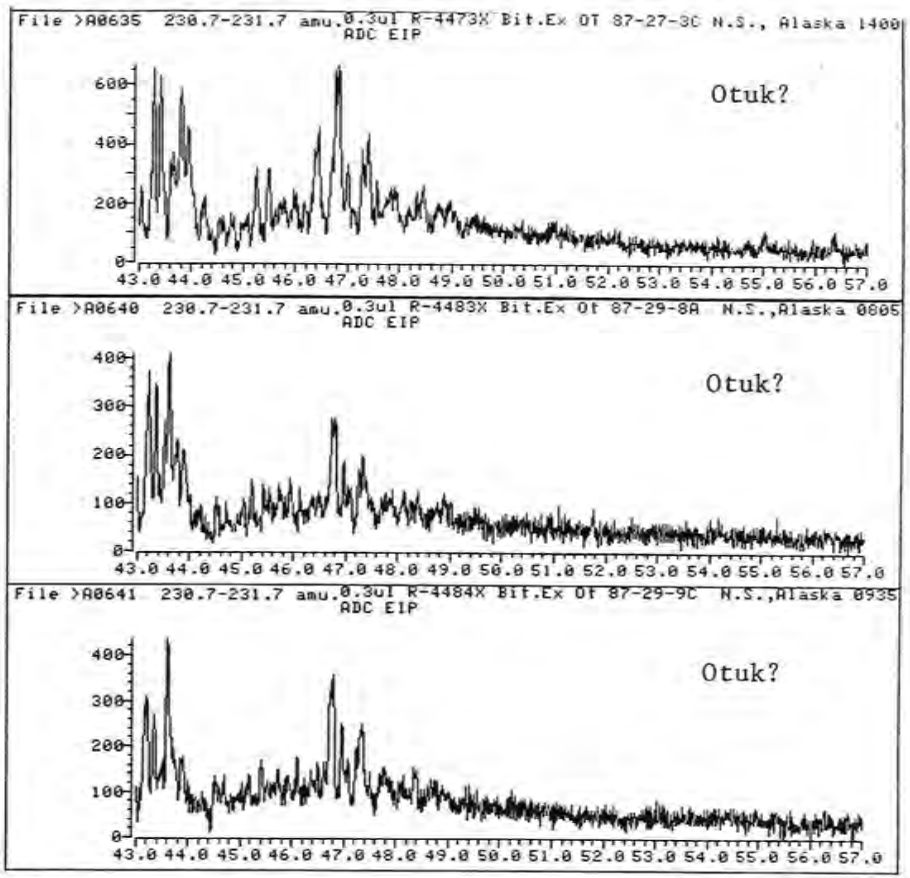
TS 879284
Figure 9b



231 m/z Ion Chromatograms, Triaromatic Steranes
(Note retention time shift between A and B GC-MS instruments)

TS 879284
Figure 10a





231 m/z Ion Chromatograms, Triaromatic Steranes
(Note retention time shift between A and B GC-MS instruments)

TS 879284
Figure 10b

AMOCO PRODUCTION COMPANY
Tulsa, Oklahoma
February 17, 1988

88048ART0228

TO: R. J. Harwood

SUBJECT: FTIR Analysis of Alaska Outcrop Kerogens: TS-879284

Introduction

Fourier Transform Infrared Analysis was performed on 33 outcrop samples from the De Long Mountains and Point Hope regions of Alaska. FTIR analysis is useful in helping to determine kerogen type and degree of oxidation (weathering). For background information on the technique, see Research Report M87-G-3, "Fourier Transform Infrared (FTIR) Spectroscopy in Source Rock Analysis", Marwin K. Kemp, June 4, 1987.

Conclusions and Discussion

A plot of the FTIR Aromatic Ratio vs the elemental analysis O/C ratio is useful for distinguishing Type II from Type III kerogens. Two such plots are attached with about half the samples shown on each. In addition, Table I summarizes the FTIR and elemental analysis data.

1. The majority of the samples are Type II kerogens for which elemental H/C values are valid for estimating the petroleum generating stage.

2. R-4450, R-4452, R-4453 and R-4455 are too mature to determine the kerogen type.

3. R-4451 is too strongly oxidized to determine the kerogen type.

4. R-4453 is slightly oxidized and too mature to find the type.

5. R-4459 gave a poor FTIR spectrum for unknown reasons. Other data should be viewed somewhat skeptically.

6. R-4467 is slightly oxidized. It is probably a Type II kerogen even though it plots just inside the Type III region. The measured H/C and generating ability will be too low and the O/C too high due to the oxidation.

7. R-4476 is on the border between Type II and III.

8. R-4481 and R-4482 are probably Type I kerogens. The attached figures do not distinguish Type I from Type II. However, a three

dimensional plot of the Aromatic Ratio vs H/C vs O/C (not shown) does make such a distinction. R-4482 definitely plots in the Type I region. R-4481 plots on the border between Type I and II.

9. A general trend was observed in this set of samples. The measured H/C values of almost all the Type II kerogens are lower than would be predicted from the Aromatic Ratios observed. The significance of this observation is unknown at this time.

Marwin K. Kemp

MKK
Attachments

Table 1. Alaska Outcrop Kerogens: TS-879284

Sample	Aromatic Ratio	H/C	O/C	Kerogen Type
R-4449	0.265	0.87	0.044	II
R-4450	0.913	0.25	0.048	Too Mature
R-4451	0.943	0.21	0.086	Oxidized
R-4452	0.935	0.26	0.058	Too Mature
R-4453	0.973	0.20	0.078	Too Mature, Ox
R-4455	0.871	0.21	0.049	Too Mature
R-4456	0.380	0.67	0.056	II
R-4457	0.486	0.51	0.045	II
R-4458	0.537	0.52	0.048	II
R-4459	0.384	0.48	0.039	II(?)
R-4460	0.402	0.56	0.037	II
R-4461	0.340	0.64	0.034	II
R-4462	0.400	0.57	0.035	II
R-4463	0.431	0.55	0.031	II
R-4464	0.482	0.52	0.036	II
R-4465	0.563	0.54	0.029	II
R-4466	0.667	0.43	0.041	II
R-4467	0.746	0.44	0.069	II(Ox)
R-4469	0.634	0.42	0.040	II
R-4470	0.657	0.56	0.053	II
R-4472	0.607	0.42	0.035	II
R-4473	0.660	0.47	0.046	II
R-4474	0.397	0.83	0.044	II
R-4475	0.710	0.50	0.050	II
R-4476	0.723	0.54	0.063	II,III
R-4477	0.721	0.47	0.041	II
R-4478	0.425	0.60	0.042	II
R-4479	0.402	0.59	0.043	II
R-4480	0.259	0.93	0.043	II
R-4481	0.246	1.27	0.036	I,II
R-4482	0.176	1.43	0.049	I
R-4483	0.625	0.52	0.051	II
R-4484	0.713	0.38	0.048	II

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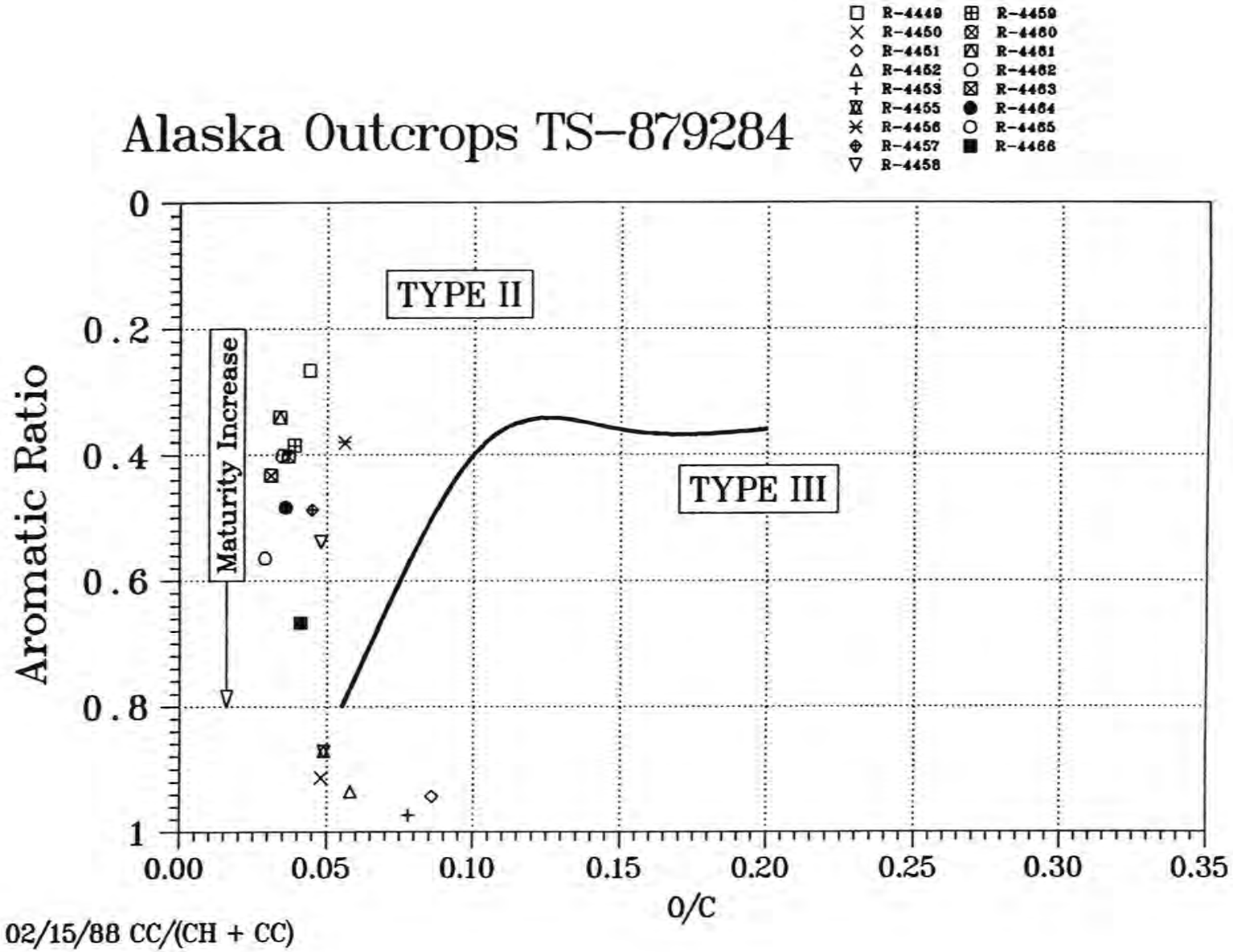
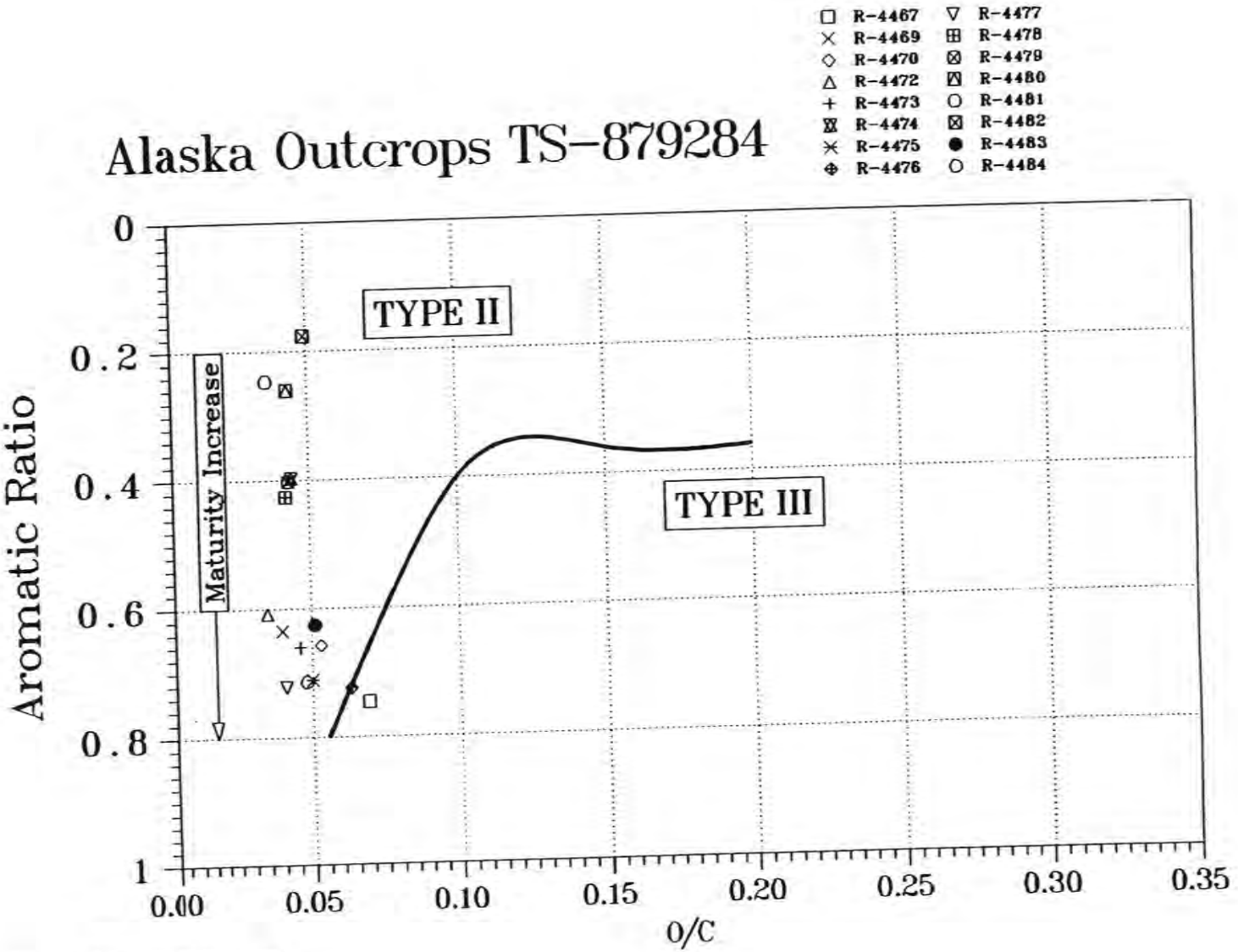


02/15/88 CC/(CH + CC)



02/15/88 CC/(CH + CC)

ELD 2-25-94

OF ELD

VISUAL KEROGEN AND VITRINITE REFLECTANCE ANALYSES OF THIRTY FIVE (35) OUTCROP SAMPLES FROM VARIOUS LOCATIONS IN ALASKA

Amoco Production Company
Project No. 879284

Thirty five (35) outcrop samples from various locations in Alaska were submitted to Geo-Strat, Inc. by the Amoco Production Company, Research Center, Tulsa, Oklahoma, for visual kerogen and vitrinite reflectance analyses.

Visual Kerogen:

Pt. Hope Mtn.

Organic matter in outcrop samples collected from the Pt. Hope location, Samples R-4456 thru R-4462 and R-4478 and R-4479, consists primarily of finely disseminated amorphous debris mixed with moderate percentages of plant tissue material (±60% and ±15% respectively). Spores and/or pollen, vitrinitic debris, inerts, and algal cysts, are less common.

Organic debris in samples R-4478 and R-4479 is yellow orange in color with tinges of orange brown. In samples R-4456 thru R-4458 and R-4460 thru R-4462, the organics vary between yellow orange and orange brown in color while in sample R-4459 they are orange brown to light brown in color. Based on our visual kerogen analyses we regard these samples as ranging from very early within the "oil window" (R-4478 and R-4479) to near the middle and latter stages of the "oil window" (R-4456 thru R-4462). In UV and Blue Light Irradiation these samples have very poor fluorescence qualities, a feature attributed to, perhaps, the fact that they are outcrop samples (outcrop samples which have undergone weathering).

De Long Mtn.

Organic matter in the majority of the outcrop samples from the De Long Mtn. region (excluding samples R-4474, R-4481, and R-4482) contain a high percentage of finely disseminated amorphous debris (±60%) mixed with moderate amounts of plant tissue fragments (± 15%) and and moderate to minor percentages of vitrinite and inerts (± 12% and ± 10%) respectively). Spores and/or pollen and algal cysts occur in several of these samples but are, for the most part, rare.

Samples R-4474, R-4481, and R-4482, are different from the majority of the De Long Mtn. samples in that they tend to have higher percentages of plant tissue fragments and vitrinitic material. This may indicate that the organics are associated with a depositional system which was more closely associated with a "near shore" type environment.

The color of the organics, when viewed in transmitted illumination, are highly variable, ranging from a dominantly yellow orange hue (outcrops from lease areas OT 87-29-3A, 87-29-5A, and 87-29-7A) to a light brown - brown hue (samples from lease areas OT 87-23-1, 87-23-5, 87-23-9B, 87-23-3 thru 87-26-8, 87-27-3 and 87-27-8). Levels of thermal maturity, based on the spore coloration method, are interpreted as ranging from early within the "oil window" to early into the "dry gas, H_2S, CO_2, stage" of hydrocarbon generation. In UV and Blue Light Irradiation, only two samples, R-4481 and R-4482, exhibited good fluorescence characteristics. The other are considered to have poor to very poor qualities.

Misheguk Mtn.

Only one sample, R-4477, from the Misheguk Mtn. area was examined. Organics in this sample consist primarily of finely disseminated amorphous debris (±60%) mixed with moderate amounts of vitrinite and inerts (±15% each) and minor occurrences of degraded plant tissue fragments (±8%). The organics are light brown to brown in color, do not show any fluorescence in Blue Light and UV Irradiation, and are considered to be well past the "oil window" in the "dry gas - condensate" stage of hydrocarbon evolution.

Vitrinite Reflectance:

Pt. Hope Mtn.

Vitrinite reflectance values range from an avearge low of ±0.47 %Ro (samples R-4478 and R-4479; lease areas OT 87-29-2A and 87-29-2B) to an avearge high of ± 0.80 %Ro (samples R-4456 thru R-4462; lease areas OT 87-24-1A, 87-24-2A, 87-24-2B, 87-24-3, 87-24-3B, 87-24-4A, and 87-24-4B).

De Long Mtn.

As can be seen on the Vitrinite Reflectance Profile the vitrinite reflectance values are highly variable. However, there is a tendency for outcrops from lease areas in sections 9, 29, 32, and 36, to be at a mature stage of alteration while vitrinite reflectances of samples from sections 10, 11, and 12, are generally mature to very mature. Those from sections 3, and some from section 11, are severely altered.

Vitrinite values range from an avearge low of ±0.55 %Ro (lease areas OT 87-29-5A and 87-29-7A) to and avearge high of ±2.07 %Ro (lease areas of OT 87-23-1, 87-23-3, and 87-23-5).

Misheguk Mtn.

Vitrinite reflectance for the single sample from the Misheguk Mtn. location, R-4477, has an average reflectivity of 1.51 %Ro and is indicative of an organic matter suite which is at a very mature stage of alteration (in the "dry gas - condensate" stage of hydrocarbon evolution).

Conclusions:

In looking at these thrity five (35) samples, Geo-Strat Inc. finds that:

1. Organic matter type and degree of thermal maturity is best for outcrop samples from the Pt. Hope Mtn. location R-4456 thru R-4462).

2. Samples R-4481 and R-4482 have the best fluorescence qualities (?highest hydrogen content).

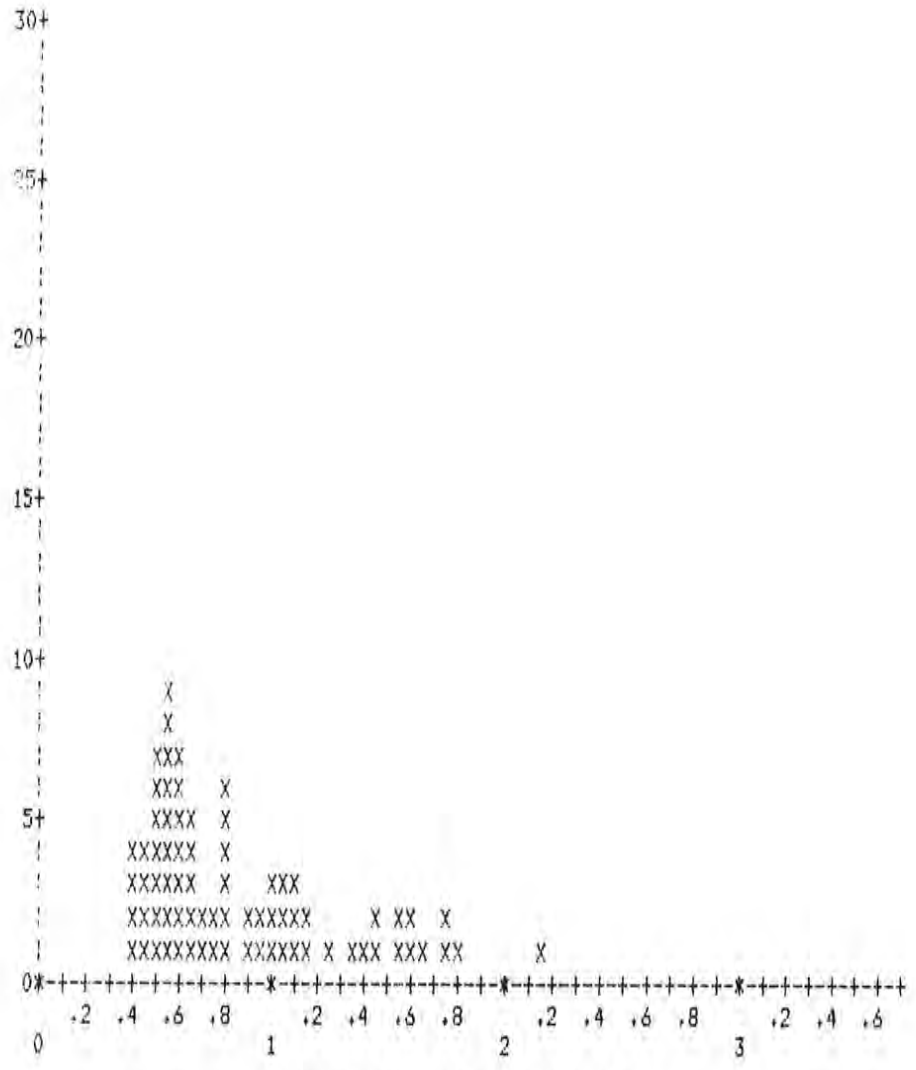
3. Outcrop samples from the De Long Mtn. locations range from early maturity to severely altered.

4. The single sample from the Misheguk Mtn. area is considered to be very mature.

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4449
DEPTH/SAMPLE NO..R-4449 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-22-2; ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.41 MAX. 2.17 AVG. 0.88 STD. DEV. 0.41



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 36 MIN. 0.41 MAX. 0.69 AVG. 0.56 STD. DEV. 0.08 +

POP.# 2 TOTAL CTS. 25 MIN. 0.72 MAX. 1.17 AVG. 0.95 STD. DEV. 0.15

POP.# 3 TOTAL CTS. 13 MIN. 1.29 MAX. 1.80 AVG. 1.57 STD. DEV. 0.16

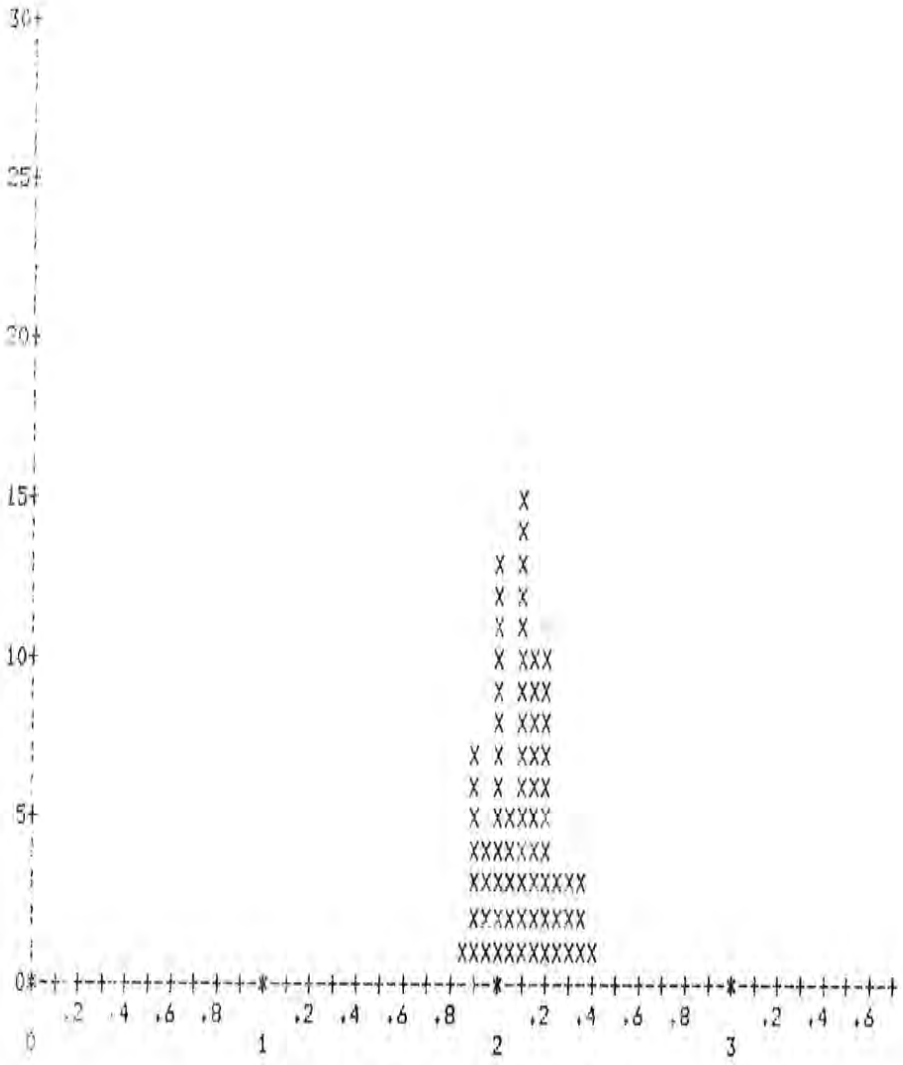
POP.# 4 TOTAL CTS. 1 MIN. 2.17 MAX. 2.17 AVG. 2.17 STD. DEV. 0.00

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4450
DEPTH/SAMPLE NO..R-4450 TYPE OF SAMPLE.....OC: ?OKPIKRUAK FM.
LOCATION.....OT 87-23-1, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS, 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.89 MAX. 2.40 AVG. 2.12 STD. DEV. 0.12



VITRINITE REFLECTANCE HISTOGRAM - %Ro

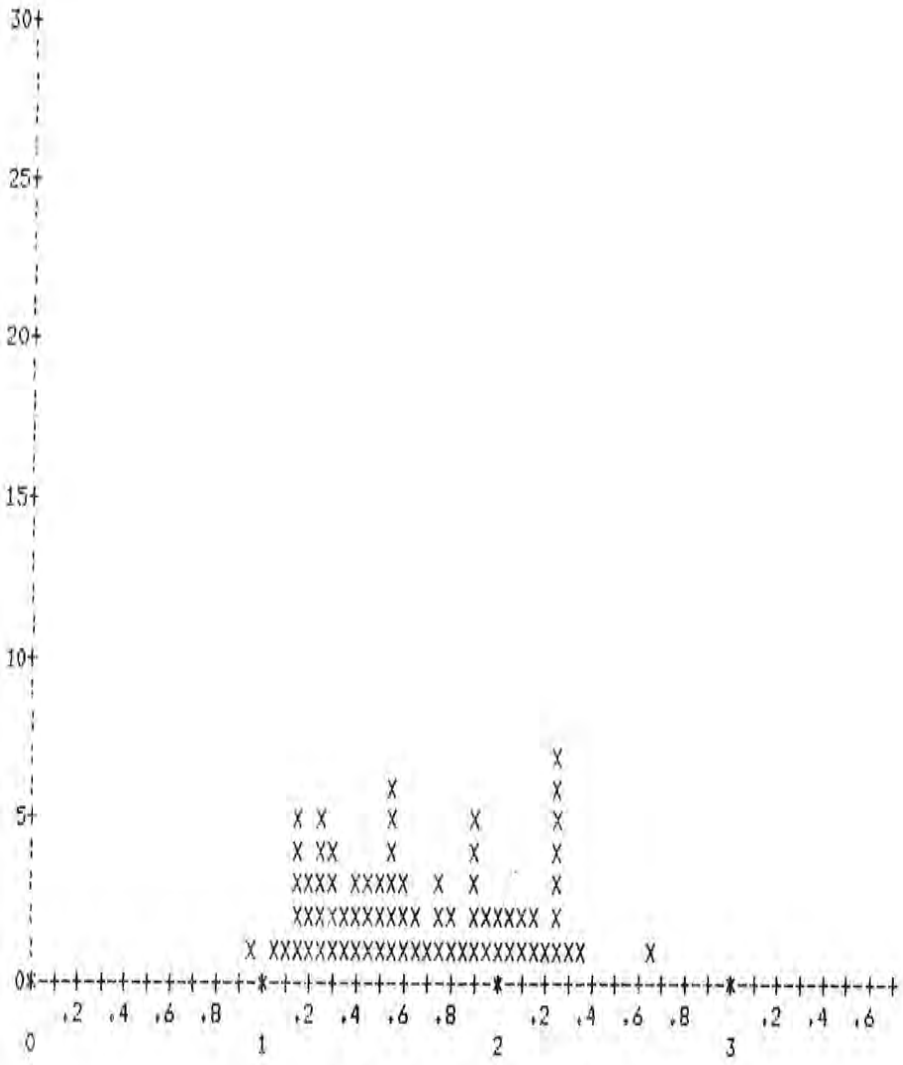
POP.# 1 TOTAL CTS. 75 MIN. 1.89 MAX. 2.40 AVG. 2.12 STD. DEV. 0.12 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4451
DEPTH/SAMPLE NO..R-4451 TYPE OF SAMPLE.....OC; OKPIKRUAK FM.
LOCATION.....QT 87-23-2, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.96 MAX. 2.69 AVG. 1.68 STD. DEV. 0.40



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 22 MIN. 0.96 MAX. 1.39 AVG. 1.23 STD. DEV. 0.10 +

POP.# 2 TOTAL CTS. 26 MIN. 1.41 MAX. 1.84 AVG. 1.60 STD. DEV. 0.13

POP.# 3 TOTAL CTS. 26 MIN. 1.87 MAX. 2.35 AVG. 2.11 STD. DEV. 0.16

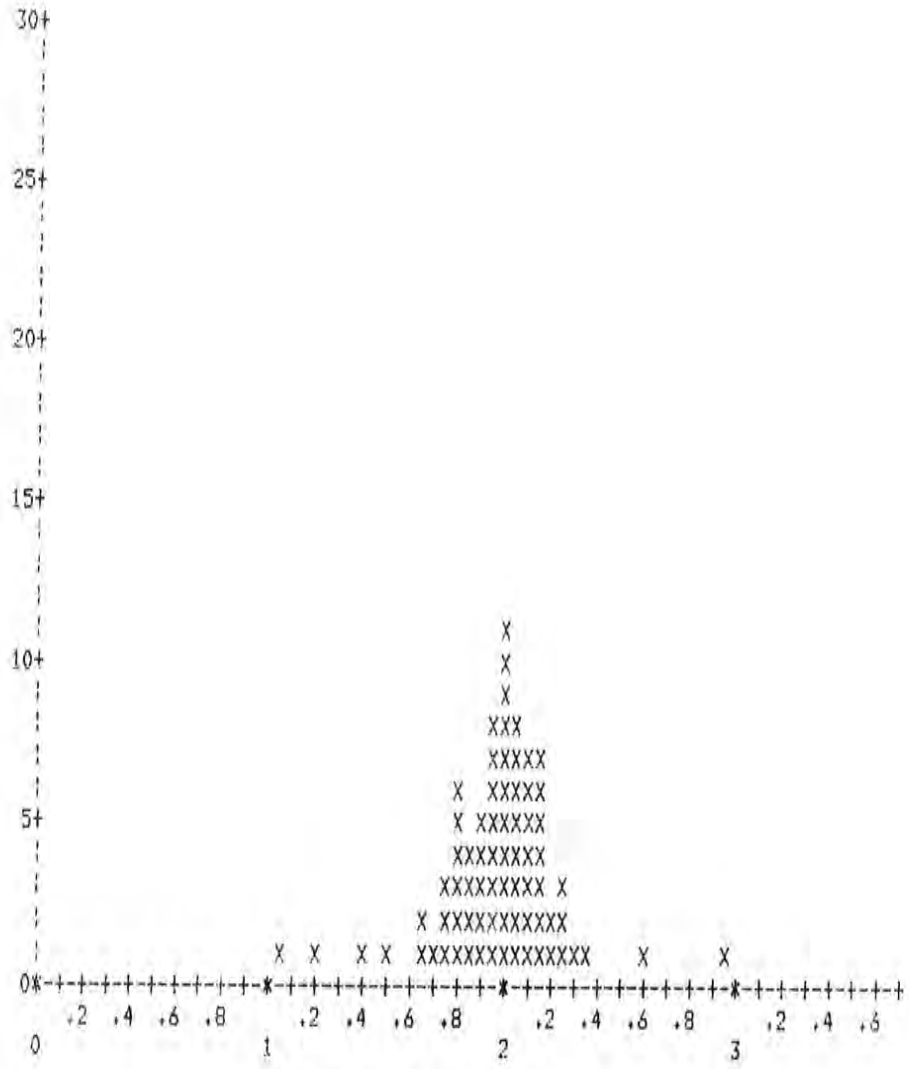
POP.# 4 TOTAL CTS. 1 MIN. 2.69 MAX. 2.69 AVG. 2.69 STD. DEV. 0.00

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4452
DEPTH/SAMPLE NO..R-4452 TYPE OF SAMPLE.....OC: SIKSIKPUKK FM.
LOCATION.....DT 87-23-3, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS, 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.06 MAX. 2.97 AVG. 2.00 STD. DEV. 0.26



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 4 MIN. 1.06 MAX. 1.54 AVG. 1.32 STD. DEV. 0.21

POP.# 2 TOTAL CTS. 69 MIN. 1.67 MAX. 2.35 AVG. 2.02 STD. DEV. 0.15 +

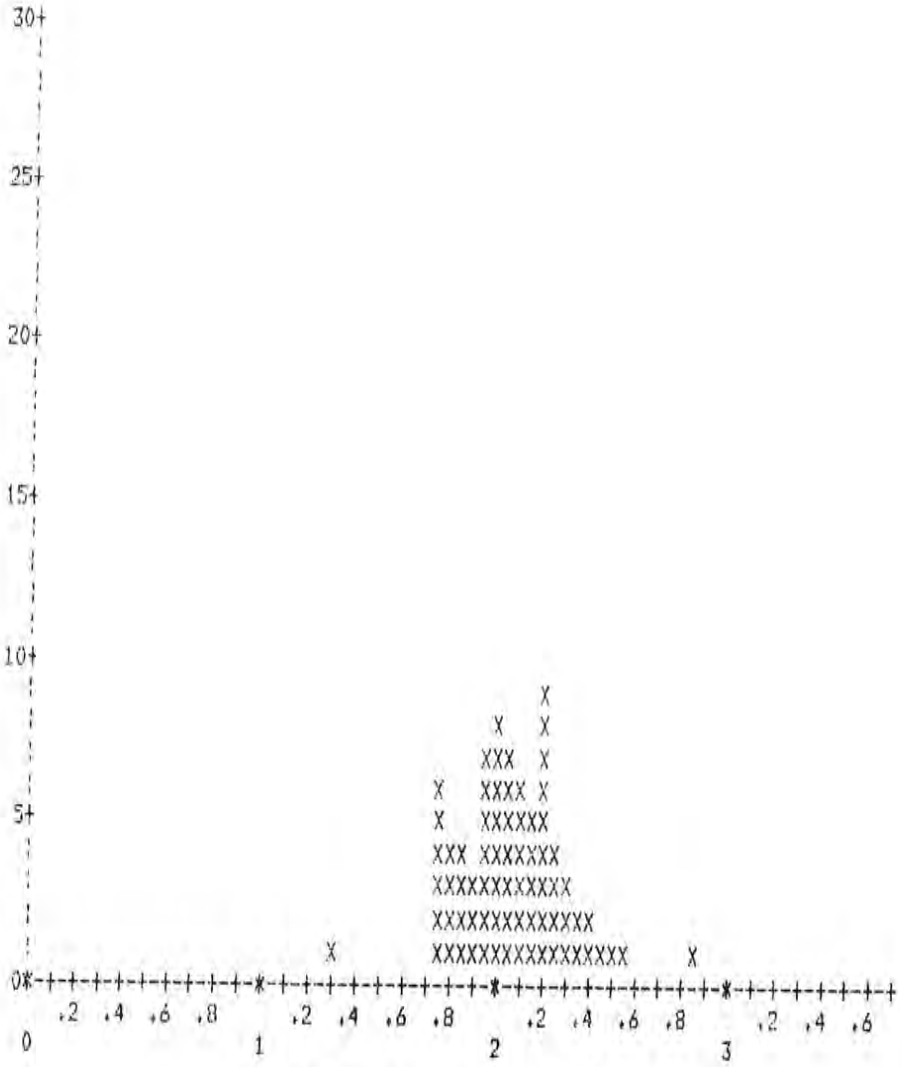
POP.# 3 TOTAL CTS. 2 MIN. 2.63 MAX. 2.97 AVG. 2.80 STD. DEV. 0.24

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4453
DEPTH/SAMPLE NO..R-4453 TYPE OF SAMPLE.....OC; KUNA FM.
LOCATION.....OT 87-23-5, ALASKA DATE.....2-11-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.33 MAX. 2.89 AVG. 2.09 STD. DEV. 0.23



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 1.33 MAX. 1.33 AVG. 1.33 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 70 MIN. 1.75 MAX. 2.40 AVG. 2.07 STD. DEV. 0.17 +

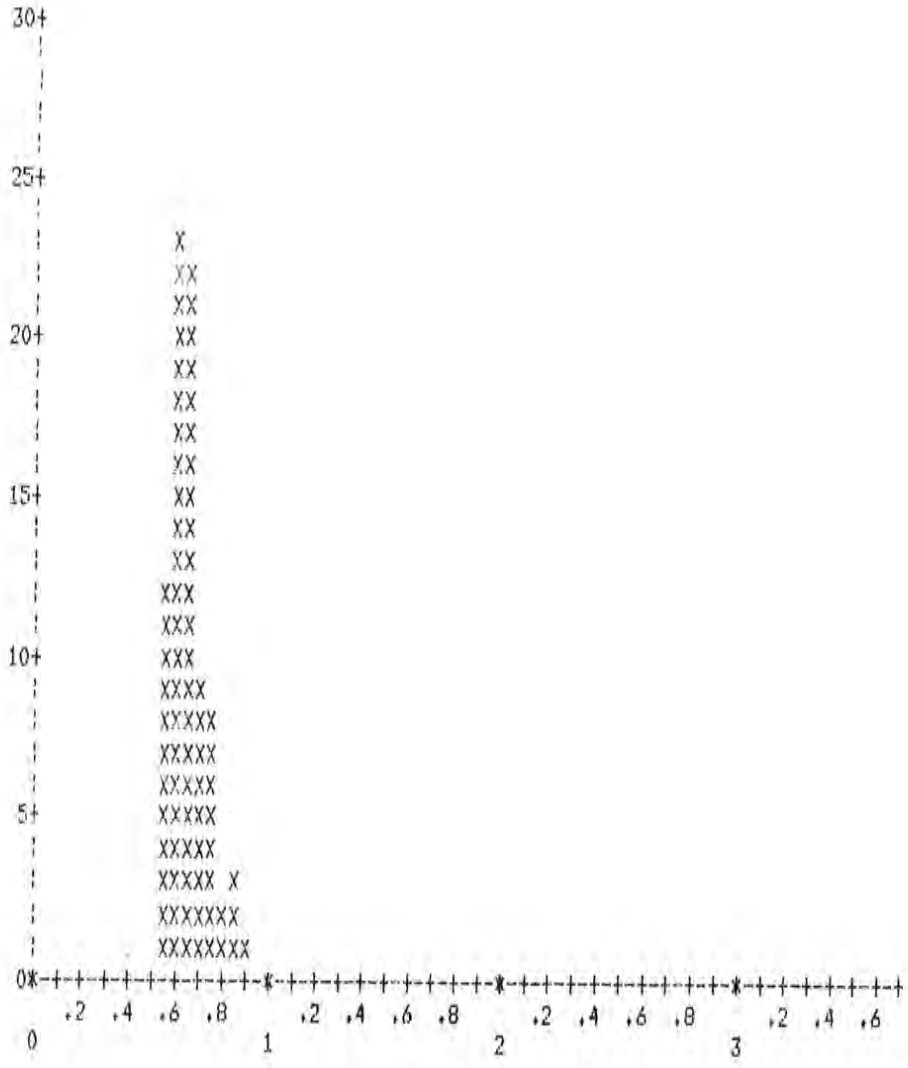
POP.# 3 TOTAL CTS. 4 MIN. 2.49 MAX. 2.89 AVG. 2.62 STD. DEV. 0.18

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4474
DEPTH/SAMPLE NO..R-4474 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-27-6, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.56 MAX. 0.94 AVG. 0.67 STD. DEV. 0.08



VITRINITE REFLECTANCE HISTOGRAM - %Ro

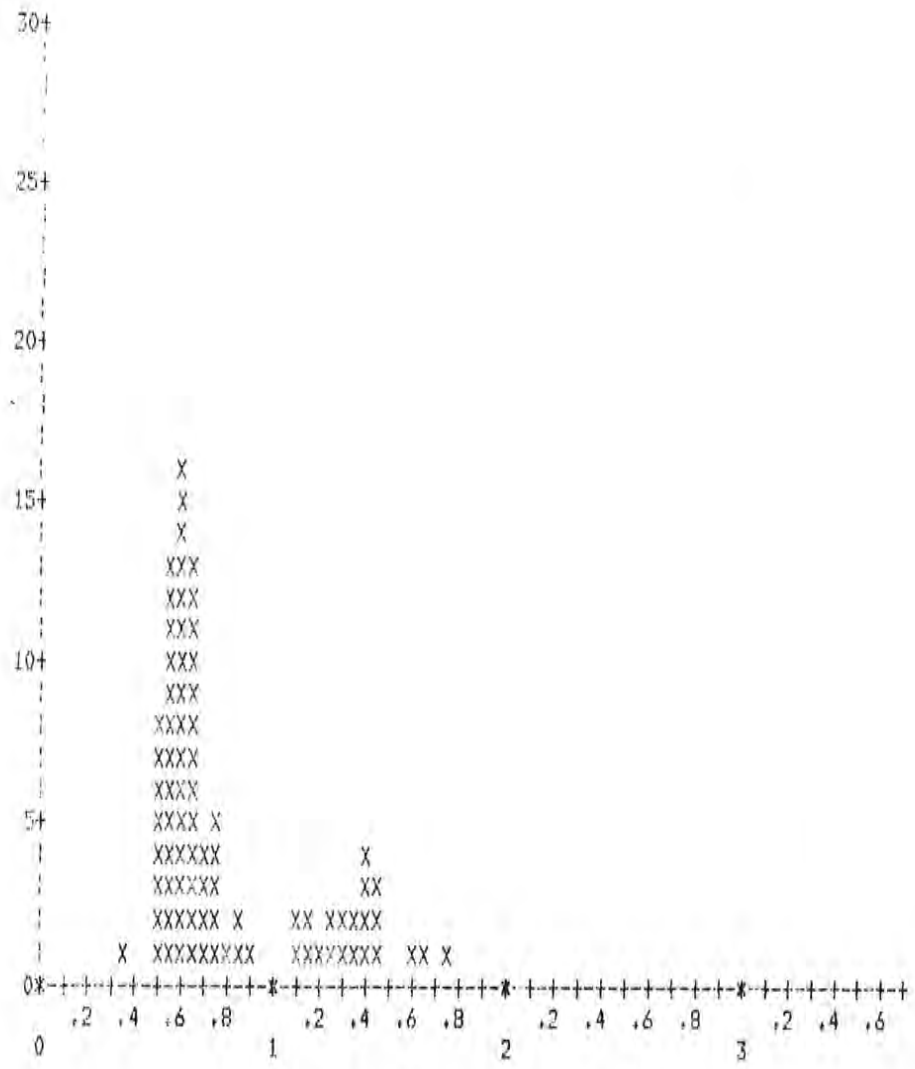
POP.# 1 TOTAL CTS. 80 MIN. 0.56 MAX. 0.94 AVG. 0.67 STD. DEV. 0.08 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4475
DEPTH/SAMPLE NO..R-4475 TYPE OF SAMPLE.....OC; OTUK FM.
LOCATION.....OT 87-27-7, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.39 MAX. 1.76 AVG. 0.82 STD. DEV. 0.34



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.39 MAX. 0.39 AVG. 0.39 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 59 MIN. 0.50 MAX. 0.78 AVG. 0.62 STD. DEV. 0.07 +

POP.# 3 TOTAL CTS. 4 MIN. 0.81 MAX. 0.92 AVG. 0.87 STD. DEV. 0.05

POP.# 4 TOTAL CTS. 18 MIN. 1.10 MAX. 1.47 AVG. 1.32 STD. DEV. 0.12

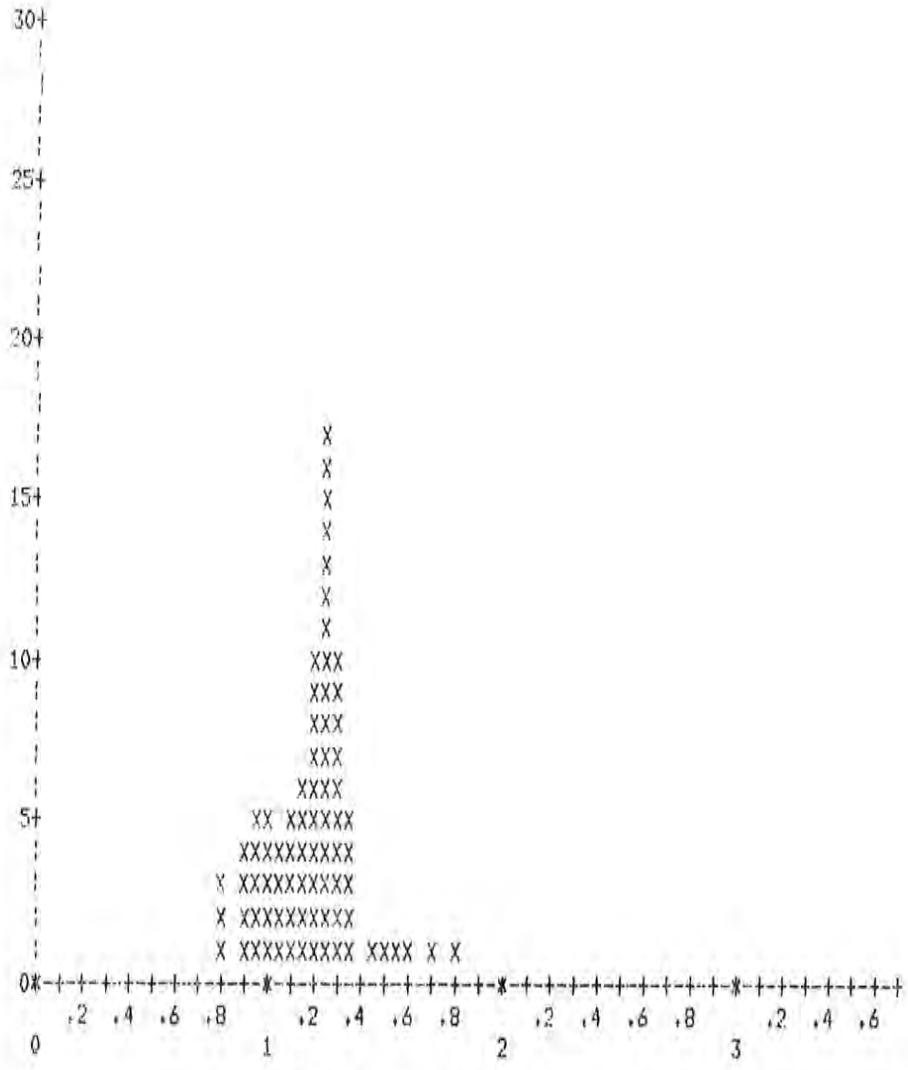
POP.# 5 TOTAL CTS. 3 MIN. 1.63 MAX. 1.76 AVG. 1.68 STD. DEV. 0.07

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4476
DEPTH/SAMPLE NO..R-4476 TYPE OF SAMPLE.....OC: FT. MTN. FM.
LOCATION.....OT 87-27-8, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.80 MAX. 1.84 AVG. 1.21 STD. DEV. 0.19



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 3 MIN. 0.80 MAX. 0.82 AVG. 0.81 STD. DEV. 0.01

POP.# 2 TOTAL CTS. 71 MIN. 0.91 MAX. 1.39 AVG. 1.19 STD. DEV. 0.13 +

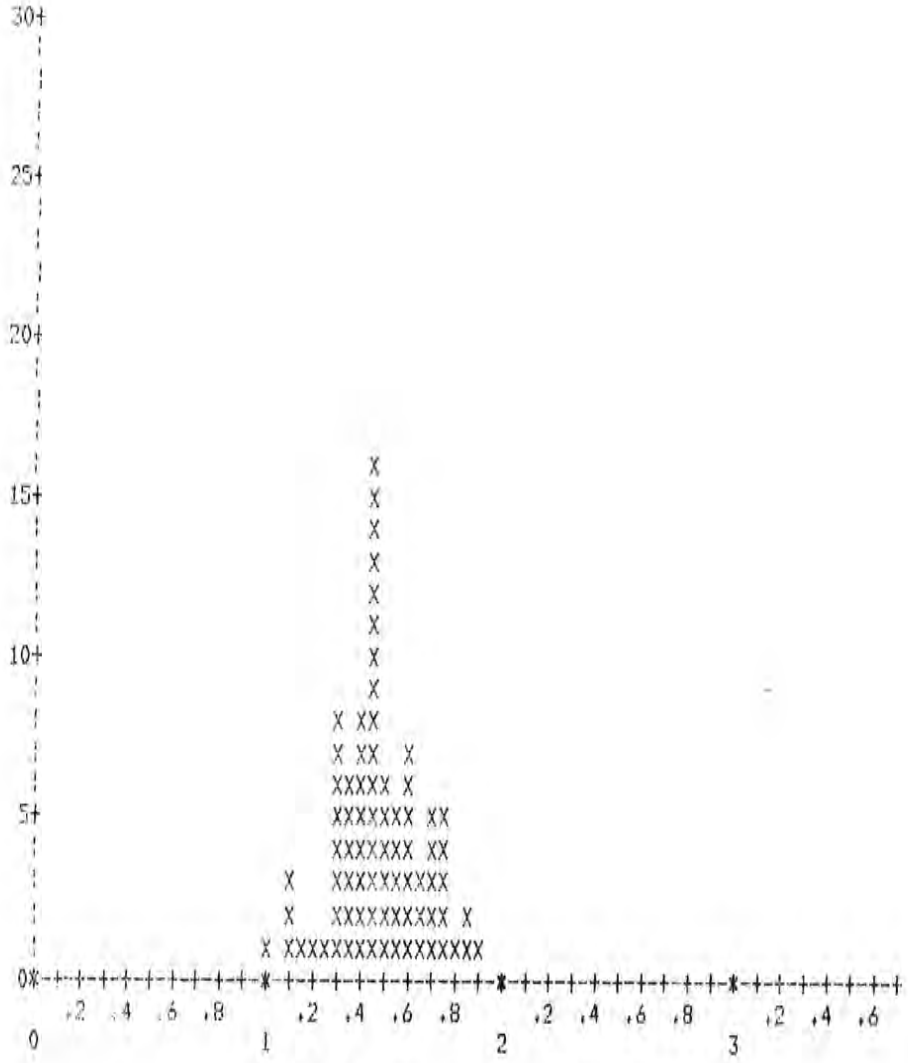
POP.# 3 TOTAL CTS. 6 MIN. 1.45 MAX. 1.84 AVG. 1.63 STD. DEV. 0.15

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4477
DEPTH/SAMPLE NO..R-4477 TYPE OF SAMPLE.....OC; ?KUNA FM.
LOCATION.....DT 87-28-7A, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 1.02 MAX. 1.92 AVG. 1.50 STD. DEV. 0.19



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 7 MIN. 1.02 MAX. 1.28 AVG. 1.15 STD. DEV. 0.09

POP.# 2 TOTAL CTS. 69 MIN. 1.30 MAX. 1.78 AVG. 1.51 STD. DEV. 0.14 +

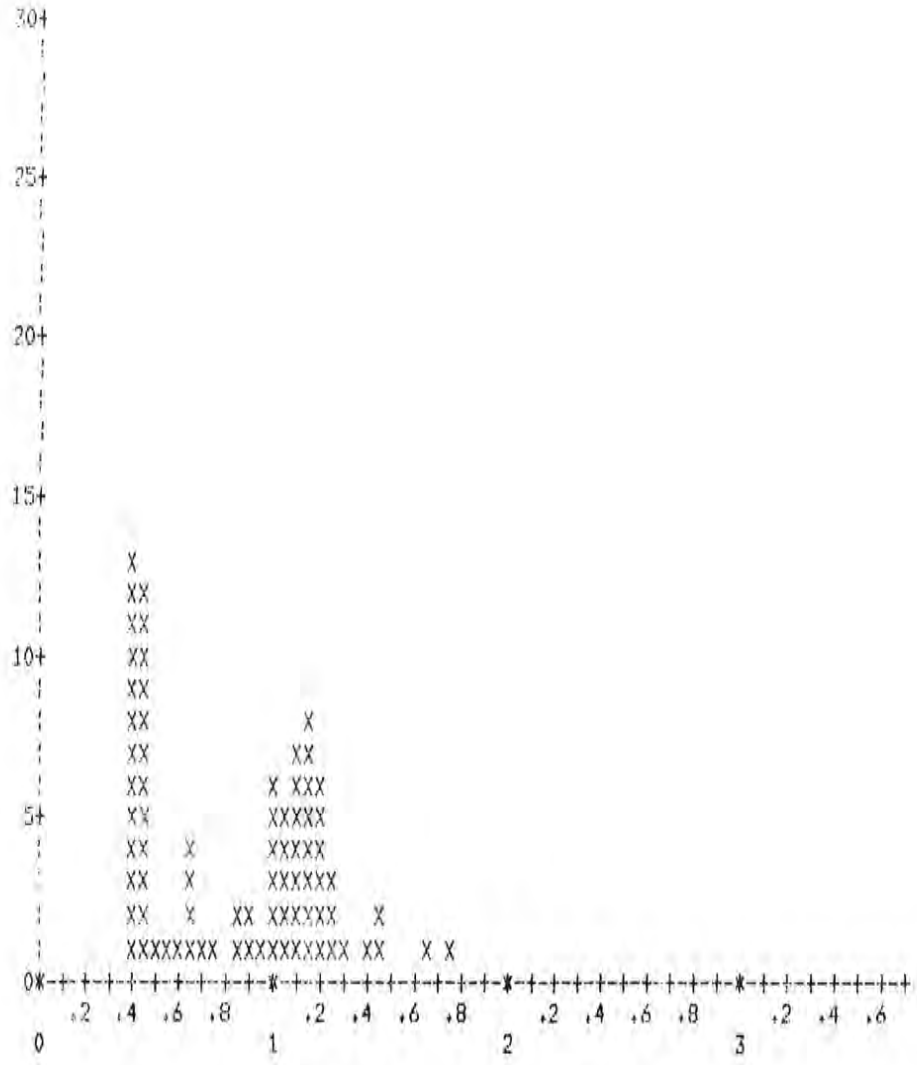
POP.# 3 TOTAL CTS. 4 MIN. 1.82 MAX. 1.92 AVG. 1.86 STD. DEV. 0.04

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4478
DEPTH/SAMPLE NO..R-4478 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-29-2A, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.40 MAX. 1.76 AVG. 0.80 STD. DEV. 0.36



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 26 MIN. 0.40 MAX. 0.51 AVG. 0.45 STD. DEV. 0.02 +

POP.# 2 TOTAL CTS. 8 MIN. 0.55 MAX. 0.75 AVG. 0.67 STD. DEV. 0.06

POP.# 3 TOTAL CTS. 44 MIN. 0.88 MAX. 1.48 AVG. 1.14 STD. DEV. 0.13

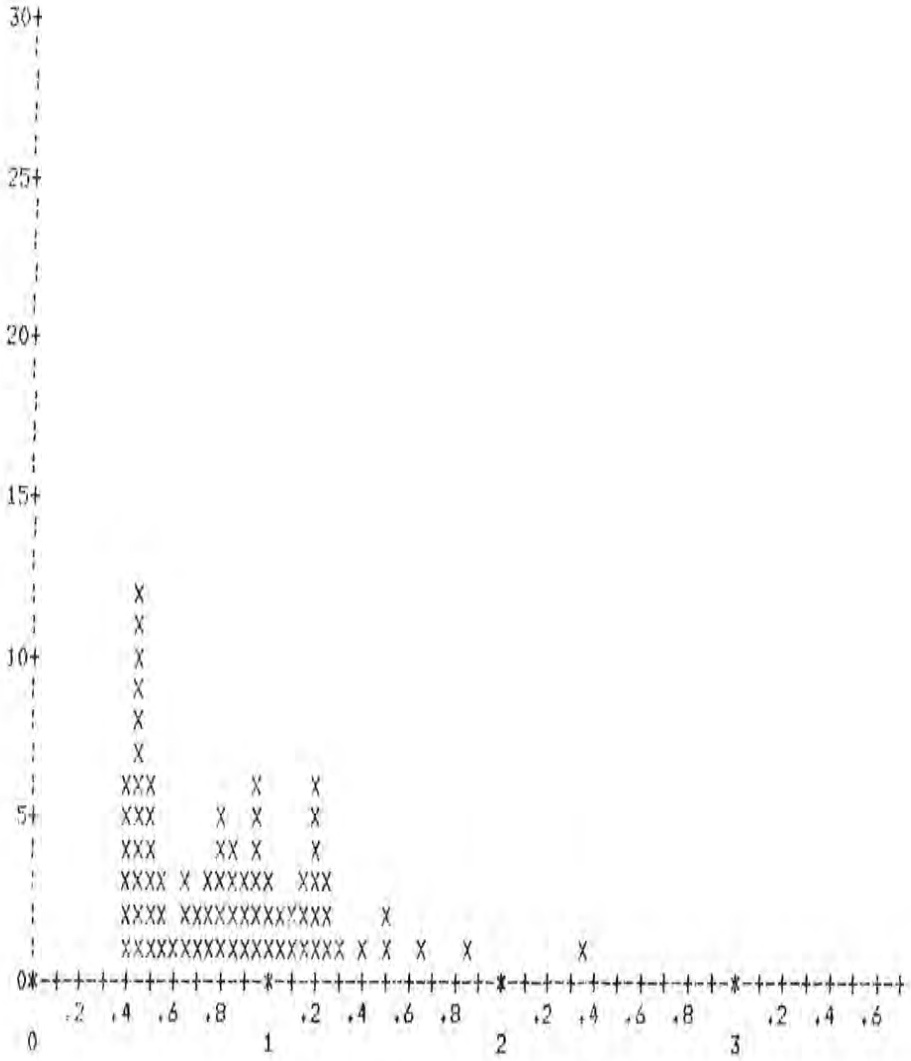
POP.# 4 TOTAL CTS. 2 MIN. 1.68 MAX. 1.76 AVG. 1.72 STD. DEV. 0.06

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4479
DEPTH/SAMPLE NO.:B-4479 TYPE OF SAMPLE.....OC: ETIVLUK FM.
LOCATION.....OT 87-29-2B, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 80

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.41 MAX. 2.39 AVG. 0.87 STD. DEV. 0.38



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 27 MIN. 0.41 MAX. 0.58 AVG. 0.48 STD. DEV. 0.04 +

POP.# 2 TOTAL CTS. 30 MIN. 0.60 MAX. 1.04 AVG. 0.85 STD. DEV. 0.12

POP.# 3 TOTAL CTS. 18 MIN. 1.08 MAX. 1.41 AVG. 1.22 STD. DEV. 0.08

POP.# 4 TOTAL CTS. 4 MIN. 1.52 MAX. 1.87 AVG. 1.65 STD. DEV. 0.16

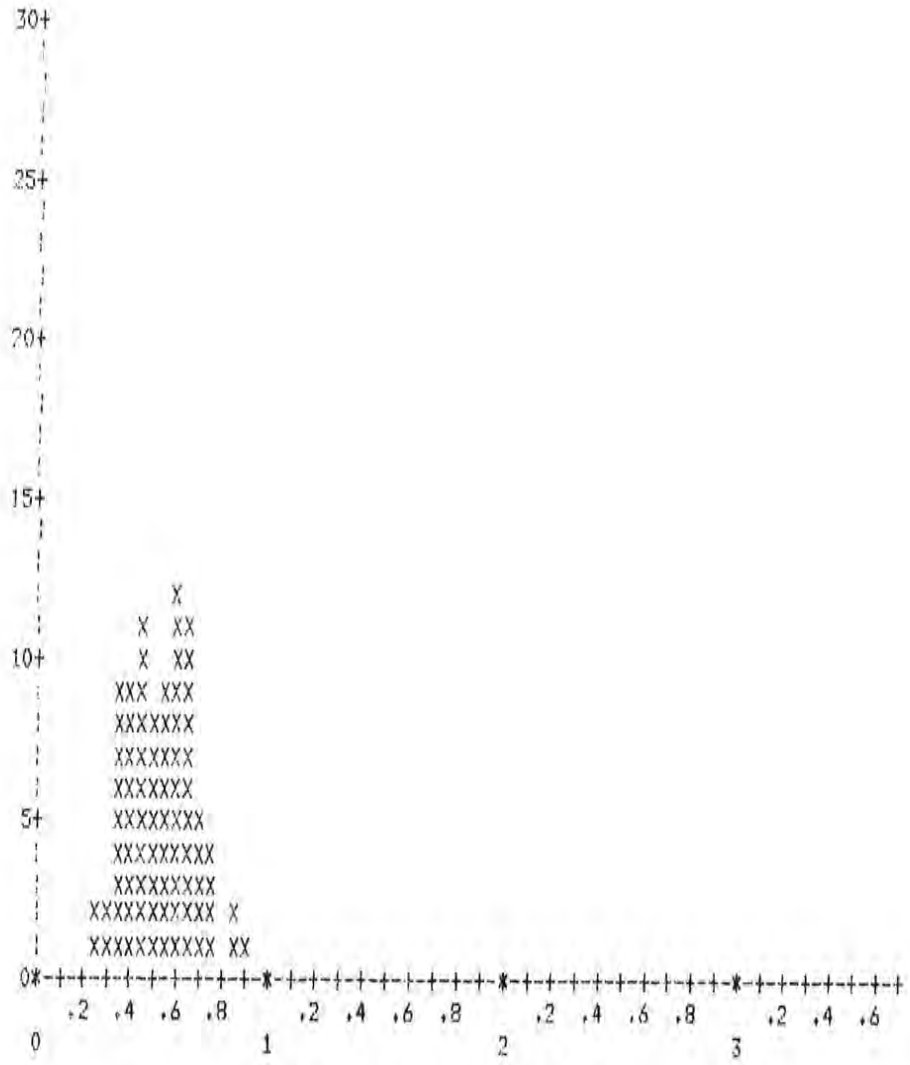
POP.# 5 TOTAL CTS. 1 MIN. 2.39 MAX. 2.39 AVG. 2.39 STD. DEV. 0.00

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4480
DEPTH/SAMPLE NO..R-4480 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-29-3A, ALASKA DATE.....2-12-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.26 MAX. 0.93 AVG. 0.55 STD. DEV. 0.14



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 82 MIN. 0.26 MAX. 0.79 AVG. 0.54 STD. DEV. 0.13 +

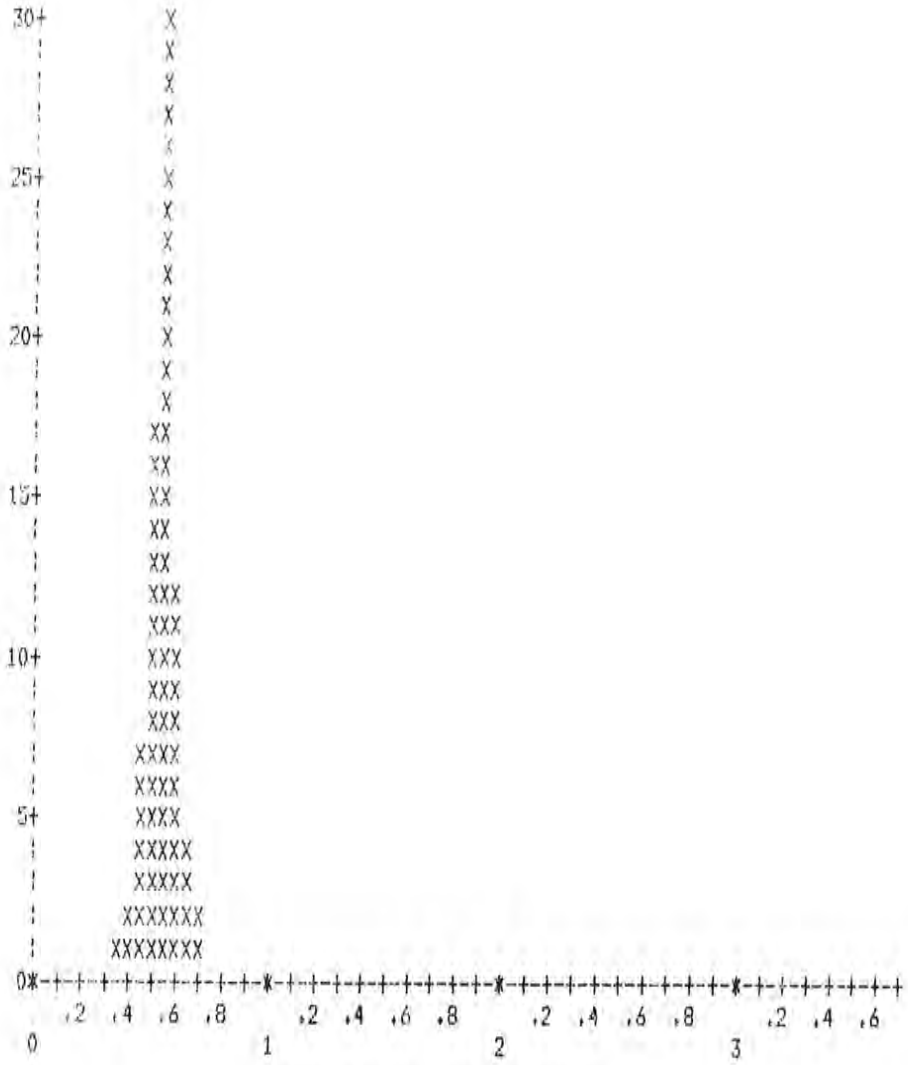
POP.# 2 TOTAL CTS. 3 MIN. 0.87 MAX. 0.93 AVG. 0.90 STD. DEV. 0.03

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT,.....,AMOCO PROD. COMPANY FILE NAME.....R-4481
DEPTH/SAMPLE NO.,R-4481 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 37-29-5A, ALASKA DATE.....2-13-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.38 MAX. 0.74 AVG. 0.56 STD. DEV. 0.06



VITRINITE REFLECTANCE HISTOGRAM - %Ro

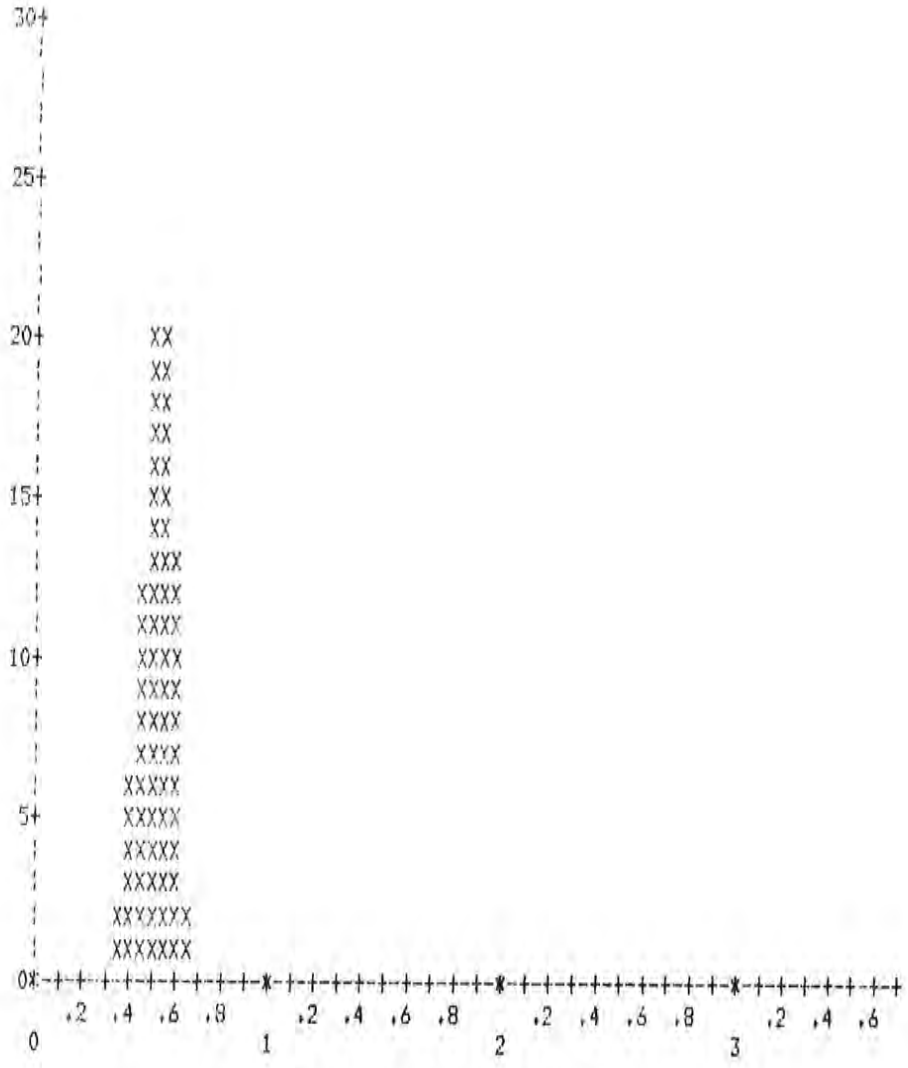
POP.# 1 TOTAL CTS. 75 MIN. 0.38 MAX. 0.74 AVG. 0.56 STD. DEV. 0.06 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4482
DEPTH/SAMPLE NO..R-4482 TYPE OF SAMPLE.....OC; ETIVLUK FM.
LOCATION.....OT 87-29-7A, ALASKA DATE.....2-13-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.37 MAX. 0.66 AVG. 0.54 STD. DEV. 0.07



VITRINITE REFLECTANCE HISTOGRAM - %Ro

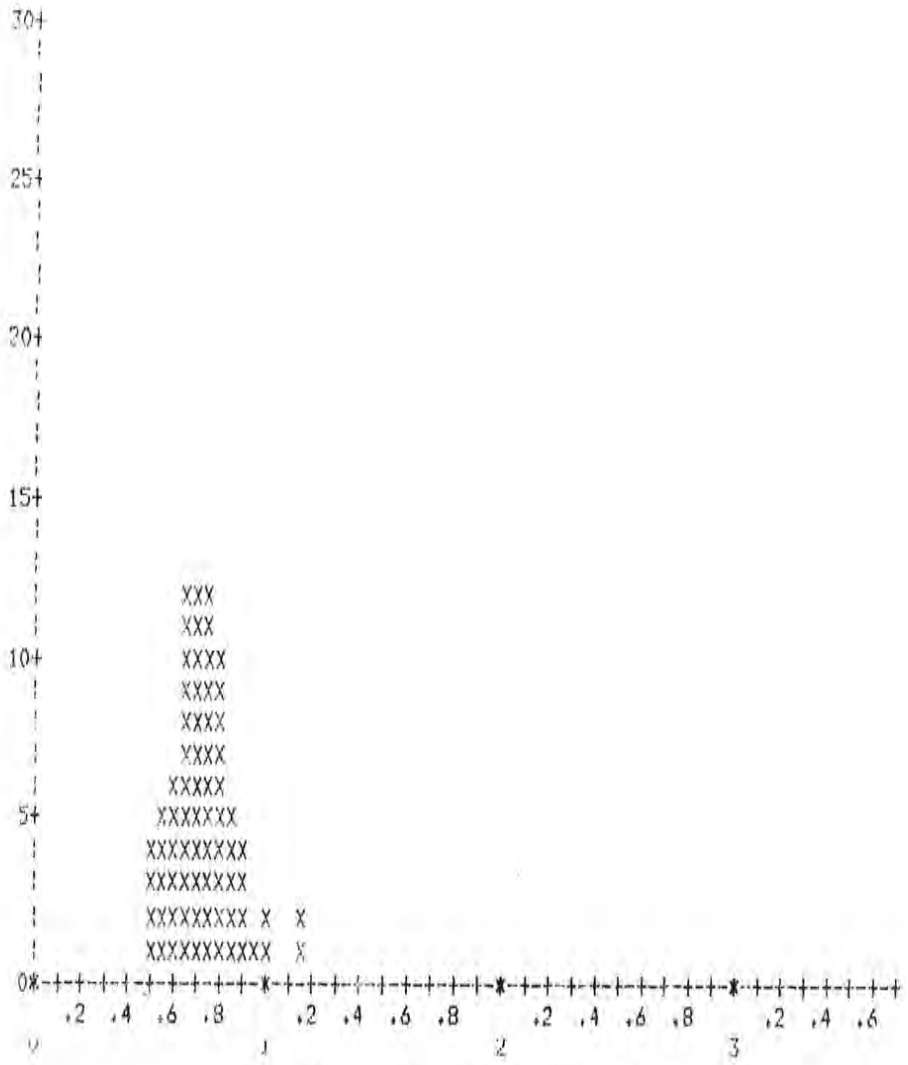
POP.# 1 TOTAL CTS. 75 MIN. 0.37 MAX. 0.66 AVG. 0.54 STD. DEV. 0.07 +

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4483
DEPTH/SAMPLE NO..R-4483 TYPE OF SAMPLE.....OC; ?OTUK FM.
LOCATION.....OT 87-29-8A, ALASKA DATE.....2-13-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 75

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.50 MAX. 1.19 AVG. 0.75 STD. DEV. 0.10



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 70 MIN. 0.50 MAX. 0.94 AVG. 0.72 STD. DEV. 0.10 +

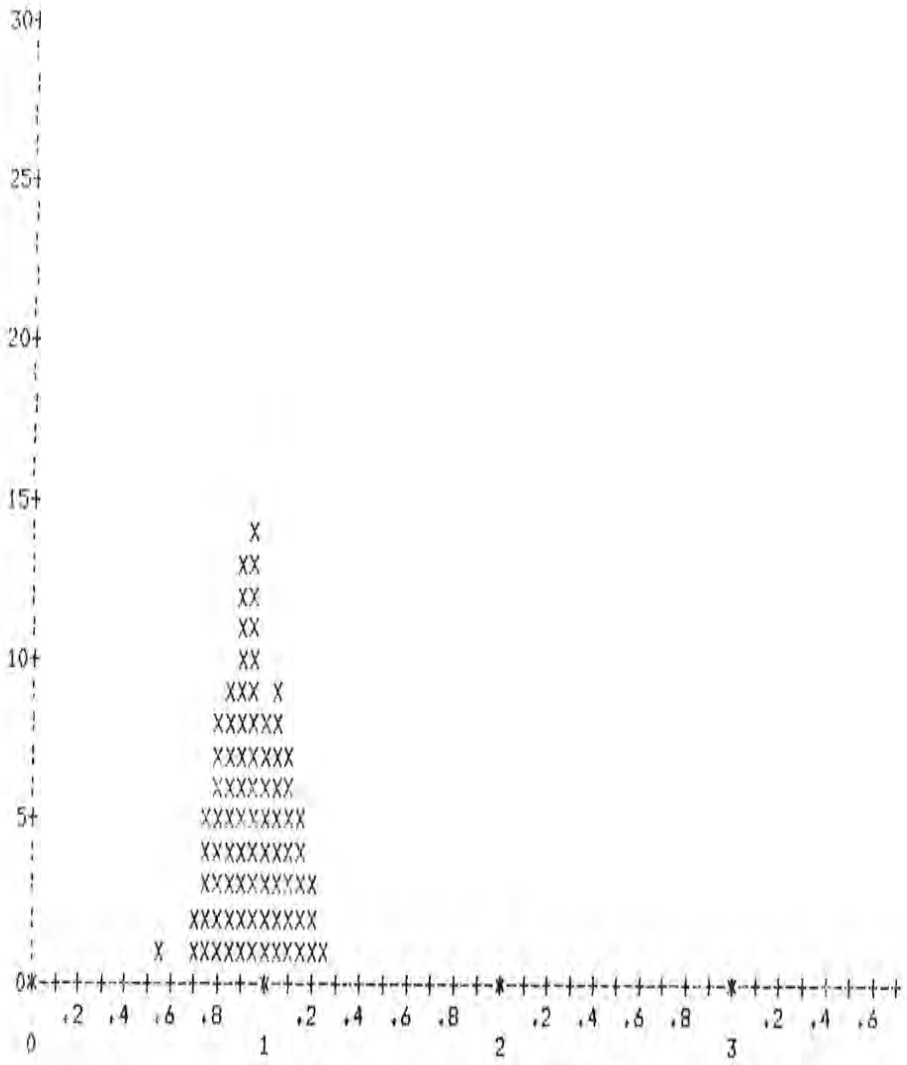
POP.# 2 TOTAL CTS. 5 MIN. 0.98 MAX. 1.19 AVG. 1.08 STD. DEV. 0.10

+ POPULATION CONSIDERED TO BE IN SITU

CLIENT.....AMOCO PROD. COMPANY FILE NAME.....R-4484
DEPTH/SAMPLE NO..R-4484 TYPE OF SAMPLE.....OC; ?OTUK FM.
LOCATION.....OT 87-29-9C, ALASKA DATE.....2-13-88
ANALYST.....K. W. SCHWAB NO. OF OBSERVATIONS. 85

STANDARD %Ro START: 1.02 FINISH: 1.02

REFLECTANCE DATA: MIN. 0.58 MAX. 1.26 AVG. 0.97 STD. DEV. 0.13



VITRINITE REFLECTANCE HISTOGRAM - %Ro

POP.# 1 TOTAL CTS. 1 MIN. 0.58 MAX. 0.58 AVG. 0.58 STD. DEV. 0.00

POP.# 2 TOTAL CTS. 84 MIN. 0.71 MAX. 1.26 AVG. 0.97 STD. DEV. 0.13 +

+ POPULATION CONSIDERED TO BE IN SITU

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4449

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4449
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4449
WELL NAME..... LEASE OT 87-22-2
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
8%	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.33	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
0.00	4.46	Very Poor	5% to 10%	1.55	Pop. 1 5.60
Very Poor					

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

NOTE: ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY.

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4450

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4450
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4450
WELL NAME..... LEASE OT 87-23-1
DATE..... 2-8-88
FORMATION/AGE..... OKPIKRUAK; L. CRET.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
8%	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.80	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.46	Very Poor	0% to 4%	1.40	Pop. 1 5.60

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4451

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4451
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4451
WELL NAME..... LEASE OT 87-23-2
DATE..... 2-8-88
FORMATION/AGE..... OKPIKRUAK; L. CRET.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
8%	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.46	Very Poor	0% to 4%	1.40	Pop. 1 5.60

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4457

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4457
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4457
WELL NAME..... LEASE OT 87-24-2A
DATE..... 2-8-88
FORMATION/AGE..... IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
8%	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		SKeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.46	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4458

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4458
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4458
WELL NAME..... LEASE OT 87-24-2B
DATE..... 2-8-88
FORMATION/AGE..... IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

7%	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	13%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
53%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
13%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.33	Very Poor	5% to 10%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Rare
Pyrite crystals on Kerogen slide - Rare

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4459

CLIENT.............. AMOCO PRODUCTION COMPANY
FILE ID............. R-4459
ANALYST............. K. W. SCHWAB
DEPTH............... OUTCROP
TYPE SAMPLE......... OUTCROP

CLIENT ID........... R-4459
WELL NAME........... LEASE OT 87-24-3
DATE................ 2-8-88
FORMATION/AGE....... ?IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

7%	Algae (Cysts, etc.)
	Bitumen (Inc. Fibrils
	Amorphous Type 1 (Massive-Fluffy)
	Amorphous Type 2 (Globular)
57%	Amorphous Type 3 (Finely Disseminated)
	Spores (Simple, Non-Trilete)
	Fungal Debris (Spores and/or Hyphae)
7%	Trilete Spores and/or Pollen
14%	Plant Tissue-Membranous Debris
	Foraminiferal Linings
	Plant Cuticle-Vitrinite Undiff.
7%	Vitrinite (Angular-Structured)
	Scolecodonts (Worms Jaws)
	Chitinozoan Debris
	Graptolite Debris
7%	Inertinite (Inc. Pyrite)
	Pyrobitumen
	Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2+	4.50	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.21	Very Poor	0% to 4%	1.73	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

NOTE: ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY.

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4460

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4460
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4460
WELL NAME..... LEASE OT 87-24-3B
DATE..... 2-8-88
FORMATION/AGE..... ?IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
21%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.43	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on Kerogen slide - Rare

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4461

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4461
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4461
WELL NAME..... LEASE OT 87-24-4A
DATE..... 2-8-88
FORMATION/AGE..... IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
21%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.43	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4462

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4462
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4462
WELL NAME..... LEASE OT 87-24-4B
DATE..... 2-8-88
FORMATION/AGE..... IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	6%	Vitrinite (Angular-Structured)
13%	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
50%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	6%	Inertinite (Inc. Pyrite)
6%	Trilete Spores and/or Pollen		Pyrobitumen
19%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.25	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Rare

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4463

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4463
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4463
WELL NAME..... LEASE OT 87-24-5
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
8%	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
67%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
8%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.80	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.42	Very Poor	0% to 4%	1.55	Pop. 1 5.60

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on Kerogen slide - Rare

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4464

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4464
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4464
WELL NAME..... LEASE OT 87-26-1A
DATE..... 2-8-88
FORMATION/AGE..... ?ETIVLUK; ?PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	25%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
50%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	13%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
13%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2+	4.50	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
1.00	5.00	Very Poor	0% to 4%	1.67	Pop. 1 5.60

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4465

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4465
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4465
WELL NAME..... LEASE OT 87-26-3
DATE..... 2-8-88
FORMATION/AGE..... OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
67%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
17%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.50	Very Poor	0% to 4%	1.55	Pop. 1 8.00

COMMENTS

ACCESSORY MINERALS

Pyrite crystals on Kerogen slide - Trace

NOTE: ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY.

[redacted] Maintained In Confidence
Amoco Production Company

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4466

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4466
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4466
WELL NAME..... LEASE OT 87-26-3B
DATE..... 2-8-88
FORMATION/AGE..... UNKNOWN
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
67%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
17%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.50	Very Poor	0% to 4%	1.55	Pop. 1 6.50

COMMENTS

ACCESSORY MINERALS

Pyrite crystals on kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4467

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4467
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4467
WELL NAME..... LEASE OT 87-26-6
DATE..... 2-8-88
FORMATION/AGE..... ETIVLIK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	8%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
23%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.46	Very Poor	0% to 4%	1.55	Pop. 1 6.50

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4452

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4452
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4452
WELL NAME..... LEASE OT 87-23-3
DATE..... 2-8-88
FORMATION/AGE..... SIKSIKPUKK; PERMIAN
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	15%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	6.00	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	ZFL	PSI	PI
-1.00	4.62	Very Poor	0% to 4%	1.40	Pop. 1 6.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

NOTE: ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY.

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4453

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4453
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4453
WELL NAME..... LEASE OT 87-23-5
DATE..... 2-8-88
FORMATION/AGE..... KUNA SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	15%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
15%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	6.00	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.62	Very Poor	0% to 4%	1.40	Pop. 1 6.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4455

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4455
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4455
WELL NAME..... LEASE OT 87-23-9B
DATE..... 2-8-88
FORMATION/AGE..... UNKNOWN
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	9%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
73%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	9%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
9%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.55	Very Poor	0% to 4%	1.40	Pop. 1 5.60

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4456

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4456
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4456
WELL NAME..... LEASE OT 87-24-1A
DATE..... 2-8-88
FORMATION/AGE..... IPEWIK; JURASSIC-CRET.
LOCATION/COUNTRY.... POINT HOPE, ALASKA

PERCENT ORGANIC CONSTITUENTS

7%	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
53%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
20%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.67	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.20	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Rare
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4469

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4469
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4469
WELL NAME..... LEASE OT 87-26-8
DATE..... 2-8-88
FORMATION/AGE..... KUNA SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
21%	Plant Tissue-Membranous Debris		SKeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.43	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4470

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4470
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4470
WELL NAME..... LEASE OT 87-27-2
DATE..... 2-8-88
FORMATION/AGE..... OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	25%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
50%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	13%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
13%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2+ to 3-	5.00	>50%	plant tissue	Mature-Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	5.00	Very Poor	0% to 4%	1.67	Pop. 1 6.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4472

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4472
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4472
WELL NAME..... LEASE OT 87-27-3A
DATE..... 2-8-88
FORMATION/AGE..... ?OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
7%	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
7%	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	14%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
7%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2+ to 3-	5.00	>50%	plant tissue	Mature-Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.64	Very Poor	0% to 4%	1.55	Pop. 1 6.50

COMMENTS

ACCESSORY MINERALS

Dol. or Pyrite rhombs on palyn. - Trace
Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

NOTE: ALL INFORMATION CONT[redacted]RY.

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4473

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4473
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4473
WELL NAME..... LEASE OT 87-27-3C
DATE..... 2-8-88
FORMATION/AGE..... ?OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	21%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
14%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.71	Very Poor	0% to 4%	1.55	Pop. 1 6.50

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4474

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4474
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4474
WELL NAME..... LEASE OT 87-27-6
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	38%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
29%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	5%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
29%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	3.80	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.95	Very Poor	0% to 4%	1.92	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Dol. or Pyrite rhombs on palyn. - Trace
Unid. crystals on Kerogen slide - Trace
Pyrite crystals on kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4475

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4475
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4475
WELL NAME..... LEASE OT 87-27-7
DATE..... 2-8-88
FORMATION/AGE..... OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	17%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
67%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	8%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
8%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	4.00	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.67	Very Poor	0% to 4%	1.40	Pop. 1 6.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4476

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4476
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4476
WELL NAME..... LEASE OT 87-27-8
DATE..... 2-8-88
FORMATION/AGE..... FT. HTN; CRETACEOUS
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	29%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
57%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
7%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Macerol	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.86	Very Poor	0% to 4%	1.55	Pop. 1 6.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

NOTICE: ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY.
Property of ... Maintained In Confidence
Amoco Production Company

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4477

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4477
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4477
WELL NAME..... LEASE OT 87-28-7A
DATE..... 2-8-88
FORMATION/AGE..... ?KUNA SH.
LOCATION/COUNTRY.... MISHEGUK MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	15%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
62%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	15%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
8%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	3- to 3	5.67	>50%	plant tissue	Very Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.92	Very Poor	0% to 4%	1.55	Pop. 1 7.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4478

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4478
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4478
WELL NAME..... LEASE OT 87-29-2A
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... POINT HOPE,, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	9%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
73%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	9%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
9%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.20	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.55	Very Poor	0% to 4%	1.40	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4479

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4479
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4479
WELL NAME..... LEASE OT 87-29-2B
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... POINT HOPE,, ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	9%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
73%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	9%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
9%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.20	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.55	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4480

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4480
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4480
WELL NAME..... LEASE OT 87-29-3A
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

7%	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	7%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
53%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	7%	Inertinite (Inc. Pyrite)
7%	Trilete Spores and/or Pollen		Pyrobitumen
20%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.20	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	OOM (oil prone)	%EL	PSI	PI
-1.00	4.20	Very Poor	5% to 10%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Dol. or Pyrite rhombs on palyn. - Trace
Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4481

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4481
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4481
WELL NAME..... LEASE OT 87-29-5A
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	17%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
22%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
6%	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	6%	Inertinite (Inc. Pyrite)
6%	Trilete Spores and/or Pollen		Pyrobitumen
44%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.20	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.56	Fair	41% to 65%	3.11	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Dol. or Pyrite rhombs on palyn. - Trace
Unid. crystals on Kerogen slide - Trace
Pyrite crystals on kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4482

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4482
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4482
WELL NAME..... LEASE OT 87-29-7A
DATE..... 2-8-88
FORMATION/AGE..... ETIVLUK; PERMO-TRIASSIC
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	24%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
18%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
6%	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	6%	Inertinite (Inc. Pyrite)
	Trilete Spores and/or Pollen		Pyrobitumen
47%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2- to 2	3.20	>50%	plant tissue	Mature

ADDITIONAL PARAMETERS

TOC	OMI	QOM (oil prone)	%FL	PSI	PI
-1.00	4.71	Fair	41% to 65%	2.59	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on kerogen slide - Trace
Pyrite crystals on kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4483

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4483
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4483
WELL NAME..... LEASE OT 87-29-8A
DATE..... 2-8-88
FORMATION/AGE..... ?OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

6%	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	12%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
47%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	6%	Inertinite (Inc. Pyrite)
6%	Trilete Spores and/or Pollen		Pyrobitumen
24%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2 to 2+	4.00	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	QMI	QOM (oil prone)	%EL	PSI	PI
-1.00	4.29	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Trace
Pyrite crystals on Kerogen slide - Trace

VISUAL KEROGEN SUMMARY CHART

Sample Number R-4484

CLIENT..... AMOCO PRODUCTION COMPANY
FILE ID..... R-4484
ANALYST..... K. W. SCHWAB
DEPTH..... OUTCROP
TYPE SAMPLE..... OUTCROP

CLIENT ID..... R-4484
WELL NAME..... LEASE OT 87-29-9C
DATE..... 2-8-88
FORMATION/AGE..... ?OTUK SH.
LOCATION/COUNTRY.... DE LONG MTNS., ALASKA

PERCENT ORGANIC CONSTITUENTS

	Algae (Cysts, etc.)		Foraminiferal Linings
	Bitumen (Inc. Fibrils		Plant Cuticle-Vitrinite Undiff.
	Amorphous Type 1 (Massive-Fluffy)	13%	Vitrinite (Angular-Structured)
	Amorphous Type 2 (Globular)		Scolecodonts (Worms Jaws)
50%	Amorphous Type 3 (Finely Disseminated)		Chitinozoan Debris
6%	Spores (Simple, Non-Trilete)		Graptolite Debris
	Fungal Debris (Spores and/or Hyphae)	6%	Inertinite (Inc. Pyrite)
6%	Trilete Spores and/or Pollen		Pyrobitumen
19%	Plant Tissue-Membranous Debris		Skeletal Fragments (Diatoms, etc.)

THERMAL MATURITY INDEX (TAI)

Population	Staplin Expanded	Geo-Strat Inc.	% of Maceral	TAI color based on	State of Maturity
1. (Pri)	2+	4.50	>50%	trilete spores/pollen	Mature

ADDITIONAL PARAMETERS

TOC	OMI	OOM (oil prone)	%FL	PSI	PI
-1.00	4.50	Very Poor	0% to 4%	1.55	Pop. 1 5.00

COMMENTS

ACCESSORY MINERALS

Unid. crystals on Kerogen slide - Rare
Pyrite crystals on Kerogen slide - Trace

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NO-09-89R
Krass

OUTCR.Samples

Sample Number: 87-22-2
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Early Jurassic

Evidence: Dinoflagellate (Nannoceratopsis gracilis),marine alga Tasmanites; few Mesozoic spores

Kerogen type: Amorphous

Thermal stage (1-7): 4
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-22-3
Lithology: Shale
Formation: Ipewik(?) or Etivluk
Field age: Jurassic-Early Cret. or Permo-Trias

Palynology age: Early Cretaceous

Evidence: Abundant marine dinoflagellates

Kerogen type: Amorphous (sporonite)

Thermal stage (1-7): 5
Generation potential: Peak generation for oil

Sort: 0

OUTCR.Samples

```
Sample Number: 87-22-4A
    Lithology: Shale
    Formation: Ipewik(?)
    Field age: Jurassic-Early Cretaceous

Palynology age: Early Cretaceous

     Evidence: Marine dinoflagellates

  Kerogen type: Woody,humic;amorphous micrite

 Thermal stage (1-7): 5
Generation potential: Early peak generation for oil
                      and gas
Sort:   0
```

OUTCR.Samples

```
Sample Number: 87-23-01
    Lithology: Shale
    Formation: Okpikruak(?)
    Field age: Early Cretaceous

Palynology age: Early Cretaceous

     Evidence: Marine dinoflagellates

  Kerogen type: Woody plus some amorphous micrite

 Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil
                      and gas
Sort:   0
```

OUTCR.Samples

==========

Sample Number: 87-23-02
Lithology: Shale
Formation: Okpikruak
Field age: Early Cretaceous

Palynology age: Early Cretaceous

Evidence: Marine dinoflagellates

Kerogen type: Woody with amorphous micrite

Thermal stage (1-7): 5
Generation potential: Early peak generation for oil and gas
Sort: 0

==========

OUTCR.Samples

Sample Number: 87-23-03
Lithology: Shale
Formation: Siksikpuk
Field age: Permo-Triassic

Palynology age: Early Cretaceous,possibly

Evidence: Marine dinoflagellates;rare,could be contaminants

Kerogen type: Woody with amorphous micrite

Thermal stage (1-7): 5
Generation potential: Early peak generation for oil
and gas
Sort: 0

OUTCR.Samples

Sample Number: 87-23-04
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,bituminous

Thermal stage (1-7): 4/5
Generation potential: Possible early generation for gas
Sort: 0

OUTCR.Samples

Sample Number: 87-23-05
Lithology: Shale
Formation: Kuna
Field age: Mississippian-Pennsylvanian

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody opaque;amorphous micrite

Thermal stage (1-7): 5
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-23-07
Lithology: Shale
Formation: Siksikpuk(?)
Field age: Permo-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody opaque,sparse

Thermal stage (1-7): 6?
Generation potential: Unknown

Sort: 0

OUTCR.Samples

Sample Number: 87-23-08
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Early Jurassic,possible

Evidence: Possible Early Jurassic dinoflgellate;weak

Kerogen type: Woody opaque,minor gray amorphous

Thermal stage (1-7): 5?
Generation potential: Unknown

Sort: 0

OUTCR.Samples

Sample Number: 87-23-09
Lithology: Shale
Formation: Kuna(?)or Okpikruak
Field age: Miss.Penn or Early Cretaceous

Palynology age: Indeterminate

Evidence: Material too opaque to identify;reprocess

Kerogen type: Woody with amorphous micrite

Thermal stage (1-7): 5
Generation potential: Possible early peak generation for gas
Sort: 0

OUTCR.Samples

Sample Number: 87-23-09B
Lithology: Shale
Formation: Kuna(?)or Okpikruak
Field age: Miss.Penn or Early Cretaceous

Palynology age: Indeterminate

Evidence: Material too opaque to identify;reprocess

Kerogen type: Woody with amorphous micrite

Thermal stage (1-7): 5
Generation potential: Possible early peak generation for gas
Sort: 0

OUTCR.Samples

Sample Number: 87-23-11
Lithology: Shale
Formation: Siksikpuk
Field age: Permo-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody opaque,sparse,minor gray amorphous

Thermal stage (1-7): 6
Generation potential: Probably none

Sort: 0

OUTCR.Samples

Sample Number: 87-23-13
Lithology: Shale
Formation: Otuk(?) or Ipewik
Field age: Triassic or Jur.-Early Cretaceous

Palynology age: Late Triassic

Evidence: Striatosccate pollen (Taeniaesporites)

Kerogen type: Woody opaque,sparse;minor gray amorphous

Thermal stage (1-7): 5
Generation potential: Probably none

Sort: 0

OUTCR.Samples

```
Sample Number: 87-23-14
    Lithology: Shale
    Formation: Okpikruak(?)
    Field age: Early Cretaceous

Palynology age: Late Triassic/Early Jurassic

      Evidence: Some Early Mesozoic pollen;lack of typical Okpikruak
                dinoflagellates

  Kerogen type: Woody opaque,minor amorphous

 Thermal stage (1-7): 5
Generation potential: Possibly early peak for gas

Sort:   0
```

OUTCR.Samples

Sample Number: 87-24-1A
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic(Bathonian/Callovian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Woody,herbaceous,sporonitic

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil or gas
Sort: 0

OUTCR.Samples

Sample Number: 87-24-1B
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (possibly Callovian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Sporonite and micritic amorphous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-24-1C
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Few marine dinoflagellates

Kerogen type: Mixed woody and sporonite

Thermal stage (1-7): 4/5
Generation potential: Possibly early generation gas; poor
Sort: 0

OUTCR.Samples

Sample Number: 87-24-1E
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Moderately abundant marine dinoflagellates

Kerogen type: Woody and sporonitic

Thermal stage (1-7): 4
Generation potential: Early generation gas;possible early peak for oil
Sort: 0

OUTCR.Samples

Sample Number: 87-24-1F
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Woody and sporonitic

Thermal stage (1-7): 5
Generation potential: Early generation gas;possible
early peak for oil
Sort: 0

OUTCR.Samples

```
Sample Number: 87-24-16
    Lithology: Shale
    Formation: Ipewik
    Field age: Late Jurassic-Early Cretaceous


Palynology age: Jurassic (Callovian-Oxfordian)

     Evidence: Sparse marine dinoflagellates


  Kerogen type: Woody and minor gray amorphous

 Thermal stage (1-7): 4/5
Generation potential: Poor

Sort:  0
```

OUTCR.Samples

Sample Number: 87-24-2A
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Mainly sporonite,micritic amorphous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-24-2B
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Mainly sporonite,micritic amorphous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-24-3
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Mainly sporonite,micritic amorphous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-24-3B
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Mainly sporonite,micritic amorphous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

```
  Sample Number: 87-24-4A
      Lithology: Shale
      Formation: Ipewik
      Field age: Late Jurassic-Early Cretaceous


 Palynology age: Jurassic (Callovian-Oxfordian)

       Evidence: Abundant marine dinoflagellates


   Kerogen type: Mainly sporonite,micritic amorphous,wood

  Thermal stage (1-7): 5
 Generation potential: Early peak generation for oil;
                       possibly early generation gas
 Sort:   0
```

OUTCR.Samples

Sample Number: 87-24-4B
Lithology: Shale
Formation: Ipewik
Field age: Late Jurassic-Early Cretaceous

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Abundant marine dinoflagellates

Kerogen type: Mainly sporonite,micritic amorphous,wood

Thermal stage (1-7): 5
Generation potential: Early peak generation for oil;
possibly early generation gas
Sort: 0

OUTCR.Samples

Sample Number: 87-24-5
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Jurassic (Callovian-Oxfordian)

Evidence: Few marine dinoflagellates;possible contamination

Kerogen type: Woody opaque, humic

Thermal stage (1-7): 5
Generation potential: Early generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-24-6
Lithology: Shale
Formation: Ipewik(?)
Field age: Late Jurassic-Early Cretaceous

Palynology age: Early Cretaceous

Evidence: Abundant marine dinoflagellates

Kerogen type: Woody and sporonitic

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for oil;
early generation for gas
Sort: 0

OUTCR.Samples

Sample Number: 87-24-7
Lithology: Shale
Formation: Ipewik(?)
Field age: Late Jurassic-Early Cretaceous

Palynology age: Late Triassic

Evidence: Striatosaccate pollen, other pollen and acritarchs

Kerogen type: Mixed;woody-herbaceous and amorphous

Thermal stage (1-7): 5
Generation potential: Early peak generation for oil;
early generation for gas
Sort: 0

OUTCR.Samples

```
Sample Number: 87-26-1
    Lithology: Shale
    Formation: Etivluk(?)or Ft.Mtn/Okpk
    Field age: Permian-Jurassic or Early Cretaceous

Palynology age: Jurassic possible

     Evidence: Rare dinoflagellates,could be contaminants

  Kerogen type: Woody

 Thermal stage (1-7): 5
Generation potential: Early gas generation

Sort:   0
```

OUTCR.Samples

Sample Number: 87-26-1A
Lithology: Shale
Formation: Etivluk(?)
Field age: Permian-Jurassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody-herbaceous,opaque

Thermal stage (1-7): 6
Generation potential: Peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-2
Lithology: Shale
Formation: Otuk
Field age: Jurassic-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,coarse fragments

Thermal stage (1-7): 4/5
Generation potential: Early generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-2A
Lithology: Shale
Formation: Otuk(?)
Field age: Jurassic-Triassic

Palynology age: Late Cretaceous (Early Senonian)

Evidence: Late Cretaceous dinoflagellates

Kerogen type: Woody,bituminous

Thermal stage (1-7): 2/3
Generation potential: Early generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-3
Lithology: Shale
Formation: Otuk
Field age: Jurassic-Triassic

Palynology age: Jurassic,possible

Evidence: Few marine dinoflagellates;could be contaminants

Kerogen type: Woody,bituminous

Thermal stage (1-7): 5/6
Generation potential: Peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-3B
Lithology: Shale
Formation: Otuk
Field age: Jurassic-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,bituminous

Thermal stage (1-7): 5/6
Generation potential: Peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-4
Lithology: Shale
Formation: Otuk
Field age: Jurassic-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,bituminous

Thermal stage (1-7): 5/6
Generation potential: Peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-5
Lithology: Shale
Formation: Otuk
Field age: Jurassic-Triassic

Palynology age: Late Trias-Early Jurassic

Evidence: Few Early Mesozoic spores

Kerogen type: Woody-herbaceous,minor amorphous

Thermal stage (1-7): 5
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-6
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,bituminous

Thermal stage (1-7): 5/6
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-7
Lithology: Shale
Formation: Ipewik(?)
Field age: Late Jurassic-Early Cretaceous

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody,herbaceous

Thermal stage (1-7): 5/6
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-26-8
Lithology: Shale
Formation: Kuna
Field age: Mississippian-Pennsylvanian

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Herbaceous,altered amorphous

Thermal stage (1-7): 5
Generation potential: Early peak generation oil or gas
Sort: 0

OUTCR.Samples

Sample Number: 87-29-1B
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody and amorphous;possible algal material

Thermal stage (1-7): 4
Generation potential: Possible early peak generation
for oil
Sort: 0

OUTCR.Samples

Sample Number: 87-29-2A
Lithology: Shale
Formation: Otuk(?)
Field age: Jurassic-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Woody and amorphous

Thermal stage (1-7): 5
Generation potential: Possible early peak generation for oil
Sort: 0

OUTCR.Samples

Sample Number: 87-29-2B
Lithology: Shale
Formation: Otuk(?)
Field age: Jurassic-Triassic

Palynology age: Indeterminate

Evidence: Barren

Kerogen type: Some amorphous plus outcrop contamination

Thermal stage (1-7): 3/4?
Generation potential: Unknown

Sort: 0

OUTCR.Samples

Sample Number: 87-29-3A
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Late Triassic

Evidence: Abundant striatosaccites pollen;marine acritarchs

Kerogen type: Mainly amorphous

Thermal stage (1-7): 4
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-29-4A
Lithology: Shale
Formation: Okpikruak(?)
Field age: Early Cretaceous

Palynology age: Early Cretaceous; Aptian/Albian (?)

Evidence: Abundant spores,moderately common dinoflagellates

Kerogen type: Woody-herbaceous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-29-5A
Lithology: Shale
Formation: Etivluk
Field age: Permian-Jurassic

Palynology age: Late Triassic-Early Jurassic

Evidence: Rare marine dinoflagellates;difficult to identify

Kerogen type: Amorphous

Thermal stage (1-7): 4
Generation potential: Early peak generation for oil

Sort: 0

OUTCR.Samples

Sample Number: 87-29-6A
Lithology: Shale
Formation: Otuk
Field age: Permian-Jurassic

Palynology age: Possibly Early Jurassic

Evidence: Possible Nannoceratopsis gracilis (dinoflagellate)

Kerogen type: Woody and amorphous;sparse

Thermal stage (1-7): 4
Generation potential: Probably poor

Sort: 0

OUTCR.Samples

```
  Sample Number: 87-29-7A
      Lithology: Shale
      Formation: Otuk
      Field age: Permian-Jurassic

 Palynology age: Late Cretaceous(?)

       Evidence: Rare Late Cretaceous dinoflagellates;could be contaminants


    Kerogen type: Mixed amorphous and herbaceous

  Thermal stage (1-7): 4
 Generation potential: Early peak generation for oil

 Sort:   0
```

OUTCR.Samples

Sample Number: 87-29-8A
Lithology: Shale
Formation: Otuk(?) or Ipewik
Field age: Permian-Jurassic or Jur.-Early Cret.

Palynology age: Early Cretaceous (Neocomian)

Evidence: Abundant pollen and marine dinoflagellates

Kerogen type: Woody and herbaceous

Thermal stage (1-7): 4/5
Generation potential: Early peak generation for gas

Sort: 0

OUTCR.Samples

Sample Number: 87-29-9A
Lithology: Shale
Formation: Etivluk,Ipewik or Okpikr.
Field age: Permian-Jurassic or Jur.-Early Cret.

Palynology age: Early Cretaceous

Evidence: Few marine dinoflagellates

Kerogen type: Woody-herbaceous,sparse

Thermal stage (1-7): 4/5
Generation potential: Probably none

Sort: 0

OUTCR.Samples

Sample Number: 87-29-9C
Lithology: Shale
Formation: Etivluk,Ipewik or Okpikr.
Field age: Permian-Jur. or Jurassic-Early Cret.

Palynology age: Early Cretaceous

Evidence: Abundant marine dinoflagellates

Kerogen type: Woody with amorphous sporonite

Thermal stage (1-7): 4/5
Generation potential: Possibly early peak generation for oil
Sort: 0

VALERIE KRASS OUTCROPS-WESTERN BROOKS RANGE 1987 FIELD PARTY

CF880007

ENCL. 10
NO-09-89R
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*Sample No.	Formation	Field age	Palynology age	Kerogen type	TAI	Generation potential scale
87-22-2	Etivluk	Permian-Jurassic	Early Jurassic	Amorphous	4	Early peak generation for oil
87-22-3	Ipewik(?) or Etivluk	Jurassic-Early Cret. or Permo-Trias	Early Cretaceous	Amorphous (sporonite)	5	Peak generation for oil
87-22-4A	Ipewik(?)	Jurassic-Early Cretaceous	Early Cretaceous	Woody,humic;amorphous micrite	5	Early peak generation for oil and gas
87-23-01	Okpikruak(?)	Early Cretaceous	Early Cretaceous	Woody plus some amorphous micrite	4/5	Early peak generation for oil and gas
87-23-02	Okpikruak	Early Cretaceous	Early Cretaceous	Woody with amorphous micrite	5	Early peak generation for oil and gas
87-23-03	Siksikpuk	Permo-Triassic	Early Cretaceous,possibly	Woody with amorphous micrite	5	Early peak generation for oil and gas
87-23-04	Etivluk	Permian-Jurassic	Indeterminate	Woody,bituminous	4/5	Possible early generation for gas
87-23-05	Kuna	Mississippian-Pennsylvanian	Indeterminate	Woody opaque;amorphous micrite	5	Early peak generation for gas
87-23-07	Siksikpuk(?)	Permo-Triassic	Indeterminate	Woody opaque,sparse	6?	Unknown
87-23-08	Etivluk	Permian-Jurassic	Early Jurassic,possible	Woody opaque,minor gray amorphous	5?	Unknown
87-23-09	Kuna(?)or Okpikruak	Miss.Penn or Early Cretaceous	Indeterminate	Woody with amorphous micrite	5	Possible early peak generation for gas
87-23-09B	Kuna(?)or Okpikruak	Miss.Penn or Early Cretaceous	Indeterminate	Woody with amorphous micrite	5	Possible early peak generation for gas
87-23-11	Siksikpuk	Permo-Triassic	Indeterminate	Woody opaque,sparse,minor gray amorphous	6	Probably none
87-23-13	Otuk(?) or Ipewik	Triassic or Jur.-Early Cretaceous	Late Triassic	Woody opaque,sparse;minor gray amorphous	5	Probably none
87-23-14	Okpikruak(?)	Early Cretaceous	Late Triassic/Early Jurassic	Woody opaque,minor amorphous	5	Possibly early peak for gas
87-24-1A	Ipewik	Late Jurassic-Early Cretaceous	Jurassic(Bathonian/Callovian)	Woody,herbaceous,sporonitic	4/5	Early peak generation for oil or gas
87-24-1B	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (possibly Callovian)	Sporonite and micritic amorphous	4/5	Early peak generation for oil
87-24-1C	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mixed woody and sporonite	4/5	Possibly early generation gas; poor
87-24-1E	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Woody and sporonitic	4	Early generation gas;possible early peak for oil

Palynology samples run by David Wall, February-March,1988

VALERIE KRASS OUTCROPS-WESTERN BROOKS RANGE 1987 FIELD PARTY

87-24-1F	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian)	Woody and sporonitic	5	Early generation gas;possible early peak for oil
87-24-1G	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Woody and minor gray amorphous	4/5	Poor
87-24-2A	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous	4/5	Early peak generation for oil
87-24-2B	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous	4/5	Early peak generation for oil
87-24-3	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous	4/5	Early peak generation for oil
87-24-3B	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous	4/5	Early peak generation for oil
87-24-4A	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous,wood	5	Early peak generation for oil; possibly early generation gas
87-24-4B	Ipewik	Late Jurassic-Early Cretaceous	Jurassic (Callovian-Oxfordian)	Mainly sporonite,micritic amorphous,wood	5	Early peak generation for oil; possibly early generation gas
87-24-5	Etivluk	Permian-Jurassic	Jurassic (Callovian-Oxfordian)	Woody opaque, humic	5	Early generation for gas
87-24-6	Ipewik(?)	Late Jurassic-Early Cretaceous	Early Cretaceous	Woody and sporonitic	4/5	Early peak generation for oil; early generation for gas
87-24-7	Ipewik(?)	Late Jurassic-Early Cretaceous	Late Triassic	Mixed;woody-herbaceous and amorphous	5	Early peak generation for oil; early generation for gas
87-26-1	Etivluk(?)or Ft.Mtn/Okpk	Permian-Jurassic or Early Cretaceous	Jurassic possible	Woody	5	Early gas generation
87-26-1A	Etivluk(?)	Permian-Jurassic	Indeterminate	Woody-herbaceous,opaque	6	Peak generation for gas
87-26-2	Otuk	Jurassic-Triassic	Indeterminate	Woody,coarse fragments	4/5	Early generation for gas
87-26-2A	Otuk(?)	Jurassic-Triassic	Late Cretaceous (Early Senonian)	Woody,bituminous	2/3	Early generation for gas
87-26-3	Otuk	Jurassic-Triassic	Jurassic,possible	Woody,bituminous	5/6	Peak generation for gas
87-26-3B	Otuk	Jurassic-Triassic	Indeterminate	Woody,bituminous	5/6	Peak generation for gas
87-26-4	Otuk	Jurassic-Triassic	Indeterminate	Woody,bituminous	5/6	Peak generation for gas
87-26-5	Otuk	Jurassic-Triassic	Late Trias-Early Jurassic	Woody-herbaceous,minor amorphous	5	Early peak generation for gas
87-26-6	Etivluk	Permian-Jurassic	Indeterminate	Woody,bituminous	5/6	Early peak generation for gas

Palynology samples run by David Wall February-March 1988

VALERIE KRASS OUTCROPS-WESTERN BROOKS RANGE 1987 FIELD PARTY

87-26-7	Ipewik(?)	Late Jurassic-Early Cretaceous	Indeterminate	Woody,herbaceous	5/6	Early peak generation for gas
87-26-8	Kuna	Mississippian-Pennsylvanian	Indeterminate	Herbaceous,altered amorphous	5	Early peak generation oil or gas
87-27-2	Otuk	Jurassic-Triassic	Indeterminate	Woody,herbaceous,opaque	5/6	Early peak generation for gas
87-27-3A	Kuna or Etivluk	Miss.-Penn. or Permian-Jurassic	Possibly Mississippian	Woody,opaque	5?	Early peak generation for gas; poor
87-27-3C	Kuna or Etivluk	Miss.-Penn. or Permian-Jurassic	Indeterminate	Woody,opaque	5?	Early peak generation for gas; poor
87-27-4	Otuk	Jurassic-Triassic	Indeterminate	Woody,minor herbaceous and amorphous	5	Probably poor,low recovery
87-27-5	Siksikpuk	Permo-Triassic	Late Triassic	Woody,sparse	5	Early peak generation for gas
87-27-6	Etivluk	Permian-Jurassic	Indeterminate	Herbaceous,minor amorphous	4/5	Early peak generation for gas
87-27-7	Otuk	Jurassic-Triassic	Indeterminate	Mixed,amorphous and woody	5/6	Possible peak generation for oil and early peak gas
87-27-8	Fortress Mountain	Early Cretaceous	Indeterminate	Woody,possible altered amorphous	6	Peak generation for gas
87-28-6	Otuk	Jurassic-Triassic	Indeterminate	Woody,altered amorphous (?)	5/6	Peak generation for gas
87-28-7A	Kuna(?)	Mississippian-Pennsylvanian	Indeterminate	Altered amorphous and herbaceous?	6	Possible peak gas generation
87-28-8B	Ipewik	Late Jurassic-Early Cretaceous	Early Cretaceous	Woody and amorphous sporonite	5	Peak generation for oil
87-29-1B	Etivluk	Permian-Jurassic	Indeterminate	Woody and amorphous;possible algal material	4	Possible early peak generation for oil
87-29-2A	Otuk(?)	Jurassic-Triassic	Indeterminate	Woody and amorphous	5	Possible early peak generation for oil
87-29-2B	Otuk(?)	Jurassic-Triassic	Indeterminate	Some amorphous plus outcrop contamination	3/4?	Unknown
87-29-3A	Etivluk	Permian-Jurassic	Late Triassic	Mainly amorphous	4	Early peak generation for oil
87-29-4A	Okpikruak(?)	Early Cretaceous	Early Cretaceous; Aptian/Albian (?)	Woody-herbaceous	4/5	Early peak generation for gas
87-29-5A	Etivluk	Permian-Jurassic	Late Triassic-Early Jurassic	Amorphous	4	Early peak generation for oil
87-29-6A	Otuk	Permian-Jurassic	Possibly Early Jurassic	Woody and amorphous;sparse	4	Probably poor

Palynology samples run by David Wall, February-March,1988

VALERIE KRASS OUTCROPS-WESTERN BROOKS RANGE 1987 FIELD PARTY

87-29-7A	Otuk	Permian-Jurassic	Late Cretaceous(?)	Mixed amorphous and herbaceous	4	Early peak generation for oil
87-29-8A	Otuk(?) or Ipewik	Permian-Jurassic or Jur.-Early Cret.	Early Cretaceous (Neocomian)	Woody and herbaceous	4/5	Early peak generation for gas
87-29-9A	Etivluk,Ipewik or Opikr.	Permian-Jurassic or Jur.-Early Cret.	Early Cretaceous	Woody-herbaceous,sparse	4/5	Probably none
87-29-9C	Etivluk,Ipewik or Opikr.	Permian-Jur. or Jurassic-Early Cret.	Early Cretaceous	Woody with amorphous sporonite	4/5	Possibly early peak generation for oil

Palynology samples run by David Wall, February-March,1988

ENCL. 11
NO-09-89R
KRASS

Amoco Production Company
Denver, Colorado

May 13, 1988

D. T. Bauer
1256 AB

Attn: Valerie A. Krass

Re: Western Brooks Range, Alaska
1987 Outcrop Samples -
Reprocessed Sample Results

Eleven (11) samples were reprocessed for palynology in an attempt to recover more and less opaque specimens following difficulties with the original batch. Six of them have been upgraded as a result, but the remaining five were still barren. The details are provided on the attached sheet.

David Wall

DW/mmm

Palynology Report

1. Samples 87-23-9, 87-23-9B, 87-27-3A, 87-27-3C

These four samples were still almost barren but rare scolecodonts (marine microscopic worm jaws) were recovered. These are not necessarily age-diagnostic but in my experience with Alaska rocks, they have been previously found in Mississippian marine shales. These samples were identified in the field as either Kuna Formation (Mississippian-Pennsylvanian) or Opikruak (Neocomian) and of these two alternatives, I would suggest the Kuna is more likely.

2. Sample 87-23-14

The reprocessed sample contained spores, pollen and rare dinoflagellates which indicate a Late Triassic and probably Norian age. This is essentially what the original determination was (Late Triassic/Early Jurassic).

3. Sample 87-27-5

The reprocessed sample contained a few marine dinoflagellates which either were missing from or poorly preserved in the original. In particular, the species Herendeenia alaskaensis was found and it gives a Neocomian age. The original age was estimated to be Late Triassic (based on rare occurrences of one acritarch and several spores) and now is considered erroneous.

4. Samples 87-26-3, 87-26-6, 87-26-7, 87-28-6, 87-28-7A

Reprocessing of these five samples did not produce any improvement in recoveries and their ages remain "indeterminate". Sample 87-26-3 was originally listed as "possible Jurassic" but it is now believed there are no indigenous Jurassic palynomorphs present and it should be considered as "age indeterminate".

David Wall
May 13, 1988

DW/mmm