ROCK-EVAL PYROLYSIS, VITRINITE REFLECTANCE, AND KEROGEN MICROSCOPY ANALYTICAL RESULTS FROM EOCENE TO PLIOCENE STRATA IN THE SUSITNA BASIN, KENAI PENINSULA, AND KACHEMAK BAY, COOK INLET, ALASKA

Kamil A. Qureshi, Baseline Resolution Inc., and Weatherford Laboratories

Raw Data File 2025-31

View to the north of exposures of the Middle Miocene Capps Coal of the Tyonek Formation in Capps Creek, northwestern Cook Inlet.

This report has not been reviewed for technical content or for conformity to the editorial standards of DGGS

2025
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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Suggested citation:
Qureshi, K.A., Baseline Resolution Inc., and Weatherford Laboratories, 2025, Rock-Eval pyrolysis, vitrinite reflectance, and kerogen microscopy analytical results from Eocene to Pliocene strata in the Susitna Basin, Kenai Peninsula, and Kachemak Bay, Cook Inlet, Alaska: Alaska Division of Geological & Geophysical Surveys Raw Data File 2025-31, 60 p. https://doi.org/10.14509/31800

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INTRODUCTION

During the summers of 2006, 2007, and 2009, geologists from the Energy Resources Section of the Alaska Division of Geological & Geophysical Surveys (DGGS) conducted fieldwork to evaluate the geology and hydrocarbon potential of the Cook Inlet region. The study area encompasses the Susitna Basin, the Kenai Peninsula, and Kachemak Bay (fig. 1). This data release presents results of Rock-Eval pyrolysis, vitrinite reflectance, and kerogen microscopy (visual kerogen) analyses. Of the 51 outcrop samples collected, 8 underwent Rock-Eval pyrolysis, and vitrinite reflectance and kerogen microscopy were performed on the entire sample set. The samples are distributed across five formations: 6 from the West Foreland Formation, six from the Hemlock Conglomerate, 18 from the Tyonek Formation, 15 from the Beluga Formation, and six from the Sterling Formation. Rock-Eval pyrolysis is widely applied to evaluate the hydrocarbon-generative potential and thermal maturity of sedimentary rocks (Peters, 1986). Vitrinite reflectance, which measures the increase in vitrinite brightness due to progressive thermal alteration, serves as a reliable geothermometer for assessing source rock maturity in petroliferous basins (Hackley, 2022). The digital data associated with this report are available as tabular (.csv) files at https://doi.org/10.14509/31800.

DATA PRODUCTS

- Rock-Eval analytical results
- Vitrinite reflectance analytical results
- Visual kerogen analytical results

METHODS

Sample Collection

DGGS field geologists collected samples from surface outcrops for Rock-Eval pyrolysis, vitrinite reflectance, and kerogen microscopy analyses. Sample location coordinates were obtained using recreational-grade GPS units, with a typical reported accuracy of about 10 meters. Coordinates were collected using the NAD27 datum. Coordinate conversion was performed from NAD27 to NAD83 using ArcGIS Pro. Each sample number corresponds to the measured section number and the sample position (meters above base of section) within each measured section. Coordinates refer to the base of the measured section.

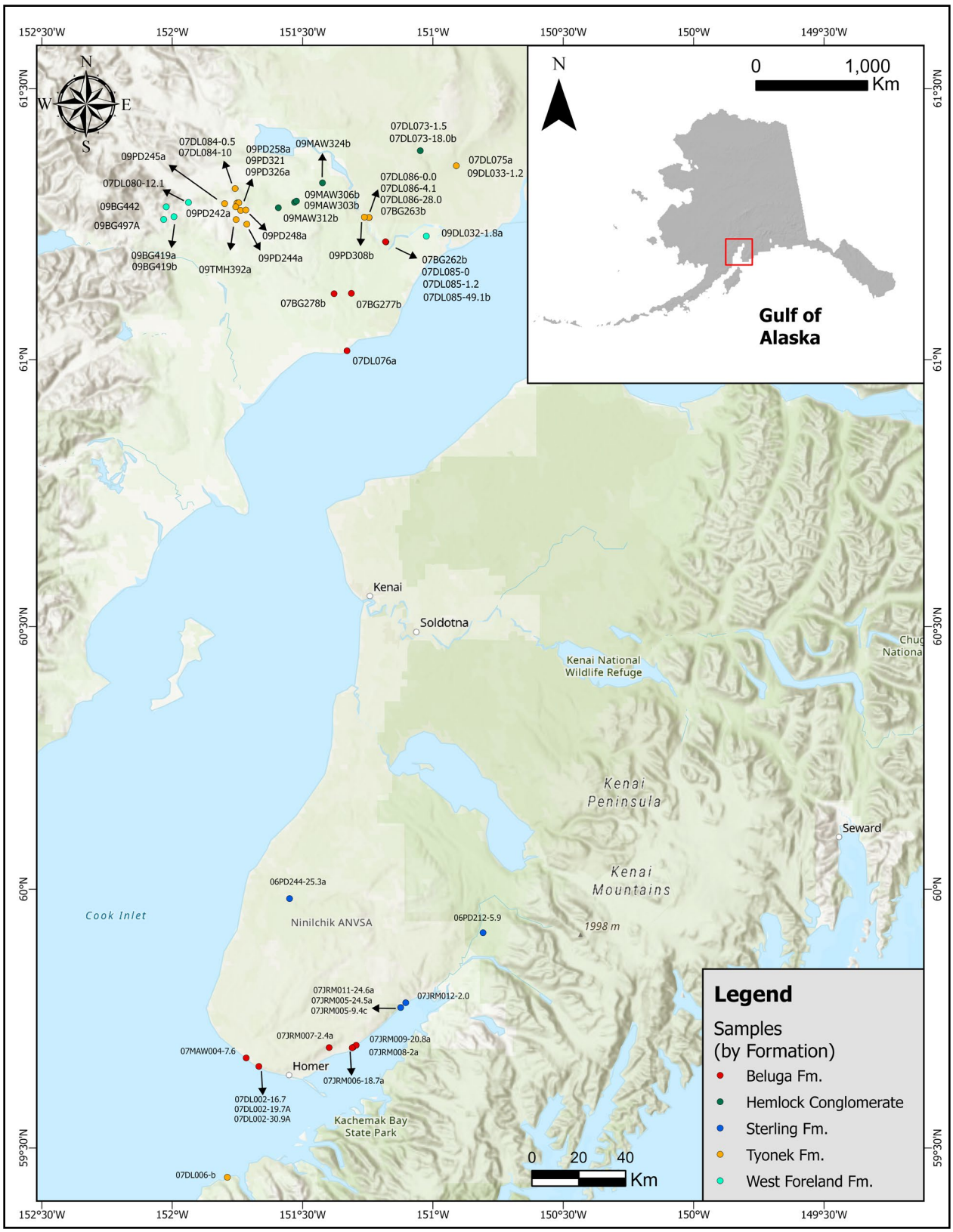

Figure 1. Map showing outcrop locations where analytical samples were collected.

Sample Analysis

Eight outcrop samples were sent to Weatherford Laboratories in Houston, Texas, for Rock-Eval pyrolysis analysis. The samples analyzed include coal, carbonaceous mudstone, and siltstone. For Rock-Eval pyrolysis, powdered samples are heated in an inert atmosphere to generate three groups of compounds—S_1, S_2, and S_3—on a pyrogram. The S_1 peak (at 300 °C) represents free hydrocarbons, while S_2 and S_3 (measured during heating from 300 °C to 600 °C) correspond to hydrocarbons and CO_2 released from kerogen decomposition, respectively. The S_2 peak reflects the hydrogen content (hydrocarbon potential), and S_3 indicates oxygen content. The Tmax value, defined as the temperature at which S_2 generation is maximized, serves as a measure of thermal maturity, with an accuracy of ±1–3 °C, depending on the analytical conditions. Tmax values from samples with $S_2 < 0.2$ mg HC/g rock are considered unreliable unless a distinct kerogen peak is observed (Peters, 1986; Peters and Casa, 1994).

Thirty-two outcrop samples were sent to Baseline Resolution, Inc. in Shenandoah, Texas and 19 to Weatherford Laboratories in Houston, Texas. The labs employed standardized methods for vitrinite reflectance analysis of coal and dispersed vitrinite in sedimentary rocks, following ASTM protocols D2798-11a and D7708-14 (2015). Analysts crushed coals, shales, and siltstones to approximately 0.1 mm and pressed them into pellets for microscopic examination (Barker and Pawlewicz, 1986b). The top surface of each pellet was polished and coated with immersion oil before being placed under a petrographic reflectance microscope (Baskin, 1979; Pawlewicz, 1987). Reflectance measurements were initially taken using a glass standard of known reflectance to establish a reference point. After calibration, analysts measured reflectance from vitrinite particles within the sample. The intensity of reflected light was recorded by a photomultiplier tube, which converted the signal into a numerical value expressed as a percentage. Vitrinite reflectance values typically ranged from approximately 0.25% (immature) to 5–6% (very mature).

Vitrinite reflectance samples were also evaluated using kerogen microscopy, also known as visual kerogen analysis. This technique complements chemical methods by providing detailed observations of the individual organic particles (macerals) that comprise sedimentary organic matter. Visual kerogen analysis is performed using a Zeiss universal microscope system equipped with halogen, xenon, and tungsten light sources. The tungsten source is used to determine the thermal alteration index (TAI) by analyzing the color of organic matter. Lighter colored organic matter indicates low maturity, while darker tones reflect higher thermal maturity (Hackley, 2022).

Analytical Results

Rock-Eval results indicate exceptionally rich source rocks with Leco Total Organic Carbon (TOC) values ranging from 32 to 57 wt% and S_2 values between 58 and 166 mg HC/g rock, classifying all samples as excellent potential source rocks. Tmax values (365–424 °C) indicate that most samples are thermally immature, implying that hydrocarbon generation has not yet occurred, but the organic matter has strong generative potential. Elevated S_1 values in some samples (up to 6.9 mg/g) may reflect minor migrated hydrocarbons or the onset of early oil generation.

Relative to standard thermal maturity stages for vitrinite reflectance (table 1), the mean vitrinite reflectance values of the analyzed samples indicate very low thermal maturity (less than 0.6%) except one sample (sample number 07DL006B). Visual kerogen analysis reveals that all samples contain very high percentages of vitrinite macerals (woody plant material of terrestrial origin) and are predominantly gas-prone, except for four samples that contain high proportions of liptinite macerals and are oil-prone.

Table 1. Thermal maturity stages for vitrinite reflectance

Stage	Reflectance Range (%)
Immature	0.2 – 0.6
Oil window maturity	0.6 – 1.1
Condensate or wet-gas window	1.1 – 1.4

Appendix A (figures A1–A8) presents the Rock-Eval pyrolysis results for individual samples, while figures A9–A12 illustrate the summary plots depicting kerogen quality, type, thermal maturity, and hydrocarbon conversion trends. Appendix B provides the original lab sheets, including the vitrinite reflectance and visual kerogen results for each analyzed sample.

ACKNOWLEDGMENTS

Capital Improvement Projects funded the DGGS Cook Inlet Basin Analysis Program from the State of Alaska. Benchmark Oil and Gas, Pioneer Natural Resources Alaska, Inc., and Chevron North America Exploration and Production Company generously provided additional support. We gratefully thank the Cook Inlet Region Incorporation (CIRI), Tyonek Native Corporation, and the Kenai National Wildlife Refuge for permitting land access. We thank the field geologists who collected most of the samples used in this study, Simone Montayne for her assistance with data compilation, and Erin Campbell for her review.

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APPENDIX A: ROCK-EVAL ANALYSIS (PYROGRAMS) FOR INDIVIDUAL SAMPLES

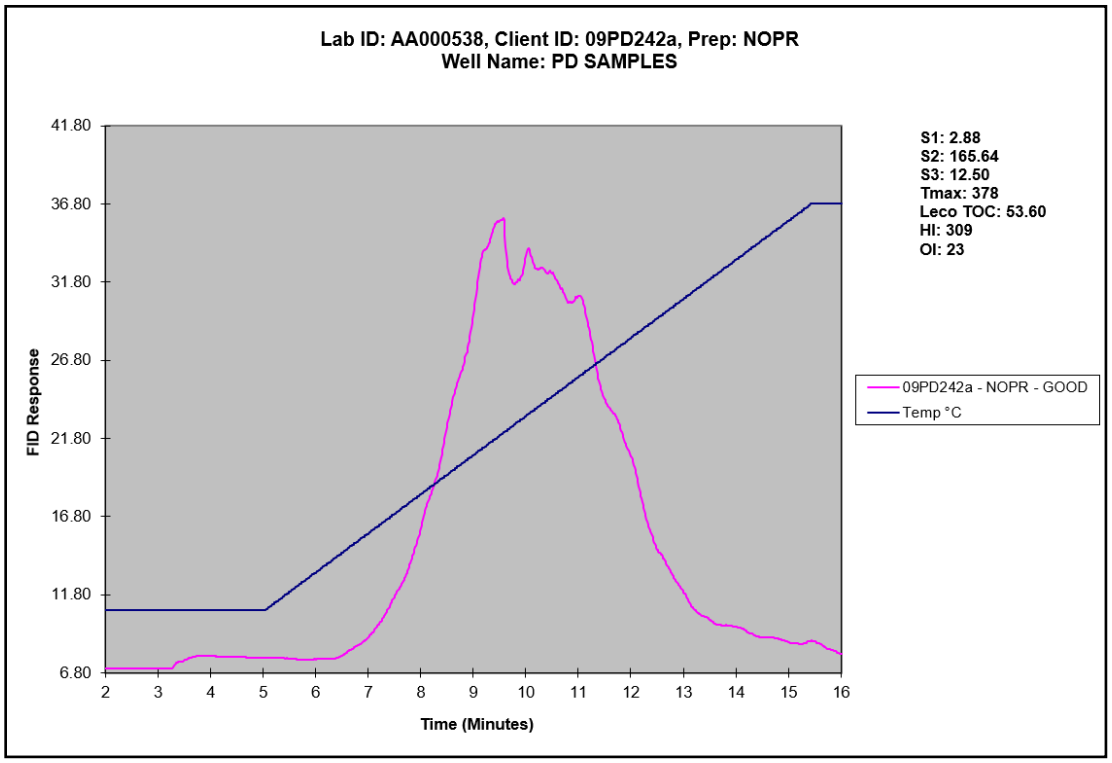

Figure A1: Sample 09PD242A pyrogram.

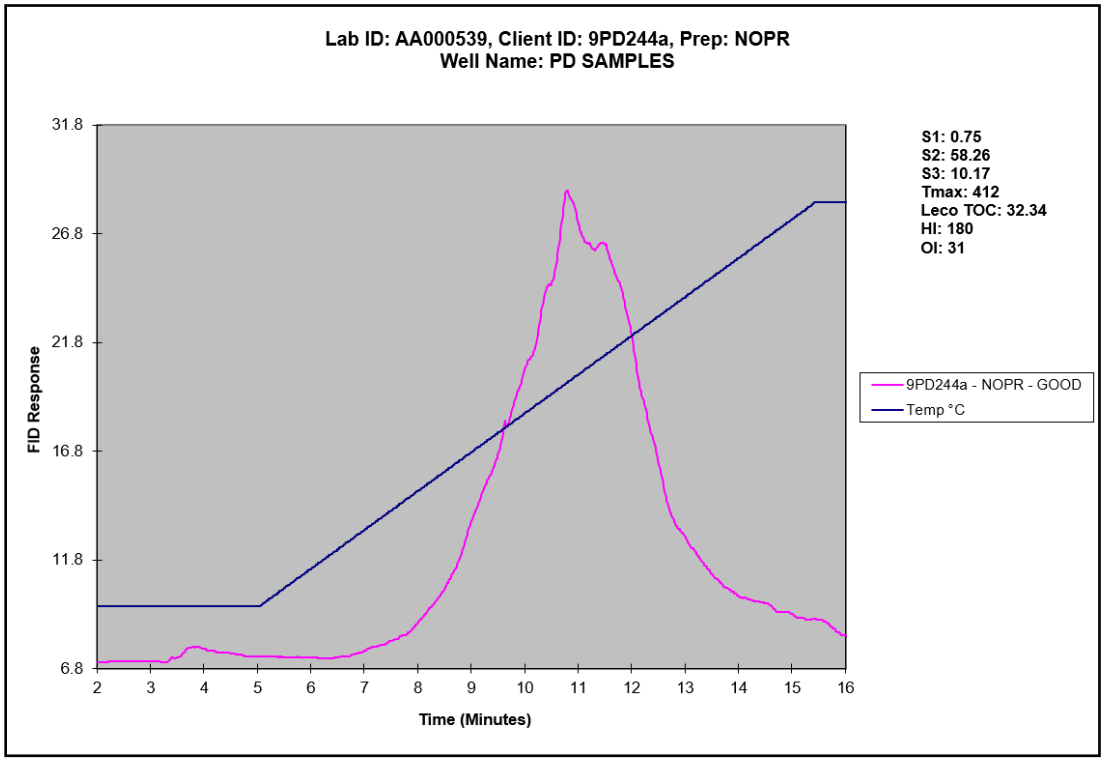

Figure A2: Sample 09PD244A pyrogram.

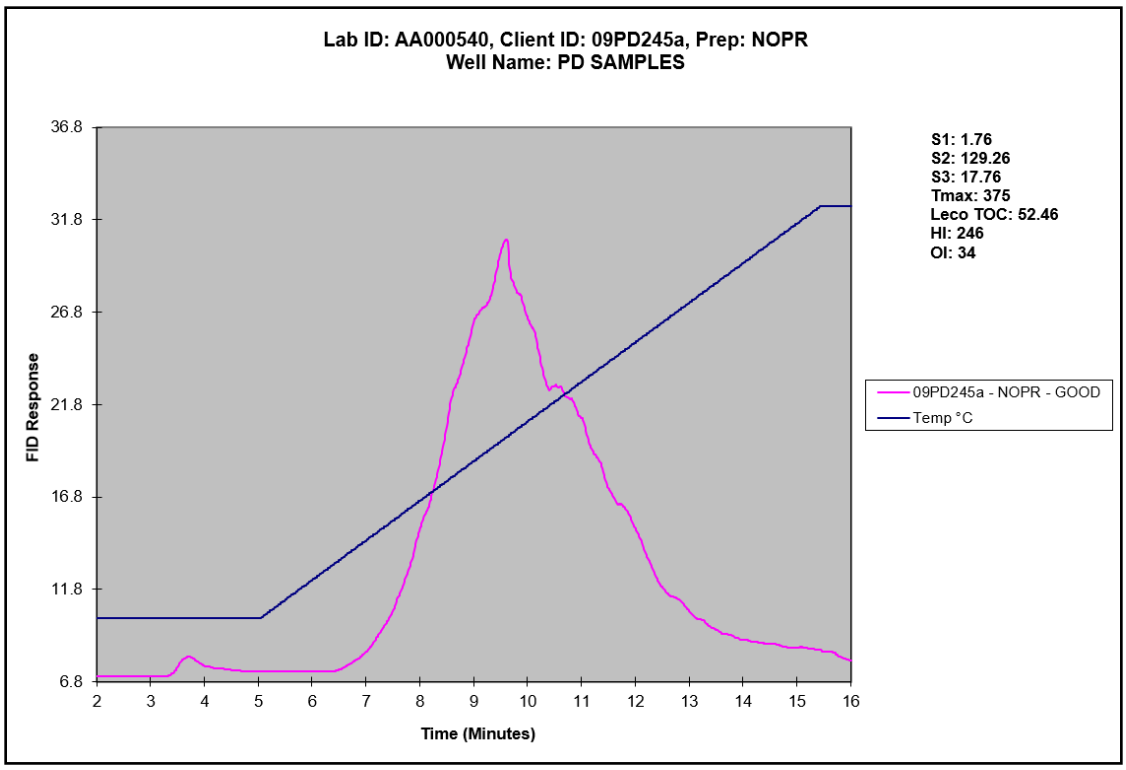

Figure A3. Sample 09PD245A pyrogram.

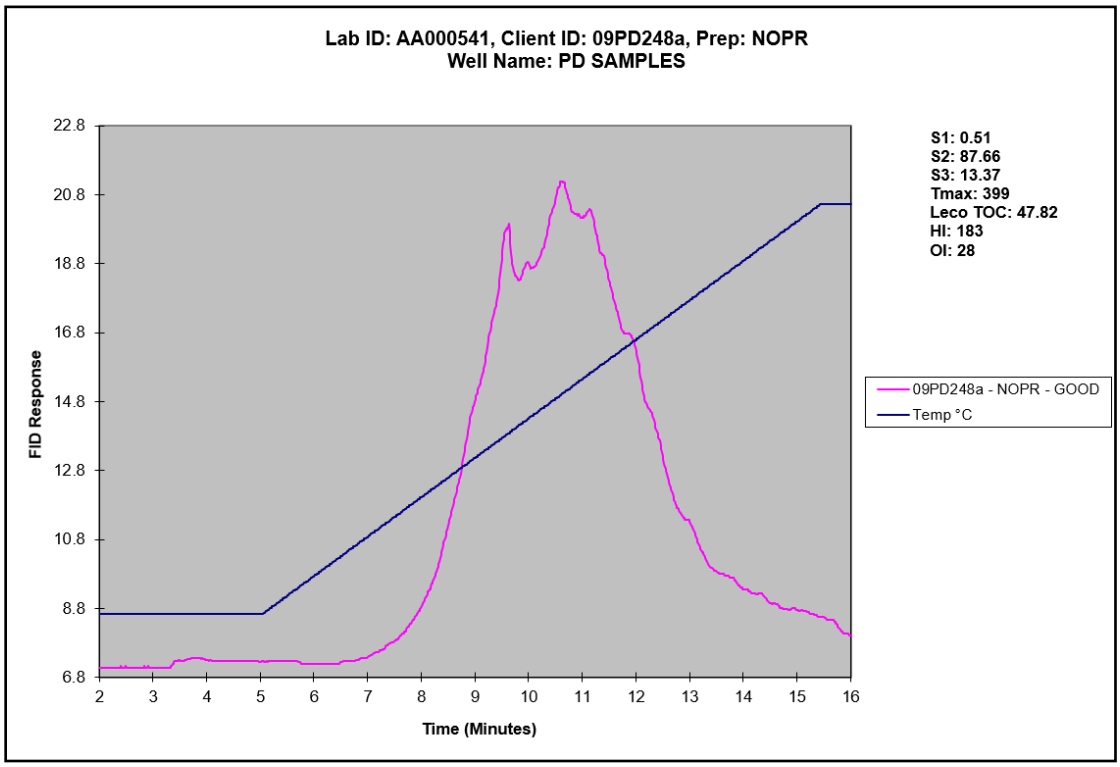

Figure A4. Sample 09PD248A pyrogram.

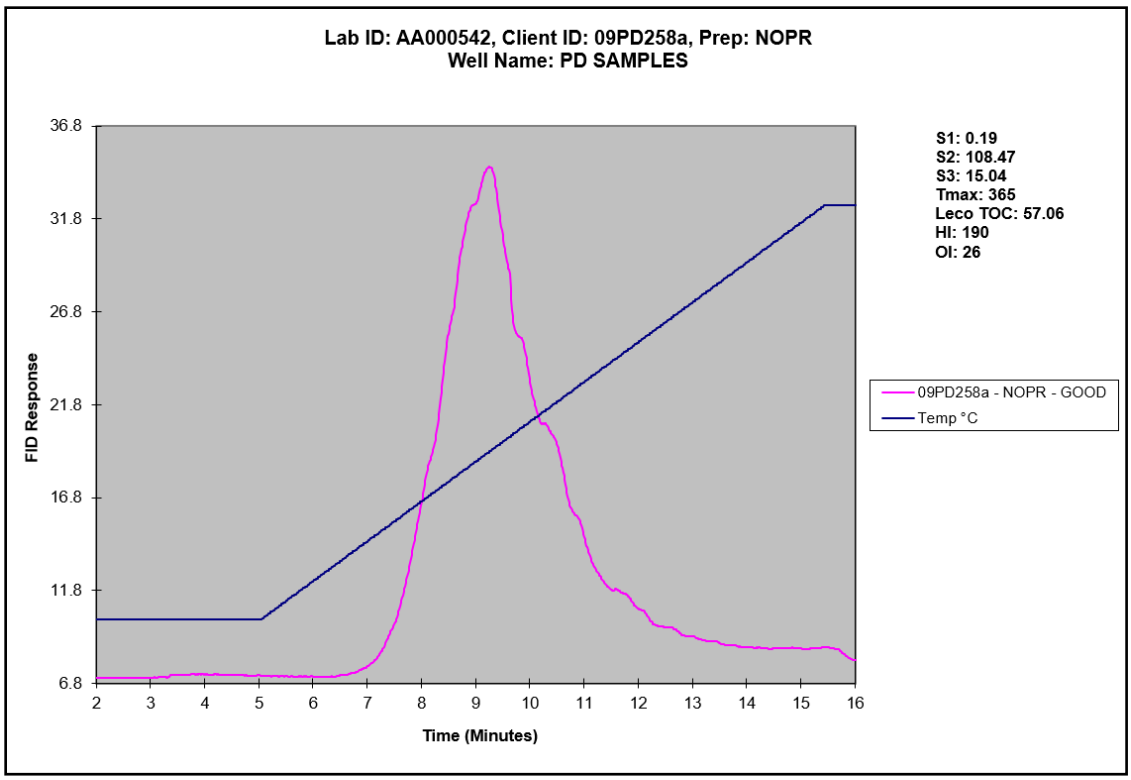

Figure A5. Sample 09PD258A pyrogram.

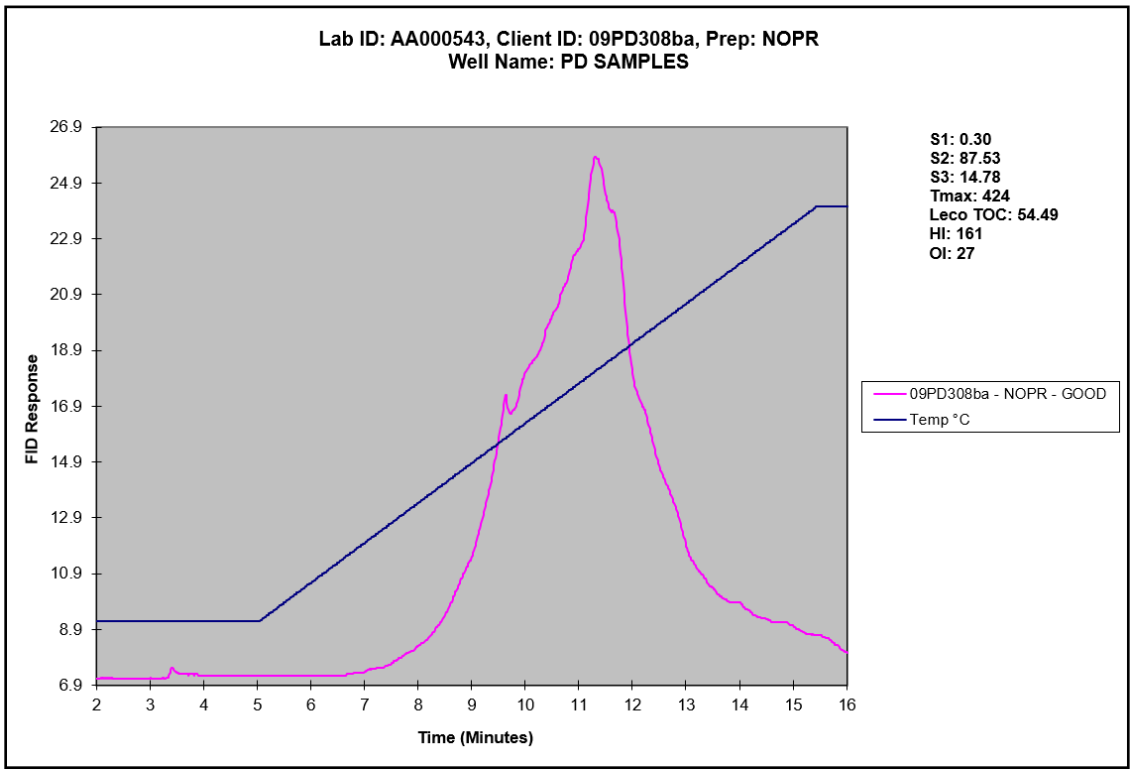

Figure A6. Sample 09PD308B pyrogram.

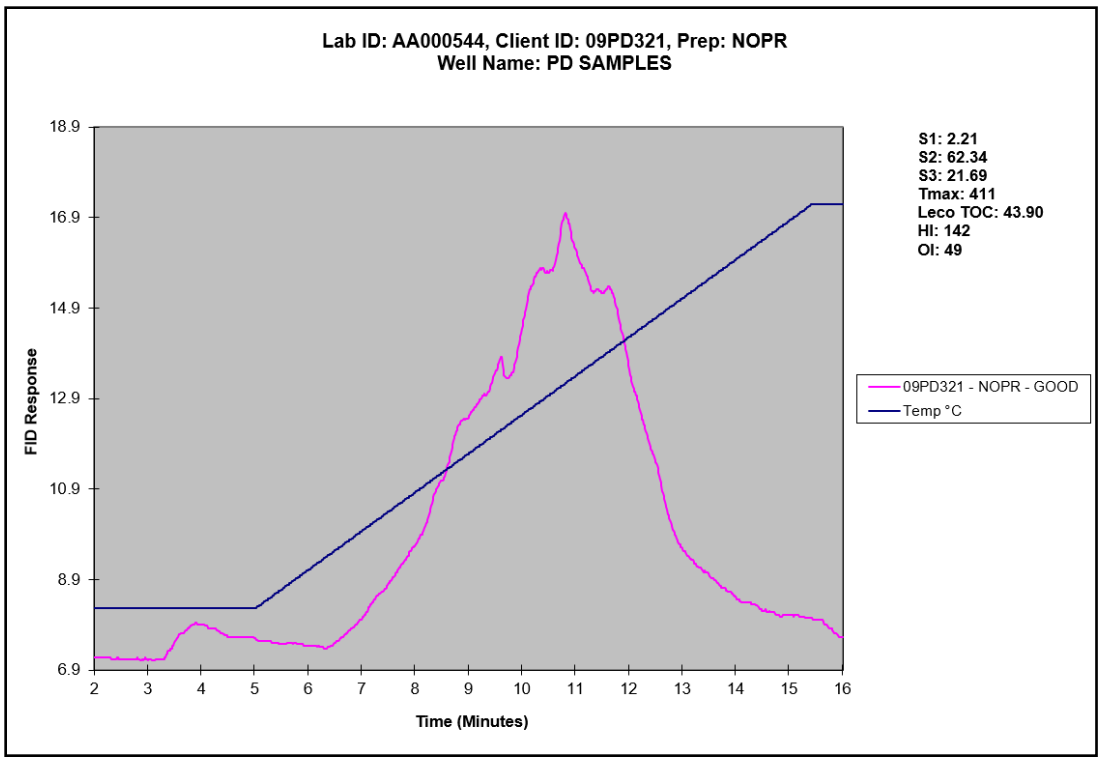

Figure A7. Sample 09PD321 pyrogram.

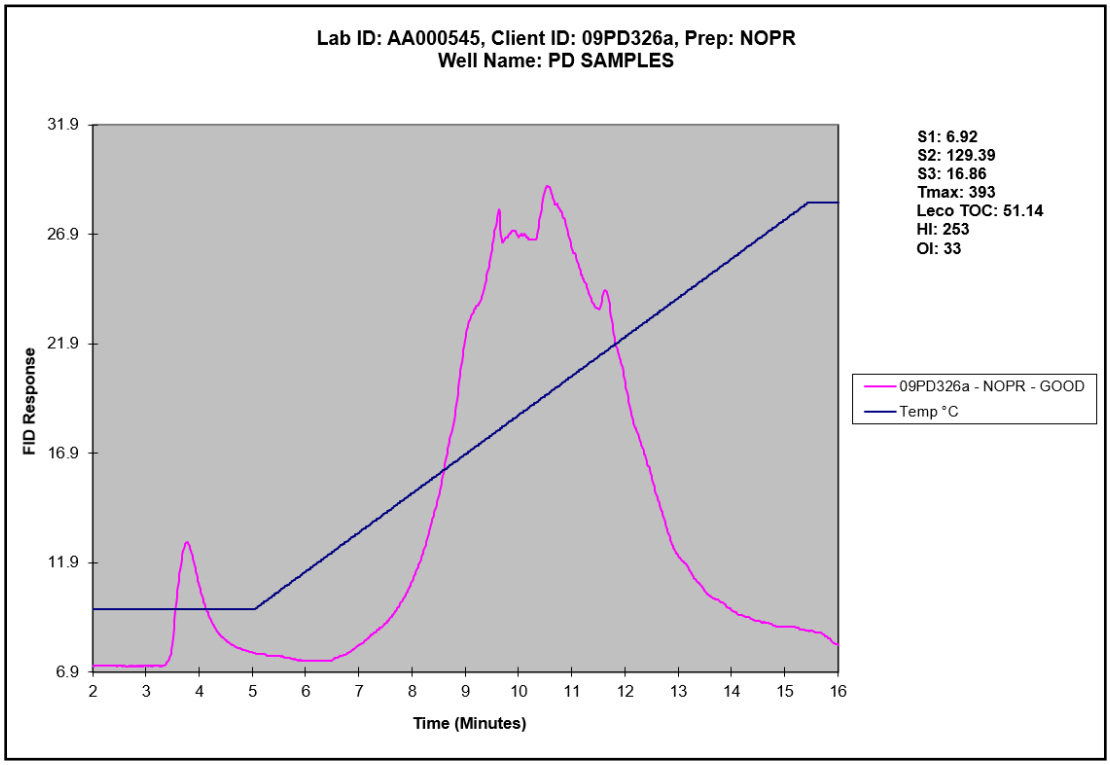

Figure A8. Sample 09PD326A pyrogram.

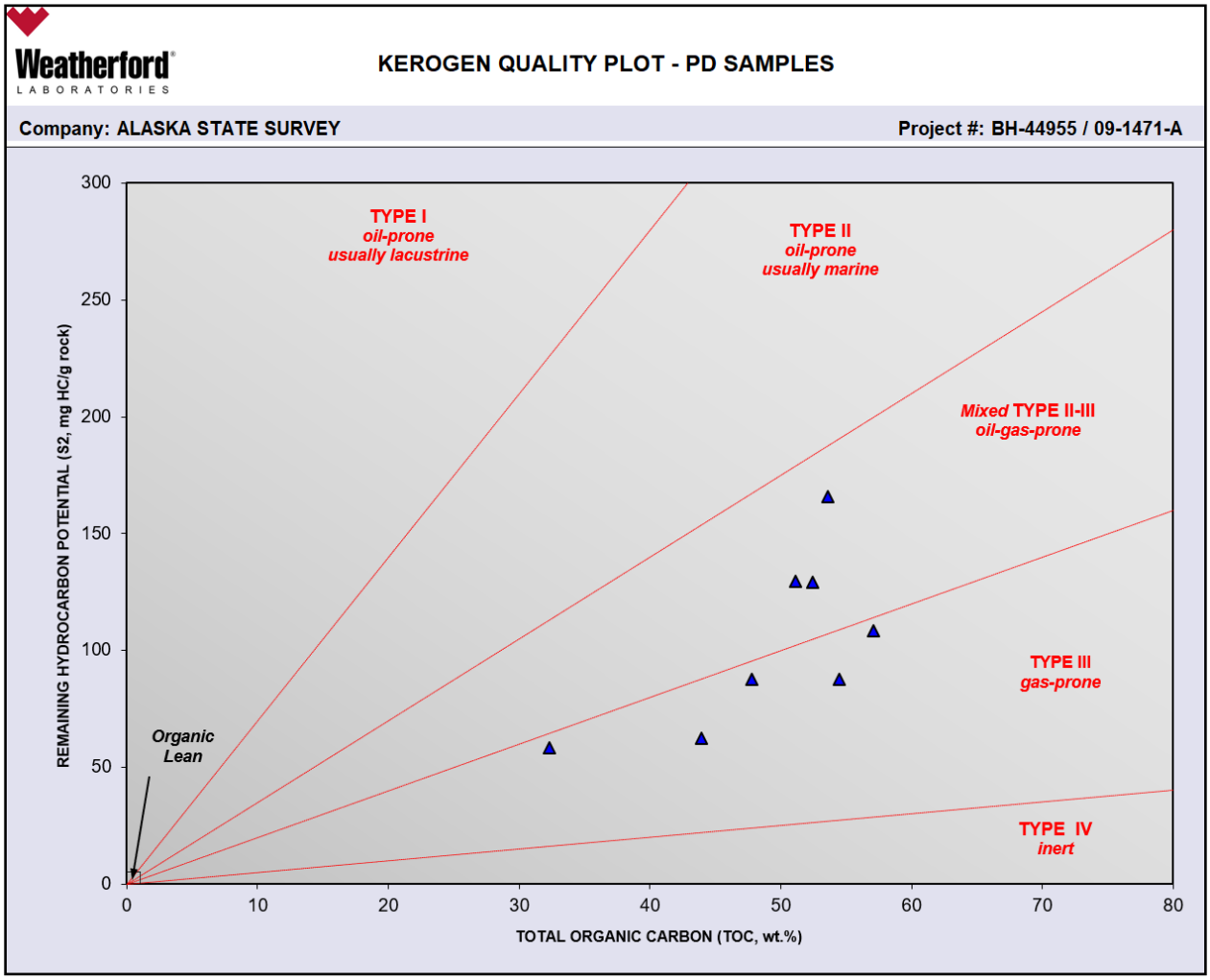

Figure A9. Kerogen quality plot of the eight samples analyzed by Weatherford Laboratories. Plotted data show mixed type II-III oil-gas-prone and type III gas-prone.

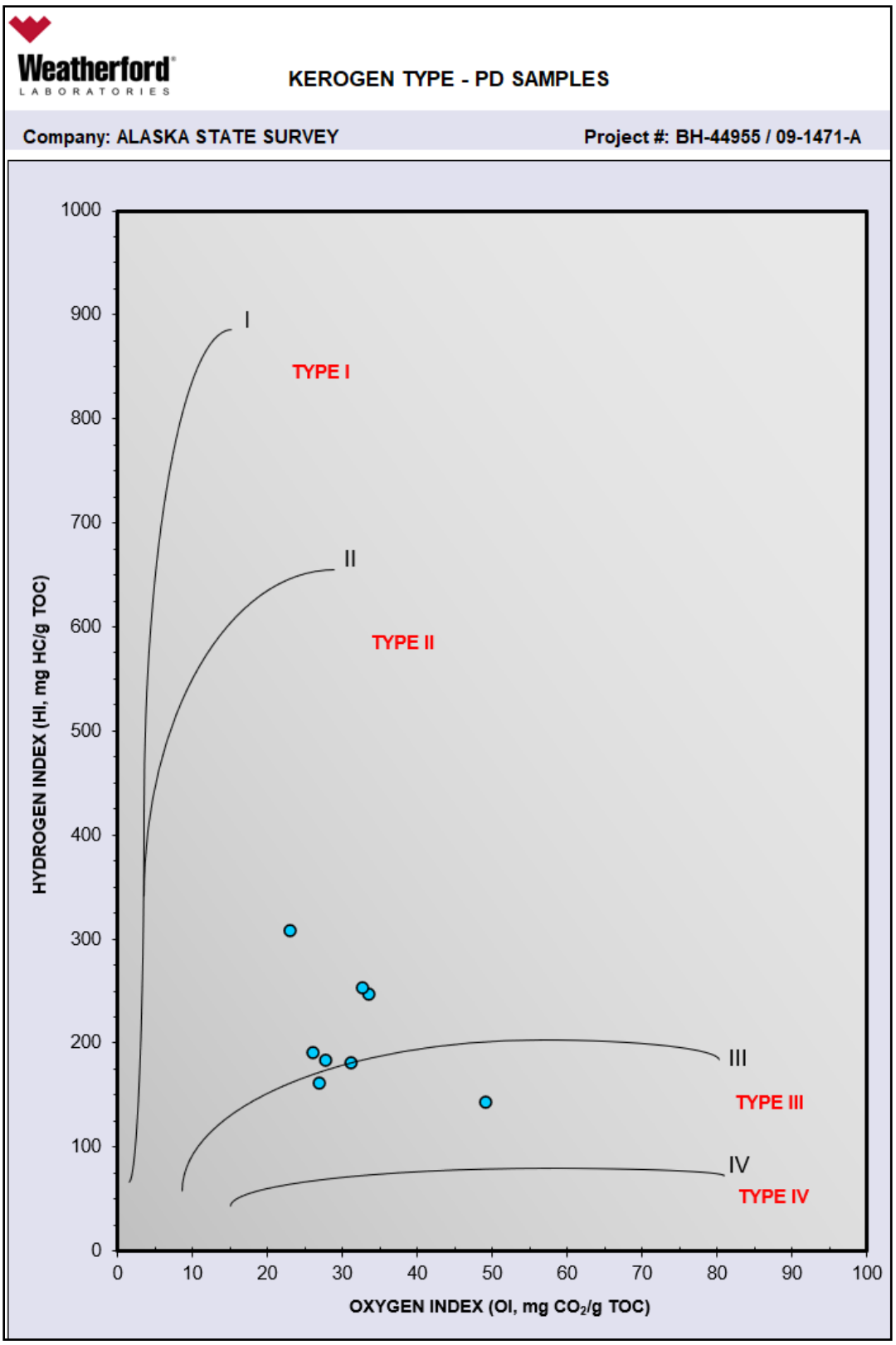

Figure A10. Kerogen type determination from Rock-Eval pyrolysis data. Types I and II will generate oil, type III gas, and type IV will generate little or no hydrocarbons. The analyzed data show the presence of kerogen types II and III.

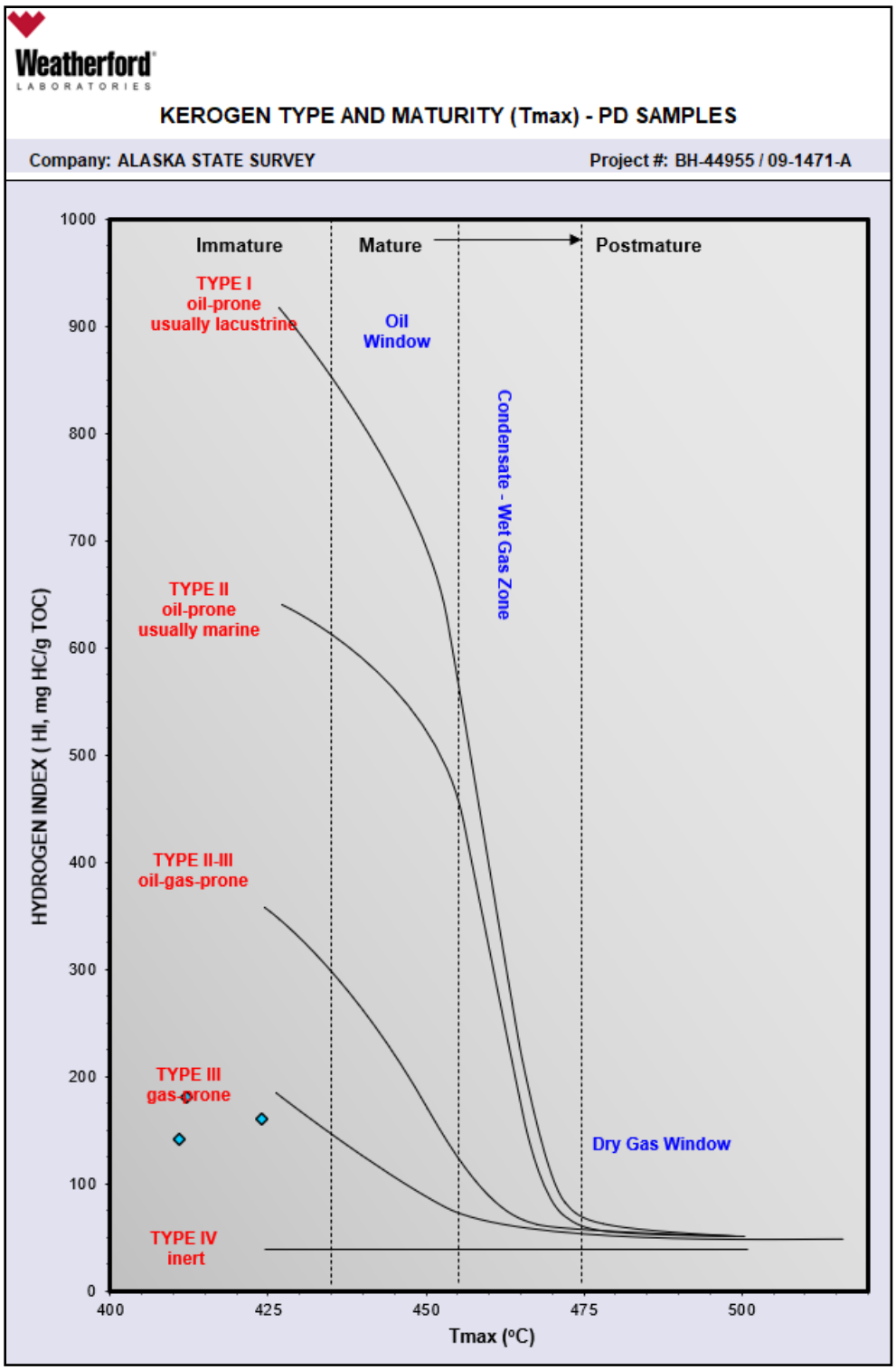

Figure A11. Kerogen type and maturity determination from Rock-Eval pyrolysis data. The data analyzed show immature kerogen type III.

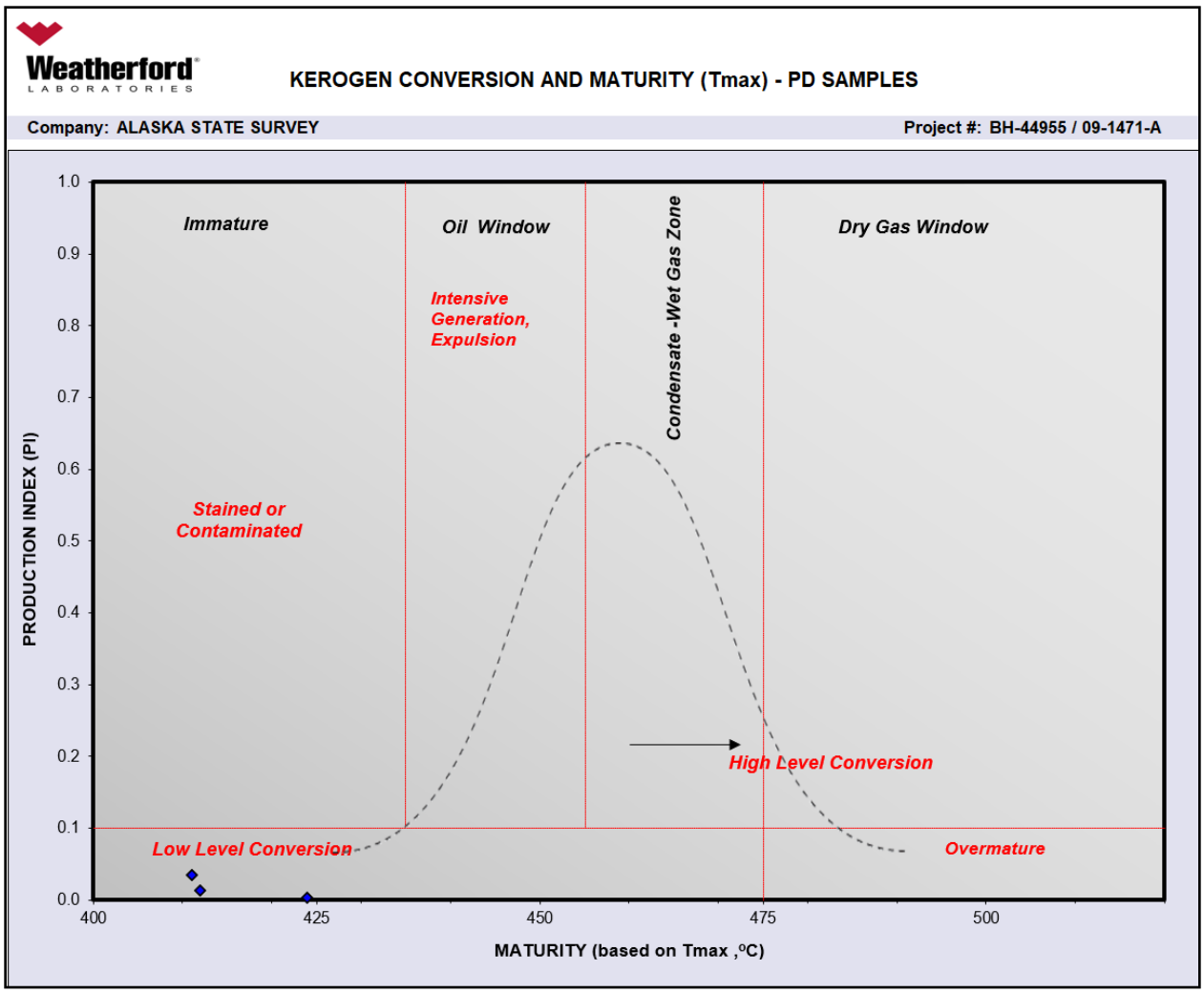

Figure A12. Kerogen conversion and maturity data suggest low-level conversion and immature kerogen.

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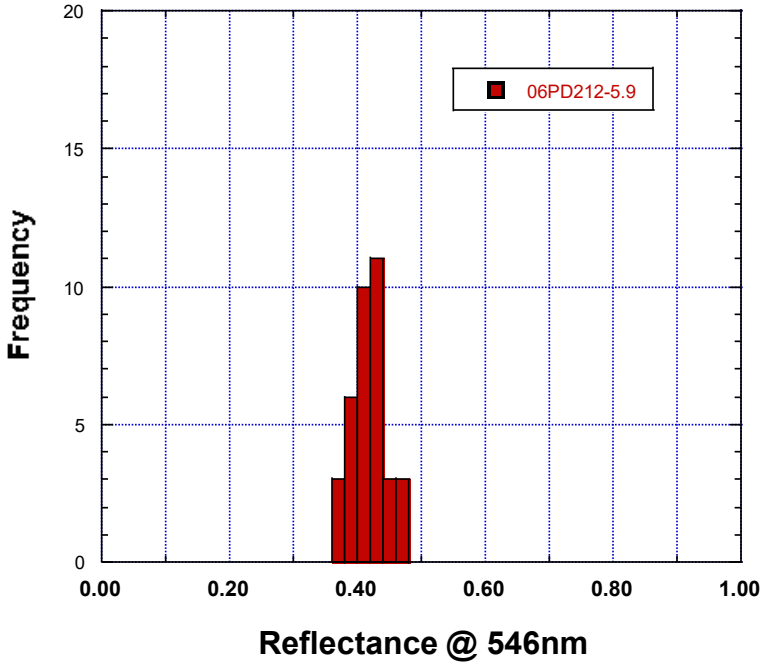
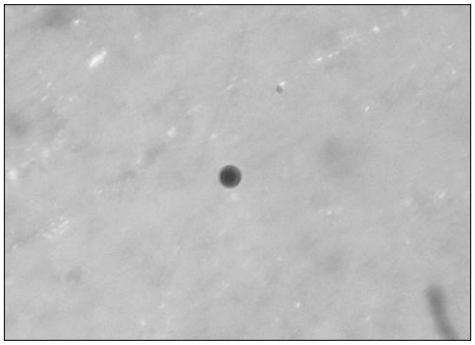
Vitrinite Reflectance and MOA



06PD212-5.9	Outcrop coal
Minimum	0.37
Maximum	0.47
Points	36
Std Deviation	0.03
Mean	**0.41**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.41%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.41%.

Ordered Ro Values (Std. = 0.906% Ro.)

0.37	0.37	0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.40	0.40
0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42
0.42	0.42	0.42	0.43	0.43	0.43	0.44	0.44	0.45	0.46	0.46	0.47

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
06PD212-5.9	AA000462	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

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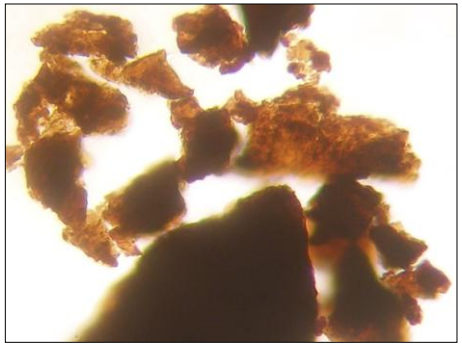
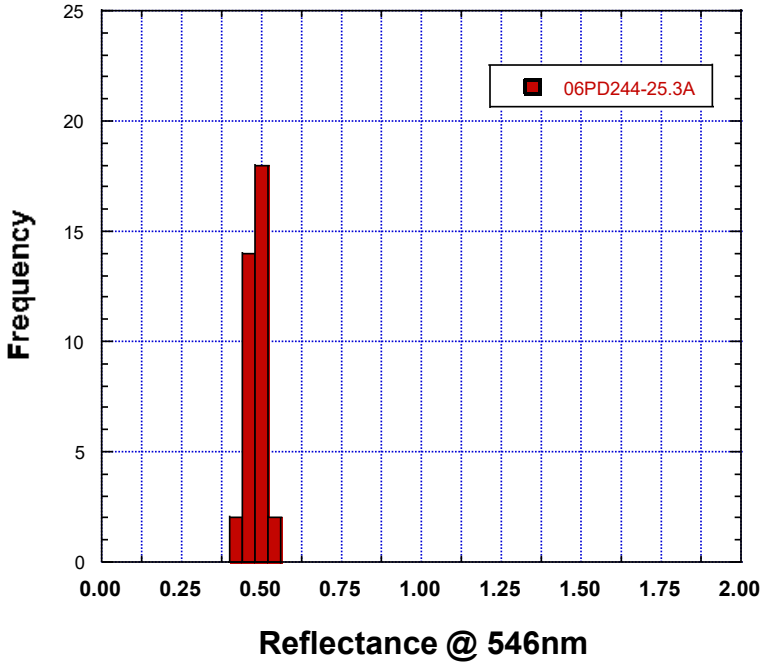
Project 07-1064-A

Vitrinite Reflectance and MOA



Alaska State Survey O/Cs



06PD244-25.3A	Out Crop
Minimum	0.41
Maximum	0.54
Points	36
Std Deviation	0.03
Mean	**0.48**

Comments: Organic matter in this sample consists predominantly of abundant amounts of low mature, humic fragments associated with almost no amorphous matter. Vitrinite particles large enough to measure are common and based on 36 values of the better preserved, lower reflecting vitrinite, the average Ro is 0.48%. Photomicrograph shows the colloidal nature of the immature vitrinite. Plant spores are absent, but the light orange color of the vitrinite suggests a TAI value of about 2.5 (Chevron Scale), which is consistent with the measured Ro of 0.48%.

Ordered Ro Values (Std. = 0.906% Ro.)

0.41	0.42	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.47	0.47	0.48	0.49	0.49	0.49	0.49	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.51	0.52	0.54

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
06PD244-25.3A	AA000527	Out Crop		5	90	5	good	5	90	2.5	no plant spores

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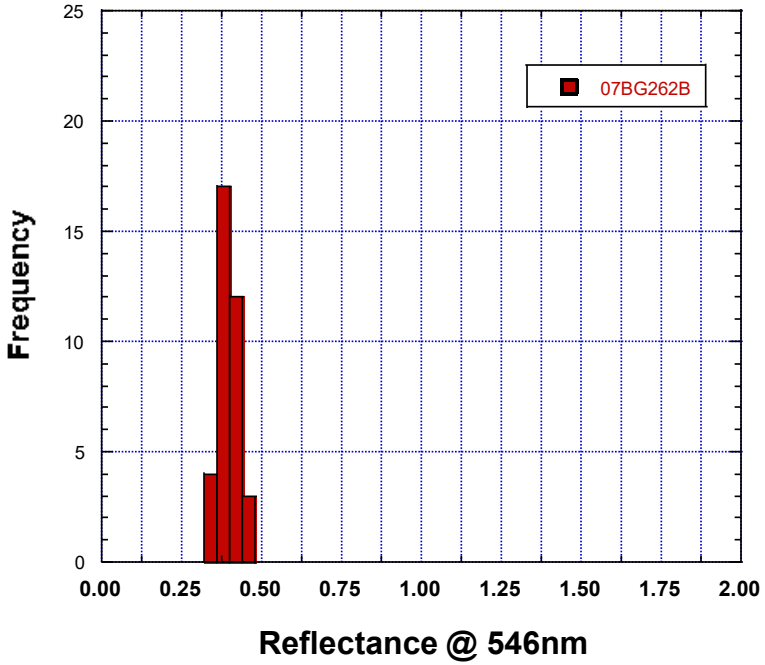
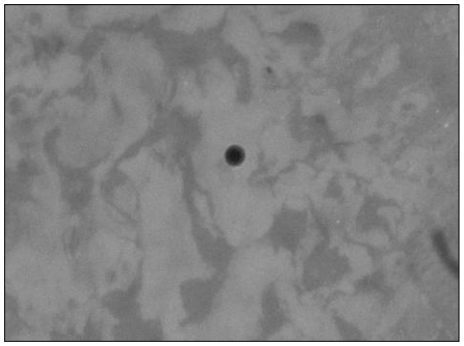
Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07BG262B	Outcrop
Minimum	0.33
Maximum	0.45
Points	36
Std Deviation	0.03
Mean	**0.39**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.39%. The photomicrograph shows huminite (pre-vitrinite) cells which have undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.33	0.33	0.34	0.34	0.36	0.36	0.37	0.37	0.38	0.38	0.38	0.38
0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40
0.40	0.40	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.44	0.45	0.45

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07BG262B	AA000442	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

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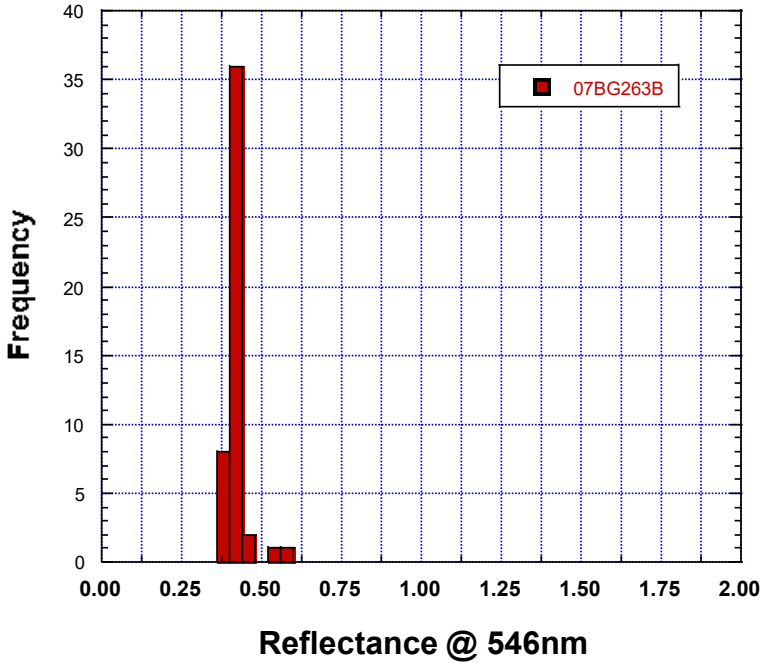
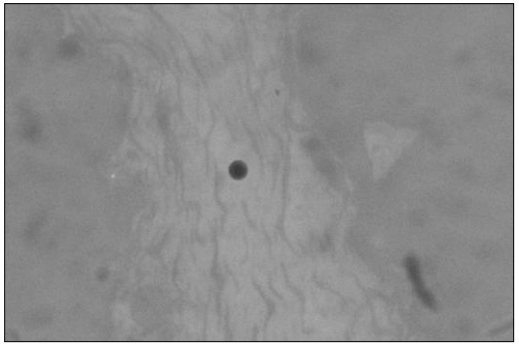
Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07BG263B	Outcrop
Minimum	0.37
Maximum	0.56
Points	48
Std Deviation	0.03
Mean	**0.42**



Comments: This sample consists of abundant coal fragments embedded in an epoxy plug. The coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 48 values the average Ro for this sample is 0.42%. The photomicrograph shows huminite (pre-vitrinite) cells which have undergone gelification embedded in an epoxy matrix which has only a slightly lower reflectance. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40
0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42
0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.55	0.56

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07BG263B	AA000443	Outcrop		5	90	5	very good	5	90		fluor. brite yellow

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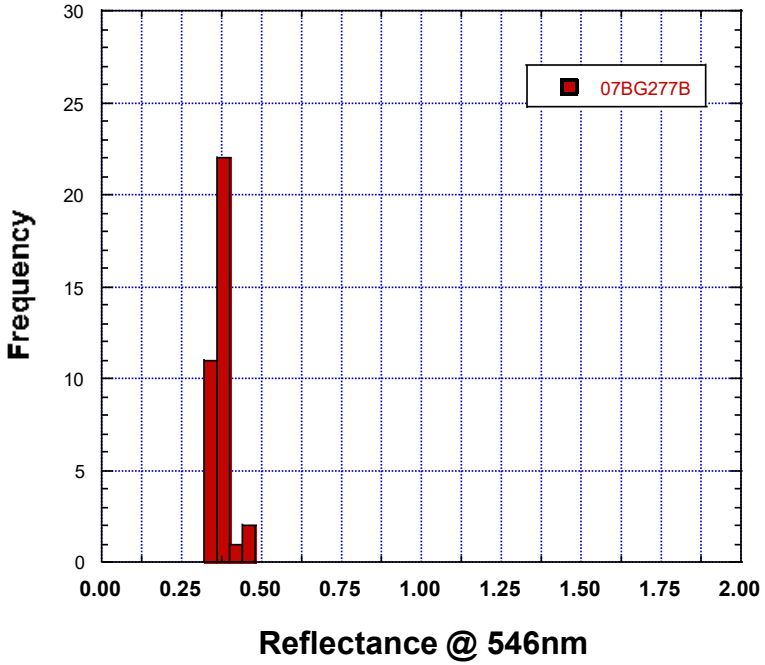
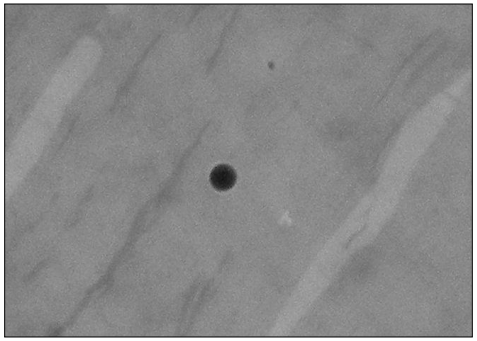
Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07BG277B	Outcrop
Minimum	0.34
Maximum	0.45
Points	36
Std Deviation	0.03
Mean	**0.37**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.39%. The photomicrograph shows huminite (pre-vitrinite) cells which have undergone gelification associated with some higher reflecting rodlets and lower reflecting liptinitic matter. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.34	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.36
0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37
0.37	0.37	0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.41	0.45	0.45

Visual Kerogen Analysis

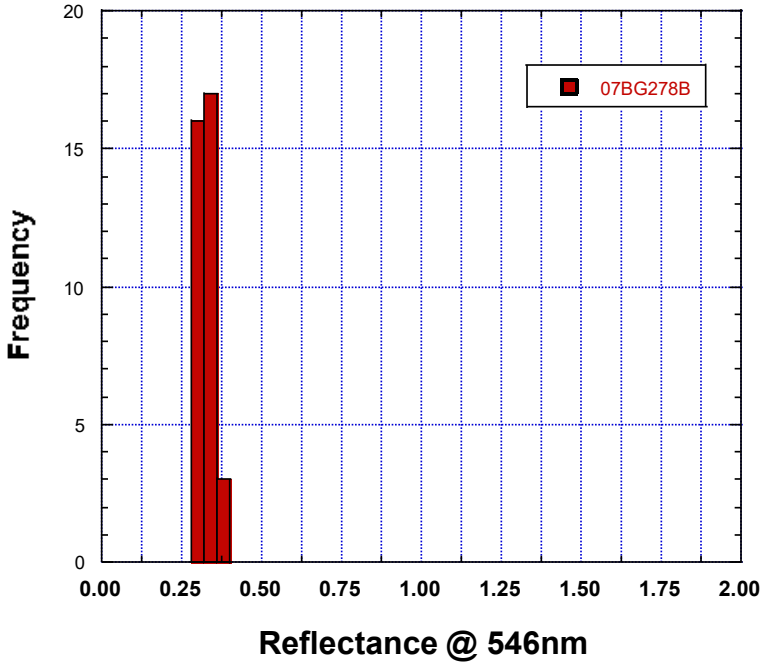
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07BG277B	AA000444	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

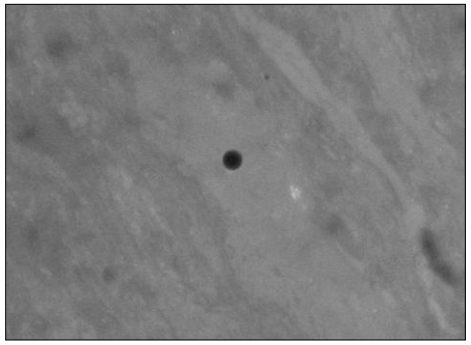
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07BG278B	Outcrop
Minimum	0.29
Maximum	0.38
Points	36
Std Deviation	0.02
Mean	**0.32**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.32%. The photomicrograph shows huminite (pre-vitrinite) cells which have undergone gelification associated with some higher reflecting rodlets and lower reflecting liptinitic matter. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.29	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.31
0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
0.32	0.32	0.32	0.32	0.33	0.33	0.33	0.33	0.35	0.36	0.37	0.38

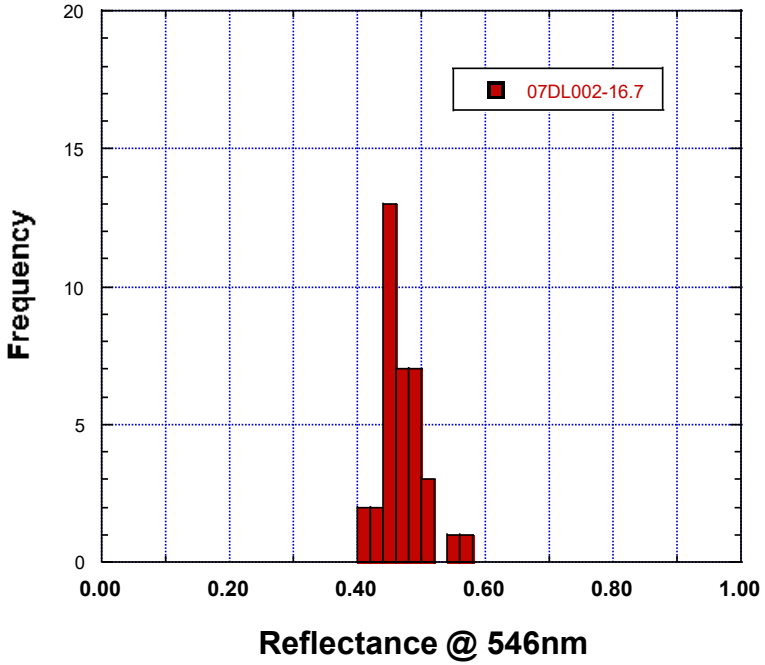
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07BG278B	AA000445	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

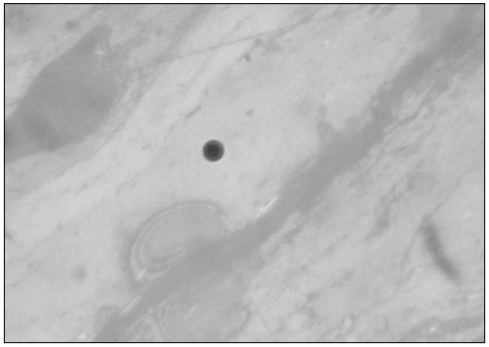
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07DL002-16.7	Outcrop coal
Minimum	0.40
Maximum	0.57
Points	36
Std Deviation	0.03
Mean	**0.46**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.46%. Photo-micrograph shows the gelified nature of the vitrinite adjacent to darker streaks of liptinite (plant cuticle). The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.46%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.40	0.41	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44	0.45	0.45
0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.47	0.47	0.47	0.47
0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.50	0.50	0.50	0.55	0.57

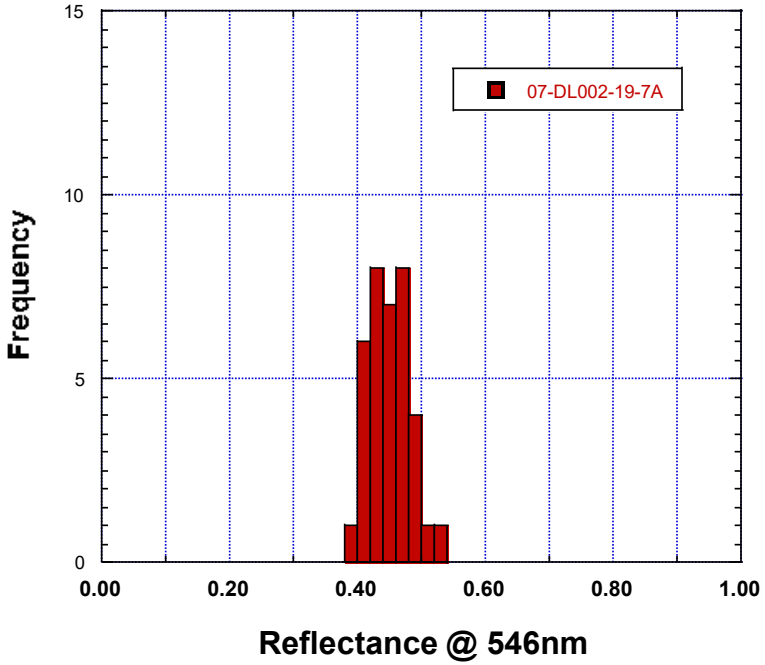
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL002-16.7	AA000449	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

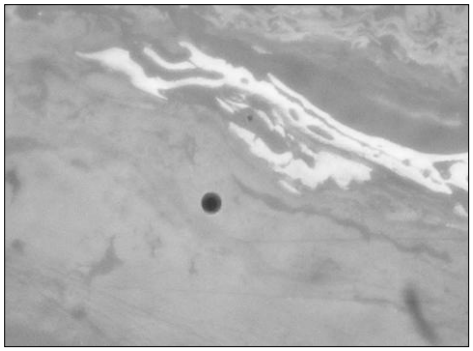
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07-DL002-19-7A	Outcrop coal
Minimum	0.39
Maximum	0.52
Points	36
Std Deviation	0.03
Mean	**0.44**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.44%. Photo-micrograph shows the gelified nature of the vitrinite adjacent to darker streaks of liptinite (plant cuticle) and bright reflecting fusinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.44%.

Ordered Ro Values (Std. = 0.906% Ro.)

0.39	0.40	0.40	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.43	0.43
0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.46	0.47	0.47	0.47	0.48	0.48	0.48	0.49	0.50	0.52

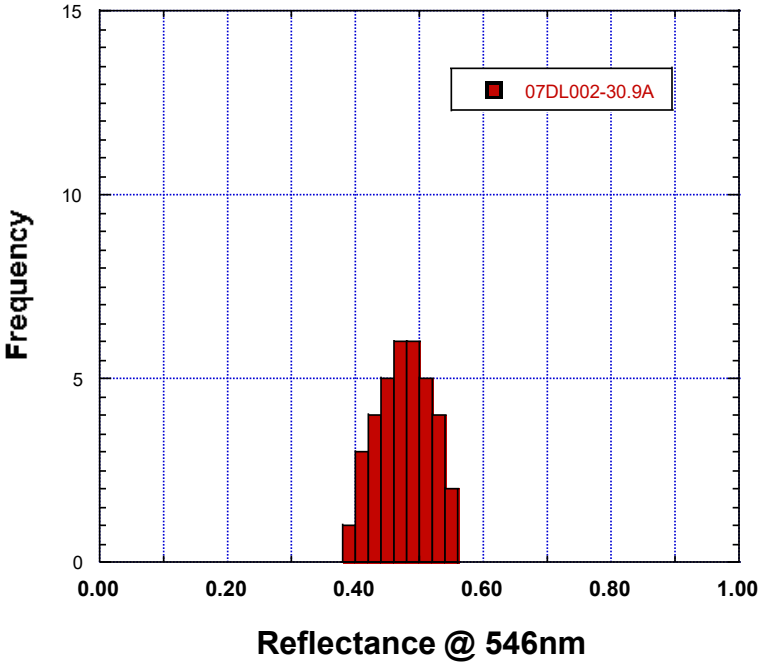
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07-DL002-19-7A	AA000450	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

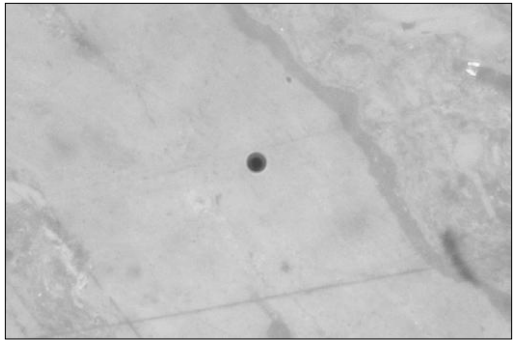
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07DL002-30.9A	Outcrop coal
Minimum	0.39
Maximum	0.54
Points	36
Std Deviation	0.04
Mean	**0.47**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.47%. Photo-micrograph shows the gelified nature of the vitrinite adjacent to darker streaks of liptinite (plant cuticle). The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.47%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.39	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.44	0.44	0.44	0.45
0.45	0.46	0.46	0.46	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.49
0.49	0.50	0.50	0.50	0.50	0.51	0.52	0.53	0.53	0.53	0.54	0.54

Visual Kerogen Analysis

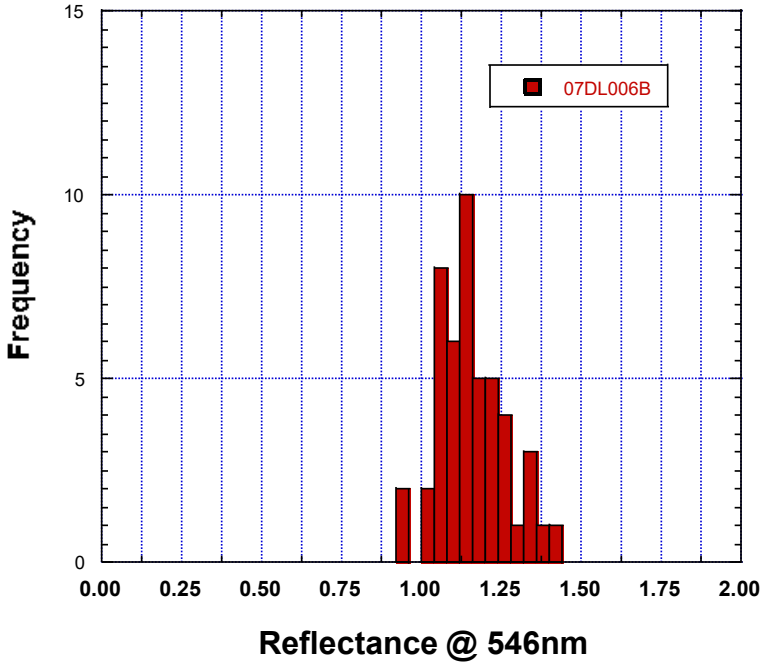
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL002-30.9A	AA000451	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

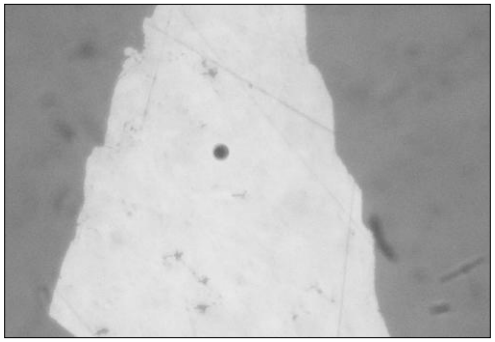
Project 07-1064-A

Vitrinite Reflectance and MOA

Alaska State Survey O/Cs



07DL006B	Out Crop
Minimum	0.94
Maximum	1.40
Points	48
Std Deviation	0.10
Mean	**1.15**



Comments: This sample is a whole-rock preparation where individual grains of rock are embedded in an epoxy plug and polished. However, in this case the grains consist almost entirely of large vitrinite particles. Vitrinite particles large enough to measure are very common and based on 48 values of the better preserved, lower reflecting vitrinite, the average Ro is 1.15%. The photo-micrograph shows a large vitrinite fragment with a reflectance of 1.16% Ro. The dark spot in the center is the measuring area of the photometer.

Ordered Ro Values (Std. = 0.906% Ro.)

0.94	0.95	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.07	1.07	1.07
1.08	1.09	1.09	1.10	1.11	1.11	1.12	1.12	1.12	1.12	1.13	1.14
1.14	1.15	1.15	1.15	1.16	1.16	1.17	1.17	1.18	1.20	1.21	1.21
1.22	1.23	1.24	1.24	1.25	1.26	1.28	1.32	1.32	1.33	1.38	1.40

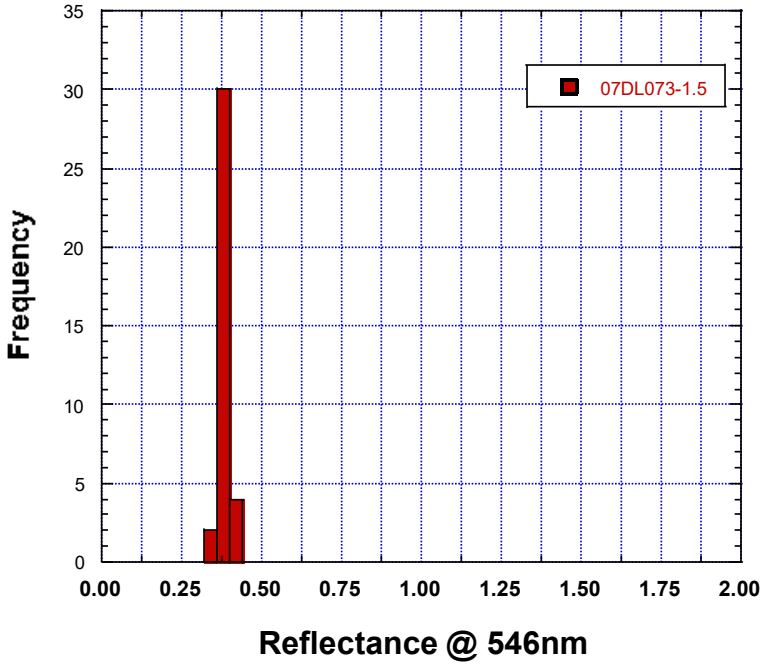
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL006B	AA000525	Out Crop		5	90	5	none	5	90	?	no plant spores

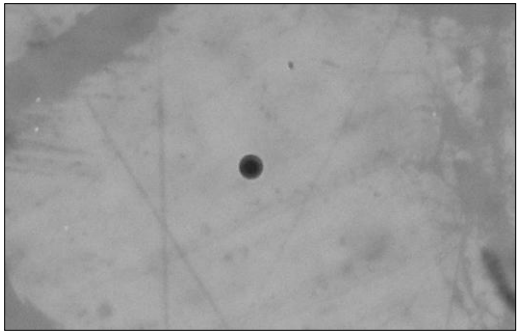
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-A

Vitrinite Reflectance and MOA



07DL073-1.5	Outcrop
Minimum	0.34
Maximum	0.40
Points	36
Std Deviation	0.01
Mean	**0.37**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.37%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.34	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37
0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.38
0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40

Visual Kerogen Analysis

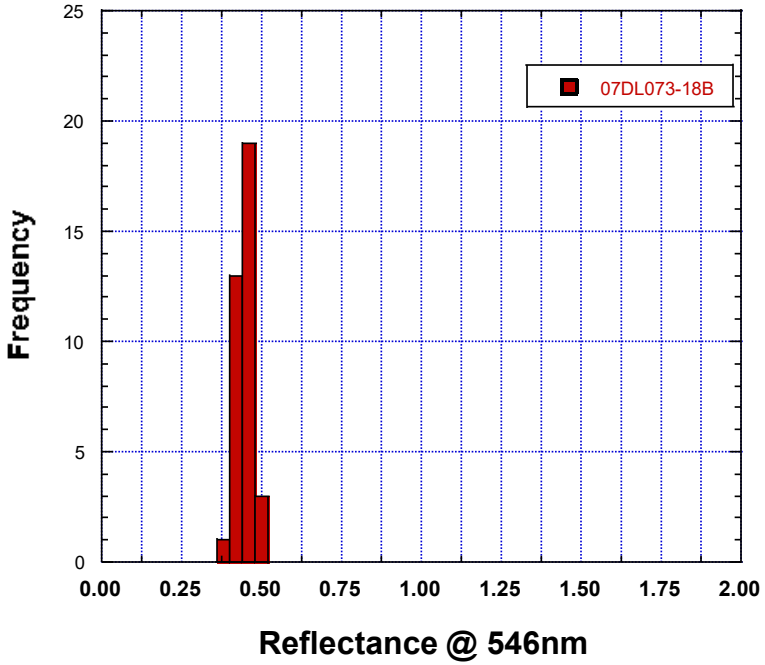
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL073-1.5	AA000437	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

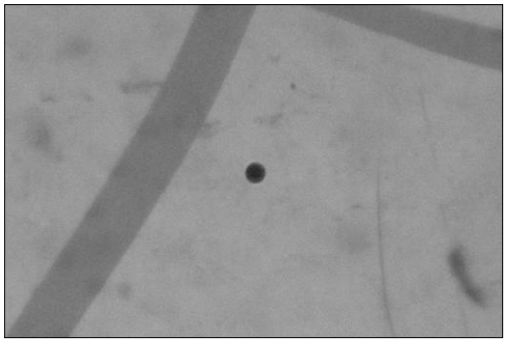
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL073-18B	Outcrop
Minimum	0.39
Maximum	0.49
Points	36
Std Deviation	0.02
Mean	**0.44**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.44%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.39	0.41	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43
0.43	0.43	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45
0.45	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.48	0.48	0.49

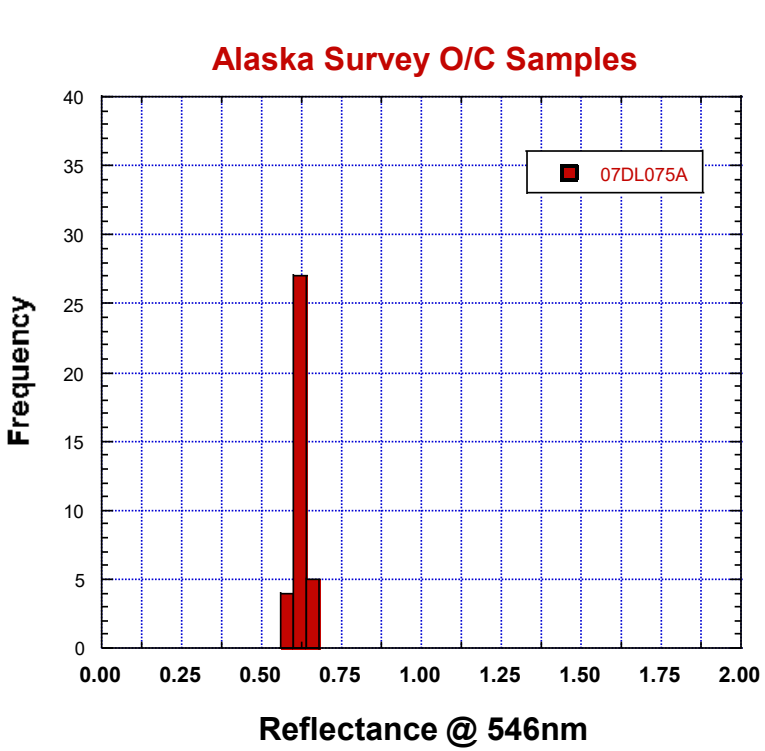
Visual Kerogen Analysis

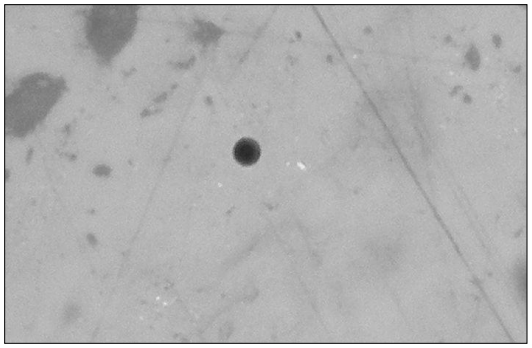
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL073-18B	AA000446	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-A

Vitrinite Reflectance and MOA





07DL075A	Outcrop
Minimum	0.58
Maximum	0.67
Points	36
Std Deviation	0.02
Mean	**0.62**

Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by vitrinite with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.62%. The photomicrograph shows a large vitrinite grain embedded with a few darker resin blebs. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.58	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.61
0.61	0.61	0.61	0.61	0.61	0.62	0.62	0.62	0.62	0.62	0.62	0.62
0.62	0.63	0.63	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.65	0.67

Visual Kerogen Analysis

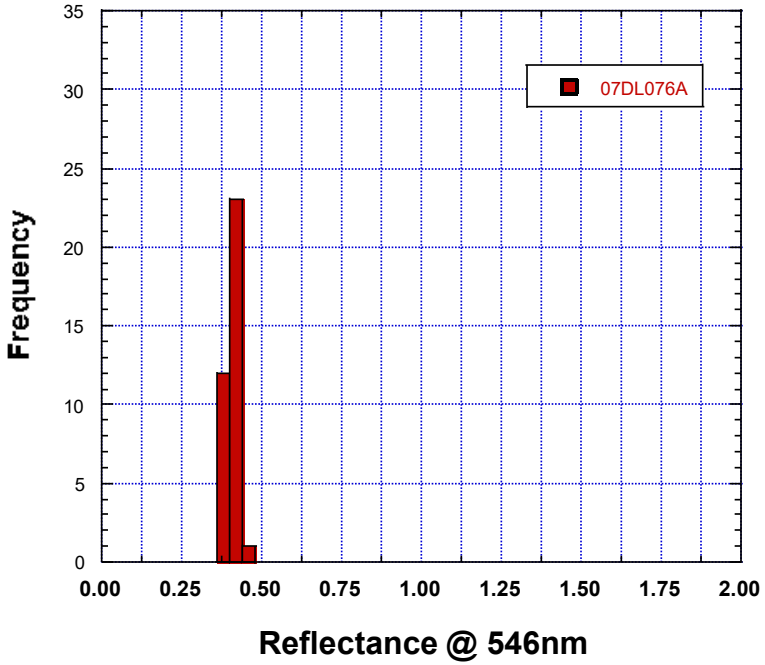
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL075A	AA000432	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

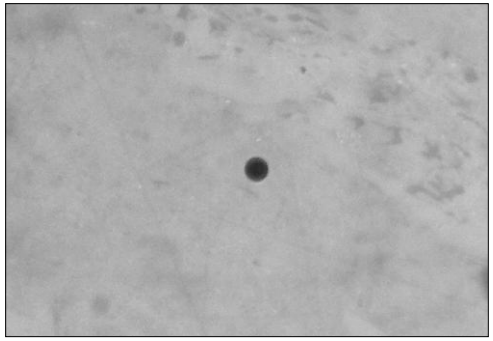
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL076A	Outcrop
Minimum	0.37
Maximum	0.46
Points	36
Std Deviation	0.02
Mean	**0.40**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.40%. The photomicrograph shows a large huminite (pre-vitrinite) grain adjacent to a slightly higher reflecting plant rootlet. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.37	0.37	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.43	0.46

Visual Kerogen Analysis

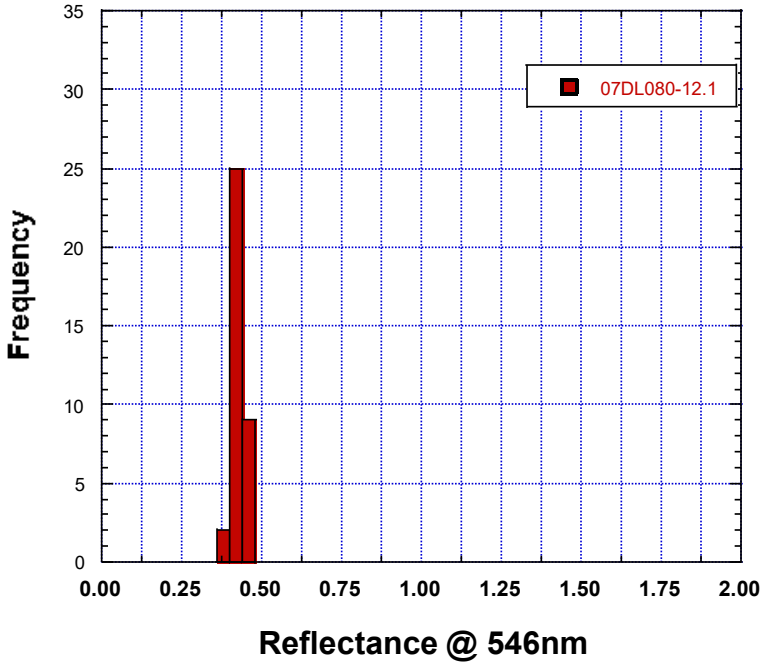
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL076A	AA000433	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

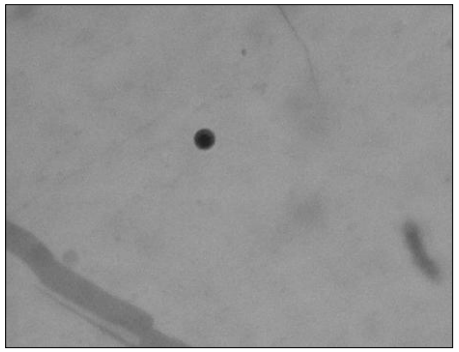
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL080-12.1	Outcrop
Minimum	0.37
Maximum	0.45
Points	36
Std Deviation	0.02
Mean	**0.42**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.42%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.39	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.42
0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.43
0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45

Visual Kerogen Analysis

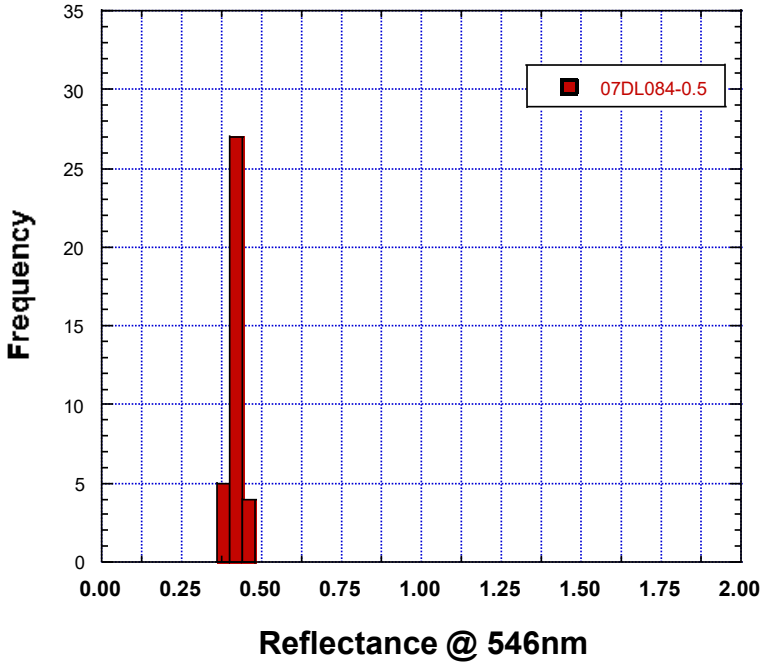
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL080-12.1	AA000447	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

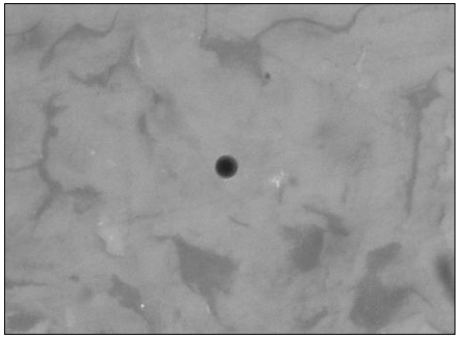
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL084-0.5	Outcrop
Minimum	0.37
Maximum	0.44
Points	36
Std Deviation	0.02
Mean	**0.41**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.41%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.41	0.41
0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42
0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.44	0.44	0.44	0.44

Visual Kerogen Analysis

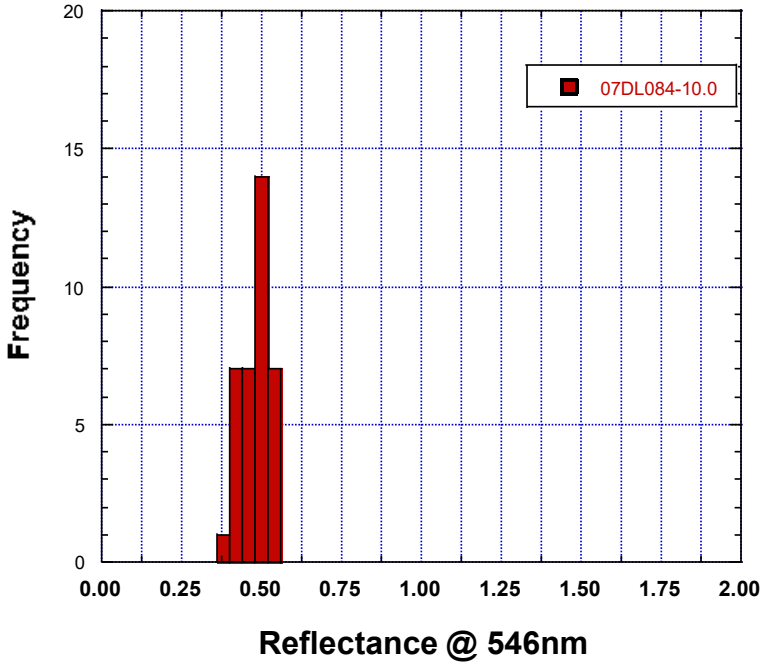
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL084-0.5	AA000434	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

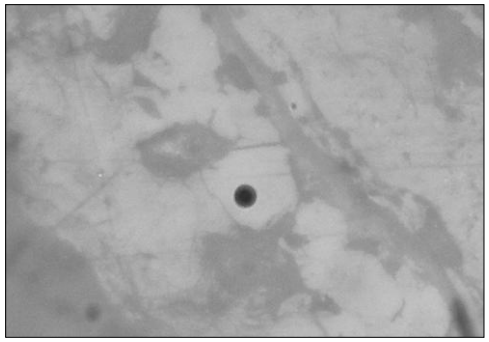
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL084-10.0	Outcrop
Minimum	0.39
Maximum	0.54
Points	36
Std Deviation	0.04
Mean	**0.47**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.47%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.39	0.40	0.41	0.41	0.42	0.42	0.42	0.43	0.44	0.45	0.45	0.45
0.46	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.49
0.49	0.49	0.50	0.50	0.50	0.52	0.52	0.52	0.52	0.53	0.54	0.54

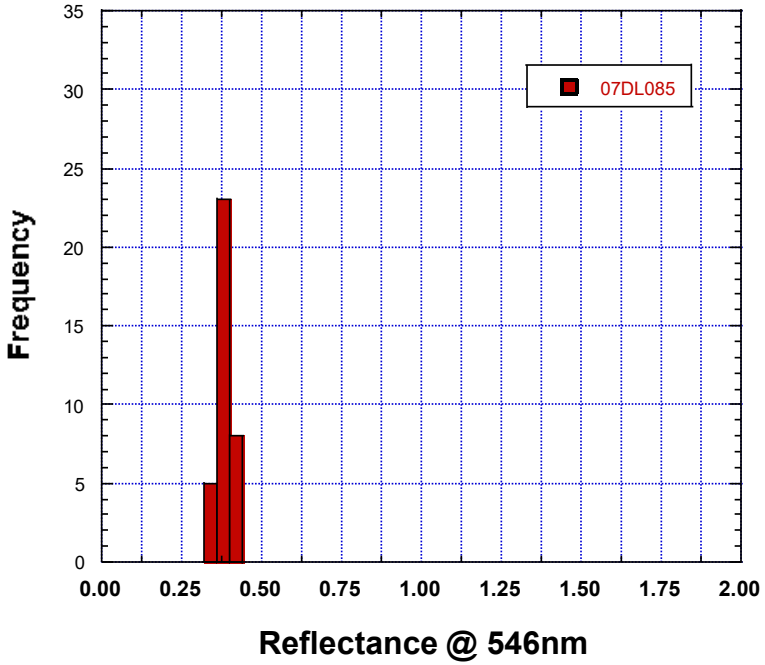
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL084-10.0	AA000438	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

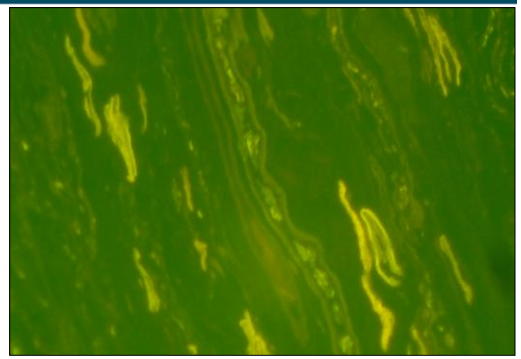
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-A

Vitrinite Reflectance and MOA



07DL085	Outcrop
Minimum	0.34
Maximum	0.41
Points	36
Std Deviation	0.02
Mean	**0.37**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.37%. The photomicrograph shows a large huminite (pre-vitrinite) grain in blue light fluorescence. The darker bands are vitrinite, associated with bright yellow fluorescing spores and plant cuticle and small algal bodies. This bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.34	0.35	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36
0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41

Visual Kerogen Analysis

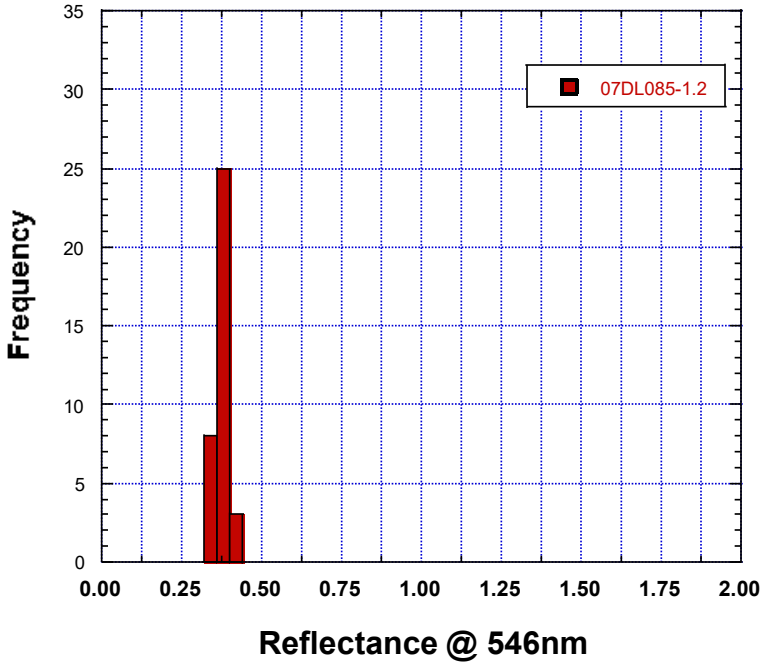
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL085	AA000448	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

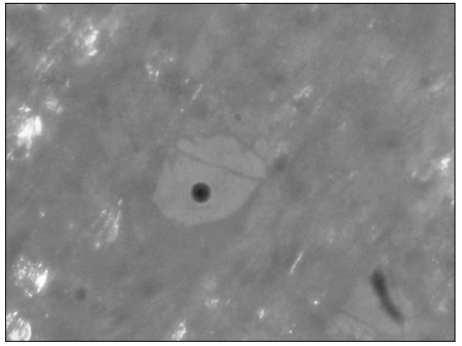
Project 07-805-A

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL085-1.2	Outcrop
Minimum	0.33
Maximum	0.41
Points	36
Std Deviation	0.02
Mean	**0.37**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.37%. The photomicrograph shows a large wood fragment embedded with huminite (pre-vitrinite) and bright spots of internal reflections of cellulose. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.35	0.36	0.36	0.36	0.36
0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.38
0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.40	0.40	0.41

Visual Kerogen Analysis

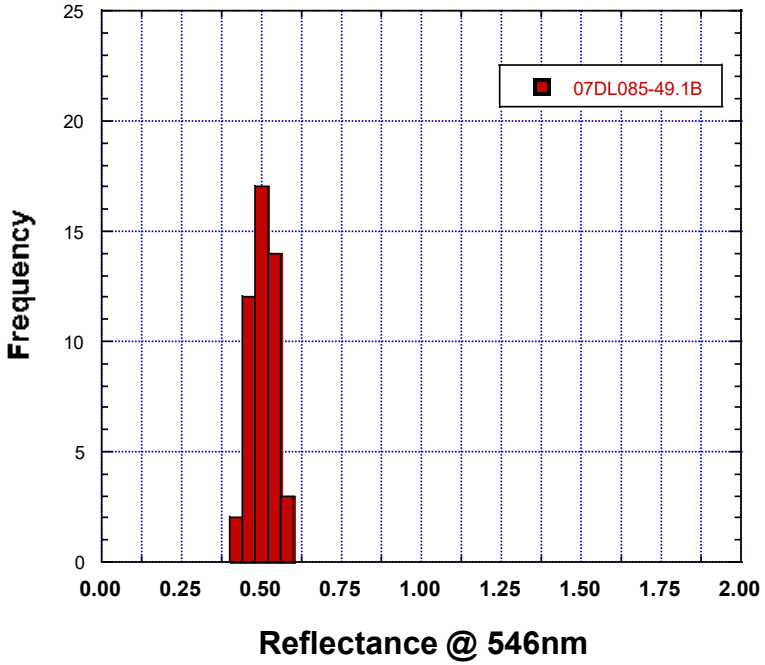
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL085-1.2	AA000435	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

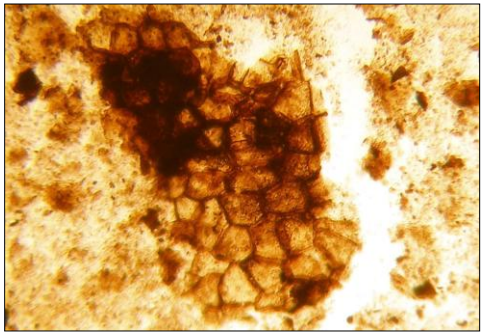
Project 07-805-AA

Vitrinite Reflectance and MOA

Alaska Survey O/C Samples



07DL085-49.1B	Outcrop
Minimum	0.42
Maximum	0.58
Points	48
Std Deviation	0.04
Mean	**0.50**



Comments: Organic matter in this sample consists predominantly of finely dispersed, low mature, humic debris associated with abundant large humic fragments. Most if the fine amorphous material is likely degraded humic debris. Vitrinite particles large enough to measure are common and based on 48 measurements of the better preserved vitrinite, the average Ro is 0.50%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are present. Their light yellow color and the very good fluorescence of the liptinitic material is consistent with an Ro of 0.50%. The photomicrograph shows a large plant cuticle fragment, common in coaly sediments.

Ordered Ro Values (Std. = 0.907% Ro.)

0.42	0.42	0.44	0.44	0.44	0.44	0.45	0.45	0.46	0.46	0.47	0.47
0.47	0.47	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.50	0.50
0.50	0.50	0.51	0.51	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.53
0.53	0.53	0.53	0.53	0.53	0.54	0.54	0.55	0.55	0.56	0.56	0.58

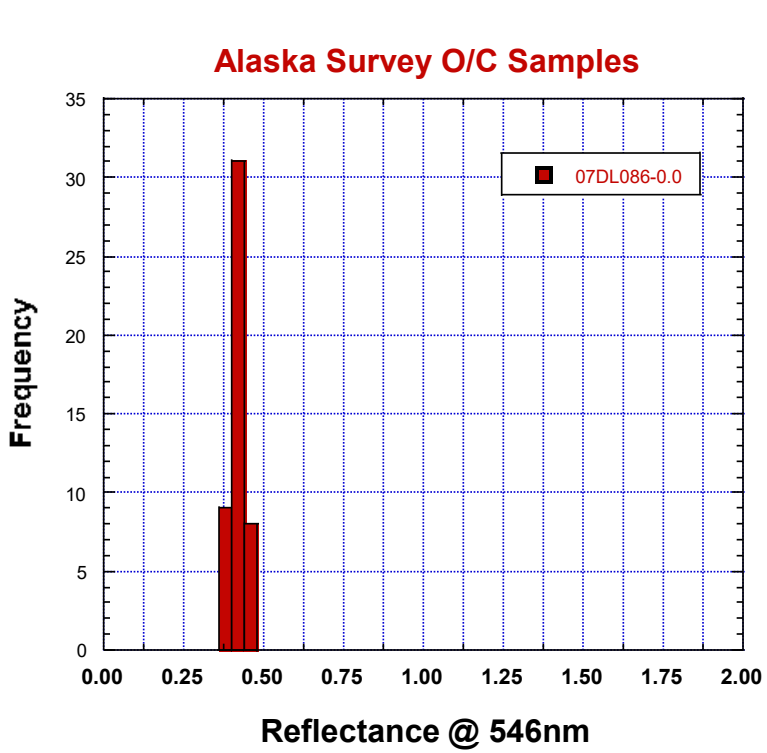
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL085-49.1B	AA000439	Outcrop		5	85	10	very good	5	85	2.5	light yellow

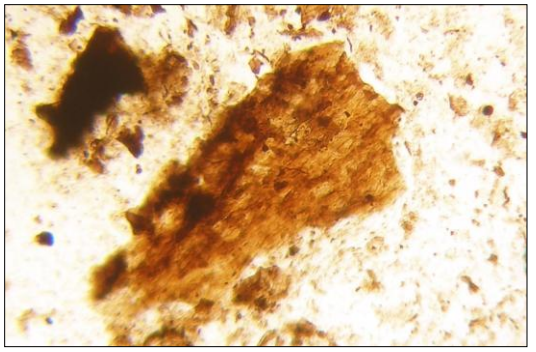
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-AA

Vitrinite Reflectance and MOA



07DL086-0.0	Outcrop
Minimum	0.38
Maximum	0.46
Points	48
Std Deviation	0.02
Mean	**0.41**



Comments: Organic matter in this sample consists predominantly of finely dispersed, low mature, humic debris associated with abundant large humic fragments. Most if the fine amorphous material is likely degraded humic debris. Vitrinite particles large enough to measure are common and based on 48 measurements of the better preserved vitrinite, the average Ro is 0.41%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent, but the very good fluorescence of the liptinitic material is consistent with an Ro of 0.41%. The photomicrograph shows a large plant huminite fragment (precursor to vitrinite), common in immature coaly sediments.

Ordered Ro Values (Std. = 0.907% Ro.)

0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40
0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41
0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43
0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.45	0.45	0.45	0.46	0.46

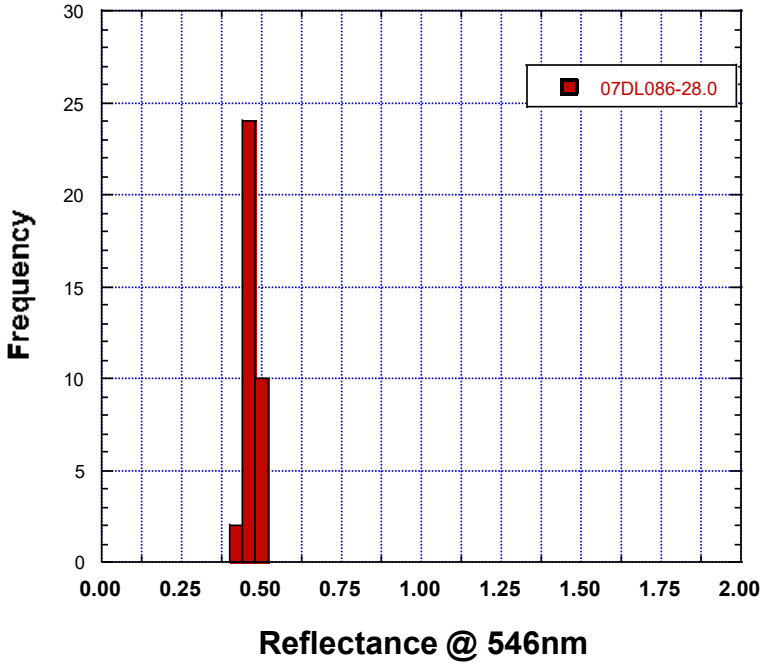
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL086-0.0	AA000440	Outcrop		10	80	10	very good	10	80	?	no planr spores

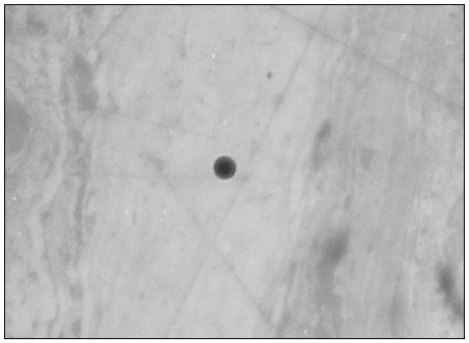
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-A

Vitrinite Reflectance and MOA



07DL086-28.0	Outcrop
Minimum	0.40
Maximum	0.51
Points	36
Std Deviation	0.02
Mean	**0.47**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.47%. The photomicrograph shows a large huminite (pre-vitrinite) grain which has undergone gelification. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values (Std. = 0.907% Ro.)

0.40	0.43	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47
0.47	0.47	0.48	0.48	0.48	0.49	0.49	0.50	0.50	0.50	0.51	0.51

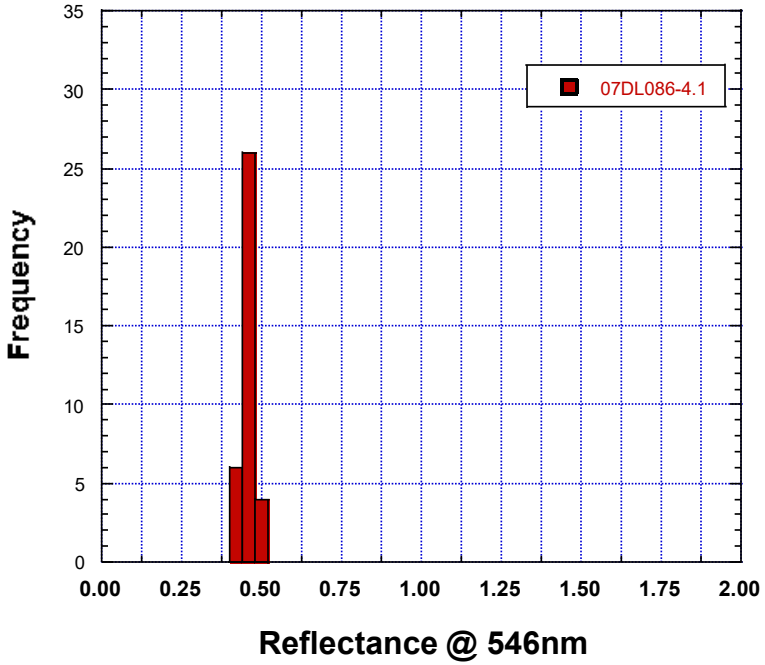
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL086-28.0	AA000441	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

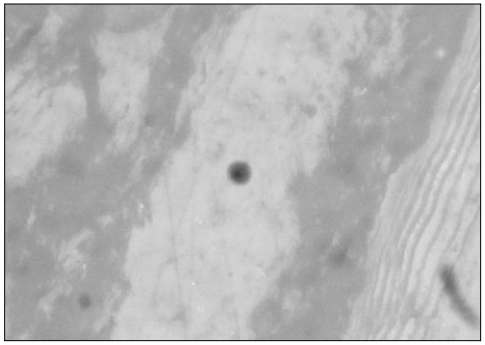
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-805-A

Vitrinite Reflectance and MOA



07DL086-4.1	Outcrop
Minimum	0.42
Maximum	0.48
Points	36
Std Deviation	0.02
Mean	**0.45**



Comments: This sample consists of a whole rock preparation of coal fragments embedded in an epoxy plug. Thus, no transmitted light analysis was completed. Maceral distribution in this sample is only an approximation as no statistical point count methods were employed. However, the coal fragments are clearly dominated by huminite particles (precursor to true vitrinite) with small amounts of liptinite (pollen and plant cuticle) and semi-fusinite present. Based on 36 values the average Ro for this sample is 0.45%. The photomicrograph shows a large huminite (pre-vitrinite) grain adjacent associated with lower reflecting liptinitic material. The black spot is the measuring area of the photometer. Plant spores are present and their bright yellow fluorescence supports the very low maturity (rank) for this sample.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.42	0.42	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.48

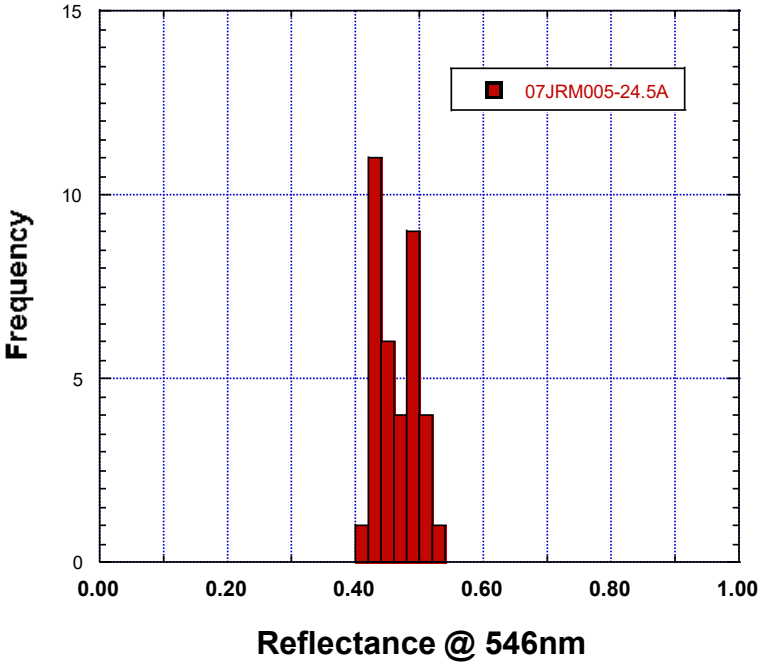
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07DL086-4.1	AA000436	Outcrop		10	85	5	very good	10	85		fluor. brite yellow

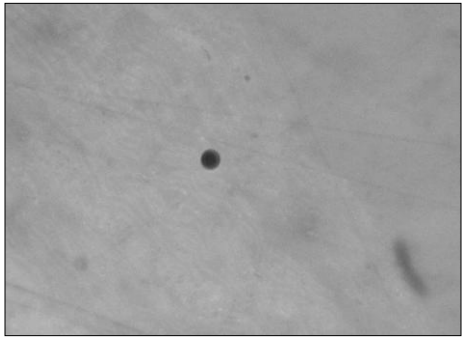
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM005-24.5A	Outcrop coal
Minimum	0.41
Maximum	0.53
Points	36
Std Deviation	0.03
Mean	**0.46**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.46%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.46%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.41	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
0.44	0.44	0.44	0.44	0.44	0.45	0.46	0.47	0.47	0.47	0.48	0.48
0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.50	0.50	0.50	0.51	0.53

Visual Kerogen Analysis

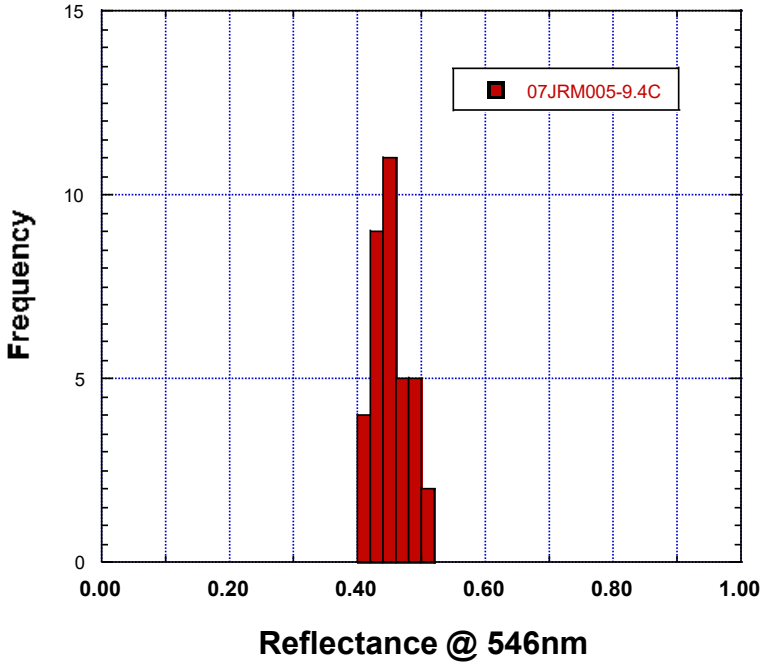
Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM005-24.5A	AA000453	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

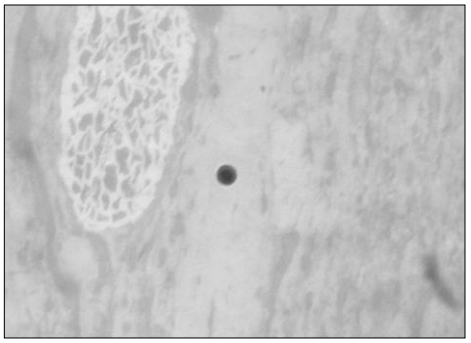
Project 07-1064-AA

Vitrinite Reflectance and MOA

Alaska State Survey O/C's



07JRM005-9.4C	Outcrop coal
Minimum	0.40
Maximum	0.50
Points	36
Std Deviation	0.03
Mean	**0.45**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.45%. Photo-micrograph shows the gelified nature of the vitrinite adjacent to a higher reflecting fungal body. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.45%.

Ordered Ro Values (Std. = 0.906% Ro.)

0.40	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43
0.43	0.44	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45
0.46	0.46	0.46	0.46	0.47	0.48	0.48	0.48	0.48	0.49	0.50	0.50

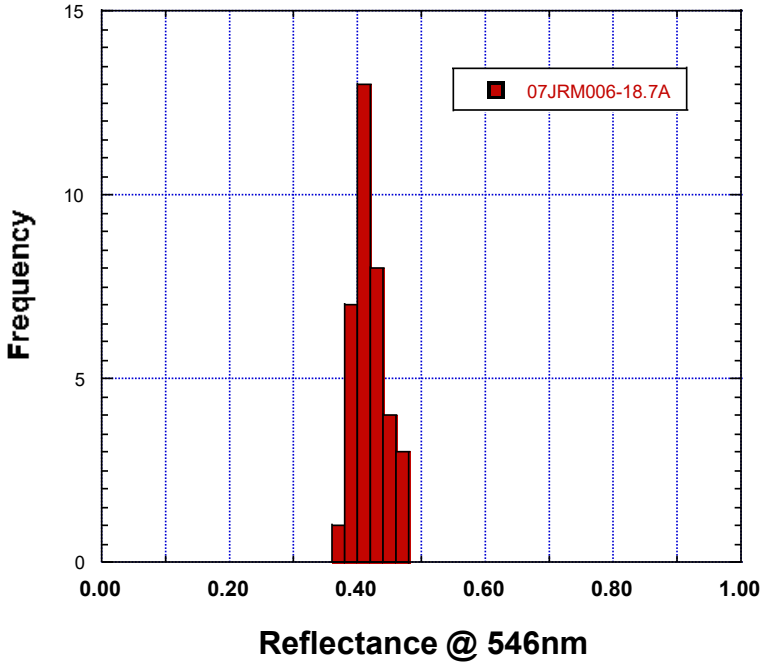
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM005-9.4C	AA000452	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

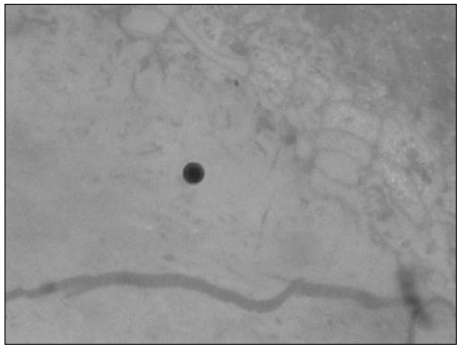
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM006-18.7A	Outcrop coal
Minimum	0.37
Maximum	0.46
Points	36
Std Deviation	0.02
Mean	**0.41**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.41%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.41%.

Ordered Ro Values (Std. = 0.906% Ro.)

0.37	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40
0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42
0.42	0.42	0.43	0.43	0.43	0.44	0.44	0.45	0.45	0.46	0.46	0.46

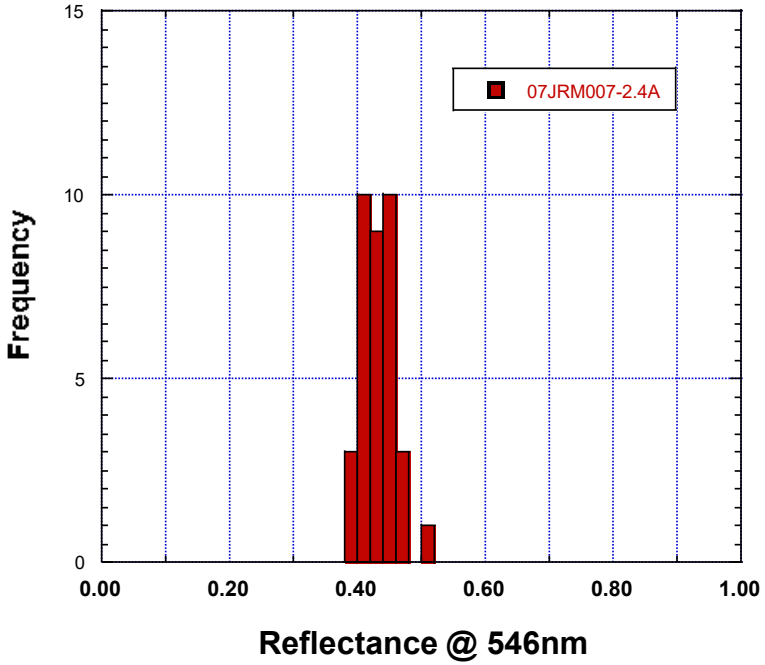
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM006-18.7A	AA000454	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

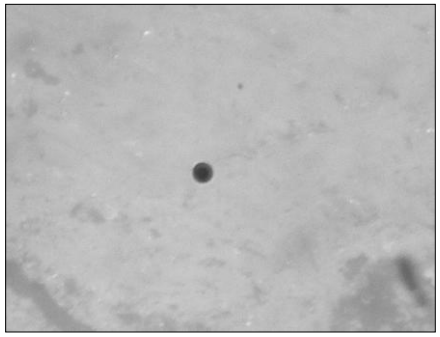
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM007-2.4A Outcrop coal	
Minimum	0.39
Maximum	0.50
Points	36
Std Deviation	0.03
Mean	**0.43**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.43%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.43%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.39	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41
0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.44	0.44
0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.47	0.47	0.47	0.50

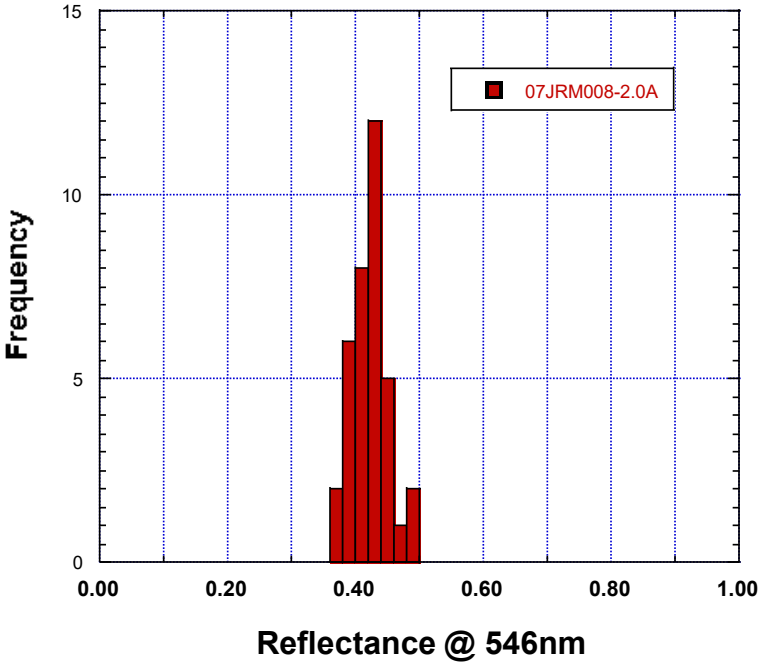
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM007-2.4A	AA000455	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

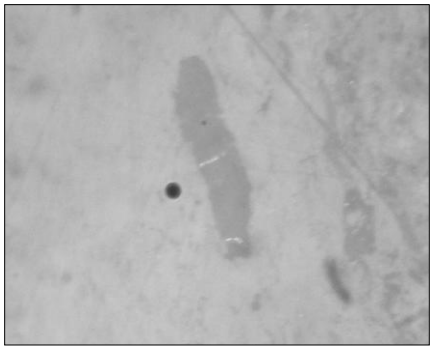
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM008-2.0A	Outcrop coal
Minimum	0.37
Maximum	0.49
Points	36
Std Deviation	0.03
Mean	**0.42**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.42%. Photo-micrograph shows the gelified nature of the vitrinite adjacent to a lower reflecting, dark resinite bleb. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.42%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.37	0.37	0.38	0.38	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.41
0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43
0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.45	0.46	0.49	0.49

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM008-2.0A	AA000456	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

BASELINE RESOLUTION, INC.
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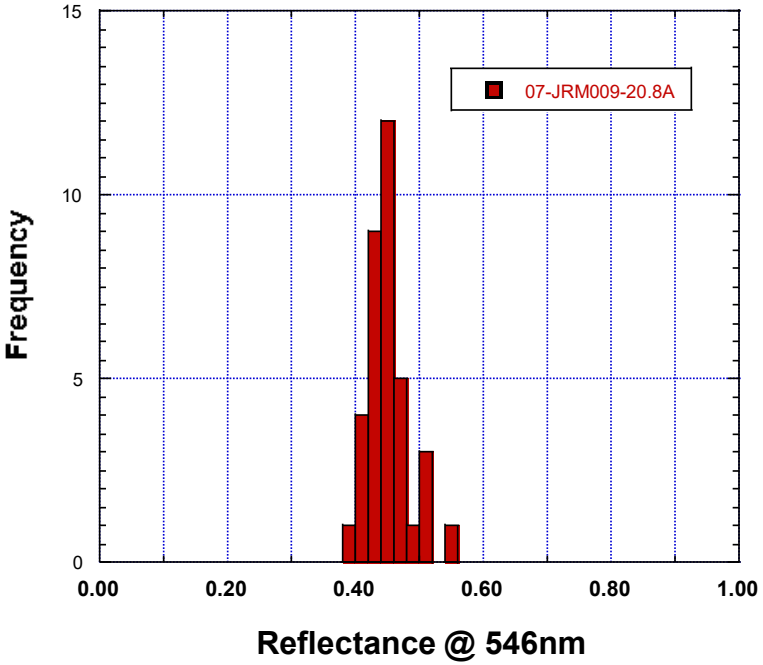
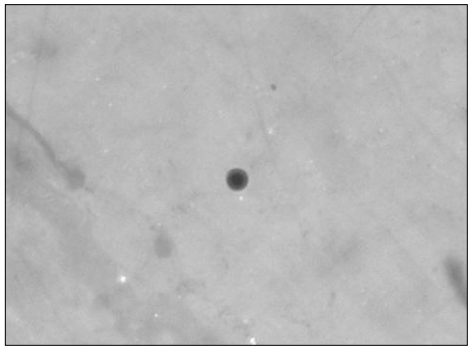
Project 07-1064-AA

Vitrinite Reflectance and MOA



07-JRM009-20.8A	Outcrop coal
Minimum	0.39
Maximum	0.54
Points	36
Std Deviation	0.03
Mean	**0.45**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.45%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.45%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.39	0.41	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.43	0.43	0.43
0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45
0.45	0.45	0.46	0.47	0.47	0.47	0.47	0.49	0.50	0.50	0.50	0.54

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07-JRM009-20.8A	AA000457	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

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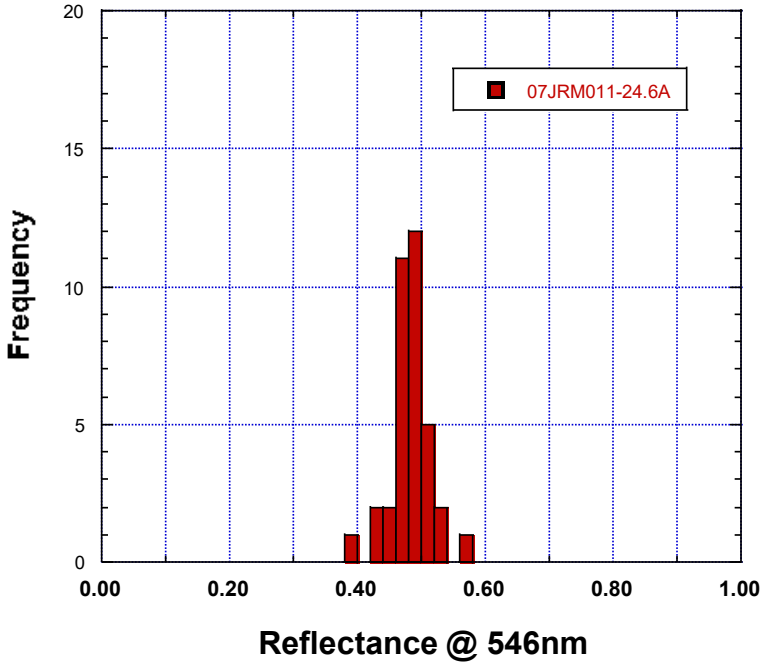
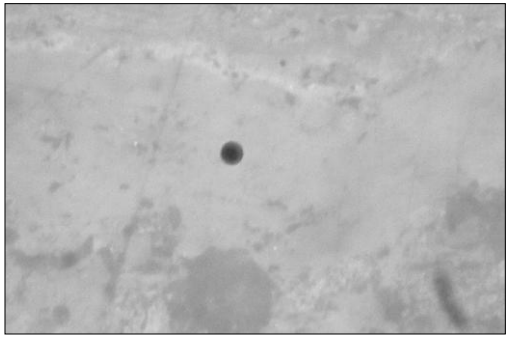
Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM011-24.6A	Outcrop coal
Minimum	0.39
Maximum	0.56
Points	36
Std Deviation	0.03
Mean	**0.48**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.48%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.48%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.39	0.43	0.43	0.44	0.45	0.46	0.46	0.46	0.46	0.46	0.46	0.47
0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.49
0.49	0.49	0.49	0.49	0.50	0.51	0.51	0.51	0.51	0.52	0.53	0.56

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM011-24.6A	AA000459	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

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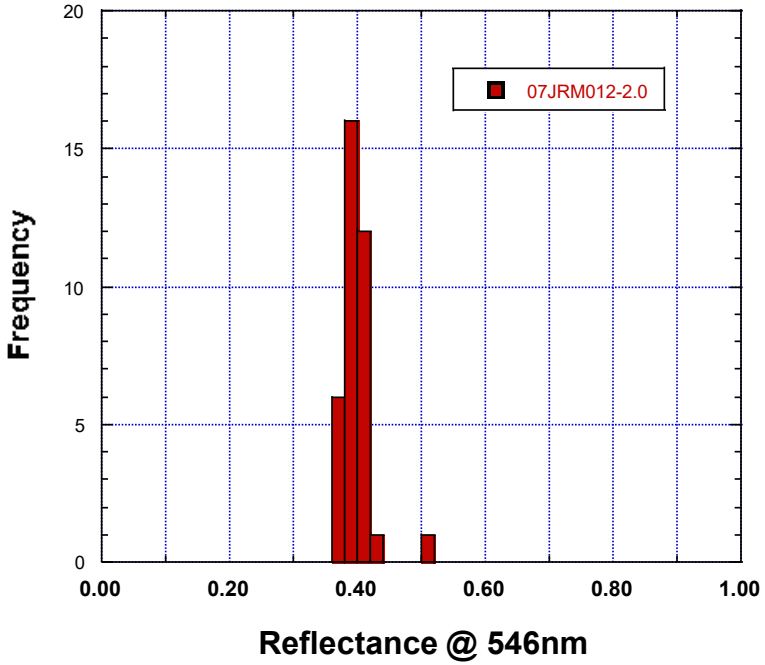
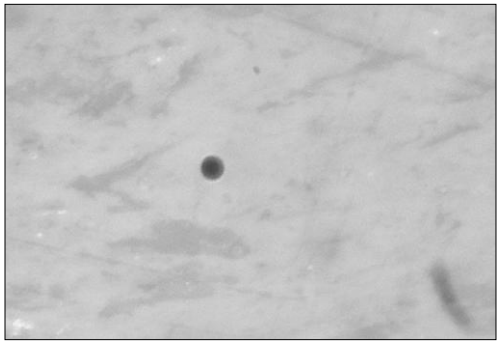
Project 07-1064-AA

Vitrinite Reflectance and MOA



07JRM012-2.0	Outcrop coal
Minimum	0.36
Maximum	0.50
Points	36
Std Deviation	0.02
Mean	**0.39**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.39%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.39%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.36	0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.39	0.39
0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40
0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.42	0.50

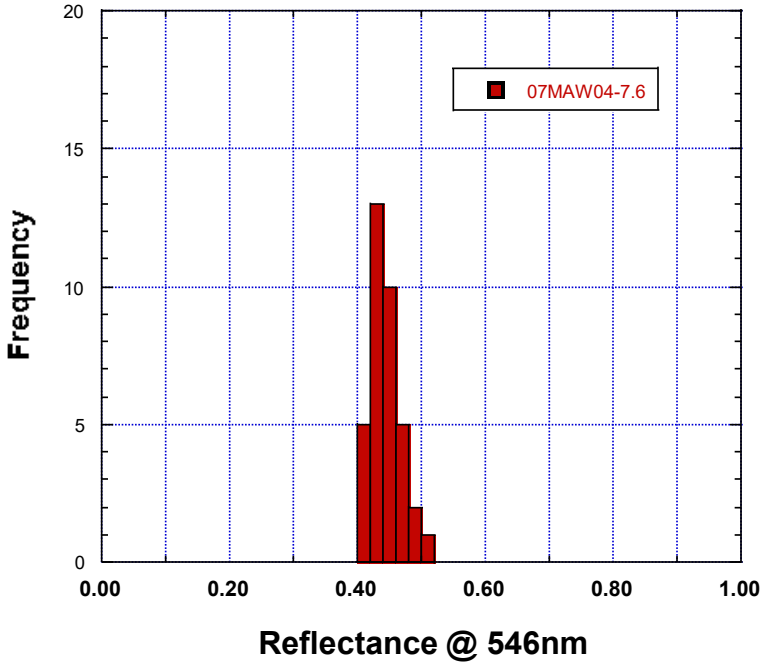
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07JRM012-2.0	AA000460	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

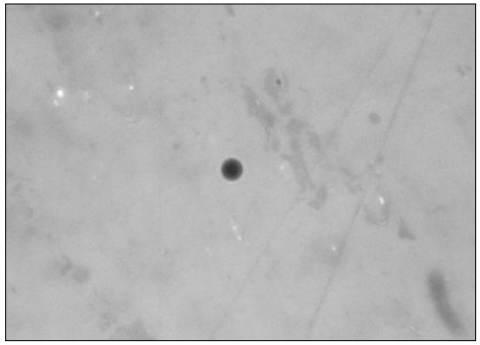
BASELINE RESOLUTION, INC.
ANALYTICAL LABORATORIES

Project 07-1064-AA

Vitrinite Reflectance and MOA



07MAW04-7.6	Outcrop coal
Minimum	0.40
Maximum	0.50
Points	36
Std Deviation	0.02
Mean	**0.44**



Comments: This sample consists of a whole rock preparation of dispersed fragments of coaly material embedded in an epoxy plug. The coaly material is dominated by the maceral huminite, a gelatinous precursor to true vitrinite, with minor amounts of liptinite and semi-fusinite present. By definition, huminite grades into vitrinite at a reflectance of 0.50%. In this sample, vitrinite (huminite) particles large enough to measure are common, and at this maturity exhibit a narrow range of reflectance values. Based on 36 values of the better preserved vitrinite, the average Ro is 0.44%. Photo-micrograph shows the gelified nature of the vitrinite. The black spot is the measuring area of the photometer. Plant spores are present and are easily observed in blue-light fluorescence. Their strong yellow fluorescence supports a low maturity for this sample and is consistent a measured Ro of 0.44%.

Ordered Ro Values *(Std. = 0.906% Ro.)*

0.40	0.40	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.43
0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.45	0.45	0.45	0.45	0.45
0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.47	0.47	0.48	0.48	0.50

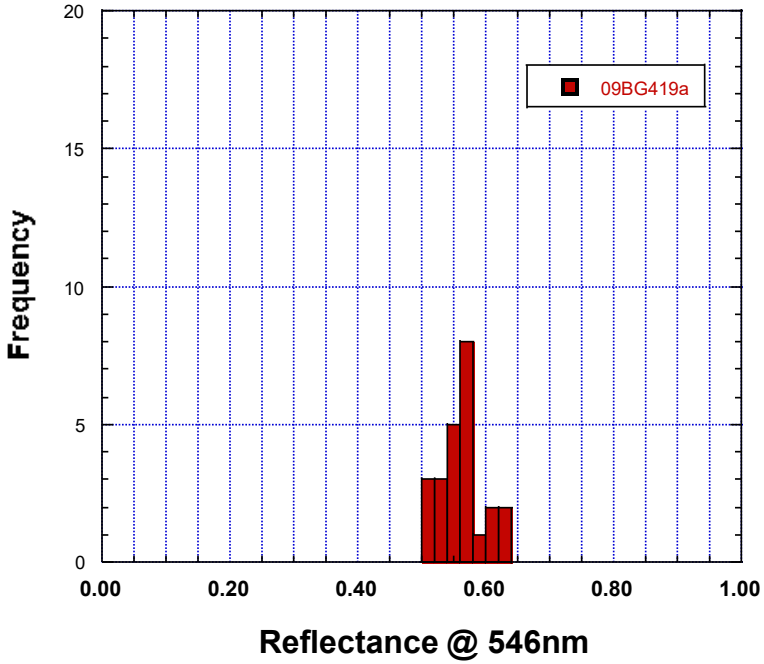
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
07MAW04-7.6	AA000461	Outcrop coal		5	90	5	excellent	5	90	2.4	brite. yel. fluor.

Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09BG419a	09BG419a
Minimum	0.50
Maximum	0.62
Points	24
Std Deviation	0.03
Mean	**0.56**

Comments: Very little OM on transmitted and reflected light preparations. Sample contains mostly small silica crystals. Vitrinite particles large enough to measure are very scarce and exhibit a narrow range of reflectance values. Based on 24 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.56%. Photomicrograph shows a large vitrinite fragment on a silica background. The black spot is the measuring area of the photometer. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.50	0.50	0.51	0.52	0.53	0.53	0.54	0.54	0.55	0.55	0.55	0.56
0.56	0.56	0.56	0.56	0.56	0.57	0.57	0.58	0.60	0.60	0.62	0.62

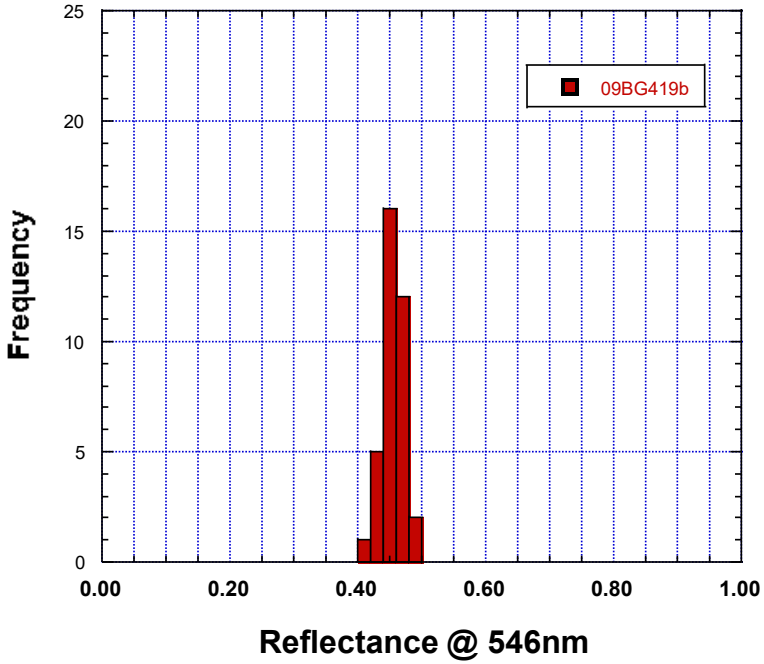
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09BG419a	AA000528	09BG419a		10	85	5	na	10	85	2.4-2.5	no plant spores

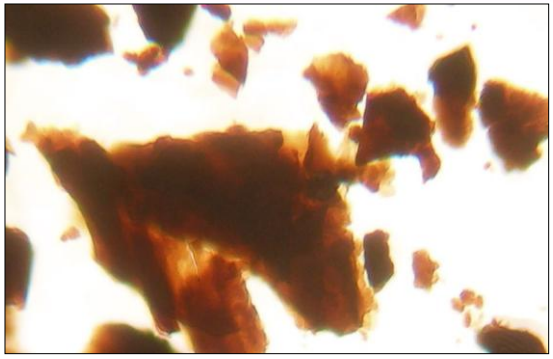
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09BG419b	09BG419b
Minimum	0.40
Maximum	0.48
Points	36
Std Deviation	0.02
Mean	**0.45**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.45%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.44%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.40	0.42	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.48	0.48

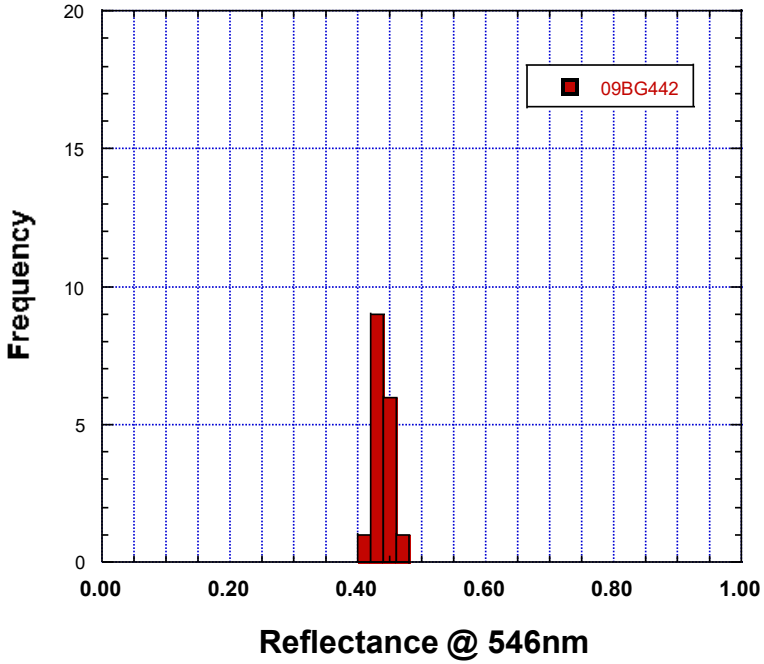
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09BG419b	AA000529	09BG419b		0	95	5	v. good	0	95	2.4-2.5	no plant spores

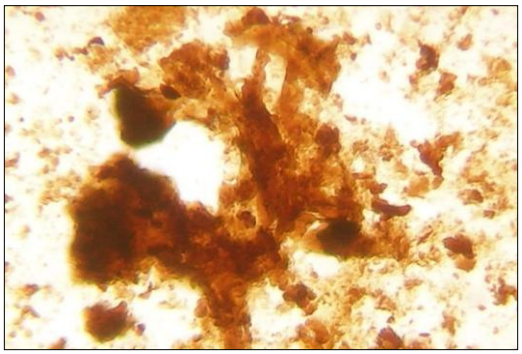
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09BG442	09BG442
Minimum	0.41
Maximum	0.46
Points	17
Std Deviation	0.01
Mean	**0.43**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with significant amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are not common, but exhibit a narrow range of reflectance values. Based on 17 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.43%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.43%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.41	0.42	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44
0.44	0.44	0.44	0.45	0.46							

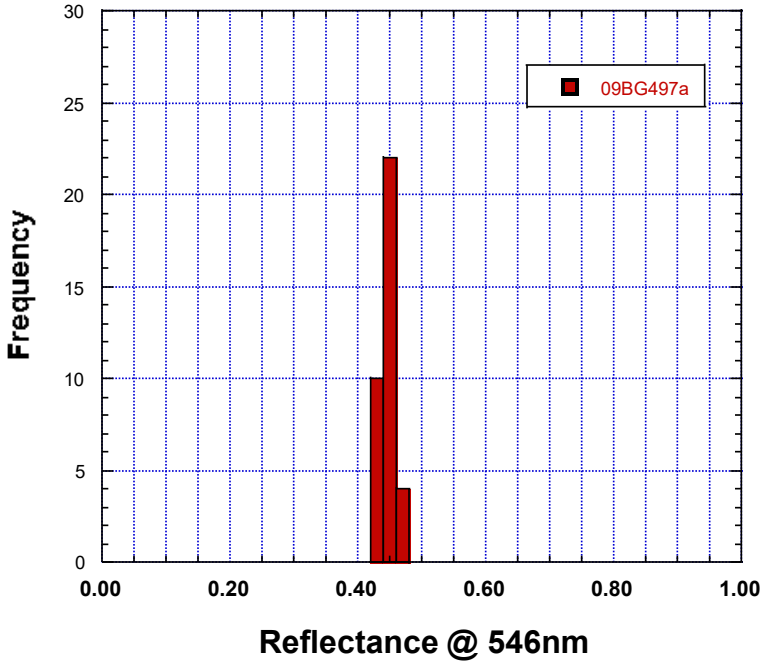
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09BG442	AA000530	09BG442		15	80	5	v. good	15	80	2.4-2.5	no plant spores

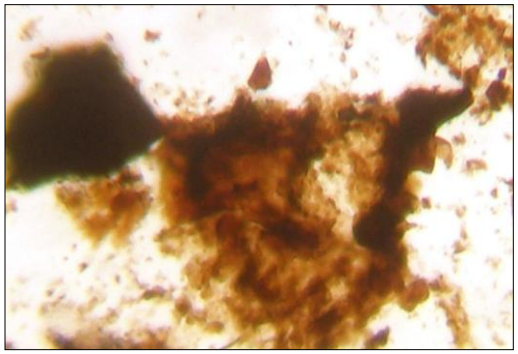
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09BG497a	09BG497a
Minimum	0.42
Maximum	0.46
Points	36
Std Deviation	0.01
Mean	**0.44**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with significant amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common, but exhibit a narrow range of reflectance values. Based on 17 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.44%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.44%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44
0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46

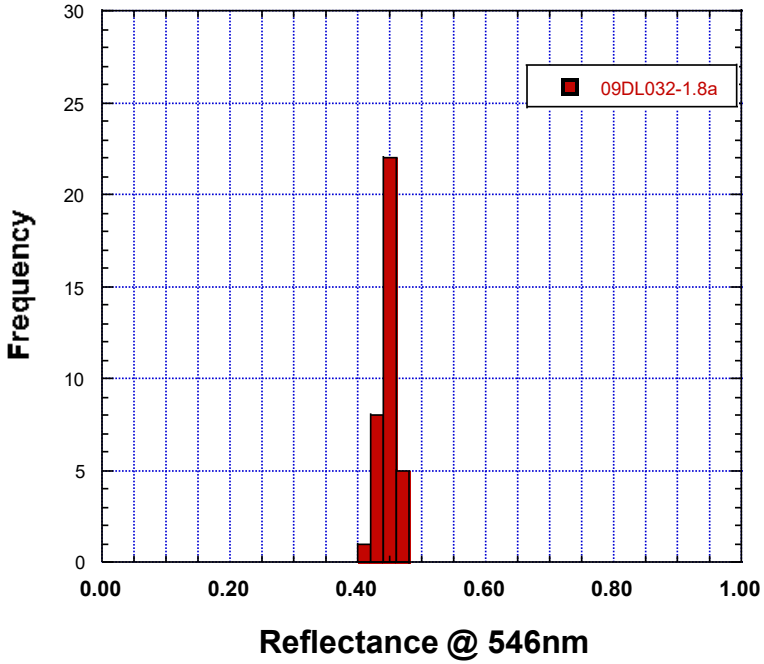
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09BG497a	AA000531	09BG497a		5	90	5	v. good	5	90	2.4-2.5	no plant spores

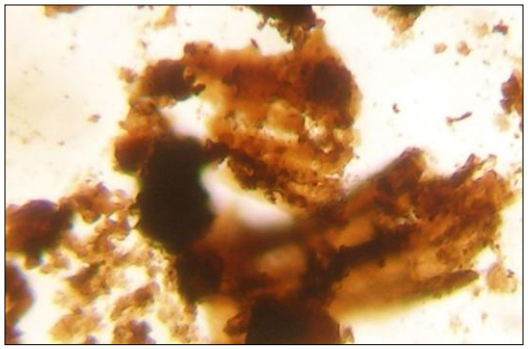
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09DL032-1.8a	09DL032-1.8a
Minimum	0.40
Maximum	0.46
Points	36
Std Deviation	0.01
Mean	**0.44**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with significant amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common, but exhibit a narrow range of reflectance values. Based on 17 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.44%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.44%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.40	0.42	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44
0.44	0.44	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45
0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.46

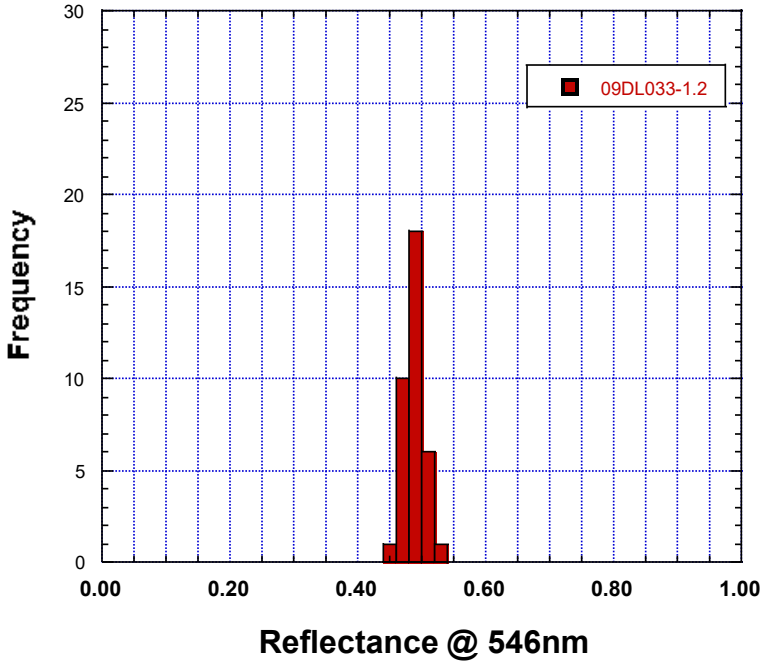
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09DL032-1.8a	AA000532	09DL032-1.8a		20	75	5	v. good	20	75	2.4-2.5	no plant spores

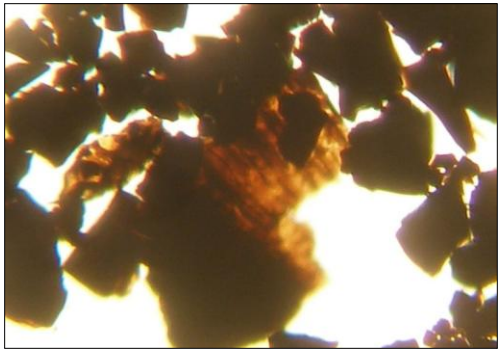
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09DL033-1.2	09DL033-1.2
Minimum	0.45
Maximum	0.52
Points	36
Std Deviation	0.02
Mean	**0.48**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.48%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.48%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.45	0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.47	0.48
0.48	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.49	0.49
0.49	0.49	0.49	0.49	0.49	0.50	0.50	0.50	0.51	0.51	0.51	0.52

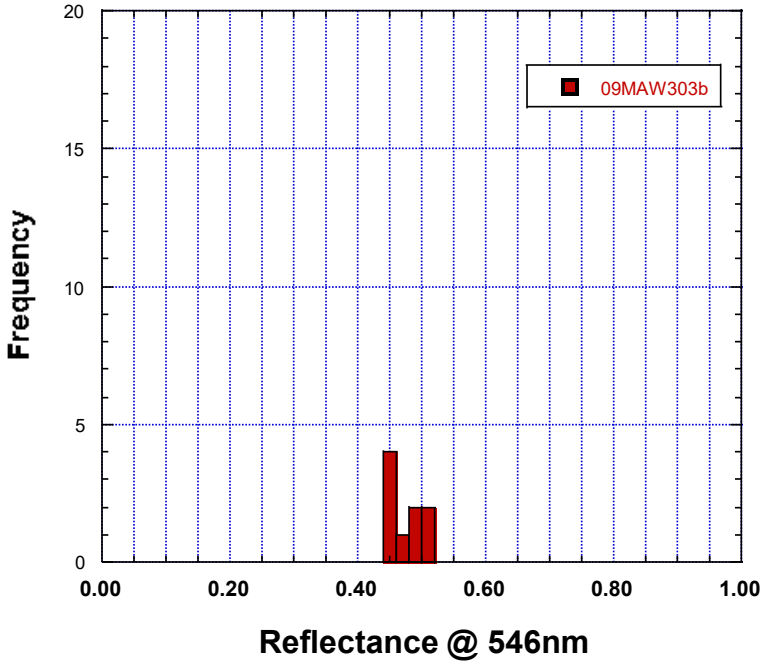
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09DL033-1.2	AA000533	09DL033-1.2		0	95	5	v. good	0	95	2.4-2.5	no plant spores

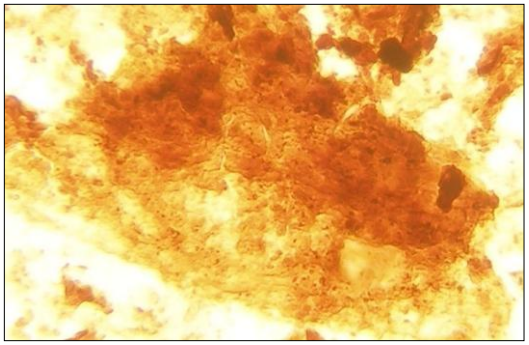
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09MAW303b	09MAW303b
Minimum	0.44
Maximum	0.51
Points	9
Std Deviation	0.03
Mean	**0.47**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with trace amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone as indicated by its good fluorescence properties. Vitrinite particles large enough to measure are very rare, but exhibit a narrow range of reflectance values. Based on 9 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.47%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.47%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.44 0.44 0.45 0.45 0.46 0.48 0.49 0.50 0.51

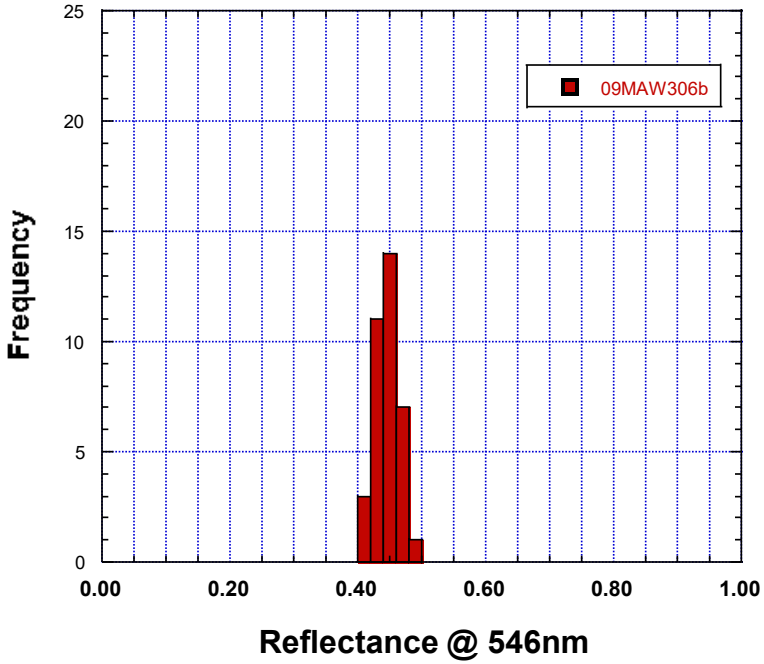
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09MAW303b	AA000534	09MAW303b		85	10	5	v. good	85	10	2.4-2.5	no plant spores

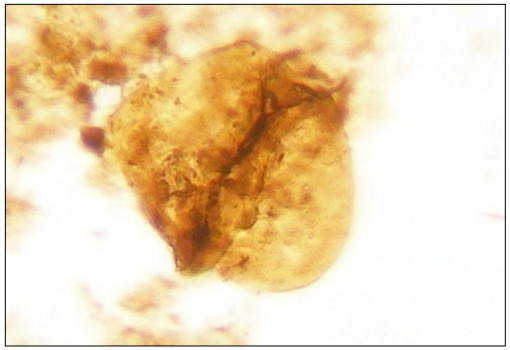
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09MAW306b	09MAW306b
Minimum	0.40
Maximum	0.48
Points	36
Std Deviation	0.02
Mean	**0.44**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with significant amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.44%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are present , and their yellow-orange color (see microphotograph) suggests a TAI value of about 2.4-2.5 (Chevron Scale), which is consistent with a measured average Ro of 0.44%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.40	0.40	0.40	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43
0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.45	0.45
0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.48

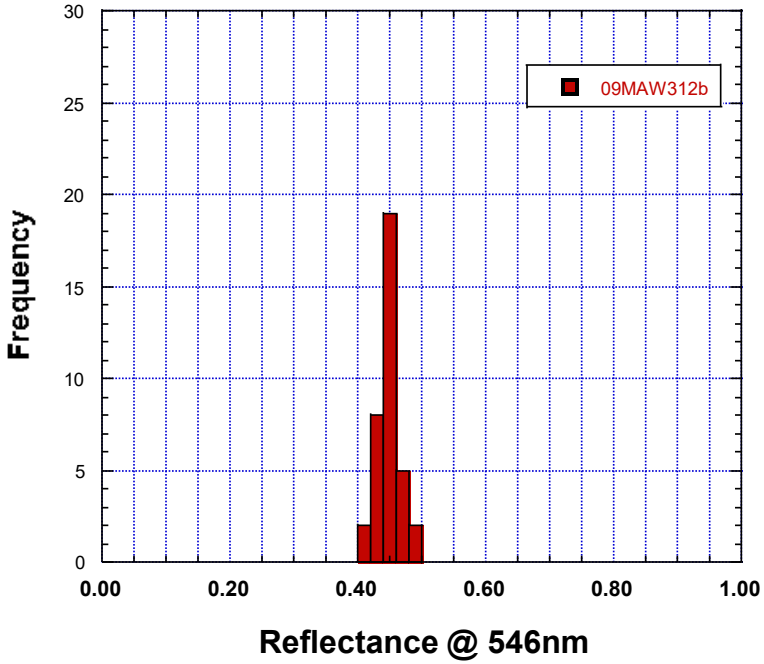
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09MAW306b	AA000535	09MAW306b		70	25	5	v. good	70	25	2.4-2.5	yellow-orange

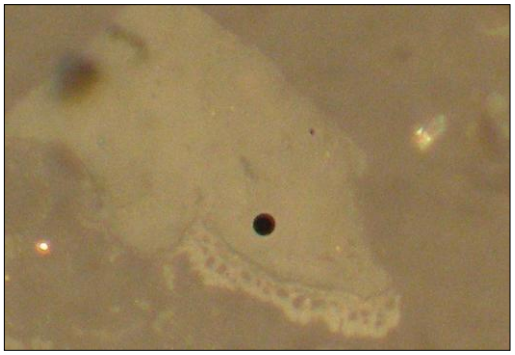
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09MAW312b	09MAW312b
Minimum	0.40
Maximum	0.49
Points	36
Std Deviation	0.02
Mean	**0.44**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with significant amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.44%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent, but the yellow-orange color of the amorphous OM suggests a TAI value of about 2.4-2.5 (Chevron Scale), which is consistent with a measured average Ro of 0.44%. Photomicrograph shows a large vitrinite fragment. The black spot is the measuring area of the photometer. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.40	0.41	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44
0.44	0.44	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45
0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.47	0.49	0.49

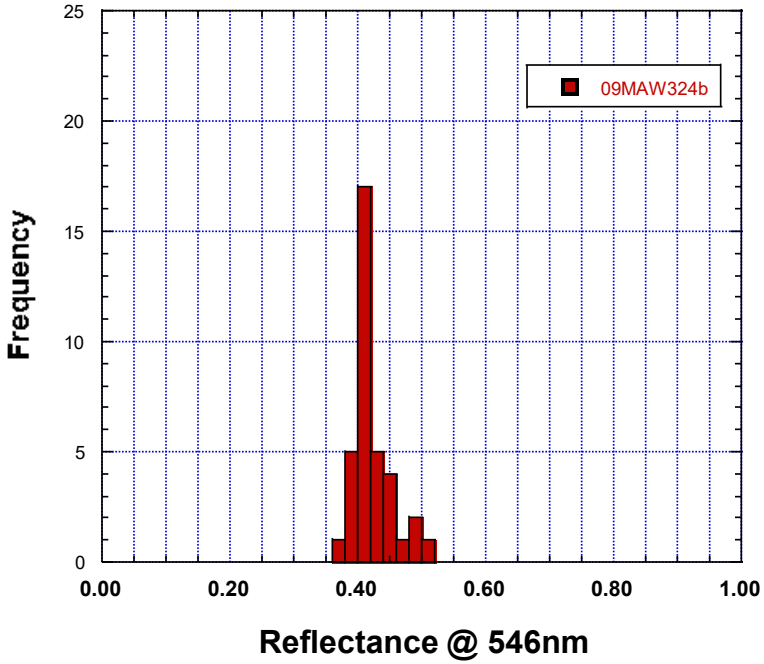
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09MAW312b	AA000536	09MAW312b		75	20	5	v. good	75	20	2.4-2.5	no plant spores

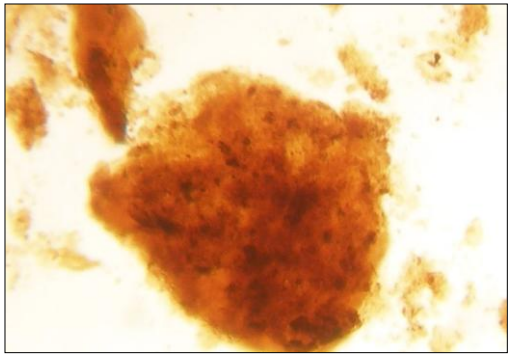
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

Alaska State Survey O/C Samples



09MAW324b	09MAW324b
Minimum	0.37
Maximum	0.50
Points	36
Std Deviation	0.03
Mean	**0.42**



Comments: Organic matter in this sample consists predominantly of very finely dispersed amorphous material associated with lesser amounts of disseminated humic debris. The amorphous OM appears to be liptinite-rich and oil-prone as indicated by its good fluorescence properties. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties Vitrinite particles large enough to measure are common, but exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.42%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the amorphous OM (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.47%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.38	0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.40
0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42
0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.47	0.48	0.49	0.50

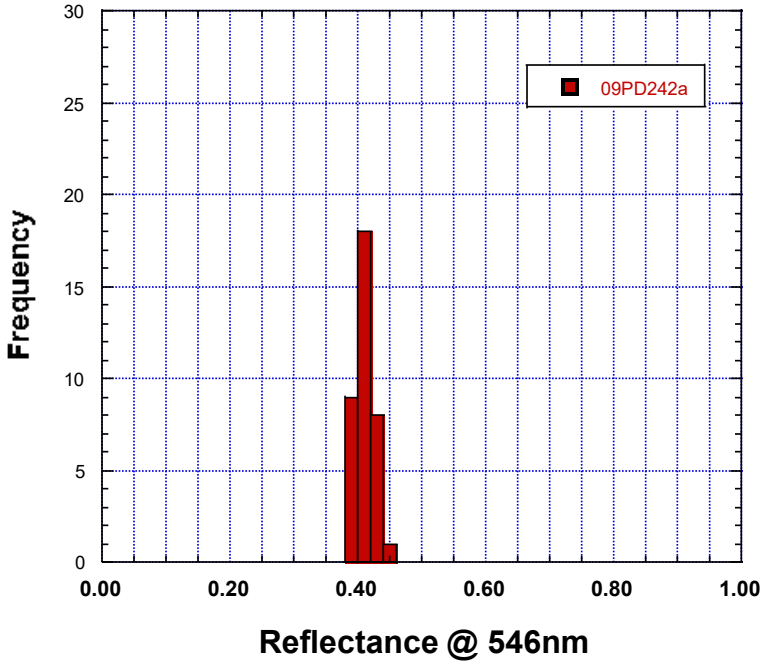
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09MAW324b	AA000537	09MAW324b		70	25	5	v. good	70	25	2.4-2.5	no plant spores

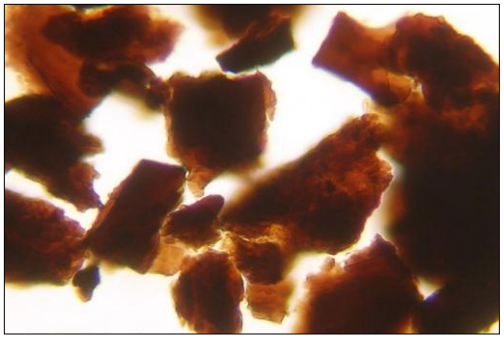
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD242a	09PD242a
Minimum	0.38
Maximum	0.44
Points	36
Std Deviation	0.01
Mean	**0.41**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.41%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.41%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40
0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41
0.41	0.41	0.41	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.44

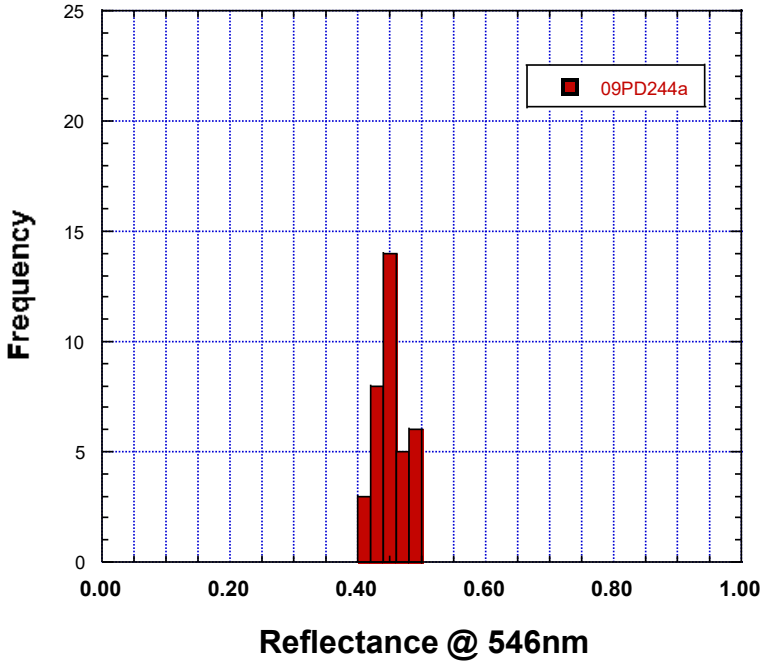
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD242a	AA000538	09PD242a		5	90	5	v. good	5	90	2.4-2.5	no plant spores

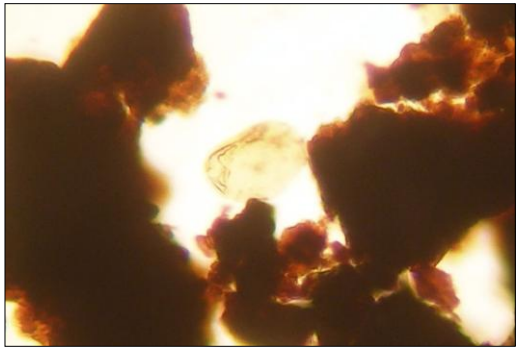
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD244a	09PD244a
Minimum	0.41
Maximum	0.49
Points	36
Std Deviation	0.02
Mean	**0.45**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.41%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are extremely rare. However, there is a single light yellow spore between the orange colored vitrinite fragments (see microphotograph), both of which suggests a low thermal maturity and are consistent with a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.41%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.44
0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
0.45	0.46	0.46	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.49

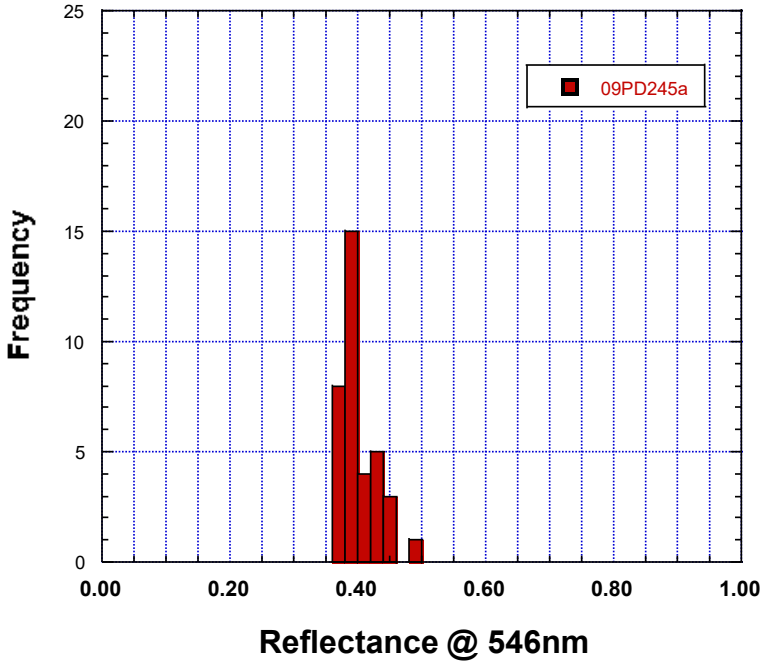
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD244a	AA000539	09PD244a		5	90	5	fair	5	90	2.4-2.5	light yellow

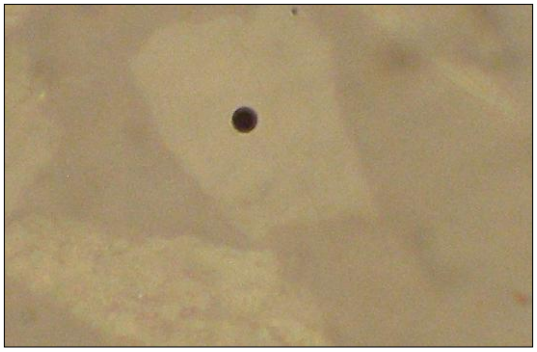
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD245a	09PD245a
Minimum	0.37
Maximum	0.48
Points	36
Std Deviation	0.03
Mean	**0.40**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.40%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent, but the orange color of vitrinite suggests a TAI value of about 2.4-2.5 (Chevron Scale), which is consistent with a measured average Ro of 0.44%. Photomicrograph shows a large vitrinite fragment. The black spot is the measuring area of the photometer. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38
0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.40
0.40	0.41	0.41	0.42	0.42	0.42	0.43	0.43	0.44	0.44	0.44	0.48

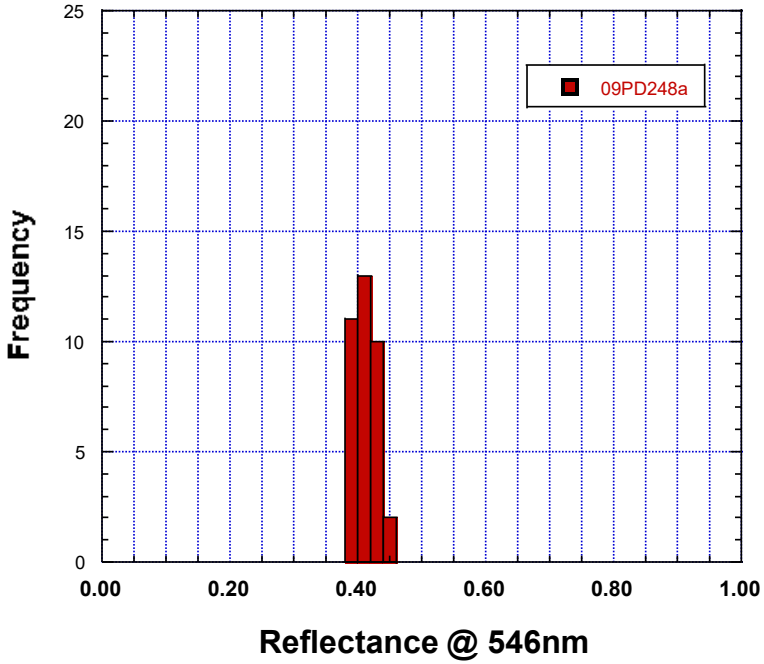
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD245a	AA000540	09PD245a		5	95	0	v. good	5	95	2.4-2.5	no plant spores

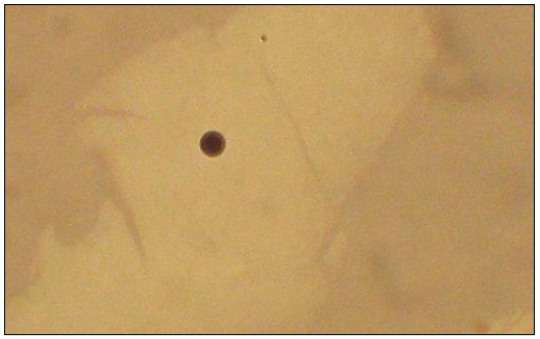
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD248a	09PD248a
Minimum	0.38
Maximum	0.44
Points	36
Std Deviation	0.02
Mean	**0.41**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.40%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent, but the orange color of vitrinite suggests a TAI value of about 2.4-2.5 (Chevron Scale), which is consistent with a measured average Ro of 0.44%. Photomicrograph shows a large vitrinite fragment. The black spot is the measuring area of the photometer. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40
0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41
0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44

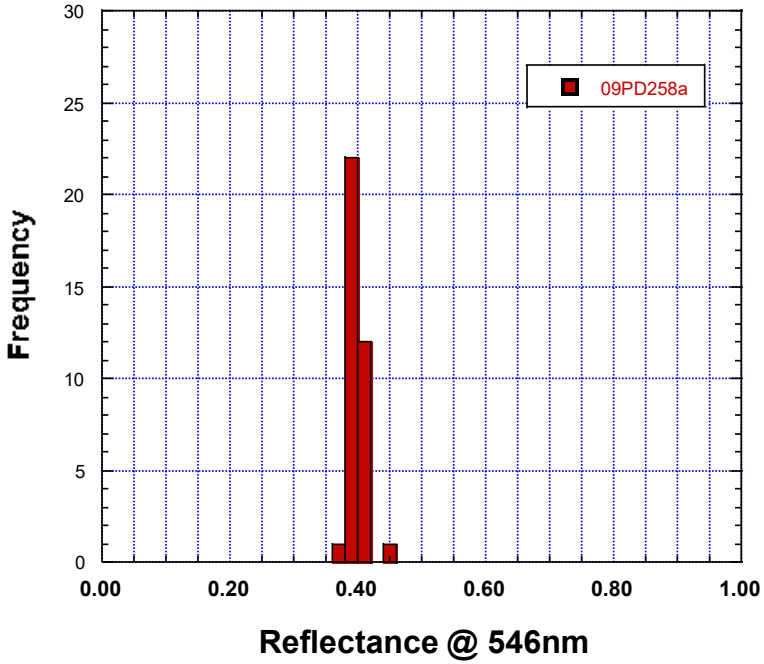
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD248a	AA000541	09PD248a		5	95	0	fair	5	95	2.4-2.5	no plant spores

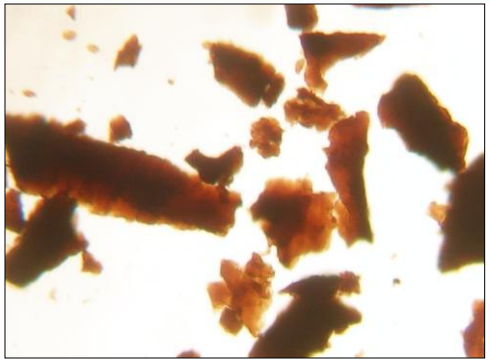
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD258a	09PD258a
Minimum	0.37
Maximum	0.45
Points	36
Std Deviation	0.01
Mean	**0.39**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.39%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, light orange color of the thin fragments of vitrinite (see microphotograph), suggests a low thermal maturity which is consistent with a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.39%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.39
0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40
0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.45

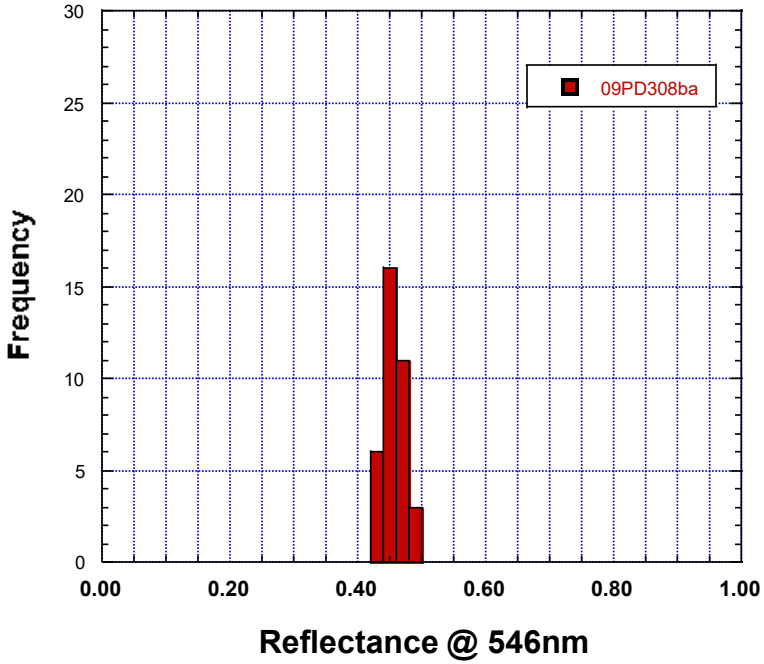
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD258a	AA000542	09PD258a		5	95	5	fair	5	95	2.4-2.5	no plant spores

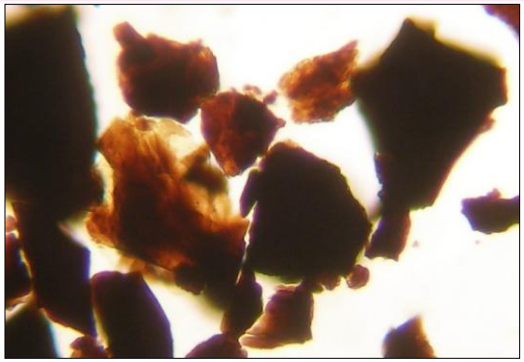
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD308ba	09PD308ba
Minimum	0.42
Maximum	0.49
Points	36
Std Deviation	0.02
Mean	**0.45**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.45%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, light orange color of the thin fragments of vitrinite (see microphotograph), suggests a low thermal maturity which is consistent with a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.45%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46
0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.48	0.48	0.49

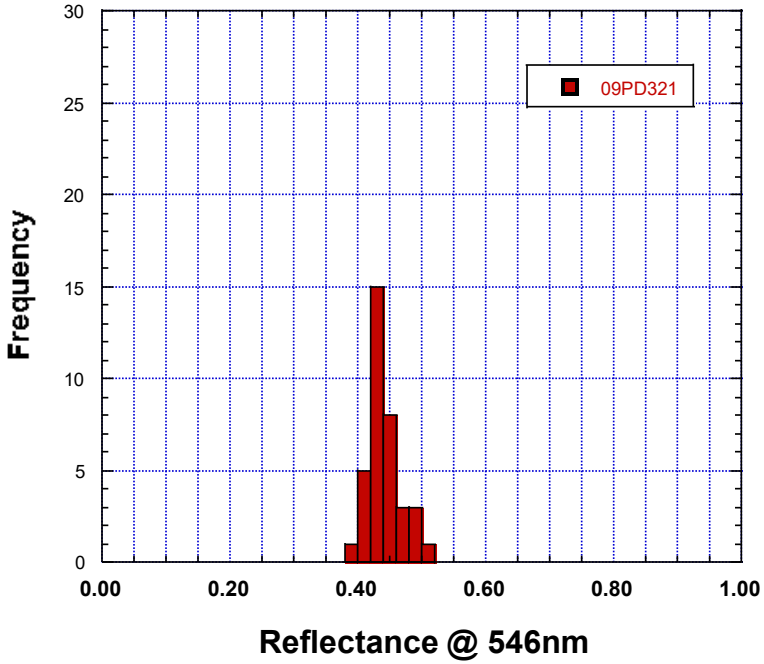
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD308ba	AA000543	09PD308ba		5	95	5	fair	5	95	2.4-2.5	no plant spores

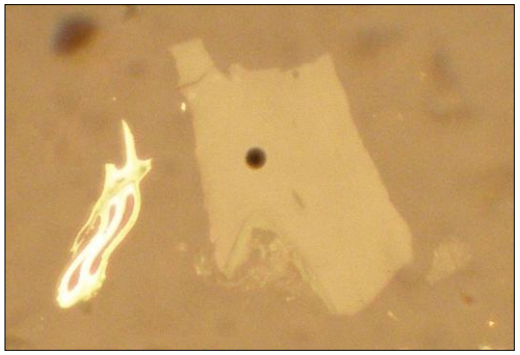
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD321	09PD321
Minimum	0.39
Maximum	0.50
Points	36
Std Deviation	0.03
Mean	**0.43**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Some of the amorphous fine material may be degraded humic debris. Vitrinite particles large enough to measure are common and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.43%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent, but the orange color of vitrinite suggests a TAI value of about 2.4-2.5 (Chevron Scale), which is consistent with a measured average Ro of 0.44%. Photomicrograph shows a large vitrinite fragment adjacent to a highly reflecting fusinite particle. The black spot is the measuring area of the photometer. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values *(Std. = 0.907% Ro.)*

0.39	0.40	0.40	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42
0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44
0.44	0.44	0.44	0.45	0.45	0.46	0.46	0.47	0.48	0.48	0.48	0.50

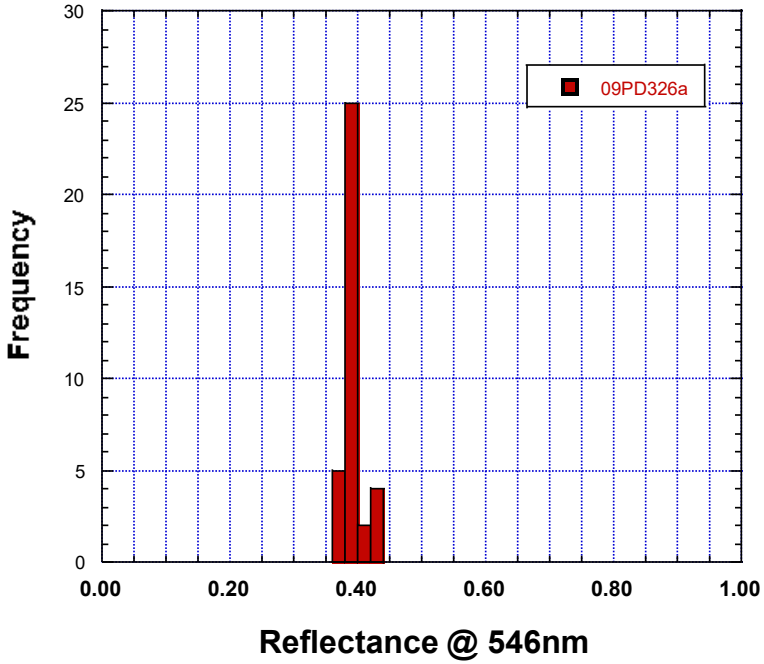
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD321	AA000544	09PD321		5	60	35	fair	5	60	2.4-2.5	no plant spores

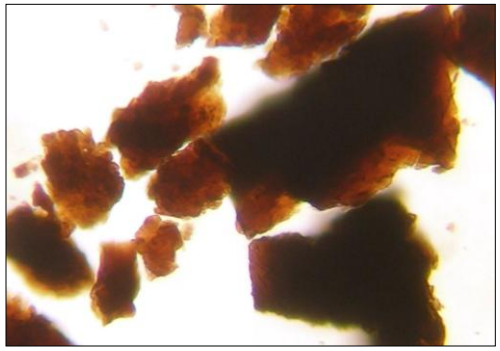
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

PD Outcrop Samples



09PD326a	09PD326a
Minimum	0.37
Maximum	0.43
Points	36
Std Deviation	0.02
Mean	**0.39**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.39%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, light orange color of the thin fragments of vitrinite (see microphotograph), suggests a low thermal maturity which is consistent with a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.39%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.38
0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39
0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.41	0.42	0.42	0.42	0.43

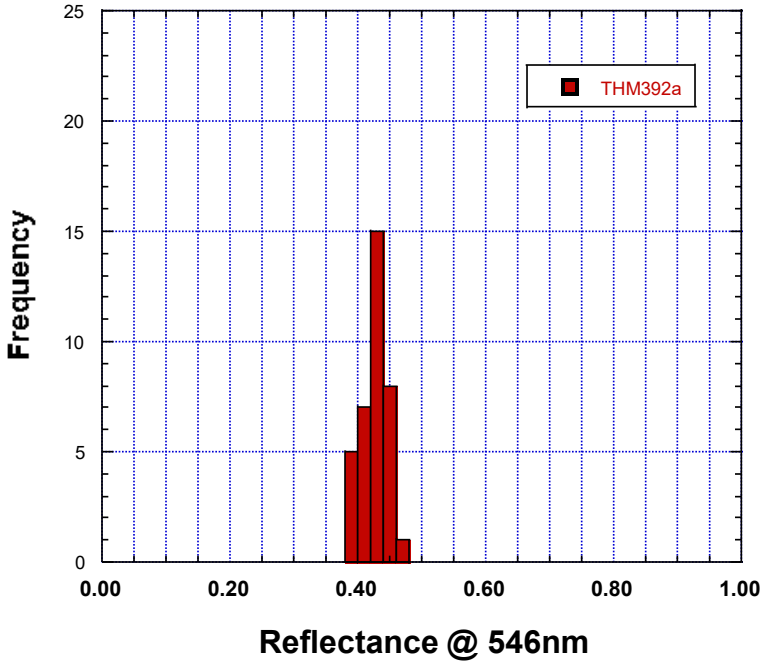
Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
09PD326a	AA000545	09PD326a		5	95	0	fair	5	95	2.4-2.5	no plant spores

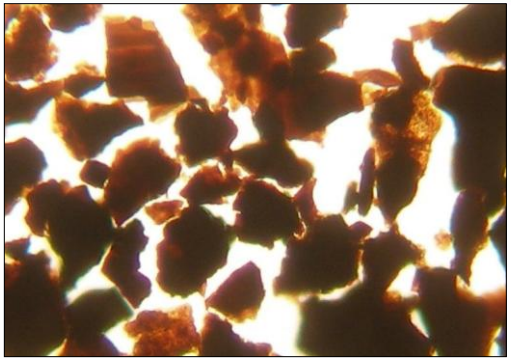
Weatherford LABORATORIES

Vitrinite Reflectance and MOA

THM Outcrop Sample



THM392a	THM392a
Minimum	0.39
Maximum	0.46
Points	36
Std Deviation	0.02
Mean	**0.42**



Comments: Organic matter in this sample consists of massive amounts of large humic fragments associated with trace amounts of amorphous material. Sample is likely an carbonaceous shale or coal. Additionally, much of the humic debris also appears liptinite-rich as indicated by its good fluorescence properties Vitrinite particles large enough to measure are abundant and exhibit a narrow range of reflectance values. Based on 36 measurements of the better preserved, lower reflecting vitrinite, the average Ro is 0.42%. Plant spores, which are good indicators of thermal maturity throughout the oil window, are absent. However, the orange color of the vitrinite in thin fragments (see microphotograph) suggests a low thermal maturity and is consistent a TAI value of about 2.4-2.5 (Chevron Scale) and a measured average Ro of 0.41%. These data suggest the OM in this sample has not reached the beginning generation stage of thermal maturity for oil-prone OM.

Ordered Ro Values (Std. = 0.907% Ro.)

0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40	0.41	0.41	0.41
0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43
0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.45	0.45	0.45	0.45	0.46

Visual Kerogen Analysis

Client ID	Sample ID	Depth	% Alg.	% Lip.	% Vit.	% Inert.	Liptinite Fluores.	% Oil Prone	% Gas Prone	TAI	Spore Color
THM392a	AA000546	THM392a		5	95	0	v. good	5	95	2.4-2.5	no plant spores