

Plate 1 A-D Vitrinite Reflectance Measurements, Histogram and Images



Company: Core Lab - IRS Division/Hope Natural Gas Company
 Formation: Utica
 Location: Wood Co., WV
 Well: Power Oil Company # 9634
 Depth (ft): 9448.00

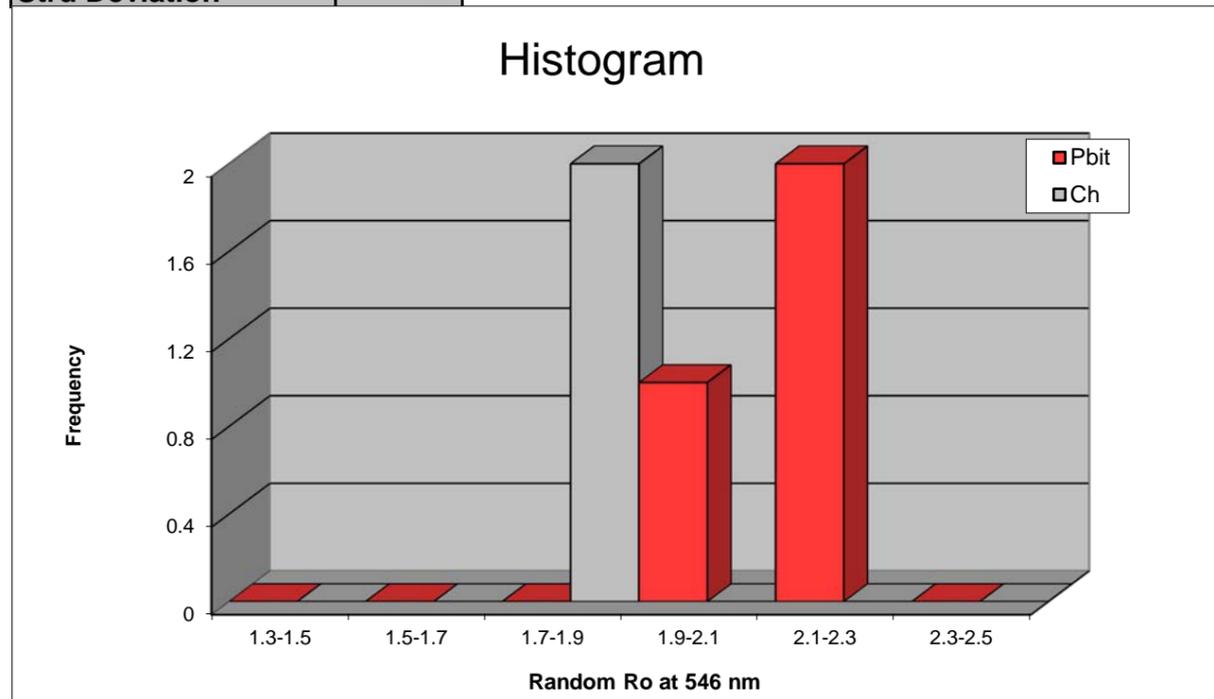
List of Ro Values in Increasing Order:

1.95 2.18 2.25

Min Value	1.95
Max Value	2.25
Mean Value	2.13
# of Measurements	3
Strd Deviation	0.16

The mean Ro, ran of pyrobitumen is 2.13% based on 3 measurements. The VRo-equivalent is 1.72%. Organic matter is post-mature and in the dry gas window.

The above values were measured on pyrobitumen. The VRo-eq is estimated to be 1.72% using the Jacob formula ($R_{vit} = R_{bit} \times 0.618 + 0.4$).



General Description: Organic matter (OM) is lean and occurs as pyrobitumen that occupies intergranular space; broken chitinozoan fragments having a pitted surface texture; minor amount of other zooclast fragments; and specks of bitumen staining. A mean Ro,ran of 2.13% measured on pyrobitumen gave an equivalent VRo of 1.72%. A mean Ro,ran of 1.84% measured on the pitted chitinozoan gave equivalent VRo values of 1.53% and 1.62%, using the correlations given by Tricker et al. (1992) ($R_{vit-eq} = (R_{chi} - 0.08) / 1.152$) and Bertrand and Malo (2001) ($R_{vit-eq} = (R_{chi} - 0.014) / 1.127$). All of these VRo values suggest that the organic matter is post-mature and in the dry gas stage of hydrocarbon generation and retention process. The matrix consists of quartz, carbonates, silt/clay, and pyrite.

Photo Captions:

- (A) Pyrobitumen (Pbit) (BRo,ran=2.219%).
 - (B) Thin and elongated fragment of a zooclast (Zoo) encountered normal to bedding.
 - (C) A broken fragment of a chitinozoan (Ch) showing the characteristic features, such as prosome (pr) and chamber (Cmb) (ChRo,ran=1.84%).
 - (D) Thin-walled chitinozoan (Ch) showing the chamber (Cmb).
- P=Pyrite.

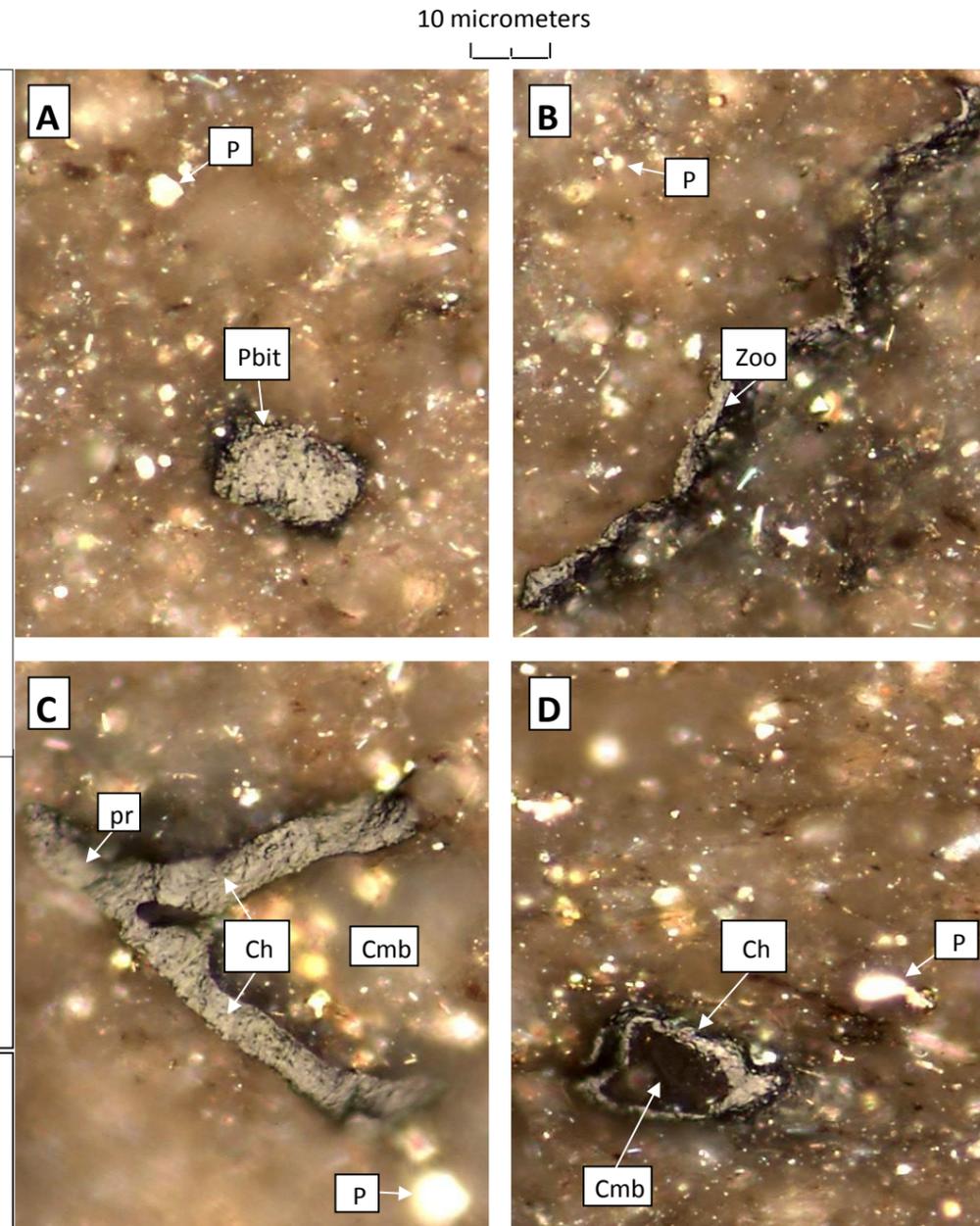


Plate 2 A-D Vitrinite Reflectance Measurements, Histogram and Images

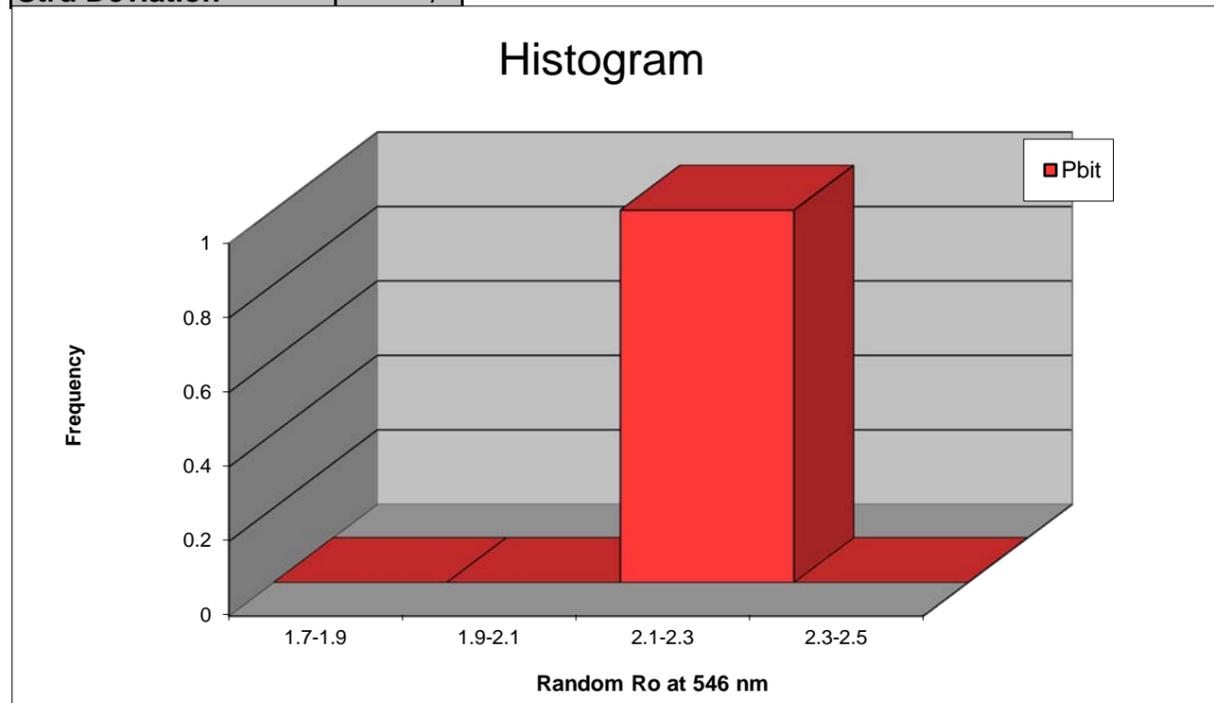


Company: Core Lab - IRS Division/Hope Natural Gas Company
 Formation: Utica
 Location: Wood Co., WV
 Well: Power Oil Company # 9634
 Depth (ft): 9481.30

List of Ro Values in Increasing Order:
 2.11

Min Value	2.11
Max Value	2.11
Mean Value	2.11
# of Measurements	1
Strd Deviation	N/A

An Ro, ran of 2.11% was measured on pyrobitumen. The VRo-equivalent is 1.70%. The above value was measured on pyrobitumen. The VRo-eq is estimated to be 1.70% using the Jacob formula ($R_{vit} = R_{bit} \times 0.618 + 0.4$). Organic matter is post-mature and in the dry gas window.



General Description: Organic matter is lean and occurs as pyrobitumen; thin-walled broken chitinozoan fragments; minor amount of other zooclast fragments; and bitumen staining. A Ro,ran of 2.11% measured on pyrobitumen gave an equivalent VRo of 1.70%, which suggests that the organic matter is post-mature and in the dry gas window. The matrix consists of quartz, carbonates, silt/clay, and pyrite.

Photo Captions:
 (A) Pyrobitumen (Pbit) in intergranular space (BRo,ran=2.111%).
 (B) Thin-walled chitinozoan (Ch) showing the chamber (Cmb).
 (C) Bitumen staining (Bit Stng) mixed with mineral matter.
 (D) Thin and elongated zooclast-like (Zoo) fragment.
 P=Pyrite.

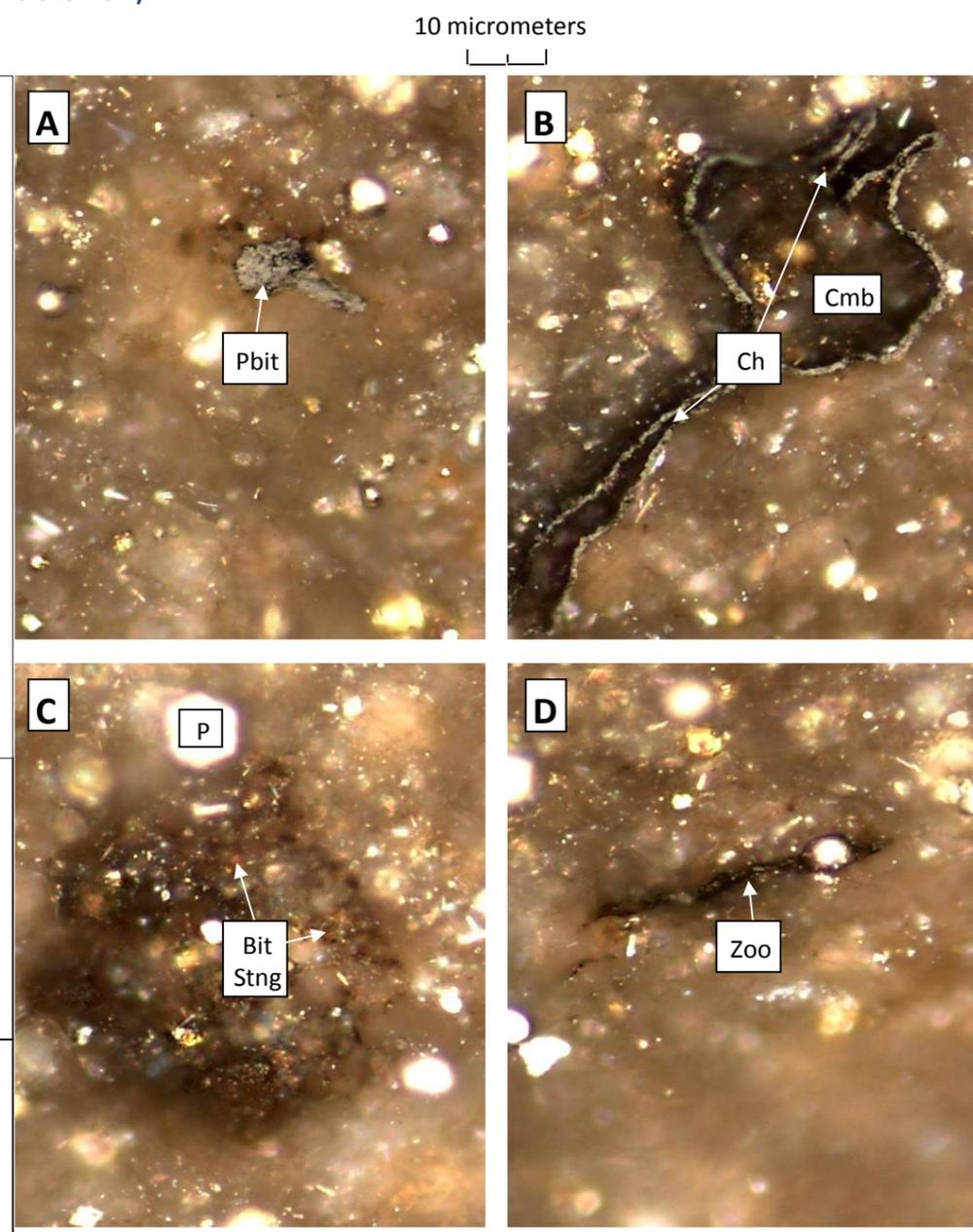


Plate 3 A-D Vitrinite Reflectance Measurements, Histogram and Images



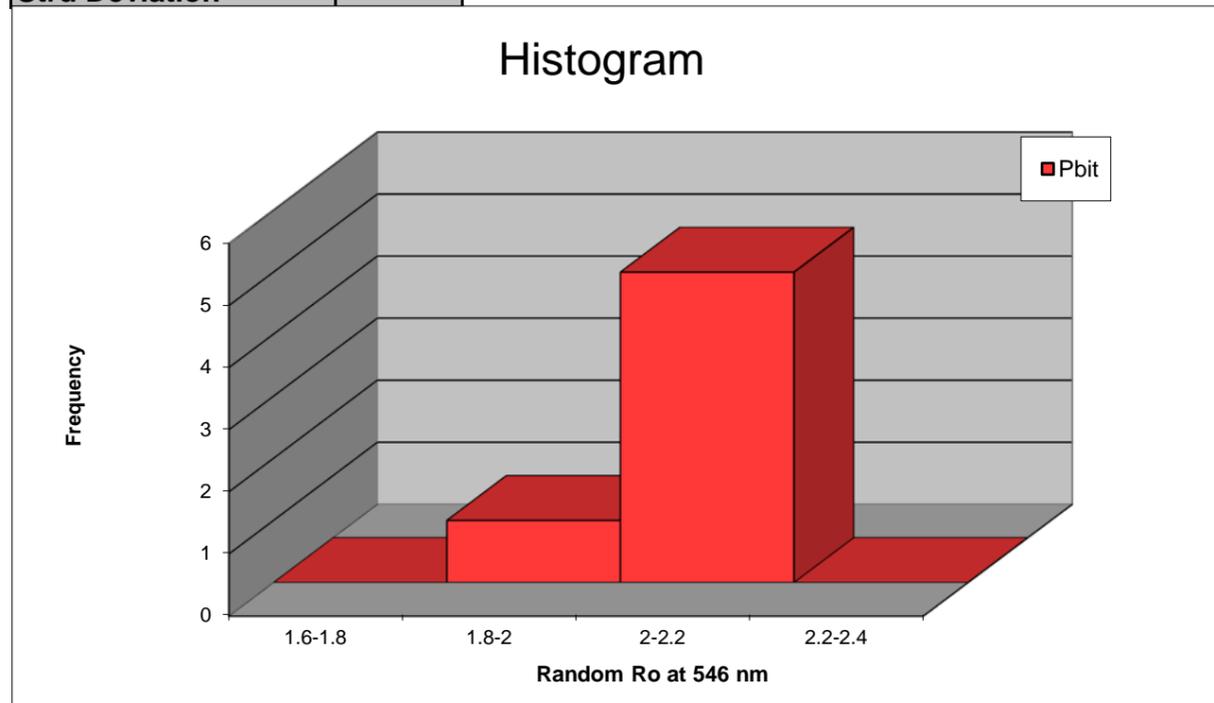
Company: Core Lab - IRS Division/Hope Natural Gas Company
 Formation: Utica
 Location: Wood Co., WV
 Well: Power Oil Company # 9634
 Depth (ft): 9541.40

List of Ro Values in Increasing Order:
 1.99 2.03 2.07 2.10 2.12 2.15

Min Value	1.99
Max Value	2.15
Mean Value	2.08
# of Measurements	6
Strd Deviation	0.06

The mean Ro, ran of pyrobitumen is 2.08% based on 6 measurements. The VRO-equivalent is 1.69%. Organic matter is post-mature and in the dry gas window.

The above values were measured on pyrobitumen. The VRO-eq is estimated to be 1.69% using the Jacob formula ($R_{vit} = R_{bit} \times 0.618 + 0.4$).



General Description: Organic matter is lean and comprises pyrobitumen, minor amount of zooclast fragments, granular bitumen, and bitumen staining. A Ro,ran of 2.08% measured on pyrobitumen gave an equivalent VRO of 1.69%, which suggests that the organic matter is post-mature and in the dry gas window. The matrix is calcareous and consists of quartz, silt/clay, and pyrite.

Photo Captions:

- (A) Pyrobitumen (Pbit) surrounding mineral matter (BRO,ran=2.077%).
- (B) Thin and elongated zooclast (Zoo).
- (C) Bitumen staining (Bit Stng) mixed with carbonate mineral matter (C).
- (D) Granular bitumen (Grnl Bit) in intergranular space.

P=Pyrite.

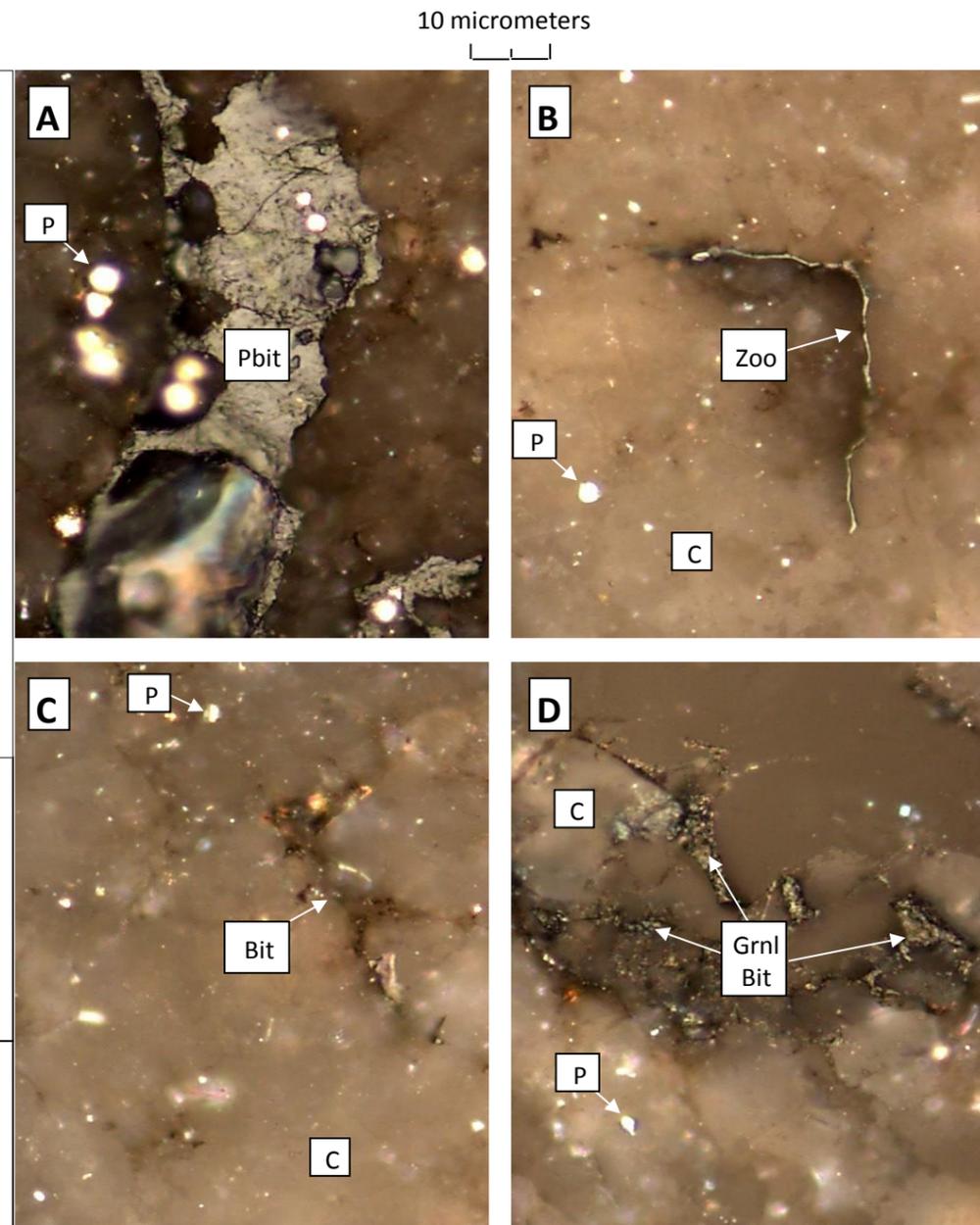


Plate 4 A-D Vitrinite Reflectance Measurements, Histogram and Images

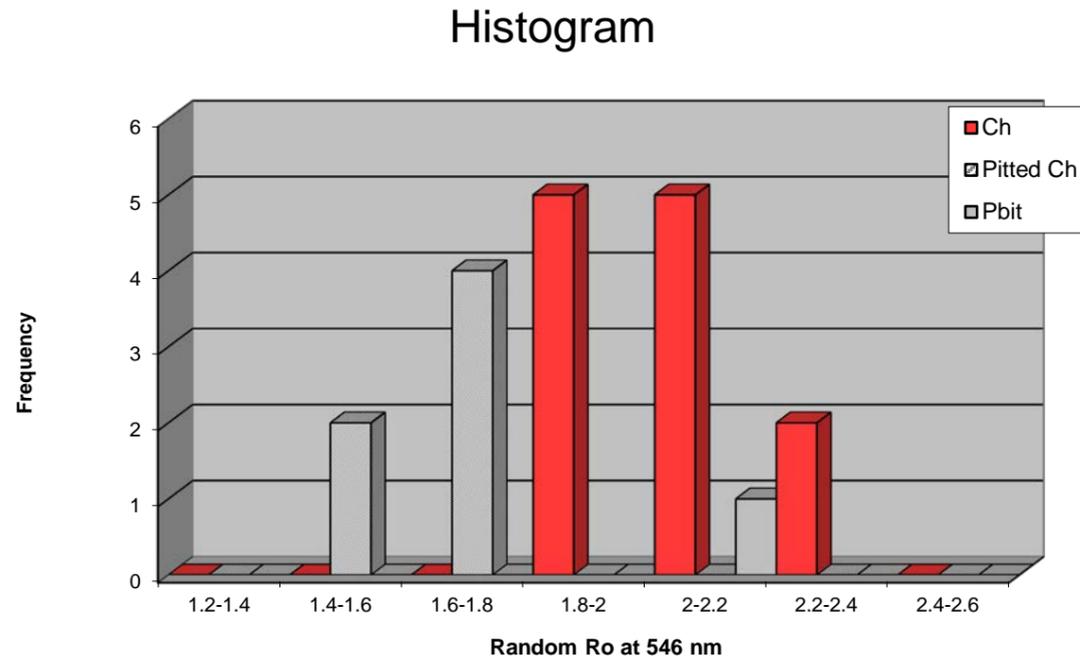


Company: Core Lab - IRS Division/Hope Natural Gas Company
 Formation: Utica
 Location: Wood Co., WV
 Well: Power Oil Company # 9634
 Depth (ft): 9588.00

List of Ro Values in Increasing Order:
 1.90 1.91 1.91 1.97 2.00 2.04 2.13 2.13 2.14 2.18
 2.24 2.39

Min Value	1.90
Max Value	2.39
Mean Value	2.08
# of Measurements	12
Strd Deviation	0.15

The mean Ro, ran of chitinozoans is 2.08% based on 12 measurements. The VRo-equivalent is 1.74%. The organic matter is post-mature and in the dry-gas window. The above values were measured on chitinozoan fragments. The VRo-eq is estimated to be 1.74% using the correlation of Tricker et al. (1992) ($Ro_{Vit-eq} = (Ro_{Chi} - 0.08) / 1.152$).



General Description: This sample is rich in broken parts of chitinozoans. Organic matter also occurs as trace pyrobitumen and bitumen staining. A mean Ro, ran of 2.08% measured on chitinozoans was used to obtain an equivalent VRo of 1.74% using the correlation given by Tricker et al. (1992). The same mean Ro, ran on chitinozoans gave an equivalent VRo of 1.83% using the correlation given by Bertrand and Malo (2001). Also, a Ro, ran of 2.11% measured on a single reliable grain of pyrobitumen gave an equivalent VRo of 1.70%. All of these equivalent VRo values suggest that the organic matter is post-mature and in the dry gas window. The matrix is calcareous and more argillaceous than the previous samples, and contains pyrite.

Photo Captions:
 (A) Pyrobitumen (Pbit) in intergranular space (BRo, ran=2.104%).
 (B) A broken part of a chitinozoan (Ch) showing the basal edge (be) (slightly out of focus because of its orientation) (ChRo, ran=2.023%).
 (C) Broken chitinozoan (Ch) (ChRo, ran=1.968%).
 (D) Chitinozoan (Ch) showing chamber (Cmb) (ChRo, ran=1.903%).
 P=Pyrite.

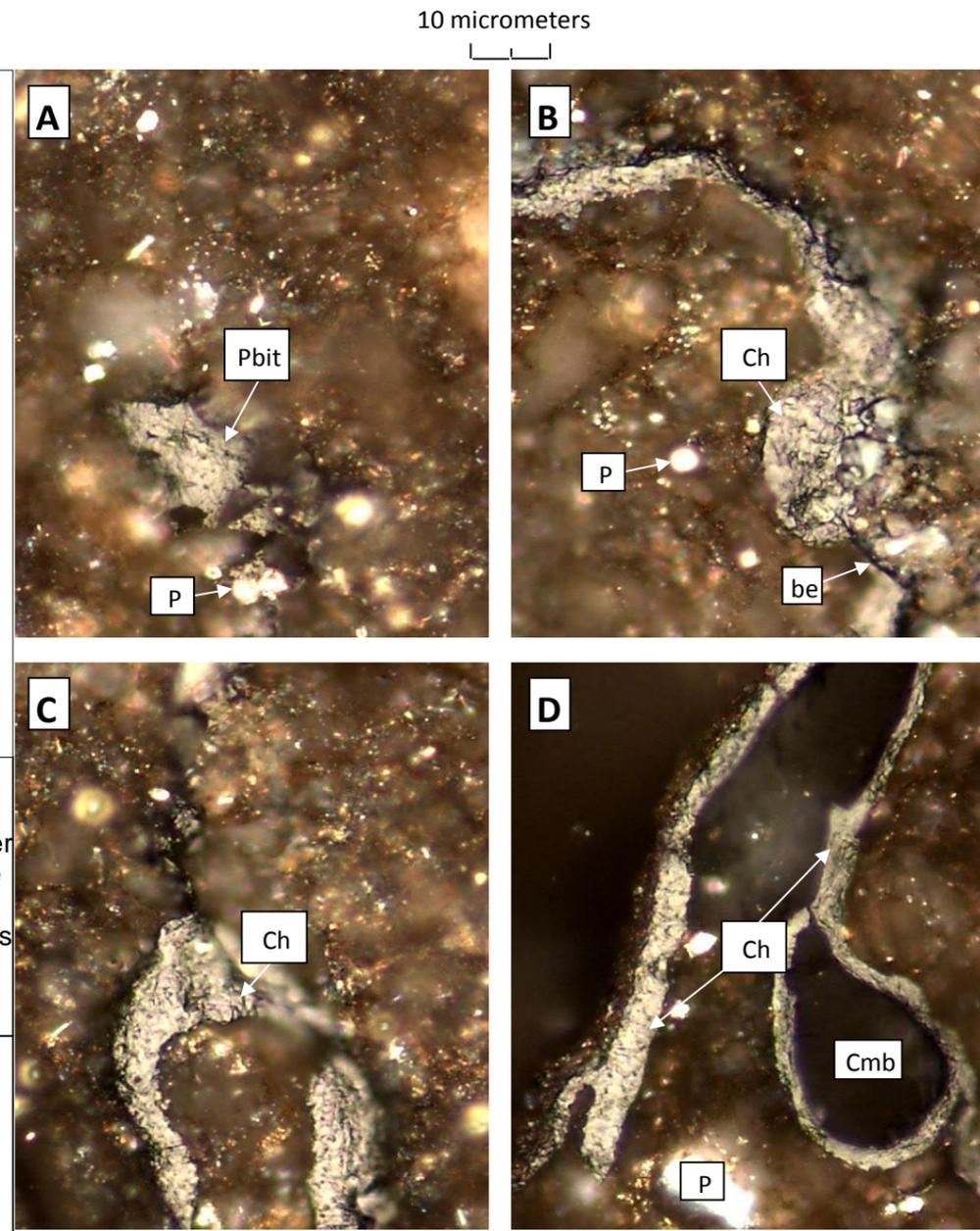


Plate 4 E-H Images and Captions Continued



Company: Core Lab - IRS Division/Hope Natural Gas Company
 Formation: Utica
 Location: Wood Co., WV
 Well: Power Oil Company # 9634
 Depth (ft): 9588.00

Photo Captions:
 (E) Thin-walled chitinozoan (Ch) showing characteristic features, such as prosome (pr) and chamber (Cmb).
 (F) Thick-walled chitinozoan (Ch) showing the chamber (Cmb) and prosome (pr). Mean $R_{o,ran}$ is 2.035%.
 (G) Same as in (E), but missing the chamber.
 (H) A zooclast (Zoo) fragment that was replaced by pyrite partially. A relic of the precursor is still visible.
 P=Pyrite.

10 micrometers

