Detailed Characterization of Green River Oil Shale Segments and Isolated Kerogen

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Skyline 16 Core

- 1000 foot core was drilled Spring 2010 in the Green River Formation, eastern Uinta Basin, Utah
- Three one-foot segments were identified to focus characterization efforts
- Identified sections sectioned for process analysis and efforts
- Focus on characterization that could be used to improve modeling effort

Mineral Composition of Shale

- QEMScan3D Quantitative Evaluation of Minerals by SCanning electron microscopy

GR-1

- Dolerite: 22.15%
- Feldspar: 23.70%
- Argillaceous: 18.25%
- Hidrocarbon-rich Dikes: 22.10%
- Carbon-rich Dikes: 82.20%
- Calcite: 7.51%
- Pyrite: 3.60%
- Other Metal (U) Phases: 1.63%
- Pyrite: 3.60%

GR-2

- Dolomite: 18.54%
- Feldspar: 25.94%
- Argillaceous: 21.65%
- Hydrocarbon-rich Dikes: 22.10%
- Carbon-rich Dikes: 82.20%
- Calcite: 7.51%
- Pyrite: 3.60%
- Other Metal (U) Phases: 1.63%
- Pyrite: 3.60%

GR-3

- Dolerite: 25.85%
- Feldspar: 25.94%
- Argillaceous: 21.65%
- Hydrocarbon-rich Dikes: 22.10%
- Carbon-rich Dikes: 82.20%
- Calcite: 7.51%
- Pyrite: 3.60%
- Other Metal (U) Phases: 1.63%
- Pyrite: 3.60%

Small Angle X-ray Scattering of Shale

SAXS data taken at the Advanced Photon Source (APS) at Argonne National Labs (ANL) on Beam Line 12-ID-B on whole rock and ground (100 mesh) shales

13C Solid State NMR of Shale & Kerogen

SAXS scattering curves fit using IGOR Pro Package and macros developed at APS. Fit on GR-3 whole rock obtained with a Schultz Polydisperse Spheres Model

Kerogen PDF Results

PDF data taken at APS at Beam Line 11-ID-B on both ground shale and isolated kerogen showing lack of long range order in kerogen

SEM/EDX of Kerogen

Data obtained on a FEI Quanta 600 SEM equipped with an EDX system to determine elemental composition at University of Utah’s Nanofab lab confirmed mineral free nature of kerogen from GR-1 (shown) and GR-2

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