

SOURCE ROCK ANALYSIS OF THE LOWER MEMBER
OF THE LEWIS SHALE, WASHAKIE BASIN, WYOMING

by:

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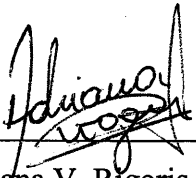
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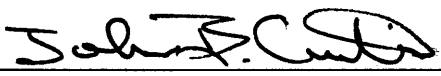
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ABSTRACT

Turbidite sandstones encased within shale source-rock within the Lewis Shale (Upper Cretaceous) comprise an important tight-gas resource system in the eastern Greater Green River basin, Wyoming. The purpose of this research is to provide a Lewis Shale source-rock characterization. This study helps clarify the relationship between source rocks and gas-oil production from reservoir rocks in the lower 600 ft (183 m) of the Lewis Shale.

A total of 145 shale samples were collected from 411 ft (125 m) of core in 3-ft (1-m) composite samples taken from 9 cores to perform TOC (total organic carbon) and Rock-Eval™ pyrolysis to determine source-rock quantity, quality and thermal maturity. Rock-Eval™ and TOC data interpretations show that a significant number of the samples have good to very good (1.0 – 5.5 wt.%) TOC contents. The samples are thermally mature and the depth of burial is between the beginning and peak of the “oil window.” Hydrogen index (HI) and oxygen index (OI) data were plotted on a modified van Krevelen plot to determine kerogen types present in the source rocks. The plot shows that organic matter is Type II and III. The HI indicates that the type of hydrocarbons generated is likely to be gas and oil. A relationship between TOC and GR (gamma ray) response was observed; a correlation coefficient (r^2) of 0.76 suggests that high GR responses in the formation correspond to intervals with high TOC values.

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