

Title:

Production of Oil Shale from the Green River Formation in Utah

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The largest deposits of oil shale in the world are documented to be in the Green River Formation of the western United States. If this oil resource (conservative estimate of 800 billion barrels recoverable) could be used to meet a quarter of the present U.S. demand for petroleum products, the resource would last for more than 400 years. This paper focuses on the upper Green River Formation in the eastern Uinta Basin (Utah), which has accumulated one of the richest and thickest oil-shale deposits. Based on cores and well logs a detailed depositional and sequence stratigraphic analysis of the upper Green River Formation is undertaken to identify the nature and extent of reservoir heterogeneity. A three-dimensional fluid flow model of the Mahogany zone, a representatively heterogeneous oil-shale interval, is built and simulated with the aim of understanding the impact of reservoir heterogeneity on a variety of production processes. Combination of pyrolysis/combustion is identified as the most efficient, though operationally much more complex. Impact of planar features (e.g. hydraulic fractures) on efficiency of heating shale reservoirs and in acting as fast communication channels within a given reservoir or from reservoir to reservoir are also assessed. This study is one of the first and unique scientific approaches to investigate the production potential of oil-shale resources of the Green River Formation in the State of Utah.

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