The Devonian Three Forks Formation: Manitoba’s Newest Oil Play

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Introduction

The Devonian Three Forks Formation is a key target for exploration in Manitoba, offering potential for new oil discoveries. This formation is characterized by its thick and laterally extensive deposits, which make it an attractive prospect for hydrocarbon exploration.

The Three Forks Formation is a significant sedimentary unit that spans the Devonian period, and its study can provide insights into the tectonic and depositional history of the region.

Features and Structure

The Three Forks Formation is composed of a variety of sedimentary rocks, including dolomitic siltstone, sandstone, and claystone. These rocks are interbedded, creating a complex stratigraphic sequence that is ideal for reservoir development.

The formation is typically divided into several units, each with distinct petrophysical properties that can influence the productivity of the reservoir.

Depositional Environment

The Three Forks Formation was deposited in a variety of environments, including shelf, slope, and basin areas. The deposition of these sediments was influenced by tectonic activity and sea level changes, which led to the formation of different depositional sequences.

Geological Setting

The Three Forks Formation is situated in the southern part of the Williston Basin, which is a major hydrocarbon province in North America. The formation is located in the Birdtail-Waskada Axis and the Qu’Appelle Group, which are significant structural elements in the basin.

Subsurface Investigation

The subsurface investigation of the Three Forks Formation involves the use of geophysical and geological data to understand the subsurface structure and properties of the formation. This includes the analysis of seismic data, well logs, and core samples.

Techniques

Several techniques are employed to study the Three Forks Formation, including sedimentological analysis, petrophysical studies, and geophysical surveys. These techniques help to identify the reservoir potential and to understand the complex stratigraphic architecture of the formation.

Three Forks Exploration

Exploration activities for the Three Forks Formation include drilling, reservoir characterization, and production testing. These activities are focused on identifying the best reservoir zones and optimizing production strategies.

Results

The exploration of the Three Forks Formation has yielded positive results, with several oil discoveries made in Manitoba. These discoveries include the Sinclair Field, the Daly Field, and the Kirkella Field, which are significant contributors to the region's oil production.

Future Development

Future development of the Three Forks Formation in Manitoba includes the continued exploration for new oil discoveries, as well as the optimization of existing reservoirs. This involves further geological and geophysical studies, as well as the application of advanced production technologies.

Conclusions

The Three Forks Formation is a promising target for oil exploration in Manitoba, offering potential for new discoveries and the revitalization of existing reservoirs. Further research and development in this region will help to unlock the full potential of this important sedimentary unit.

References


Karasinski, D.R., 2004: Middle Bakken diagenesis. (Karasinski, 2006)

Figure 1: Map of study area with area of interest highlighted. Figure 2: Map showing structural lineament. Figure 3: Three Forks Formation reference log with correlating core samples of subunits. Figure 4: Core photos taken in white (left) and ultraviolet (right) light. Figure 5: Schematic diagram displaying the distribution of Three Forks facies along an on-bank carbonate platform and high-energy carbonate shelf rim. (Karasinski, 2004)