North Hill Creek 3-D Seismic Exploration Project

DE-FG26-00BC15193

Program
This project was selected under the DOE solicitation DE-RP26-99BC15184 (1999). The goal of the Native American Initiative is to help Native American tribes meet their own energy resource needs and achieve sustainable energy development.

Project Goal
Apply 3-dimensional seismic surveying on the Uintah and Ouray Reservation with the goal of identifying oil and gas resources on virtually unexplored land that potentially holds million of barrels of crude oil.

Performers
Wind River Resources Corp.
Roosevelt, UT

Ute Indian Tribe
Uintah & Ouray Reservation, UT

Black Coral, LLC
Denver, CO

Fall-Line Exploration, Inc.
Denver, CO

Project Results
Fifteen successful wells (no dry holes) have been drilled to exploit gas resources on the Uintah & Ouray Reservation in the Uinta Basin, Utah based on the 25-square mile 3-D seismic survey conducted there in 2000-2001. The project found commercial oil, natural gas and natural gas liquids in a remote part of the Reservation, which had been previously underexplored.

Benefits
Production from the several wells represents the first commercial natural gas from the Wingate Formation, and the first production from the Entrada Formation in the southern Uinta Basin. The Ute Tribe has benefited from increased oil and natural gas revenue from these wells. At least three additional 3-D seismic surveys have been completed in the vicinity of the North Hill Creek survey and five additional surveys are being planned for the summer and fall of 2004.

The total cost of the seismic survey at $1.5 million (includes Flat Rock Field) is comparable to the cost of a single deep dry hole in the region. Application of advanced seismic technology for exploration and development drilling in the North Hill Creek area of the Uinta Basin demonstrates the need to reassess areas that have been overlooked for natural gas recovery in recent years. There remains a large area of unexplored and underexplored opportunities on Ute Indian lands, Utah state lands, and federal lands in the Book Cliffs area of the Uinta Basin that could benefit by 3-D survey and modern interpretation.

It is hoped that environmental groups will come to recognize that 3-D seismic is an "environmentally friendly technology" in Utah, because it reduces the number of dry holes. Typically 15 wildcat wells would result in only 2-3 producing wells. Four extremely dry years after the survey at North Hill Creek, it is not obvious on the ground that the survey ever took place.

Background
The Uinta Basin of northeast Utah has been producing oil and gas for over 50 years. The Uintah and Ouray Reservation of the Ute Indian Tribe covers 1.2 million acres in the Uinta Basin. Although oil and gas has been exploited on the reservation from the 1940s through the present. Little exploration took place after the 1970s and large areas of the reservation remained unexplored. Limited natural gas pipeline infrastructure resulted in many potential gas wells being plugged by operators searching primarily for oil. Even after a natural gas pipeline was constructed nearby, development was slow, because of weak markets. The reasons for the lack of use of 3-D seismic exploration included high costs associated with challenging topography, low expectations of data quality, and a philosophy of step-wise development rather than new exploration. In the late 1990s low prices for natural gas further contributed to a lack of interest in exploring areas thought to be primarily gas-bearing, which included much of the Uintah-Ouray Reservation. The Ute Indian Tribe wanted to develop their mineral acreage and partnered with Wind River Resources to develop the North Hill Creek area believed to have great potential for oil and gas production.

Project Summary
- Successful wells have been drilled in a remote part of the reservation.
- Nine geologic formations are contribut-

Completion operations in the seismic surveying area.

ing hydrocarbons to the wells.

- First commercial production of natural gas from the Wingate formation.
- First commercial production of natural gas from the Entrada Formation in the Uinta Basin.
- The quality of the 1st significant exploratory 3-D survey in the Uinta Basin has encouraged other operators to employ the technology.

In the fall of 2000, a 3-D seismic survey was conducted over 25 sq. miles; 15 sq. miles of reservation lands, and an adjoining 10 sq. miles of non-reservation land in Flat Rock Field. Flat Rock Field provided data from 20 existing wells for correlating the stratigraphic framework and seismic lines. Processing and interpretation of the survey indicated a number of promising leads.

The seismic survey was helpful in delineating the structure and stratigraphy of a complex multi-formation structure on the north edge of the Uncompahgre Uplift. The structural features of the Uncompahgre Uplift and the stream channels formed in the Wasatch, Mesaverde, Dakota and Cedar Mountain formations were the main focus of the research. In addition to known oil shows in the Tertiary Wasatch Formation, gas shows were discovered in the Cretaceous Cedar Mountain and Dakota formations and Mesaverde Group, and in the Jurassic Entrada and Triassic Wingate formations.

Although the potential for production from these deeper formations, the Entrada and Wingate, was considered they were not known for oil or gas production. The seismic survey provided the first images of the Hill Creek anticline and the thick eolian sand deposits of the Entrada and Wingate formations, which appear to underlie a very large area in the southern Uinta Basin. Because of the seismic data, test wells were drilled to the Entrada and Wingate, which exceeded expectations.

Fifteen wells have been drilled based on the survey with no dry holes. Several of the wells have become the best gas producers in Utah demonstrating the value of applying modern exploration technologies to known but untested areas. As a result of the seismic survey on the Uintah and Ouray Reservation production has been established from ten geological formations from depths at 3,500 ft in the Wasatch to 12,250 ft in the Wingate.

Current Status (September 2004)

The project was completed late in 2003, but the information continues to be used to expand the drilling in the Uinta Basin. Several interesting geological structures and anomalies were identified at depth, south of the fault in the northeast corner of the 3-D data set. These areas have not been explored, but the potential for hydrocarbons from the Entrada, Wingate and Mancos formations in this area is high. The value of using 3-D data for explored lands in Utah has been proven and can be applied to similar areas such as the Book Cliffs area.

Drilling on the Unitah and Ouray Reservation.

Project Start: September 14, 2000
Project End: December 31, 2003

Anticipated DOE Contribution: $500,000
Performer Contribution: $275,000 (35% of total)

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