

P R O J E C T facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

OIL recovery
P R O G R A M

IMPROVED RESERVOIR MANAGEMENT AND DESCRIPTION HELP TARGET INFILL WELLS IN A TEXAS FIELD — THE FINA PROJECT

PRIMARY PROJECT PARTNER

Fina Oil & Chemical Co.
Midland, TX

FOSSIL ENERGY PROGRAM

**Oil Field Recovery
Demonstrations**

MAIN SITE

**West Texas Midland
Basin**
Midland, TX

TOTAL ESTIMATED COST

\$20.3 million

COST SHARING

DOE - \$8.7 million

Non-DOE - \$11.6 million

DE - FC 22 - 9314989

Project Description

Fina Oil and Chemical Company is conducting a Department of Energy-sponsored field test to demonstrate the use of detailed reservoir description to locate and drill new production wells between existing wells in the North Robertson Unit in Gaines County, Texas. The objective of this "targeted infill drilling" is to place the wells only at locations that will maximize the economic production of oil.

The North Robertson Unit produces from Class 2 shallow shelf carbonates on the northwest rim of the West Texas Midland Basin. Variations in rock type, thickness and continuity of the reservoir strata have limited recovery from previous waterfloods. The flow between existing injection and production wells drilled on an unvarying grid pattern misses many of the oil-containing zones.

Fina is performing detailed reservoir descriptions based on geological and well data to selectively target optimal infill well sites for maximum oil recovery. Three representative areas within the North Robertson Unit are being studied in detail. Computer models will analyze reservoir performance and guide the placement of new targeted infill wells. Results from these focused studies will be applied throughout the Unit and in other similar area reservoirs to increase oil recovery and improve economic performance.

Candidate wells for deepening and recompletion have been identified. The production rate from the Unit is expected to increase by about 10% when these recompletions are implemented. Current tasks include modeling of reservoir performance and the distribution of reservoir properties. Tasks to be undertaken in the immediate future will focus on predicting optimum locations for infill wells in preparation for the field demonstration phase of the project.

Program Goal

DOE's Oil Recovery Field Demonstration Program solicited industry input on ways to overcome barriers to production in various types of reservoirs. Fina adopted a program to improve production in West Texas shallow shelf carbonate reservoirs using detailed knowledge of the reservoir, improved reservoir management, and infill drilling guided by the reservoir studies rather than using an unvarying grid, which is commonly counterproductive.

In addition to an expected 10% production increase from the recompletion of existing wells, Fina estimates the new infill wells will produce in the range of 650 to 950 barrels per day from a field where currently 144 wells are producing a total of only 3000 barrels per day. If the project is successful, application of the technology to other shallow shelf carbonate reservoirs has enormous potential for additional production.

Project Partners

DAVID K. DAVIES & ASSOC.
Kingwood, TX

MOBIL OIL CO.
Midland, TX

**CTR FOR ECON. & ENERGY
DIVERSIFICATION (UTPB)**
Odessa, TX

TEXAS A&M
College Station, TX

SCHLUMBERGER
Midland, TX

UNIVERSITY OF TULSA
Tulsa, OK

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Project Benefits

"Infill" drilling using a gridded, indiscriminating pattern can lead to emplacement of poorly producing wells and may disrupt ongoing production or injection operations. Fina's project demonstrates conventional and advanced technologies that can be used to drill geologically targeted infill wells for maximum economic recovery of oil in shallow shelf carbonate reservoirs.

At the inception of this project, total production from the 144 producing wells in the North Robertson Unit was only 3,000 barrels per day. Expected recoveries from the geologically targeted infill wells drilled in association with this project are expected to be in the range of 650 to 950 barrels per day per well. Implementation over the entire Unit of the concepts developed in this project could result in the recovery of an additional 16.5 to 22 million barrels of oil or an additional 6 to 8% of the oil originally in place at the time of discovery.

Typical Clearfork reservoirs have recovered only 15 to 22% of the oil they originally contained; the use of targeted infill drilling in combination with waterflooding could recover as much as 2.5 billion barrels of additional oil from these reservoirs alone. Because all shallow shelf carbonate reservoirs to some degree have heterogeneous characteristics similar to the Clearfork, tremendous volumes of additional oil have the potential to be recovered using targeted infill technologies.

The results from this project will have additional economic impacts on other operations as expensive but locally unsuitable technologies are identified and avoided in similar reservoirs. Benefits of Fina's approach also extend to improving the efficiency of enhanced oil recovery (EOR) processes. The success of EOR projects such as carbon dioxide or chemical floods aimed at removing oil not displaced by injected water is dependent on efficient access to reservoir beds. Targeted infill drilling can provide that access.

CONTACT POINTS

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Cost Profile (Dollars in Millions)

	Budget Period 1		Budget Period 2	
	06/13/94	03/12/96	06/12/99	06/12/99
Department of Energy*	\$1.2		\$7.5	
Private Sector Partners	\$2.13		\$9.43	

* Obligated Funding

Key Milestones

