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QUARTERLY TECHNICAL PROGRESS REPORT

ADVANCED OIL RECOVERY TECHNOLOGIES FOR IMPROVED RECOVERY FROM SLOPE BASIN CLASTIC RESERVOIRS, NASH DRAW BRUSHY CANYON POOL, EDDY COUNTY, NM

DOE Cooperative Agreement No. DE-FC-95BC14941

Strata Production Company
P.O. Box 1030
Roswell, NM 88202
(505) 622-1127

Date of Report:	January 22, 1996
Award Date:	September 25, 1995
Anticipated Completion Date:	September 24, 1997 -- Budget Period I September 25, 2000 -- Budget Period II
Award Amount for Current Fiscal Year:	\$1,786,163
Award Amount for Budget Period I:	\$3,354,067
Name of Project Manager:	Mark B. Murphy
Name of D.O.E. Project Officer:	Edith C. Allison, Bartlesville Project Office
Reporting Period:	October 1 to December 31, 1995

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Objectives

The overall objective of this project is to demonstrate that a development program based on advanced reservoir management methods can significantly improve oil recovery and to transfer this technology to oil and gas producers in the Permian Basin. The demonstration plan includes developing a control area using standard reservoir management techniques and comparing the performance of the control area with an area developed using advanced management methods. Specific goals to attain the objective are: (1) to demonstrate that a development drilling program and pressure maintenance program, based on advanced reservoir management methods, can significantly improve oil recovery compared with existing technology applications, and; (2) to transfer the advanced methodologies to oil and gas producers in the Permian Basin and elsewhere in the U.S. oil and gas industry.

Summary of Technical Progress

This is the first quarterly progress report on the project. Results obtained to date will be summarized.

Description of Project Work

The plan calls for developing a control area using standard reservoir management techniques and comparing the performance of the control area with an area developed using advanced reservoir management methods. Eight new wells will be drilled for data acquisition in a pilot demonstration project area. Results from reservoir characterization and simulation studies from the pilot project will be used to design an optimum field demonstration program that is anticipated to involve the drilling of ten wells using various combinations of vertical and horizontal drilling techniques and employing selective completions to optimize production performance. The program anticipates that the 3-D seismic data analysis, reservoir simulations, production and geostatistical studies and additional well drilling will facilitate the unitization of the project area.

This is a five year project with two budget periods; duration of the first budget period is two years and duration of the second is three years. During the first period, the feasibility of a pilot project will be determined and the extrapolation of the results will be applied to a full field implementation, if technically and economically feasible. The full implementation will occur in period two, and the preliminary results obtained from the pilot will be confirmed.

History and Status of Project

The Nash Draw Unit produces primarily from the Permian Delaware Mountain Group Sandstones. Unit production comes from a total of 14 different sands within the Brushy Canyon and Cherry Canyon Members. The sands were deposited as part of a submarine fan/channel complex in a 4,000 ft basinal fill sequence. Depositional strike is generally north/northeast-south/southwest with the productive sands draping over subtle structural noses and/or closures. Post depositional

compaction may also play a part in the trapping mechanisms. Lateral variations in porosity and permeabilities limit the extent of the individual reservoirs and act as a stratigraphic component of the traps. Porosities range from 12 to 20%, and permeabilities vary from 0.5 to 18 md. The most prolific sands in the field are the basal sands of the Brushy Canyon Member, and average net pay thickness is 90 ft. A type log for the Lower Brushy Canyon Sequence at the Nash Draw Unit is presented in Figure #1. The primary productive intervals are the "K" and "L" sands.

As part of the project two new wells were drilled for data acquisition: Nash Draw Unit #23 and Nash Draw Unit #24. Locations of these new wells and the existing wells in the Nash Draw Unit are shown in the structure map presented in Figure #2. Wells in the Unit now consist of 13 Delaware producing wells and one salt water disposal well.

When Nash Draw Unit #24 was drilled, multiple sidewall cores were obtained for analysis. When Nash Draw Unit #23 was drilled, 203 ft of full core was cut from 6641 to 6844 ft. The routine core analysis included porosity, permeability, and saturation for each foot of core. Special core analyses are in progress to determine wettability, relative permeabilities, mineralogy, pore structure, and clay content. Normal suites of logs were obtained in both wells, and a Magnetic Resonance Imaging tool was run in Well #23 for comparison of permeability and saturation data to the core that was taken.

Compilation of data, including production and well data, has begun to provide basic data to the simulation team. Data input into the reservoir characterization model and simulator will begin next quarter.

All of the major subcontractors for the project have been identified. Agreements with several subcontractors have been executed and the remainder are being finalized.

Plans for the next quarter call for the drilling of the next data acquisition well, Nash Draw Well #25, in February 1996. The preliminary well design calls for the acquisition of the vertical seismic profiling images as part of the reservoir characterization activities. The VSP data will be used to design the 3-D seismic program, which is scheduled to be conducted during the late spring or summer of 1996.

TYPE LOG
NASH DRAW DELAWARE UNIT
STRATA PRODUCTION COMPANY

NASH UNIT #24
LOWER BRUSHY CANYON SEQUENCE

Figure 1

○ = DELAWARE
PRODUCER

Type map:	STRUCTURE MAP	
Area:	NASH UNIT-LAGUNA SALADO	
Horizon:	T/BONE SPRING	
C.I. 50 FEET	Scale:	NTS
County: EDDY	State:	NM
Date: 4/95	GEOLOGY: BJU	

Figure 2