TITLE: IMPROVED OIL RECOVERY IN MISSISSIPPIAN CARBONATE RESERVOIRS OF KANSAS -- NEAR TERM -- CLASS 2

Cooperative Agreement No.: DE-FC22-93BC14987

Contractor Name and Address: The University of Kansas Center for Research Inc.

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Award Date: September 16, 1994

DOE Cost of Project: $ 3,169,252 (Budget Period 1 09/18/94 -- 05/15/97

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Reporting Period: January 1, 1997 -- March 31,1997

OBJECTIVES

The objective of this project is to demonstrate incremental reserves from Osagian and Meramecian (Mississippian) dolomite reservoirs in western Kansas through application of reservoir characterization to identify areas of unrecovered mobile oil. The project addresses producibility problems in two fields: Specific reservoirs target the Schaben Field in Ness County, Kansas, and the Bindley Field in Hodgeman County, Kansas. The producibility problems to be addressed include inadequate reservoir characterization, drilling and completion design problems, non-optimum recovery efficiency. The results of this project will be disseminated through various technology transfer activities.

At the Schaben demonstration site, the Kansas team will conduct a field project to demonstrate better approaches to identify bypassed oil within and between reservoir units. The approach will include:

- Advanced integrated reservoir description and characterization, including integration of existing data, and drilling, logging, coring and testing three new wells through the reservoir intervals. Advanced reservoir techniques will include high-resolution core description, petrophysical analysis of pore system attributes, and geostatistical analysis and 3D visualization of interwell heterogeneity.
- Computer applications will be used to manage, map, and describe the reservoir. Computer simulations will be used to design better recovery processes, and identify potential incremental reserves.
- Comparison of the reservoir geology and field performance of the Schaben Field with the previously described by slightly younger Bindley Field in adjacent Hodgeman, County.
- Drilling of new wells between older wells (infill drilling) to contact missed zones;
- Demonstration of improved reservoir management techniques, and of incremental recovery through potential deepening and recompletion of existing wells and targeted infill drilling.

SUMMARY OF TECHNICAL PROGRESS BUDGET PERIOD 2

Progress is reported for the period from 1 April 1997 to 30 June 1997. Work in this quarter concentrated on finishing the full field reservoir simulation (Task 1.2), generating a final report for Budget Period 1, technology transfer efforts (Task 2.2) and demonstrating the incremental recovery of additional mobile oil through targeted infill drilling (Task 2.1). Two wells using locations identified through the reservoir characterization and simulations were drilled and are awaiting completion.

Task I.1 -- Acquisition and Consolidation of Available Data (Complete 3/31/96)

This task is complete except for the continuing addition of production data from the demonstration site.

Task I.2 -- Reservoir Characterization (Target Completion Date 3/31/97)

The geologic reservoir characterization for the Schaben Field is complete and has been presented at several national and regional meetings. Much of the geologic and production data including maps, cross-sections and core analysis are available on-line at the reservoir, lease and well levels. The Uniform Resource Locator (URL) is http://www.kgs.ukans.edu/DPA/Schaben/schabenMain.html.

The reservoir simulation study for Schaben Field is complete. Production history for hydrocarbons and water have been matched at the field and well levels. The simulation was completed using a modified version of USDOE's BOAST 3 and MS Excel to handle preprocessing of field data and post-processing of graphics. The simulations show that lateral sweep efficiency with the heterogeneous Schaben reservoir has been very poor and the potential exists for recovering bypassed mobile oil with targeted infill drilling and possibility

horizontal drilling. Reservoir characterization is complete and will be used to develop a reservoir management plan to be demonstrated in Budget Period 2.

Task I.3 -- Technology Transfer (Target Completion Date: 5/15/97)

Technology transfer is an ongoing process that includes access to information through the Internet, almost daily inquires and formal presentations. A paper, on the combination of magnetic resonance and traditional petrophysical techniques to determine characterize a heterogeneous reservoir, will be presented April 9 at the American Association of Petroleum Geologists (Guy and others, 1997). A presentation on the results of the Schaben reservoir simulation using BOAST 3 was presented on 20 March at the Tertiary Oil Recovery Conference in Wichita (Gerlach an Bhattacharya, 1997). We continue to work with a number of Kansas operators on application of the technologies developed as part of the Class 2 project. We are providing access to the digital data and results from the project through an on-line (Internet) accessible format.

REFERENCES

1997, Gerlach, P, and S. Bhattacharya, Simulation of primary and alternate locations for five infill wells, Schaben Field, Ness County, Kansas: Kansas Geological Survey Open File Report 97-46.

1997, Guy, W. J., T. R. Carr, E. K. Franseen, S. Bhattacharya, and S. Beaty, Combination of magnetic resonance and classic petrophysical techniques to determine pore geometry and characterization of a complex heterogeneous carbonate reservoir: American Association of Petroleum Geologists Annual Meeting Abstracts, Dallas.