

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

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The University of Kansas Center for Research Inc.

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(1<sup>st</sup> Quarterly Report)

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**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.

**Project Status**

The project began in September of 1994, and will run through 1998.

**Project Description**

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.

The project is an effort to make Kansas producers more aware of potentially useful technologies and to demonstrate in actual oil field operations how to apply them. For many producers, especially independents, such information is important for continued production. A major emphasis of the Kansas project will be collaboration of University scientists and engineers with the independent producers and service companies operating in the state. An extensive technology transfer effort will be undertaken to inform other operators of the results of the project. In addition to traditional technology transfer methods (e.g., reports; trade, professional, and technical publications; workshops; and seminars) a public domain relational database and computerized display package will be made available through the Internet and other means of digital access.

### **Summary of Technical Progress**

General Overview.--The bulk of work to date has concentrated on Task 1.1. Some preliminary work on reservoir characterization (Task 1.2) is underway.

#### **Task I.1 - Acquisition and Consolidation of Available Data (Target Completion Date: 4/2/95).**

Summary of work in last quarter.--All wells in and surrounding Schaben Field that contain production, log and/or core information have been identified from computer databases and paper records. All digital well locations were checked and if necessary were corrected. Unique well id's (API numbers) were checked and if necessary were assigned. Digital cultural data were downloaded and checked (e.g., political boundaries and townships and sections). This forms the geographic and well database that all geologic, engineering and production data will be loaded. The data will be stored under an Openworks compatible database. ORACLE, the primary relational data base management system, has been obtained and loaded

Cores have been described at the macroscopic level and samples have been selected for further analysis. Samples for petrographic analysis were sent off for thin sections.

Logs from approximately 200 wells are in the process of, or have been digitized. The digital log data is currently being loaded into Landmark's Stratworks and Terrasciences' TerraStation for geologic analysis.

Summary of planned work for next quarter.-- We will complete all major acquisition and consolidation of geologic, engineering and production data by the

end of the next quarter. During the next quarter production and producibility data will be loaded into a separate database that will be compatible with the geologic data base (It will use the same unique well id's). The resulting digital database along with the data acquired from the three new wells planned for the coming month will be important for adequate reservoir characterization.

### **Task I.2 - Reservoir Characterization (Target Completion Date: 3/3/96).**

Summary of work in last quarter.--Preliminary petrophysical and core analysis have been completed and indicate that the reservoir is highly vertically stratified, of variable lithology (limestone, dolomite, and chert), and has high BWV (Bulk Water Volume). The complexity of the reservoir and the diverse nature of extant logs (i.e., various vintages, quality, and type) make the gathering of additional high quality logs tied to core data important to an adequate reservoir description.

Summary of planned work for next quarter.--Three wells will be drilled, cored, logged, and tested during the coming month. Analysis of data from these wells along with development of a descriptive reservoir model will be initiated and preliminary results should be available (e.g., cross-sections, structure maps, net maps, etc.).

### **Task I.3 - Technology Transfer (Target Completion Date: 8/4/96).**

Summary of work in last quarter.-- This is very early and the project and the technology available to be transferred are limited. However, related work on a Kansas interactive oil and gas field map have used production data from Schaben Field and Ness County as a prototype. The production data for the state, county and individual field are available on-line through the Internet. The data can be accessed through the Petroleum Research Section's home page (<http://crude1.kgs.ukans.edu/>). Even though the site is not publicized access has been picking up and includes a number of independent oil companies. We will continue to feed information to posted on the net.

Summary of planned work for next quarter.--We will continue to feed information to posted on the net.