**Application of Advanced Reservoir Characterization,
Simulation, and Production Optimization Strategies to
Maximize Recovery in Slope, and Basin Clastic Reservoirs,
West Texas (Delaware Basin)**

**Quarterly Report
January 1 - March 31, 1997**

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TECHNICAL PROGRESS REPORT

Title:	APPLICATION OF ADVANCED RESERVOIR CHARACTERIZATION, SIMULATION, AND PRODUCTION OPTIMIZATION STRATEGIES TO MAXIMIZE RECOVERY IN SLOPE AND BASIN CLASTIC RESERVOIRS, WEST TEXAS (DELAWARE BASIN)
Cooperative Agreement No.:	DE-FC22-95BC14936
Institution:	Bureau of Economic Geology The University of Texas at Austin University Station, Box X Austin, Texas 78713-7508
Date of Report:	April 30, 1998
Award Date:	March 31, 1995
Anticipated Completion Date for this Budget:	June 30, 1998
Government Award for this Budget Period:	\$1,010,208
Program Manager:	Jerry Casteel
Principal Investigator:	Shirley P. Dutton
Contracting Officer's Representative:	Jerry Casteel
Reporting Period:	January 1, 1998 - March 31, 1998

OBJECTIVES

The objective of this project is to demonstrate that detailed reservoir characterization of slope and basin clastic reservoirs in sandstones of the Delaware Mountain Group in the Delaware Basin of West Texas and New Mexico is a cost effective way to recover a higher percentage of the original oil in place through strategic placement of infill wells and geologically based field development. Project objectives are divided into two major phases. The objectives of the reservoir characterization phase of the project were to provide a detailed understanding of the architecture and heterogeneity of two fields, the Ford Geraldine unit and Ford West field, which produce from the Bell Canyon and Cherry Canyon Formations, respectively, of the Delaware Mountain Group and to compare Bell Canyon and Cherry Canyon reservoirs. Reservoir characterization utilized 3-D seismic data, high-resolution sequence stratigraphy, subsurface field studies, outcrop characterization, and other techniques. Once the reservoir-characterization study of both fields was completed, a pilot area of approximately 1 mi² in one of the fields was chosen for reservoir simulation.

The objectives of the implementation phase of the project are to (1) apply the knowledge gained from reservoir characterization and simulation studies to increase recovery from the demonstration area, (2) demonstrate that economically significant unrecovered oil can be recovered by a CO₂ flood of the demonstration area, and (3) test the accuracy of reservoir characterization and flow simulation as predictive tools in resource preservation of mature fields. A geologically designed, enhanced-recovery CO₂ flood and well-completion program will be developed. Through technology transfer workshops and other presentations, the knowledge gained in this study can then be applied to increase production from the more than 100 other Delaware Mountain Group reservoirs.

SUMMARY OF TECHNICAL PROGRESS

Technology Transfer

A poster and core display about slope and basin clastic reservoirs at Geraldine Ford field was presented at the Sixth Archie Conference in Kerrville, Texas, in February. The following abstract was distributed to the conference participants:

Dutton, S. P., Asquith, G. B., and Malik, M. A., 1998, Incorporation of core data into reservoir characterization of a deep-water channel-levee and lobe deposit, Ford Geraldine Unit, Delaware Basin (abs.): Sixth Archie Conference, Kerrville, TX.

A core and poster display was presented at the Permian Basin Section–SEPM meeting “Permian Basin Core Workshop—DOE Funded Reservoir Characterization Projects” in Midland in February. The following paper was published in the meeting transactions:

Dutton, S. P., Barton, M. D., Clift, S. J., and Guzman, J. I., 1998, Ramsey sandstone deep-water channel-levee and lobe deposits, Ford Geraldine Unit, Reeves and Culberson Counties, Texas: in Stoudt, E. L., Dull, D. W., and Raines, M. R., eds., Permian Basin Core Workshop—DOE Funded Reservoir Characterization Projects: Permian Basin Section–SEPM Publication No. 98-40, 33 p.

A talk was presented at the SPE Permian Basin Oil and Gas Recovery Conference in Midland in March. The following paper was published in the meeting transactions:

Malik, M. A., 1998, Compositional simulations of a CO₂ flood in Ford Geraldine Unit, Texas: SPE paper 39794, presented at 1998 SPE Permian Basin Oil and Gas Recovery Conference, Midland, TX, March 23-26, 1998, p. 375-383.

PLANNED ACTIVITIES

Conoco, Inc., the industry partner for this project through December, 1997, has decided not to proceed to a Phase 2 field demonstration in the Ford Geraldine unit. The decision by Conoco, Inc. not to proceed to Phase 2 provides an opportunity for a different, and more definitive, Phase 2 field demonstration in East Ford field, with Orla Petco as the industry partner. Orla Petco, Inc. is the operator of East Ford field, which is immediately adjacent to the Ford Geraldine unit and produces from the same Ramsey sandstone channel. The Bureau and Orla Petco propose to work together in Phase 2, thus allowing the original objectives—assessment of the effectiveness of CO₂ flooding to improve recovery in a mature Ramsey sandstone field—to be accomplished.

Reservoir characterization of East Ford field will be necessary before moving to the field-demonstration phase. Reservoir characterization of this new field will provide an excellent opportunity to test the transferability of the information and methodologies that were developed during the Ford Geraldine study to another Delaware Mountain Group field with less abundant data. It is anticipated that information on depositional processes, geometries, and dimensions of Bell Canyon sandstone bodies developed from the outcrop study will apply to Ford East field equally well as to the reservoirs at the Ford Geraldine unit. Furthermore, the methods of petrophysical analysis developed to work with the 1950's vintage logs from the Ford Geraldine unit should be applicable in East Ford field as well. A revised statement of work will be submitted in the next quarter that will propose this revision in the scope of work for the project.