

PROJECT FACT SHEET

CONTRACT TITLE: Integration of Advanced Geoscience and Engineering Techniques to Quantify Interwell Heterogeneity in Reservoir Models

DATE REVIEWED: 07/28/1994

DATE REVISED: 07/28/1994

OBJECTIVE: Integrate advanced geoscience and reservoir engineering concepts to quantify reservoir architecture and dynamics of fluid-rock and fluid-fluid interactions as they relate to lithologic characterization.

ID NUMBER: DE-AC22-93BC14893

CONTRACTOR: New Mexico Inst of Mining & NM Petro. Rec Rsch Ctr

B & R CODE: AC0540000

ADDR: Kelly Building, Room 205

CONTRACT PERFORMANCE PERIOD: 09/29/1993 to 09/28/1996

Socorro, NM 87801

PROGRAM: Supporting Research
RESEARCH AREA: Geoscience

CONTRACT PROJECT MANAGER:

NAME: F. David Martin

ADDR: New Mexico Inst of Mining & Tech
Kelly Building, Room 210
Socorro, NM 87801

DOE PROGRAM MANAGER:

NAME: George J. Stosur

COMMERCIAL: (301) 903-2749

PHONE: (505) 835-5143

FAX: (505) 835-6031

DOE PROJECT MANAGER:

NAME: Robert E. Lemmon

LOCATION: BPO

COMMERCIAL: (918) 337-4405

PROJECT SITE:

Socorro, NM

Austin, TX

Stanford, CA

SCHEDULED MILESTONES:

- | | |
|--|-------|
| 1. Project Planning (Completed) | 04/94 |
| 2. Geology and Petrophysics Research | 03/96 |
| 3. Hydrologic and Tracer Research | 03/96 |
| 4. Geophysical Research | 03/96 |
| 5. Field Tests | 05/95 |
| 6. Reservoir Characterization/Simulation | 09/96 |
| 7. Project Monitoring and Evaluation (Quarterly & Final Reports) | 10/96 |
| 8. Technology Transfer | 09/96 |

FUNDING (1000'S)	DOE	OTHER	CONTRACTOR	TOTAL
PRIOR FISCAL YRS	749	0	1,074	1,823
FISCAL YR 1994	0	0	0	0
FUTURE FUNDS	0	0	0	0
TOTAL EST'D FUNDS	749	0	1,074	1,823

PROJECT DESCRIPTION: The interdisciplinary effort will integrate geological and geophysical data with engineering and petrophysical results through reservoir simulation to quantify reservoir architecture and the dynamics of fluid-rock and fluid-fluid interactions. Subcontractors from Stanford University and the University of Texas at Austin (UT) will collaborate on the project. The Department of Geophysics at Stanford, will couple crosswell reflection imaging and interwell transmission tomography in a procedure not attempted previously on field data. Further research, design, and interpretation of a single-well wettability tracer test developed in the UT laboratories but not yet field tested will be conducted. Several members of the PRRC staff will participate in the development of improved reservoir description by integration of the field and laboratory data as well as in the development of quantitative reservoir models to aid performance predictions.

PRESENT STATUS: The three-year project, initiated in September 1993, is in the first year. Subcontractor agreements with the University of Texas and Stanford University have been submitted, modified, and executed. Pecos Petroleum Engineering Inc. in Roswell, NM, was retained as the field site agent.

ACCOMPLISHMENTS: Preliminary work for the outcrop phase of this study has included collecting serial photos, geologic and tomographic maps of the area, and driving the roads in the area to identify Queen outcrops that may be useful for our study. Several trips were made to the field area this quarter, and a few promising outcrops were located.

A report on the diagenesis in the cored interval of Well 1-16 was prepared. Examination of this core demonstrates quite clearly the combination of depositional and diagenetic effects that served to create a hydrocarbon reservoir in the Sulimar Queen Field.

A sample of Sulimar Queen crude oil was obtained in January 1994 for laboratory evaluation of rock/fluid properties. Preliminary wettability testing of this oil sample has been conducted with a series of standard brines of fixed pH and ionic composition for comparison to other crude oils. Other measurements have been made to characterize the oil including density, viscosity, asphaltene content, and elemental analysis. Preliminary tests of adhesion and adsorption of Sulimar Queen oil and gas indicated that adhesion occurred at pH 6 and less, for most of the range of ionic strengths investigated. Adsorption results were intermediate to water-wet on silica surfaces in the absence of divalent ions.

A plan of operations for the Unit during the coming year was submitted to and approved by the Bureau of Land Management (BLM) on February 3, 1994. The state production tapes for the Sulimar Queen Unit were reformatted into a PC-based relational database, well logs were incorporated with the basemap, and the status of all the wells in the Sulimar Queen Unit was updated. The New Mexico Oil Conservation Division witnessed bradenhead tests in all injection wells on April 6, 1994. These tests ensured that all injectors are mechanically sound.

BACKGROUND: A more quantitative definition of reservoir heterogeneity is proposed through the integration of geologic, geophysical, and engineering databases into a multidisciplinary understanding of reservoir architecture and associated fluid-rock and fluid-fluid interactions. The intent is to evolve quantitative reservoir description incorporating outcrop, field, well-to-well, and laboratory core-rock and fluid data of widely varying scales to allow greater accuracy and confidence during simulation and modeling as steps toward gaining greater recovery efficiency from existing reservoirs.