PROJECT
facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

OIL recovery
PROGRAM

RECOVERY OF TRAPPED OIL — THE ARCO WESTERN FIELD TEST

PRIMARY PROJECT PARTNER
Arco Western Energy
Bakersfield, CA

FOSSIL ENERGY PROGRAM
Oil Field Recovery Demonstrations

MAIN SITE
Yowlumne Field
Kern Co., CA

TOTAL ESTIMATED COST
$7.8 million

COST SHARING
DOE - $3.9 million
Non-DOE - $3.9 million

DE-FC22-95BC14940

Project Description

In its 20-year history, the Yowlumne field in California's San Joaquin Basin has experienced primary depletion, a secondary recovery program, and now is in significant decline as the waterflood programs mature. Although little oil remains in the central parts of the field, large volumes of oil apparently have been moved by injected water and trapped in the thin sands at the field edges. Recovery of this oil would be uneconomic using conventional wells. As part of the Department of Energy's initiative to assist oil operators increase domestic oil and gas production, ARCO Western Energy will demonstrate that reservoir modeling to accurately locate the oil, combined with slant well drilling technology, multiple fracture treatments, and production using a new high-volume, high-temperature submersible pump can recover an economic volume of oil from these multiple thin reservoirs.

A detailed reservoir model will define how variations in the prospect area strata affect the flow of fluids through the reservoir. Hydraulic fracturing of an existing well will provide data for the design of fracture treatments in the proposed slant well. Based on these data and economic analyses of drilling and completion methods, a 1,100-foot lateral borehole will be drilled across the thinly-bedded field margins and will be hydraulically fractured.

As of early 1996, fracture design for the test well and reservoir characterization of the study area has begun. Analysis of geological and engineering data from this well will help refine the reservoir model. Well performance will be monitored, and well and reservoir problems diagnosed. The results of the project will be transferred via reports, seminars, instructional video and CD-ROM to operators for application to fields with similar problems.

Program Goal

One of the DOE Oil Program goals is to help develop new technologies that can increase production from complex reservoirs that have not responded to conventional technologies. This effort can increase domestic production without the added expense of finding and developing new reservoirs. Thinly stratified reservoirs, common in the U.S., have been poor producers because of two problems— locating a well to contact all of the strata, and producing multiple reservoirs with different pressures and water contents. ARCO expects the combination of new technologies they have developed and will test in this project will allow them to overcome the problems and contact and produce from many thin reservoirs.

If successful, Arco estimates the technologies could produce as much as 745,000 barrels of additional oil from the project, and could increase reserves as much as 8.3 million barrels by application to the rest of the Yowlumne field. Each additional barrel of oil from this field provides 12.5% federal royalties, in addition to federal, state and local taxes and beneficial impact on local economies. Analogous reservoirs where the technologies could be used, primarily in California and Texas, contain more than 300 million barrels of oil.

Project Partners

ARCO WESTERN ENERGY
Bakersfield, CA

THE UNIVERSITY OF CALIFORNIA AT SANTA BARBARA
Santa Barbara, CA

CALIFORNIA DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES
Bakersfield, CA

DOWELL SCHLUMBERGER
Bakersfield, CA

Recovery of Trapped Oil — The Arco Western Field Test

Project Benefits

In this project, Arco and its partners plan to demonstrate that hydraulically fracturing of strata adjacent to deviated wells is a cost-effective approach to develop thinly-bedded zones that are typical of deep basin reservoirs common in the San Joaquin and Los Angeles basins. If successful, this project will provide a practical demonstration of several leveraged technologies that can be applied to a huge volume of remaining oil in place in other fields.

Arco estimates that it could produce as much as 745,000 barrels of additional oil from the project. Application of the successful technologies throughout the Yowlumne field could increase reserves by as much as 8.3 million barrels, and could increase reserves in analogous reservoirs, primarily located in California and Texas, by 334 million barrels.

CONTACT POINTS

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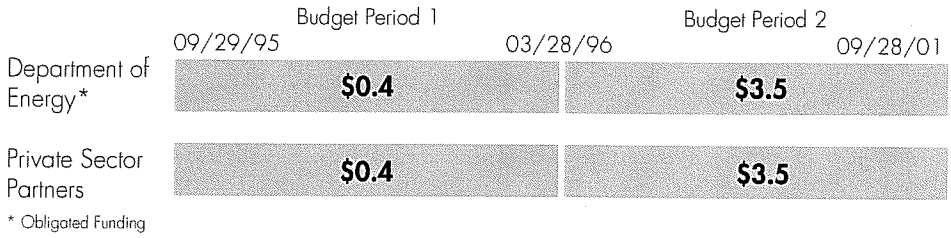
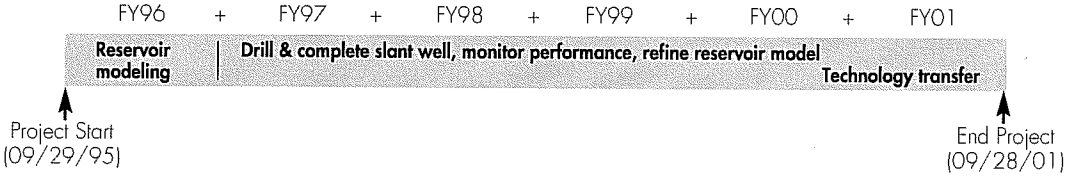
Cost Profile (Dollars in Millions)



* Obligated Funding

Key Milestones



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