**An Advanced Fracture Characterization and Well Path Navigation System
for Effective Re-Development and Enhancement of Ultimate Recovery from
the Complex Monterey Reservoir of South Ellwood Field, Offshore
California**

Quarterly Technical Progress Report

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Principal Investigator: Steve Horner

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Submitting organizations:

Venoco Inc
5464 Carpinteria Ave. Suite J
Carpinteria, CA 93013-1423

Progress Report January 1, 2005- March 31, 2005

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Abstract

Venoco Inc, intends to re-develop the Monterey Formation, a Class III basin reservoir, at South Ellwood Field, Offshore Santa Barbara, California.

Well productivity in this field varies significantly. Cumulative Monterey production for individual wells has ranged from 260 STB to 8,700,000 STB. Productivity is primarily affected by how well the well path connects with the local fracture system and the degree of aquifer support. Cumulative oil recovery to date is a small percentage of the original oil in place. To embark upon successful re-development and to optimize reservoir management, Venoco intends to investigate, map and characterize field fracture patterns and the reservoir conduit system. State of the art borehole imaging technologies including FMI, dipole sonic and cross-well seismic, interference tests and production logs will be employed to characterize fractures and micro faults. These data along with the existing database will be used for construction of a novel geologic model of the fracture network. Development of an innovative fracture network reservoir simulator is proposed to monitor and manage the aquifer's role in pressure maintenance and water production. The new fracture simulation model will be used for both planning optimal paths for new wells and improving ultimate recovery.

In the second phase of this project, the model will be used for the design of a pilot program for downhole water re-injection into the aquifer simultaneously with oil production. Downhole water separation units attached to electric submersible pumps will be used to minimize surface fluid handling thereby improving recoveries per well and field economics while maintaining aquifer support.

In cooperation with the DOE, results of the field studies as well as the new models developed and the fracture database will be shared with other operators. Numerous fields producing from the Monterey and analogous fractured reservoirs both onshore and offshore will benefit from the methodologies developed in this project.

This report presents a summary of all technical work conducted during the sixth quarter of Budget Period II.

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Introduction

The Field Demonstration site for this Class III (basin clastic) Program Proposal is the South Ellwood Field located offshore California. The Monterey Formation is the main producing unit in the South Ellwood Field and consists of fractured chert, porcelanite, dolomite, and siliceous limestone interbedded with organic mudstone. This reservoir has an average thickness of 1,000 feet, and lies at subsea depths of approximately -3,500' to -5,000'.

Venoco and USC jointly submitted an application to conduct a DOE co-operative investigation of the Monterey formation at South Ellwood in June 2000. The DOE granted this application in July 2000.

Executive Summary

Venoco and USC prepared a proposal for a DOE sponsored joint investigation of the fractured Monterey formation. It was agreed that Venoco would construct the geologic model for the field and gather new reservoir data as appropriate. USC would then develop a simulation model that would be used to optimize future hydrocarbon recovery. Joint Venoco-USC teams were established to manage the flow of data and insure that Venoco and USC activities remained synchronized. A co-operative agreement was signed with the DOE on July 31, 2000.

During Budget period I, Venoco worked with USC to develop a new geological and engineering model of the Monterey formation. This cooperative work between USC and Venoco has made several contributions to the tech transfer goal of the U.S. Department of Energy. The most significant of these were; the development of an interactive database on the Monterey Formation, a new simulation algorithm for the description of fracture-controlled Monterey Reservoirs, a pattern recognition method for analysis of well log data and methods for subsurface control of high water production. USC no longer participates in the project after the conclusion of Budget Period I activities.

The primary goal of the Budget Period II is to develop the new fault blocks identified as a result of the field re-evaluation conducted during Budget Period I. A Middle Sespe prospect was identified by an exploration well drilled from a jack-up in 1985. We have used the reprocessed 3D to image the South Ellwood structure at Sespe level. 3120-15RD4 is currently being tested to appraise this Lower Sespe structure. A second exploratory well will be drilled in 2005 to test the North Flank block of the Monterey.

Experimental

Not applicable for the work performed.

Results and Discussion

Task II – New Data

None

Task IV-1—Produced Water Re-Injection

The two existing group separators (V-107 and V-108) will be retrofitted with new internals to allow three phase water separation. NATCO, the original designer of the group separators has designed new vessel internals for retrofitting these vessels. Upgrades will include a new proprietary “Porta Test Revolution” inlet separation device, a higher water weir and new water level control, alarm and shutdown instrumentation. The “Porta Test Revolution” inlet separation device utilizes centrifugal force to separate gas from the liquid without foaming. The higher water weir will allow longer liquid retention time to provide more complete water oil separation. These improvements will reduce the water cut in the oil shipped to Ellwood to approximately 10%. The Revolution devices have been arrived and during a platform shutdown in February 2005 we installed a new production header to direct all Holly produced fluids into a single production separator. Production V-107 was taken off line and cleaned. However since drilling operations are continuing on the Sespe and North flank wells, it was not possible to begin welding the internals in this vessel due to the limitations imposed by Venoco’s simultaneous operations policy. The modification of the two separators was postponed until the end of drilling operations in August 2005. Water injection should begin by the fourth quarter of 2005.

Task IV-2—Downhole Water Separation ESP’s

Venoco conducted a review of Platform Holly modifications that would be required to accommodate additional ESP wells. We are currently looking at designs for a new Vapor Recovery Unit compressor and a new high voltage step down transformer.

Task IV-3—Development of New Fault Blocks

South Ellwood 3D Simulation Model

A new reservoir simulation model of the Monterey was constructed using CMG after the geological model was modified to add two new faults. The model is presently being history matched to production and pressure data.

New Well 3120-15 RD4

The Sespe well was renamed 3120-15RD4 by the California Division of Oil, Gas and Geothermal Resources since the producing interval is located on State lease 3120. The well reached a total depth of 14247' on January 17th 2005. Excellent gas shows were evident in the Middle Sespe, Gaviota and Coldwater formations. Oil indications were diminished by the fact that the well had been drilled with oil-based mud. A logging string consisting of Array Induction, Density-Neutron, Spectral Gamma Ray and Oil Based dipmeter tools was run to 13650'. More than 600' of net pay was indicated on the logs. A 5-1/2" liner was run but it stuck off bottom with the shoe at 12965'. The liner was cleaned out and the open hole section found plugged with cement. A new hole 3120-15RD4 sidetrack was drilled to 13650'. A 2-7/8" completion string was run to test a barefoot section in the massive sands of the Gaviota formation from 12965-13650'. This zone tested wet with minor traces of gas. The reservoir pressure was estimated to be 5500 psi. During testing the high bottom temperature of 250° F caused the tubing to buckle and plug with mud. The completion will be recovered and the Middle Sespe sands currently behind pipe will be tested. Net pay in the Middle Sespe is 338'. If successful, a production test in the Middle Sespe will add up to 12 MMB of reserves. Reprocessing of the 1982 Arco seismic data conducted under Budget Period I of this contract helped Venoco define this Sespe trap.

Middle Sespe Pay in 3120-15 RD4

Task V- Project Management

Project review meetings were held on a monthly basis in Carpinteria. Individuals working on the project during this quarter included:

Reservoir Studies:

Steve Horner

Geological/Geophysical Modeling

Marc Kamerling, Chris Knight

Project Management:

Steve Horner

Task VI-Technology Transfer

Marc Kamerling gave a presentation to the San Joaquin Geological Society on March 8, 2005 entitled The Monterey Formation at South Ellwood Field, Santa Barbara Channel, California

Conclusions:

This is the sixth quarterly technical report for Budget Period II. Three significant new projects are in progress. The first new fault block appraisal well was completed to test the Sespe prospect identified from seismic reprocessing. A second exploratory well will be drilled in the second quarter of 2005 to appraise the North flank block of the Monterey. In addition, we have completed design work to separate and re-inject all produced water back into the Monterey at Holly. Equipment has been purchased to modify the Holly separators and we expect to complete the project by Q4 2005. These projects could add more than 30 MMB of reserves to South Ellwood field.

References

Sedimentology and Paleontology of Eocene rocks in the Sespe Creek area, Ventura County, California, Fritsche A.E. ed, Society for Sedimentary Geology, book 74, 1994