ASSIST IN THE RECOVERY OF BYPASSED OIL FROM RESERVOIRS IN THE GULF OF MEXICO

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Louisiana State University
Department of Petroleum Engineering
Baton Rouge, LA 70803-6417

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Principal Investigator: Philip A. Schenewerk

Project Manager: Gene Pauling
Metairie Project Office

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EXECUTIVE SUMMARY

Progress continues for reducing the data to fit a simplified model and redescribing the resource to accommodate known production behavior and certain geologic assumptions. In addition, final reports are currently being prepared.

INTRODUCTION

Much of the remaining oil offshore is trapped in formations that are extremely complex due to intrusions of salt domes. Conventional seismic processing techniques cannot clearly image either these traps or the full extent of oil-bearing segments near the salt domes; therefore, substantial volumes of oil may have remained uncontacted by previous drilling.

Recently, however, significant innovations have been made in seismic processing and mathematical migration of seismic signal. In addition, significant advances have been made in deviated and horizontal drilling technologies and applications. These technology advances make it possible to reprocess existing seismic data to identify non-contacted portions of the reservoirs, which can then be contacted using advanced drilling technologies to kick out new wells from existing wells. Effective application of these technologies, along with improved recovery methods, offers opportunities to significantly increase Gulf of Mexico production, delay platform abandonments, and preserve access to a substantial remaining oil target for enhanced recovery and other advanced recovery processes.

PROJECT DESCRIPTION

The objective of this research is to assist the recovery of non contacted oil from known reservoirs on the Outer Continental Shelf in the Gulf of Mexico. Mature offshore reservoirs, declining oil reserves, declining production, and other natural forces are accelerating the abandonment of offshore oil resources and production platforms. As these offshore wells are plugged and the platforms are abandoned, an enormous volume of remaining oil will be permanently abandoned. Significant quantities of this oil could be recovered using advanced technologies now available if the resource can be identified.

This project will proceed under three broad phases:

Analysis -- TORIS level data will be collected on the major fields located in the piercement salt dome province of the Gulf of Mexico Outer Continental Shelf. Representative reservoirs will be studied in detail in order to evaluate undeveloped and attic oil reserve potential. These detailed investigations will be used to calibrate the TORIS level predictive models. The recovery potential of advanced secondary and enhanced oil recovery processes and the exploitation of undeveloped and attic oil zones for salt dome reservoirs in the Gulf of Mexico will be assessed.

Supporting Research -- Supporting research will focus on the modification of public domain reservoir simulation models to accurately simulate the conditions encountered in the piercement salt dome province of the Gulf of Mexico. Laboratory research will focus on the development of fluid relationships that will be used in the simulation of miscible and immiscible processes in the project area.

Technology Transfer -- A significant effort is planned to transfer the results of this project to potential users of the technology. Technology transfer activities will also provide feedback channels that will help keep the analysis and supporting research focused on the most important problems associated with this project.

PROJECT STATUS AND PLANNED ACTIVITIES

Data Reduction

Data reduction continues for this update. Data reduction is necessary for the predictive models to be as accurate as possible given the information available. The data reduction steps include the following:

- Describe reservoirs as segments of constant thickness ring bounded by radial faults.
- Identify location of each well penetration.
- Match well locations within each reservoir with completion and production data from MMS production database.

The entire Gulf of Mexico contains 21,045 reservoirs in 835 fields. Piercement salt domes account for 5,809 reservoirs in 74 fields. Within the piercement salt dome fields 60% of the original oil in place is contained within 1,150 reservoirs in 46 fields. Legible MMS maps were available on 815 reservoirs of the 1,150 previously described reservoirs. Therefore, TORIS level data reduction was possible on these 815 reservoirs.

Data reduction work in progress during this quarter include the following:

- Match identified well locations within each reservoir with completion and production data.
- Generate key production characteristics for each well in each reservoir
 1. Completion data
 2. First production date

3. First significant water cut date
 4. First high GOR production
 5. Water-out date
 6. Last production date
 7. Annual production
- Account for wells in FRRE not on map.
 - Check sum of well production against FRRE totals
 - Compile individual TORIS level reservoir data file for each reservoir from map data, FRRE data and defaults.

Model Development

Resource re-description work in progress during this quarter include the following:

- Construct model which compares oil and water production behavior from adjacent wells and ranks "Most Likely" to "Least Likely" positions of unmapped faults (simple production behavior comparison or BOAST history match).
- Determine basis for adding faults - Log normal distribution of block sizes, multiple of existing fault blocks based upon statistical analysis.
- Place faults in most likely position and redefine reservoir description which honors production behavior under increased complexity case (simple material balance or BOAST model).

Production modeling work in progress during this quarter include:

- Develop model to predict primary production performance of new wells drilled into previously unmapped fault blocks (as defined by resource re-description).
- Develop similar miscible/immiscible "attic gas injection" model for updip oil zones.
- Calibrate using BOAST/MASTER or model using BOAST if possible
- Integrate predictive models with existing TORIS economic routines - revise cost assumptions and equations for Gulf of Mexico.

Final Reports

Final report write-ups for this project are currently underway.

SUMMARY OF PROGRESS

Progress continues for reducing the data to fit a simplified model, model development for resource assessment and the preparation of final reports.

REPORT DISTRIBUTION LIST

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REFERENCES

None for this report

PUBLICATIONS

None for this report.