



# Early Reservoir Appraisal, Utilizing a Well Testing System

## Project Fact Sheet

### Program

2008 Ultra-Deepwater Program

### Project Number

08121-2501-02

### Start Date

October 2009

### Duration

19 Months

### RPSEA Share

\$810,000

### Cost Share

\$230,000

### Prime Contractor

Nautilus International LLC

### Participants

INTECSEA; General Marine Contractors LLC; Knowledge Reservoir, LLC; Marecsa; Expro International Group, Ltd; Tidewater Marine, LLC; Petrodin; The University of Tulsa; Peter Lovie

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### Reports and Publications

Technology Status Assessment

Task 6.3: Final Report on Technology Readiness Workshop

Final Report

Final Supplemental Reports - General Marine Contractors

Final Supplemental Reports – INTECSEA

Final Supplemental Reports – Marecsa

Final Supplemental Reports – Expro

05.10.17

## Research Objectives

This project evaluated possibilities for deepwater testing in the Gulf of Mexico (GoM). The research objectives of this project included reservoir modeling of three major deepwater GoM reservoir plays and simulations of a variety of well tests (long/short term, injection/production testing). Various well testing systems were designed to optimize deepwater well testing in the GoM and were evaluated in a technical readiness workshop. A computer spreadsheet of the eight deepwater well testing systems and their components was assembled. This spreadsheet provides engineers and geoscientists a way to compare the various well testing systems for deepwater testing applications and provides a roadmap for well testing options in deepwater GoM.

## Approach

A team of subject matter experts was assembled to address the issues involved with deep water well testing for early reservoir appraisal. The project was divided into two parts — part one was reservoir oriented and part two focused on well test designs and operations. Experts in the fields of reservoir engineering, transient well testing, drilling, subsea equipment, risers, well testing, facilities, and production all made significant contributions in time, expertise, and documentation to this project. The project started with extensive analyses and well test simulations for three major reservoir geological plays in the GoM to determine the reservoir and fluid characteristics. The reservoir modeling led to the design of eight well testing systems that can be used for short-term, long-term, interference, and injection testing. Each system was analyzed for operational feasibility in reference to subsea and surface safety systems, and vessel requirements, with the focus of reducing risks to personnel, the environment, equipment, and compliance with all applicable regulations.

## Accomplishments

The reservoir analysis provides industry professionals with guidance regarding well test methods and results in terms of the type of well test to perform based on test duration and expected flow rates, and it develops expected outcomes in order to better characterize a reservoir. The well test system architectural designs and operational feasibility analysis gives industry professionals all the available options for deepwater well testing for various downhole, subsea, surface, and vessel options, with an extensive focus on safety requirements. Providing this information to industry professionals and operators allows for more accurate decisions when justifying the production capacity and commerciality of a field or reservoir.

## Significant Findings

Numerous well test simulations showed that production rates between 1000 and 2000 BPD would give the necessary pressure versus time results to perform classical pressure transient analysis. Deepwater testing can be done less expensively, and in less time, using this technique as is common with traditional deepwater well testing today. A representative set of injection well test simulations (fluid injection and pressure fall-off) yielded the same end results as the more common production and build-up tests. The industry experts attending the Technical Readiness Level workshop supported this conclusion and recommended doing more work to prove the technical and operational viability of injection testing in deepwater.

## Future Plans

Nautilus International has proposed a field test in the GoM to demonstrate the use of the self standing riser in well testing.

## Acknowledgements

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