

Public Executive Summary

Title: Improvements to Deepwater Subsea Measurements

Name of Offeror: Letton-Hall Group, LLC.

Project Manager: James Pappas

Principal Investigator: Winsor Letton, Ph.D.

Additional participants: Oceaneering, International; Multiphase Systems Integration, LLC.; Asept, Inc.

Solicitation Number: RFP2007DW1301 (07121-1301)

Project Start Date: October 27, 2008

Project End Date: December 31, 2011

Total Estimated Cost:	\$ 4,500,158.00
RPSEA Maximum Share:	\$ 3,600,126.00
Letton-Hall Group Cost Share:	\$ 900,032.00

Goal

This project seeks to address gaps in the deployment and use of multiphase and wet gas meter technology in deepwater production systems. Continuous measurement information collected on individual subsea wells will allow for a better assessment of well performance and thus can improve recovery from deepwater reservoirs beyond that possible with current capabilities.

Background

The advent of deepwater production systems, and especially the need to commingle production from marginal developments, dictates measurement capabilities beyond the current state of the available technology. Since commingled streams often represent different ownership and/or royalty interests, any measurement irregularities may result in fiscal inequities – perhaps on the order of tens of millions of dollars. Unless the risk of such occurrence is minimized, many easily produced fields may never be considered for development.

There is a strong imperative to improve recovery from deepwater reservoirs beyond current capabilities. To accomplish this means that continuous measurement information on individual wells will be required. This can only be achieved through better information on well performance. Improving the reservoir recovery by even a few percent may translate into tens of millions of barrels of additional reserves. These additional reserves will be gained through better information on well performance. For example, an improvement of 5% in recovery of Thunderhorse reserves would be worth nearly \$5 billion to the owners and over \$600 million to the US Treasury at current prices. Better well rate and composition data is clearly a key in attaining these improvements.

The need for measurement is especially great on the HP/HT projects, where the environmental demands on the equipment pose such a problem. The issue is exacerbated by the fact that the current small number of HP/HT prospects will provide little incentive for manufacturers to develop special metering equipment that only has use in a few applications. Unless special programs such as this are carried out, it is possible that these deepwater, high-risk applications may never be developed.

A final key aspect of the work is its importance in the development of subsea processing capabilities, where the fluids produced from each well will be separated, compressed, pumped, dehydrated, re-injected, disposed of...essentially subjected to any process that is routinely done on a production platform today. By doing this, not only will hydrocarbon recovery be improved, but there will be less risk of an adverse environmental event. However, measurement improvements will be necessary since the human beings who normally insure that sampling and metering are carried out properly will not be available.

The objective of the Project DW1301 is thus to address gaps in the deployment and use of multiphase and wet gas meter technology in deepwater production systems. Specifically, the immediate tasks and goals of this project are:

- (1) to develop and standardize deepwater well fluid sampling,
- (2) to develop the means to convey clamp-on measurement systems to deepwater wells via ROV,
- (3) to understand the ways in which production alteration of meters affects their response,
- (4) to develop and qualify sensors for HP/HT environments,
- (5) to evaluate the effectiveness of wellbore flow models, such as virtual flow meters, and
- (6) to develop uncertainty models of the complete multi-well production system from subsea meter to topside.

Potential Impacts

The successful completion of the work prescribed in DW1301 will improve the accuracy with which is known the flow rate from each well, thereby improving the reservoir management and ultimate recovery from deepwater fields. Additionally, enhanced measurement accuracy will make the assignment of revenues and royalty payments more equitable. New fields with high pressures and high temperatures will be produced and measured where such was not possible before. And the ability to process well production on the sea floor will achieve greater recovery with reduced environmental impact than is possible today.

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