# Award No. DE-FC26-05NT42666
# Battelle Pacific Northwest Division

## Gas Hydrates Assessment
## B. Peter McGrail, Principal Investigator

**Quarterly Report – Q1 (FY2007)**
**October-December 2006**


**Executive Summary**

This project will compare and contrast, through numerical simulation, conventional and innovative approaches to producing methane from gas hydrate-bearing geologic reservoirs. Initially, the project will investigate the production of gas hydrates from idealized reservoir configurations. If the initial investigation shows promise for the innovative approaches, additional simulation studies will be conducted using actual gas hydrate reservoir data from the Alaska North Slope (ANS) region. The project is still in the initial planning phase with the work so far focused on development of a comprehensive Research Management Plan and Statement of Project Objectives. Issuance of Statements of Work to partner institutions, University of Alaska – Fairbanks, and International Separations Technologies, Inc. is in progress. Preparation of a Technology Status Assessment Report began this quarter and will be issued in early Q2.


**Results of Work During Reporting Period**

***Phase I***

Task 1: Project Management

During this quarter, project staff were largely unavailable due to commitments with regards to an FE-1 tracked milestone on the FutureGen project. Staff availability should return to normal in Q2 and progress resumed.

Task 2: Technology Status Assessment

A draft of the TSA document was completed in late December and will be finalized in early Q2.

Task 3: Basic reservoir Simulation

During the month of November a presentation, entitled " STOMP-HYD: A New Numerical Simulator for Analysis of Methane Hydrate Production from Geologic Formations," was made at the 2nd International Symposium on Gas Hydrate Technology (see reference below). Funding for this trip was provided by KIGAM. The presentation focused on the key differences between the numerical solution approaches used in STOMP-HYD, versus comparable codes (e.g., TOUGH-Fx/HYDRATE) and simulation results from the latest version of STOMP-HYD for hydrate production using the $CO_2$ exchange technology. STOMP-HYD currently appears to be

the only multifluid subsurface flow and reactive transport simulator with capabilities for simulating mixed-gas hydrate systems.

Task4: Reservoir Simulation with ANS Field Data

This task is not scheduled to start until Task 3 scope has been completed.

**Significant Issues and Corrective Action**

Initiation of Task 2 and Task 3 work has been delayed due to more extensive modification and revisions to the RMP than expected. Senior staff have also had very limited time available due to other project commitments. This situation is expected to significantly improve after Q1 of FY07.

**References**

White, M. D. and B. P. McGrail. 2006. " STOMP-HYD: A New Numerical Simulator for Analysis of Methane Hydrate Production from Geologic Formations," In Proceedings of 2nd International Symposium on Gas Hydrate Technology, 1-2 November 2006, KIGAM, Daejeon, Korea.

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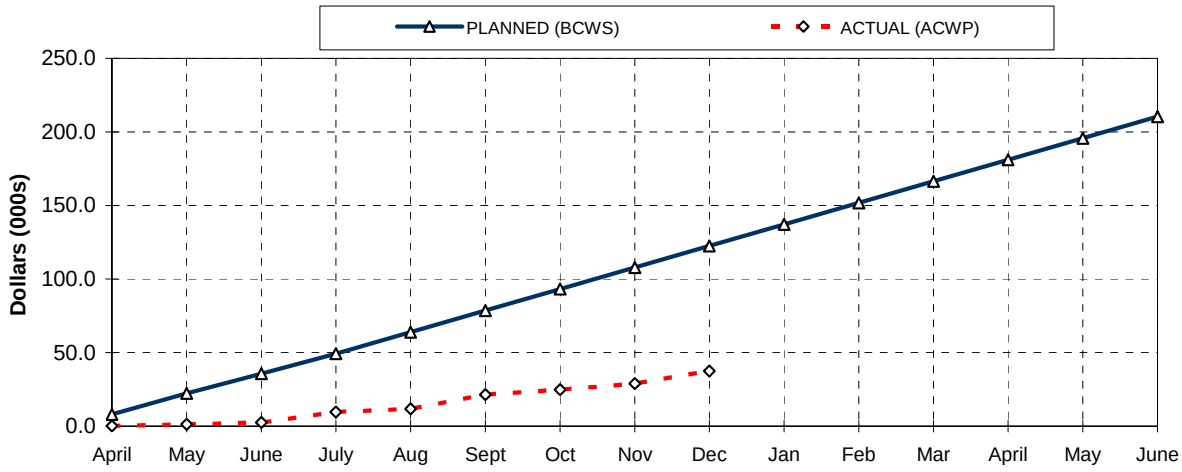
**Planned and Actual Cumulative Spending Curve**
(DOLLARS IN THOUSANDS)




| ($K) | April | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | April | May | June | FY07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Planned Cost** | 7.97 | 14.33 | 13.37 | 13.7 | 14.64 | 14.64 | 14.6 | 14.6 | 14.64 | 14.6 | 14.64 | 14.6 | 14.6 | 14.6 | 14.64 | 210.4 |
| **Actual Cost by Month** | 0.2 | 1.1 | 1.2 | 7.1 | 2.2 | 9.7 | 3.2 | 4.3 | 8.5 | | | | | | | 37.5 |
| **Variance Cost** | 7.7 | 13.2 | 12.2 | 6.6 | 12.5 | 4.9 | 11.4 | 10.4 | 6.1 | | | | | | | |
| **Cumulative Planned** | 8.0 | 22.3 | 35.7 | 49.4 | 64.0 | 78.6 | 93.3 | 107.9 | 122.6 | 137.2 | 151.8 | 166.5 | 181.1 | 195.8 | 210.4 | 210.4 |
| **Cumulative Actual** | 0.2 | 1.3 | 2.5 | 9.6 | 11.8 | 21.5 | 24.7 | 29.0 | 37.5 | | | | | | | |
| **Cumulative Variance** | 7.7 | 21.0 | 33.1 | 39.7 | 52.2 | 57.1 | 68.5 | 78.9 | 85.0 | | | | | | | |

| Milestones | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Task 1. Prepare a Research Development Plan | | | | | ☆ | | | | | | | | | | |
| Task 2. Prepare a technology Status Assessment | | | | | | | | | | | □ | | | | |
| Project Kickoff Meeting | | | | ☆ | | | | | | | | | | | |
| Complete Research Management Plan | | | | | | ☆ | | | | | | | | | |
| Quarterly Reports | | | ☆ | | | ☆ | | | ☆ | | | △ | | | △ |

LEGEND

SCHEDULED △ DEVIATION □ COMPLETED ☆

TIME LINE ——— ELIMINATED BY REDUCTION ⊘

Cost share is not applicable until start of Task 3 activities has been approved.