Oil & Natural Gas Technology

DOE Award No.: DE-NT0006553

Progress Report
Fourth Quarter 2009

ConocoPhillips Gas Hydrate Production Test

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Prepared for:
United States Department of Energy
National Energy Technology Laboratory

February 24, 2010

Office of Fossil Energy
Executive Summary

Accomplishments

- Continued the process to gain working interest co-owner approval for the proposed production test sites.
- Progressed Experimental Design and Well Design

Current Status

- Integrating Prudhoe Bay Unit working interest owner feedback into revised ballot
- Progressing simulation and experimental projects to support field trial

Introduction

Work began on the ConocoPhillips Gas Hydrates Production Test (DE-NT0006553) on October 1, 2008. This report is the fifth quarterly report for the project and summarizes project activities from October 1, 2009 to December 31, 2009. Work during this quarter was focused on Tasks 3 and 4 from Phase 1 (Site Identification) and Tasks 5 and 6 from Phase 2 (Field Test Planning.)

Task 3 (Phase 1): Field Site Ownership Partner Negotiations

ConocoPhillips continues its efforts to gain permission from Unit co-owners for execution of production test at the site identified under Subtask 2.6. ConocoPhillips facilitated meetings with DOE, BP, ExxonMobil, Chevron, USGS, and ASRC representatives on November 3rd in Anchorage to advance project execution. At a follow up meeting of the Prudhoe Bay Working Interest Owners agreement was reached to draft a formal ballot for the proposed production test on an ice pad adjacent to Prudhoe Bay Unit L-pad. ConocoPhillips will continue to keep DOE informed of the progress on gaining formal co-owner approval for the field trial through regular project communications and will inform DOE of any issues that could affect the execution of the production test planned under this project.
Task 4 (Phase 1): Evaluation of Synergies with DOE-BP Arctic Field Project
ConocoPhillips personnel have facilitated meetings with Anchorage-based BP hydrates staff to review synergies between the ConocoPhillips CO₂/CH₄ exchange production test and BP’s long-term depressurization test. Advancement of this initiative will occur upon receipt of a formal proposal to Prudhoe Bay Unit working interest owners for long-term depressurization test, outlining proposed location and operational plan.

Task 5 (Phase 2): Detailed Well Planning/Engineering
ConocoPhillips experimentation has confirmed that upon carbon dioxide injection, “excess free water” may combine with CO₂ to form CO₂-hydrate. Upon CO₂-hydrate formation, reservoir permeability may decrease sufficiently low that matrix injection of CO₂ will be inefficient. To address this eventuality, scoping evaluation of hydraulic fracture stimulation, using the commercially available “StimPlan” program, is underway.

Task 6 (Phase 2): Pre-Drill Estimation of Reservoir Behavior
ConocoPhillips simulation confirmed laboratory results regarding the detrimental affects of CO₂-hydrate formation on reservoir permeability. Simulation also indicates that heat-of-hydrate-formation, associated with conversion of 30% free water to CO₂-hydrate, at expected North Slope reservoir conditions, will increase reservoir temperature less than 1° Fahrenheit.

Cost Status
Expenses incurred during this quarter were above the Baseline Cost Plan as shown in Exhibit 1. However, Cumulative Incurred Costs are below Cumulative Baseline Cost due to the delay in purchasing long-lead items and fewer cumulative hours required by our Alaska and Technology staff to progress the project.
Exhibit 1 - Cost Plan/Status

<table>
<thead>
<tr>
<th>COST PLAN/STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Phase</td>
</tr>
<tr>
<td>Baseline Reporting Quarter</td>
</tr>
<tr>
<td>Federal Share</td>
</tr>
<tr>
<td>Non-Federal Share</td>
</tr>
<tr>
<td>Total Planned</td>
</tr>
<tr>
<td>Cumulative Baseline Cost</td>
</tr>
</tbody>
</table>

**ACTUAL INCURRED COSTS**

Federal Share | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Non-Federal Share | 121912 | 186689 | 275348 | 354447 | 264734 | 121912 | 186689 | 275348 | 354447 | 264734 |
Total Incurred Cost | 121912 | 186689 | 275348 | 354447 | 264734 | 121912 | 186689 | 275348 | 354447 | 264734 |
Cumulative Incurred Cost | 121912 | 307111 | 582458 | 936806 | 1191640 | 121912 | 307111 | 582458 | 936806 | 1191640 |

**VARIANCE**

Federal Share | 0 | 0 | -80000 | -1450000 | 0 | 0 | 0 | 0 | 0 |
Non-Federal Share | -204098 | -313073 | -115527 | 20572 | 84035 | -204098 | -313073 | -115527 | 20572 | 84035 |
Total Variance | -204098 | -313073 | -175527 | -1429428 | 84035 | -204098 | -313073 | -175527 | -1429428 | 84035 |
Cumulative Variance | -204098 | -517181 | -892688 | -2122118 | -2038081 |

Milestone Status
Milestone Status is shown in Exhibit 2 below.

Exhibit 2 – Milestone Status

<table>
<thead>
<tr>
<th>MILESTONE STATUS REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td># Description</td>
</tr>
<tr>
<td>Field trial site selected</td>
</tr>
<tr>
<td>Partner negotiations completed</td>
</tr>
<tr>
<td>Synergies with DOE-BP project identified</td>
</tr>
<tr>
<td>Well test designed and planned</td>
</tr>
<tr>
<td>Well and reservoir performance predicted</td>
</tr>
<tr>
<td>Field testing completed</td>
</tr>
<tr>
<td>Injection and production monitoring completed</td>
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<tr>
<td>Well abandonment complete</td>
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</tbody>
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