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Quarterly Progress Report
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Characterization and Quantification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields

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FOURTH QUARTERLY PROGRESS REPORT

JULY-SEPTEMBER 2007

CHARACTERIZATION AND QUANTIFICATION OF THE METHANE HYDRATE RESOURCE POTENTIAL ASSOCIATED WITH THE BARROW GAS FIELDS

DOE Project Number: DE-FC26-06NT42962

Awarded to

North Slope Borough, Alaska

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DISCLAIMER

EXECUTIVE SUMMARY

Phase 1B of the project commenced August 1, 2007, with the initial task of revising the Research Management Plan to incorporate changes suggested by technical advisory group (TAG) feedback on Phase 1A results. The revised RMP was submitted on September 5, 2007.

A produced water sample was collected from the East Barrow #14 well, and the sample was analyzed for comparison to samples collected during drill stem tests performed while drilling the East Barrow wells. Unfortunately, the sample from the East Barrow #14 well drill stem test was contaminated with drilling fluid, and cannot be used as a baseline. However, DST samples from E.B. #17 and 19 had been collected and analyzed during drilling operations, and appear to represent reasonable formation water composition. Comparative analysis of the recent E.B. #14 well sample and the prior samples is presently being conducted, and samples will continue to be collected periodically from E.B. #14 to track any compositional changes over time.

Seismic interpretation and mapping of the Barrow Gas Fields is underway, using all available seismic and well data, and a core-log model is being developed to facilitate reservoir characterization for volumetric calculation and dynamic reservoir modeling.

SUMMARY OF PROJECT

The North Slope Borough (NSB) has established a team to characterize and quantify the methane hydrate resource potential associated with the Barrow Gas Fields (BGF), which are owned and operated by the NSB in a permafrost region of arctic Alaska. Currently, gas from these three producing fields provides heating and electricity for Barrow, which is the economic, transportation, and administrative center of the NSB. Other commercially-operated producing oil and gas fields within the NSB include Prudhoe Bay, Milne Point, Kuparuk, Alpine and Endicott. The results of this project will enhance the understanding of the nature and occurrence of methane hydrates in the arctic environment, and specifically in the Barrow Gas Fields, and will server to evaluate the potential influence of gas hydrates on gas supply and production from producing gas fields. Findings of this project will contribute significantly to understanding the role of gas hydrate as a recharge mechanism in a producing gas field, and provide substantial commercial and social benefits for the NSB.

The characterization and quantification of methane hydrate resources in the Barrow Gas Fields (BGF) will be completed in three phases: IA, IB, and II. This approach will allow for timely evaluation and adjustment of methods and objectives as new findings are obtained. The Research Management Plan (RMP) lays the framework for all three phases, and it has been revised for Phase 1B based on input from the TAG.

Phase 1A concluded that methane hydrate stability zones exist in association with two of the BGF (Walakpa and East Barrow), validating the postulate that the gas fields in question are potentially being recharged by dissociation of adjacent methane hydrates. Based on these results, funding was approved for Phase 1B of the study.

In Phase 1B, the NSB will a) determine probability that the reservoir is continuous up-dip into the methane hydrate stability zone, and contained sufficient water to combine with available gas to form gas hydrate; b) determine the optimum well location for a dedicated methane hydrate well; and c) quantify reserves, expected production rates and depletion mechanisms for methane hydrate production.

The Project has been funded for $609,859 for Phase 1B to accomplish the following four tasks:

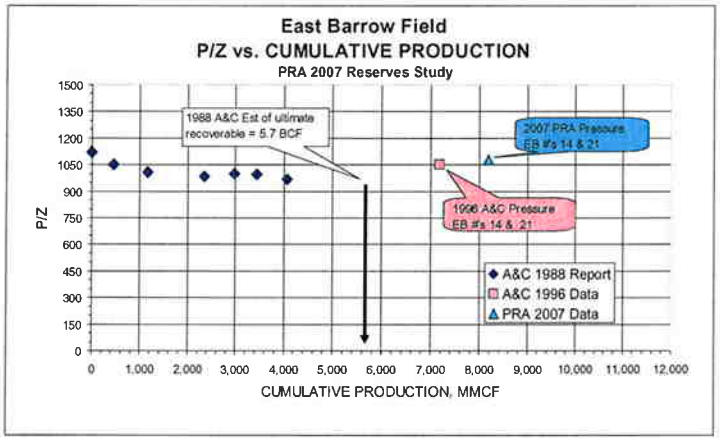
Task 5 —	Revise RMP, Map Barrow Area and Walakpa Gas Fields
Task 6 —	Reservoir Characterization and Selection of Optimum Test Well Location
Task 7 —	Build methane hydrate reservoir simulator to model methane hydrate test well production
Task 8—	Phase I Final Report

The results of Phase 1B will determine whether or not funding will be requested for Phase 2.

PROJECT TASKS COMPLETED THIS QUARTER

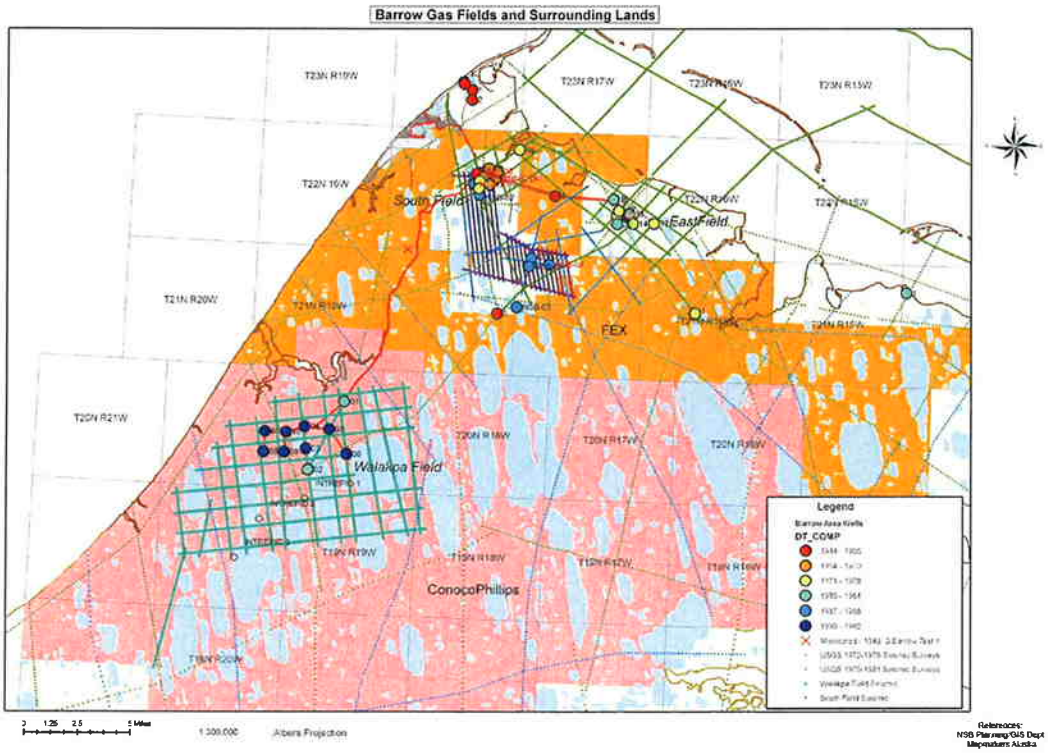
TASK 5a: Revise Research Management Plan (RMP)

The RMP was revised to incorporate input from the Technical Advisory Group (TAG). Changes included: updating the project schedule to reflect the two no-cost extensions approved in Phase 1A; addition of a seismic reprocessing step to evaluate the use of AVO techniques to determine reservoir presence or absence; expansion of Task 5 to include produced water sampling and anaylsis from the E.B. #14 well; and greater emphasis on the production history information to assess the importance of unusual material balance modeling results.



TASK 5b: Map Barrow and Walakpa Gas Fields

All available seismic and well data associated with the Barrow Gas Fields has been loaded to the interpretation workstation, and seismic survey wavelet and datum balancing has been performed to match the various surveys. Synthetic seismograms have been generated to tie wells to seismic for horizon identification, and wavelet extraction.



One-dimensional and two-dimensional seismic modeling is underway to understand the effects of reservoir pore-fluid saturations (free gas vs. hydrate) on the seismic response, and wedge modeling to assess the impact of thinning reservoir section.

Seismic interpretation and mapping to define gross reservoir container for volumetrics and dynamic reservoir simulation is underway.

Core analysis for wells cored over the Walakpa and Barrow Sandstones have been loaded to the interpretation workstation, and a core-log model is being developed to facilitate poro-perm and saturation characterization.

TECHNOLOGY TRANSFER

- Tom Walsh and Pete Stokes of PRA, and Steve MacRae of the North Slope Borough attended the Merit Review in Golden, Colorado September 18-20 to present project status and to learn about other ongoing Doe-NETL-funded hydrate research.

- Tom Walsh will present a paper on the status of the Barrow project at the Arctic Energy Summit in Anchorage, Alaska, October 15-18.

CONCLUSION

Phase 1B commenced in this fourth quarter, and the initial focus was on revision of the RMP and gathering and loading seismic and well data for reservoir mapping. Sampling and analysis of produced water from the E.B. #14 well was completed to initiate a time-series analysis of formation water chemistry.

Three team members participated in the Project Merit Review in Golden, Colorado in mid-September, and a project status paper was submitted for the Arctic Energy Summit to be hosted by the Department of the Interior in Anchorage, AK on October 16.

Objectives for the upcoming fifth quarter are to complete the reservoir characterization, estimate the potential hydrate resource volume, and perform dynamic reservoir simulation to model depletion mechanism and predict production performance.

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