

FIRST QUARTERLY PROGRESS REPORT

OCTOBER – DECEMBER 2006

**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

Project Director/Manager: Kent Grinage

Principal Investigator: Thomas P. Walsh

Prepared by

Thomas P. Walsh
Peter J. Stokes, P.E.
Petrotechnical Resources of Alaska, LLC
3601 C. Street, Suite 822
Anchorage, AK 99503

Prepared for:

U.S. Department of Energy
National Energy Technology Laboratory
626 Cochrane Mills Road
P.O. Box 10940
Pittsburgh, PA 15236-0940

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

EXECUTIVE SUMMARY

The Characterization and Quantification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields Project (“Project”) was conditionally approved by the DOE/NETL on November 14, 2006.

The funding approval was for \$152,465 to completed Phase 1A, which consists of Tasks 1-4. Phase 1B will be funded based on the results of Phase 1A.

A Project kickoff meeting was held on November 14, 2006.

The Research Management Plan (“RMP”) for the Project was submitted to DOE on December 13, 2006. Initial comments were received back on December 14, 2006, and final comments are expected by January 14, 2007.

Work on the Technology Status Assessment (“TSA”) commenced in this period, with planned submission in 1st Quarter 2007.

Preparation to develop a gas hydrate stability model began to include:

- Gas sampling wells were chosen and sampling procedures were developed.
- Review of well and field history files was begun to collect all information on pressure, temperature and gas/fluid analysis.
- An approach to define the hydrate stability zone for the NSB gas fields was begun with the University of Alaska – Fairbanks Petroleum Engineering Department. A meeting was held in Fairbanks on December 15 to discuss stability model development, attended by Tom Walsh, Shirish Patil, and Abhijit Dandekar.

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, 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 serve 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 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; however, it will be updated before commencement of Phase II, if warranted and funded in the future.

Phase 1A will determine whether the methane hydrate stability zone exists up-dip of one or more of the Barrow Gas Fields, validating the postulate that the gas in question is derived from disassociated methane hydrates vs. free gas. If the results are positive, then funding will be released for Phase 1B.

In Phase 1B, the North Slope Borough will a) determine probability that the reservoir is continuous up-dip into the methane hydrate stability zone, and contains 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.

PROJECT FUNDING APPROVAL

The approval was for \$152,465 for Phase 1A to accomplish the following four tasks:

- Task 1 — Develop Research Management Plan
- Task 2 — Complete Technology Status Assessment
- Task 3 — Develop a methane hydrate stability model
- Task 4 — Prepare Phase IA Final Report

Phase 1A will determine whether the methane hydrate stability zone exists up-dip of one or more of the Barrow Gas Fields, validating the postulate that the gas in question is derived from disassociated methane hydrates vs. free gas. If the results are positive, then funding will be released for Phase 1B.

PROJECT KICKOFF MEETING

A DOE project kickoff meeting was held in Anchorage on November 14, 2006.

Attendees at the meeting were:

Tom Walsh, Petrotechnical Resources of Alaska
Jim Hemsath, US Dept. of Energy, NETL
Shirish Patil, University of Alaska, Fairbanks (via teleconference)
Kent Grinage, North Slope Borough
Steve MacRae, North Slope Borough

At this project kick-off meeting the principals of the project met and discussed the project scope and the timeline was reviewed. There will also be an additional kickoff meeting at the NETL in Morgantown, WV in the 1st Quarter 2007.

TASK 1: RESEARCH MANAGEMENT PLAN STATUS

The RMP concisely addresses the overall project. The RMP will to be approved by the DOE Contracting Officer's Technical Representative (COR). The RMP will be reviewed and updated as needed or requested at key decision points in the project.

The RMP was prepared and the initial submittal made on December 14, 2006. Final submittal with NETL comments will be on January 14, 2007.

TASK 2: TECHNOLOGY STATUS ASSESSMENT STATUS

The Technology Status Assessment (TSA) describes the current state of information and/or technology relevant to the proposed work, including both positive and negative aspects of each existing approach or technology. The TSA will address the following topics:

Current state of information or technology (Industry wide)

- Summary of background of industry/sector
- Technologies/Tools/Approaches/Data being used
- Benefits and inadequacies of current state-of-the-art.

Development Strategies

- Why new approach is required?
- Problems to address in the research project

Future

- What barriers will the research overcome and the potential impact on the exploration or ultimate production of gas hydrate, or the understanding of gas hydrate's role in the natural environment.
- Deliverables – Tools, Methods, Instrumentation, Products, etc.

References (relevant to the project).

Research for the TSA began during the period and will be submitted in February, 2007.

TASK 3: DEVELOP A METHANE HYDRATE STABILITY MODEL STATUS

The methane hydrate stability model will be based on the analysis of gas composition, formation water composition, and local pressure and temperature gradient. These parameters will determine the location and extent of a postulated gas hydrate stability zone, based on known phase behavior of methane gas hydrate. The results of gas composition analysis and gas hydrate stability modeling will be used to decide whether or not to proceed with Phase IB.

Gas sampling wells were chosen and sampling procedures were developed for Task 3. The sampling work is planned in 1st Quarter 2007. The samples will be taken from 3 wells in each field and analyzed for composition and isotope characterization using Iso-Tech Labs.

Review of well and field history files was begun to collect all information on pressure, temperature and gas/fluid analysis. Additionally static temperature gradients will be taken from non-producing wells in the East Barrow Field.

A discussion on the approach to define the hydrate stability zone for the NSB gas fields was begun with the University of Alaska – Fairbanks Petroleum Engineering Department. Initial plans are to use the CSM hydrate stability model. Gas and water compositions will be used as model inputs.

CONCLUSION

The Project was started during the 4th Quarter 2006 period and the initial tasks of a Research Management Plan and the Technology Assessment Status were completed or underway.

Planning and data collection for the methane hydrate stability model was initiated during the period.

There were no technical conclusions made during this period as this was the start of the project.

Cost Plan Status

[illegible]

Milestone Plan/ Status Report

Task/ Sub-task		Critical Path Project Milestone Description	Project Duration					Planned	Planned	Actual	Actual
			10/16/06 - 1/28/08					Start	End	Start	End
			2006	2007			Date	Date	Date	Date	
			Q4	Q1	Q2	Q3	Q4				
1.0	Research Management Plan	X					11/14/2006	12/15/2006	11/14/2006	12/15/2006	
2.0	Technology Status Assessment						12/15/2006	2/28/2007	12/15/2007		
3.0	Develop Methane Hydrate Stability Model						1/29/2007				
3.1	Phase 1A Topical Report						3/19/2007				