

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

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The North Slope of Alaska has significant methane hydrate resource potential, and results of previous studies suggest that gas hydrates exist in the Barrow area. Currently, gas from three producing fields in the Barrow area provides heating and electricity for Barrow, the economic, transportation, and administrative center of the North Slope Borough (NSB). As energy demands grow on the North Slope, it is important to characterize, quantify, and evaluate the potential impact of the postulated gas hydrate accumulation to guide future development, and assess the resource value of the hydrates.

A two-phase research program was completed in March, 2008, funded jointly by the U.S. Department of Energy and the North Slope Borough. The objective of the study was to better understand the nature and occurrence of methane hydrates in the Barrow Gas Fields and to evaluate the potential influence of gas hydrates on gas supply and production. Phase 1A confirmed the existence of gas hydrates in association with the Barrow Gas Fields through the sampling and analysis of produced gas from the three fields; determination of the temperature and pressure gradient; and modeling of hydrate stability envelope. In Phase 1B, a detailed reservoir characterization was completed to support simulation of hydrate production methodologies; quantification of hydrate resource; and selection of optimal locations for possible hydrate production test well(s). A proposal is currently being prepared to secure funding to design and drill a dedicated gas hydrate well near Barrow.

The results of Phase 1B support the postulate that methane hydrate dissociation serves as a recharge mechanism to the free gas currently in production. Based on these findings, future development and operation of the Barrow Gas Fields will be significantly impacted, and the resource base represented by the Barrow Gas Fields will be greatly expanded. Findings of this project will contribute significantly to understanding the role of gas hydrate in recharging a producing gas field, while providing substantial commercial and social benefits for the NSB.