

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 previous studies suggest that gas hydrates exist in the Barrow area. Currently, gas from three producing fields provides heating and electricity for Barrow, the economic, transportation, and administrative center of the North Slope Borough. As energy demands grow, it is important to characterize, quantify, and evaluate the potential impact of the postulated gas hydrate accumulation to guide future development. The Barrow Gas Fields (BGF) provide an excellent opportunity to study the interaction between a producing free gas reservoir and an overlying hydrate accumulation. A phased research program is underway, funded jointly by the U.S. Department of Energy- NETL and the North Slope Borough to prove the existence of hydrate accumulations associated with the free gas fields, quantify the size of postulated accumulations, and drill and production test a dedicated hydrate test well.

Modeling work completed in Phase 1A of the study supports the existence of methane hydrates in association with the East Barrow and Walakpa Gas Fields. Phase 1A included sampling and analysis of produced gas, determination of temperature and pressure gradient, and modeling of hydrate stability. In Phase 1B, a detailed reservoir characterization was completed.

Phase 2 of the study commenced December 1, 2008, with the goal of drilling a hydrate test well in late 2010 in the East Barrow Gas Field. This well is intended to collect core from the Barrow Sandstone within the hydrate stability zone, gather LWD and wireline logs over the hydrate and free gas zones, and produce free gas while monitoring the interface between free gas and hydrate.

Core and logs will be analyzed in the field, and a comprehensive decision matrix will be utilized in the decision to complete a monitoring well, and drill a horizontal production test well, or to move to a secondary location in the Walakpa Gas Field. A detailed coring operations, preservation and analysis plan has been designed to allow for the real-time decision process in the field.

In the success case, a gas production test well will be completed with slotted production liner straddling the base methane hydrate stability zone (BHSZ). A nearby monitoring well, will monitor changes in the BHSZ. The production test well will be produced at a relatively high rate from the free gas leg just below the BHSZ, thereby reducing reservoir pressure, and inducing depressurization dissociation.