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## Oil & Natural Gas Projects
Exploration and Production Technologies

**Producing Light Oil from a Frozen Reservoir: Reservoir and Fluid Characterization of Umiat Field, National Petroleum Reserve, Alaska**

**DE-FC26-08NT0005641**

**Goal**

The goal is to develop a robust reservoir model to test possible production methods for Umiat and similar frozen reservoirs that do not use steam or a liquid that will freeze. This will be accomplished by collecting the data needed to develop both a robust geologic and an engineering model. The results will provide important information on production methods for this and similar frozen reservoirs in northern Alaska and other arctic regions.

**Performers**

University of Alaska Fairbanks, Fairbanks, AK 99775-7320
Renaissance Alaska LLC

**Background**

The Umiat oil field contains light oil in a shallow, frozen reservoir in the Brooks Range foothills of northern Alaska. The Umiat field was discovered in the 1940's but it was never considered viable because it is shallow, in the permafrost, relatively small and far from any transportation infrastructure. Initial estimates of recoverable reserves in the Umiat field ranged from 30 to over 100 million bbl, with an average of about 70 million bbl (Baptist, 1960). However, recent reserve estimates by private industry suggests that the accumulation may be considerably larger than originally thought, and modern horizontal drilling techniques enable development of a shallow reservoir. This makes Umiat and similar fields in northern Alaska attractive exploration and production targets.

However, little is known about how to produce conventional oil from a frozen reservoir. Most prior work has been on production techniques for heavy oil in unconsolidated but unfrozen sands, or on gas hydrates. There is no information on the behavior of a rock/ice/light oil system at low pressures. This information along with a robust reservoir model is needed to accurately model and evaluate the effectiveness of different production methods.

**Potential Impacts**

The Umiat field contains significant albeit unconventional (i.e., frozen) potential energy resources. This is a particularly attractive target considering the decline in the production of conventional oil resources from Alaska's North Slope. Development of production methods and strategies from these shallow unconventional resources will promote economically viable resource extraction. This project will encourage involvement of smaller companies in Alaska exploration and production by providing to the public critical information not currently available and by evaluating the applicability of existing production techniques. This information will increase the chances of successfully bringing smaller fields into production.

**Accomplishments**

None to date. Project just starting.

**Current Status**

The project started on October 1, 2008. During the first year, work will focus on compiling existing information on the reservoir, trap and rock and fluid properties. Existing 3D seismic data will be sampled and processed for structural evaluation of trap size, shape and fracture character. Drilling and collection of new reservoir and fluid data is planned for winter 2009. Geologic fieldwork in summer of 2009 will focus on augmenting existing geologic data, including reservoir character, stratigraphic and sedimentologic context and fracture character.

**Project Start:** October 1, 2008
**Project End:** September 30, 2011

**DOE Contribution:** $1,350,652
**Performer Contribution:** $1,530,000

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