EMD Gas Hydrate Committee

2015 EMD Gas Hydrate Committee Mid-Year Report

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COMMITTEE ACTIVITIES

On behalf of the Gas Hydrate Committee, the committee chair wrote the Natural Gas Hydrate section of the Natural Resources Review publication and the EMD column for the November 2015 AAPG Explorer.

EXECUTIVE SUMMARY

Gas hydrate exploration and development activity is continuing in several countries, and the focus has begun to shift from identification and quantification of natural gas hydrate deposits to the engineering of commercial production systems. Significant technical hurdles remain and are being addressed. The success of these efforts will determine whether natural gas hydrate may be able to contribute to global energy supplies.

STATUS OF U.S. GAS HYDRATE ACTIVITIES

U. S. Department of Energy (DOE) Advisory Committee

The DOE has named a new Methane Hydrate Advisory Committee.The Committee is to advise the Secretary of Energy on potential applications of methane hydrate, assist in developing recommendations and priorities for the methane hydrate research and development program, and submit to Congress one or more reports on an assessment of the research program and an assessment of the DOE 5-year research plan.

The 15 members are Thomas Blasingame (Texas A&M), Richard Charter (The Ocean Foundation), Dr. Peter Flemings (University of Texas at Austin), Matthew Hornbach (Southern Methodist University), Miriam Kastner (Scripps Institute of Oceanography), Carolyn Koh (Colorado School of Mines), Craig Shipp (Shell International Exploration & Production), Robert Swenson (Alaska State Geologist Emeritus), Mark Myers (Alaska Department of Natural Resources), Michael Max (Hydrate Energy International), George Moridis (Lawrence Berkeley National Lab), Joel E. Johnson (University of New Hampshire), Robert L. Kleinberg (Schlumberger-Doll Research), Evan A. Solomon (University of Washington), and Lori L. Summa (ExxonMobil Upstream Research).

Gulf of Mexico
The current Gulf of Mexico program is a consortium led by the University of Texas at Austin, in partnership with The Ohio State University, University of New Hampshire, Columbia University-Lamont-Doherty Earth Observatory, the Consortium for Ocean Leadership and the U.S. Geological Survey. The program completed the evaluation of prospective drill sites in October 2015, and has officially transitioned into Phase 2 with a full-scale, land-based test of the project's existing pressure coring system anticipated for December 2015. During Phase 2, the project will initiate efforts to develop needed core storage, transport, handling and analysis capabilities, and will conduct a marine field test of the pressure coring system. That test, planned for 2018 will likely take cores from some of the locations where natural gas hydrate was logged with LWD tools in the 2009 program led by Chevron. The Phase 2 results will guide a large-scale field expedition slated for Phase 3.

The project is planned to conclude at the end of September 2020, with a total cost of $81,022,246, of which the U.S. Department of Energy is contributing $54,297,682.

Alaska
On the North Slope, 18 potential drilling locations are being evaluated for a long-term test, with funding for the program contributed by JOGMEC (Japan). No estimated dates for drilling have been announced.

STATUS OF INTERNATIONAL GAS HYDRATE ACTIVITIES

India
The government of India completed a 150-day drilling, logging, and pressure coring expedition in July 2015, utilizing the drillship Chikyu. The 2006 program had targeted bottom simulating reflectors (BSRs) and recovered hydrate, but found no sand reservoirs. The 2015 program specifically targeted sand reservoirs with hydrate potential. Thus far, the results of the expedition have not been released.

Japan
Japan continues to move toward commercial production of natural gas from hydrate. In evaluating data from the 2013 production test, the Japanese program recognized the need to address some critical technology issues. One of these is the need for greater sand control than previous production tests in Japan, Canada, or Alaska had achieved. As the hydrate-bearing sands are poorly consolidated, the *in situ* dissociation of the hydrate to its component gas and water, followed by flow to the wellbore, has consistently resulted in movement of the reservoir sands. Unless improved methods of sand control are developed, producing wells are expected to quickly fail.
A second issue being addressed is the technology required to restart a hydrate well after it has been shut in. While computer models indicate that hydrate reservoirs might be able to sustain production at commercial rates for many years, it is likely that the production would have to be shut in periodically during the life of a well, and then restarted. Several scenarios for accomplishing this are under consideration.

To address these issues, Japan is planning a 1-month production test. The date of the test has not been officially announced. It should be noted that the goals of the test do not include the determination of a maximum IP rate. A timeline for commercial production has not been announced.

European Union

The initial meeting of the European Union's MIGRATE (Marine Gas Hydrates: An Indigenous Resource of Natural Gas for Europe) Program was convened in Malaga, Spain on October 5 and 6, 2015. The European Cooperation for Science and Technology (COST) initiated this program to integrate the expertise of a large number of European research groups and industrial players in the field of natural gas hydrate. MIGRATE will examine the potential of gas hydrates as an economically feasible and environmentally sound energy resource through working groups focusing on 1) resource assessment, 2) exploration, production, and monitoring technologies, 3) environmental challenges, 4) integration, public perception, and dissemination. Study areas will span the European continental margins, including the Black Sea, the Nordic Seas, the Mediterranean Sea and the Atlantic Ocean.

The German National Initiative on Gas Hydrate Research has resulted in the formation of the SUGAR Consortium (**Su**b-marine **Ga**s Hydrate **R**eservoirs) with the goal of combining the gas hydrate expertise of the German academic community with the engineering capabilities of German companies. The consortium is led by GEOMAR and has been active since 2008. Primary research areas include global and basin modeling, 3-D seismic acquisition, controlled source electromagnetic (CSEM) acquisition (both 2-D and 3-D), and development of seafloor drilling capabilities.

The seafloor drilling capabilities have been tested in the marine environment with the Bauer Group's MeBo200, a drilling device capable drilling to 200 meters and light enough to be launched from relatively small ships. A larger unit, the MeBo500 is under development with a capability of drilling to 500 meters. To enable this drilling unit to be launched from small ships it is designed to be modular, with its three component pieces assembled on the seafloor. If successful, this technology could allow hydrate exploration at far lower costs than is currently possible.

Industry Activity

Many major oil companies have had internal programs on natural gas hydrate as a commercial resource, but few have ever released the results of the evaluations or even admitted that these evaluations have taken place. One company that has gone public with their program is Statoil. Statoil presented an overview of their program at the 3P Arctic Conference is October 2015. Their program analyzed 567 basins worldwide of which they determined 256 had hydrate potential. Of these 192 were evaluated in detail. The results of the evaluations have not been released.

Meetings

The AAPG-sponsored 3P Arctic Conference in Stavanger, Norway included a gas hydrate session on October 1, 2015, with seven papers presented on current research.

Summary

There is a continued focus on natural gas hydrate as part of a petroleum system, and a realization that exploration must be more than merely a hunt for bottom simulating reflectors (BSRs). All of

the petroleum system elements must be present (reservoirs, gas flux, and seals), whether a BSR is present or not.