

EMD Gas Hydrates Mid-Year Committee Report

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Committee Activities

The Gas Hydrate Committee has over 900 members in 62 countries (Table 1) with 63% residing outside of the United States. This is a reflection of the growing interest in gas hydrate resource potential, especially in nations that lack an adequate domestic supply of natural gas. The committee will encourage participation in gas hydrate sessions at AAPG conferences at international venues. The large number of members (692) who agreed to serve as Advisory Committee members will be narrowed in the coming months to those who will actively participate in committee activities such as gathering and disseminating information about gas hydrate programs and chairing gas hydrate sessions at conferences and other events.

Gas Hydrate in Japan

Two deepwater hydrate production tests are currently planned for offshore Japan in fiscal 2012 (calendar 2013). The test durations are currently planned for 4 weeks and 3 months, respectively, and will provide important information for MH21, the Japanese gas hydrate program. Site selection, test details, and other considerations are currently under review. The proposed maximum production rates have not been released and the Gas Hydrate Committee hopes that the rates will be sufficiently high to raise industry interest in gas hydrate resource potential elsewhere in the world. Sources within the program indicate that commercial production of gas from hydrate could commence in as little as five years.

The Japanese program has conducted extensive modeling to assess development economics. Of critical importance for cost-effectiveness are

- Increase in gas production rate
- Improvement in recovery factors
- Reduction in water production rate
- Reduction in sand production rate
- Reduction in subsea system costs

Additional information on the Japanese program may be found at the MH21 website:

<http://www.mh21japan.gr.jp/english/>

Interest in natural gas as a fuel for the generation of electricity has intensified since the Fukushima Daiichi nuclear disaster, and Japanese imports of natural gas have increased 14% since the March tsunami. With spot prices for LNG cargos rising above \$15 per million BTU, production of gas from hydrate should be commercially viable in the Japanese market. The Japanese government is actively pursuing alternatives for nuclear power and has increased funding for the MH21 since the March events.

Japan has also signed on with funding and participation with the ConocoPhillips carbon dioxide injection test in Alaska, described below in the section on "Gas Hydrate in Alaska".

Gas Hydrate in India

Sites have been selected for an LWD drilling program that is scheduled to commence in late 2012 offshore India. This program is a follow-up to the 2006 program that recovered significant amounts of gas hydrate in cores. The 2006 program targeted bottom simulating reflectors (BSRs) but did not encounter reservoir lithologies suitable for production. India's National Gas Hydrate Program (NGHP) has focused since then on reservoir delineation and resource assessment.

Additional information about NGHP may be found at the website:

<http://www.dghindia.org/NonConventionalEnergy.aspx>

Gas Hydrate in South Korea

The South Korean program, under the direction of the Korea Institute of Geoscience & Mineral Resources, is currently studying the results of the gas hydrate drilling program conducted during the summer of 2010. The program targeted sand reservoirs and was a follow-up to the successful hydrate drilling program conducted offshore South Korea in 2007.

Gas Hydrate in China

No reliable information is available on any new field programs for offshore China that would follow the 2007 program. That effort successfully recovered gas hydrate but did not encounter producible reservoir lithologies.

Studies are continuing on the gas hydrate recovered in late 2009 from the Qinghai-Tibetan Plateau. The hydrates in these occurrences contain higher density hydrocarbon gases along with methane, allowing the hydrate to form at shallower depths than would be stable for methane hydrate alone. Given the large area with pressures and temperatures within which gas hydrate would be stable, this suggests a very large potential onshore gas resource base.

Gas Hydrate in Alaska

ConocoPhillips has completed the first phase of a 2-phase project to test the concept of CO₂ injection into a methane hydrate reservoir to determine the potential for methane production while permanently sequestering CO₂. Drilling operations for the Ignik Sikumi #1 well began earlier this year and the well was drilled, tested and temporarily abandoned in March and early April 2011, using an ice pad adjacent to Prudhoe Bay Unit L-pad. In the upcoming winter, the well will be re-entered and the CO₂ injection/methane exchange concept will be carried out. The project was initiated by ConocoPhillips with substantial funding from the U.S. Department of Energy. Significant additional funding for the second phase is being provided by Japan.

The field test in Prudhoe Bay, Alaska to assess sustainable production rates for hydrate reservoirs was originally scheduled to commence earlier this year and continue for 18 to 24 months, operated by BP Alaska Exploration. The test is currently on hold and contacts within the project have indicated that the test may move forward in the next year or two following an evaluation of the results of the ConocoPhillips test. The BP test would follow the successful Mt. Elbert test in 2007 in which 100 feet of hydrate-bearing core were retrieved with hydrate saturations as high as 75% of pore volume. A Modular Formation Dynamics test provided key information on the response of the hydrate reservoirs to depressurization. Data and analysis related to the Mt. Elbert well program were published in the February 2011 volume of the Journal of Marine and Petroleum Geology.

Additional reports and publications about U.S. gas hydrate projects are available at the NETL website:

<http://www.netl.doe.gov/technologies/oil-gas/futuresupply/methanehydrates/maincontent.htm>

Gas Hydrate in the Gulf of Mexico

As a result of the Deepwater Horizon disaster additional gas hydrate field operations in the Gulf of Mexico that were planned as a follow-up to the highly successful 2005 and 2009 expeditions are now on hold. A future expedition (Leg III) will use a new coring system designed to collect hydrate-bearing sands at reservoir pressure and transfer the samples at pressure to a variety of newly-constructed testing devices. These samples will enable the first measurements of a range of physical properties of marine gas hydrate sand reservoirs. Results of the 2009 expedition are available at:

<http://www.netl.doe.gov/technologies/oil-gas/FutureSupply/MethaneHydrates/JIPLegII-IR/>

In addition, an upcoming special issue of the journal “Marine and Petroleum Geology” will contain a series of peer-reviewed papers from the 2009 expedition.

Gas Hydrate at 2012 ACE

The 2012 AAPG annual meeting in Long Beach will include gas hydrate oral and poster sessions, and the Gas Hydrate Committee is planning to have a late afternoon “Friends of Gas Hydrate” meeting that will be open to everyone interested. All of these events are scheduled for Tuesday, April 14, 2012.

Other Gas Hydrate Activities

The 7th triennial International Conference on Gas Hydrate (ICGH) was held in Edinburgh, Scotland in July, 2011. The conference included 647 orals and posters covering a broad range of gas hydrate topics including physical chemistry, laboratory studies, climate change implications, flow assurance, resource assessment, and extraterrestrial occurrence. The abstracts should be available online at no charge in the near future.

In November, 2011, Marine and Petroleum Geology published an issue on “Occurrence and exploration of gas hydrate in the marginal seas and continental margin of the Asia, India and Oceania region”. These peer-reviewed papers are an excellent addition to the literature and are of great value for anyone interested in the gas hydrate activities in this region – a region that is currently seeing the greatest level of gas hydrate field work.

Table 1
Gas Hydrate Committee
(Advisory and Observing Members)

Country	Committee Members
United States	337
India	65
United Kingdom	55
Egypt	44
Nigeria	42
Canada	39
Indonesia	38
China	23
Colombia	23
Pakistan	22
Norway	22
Australia	21
Italy	12

Malaysia	11
France	11
Argentina	11
Brazil	9
Germany	8
Iran	8
Mexico	7
Poland	7
Saudi Arabia	7
Russia	6
Hungary	5
Japan	5
Spain	5
Benin	4
Denmark	4
Portugal	4
Jordan	3
Romania	3
Netherlands	3
Peru	3
Algeria	2
Angola	2
New Zealand	2
Philippines	2
South Africa	2
South Korea	2
Thailand	2
Trinidad	2
United Arab Emirates	2
Azerbaijan	1
Bangladesh	1
Cambodia	1
Cameroon	1
Ecuador	1
Ghana	1
Greenland	1
Jamaica	1
Kuwait	1
Lebanon	1
Malta	1
Morocco	1

North Korea	1
Oman	1
Serbia	1
Sudan	1
Taiwan	1
Uganda	1
Venezuela	1
Zambia	1