EMD Gas Hydrates Committee Report

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Art Johnson, P.G., Chairman, Hydrate Energy International, Kenner, Louisiana
Vice-Chairs:
TBA, (Vice-Chair: Industry)
TBA, (Vice-Chair: Government)

United States Gas Hydrate Program

The U.S. Gas Hydrate program has been functioning at a low level compared with the period from 2001 to 2010 as the Department of Energy has moved away from fossil energy. That approach has now changed under Secretary Ernest Moniz, and fossil energy is now being included in the federal "All of the Above" philosophy of energy. Gas hydrate is now a special emphasis of the DOE Office of Fossil Energy. The gas hydrate program has $8 million in the 2014 budget and that is being increased to $15 million in the proposed 2015 budget.

Areas of gas hydrate focus are continuation of the characterization of gas hydrate in the Gulf of Mexico and a production test in Alaska. A solicitation is being released from DOE regarding the Alaska test, and the State of Alaska is working with DOE to identify a site for the test on state lands west of Prudhoe Bay Field. Industry participation will be necessary.

A new Methane Hydrate Advisory Committee has been established and will meet in Galveston March 27-28. 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 Committee's charter stipulates that up to 15 members can be appointed by the Secretary of Energy, representing institutions of higher education, industrial enterprises and oceanographic institutions and state agencies.

Gas Hydrate in China

China's second major gas hydrate expedition, GMGS2, took place between June and September 2013 and utilized the Fugro M/V REM Etive. The primary objective of the expedition was to accurately quantify gas hydrate in sediment cores and to determine the nature and distribution of gas hydrate within the sedimentary sequence in the in the eastern part of the Pearl River Mouth basin, in the South China Sea (Figure 1). The investigated area lies northeast of the Shenhu site, where the first Chinese gas hydrate expedition (GMGS1) was completed in 2007. The GMGS2 expedition was contracted by the Chinese Geological Survey's Guangzhou Marine Geological Survey (GMGS) and conducted by Fugro, Schlumberger, and Geotek.

To achieve these goals, GMGS2 employed an initial Logging While Drilling (Schlumberger LWD) phase (Leg 1), followed by a coring and sampling phase (Legs 2 and 3), which included some wireline logging. Sixteen possible drilling sites were identified prior to the expedition, at sites with water depths ranging from 667 m to 1747 m. During the course of the expedition, 13 of the 16 possible sites were investigated. Of the 13 sites investigated during the GMGS2 expedition, five were selected for further analysis by coring. Fugro coring tools used for GMGS2 included rotary and non-rotary tools for sampling different lithologies, as well as pressure coring tools designed to recover gas hydrate samples at *in situ* pressures. A

team of GMGS and Geotek scientists and technicians performed a comprehensive suite of analyses of all core material recovered on board the vessel.

Figure 1: Location of the GMGS1 (2007) and GMGS2 (2013) locations.

Geotek provided a range of geophysical and geochemical core processing and core analysis equipment in containerized mobile laboratories for both pressure cores and non-pressure cores. The equipment suite included the Pressure Core Analysis and Transfer System (PCATS) for analyzing pressure cores up to 3.5 m long and PCATS Triaxial equipment for performing geomechanical tests on samples recovered at full, *in situ* hydrostatic pressures. Whole core analysis equipment for non-pressure cores included fast automated thermal infrared core logging as well as standard geophysical core logs.

Cores were split on board the ship, before additional imaging and XRF measurements were made for detailed sedimentological analysis. A geochemistry laboratory provided a full suite of pore water and gas analyses suitable for determining the nature and distribution of gas hydrate.

Using combined data from logging and core sampling, we were able to confirm that nine of the 13 sites investigated contain gas hydrate in one form or another. All five of the cored sites contain gas hydrate. Gas hydrate-bearing lithologies identified from the coring include the following morphologies: a) massive forms of visible gas hydrate; b) disseminated gas hydrate in deeply-buried fine-grained sediments; c) dense, thin veins of gas hydrate in shallow, fine-grained sediments; and d) disseminated gas hydrate in coarse-grained sediments.

A conclusion of the 3-month expedition was that the drilled region is a very active area of methane flux, and that gas hydrate is common in the first 200 meters below the seafloor. This area is of the richest and most complex marine gas hydrate environments studied to date.

Gas Hydrate in India

The second leg of India's gas hydrate drilling program is scheduled for October, 2014, with a third leg in the summer of 2015. The program is targeting hydrate-bearing sands with a focus on reservoir delineation and resource assessment.

Gas Hydrate in South Korea

After two successful drilling programs (2006 and 2010), South Korea is planning a gas hydrate production test for 2014. The date has not yet been released.

Meetings

A Gordon Conference on "Natural Gas Hydrate Systems" is scheduled for March 23-28, 2014.