Fall 2003

Fire in the Ice

THE NATIONAL ENERGY TECHNOLOGY LABORATORY METHANE HYDRATE NEWSLETTER

CONTENTS

You See Ice—We See Gas Hydrates

by Barry Freifeld, Lawrence Berkeley National Laboratory

What happens when you take a high-technology, medical computed tomography (CT) system, remove 80 percent of the weight, shrink it to the size of a refrigerator, increase its imaging resolution, cut the cost by an order of magnitude, and optimize it to look at geologic core samples? What you end up with may look like the world's first cabinet-safe, portable, x-ray CT, whole-core scanner—built by engineers and scientists at Lawrence Berkeley National Laboratory (Berkeley Lab).

Berkeley Lab Portable X-Ray CT History

The story starts at a breakout session held during the 3rd ChevronTexaco Joint Industry Partners (JIP) Workshop in Houston in May 2002.

Barry Freifeld presented results from an experiment conducted in collaboration with Laura Stern and Stephen Kirby from the U.S. Geological Survey. Using Berkeley Lab's medical x-ray CT unit, the group tracked the progression of a

Portable x-ray CT team members: (left to right) Paul Reiter, Victor Gruol, Barry Freifeld, Jacob Pruess, and Tim Kneafsey. Missing: Ted de Castro, Phil Rizzo and Liviu Tomutsa.

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Be sure to visit our website at http://www.netl.doe.gov/scng/hydrate

INTENT

Fire in the Ice is published by the National Energy Technology Laboratory to promote the exchange of information among those involved in the research and development of gas hydrates as a resource.

www.netl.doe.gov/scng/hydrate

Editor's Note. We want to acknowledge the participation of W.R. Wiley Environmental Molecular Sciences Laboratory (EMSL) in the hydrate research at Pacific Northwest National Laboratory (PNNL). See the article "New Tools Advance Scientific Studies of Natural Gas Hydrates" in the Summer 2003 issue of *Fire in the Ice*. A portion of the research described in that article was performed at EMSL, a national scientific user facility sponsored by the U.S. Department of Energy (DOE) Office of Biological and Environmental Research, which is located at PNNL. PNNL is operated for DOE by Battelle.

dissociation front through a hydrate/sediment mixture. To do this, they performed difference tomography: a baseline image is acquired, and then, by performing image subtraction of subsequent images, very subtle changes can be discerned. Using this method, they now could discover where the gas came from, and how sample textural features might influence production.

Brad Julson from the Ocean Drilling Program (ODP) spoke during the same breakout session about the scientific activities planned for the upcoming ODP Leg 204: Drilling Hydrates on Hydrate Ridge, Offshore Oregon. (See the Fall 2002 *Fire in the Ice* newsletter.) The opportunity was too great to pass up. With the support of NETL and Leg 204's staff scientist Frank Rack, Berkeley Lab built a portable x-ray CT system (in 5 weeks!) that could be brought onto the ODP research vessel *JOIDES Resolution*.

It has been a whirlwind first year for the portable x-ray CT system. First, the scanner was used during ODP Leg 204 from July through September 2002, imaging over 500 cores. The system enjoyed a brief stay at the ODP Gulf Coast Core Repository in College Station, TX, to perform some follow-up studies on Leg 204 cores, prior to a major overhaul and upgrade at Berkeley Lab. The previous x-ray source that was obtained secondhand was replaced with a new, micro-focus x-ray source, yielding image resolutions better than 200 µm. Dissociation experiments were conducted at Berkeley Lab in February 2003, with the new system outperforming a more expensive, room-hogging medical CT system. It then traveled to Hot Ice #1, the first dedicated hydrate research well in Alaska. (See the Spring 2003 *Fire in the Ice* newsletter for details.) Approximately half of the 390 Hot Ice #1 core tubes, containing sandstones, mudstones, coals, and conglomerates, were imaged using the x-ray CT scanner. To complete a busy year, two weeks after the system returned from Alaska, it was shipped to Bermuda for a return onto the *JOIDES Resolution* for ODP Leg 210 for imaging cores collected in the Newfoundland half of the Newfoundland-Iberian margin.

The x-ray CT system installed on the Bridge Deck of the JOIDES Resolution during ODP Leg 210.

X-Ray CT Innovations

Berkeley Lab's portable x-ray CT unit is unique because it was designed as a portable system for imaging geologic core. A major limitation of commercially available x-ray CT systems is the requirement for dedicated lead-lined rooms or heavy lead enclosure. The inventors looked to the federal requirements that govern airport baggage screening systems, knowing that in a busy core-processing laboratory, people need to be able to work next to the machine. The inventors realized that if they encapsulated only the small volume between their x-ray source and imager, and allowed the shielding to slide along the core, they eliminated the need for a 300 kg lead box. Berkeley Lab's radiological safety officer, Ted de Castro, helped meet federal regulations. The inventors ended up needing only 20 kg of carefully placed lead shielding.

The biggest improvement in the operation of the instrument resulted from a comment that ODP's Brad Julson made at the JIP Workshop. He noted that, on the *JOIDES Resolution*, they had used an industrial cabinet imaging system, but said the images were poor (dark in the center and bright at the edges) because of the cylindrical shape of recovered core. Berkeley Lab's system incorporates an aluminum compensator that sits between the core and the x-ray image intensifier, flattening the image intensity variation from the edges of the core right through the center. Because of the compensator, an industrial camera with an inexpensive 10-bit frame grabber card yields images superior to those from high performance Peltier-cooled scientific cameras costing twenty times as much.

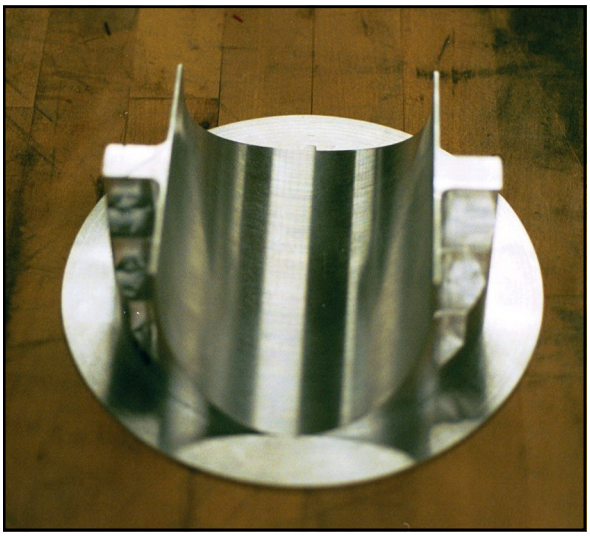

Photo of the aluminum compensator. During operation of the x-ray CT scanner, this compensator sits between the geologic core and image intensifier. Careful design and manufacturing of this piece allows the Berkley Lab x-ray CT to give unsurpassed image quality using an inexpensive off-the-shelf CCD camera.

System Specifications

The basic specifications for the x-ray CT system are as follows:

- Weight:~200 kg
- Dimensions: 1.37 m × 0.61 m × 2.03 m (W×D×H)
- X-ray Source: 65 W continuous, 45–130 kV at 0.5 mA
- Maximum Sample Size: 1.5 m × 9.5 cm diameter cylinder
- Core rotated on vertical axis
- 15 cm image intensifier
- X-ray filter for multi-energy scanning
- Beam compensation optimized for core geometry
- Cabinet safe (CFR1020.40 compliant)
- Imaging Speed:
  - 10 minutes/meter (low resolution mode)
  - 30 minutes/meter (high resolution)

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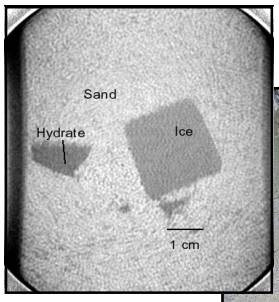

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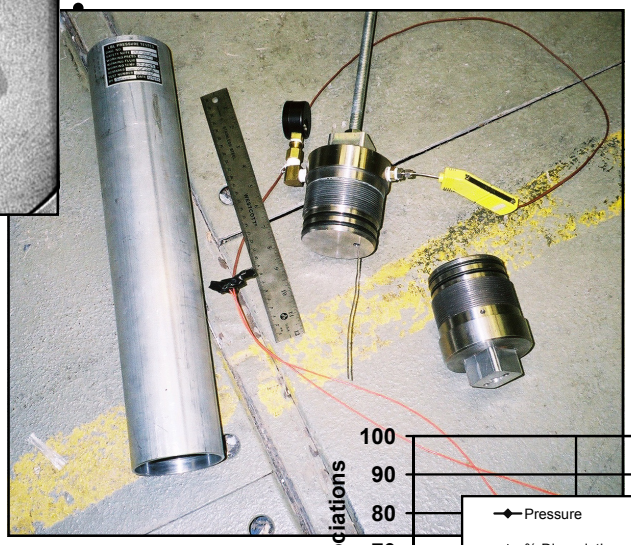

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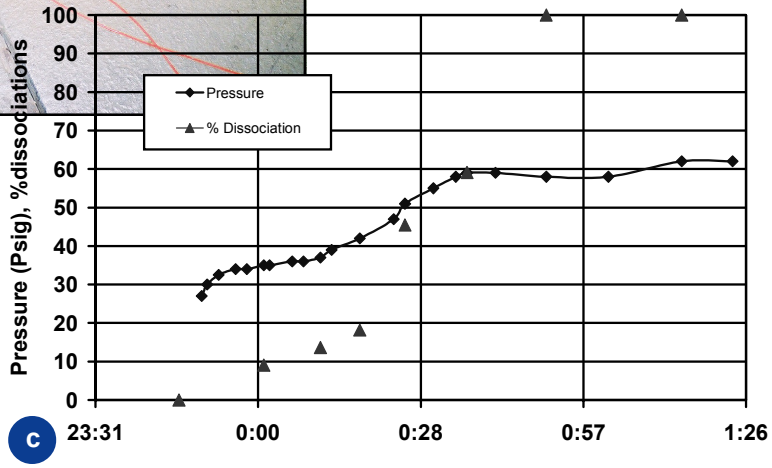


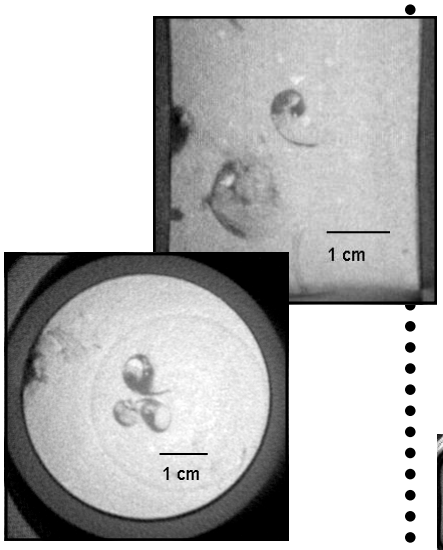
Dissociation of synthetic hydrate in a sand matrix was used to show how the portable x-ray CT can be used to investigate the kinetics of hydrate dissociation. (a) x-ray CT image of hydrate (left) and ice (right) in a sand matrix (b) pressure vessel used for performing hydrate imaging experiments (c) graph showing the progression of hydrate dissociation during an experiment comparing the pressure in the vessel with the percent dissociated, as estimated from x-ray CT images.

Imaging Hydrate/Sediment Mixtures

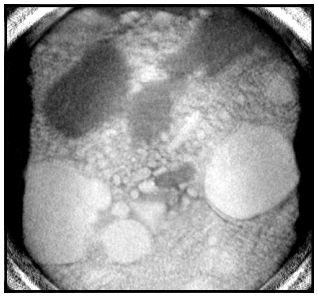
To investigate whether the x-ray CT system could reveal the spatial distribution of hydrates in a geologic core, researchers performed experiments using synthetic porous methane hydrates mixed in a sand matrix. Regular water ice was used as a reference material for comparison to the methane hydrates. Not only were researchers able to get accurate estimates of the methane content of the synthetic samples (0.091 g/cc estimated versus 0.084 g/cc actual), but they were also able, using x-ray difference tomography, to see the time-dependent progression of hydrate dissociation. Without ever splitting a core sample, the portable x-ray CT system can show that the ice is really a gas-rich hydrate sample.

Future plans are to bring the x-ray scanner back to Hot Ice #1 when drilling resumes during fiscal year 2004. To inquire about using the x-ray CT system or to obtain more information, contact:

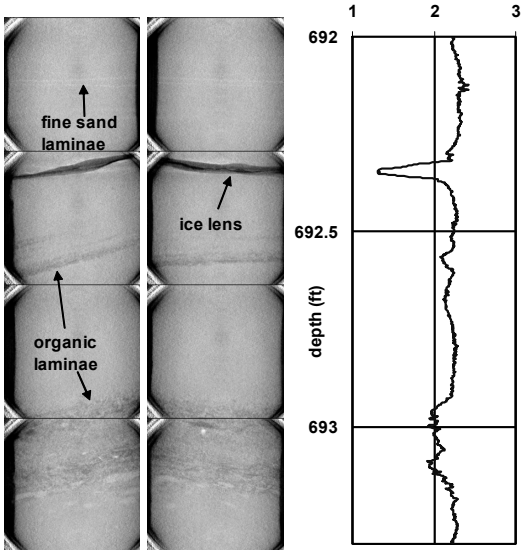
Barry Freifeld at bmfreifeld@lbl.gov (510) 486-4381 or visit the website:
http://www.lbl.gov/Tech-Transfer/collaboration/techs/lbnl1842.html



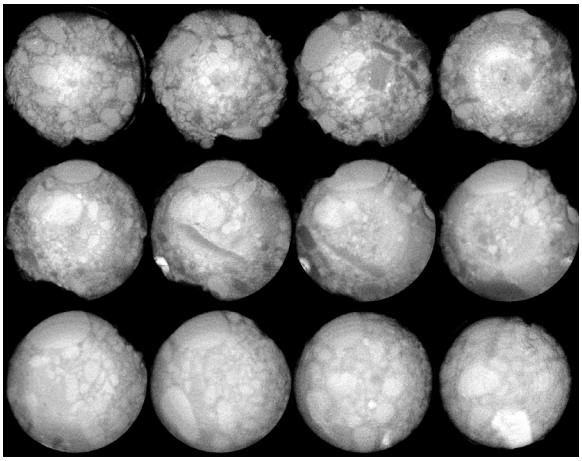
X-ray CT images of foraminifera in a Boise Sandstone.



A conglomerate from Hot Ice #1 shows quartz and sandstone gravel cemented in a sand/ice matrix.



X-ray CT images from Hot Ice #1 core revealing bedding planes in a sandstone. The two images are orthogonal vertical slices through the core. CT images reveal millimeter thick laminae and cross-set thickness, providing information on the depositional environment in the Sagavanirktok Formation.



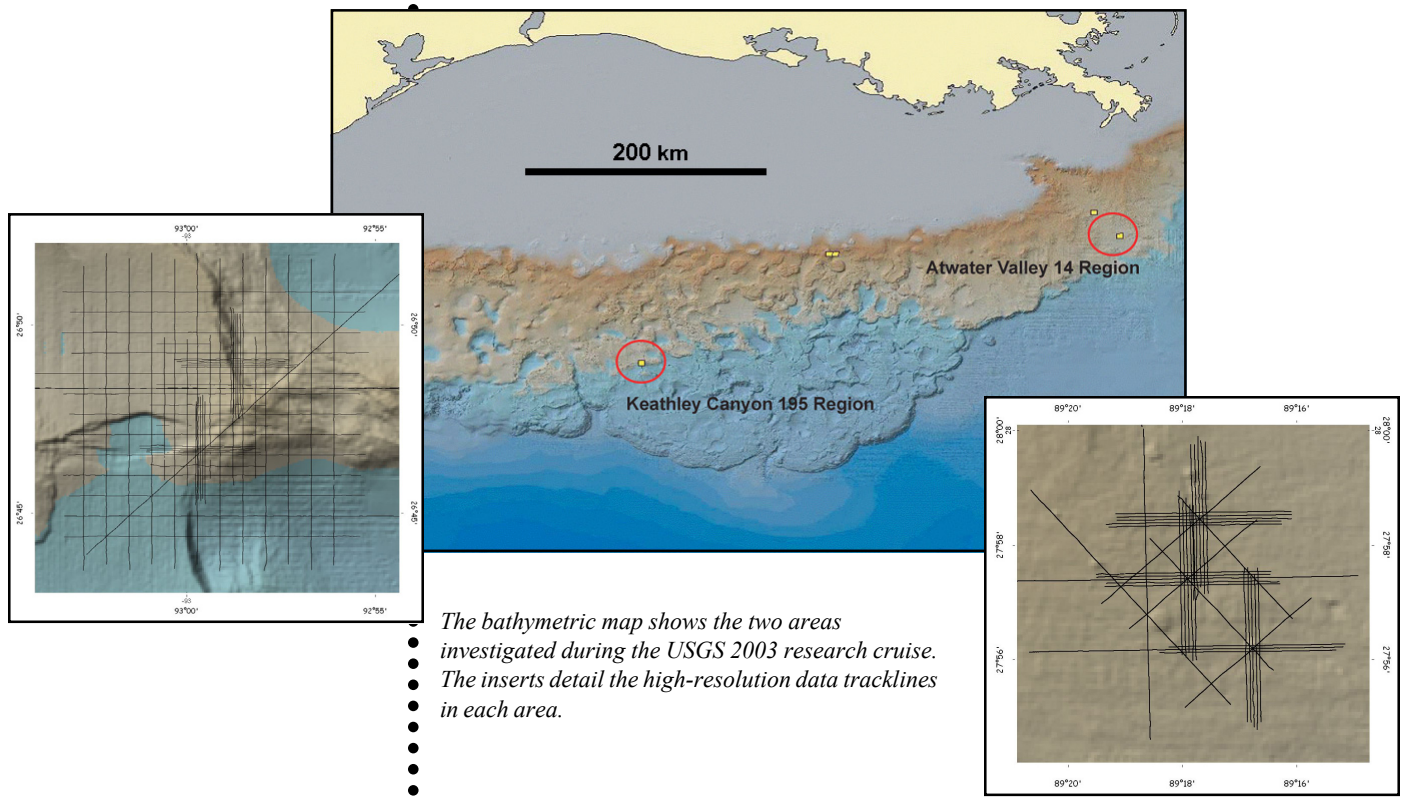
A sequence of x-ray CT images showing virtual thin sections taken every 0.5 cm through a Hot Ice #1core.

USGS Scientists Use Collected Seismic Data to Select Drilling Sites for 2004

by Patrick Hart, Deborah Hutchinson, and Brandon Dugan, U.S. Geological Survey

Seventeen scientists aboard Texas A&M's research vessel, the *R/V Gyre*, spent two weeks in May 2003 acquiring high-resolution seismic reflection data in the Gulf of Mexico. The team from the U.S. Geological Survey (USGS) collected and processed over 600 miles (1,000 kilometers) of high-quality two-dimensional multichannel data from the Keathley Canyon and Atwater Valley regions. The seismic data will provide detailed sub-bottom images that will be used to help select locations of drilling sites at the two areas.

As part of the Gulf of Mexico Joint Industry Project (JIP), the seismic data is a major step in fulfilling the JIP goal of a dedicated hydrate test-well drilling program, planned for the spring of 2004. This drilling program will provide detailed geophysical logging data and continuous cores from sites in the Keathley Canyon Block 195 and Atwater Valley Block 14 deepwater areas. Up to 16 holes will be drilled at as many as eight sites using riserless drilling by the drillship *Fugro Explorer*. Twin holes are to be drilled at each site to allow for both logging and coring. Long-term monitoring equipment may also be installed in the holes.



The bathymetric map shows the two areas investigated during the USGS 2003 research cruise. The inserts detail the high-resolution data tracklines in each area.

DEEPWATER HYDRATES

The Gulf of Mexico Joint Industry Project (JIP) is a consortium of government, industry, and academia that has undertaken a multiyear project to characterize natural gas hydrates in the deep water of the Gulf of Mexico. ChevronTexaco is leading this venture.

The northern Gulf of Mexico is well known as one of the world's premier regions for the production of oil and gas from conventional geologic sources. For decades, a significant share of the U. S. oil and natural gas supply has come from hundreds of drilling and production platforms and pipeline infrastructure networked throughout the shallow waters of the Texas, Louisiana, and Mississippi continental shelf. In recent years, the demand for new energy reserves has pushed exploration off the continental shelf into the deeper waters of the continental slope. This deepwater region contains vast deposits of hydrocarbon resources as well as formidable challenges to exploration and production. Methane hydrates, which can occur at the temperature and pressure conditions characteristic of these deepwater sediments, is one such challenge.

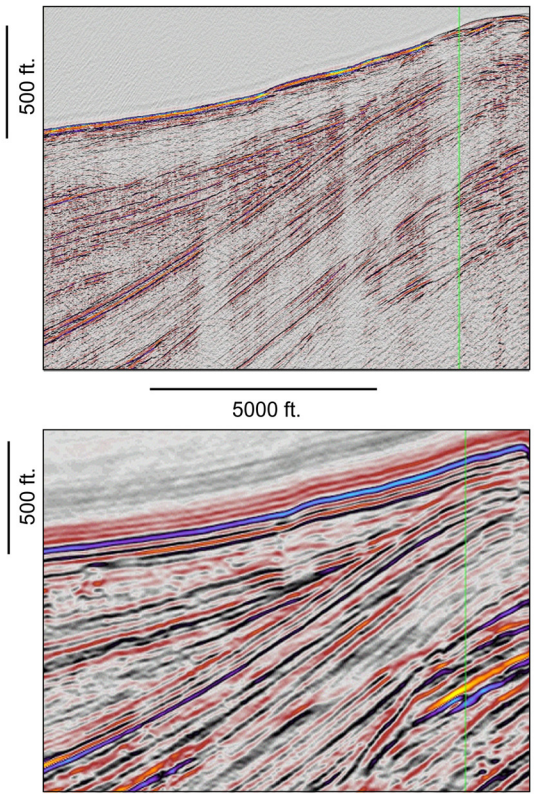
The JIP is focused on developing technology to better characterize the occurrence of gas hydrate in the northern Gulf and on developing a better understanding of its impact on seafloor stability and the safety of deepwater drilling and production operations.

The USGS data track-line locations were chosen to reveal details of features on WesternGeco's three-dimensional (3D) seismic data. The features are possibly related to subsurface accumulations of gas hydrates. The initial interpretation of the 3D data, completed prior to the USGS cruise, revealed a bottom simulating reflector (BSR) in the Keathley Canyon study area. Although rarely observed on seismic data from the northern Gulf of Mexico, BSRs are considered a primary geophysical indicator of free gas associated with submarine gas hydrates, making the Keathley Canyon BSR one of the most compelling drilling targets for the JIP.

In the Atwater Valley study area, several seafloor mounds may be active vents where fluids and natural gas that have migrated from the deep subsurface are expelled into the water column. Gas hydrates have been recovered in piston cores from the seafloor at similar mounds throughout the northern gulf, and researchers have speculated that significant hydrate accumulations may be found adjacent to the faults or migration pathways that feed these seafloor vents. This reasoning is supported by the observation on the seismic reflection data that at least one of the Atwater mounds is underlain by a BSR-like seismic feature directly beneath the mound that has been dramatically warped upward.

The process of acquiring the high-resolution seismic data differed significantly in both equipment employed and acquisition method, when compared to the methodology routinely used by the hydrocarbon exploration industry.

A conventional exploration seismic survey consists of a ship towing several hydrophone streamers, each 3.7 to 6.2 mi (6 to 10 km) in length, that record the reflected signals from repeated underwater blasts of compressed air generated by a synchronized array of more than 100 air guns. The reflected sound waves are primarily within the frequency range of 10 to 80 Hz and can image geologic structure to large depths within the crust. These surveys produce data that can resolve geologic features as small as 50 ft (15 m) in thickness.



Comparison of high-resolution seismic section (above) with conventional exploration data (below).

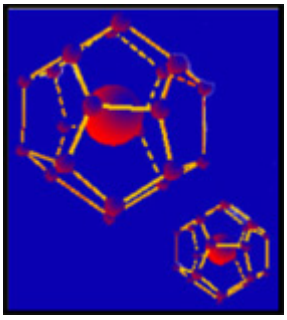
The USGS high-resolution data acquisition, on the other hand, uses a single, short 820-ft (250-m) hydrophone streamer and a single air gun source, which generates a much smaller signal at a higher frequency range, between 40 to 400 Hz. The resultant data only imaged the upper 0.6 to 1.2 mi (1 to 2 km) of the subsurface, but were able to resolve features as small as 16 ft (5 m) in thickness. This means that the high-resolution data can be used to complement the industry 3-D data by providing valuable additional detail. Features such as thin sand beds or small displacement faults that could be associated with hydrate deposits have a much better chance of being imaged using the new high-resolution data.

Additional data will be combined with the USGS high-resolution and WesternGeco 3-D seismic data to fully evaluate both the Keathley Canyon and Atwater Valley study areas prior to selecting the final sites for the JIP drilling program. There are also plans to deploy a seafloor resistivity system from the Woods Hole Oceanographic Institution and the Deep-Towed Acoustic/ Geophysical System (DTAGS) from the Naval Research Lab on upcoming cruises. Each new piece of data will further evolve the interpretation of the study areas, and will help pinpoint the optimum locations for the JIP test wells.

For additional information on the May 2003 USGS seismic cruise, visit: http://soundwaves.usgs.gov/2003/07/fieldwork.html

A hydrophone streamer is being deployed from the stern of the R/V Gyre *in heavy seas.*

Team from the USGS Gulf of Mexico 2003 gas hydrate research cruise gathers on the bow of the R/V Gyre. Photographs courtesy of Lori Hibbeler.



Denver Hydrate Meetings Showcase Hydrate Research Accomplishments

Two meetings held back-to-back featured recent accomplishments in hydrate research, and planning for the upcoming hydrate research wells in the Gulf of Mexico.

The U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) and ChevronTexaco held a Methane Hydrate Research and Development (R&D) Conference and Joint Industry Project (JIP) Workshop, September 29-October 1, in Westminster, Colorado. More than 110 scientists and engineers from industry, universities, national laboratories, and government agencies participated. The conference and workshop also included international methane hydrate experts from Canada, France, Germany, India, Japan, and the United Kingdom.

DOE hosted the Methane Hydrate Conference, and Dendy Sloan (Colorado School of Mines) was the keynote speaker. ChevronTexaco hosted the JIP Workshop. The Energy Forum's Neil Staley and Wendy DiBenedetto managed both events. The conference presentations and workshop discussions emphasized the importance of cooperation and active collaboration among all the participants in the National R&D Program. Conference attendees were pleased at the high level of synergy among industry, academia, national labs, and government agencies.

DOE/NETL Methane Hydrate R&D Conference

The conference highlighted the scientific, engineering, and modeling accomplishments made under the National Methane Hydrate R&D Program, which is led and coordinated by DOE NETL. Speakers presented results of R&D work in onshore areas of the U.S. and Canadian Arctic, and in offshore areas including the Gulf of Mexico and Hydrate Ridge. The conference updated the hydrate research community on the state of knowledge in hydrate resource evaluation, reservoir and production modeling, and technology development.

Hydrate Research in the Arctic Environment

Tom Williams (Maurer Technology), Bill Liddell and Richard Sigal (Anadarko Petroleum) discussed plans to resume drilling the Hot Ice #1 well, southwest of Prudhoe Bay, Alaska, from Anadarko's Arctic Platform during this winter's drilling season. The project team has made improvements to drilling and coring systems, and to core analysis procedures and live monitoring of the drilling. They plan to collect continuous core to the base of the hydrate stability zone, and to perform vertical seismic profiling and production testing as part of this winter's operations.

Tim Collett (U.S. Geological Survey—USGS) presented results of ongoing collaborative work with DOE, industry, the Bureau of Land Management (BLM), and the State of Alaska Division of Geological and Geophysical Services to understand the geology, geophysics, and reservoir potential of the Eileen and Tarn accumulations on the North Slope of Alaska.

Robert Hunter (BP Exploration) presented some preliminary modeling results that suggest that production from a free gas zone underlying a hydrate interval, recharged by gradual pressure dissociation of the hydrates, could result in 2.25 billion cubic feet (Bcf) incremental gas production from an idealized five-well project. BP's results from seismic data analysis suggest that the hydrate-bearing intervals are much more compartmentalized than anticipated.

Scott Dallimore (Geological Survey of Canada—GSC) presented results from the Mallik 2002 Production Research Well program. The research well, in the Mackenzie Delta, Northwest Territory, Canada, included a 5-day production test, with thermal stimulation of a 13-m (42.7-ft) perforated hydrate interval. Cross-hole tomography was performed between the producing well and an adjacent observation well. Detailed results of the Mallik 2002 program will be presented at a symposium in Japan this December (see announcements).

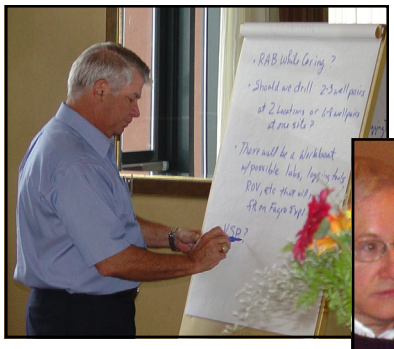
The Arctic session ended with a discussion by George Moridis (Lawrence Berkeley National Laboratory—LBL) on results of reservoir simulations that have been performed at LBL over the past year on data from the Mallik, Hot Ice #1, and Milne Point areas. The simulations reveal that the best scenario for producing gas from hydrates is where "Class 1" hydrates are present; that is, where hydrates are found near the base of the stability field, and are underlain by a significant thickness of free gas. Moridis emphasized the importance of looking to Class 1 hydrates for production, because in these settings, the hydrates will dissociate more readily and energy input requirements for production can therefore be minimized.

Hydrate Research in the Marine Environment

Emrys Jones (ChevronTexaco) described the Gulf of Mexico JIP, outlining the extensive list of participating partners and stressing that the primary goal of the project is not production, but rather geohazard characterization. Results of seismic reprocessing were shown, and selected drilling sites at Keathley and Atwater canyons were discussed. Drilling is planned with the *Fugro Explorer* during April or May 2004.

Deborah Hutchinson (USGS) reviewed the value and pitfalls of existing seismic data for mapping hydrate occurrences in the Gulf of Mexico, and recommended that current research be focused on collection and analysis of three types of data: (1) seismic data to describe geology, (2) heat flow data to describe the thermal regime, and (3) geochemical data to describe the complexity of the hydrate/fluid/sediment system. Through integration of these data, a more complete understanding of hydrate occurrences in the Gulf can be achieved.

Joseph Gettrust (Naval Research Laboratory—NRL) presented the results of work on the geochemical analysis of hydrate distribution. This was followed by



Steve Holditch (Schlumberger) during one of the JIP breakout sessions. Photograph courtesy of The Energy Forum, LLC.

Peter Schultheiss (Geotek, Ltd) participates in the JIP workshop.

an update on the status of the Gulf of Mexico seafloor monitoring station by Robert Woolsey and Tom McGee (University of Mississippi Center for Marine Resources and Environmental Technology—CMRET). Frank Rack (Joint Oceanographic Institution—JOI) presented an overview of the Ocean Drilling Program (ODP) Leg 204 expedition to Hydrate Ridge, off the coast of Oregon, a cruise partially funded by DOE.

The DOE conference ended with Pulak Ray (Minerals Management Service—MMS) describing MMS's evaluation of the volumes of methane technically recoverable from hydrates on offshore leases, and Andrew Shepard (National Oceanic and Atmospheric Association—NOAA) describing NOAA's efforts to assess the role of methane hydrates in the global carbon cycle.

ChevronTexaco JIP Workshop

The ChevronTexaco JIP Workshop began with formal presentations on the status of seismic imaging of hydrate-bearing sediments and slope stability investigations in the Gulf of Mexico by Steve Holditch (Schlumberger), followed by Nader Dutta and Fred Snyder (WesternGeco).

Ben Bloys (ChevronTexaco) and Frank Rack (JOI) gave presentations on major issues facing the JIP in drilling, coring, core handling, onsite core analysis, and logging. Lessons-learned during hydrate coring on the *JOIDES Resolution* on ODP Leg 204 were recounted by Frank, with the help of some video evidence of what can happen when a pressurized core barrel is opened after dissociation has occurred.

Carolyn Ruppel (Georgia Tech) reviewed the status of research on measuring and modeling hydrate-bearing sediments.

After the formal presentations, scientists and researchers participated in breakout sessions to prioritize plans for the upcoming drilling effort in the Gulf of Mexico. The sessions focused on drilling, logging, coring, core handling, and core analysis. The results of the workshop, including prioritized recommendations from the breakout sessions, will be used by the JIP to finalize plans for the 2004 drilling program.

Copies of the presentations are now available on the Methane Hydrate website at http://www.netl.doe.gov/scng/hydrate/index.html and on the Energy Forum website at www.theenergyforum.com.

Brad Tomer, USDOE/NETL (left) and Neil Staley, The Energy Forum (right). Photograph courtesy of The Energy Forum, LLC.

Left to right, Kirk Osadetz (Geological Survey of Canada), Edith Allison (USDOE), Steve Holditch (Schlumberger). Photograph courtesy of The Energy Forum, LLC.

Announcements

Mallik 2002 Gas Hydrate Production Research Well Program

International Symposium on Methane Hydrates

"From Mallik to the Future"

December 8 to 10, 2003,
Hotel New Otani, Chiba, Japan

The partners of the Mallik 2002 Gas Hydrate Production Research Well Program* are pleased to announce an International Symposium on Methane Hydrates. This meeting will serve as the first public release of the scientific and engineering results from the Mallik program that was undertaken to study the production potential and environmental conditions of gas hydrates. Three research wells were completed during the winter of 2002 in Mackenzie Delta, N.W.T., Canada. The diverse science program included a broad suite of core studies, surface and downhole geophysical surveys, and reservoir simulation modelling. Production testing experiments for the first time monitored formation response and gas flow induced by pressure drawdown and thermal stimulation.

An open session in the symposium will also explore future international gas hydrate science and production research priorities and venues to further collaboration.

Conference Chair:	Mr. Noboru Tezuka (JNOC)
Co-Chair:	Dr. Rolf Emmerman (GFZ)
Program Chair:	Mr. Scott R. Dallimore (GSC)
Co-Chairs:	Dr. Timothy S. Collett (USGS)
	Dr. Michael Weber (GFZ)
	Dr. Takashi Uchida (JNOC)
	Mr. Takahisa Inoue (JNOC)
	Mr. Tetsuo Yonezawa (JNOC)

For more information, see the Mallik Project web sites (gashydrate.com; icdp.gfz-potsdam.de) and follow the links to the "From Mallik to the Future" symposium.

* Partners of the Mallik 2002 Gas Hydrate Production Research Well Program: Geological Survey of Canada (GSC), Japan National Oil Corporation (JNOC), GeoForschungsZentrum Potsdam (GFZ), United States Geological Survey (USGS), United States Department of Energy, India Ministry of Petroleum and Natural Gas (Gas Authority of India/Oil and Natural Gas Corporation), BP-Chevron-Burlington Joint Venture Group. The program was also accepted as a project within the auspices of the International Continental Scientific Drilling Program.

American Geophysical Union Fall 2003 Meeting

The American Geophysical Union Fall (AGU) 2003 meeting will include two gas hydrate symposia:

- Beyond Hydrate Ridge: Studies of Natural Gas Hydrate From Around the Globe
- Gas Hydrates in Accretionary Complexes

Sixteen oral presentations and over 40 poster presentations are scheduled. The Fall meeting will be held December 8-12, 2003 at the Moscone West meeting facility in San Francisco. Additional information can be found at http://www.agu.org/

AGU is a worldwide scientific community that advances, through unselfish cooperation in research, the understanding of Earth and space for the benefit of humanity.

Third International Workshop on Methane Hydrates Research and Development

The Third Workshop of the International Committee on Gas Hydrates is scheduled for November 18-21, 2003, in Viña del Mar, Chile. The workshop will include lectures and panel discussions. Invited participants will develop a plan for continuing collaborative studies on methane hydrates. Topics for this year's workshop include:

- Methane hydrate resource characterization and distribution
- Methane hydrate kinetics, dissociation, and biogeochemistry
- Environmental concerns: seabed stability and ecosystem health
- Methane hydrate future development

The workshop is being organized by the Pontificia Universidad Católica de Valparaíso, Chilean Navy Oceanographic and Hydrographic Service, Marine Biogeochemistry Section at the Naval Research Laboratory, Hawaii Natural Energy Institute of the University of Hawaii and in cooperation with the Institute for Energy Utilization, AIST, Hokkaido, Department of Physics at the University of Bergen, the Office of Naval Research-Global, the United States Department of Energy, the Chilean Commission of Energy, and FONDEF, Fund for the Promotion of Scientific and Technological Development (Chile).

Announcements

Special Session on Gas Hydrates – 2004 American Association for the Advancement of Science Annual Meeting

Methane Hydrates: Fuel, Carbon Storage, and Climate Change will be the topic of a special session within The Science of Earth and Sky symposium at the 2004 American Association for the Advancement of Science (AAAS) annual meeting. The meeting will be held in Seattle, WA, February 12-16, 2004. The hydrate session is scheduled for the afternoon of February 13. The AAAS Annual Meeting and Science Innovation Exposition is the largest general science conference in America. Information on the AAAS Annual meeting can be found at http://www.aaas.org/meetings/.

AAAS
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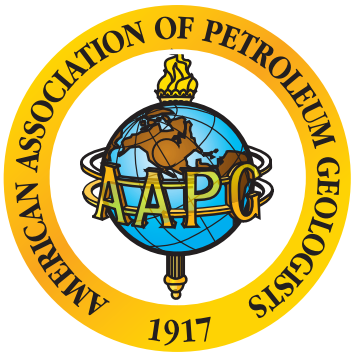
American Association of Petroleum Geologists Annual Meeting 2004

The American Association of Petroleum Geologists Annual Meeting, April 18-21, 2004 in Dallas will include two oral sessions and one poster session on methane hydrate research. More information can be found at http://www.aapg.org/meetings/dallas04/technical/index.cfm.



International Geological Congress, Italia 2004, Florence, Italy

Recent developments in gas hydrates will be the subject of several Topical Symposia at the 32nd International Geological Congress (IGC), Italia 2004. The IGC will be held in Florence, Italy, August 20-28, 2004. The Gas Hydrates in Continental Margins symposium [session T15.03] will include a diverse range of issues, such as geophysical detection and characterization, modes of formation, biological mediation, mechanisms for gas release into the ocean, and interaction with climate change. Hydrate research will also appear in the Future of Energy Resources [T09.04], Deep Biosphere [T18.01], and Submarine Slope Stability [T15-04] sessions.

Information on the IGC can be found at its web site http://www.32igc.org. The deadline for submittal of abstracts is January 10, 2004.

IUGS
International Union of Geological Sciences

The 32nd International Geological Congress will take place at the Fortezza da Basso. This antique structure, once used as barracks for the Florentine Army and as storage for their weapons, has recently been converted into a versatile Convention Center offering full technical facilities. The Fortezza da Basso will also host the GeoExpo exhibition.

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Spotlight on Research

JESSE HUNT–MINERALS MANAGEMENT SERVICE

Jesse Hunt graduated from the University of Georgia in 1969 with a B.S. in geology, and continued with an M.S. in geology in 1974. His thesis addressed the geology and geological history of Gray's Reef, now a National Marine Sanctuary, located off the Georgia coast. Following graduation, Jesse performed a 2-year sedimentological study of the Caribbean continental margin of Venezuela for a private Venezuelan research foundation based on Margarita Island, Venezuela. The study was a multi-disciplinary study aimed primarily at fisheries development.

Jesse returned to the United States in 1976 and went to work for the New Orleans Outer Continental Shelf Office of the Bureau of Land Management (BLM). This office conducted oil and gas lease sales and environmental studies in the Gulf of Mexico and the Atlantic coast south of Cape Hatteras.

Jesse was first exposed to gas hydrates through research the BLM funded with the U.S. Geological Survey (USGS). He worked closely with Pete Popenoe, Bill Dillon, and Mahlon Ball at the USGS at Woods Hole. Seismic data collected on the Blake Ridge revealed the famous seismic line showing a classic bottom-simulating reflector.

Jesse left government service in 1980 and worked for four years in offshore exploration for Gulf Oil Corporation in New Orleans. When he returned to government service, this time with the Minerals Management Service (MMS), he worked in the Leasing and Environment Section. He transferred to the Office of Resource Evaluation (RE) and resumed evaluating tracts for lease sales.

In 1998, Jesse moved to the Resource Studies Section of RE and again became involved with gas hydrates. His principal duties included tracking and conducting research into gas hydrates. Jesse initiated RE's water-bottom mapping project to map the seafloor reflector on all 3-D seismic surveys in the deepwater area of the Gulf of Mexico. To date, MMS has approximately 90 percent of the Central Gulf slope and about 85 percent of the Western Gulf slope covered by the bottom maps.

Geologists noted that often where deep-seated faults cut the seafloor reflector, high positive amplitude anomalies occurred around the fault cuts. Through MMS contract research with Harry Roberts at Louisiana State University (LSU), a research submersible was used to examine a number of the better anomalies. The amplitude anomalies represent hydrocarbon-seep-related features, such as gas hydrates, authigenic carbonates, beds of clam and mussel shells, chemosynthetic organisms, and active mud volcanoes (which have a negative amplitude response).

Jesse gained a better understanding of gas hydrates from on-board and subsequent discussions with Bill Dillon of the USGS, Harry Roberts of Louisiana State University, Bob Woolsey of the University of Mississippi, and Roger Sassen of Texas A&M University. Jesse also serves as the MMS representative on the Executive Board of the ChevronTexaco Joint Industry Program to drill hydrates in the Gulf of Mexico.

The MMS is currently assessing gas hydrate occurrences in the Gulf of Mexico as a natural gas resource. As part of this effort, Jesse is assessing the occurrence and areal extent of gas hydrates.

Jesse underwent a successful liver transplant in May, and is now back at work. He is eager to resume hunting, fishing and being with his family. He is ready to start teaching his 3-year old grandson, Jesse Lindsey Hunt IV, the proper techniques of fishing in the Louisiana coastal marshes.