

Kelly tells DOE hearing of need for deep gas, cost

AT A US DEPARTMENT of Energy public hearing in Houston 14 Aug, **Paul L Kelly**, IADC Government Affairs Committee Chairman, emphasized the need to develop deep gas reserves in the US Gulf of Mexico and outlined what the industry needs to do the job.

He also commended Energy Secretary **Spencer Abraham** for commissioning a review of federal oil and gas research programs.

"It is encouraging to see him moving so quickly to implement two of the recommendations of the National Energy Policy Development Group to the President to direct the Secretaries of Energy and Interior to promote enhanced oil and gas recovery from existing wells ... and to improve oil and gas exploration technology..." said Mr Kelly.

He said the report of the National Energy Development Group is an excellent road map to follow to meet future demand for energy.

Mr Kelly is Senior Vice President, Special Projects, **Rowan Companies Inc.**

TECHNOLOGY ADVANCES

Technology improvements are particularly important because of the more difficult conditions accompanying new resources, said Mr Kelly.

Deeper wells encounter extreme temperatures and pressures, and more corrosive environments.

Technology advances are essential for improving operational efficiencies, reducing resource development time, increasing production, developing frontier areas, controlling costs, and minimizing environmental impact, said Mr Kelly.

Though improvements are expected to continue, he expressed concern that industry restructuring, consolidation and spending cuts have resulted in reductions in research budgets.

Producers are turning to the service sector to develop new technology and industry consortia have been formed to address critical technology challenges such as deepwater development.

These changes improve the efficiency of research spending, he said, but basic and long-term research is not being adequately addressed.

"These are areas where the Department of Energy has an important role to play in partnering with universities and the private sector."

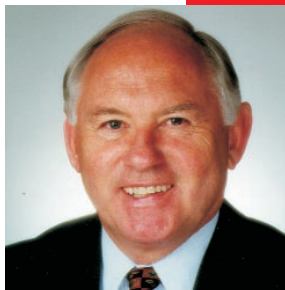
WHAT INDUSTRY NEEDS

Mr Kelly said the findings of a **National Petroleum Council** report, "Research, Development and Demonstration Needs of the Oil and Gas Industry," prepared in 1994-1995 are still valid.

He suggested re-reading the report in connection with the present review would be useful.

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**—Paul L Kelly
Rowan Companies Inc**



Part of that study involved a comprehensive survey of the oil and gas industry to determine the desired technology advances, their impact, and their likelihood of commercial availability both in the short term and the long term.

High priority needs for upstream operations in that report included high-resolution depth imaging, improved well productivity and hydrate control and prevention.

Paraffin control was rated to have high impact for independents, but not for majors, said Mr Kelly.

"Service companies in 1995 indicated a high priority need for horizontal well technology."

DEEP GAS PROMISE

Mr Kelly cited the importance of deep gas resources in the Gulf of Mexico in meeting US natural gas demand.

The **US Minerals Management Service** estimates that undiscovered resources at more than 15,000 ft below sea level in the Gulf of Mexico Outer Continental Shelf amount to 5-20 tcf. The most likely value is 10.5 tcf.

MMS estimates 6.3 tcf of this undiscovered resource lies under existing leases, the rest under blocks not currently leased.

"Deeply buried sediments on the OCS are relatively unexplored," Mr Kelly told the hearing. "Out of 35,000 wells drilled on the OCS, there are only 1,842 wells drilled deeper than 15,000 ft subsea."

These wells discovered 503 reservoirs below 15,000 ft subsea having an estimated 10 tcf of recoverable gas resources. The average discovery size of a deep gas reservoir was about 20 bcf.

For both Central Gulf Sale 178 last March and Western Gulf Sale 180 held in August, MMS included a royalty relief incentive to encourage operators to explore and develop deep well gas reservoirs quickly in order to meet the challenges of the US growing natural gas demand.

Demand is now estimated to rise from about 22 tcf in 1999 to more than 30 tcf in 2015, said Mr Kelly.

The royalty relief incentive provides that for a lease in less than 200 m of water where a new deep gas reservoir is drilled and production begins within the first 5 years, the leases will receive a royalty suspension on the first 20 bcf of deep gas production.

Goal of the initiative is to boost OCS gas production during the period from 2001 through 2006.

OCS gas production has been declining since 1997, said Mr Kelly, and gas from development of the largest undeveloped Gulf deepwater fields, Alaska and Canada is not expected to contribute significant enough increases in gas production to meet US demand until after 2006.

"Royalty suspension volumes for deep gas production are intended to help offset the high cost and high risk associated with drilling deep wells on the OCS," said Mr Kelly.

"The royalty value of 20 bcf of gas at 1/6 royalty and \$3.50/MMBTU is approximately \$11.7 million. This value represents the low end of the estimated \$9 to \$23 million it costs to drill a deep well on the OCS."

Today, the Gulf of Mexico provides about 27% of US gas supply.

"Proved gas reserve additions by reservoir discovery year and annual gas production in the Gulf show an ominous declining trend for gas," said Mr Kelly.

Annual gas production from Federal waters of the Gulf has exceeded additions to proved reserves every year since 1984, causing a steady decline in remaining reserves.

Proved reserve additions by reservoir discovery year have declined since the early 1970s.

Approximately 78% of total gas production from Federal waters in the Gulf was produced from less than 200 m water depth in 1999.

"New discoveries in deepwater may eventually change this downward trend," said Mr Kelly, "but deepwater reserves have longer lead times for development, and America needs new gas discoveries as soon as possible.

"Deep gas reservoirs offer the means to fill the gap between now and 2006."

DEEP GAS WELL COSTS

Deep gas wells are more expensive than shallow wells because of higher pressures and temperatures, and because corrosives such as carbon dioxide and hydrogen sulfide are found in fluids in the deep sediments, Mr Kelly told the hearing.

The presence of salt can lower well temperatures, he said, but salt can cause lost circulation and other hole problems.

"As a drilling contractor focused primarily on jackup rig drilling in the shallow water Gulf, Rowan has responded to the need for deep gas wells by modifying its existing rig fleet and building new rigs with higher horsepower, top drives and more mud pumping capability to handle

Sample tech needs

Exploration

High resolution seismic depth imaging
Advanced seismic acquisition

Drilling and completion

Advanced fracture techniques
Well productivity

Deepwater offshore

Extended reach drilling

Flowlines

Flow metering

Subsea equipment

Risers

Drilling

Workover

Hydrate prevention

Multi-phase pumps

Arctic region activities

Development

Drilling

Source: Short term high priority
technologies from the National
Petroleum Council 1995 survey of
research and development needs.

higher pressures and temperatures," said Mr Kelly.

"The investment in all these feature must be recovered and therefore adds to the higher costs of drilling operations in deep structures."

This is an area where oil and gas exploration technology is ripe for advancement through cooperation between public and private entities, he said.

"The Department of Energy already has done some research on the behavior of metals under high temperatures and high pressures, including corrosion effects. Military research done in the past could no doubt also offer potential solutions to the challenges we face if we are to drill more wells deeper."

GAS HYDRATES

In his statement, Mr Kelly also outlined the potential of gas hydrates, ice-like crystalline structures of water that form "cages" that trap low molecular weight gas molecules, especially methane.

"If (gas) hydrates could be economically recovered, they represent an enormous potential energy resource.

In the US offshore, hydrates have been identified in Alaska, all along the West Coast, in the Gulf of Mexico, and notably, offshore South Carolina," he said.

"The technology does not exist to extract methane hydrates on a commercial scale."

Mr Kelly cited a report of the US Department of Interior's OCS Policy Committee Subcommittee on Natural Gas on the US OCS, published in May.

The report recommended that "The MMS, in cooperation with DOE, should encourage international cooperation in development of gas hydrates in an environmentally sound manner, with a goal of a pilot program in place within 10 years."

DOE has studied gas hydrates for several years, as have many other countries and organizations, said Mr Kelly.

"It is time to bring all this knowledge together in a cooperative way so that we can advance the technology required to use these hydrates on a commercial scale."