

The Role of Science and Technology in U.S. Energy Security

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In the ongoing discussion of our nation's energy consumption, production and dependency, one fact often omitted is that the United States is still the third largest producer of oil in the world. A major contributor to this engine of production is the offshore public land of the United States that we call the Outer Continental Shelf (OCS). The OCS today accounts for about 30 percent of domestic oil production and about 27 percent of domestic natural gas production.

These resources come from about 40 million acres of public land—an area nearly the size of the state of Oklahoma. The ability to produce this much oil and gas safely and without major environmental effects is a testament to the effectiveness of safety systems employed by industry and supported by the regulatory mechanisms of the federal government.

A Safe Record

Two recent events reinforce this conclusion. First, in September 2002, over 4,000 oil and gas facilities and about 25,000 workers were evacuated twice when two tropical storms and one hurricane passed through the Gulf of Mexico. These facilities and workers usually produce about 1.8 million barrels of oil and 14.5 million cubic feet of natural gas per day, and these evacuations resulted in no loss of life and no significant injuries. After the storms had passed and extensive damage assessments were completed, it was found that only 10 out of the 800 facilities in the direct path of these storms were damaged seriously enough to prevent them from returning to service. Pollution prevention measures were also effective during the storms and hurricane, as there were only nine reported incidents resulting in about 400 barrels spilled—one-

third of which were recovered.

Also in September 2002, the National Academy of Sciences released its third *Oil in the Sea* report. This 2002 study of how oil gets into the ocean is an update of two previous editions published in 1975 and 1985.

A major finding of the 2002 report is that the amount of oil spilled into the oceans worldwide from offshore oil and gas industry activity is small, about four percent of the total, compared to major sources, such as municipal waste and runoff, natural seeps and marine transportation. In addition, over the last 30 years this amount has remained essentially the same while offshore oil production worldwide has increased by over 200 percent. The record is even better when only U.S. domestic waters are considered. In fact, more oil seeps naturally into U.S. offshore waters in three days than was spilled from offshore oil and gas operations during the entire year.

An Effective Regulatory System

A key component of the Minerals Management Service (MMS) regulatory regime is our peer-reviewed science and engineering research programs. Our program of environmental study, in operation since 1974, has funded millions of dollars worth of studies to academic and private institutions in completing over 900 research projects. The MMS technology and research assessment program was established in the 1970s, and then incorporated into the requirements of the OCS Lands Act in 1978, to ensure that industry operations on the OCS use the best available and safest technologies.

The contributions of both these programs have been essential in helping MMS staff to identify offshore areas to lease develop mitigation measures

that industry must implement in their exploration and development programs, and write regulations that mandate safety systems and processes that ensure a safe workplace as well as protect the environment. In addition, some of our research programs have helped to spur the development of alternative technologies for offshore activity.

Science Used in Many Ways

Let me give you a few examples. In November 2002, MMS approved a deepwater oil and gas project that includes the first permanent use of synthetic (polyester) moorings to anchor a floating platform to the seabed. The synthetic mooring consists of high-strength polyester fibers that provide a level of protection that is equivalent or greater to that of steel wire rope systems, while reducing the vertical loads on the facility's hull.

We became convinced of the safety and reliability of this approach after participating in extensive testing and review. The MMS previously partici-

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pated in nine joint industry projects (JIPs) and studies on synthetic moorings with \$765,000 in research funding directed towards this effort. As part of these JIPs, the MMS worked with the United Kingdom's National Engineering Laboratory to study fatigue of polyester moorings and to evaluate the long-term durability of fiber ropes in a marine environment.

Additionally, MMS participated in, and sponsored, three workshops to increase the understanding and practical use of synthetic moorings worldwide. These JIPs and workshops were instrumental in the development of the American Petroleum Institute's industry-wide recommended practice for

the use of synthetic moorings.

One issue that is currently of worldwide concern and could have serious impact on the offshore oil and gas industry is the issue of noise in the ocean and its effects on marine mammals, specifically whales. Exploration for oil and gas offshore has been greatly enhanced over the last two decades by the development and increased availability of 3D seismic data. This geophysical tool is now an essential component of every company's exploration plan. A by-product of seismic data collection is noise beneath the sea surface.

Past MMS-sponsored studies have shown that at least several hundred sperm whales live in northern Gulf of Mexico waters. As the offshore petroleum industry moves into deeper waters, the potential for interaction with sperm whales and other deepwater cetaceans increases. In September 2002, we announced the results of the first cruise in a multi-year study in the Gulf of Mexico to ascertain the effects of seismic-generated noise on marine mammals.

Ultimately, the results will be used by MMS to evaluate what effects seismic surveys may have on sperm whales whether some areas of the gulf represent preferred locations for whales and what actions would mitigate adverse effects on these whales. Researchers around the world will use this study's results.

These are only two examples of the type of research that MMS is funding in an effort to fully understand the effects of oil and gas exploration and production on the marine environment.

The Challenge Ahead

As we in the United States discuss the need for diversity in energy supply to enhance our energy security, we must appreciate the inherent impact of these choices. Although the oil and gas industry has proven that it can develop energy resources throughout a range of environments and working conditions, MMS environmental studies and engineering research provide information that is essential to making the decision of where and how to allow that development to proceed.

As MMS celebrates its 20th anniversary of the safe and effective management of the offshore oil and

gas industry, we look forward to the next 20 years and the challenges that will ultimately come. We are convinced that advances in technology, supported by a federal regulatory system that incorporates sound scientific research, will continue to play an important role in securing a safe and dependable energy supply for our nation. /st/