STATEMENT OF
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BEFORE THE
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

OVERSIGHT HEARING ON
"RESEARCH AND TECHNOLOGY NEEDS FOR EFFECTIVE CLEANUP OF OIL SPILLS"
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Thank you, Chairman Baird, Ranking Member Inglis, and Members of the Subcommittee, for the opportunity to discuss oil spill research at the Department of the Interior related to oil and gas exploration on the Outer Continental Shelf (OCS). I have been asked to provide the Subcommittee with an overview of the role the Minerals Management Service (MMS) has in oil spill research, including that of Ohmsett – The National Oil Spill Response and Renewable Energy Test Facility, and the activities and programs MMS has pursued since the passage of the Oil Pollution Act of 1990 to improve oil spill response technologies.

The MMS is the bureau within the Department of the Interior responsible for the management of the Nation's renewable energy, oil, natural gas, and other mineral resources on the OCS as well as the energy and mineral revenues from the Federal OCS and Federal onshore and American Indian lands. The tragedy and the massive spill associated with the Deepwater Horizon have underscored the importance of Secretary Salazar's reform agenda. The MMS has three distinct missions that are to be separated for the benefit of effective energy development, enforcement and revenue collection. The Secretarial Order that was signed on May 19, 2010 will establish the Bureau of Ocean Energy Management, the Bureau of Safety and Environmental Enforcement, and the Office of Natural Resources Revenue.

Currently, it is the MMS that has jurisdiction over approximately 1.7 billion acres of the OCS, on which there are about 7,400 active oil and gas leases. Key missions for both our conventional and renewable energy programs include safety, protection of the environment, coordination with affected state and local governments and federal agencies, and a fair return for the use of OCS lands. MMS works with other federal agencies, state and local governments, industry, and academia to achieve a common objective to maintain high standards for safety and environmental protection and to meet national economic, security and energy policy goals. In Calendar Year 2009, the OCS was a significant source of oil and natural gas for the Nation's energy supply, providing

about 570 million barrels of oil and 2.4 trillion cubic feet of natural gas, accounting for about 31 percent of the Nation's oil production and 11 percent of domestic natural gas.

Whenever oil is being handled - whether in tankers, pipelines, or production facilities, onshore or offshore, in the U.S. or abroad - spills are a possibility. For that reason it is imperative that U.S. and international agencies work together to prepare for oil spills in a comprehensive manner. This preparation includes continued improvement in response technology and procedures.

Overview

For more than 25 years, MMS has conducted oil spill response research (OSRR) to improve capabilities for detecting and responding to an oil spill. The major focus of the program is to improve the knowledge, technologies and methodologies used for the detection, containment, and cleanup of oil spills that may occur on the OCS. The OSRR program is a cooperative effort bringing together funding and expertise from research partners in Federal government, industry, academia and the international community to collaborate on research projects. The OSRR program operates through contracts with universities, government agencies and laboratories and private industry to assess technologies and to perform necessary applied research. The findings resulting from the research are disseminated through a variety of public forums such as workshops, conferences, peer-reviewed publications and the internet. The intent is to make this information widely available to oil spill response personnel and organizations world-wide.

The MMS coordinates oil spill research closely with the National Oceanic and Atmospheric Administration (NOAA), the U.S. Coast Guard (USCG), and the Environmental Protection Agency (EPA) through participation on the National Response Team and on the Interagency Coordination Committee for Oil Pollution Research. This allows the MMS to foster collaborative research at the national and international level, optimize current and future research initiatives, minimize research duplication, and ensure that the needs of the OCS program are addressed. Partnering has reinforced MMS's oil spill response research and has encouraged oil spill technology development efforts by academia and industry. The MMS has participated in the exchange of technological information with Canada, France, Germany, Japan, Norway and the United Kingdom through cooperative research projects, workshops and technical meetings.

The activities undertaken by the MMS OSRR program comply with the research and development provisions of Title VII (33 USC Sec. 2761 – 2762) of the Oil Pollution Act of 1990 (OPA-90). The OPA-90 authorized up to $28 million annually for oil spill research across the Federal agencies, subject to appropriations. The MMS funding for oil spill research activities is appropriated from the National Oil Spill Liability Trust Fund and for the past ten Fiscal Years has been between $6 and $7 million. To date, MMS has funded over 120 projects directly related to oil spill research. These projects cover topics ranging from oil behavior in water, chemical treating agents, remote sensing, spill response in arctic environments, mechanical containment options and in-situ burning.

The Ohmsett facility, which is discussed later in more detail, is a 600-foot long test tank managed by MMS, has been integral to many of these projects, and remains an important tool for MMS, academia and the oil spill response industry.

MMS plans and implements OSRR projects that have multiple phases in a stepwise approach over several years, enabling MMS to secure cooperative funding from private industry as well as countries that have offshore regulatory programs. The MMS OSRR program monitors and works with other agencies and industry whenever possible through active partnering. More than 40 percent of the OSRR projects are jointly funded projects, where MMS partners with other stakeholders to maximize research dollars.

Information derived from the OSRR program is directly integrated into MMS's offshore operations and is used to make regulatory decisions pertaining to permitting and approving plans, safety and pollution inspections, enforcement actions, and training requirements. The MMS as well as U.S. and foreign government agencies and organizations worldwide use the results from the OSRR program and Ohmsett in making planning, regulatory, and emergency response decisions.

MMS Oil Spill Response Research

Many technical advances in oil spill response can be attributed to relevant multi-phase research projects that involve scientists worldwide. Applied research and the development of response strategies traditionally involve a combination of laboratory small-scale tests, meso-scale tank and basin experiments, and full-scale field trials. The MMS has used this approach to develop, initiate, and conduct more than 200 meaningful oil spill response research projects. In light of the ongoing spill in the Gulf, however, it is obvious that much work remains to be done.

Once the MMS has identified a research need or data gap in spill response, we initiate and conduct a scoping project to define the current state-of-the-art for this technology or methodology. The results from these scoping projects are used to develop a systematic approach required to successfully address the data need. Communicating the results from these projects to government agencies and private industry is the next step to build consensus on the future research direction. A carefully focused work plan or agenda encompassing a priority list of projects is developed. It is generally beyond the capabilities of any one organization to fund these projects in their entirety. International cooperation, including governmental and industry participants, is needed to make substantial progress in the most important research and development areas. Given the specialized nature and limited number of researchers actively working on oil spill response, it is essential to involve different centers of expertise on a global scale. The MMS has initiated many successful jointly funded projects (national or international) to leverage our program funds and expand the scope of the project to develop innovative or new technological advancements to detect, contain, and clean up oil spills in the marine environment.

Ohmsett – The National Oil Spill Response and Renewable Energy Test Facility
Ohmsett is a unique oil spill response research test facility located at the U.S. Naval Weapons Station Earle, Leonardo, New Jersey. The term Ohmsett is an acronym for Oil and Hazardous Materials Simulated Environmental Test Tank. It is the only facility in the world that allows for full-scale oil spill response testing, training and research conducted with a variety of oils in a marine environment under controlled conditions.

Ohmsett was originally constructed and operated by the EPA from 1973 until it was closed in 1988. The U.S. Navy acquired Ohmsett in March of 1989 just a few months before the Exxon Valdez oil spill in Prince William Sound, Alaska. That event prompted renewed interest in responding to oil spills, and within a year OPA-90 was signed into law. That same year, Ohmsett was formally mandated for use as a testing facility under the control of MMS. With additional financial support from the USCG and Environment Canada, MMS began a two-year restoration project for Ohmsett, and dedicated the facility in July of 1992.

The facility is critical to oil spill response technology development in the U.S. and is a vital component of the MMS nationwide oil spill research program. Ohmsett plays an essential role in developing the most effective response technologies, as well as preparing responders with the most realistic training available before an actual spill. Ohmsett is a government owned, contractor operated facility; and is available for use by state, federal, and foreign government agencies, industry and academia.

The Ohmsett facility represents a necessary intermediate step between small scale "laboratory testing" and open water testing of equipment. Ohmsett is used to test and evaluate mechanical response equipment such as oil spill containment booms and skimmers and temporary storage devices. We can test and evaluate fire resistant containment booms using an air-injected propane burner system that realistically simulates in situ burning at sea. The Ohmsett facility allows for testing and evaluation of remote sensing instruments under a wide range of conditions. Sensors can be mounted on the Ohmsett Bridge or on the tower above the tank. The tank is also large enough that aircraft and helicopters can fly over a test oil slick to evaluate sensor performance.

The Ohmsett facility also conducts realistic dispersant effectiveness testing through the design and development of a calibrated, referenced and realistic test protocol and subsequent testing under cold and temperate conditions using fresh and weathered crude and fuel oils. The National Research Council strongly supported the use of wave tank testing in their recent review of chemical dispersants. Ohmsett is the world’s largest wave-tank complex presently conducting such research and is the logical venue for bridging the gap between laboratory and field testing. MMS has added the capability to conduct effectiveness testing on a variety of chemical treating agents, dispersants and emulsion breakers and sorbent products. All equipment tests are conducted in accordance with the American Society of Testing and Materials (ASTM) standards and guidelines.

Ohmsett is also the premier training site for spill response personnel from state and federal government agencies, private industry and foreign countries. While receiving state of the art training, students use full-size equipment with real oil in varying oceanographic conditions to increase their recovery proficiency. Publication of the Ohmsett Gazette, the facility's semi-annual newsletter, keeps the oil spill community abreast of recently conducted facility activities. Ohmsett's website, found at http://www.ohmsett.com, describes the testing that the facility conducts and gives objective results of the research conducted.

MMS Oil Spill Response Research

The following are some examples of the information and technological advances of the MMS OSRR Program that are currently being used to respond to the Deepwater Horizon oil spill.

1. Physical and chemical properties of crude oil

Crude oils differ greatly in physical and chemical properties, and these properties tend to change significantly during a spill with physical weathering, biodegradation and emulsification. Such properties have a direct bearing on oil recovery operations, influencing the selection of response methods and technologies applicable for cleanup, including their effectiveness and capacity. Knowledge of the ultimate fate and behavior of oil should drive countermeasure decisions.

Since the early 1990's, the MMS and Environment Canada (EC) have jointly funded research to analyze different types of crude oil and oil products and include this information in a searchable database. The database currently has information on more than 475 different oil types. It is available at http://www.etc-cte.ec.gc.ca/databases/OilProperties/oil_prop_e.html.

The physical and chemical properties from several Gulf of Mexico crude oils contained in the catalog closely resemble the oil being released at the Deepwater Horizon site. This information is currently being utilized by various government and industry spill modeling groups to determine the fate, behavior and transport of the oil.

2. Project "Deep Spill"

In June 2000, the Deep Spill experiment (a jointly funded project initiated by the MMS that included 23 different oil companies) was conducted in the Norwegian Sea and included four controlled discharges of oil and gas from a water depth of 844 meters. Empirical data was obtained for verification and testing of numerical models for simulating accidental releases in deep waters. The experiments were also used to test equipment and methodologies for monitoring and surveillance, and evaluation of the safety aspects of accidental releases of gas and oil in deep waters. Spill models currently being used by the Unified Command for the Deep Water Horizon oil spill were developed with data and algorithms gathered from project Deep Spill.

3. Oil Spill Thickness Sensor

One of the most important initial steps in response to an oil spill at sea is the assessment of the extent of the oil slick and the quantity (i.e. thickness) distribution of oil within it. A critical gap in spill response was the lack of capability to measure and map accurately the thickness of oil on water and to rapidly send this information to response personnel in the command post.

Over a three-year period (2005-2008), the MMS and the California Department of Fish and Game, Oil Spill Prevention and Response (DFG/OSPR) jointly funded a research program to remotely measure and map the thickness of an oil slick using a portable multispectral and thermal camera the information gathered is electronically transmitted to a secure server that can be accessed by first responders. This new remote oil spill mapping and detection technology has been used in California three times in the past year to assist in response operations. It is currently being used for the Deepwater Horizon oil spill. The system acquires, processes and disseminates digital Geographic Information System compatible oil slick thickness maps in near real time and transmits this information directly to response personnel in the command post to assist with operational response decisions and deployment of manpower and response countermeasures.

4. Mechanical Containment and Recovery

In most countries, mechanical recovery of spilled oil is the first and preferred response option. A containment boom is normally used in combination with an oil recovery skimmer. MMS research has focused on methods to improve the effectiveness of equipment and techniques for the mechanical recovery of oil spills. Research on the processes of oil adhesion to the surface of oil skimmers improved recovery efficiency by 20 percent, however further research demonstrated that changing the surface pattern of the drum improved recovery efficiency by over 200 percent. Results from this research project were patented and there are at least six types of grooved skimmers being commercially sold around the world. Several of the grooved skimmers are being used by the Unified Command in the Deepwater Horizon oil spill.

5. Development of Standard Test Protocols

The USCG and the MMS have collaborated in an effort to develop a standard protocol for testing oil skimmers. The American Society of Testing and Materials (ASTM) subcommittee on skimmers recently adopted the standard methodology (ASTM F631-99 (2008)) for measuring the effective daily recovery capacity (EDRC) for a given skimmer system. The USCG uses EDRC as a key component in rating and regulating the oil spill response capability of responsible parties and oil spill removal organizations. Skimming systems being used for the Deep Water Horizon response have been tested at Ohmsett using this new ASTM protocol.

6. In Situ Burn Research

MMS was designated as the lead agency for in situ burn research (ISB) in the Oil Pollution Research and Technology Plan prepared under the authority of Title VII (33 USC Sec. 2761 – 2762) of the OPA-90. Between 1995 and 2003, the MMS partnered with the National Institute of Standards and Technology to conduct more than ten

different ISB research projects involving hundreds of laboratory, small and full-scale and at sea burn experiments. Emphasis was on the emissions to air and water, equipment evaluations including fire resistant booms, smoke plume modeling, and research to extend the "Window of Opportunity" through the use of chemical herders and emulsion breakers.

The technology to effectively predict downwind smoke plume trajectories and monitor particulate concentrations has evolved with the MMS ISB research program. Smoke plume models and monitoring protocols have been developed and are available. A Large Outdoor Fire Plume Trajectory model (ALOFT) was developed to predict and analyze the downwind distribution of smoke particulates and combustion products from large burns. Two versions are available: one for flat terrain and the other for mountainous terrain. Monitoring capability can be readily deployed to support in situ burn operations.

To disseminate results of eight years of intensive ISB research, the MMS assembled a comprehensive compendium of scientific literature on the role of in situ burning as a response option for the control, removal and mitigation of marine oil spills. All operational aspects of burning are covered in detail. The MMS has distributed more than 5,000 ISB-CD sets worldwide. Results from the MMS ISB research program are currently being used to make operational decisions on use of burning as a countermeasure for the Deep Water Horizon oil spill.

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7. Chemical Dispersants

The use of chemical dispersants is another important option in oil spill response. In the past seven years, fifteen major dispersant research projects were conducted at Ohmsett addressing five critical operational areas including: quantifying the major factors limiting dispersant performance, improving monitoring of dispersant effectiveness, addressing specific operational questions related to the physical and chemical properties of dispersants and the interaction of treated hydrocarbons with physical removal devices such as skimmers, scaling-up from bench tests to full-scale field testing, and addressing site-specific performance questions (i.e. Arctic versus temperate Gulf of Mexico). More information, including publications of Ohmsett research, can be found on the Ohmsett web page, available at: http://www.mms.gov/tarprojectcategories/ohmsett.htm

Future Oil Spill Response Research

The oil spill response activities for the Deepwater Horizon oil spill indicate that additional oil spill response research is necessary. The Department of the Interior and MMS look forward to working with Congress and the Interagency Coordination Committee on Oil Pollution Research to focus our efforts on needs that have come to light from the Deepwater Horizon oil spill.

Conclusion

Mr. Chairman, this concludes my prepared statement. Thank you for the opportunity to present an overview of the MMS's oil spill response research program and the Ohmsett facility. I would be happy to respond to questions you or Members of the Subcommittee have.