

MMS TODAY

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MMS's Environmental Studies Program: Ready to Meet the Challenges of 1996

One of President Clinton's top priorities has been to "protect America's and also the world's environment." He has been unwavering in fulfilling this promise he made to the American people in 1992. This commitment has been demonstrated consistently over the past three years, during which he has gone to great lengths "to preserve our commitment to our parents, to protect opportunity for our children, to defend the public health, and our natural resources and natural beauty . . ." He reaffirmed this commitment in the 1996 State of the Union Address in which he identified one of our challenges as leaving our environment safe and clean for the next generation.

Secretary of the Interior Bruce Babbitt has echoed this commitment, and set out in 1992 to improve the management of the nation's natural resources -- "to balance needed development with a renewed emphasis on stewardship and conservation." He has said that one of the ways this can be accomplished is through the "improvement and reliance upon science at the Interior Department . . . decisions regarding the nation's resources must depend on sound scientific data and analysis. My goal is to increase the already significant capability of the Department in this area, to elevate the

quality and credibility of the Department's research, and to insist that research results be used to inform decision-making."

One of the greatest assets of the Department of the Interior's Minerals Management Service (MMS) is its top-notch Environmental Studies Program (ESP). It provides the environmental, social and economic information necessary for the Bureau to carry out its offshore program in a safe, judicious

continued on page 3

In this issue:

■ Environmental Studies -- From A to Z and from Coast to Coast,	4
■ From the White House,	6
■ Operations Monitoring,	7
■ Unique Federal/State Project in California,	8
■ Oceanography in Risk Assessment,	11
■ The Trans-Gulf Migration,	11
■ Intertidal Study,	13



Monarch butterflies rest on offshore platforms during their long migration routes. See story on page 11 inside.

Message from the Director

I'm especially pleased to release this issue of "MMS Today." The focus of this issue is on the science and technology in which MMS engages.

We believe that in order to have a sound offshore natural gas and oil leasing program, it must be based on sound science, state-of-the-art technology, and the ability to adapt to and accommodate new and advanced technologies.

Interior Secretary Babbitt called to the forefront of MMS's mission the use of sound science in all offshore decision-making. He also called for us to work closely with all affected parties in developing America's offshore natural gas and oil leasing program for 1997-2002. The program, which will be released in the fall of 1996, reflects three primary principles that carry out those directives: science-based decision-making, consensus-based decision-making, and balancing national energy needs and environmental sensitivity by emphasizing natural gas as the environmentally preferred fossil fuel.

This past year was a time of enormous challenge and transition, yet perhaps one of the most productive ever, particularly on the science front. In 1995, some interesting and exciting experiments were conducted at the national oil spill response facility, including the testing of a multiple boom prototype that could provide a major breakthrough in mechanical oil-spill clean up; and experi-

menting with the U.S. Coast Guard to test airborne sensors designed to measure the thickness of oil spills.

Another scientific advancement for MMS involved assessing seismic activity offshore. In June 1995, MMS placed instruments beneath the sea floor in the Santa Barbara Channel, to assist scientists and engineers understand the effects of earthquakes on offshore structures and to learn more about the earth's movement under the ocean. In September, an onshore earthquake near China Lake, California, measured 5.9 on the Richter Scale and registered loud and clear on the system, marking the first time the United States collected seismic data using a network of seafloor probes. Previously, we were only able to measure earthquakes onshore, and then use that information to design offshore structures. The information obtained from the instruments will be used in reassessing California's offshore platforms. Eventually we hope to link up with the Southern California Earthquake Center, the U.S. Geological Survey and others so the information can be used in conjunction with the onshore seismic network.

Science has and will continue to play a major role in every decision regarding our nation's offshore energy resources. To enhance that process, in November, I established a Joint Subcommittee on Environmental Information for Select Outer Continental Shelf (OCS) Areas

Under Moratoria. The subcommittee will include members from the OCS Policy Committee and the OCS Scientific Committee of the Interior Department's Minerals Management Advisory Board. It will provide an independent review and evaluation of specific information needs for areas where controversy has led to Presidential or Congressional restrictions on leasing on the OCS.

This issue of "MMS Today" will highlight for you how we have joined hands and leveraged funds through some very successful state, federal, industry, and academic partnerships to accomplish the President's vision of a federal government that works better and costs less.

In regard to the recent government shutdown, MMS is pleased to be up and running again. We will continue to work to ensure that we're managing the public's resources in the most efficient way possible, that we're providing necessary protection for the environment, that we're obtaining fair market value for the taxpayer, and that we are collecting and disbursing revenues promptly.

MMS is moving forward with a variety of continuous improvement initiatives--all of which include the input of affected parties. We have embarked upon a series of innovations designed to streamline the way we do business. We have recently announced three initiatives to improve the Royalty Program. A fourth innovation recently announced that MMS's Environmental Studies Program is making over 20 years of environmental studies research available to the public in a user-friendly data base on the World Wide Web.

I hope that this issue will not only serve to inform you of the ongoing research MMS conducts, but also to stimulate any ideas you might have for cooperative research on some of the many scientific projects we have in progress.



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Environmental Studies

Continued from page 1

manner. In 1996, the ESP will continue to play a critical role in providing a strong foundation for science-based decision-making.

It is the information collected by the ESP that provides the foundation of data needed to properly analyze, discuss, and guide decisions on proposed lease sales, exploration, production, and development.

The ESP has conducted nearly 1,000 separate studies to examine the environmental impacts that could possibly occur from the OCS program. Many additional studies are in progress or planned to ensure that offshore activities and operations are conducted safely, preventing detrimental effects to surrounding habitats.

MMS's work hasn't gone unnoticed. In 1994, MMS received the "Environmental Stewardship Award" from the National Oceanic and Atmospheric Administration for protecting the East and West Flower Garden Banks for over 20 years, including urging that an active pipeline be rerouted. This accomplishment was a landmark in demonstrating that with care and caution, development and environmental protection can co-exist.

Also, in 1994 MMS was recognized by the President's Council on Environmental Quality and the National Association of Environmental Professionals when it received the 1994 Federal Environmental Quality Award for its commitment to excellence in environmental decision-making.

Altogether MMS has funded over \$570 million in environmental studies to address possible impacts of offshore drilling on the environment. In Texas, for example, MMS has committed over \$125 million to environmental studies focusing on distribution and abundance of marine mammals in the North-Central and Western Gulf; solid waste pollution on Texas beaches; long-term monitoring of the Flower Garden Banks; sea



MMS has funded millions of dollars in studies designed to address the impacts of offshore oil and gas development on the coastal, human, and marine environment.

turtle behavior relative to offshore structures; and Texas/Louisiana shelf circulation patterns. **(Editor's note: highlights of nationwide studies are provided on pages 4 and 5.)**

But the ESP doesn't operate in a vacuum. Despite the fact that it consists of over 40 marine biologists, oceanographers, physical scientists, and other scientific experts Bureauwide, an integral part of the ESP and its activities is the Scientific Committee of the Minerals Management Advisory Board. The Scientific Committee is currently comprised of 15 members, appointed by the Secretary of the Interior for 2-year terms. Its role is to advise the MMS Director on the feasibility, appropriateness, and scientific value of MMS's ESP. **(see sidebar on page 4 for membership).**

"Despite budgetary constraints, MMS's Environmental Studies Program will continue to sponsor high-quality science that directly supports key leasing and development decisions," says Dr. Ken Turgeon, Chief of MMS's ESP. "MMS research also contributes to the state-of-the-art knowledge of the marine environment for the nation as a whole," he added.

Turgeon says that in recent years, requests for new studies have generally outpaced the budget and as a result, priorities must be carefully evaluated to achieve the maximum benefit. The Scientific Committee has a voice in how these dollars are best spent to benefit the nation and protect the environment. Coordination and cost sharing with universities and other federal agencies have allowed MMS to optimize its research dollars.

"Coastal Marine Institutes (CMI's) were developed as part of an initiative to cultivate new state/federal research partnerships on environmental and socioeconomic issues of mutual concern and to best leverage funds," he said. Through the Universities, the participating States provide matching funds of at least one dollar for each dollar provided by MMS. CMI's are now established with Louisiana State University, with the University of Alaska at Fairbanks, and with the University of California at Santa Barbara. "CMI's and cost sharing have been highly successful, and something the Scientific Committee wants to see continue," Turgeon said.

In 1996, the ESP has a busy schedule. It has been and will continue to play a major role in MMS's 5-Year Offshore Oil and Gas Leasing Program. Publication of the Proposed 5-Year Program and the Draft Environmental Impact Statement occurred in February, and the Secretary is expected to approve the Final 5-Year Program in August.

The ESP will also be conducting physical oceanography studies that support the 5-Year Program. These studies focus on circulation patterns and water current meters, and the information is used to simulate hypothetical oil spills and project the movement of oil from designated locations. For more information, contact Ken Turgeon, (703) 787-1717.

—Lee Scurry

—Donna Cedar-Southworth

THE OCS SCIENTIFIC COMMITTEE

- * **Dr. Mary Altaio**, Deputy Director for Research at Scripps Institution of Oceanography.
- * **Dr. Billiana Cicin-Sain**, Professor, Graduate College of Marine Studies, Department of Political Science, and Graduate School of Urban Affairs and Public Policy, University of Delaware.
- * **Dr. James Coleman**, Executive Vice Chancellor at Louisiana State University.
- * **Dr. Eric Creelius**, Technical Group Leader for Marine Chemistry, Battelle Northwest.
- * **Dr. Joanna Erdtler-Warda**, Anthropologist, Assistant Professor, Department of Forest Resources, and Director, Natural Resources and Environmental Policy Analysis Program, College of Natural Resources, Utah State University.
- * **Dr. Michael Fry (Chair)**, Professor with University of California, Davis California, and Director, Center for Avian Biology.
- * **Dr. Lee Huskey**, Professor of Economics, University of Alaska, Anchorage.
- * **Dr. William Merrell**, Vice Chancellor for Research Policy, Texas A&M University.
- * **Dr. Steve Murdock (Vice Chair)**, Professor of Rural Sociology and Department Chair at Texas A & M University.
- * **Dr. Steven Murray**, Department of Biological Science, California State University.
- * **Dr. Henry Niebauer**, Professor of Marine Science, University of Alaska.
- * **Dr. James O'Reilly**, Exxon (on loan) to assist in Natural Resource Damage Assessment effort investigating effects of Valdez on Prince William Sound.
- * **Dr. William Schroeder**, Professor and Coordinator of Marine Science Program, University of Alabama.
- * **Dr. Richard Sternberg**, Professor, School of Oceanography, University of Washington.
- * **Dr. Douglas Wartzok**, Associate Vice Chancellor for Research, Dean of Graduate School, University of Missouri, St. Louis.

Environmental Studies -- from A to Z and from Coast to Coast

NATIONAL HIGHLIGHTS.

■ **Environmental Studies Program Information System (ESPIS)**. One of the most significant accomplishments for ESP and the scientific community nationwide is its implementation of ESPIS. Through ESPIS, the ESP is making over 20 years of environmental studies research available to the public in a user-friendly data base on the World Wide Web. Already, technical summaries of all studies are accessible, and the entire text of the studies will be available online by the end of September 1996. The summaries can be accessed on the Internet at <http://www.mms.gov/espis>.

■ **MMS Interactions with the National Biological Service (NBS)**. MMS and NBS have established formal procedures to conduct and coordinate biological research to meet the information requirements of MMS resource management decisions.

■ **ESP Coordination with U.S. Geological Survey (USGS)**. MMS and USGS have met to review planned MMS marine environmental study projects and the USGS's capabilities and interest in joining in those projects.

■ **Socioeconomic Research**. Work continues on developing a nationwide strategy for MMS socioeconomic research. The framework for this research is divided into seven components: 1) is-

sues identification; 2) national economic analysis; 3) regional level analysis; 4) community/individual level analysis; 5) resource-use issues; 6) adaptive policy studies; and 7) monitoring/mitigation.

PACIFIC STUDIES.

■ **Monitoring Study**. The third phase of field sampling was completed in 1995 for the California Monitoring Program (CAMP). This study assesses the long-term effects of offshore natural gas and oil development and production in the Santa Maria Basin. A final report will be available this winter.

■ **Deepwater Studies**. MMS continues to evaluate the physical disturbance to deepwater communities from anchors, anchor chains, and drill cuttings. The final report was published this past summer.

■ **Taxonomic Atlas**. Work continues on a Taxonomic Atlas of the Santa Maria Basin Fauna. This 14-volume Atlas is expected to be completed during 1996.

■ **Marine Bird Program**. This program was developed to provide information on Southern California seabird and shorebird populations. Birds to be studied included shorebirds of Ventura County and coastal seabirds in the Tri-County area (Ventura, Santa Barbara, and San Luis Obispo).



MMS employees are some of the most renowned scientists worldwide.

■**Reef Dynamics.** A 3-year, cooperative research program involving MMS, NBS, and the University of California at Santa Barbara is examining the biological and physical processes of rocky reef fish dynamics at state and federal platforms.

■**Oil and Gas Resources.** MMS is procuring a regional baseline analysis of the role of oil and gas industry in the Tri-County area. The California Offshore Oil and Gas Energy Resources (COOGER) study is a joint industry/federal government/county planning effort for projecting onshore OCS effects.

GULF OF MEXICO STUDIES.

■**Marine Sanctuary Program.** MMS continues work with the NOAA National Marine Sanctuary Program to monitor the environmental conditions and health of coral reefs at the East and West Flower Garden Banks. Results will be used to evaluate the effectiveness of lease stipulations designed to protect these biological resources.

■**Effects of Noise.** MMS is administering a study funded by the Office of Naval Research to summarize the effects of noise on marine mammals.

■**Whales, Dolphins and Sea Turtles.** MMS is studying the distribution and abundance of whales, dolphins and sea turtles in deep water in the Gulf.

■**Marine Animal Populations.** MMS is examining whether marine animal populations have become more tolerant and better adapted to chronic petroleum hydrocarbon pollution than populations from more pristine locations. Researchers will examine blue crabs and killifish and their interaction between low-oxygenated water contaminated with South Louisiana crude oil.

■**Sea Anemones.** The biochemical responsiveness of sea anemones may provide a clear early warning signal of environmental stress. A characterization of sea anemones will quantify ecological impact from point- and non-point source pollution through biomarkers of stress load and ecological health.



CSP studied the migration route of bowhead whales and subsistence needs of Native Alaskans in preparing the Draft Proposed Five-Year Program, and afterwards, deemed it necessary to enact regulations to protect the animals and needs of the natives.

■**Air Quality.** A Gulf of Mexico air quality study was just completed assessing the effects of offshore development in the western and central planning areas on ozone levels in coastal areas of Texas and Louisiana that fail to meet the federal ambient air quality standards for ozone.

■**Air Emissions.** A baseline study was completed to gather data on industrial air emissions from engines on oil and gas platforms.

■**Breton Wildlife Refuges.** MMS is planning a cumulative air quality analysis for the Breton Wildlife Refuge and Wilderness Area, which is home to several endangered species and migratory waterfowl.

■**Shift in Operators.** Several studies are examining possible changes in business practices and accident rates in relation to the shift in operators from large corporations to small independent companies.

ALASKA STUDIES.

■**Noise.** Industry noise from offshore activities has been studied for the past few years. A final report on the responses of spring migrating bowhead and beluga whales to that noise will be available by March 1996. An in-house annual survey of summer and fall distribution and movements of bowheads in the Beaufort and Chukchi Seas continues.

■**Marine Mammals.** Collection and archiving of marine mammal tissues for future analyses will be continued through participation and support of the National Marine Mammal Tissue Bank, National Marine Fisheries Service.

■**Fisheries.** Several fisheries research projects are being funded by the CMI. Two deal with identifying habitats and the biota found there. These studies will identify nursery grounds for juveniles, characterize them by physical and biological characteristics, and develop indices of relative species abundance.

■**Biomonitoring.** A biomonitoring CMI project is gathering data on intertidal community structure recruitment and succession in order to assess damage and rates of recovery following catastrophic disturbances, both anthropogenic and otherwise.

■**Social Indicators.** A multi-year social indicators study that developed a set of valid measures for monitoring social and cultural change in rural Alaska has been completed. The study generated a substantial multi-year database of subsistence, economic and social data at the household level.

—Lee Scurry



MMS studies marine mammals.



Dr. John Gibbons with President Bill Clinton and Vice President Al Gore in the Oval Office.

John H. Gibbons is Assistant to the President for Science and Technology.

Fifty years ago, in an office on 16th Street here in Washington, Vannevar Bush had just finished *Science, The Endless Frontier*, a blueprint for American science and technology that has kept us the world leader in research through five difficult decades. His message was simple: The U.S. was in a time of great change. Science and technology bring great rewards to society — good jobs, a higher standard of living, better health. Discovery is unpredictable, so we must invest in a broad portfolio of research or America will fall behind its world competitors.

On these things we have agreed as a nation for 50 years. What concerns me is that, if we simply continue to parrot Bush's vision of half-a-century ago, we have come nowhere near answering the fundamental questions the American people are asking about the need for federal support of science and technology.

The question is not whether science and technology are good things. The federal government supports a lot of good things. It's a good thing to have health care for the elderly. It's a good thing to have a school lunch program. It's a good thing to have clean air and clean

water. It's a good thing to have a strong national defense system.

The question, rather, is how do you structure a budget that gives you all of these good things — and does it without robbing Peter to pay Paul? And does it, moreover, in ways that the American people believe in and can continue to support.

I firmly believe that the American people support and expect federal funding of science and technology. But we have been woefully unsuccessful in explaining to them what kind of commitment this requires. Had we been more successful with this message over the past decade, we would not be facing the dire fiscal crisis in science and technology funding that confronts us today.

The current system of funding for research and development is the product of trial and error and painstaking reassessment since the birth of our Republic. It is an incredible tapestry — woven out of the hard work of our nation's scientists and engineers using threads from the private sector, federal funding, university research, and international scientific collaboration — and it is a remarkably sturdy and resilient piece of art. It responds to the threat of new and emerging diseases, as we've seen recently with Hanta virus and Ebola. It supports a space program that can put our minds

The development of environmental technologies is important to the nation, important to the President, and important to those who are engaged in the management of our mineral and other natural resources.

where our feet can never go. It nurtures the minds of our children, and prepares them for the high-technology global economy that will provide the jobs of the future.

It has given us a world largely at peace, and guards our national security. It helps make us better stewards of our planet, and protects the air we breathe and the water we drink. It puts food on our tables — and the tables of much of the world.

It is strong. It is beautiful. It is carefully crafted.

It is not indestructible.

Start pulling a thread here or a thread there, and you might not notice it on a tapestry of this size. Maybe the hue is diminished somewhat, or small details — the fine embroidery — in the total picture are lost.

But how many tapestries do you know of that can stand to have a third of the threads pulled out? Does that leave you a fabric intact, or a mess of tangled yarn? And if you pull the threads blindly, what is the chance that you'll have a picture left when you finish?

One of the threads that's getting pulled more often than others in recent months is what this Administration has called environmental technologies. These are production, manufacturing, or other techniques that reduce pollution over current technology, or actually help to correct past environmental mistakes.

Operations Monitoring Project

The development of environmental technologies is important to the nation, important to the President, and important to those who are engaged in the management of our mineral and other natural resources. Environmental technologies offer ways to reduce the chance of environmental damage during mineral, oil, and gas extraction; during mineral and petroleum processing; and all the way through the commercial cycle through end use by the consumer.

The development of these technologies requires active support from the federal government — the rewards benefit society as a whole, but sometimes cannot be captured sufficiently by a single corporation to warrant solely private investment. And the development of environmental technologies requires a favorable business environment, as well as a common-sense approach to regulating the risks involved in using any new technologies. What they told me is that they face a new and uncertain future, where the road maps to success are unknown. Knowledge is the only clear advantage in such a time, and we are squandering this advantage if we permit deep and broad cuts to our nation's R&D portfolio.

Several months ago, I met over dinner with a group of oil industry executives in Houston to hear what we needed to do to help them develop these kinds of technologies. The Vice President had just released the Administration's National Environmental Technology Strategy, and I wanted to know what they thought about it. They told me that the minerals and petroleum industries already were at the technological forefront. They told me about exciting new techniques they'd developed, including one company that's using sulfur-eating bacteria to remove sulfur from oil before processing. And they told me that they feared the kind of research that leads to new discoveries like this was endangered.

Overall, their message was simple: Keep doing what you're doing. Give us the tools with which we can innovate —

partnerships with government and academia, cooperative research and development agreements, business extension programs. And continue to work with us to reduce the burden of excessive environmental regulation.

One area where government/industry partnership has been extremely fruitful is in research relative to oil-spill response technologies. After the Prince William Sound oil spill and the subsequent passage of the Oil Pollution Act of 1990, the Minerals Management Service became an active participant with industry in developing cleanup technologies and mitigating measures for massive oil spills. These research and development efforts include:

- new remote sensing systems;
- dispersants that really work; and
- the use of in-situ burning as an efficient and less polluting way to respond to an oil spill.

The successful demonstration of in-situ burning as a cleanup method for an open-water spill has proved a remarkable achievement can occur with a true government/industry partnership. The huge expense of field testing programs as well as the complexities of the necessary environmental permits could not have been overcome without a true commitment by both parties.

They reminded me that knowledge is our key to the future. It lets us get our kids up on our shoulders, to give them the boost they'll need to see the dawn of the new century. As a new grandfather, I am committed to making sure my grandchildren see that dawn from a position of clear advantage.

The President and Vice President share that commitment — a vision more powerful than mere ledger sheets and calendars. I believe the public shares that commitment, and I believe the readers of this publication share it. Together — as partners in scientific enterprise — we can weave a tapestry of cooperative success that will keep this nation great.

While studies have shown that the acute impacts of OCS development are localized, there is less certainty about the nature and consequences of the subtle, long-term stresses that may be associated with OCS development, particularly in areas with a long history of activity.

Phase I of the Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX) is a complex but integrated series of multidisciplinary investigations that examine the impacts of sublethal, chronic exposure to discharges from oil and gas production facilities on marine ecosystems.

GOOMEX is intended to develop environmental indicators of contaminant stress. These indicators will be useful in the preparation of environmental impact statements and will provide future guidance for stipulated activity on the OCS. As a result, GOOMEX will lead to the creation of mitigation measures and the modification of the scope of proposed lease sales in the Gulf, and will feed directly into the operational aspects of regulating leasing activities.

Mitigation measures that have affected many operational aspects of OCS activities, such as effluent discharge, site clearance, mandated sea-bottom surveys, and archaeological surveys, have resulted from previous studies.

Phase I of GOOMEX is the outcome of a competitive contract procurement won by The Geochemical and Environmental Group (GERG) of Texas A&M University. This \$4.5 million multidisciplinary investigation seeks to develop a suite of environmental indicators that will be refined in subsequent phases into standard monitoring procedures that will be implemented in future OCS exploration and development activities. The study sites are all off Texas: Matagorda Island Field Block 686, Mustang Island Area East Addition Block A-85, and High Is-

continued on page 8

Unique Federal/State Project Underway in California

Operations Management
Continued from page 7

land Block A389 (which includes the East Flower Gardens).

As the result of the development of techniques to measure biochemical responses of resident fauna chronically exposed to discharges from long-term OCS production platforms, early warning indicators will be developed to monitor natural gas and oil operations so that managers and operators can be alerted before marine ecosystems are damaged.

GOOMEX attempts to develop data on the natural variability associated with Gulf marine ecosystems so that disturbances caused by chronic exposure to contaminant discharges can be measured. Responses from the molecular to the organismal up to the community level are being studied. Already GOOMEX has identified the primary biochemical detoxification systems that are highly sensitive to contaminant exposure biochemical responses, immunological responses and genotoxicity.

Texas A&M is analyzing the information generated from the completed field seasons and is synthesizing it into a comprehensive, multi-volume final report. This information will constitute a database on the fate and effects of hydrocarbons and metals from the operations of OCS platforms. The environmental benefits that will result from the incorporation of knowledge learned from GOOMEX will benefit the daily operations on the OCS, making them more environmentally safe.

—Dr. Pasquale Roscigno
Gulf of Mexico Region

Situated in the Santa Barbara Channel, 4 miles offshore Carpinteria, CA, is a unique joint federal/state/industry project—a partnership among the Minerals Management Service, the California State Lands Commission, the agent of the state responsible for leasing and regulating development of the oil and gas resources in state waters and for collecting revenues from the production of these mineral resources, and Pacific Offshore Operators, Inc. (POOI), a small, independent oil and gas company.

The project, which was initiated in mid-1993, involves a joint technical study of the Carpinteria offshore field. The field straddles the federal/state boundary in the eastern Santa Barbara Channel. Since the 1960's, the field has produced oil and gas from five platforms: HOGAN and HOUCHIN (currently operated by POOI) and HENRY (operated by Unocal) in federal waters, and HOPE and HEIDI (operated by Chevron) in California state waters.

As of the end of 1993, the field had yielded a total of about 26 million barrels of oil and 89 billion cubic feet of natural gas. About 38 percent of the total production of oil and 46 percent of the total natural gas was produced from within the state portion of the field.

In May 1993, however, Chevron Oil Company stopped production from HOPE and HEIDI and began to abandon these state-water facilities. Chevron had been producing natural gas and oil from the field since 1964. But by early 1993, the company felt it was no longer economically feasible for them to operate these platforms. Chevron plugged and abandoned the wells and was scheduled to remove these platforms in the Fall of 1995.

The remaining three platforms in the field continue to produce oil and gas. Unocal is currently producing 1,380 barrels of oil per day (BOPD) and 525,000 cubic feet of natural gas per day (MCFGPD); POOI is producing approximately 1,200 BOPD and 1.750 MCFGPD in the federal waters. Estimated reserves for the federal portion are about 3 million barrels of oil

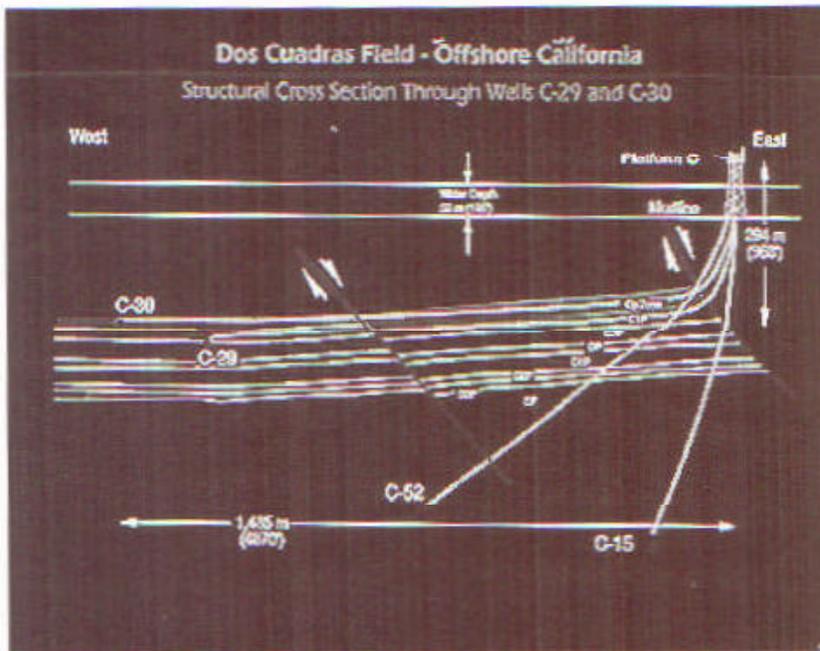
and about 2.5 billion cubic feet of gas (as of 12/21/93).

The California State Lands Commission approached the MMS to conduct a joint study of the Carpinteria Offshore field. The purpose of the study was to look for opportunities to recover the bypassed oil in state waters. The State Lands Commission was interested in studying the common federal/state reservoirs for possible future drilling and production from an existing platform on the adjacent federal lease. In addition, the State Lands Commission also sought to encourage POOI, the adjacent federal lessee, to expand their leasehold to include the mineral rights currently held by Chevron. This would allow for future development of the state portion of the field from POOI's platform HOGAN.

To date, California has received in excess of \$6 billion from oil and gas production from state tidelands. Average annual income to the state from these properties over the past 5 years is \$142 million.

MMS is the mineral resource manager for the federal portion of the Offshore Carpinteria field. In total, the Department of the Interior has disbursed more than \$5 billion to California from oil and gas production on the Outer Continental Shelf from 1953 through 1994. To ensure that the state is compensated for drainage from state properties, a portion of these revenues flow to the state through a sharing of revenues collected for production from a band in federal waters within 2 to 6 miles of the state's seaward boundary. California has received a total of \$4 million from such production.

The state and the nation share a joint interest in recovering the gas and oil resources from the entire field as efficiently as possible, with the existing infrastructure and appropriate environmental safeguards. Therefore, MMS and the California State Lands Commission joined together to study what impacts would occur when Chevron shut in the wells on the state portion. The ongoing study is looking at the possibility



Extended reach drilling, depending on the depth of the structure (field), can access hydrocarbon reserves from up to a distance of 3 miles.

of producing the remaining state reserves through long-reach wells directionally drilled from a single platform already existing in federal waters.

Since Pacific Operators Offshore Inc. was already operating Platform HOGAN in the adjacent federal waters, and was interested in recovering the remaining reserves in the state portion of the field, POOI was requested to provide data for the study and immediately agreed to join the proposed study. In addition, they recommended including Los Alamos National Laboratory in the effort. Los Alamos, in turn, brought in the University of Houston's Institute for Improved Oil Recovery. Team members pooled together remarkable, high-level, state-of-the-art science and computer expertise to identify and model the best methods currently available to recover potentially bypassed oil reserves.

"Everyone comes out a winner," says Jeff Kennedy of MMS, who is the Chief Geologist from MMS's Pacific offshore region assigned to the project. From an environmental perspective, if the oil is removed in a controlled manner some of the tar on the beaches as well as gaseous releases and air pollution, which result from an enormous volume of natural seepage, could be lessened.

"The State benefits immensely because, if the project is a success and reserves are accessible from the federal portion, the State will continue to receive revenues without having offshore structures located in their waters. The study has created a strong partnership between MMS, the state, and industry, allowing for a full exchange of information between the state and federal government in determining the accessibility and value of resources within these areas," he said.

Scientists from MMS, the state, and POOI are working together to examine the geologic framework of the field. Kennedy explained that geologic modeling is like creating a three-dimensional picture of what the earth looks like under the surface — depicting where the oil and gas are trapped. The scientists will then work with Los Alamos and University of Houston to perform reservoir simulation, which uses the geologic framework to predictively model the flow of the oil and gas into the proposed long-reach, directionally drilled development wells. Based on the picture, the group will have a good idea of where the bypassed oil can be found.

Database management is another important component of the study. Over 20

years of exploration and development in the Offshore Carpinteria field — and some 217 wells drilled — have produced a vast amount of detailed well data, reservoir engineering data, and geologic information. These data are being organized into a comprehensive data base for the study. This information is an indispensable ingredient in the engineering and geotechnical modeling and simulation efforts now in progress.

In addition, the study has opened the way for other joint studies between MMS and the California State Lands Commission. These studies will examine other oil and gas fields within the Pacific offshore area to determine the extent to which these fields have common resources in both federal and state waters. MMS and the State Lands Commission are already working to determine the estimated reserves and extent of the Rocky Point and Jalama fields in the western portion of the Santa Barbara Channel.

"We are enthusiastic about this new partnership," said Kennedy. "These efforts serve the public interest by maximizing resource recovery in a manner that is consistent with the interests of the nation, the state, and local residents. One of the advantages of this approach is that it could provide access to the reserves while consolidating development to reduce visual intrusion offshore and onshore while continuing to provide strong environmental safeguards," he said.

What it boils down to is a partnership—a successful partnership among the state, the federal government, and industry built on shared science and expertise. "The ultimate result," said Kennedy, "is enhanced, efficient oil recovery; a continuation of economic life of the field; additional state and federal revenues; collaborative scientific efforts; and the continuation of a long, productive relationship."

—Ellen Aronson

—Donna Cedar-Southworth

*Special thanks to Jeff Kennedy for his contributions to this article

Congressional Report

On January 3, 1996, the House and Senate ended the first session of the 104th Congress and immediately began the second session. The legislative agenda of the first session was dominated by the "Contract With America" and budget and appropriations legislation. Despite intense and ongoing focus on these issues, a variety of other legislation, some impacting the programs of MMS, was debated and/or enacted by the Congress. Between legislation already enacted or pending, both the Offshore and Royalty Management programs could be significantly impacted by the work of the 104th Congress.

ENVIRONMENTAL LEGISLATION

At the end of the first session of the 104th Congress, many major environmental initiatives had been discussed, but no major movement had occurred on items such as the Endangered Species Act, Superfund legislation, the Clean Water Act, and the Safe Drinking Water Act. Action is expected on many of these items during the second session of the 104th Congress.

FISCAL YEAR 1996 APPROPRIATIONS

Currently, only 8 of 13 appropriations bills have been enacted into law--and only one reached President Clinton's desk before October 1. Of the 5 appropriations bills still pending enactment, 3 have been vetoed (including the Department of the Interior bill) and 2 are still pending before Congress.

BUDGET RECONCILIATION

The most important piece of legislation passed last session was Budget Reconciliation legislation. This legislation proposed to balance the budget in seven years by a variety of actions, and in the process, made sweeping policy changes to a broad array of Federal programs (including the Royalty Management program). A bill passed by

Congress was vetoed by the President in December 1995.

Negotiations are currently underway between Congress and the Administration to bridge their differences on a range of budget and policy-related issues. Given the high priority of the budget by Congress, the issue will probably continue to dominate the second session of Congress.

LEGISLATION AFFECTING MMS

■ **P.L. 104-58 (Deepwater Royalty Relief)** - On November 28, 1995, the President signed into law S. 395--a bill to authorize and direct the Secretary of Energy to sell the Alaska Power Administration and to authorize the export of Alaska North Slope (ANS) crude oil. Title II of the bill lifts the 22-year ban on the export of ANS oil and allows export unless the President finds that selling the State's oil abroad is not in the national interest. It also requires that transport of ANS crude oil be by U.S.-owned and crewed vessels.

Section 302 contains a discretionary provision that amends section 8(a) of the OCSLAA to promote development, increased production, and production of marginal resources from producing or non-producing leases. This provision includes non-producing leases and allows the Secretary to grant reductions on other than a case-by-case basis, but limits this discretionary authority to the Central and Western Gulf of Mexico and the portion of the Eastern Gulf of Mexico offshore Alabama.

Section 302 also contains a mandatory provision that provides royalty relief for existing leases located in water depths of 200 meters or greater in the Western and Central Gulf (as well as offshore Alabama). A suspension generally shall be granted within 180 days of application if the Secretary determines that a project is not economic in the absence of the relief. If relief is granted, then at a minimum, it shall be for a specified volume or production.

Section 303 contains a discretionary provision that adds a new bidding system to those already authorized by section 8 of the OCSLAA. Specifically, leases located anywhere on the OCS can be offered with suspension of royalties for a period, volume, or value of production, as determined by the Secretary.

Section 304 contains a mandatory provision that requires the new bidding system authorized in section 303 to be used for the next 5 years for tracts located in water depths of 200 meters or greater in the Western and Central Gulf (as well as offshore Alabama).

■ **Financial Responsibility Requirements for "Offshore Facilities"** -- On November 17, 1995, the Senate passed S. 1004 (U.S. Coast Guard reauthorization legislation). Amendment 3059 to that bill was approved by voice vote and would clarify section 1016(c)(1) of the Oil Pollution Act of 1990 (OPA). Earlier, the House had passed their version of U.S. Coast Guard reauthorization legislation (H.R. 1361), which also included language clarifying section 1016(c)(1).

Both versions of clarifying language address the major issues outlined by Secretary Babbitt in his July 20, 1995, letter -- jurisdiction; level of financial responsibility certification to be required; and de minimis exemptions. The Senate version comports more closely with the Secretary's recommendations. The House and Senate are working to resolve differences over the 2 bills, including language pertaining to section 1016(c)(1).

■ **Royalty Fairness and Simplification Legislation** -- H.R. 1975 and S. 1014 were introduced by Congressman Ken Calvert, Chairman of the House Resources Subcommittee on Energy and Mineral Resources, and Senator Don Nickles, Chairman of Senate Energy Subcommittee on Energy Production and Regulation. After both a House and Senate hearing, the "Royalty Fairness" bill was included in the Budget Reconciliation legislation vetoed by President Clinton on December 6.

Oceanography in Risk Assessment

"The science of oceanography plays a leading role in oil-spill risk assessment," said Walter Johnson, an MMS oceanographer, "and determining the level of risk to the environment — should an oil spill occur — is of vital importance and crucial for preparedness."

In fact, many preleasing and leasing decisions rely on the data gathered by oceanographers.

The first step in data collection involves observation and measurement. Everywhere there is offshore leasing and development, MMS scientists collect data on ocean circulation patterns, winds, water currents, temperature and salinity, as well as offshore eddies and the outflow of major rivers, such as the Mississippi.

All of this information is incorporated in computer models to calculate and plot the path of hypothetical oil spills. The model output, along with information on sensitive areas, such as fisheries, tourist beaches and endangered species' habitat and migration routes, plays an important role in determining the risk assessment of MMS leasing decisions.

Examples of Oceanography Research:

- Circulation on the North Central Chukchi Sea Shelf study and the Winter Circulation Processes in the Northwest Chukchi Sea study.
- Analysis and acquisition of observations on the California Shelf.
- Marine Boundary Layers Accelerated Research Initiative.
- The largest oceanography study undertaken by MMS to date is the Louisiana/Texas (LATEX) physical oceanographic study. Currently, more than 30 state, industry and academic projects are registered to receive portions of the LATEX data.

In addition, a major tool for studying ocean current and circulation patterns is the drifting buoy. Since October 1993, more than 350 drifting buoys have been released and tracked in the Gulf of Mexico.

—Lee Scurry

The Trans-Gulf Migration

The following article has been adapted from "The Trans-Gulf Migration of the Monarch Butterfly" by Dr. Gary Noel Ross, President, Baton Rouge Audubon Society.

The monarch butterfly is world famous for its seemingly miraculous treks between Canada, the United States, and Mexico. Although the insect's land routes are fairly well known, the distinguished international traveler has recently acquired a new reputation — ocean voyager.

After four years of research in the northwestern Gulf of Mexico, Dr. Gary Noel Ross has compiled substantial data that advance new theories on monarch migration.

The flight path for the butterflies is consistently south to southwest in October, and north to northeast in March. In the spring, primed for reproduction, monarchs leave their forested retreats in central Mexico to begin searching out milkweeds, their only host plants. "Of those that reach the Mexican Gulf coast, many probably continue to skirt the water line northward since those offshore waters contain very few production platforms or drilling rigs," said Ross. "However, my data indicate that some monarchs launch out over the water."

The direct route across the Gulf is advantageous for the butterflies because it's more than 200 miles shorter than the original flight path that hugs the coastline. And, thanks to offshore petroleum platforms, the insects have resting spots along the way.

According to Ross, nearly 30 different manmade structures — ranging from just a few miles offshore to nearly 150 miles offshore — host monarchs twice a year. During each migration, at least one platform is inundated by hundreds if not thousands of butterflies, usually at dusk.

The majority remain on the platform throughout the night. Then, with renewed vigor and without suitable food, the butterflies are driven by instinct to

migrate onward — another 10-12 hours over approximately 350 miles of water.

Although the insects seem to prefer moving when winds are favorable for gliding, the tenacious migrants are able to hold to their apparently prescribed course even when faced with strong head winds. The butterflies usually fly 30-130 feet above the warm Gulf water, presumably taking advantage of thermal uplift.

"I am often asked just how do the migrating monarchs home-in on the offshore structures? Again, the past four years of research offer compelling evidence," Ross said. "More than 90 percent of all butterfly records involve offshore structures that are yellow in color. Since monarchs are known to be highly sensitive to that color, I theorize that the fall migrants mistake the colorful platforms for patches of goldenrod, a favorite source of nourishing nectar, or perhaps even for trees sporting autumnal foliage.

"But magnetism probably plays a significant role, too," he said. The body of each monarch contains small quantities of magnetite, which provides the ability to navigate over great distances. In fact, the record for one monarch tagged in Ontario and later retrieved in Mexico stands at 2,133 miles. Since the offshore facilities continually generate substantial electromagnetic fields because of their electrical generators, telecommunication equipment and massive iron construction, Ross theorizes that the insects' genetic programs are fooled.

Ross believes that the monarchs that launch out over the water have a decided advantage over those that continue to skirt the coast line.

Monarchs are genetically tied to breed on only milkweed plants, which are relatively common along roadsides and within pastures. These showy plants survive because of a milky sap that contains chemical substances that render the plants more or less immune to predators. Monarch caterpillars have evolved so that they tolerate and actually sequester and incorporate these toxins into their own

continued on page 12

The Trans-Gulf Migration*Continued from page 11*

body chemistry. For that reason, monarch caterpillars are also immune to many predators. During metamorphosis, these same toxic alkaloids are passed to the adults making them unpalatable. The striking colors of both the caterpillars and butterflies supposedly advertises this immunity to potential predators: "I taste bad. Leave me alone!"

But all milkweeds are not equally potent. As a corollary, all monarchs are not equally potent. In fact, experiments have proven that some monarchs contain practically no measurable quantities of alkaloids and are readily eaten by predators.

According to evolutionary theory, the monarchs that breed on species of milkweed that are the most potent will have a greater potential for survival. And from there, natural selection favors them over the butterflies that breed on weaker toxic varieties of milkweed.

"My analysis of the vegetation of coastal Louisiana indicate that only one species of milkweed is common there — the green or antelope-horn milkweed," said Ross. "It's also ranked as one of the most toxic of its kind. I reason, therefore, that those monarchs that migrate in the spring across the waters of the Gulf are able to breed on a species of milkweed that virtually assures the survival of most of their offspring. As such, the oceanic route increases the survival potential for the butterfly species through time.

"I am not yet in a position to propose that the oil industry's development in the Gulf of Mexico over the past 50 years has inadvertently sparked the evolution of a new, more direct flyway for the monarch. However, I do believe that this 'Trans-Gulf Express' does offer migrants a definite advantage: A shorter route complete with open-sea oases, and access to breeding grounds with host plants rich in alkaloids. And so, what may have begun as only a chance wandering by few wayward individuals, is now being continually reinforced and expanded," said Ross.

continued on page 13

Innovations at MMS--MMS is moving forward with a variety of continuous improvement initiatives designed to streamline the way the Bureau does business. In 1995, MMS announced three initiatives to improve the Royalty Program: one simplified assessing late and erroneous production reporting; another stepped up efforts for electronic submissions of and improvements to royalty payor forms; and a third issued interim guidelines that streamline and simplify the royalty relief application process for producers operating offshore leases with revenues that are inadequate to sustain continued production. A fourth innovation announced the Environmental Studies Program progress in making over 20 years of environmental studies research available to the public on the World Wide Web. These innovations will be ongoing.

Unitization/Suspension Workshop

--The Gulf of Mexico OCS Regional office hosted a unitization/suspension workshop in New Orleans in November. Issues addressed included: policies for and administration of offshore federal units; a draft Letter to Lessees and Operators (LTL) clarifying the policy for approving exploratory, development, and production unitization proposals; regulatory authority and associated policies for granting lease suspensions of production and operations; and a draft LTL providing an overview of the suspension program. Two industry panels (one for unitization issues and one for suspension issues) made presentations. Both major and independent oil and gas companies were represented. Written comments were received through January 31, 1996.

Natural Gas Deliverability--Mike Melancon of the Gulf of Mexico office of Resource Evaluation participated in a National Ocean Industries Association (NOIA) Gas Panel titled "Can the Gulf of Mexico Remain the Backbone of the U.S. Natural Gas Deliverability?" During presentations, two primary areas of concern were expressed by panelists:

1) the number of gas prospects that currently exist on the Gulf shelf is at its lowest point in the recent past. This is attributable to the large number of gas prospects that have been identified and drilled as a result of 3D seismic technology; 2) if U.S. natural gas demand dramatically increases, the federal offshore Gulf may be currently producing at its maximum deliverability and could not fulfill this demand. MMS projects that if this demand were long term, an additional 1 to 2 billion cubic feet per day could be achieved by reworking current producing and nonproducing gas completions and recompleting some existing wells in new producible gas reservoirs. However, increasing gas production results in a more rapid decrease in gas reserves requiring a more aggressive gas exploration program to offset future gas production declines.

The results of the panel presentations indicated that the Gulf of Mexico could remain the backbone of U.S. natural gas deliverability if aggressive natural gas exploration occurs.

Training Program--MMS held a public workshop and pilot test training on well-control and production-safety systems on December 6, 1995, at the Gulf of Mexico office. The program included a session on the proposal to allow third parties to accredit worker training programs, and a presentation summary of the third-party accreditation comments received in response to a *Federal Register* notice published in August 1994. The workshop provided an additional opportunity to discuss third-party options.

SEMP Workshop--More than 280 parties participated this past fall in two Safety and Environmental Management Program training workshops sponsored jointly by the American Petroleum Institute (API), the Offshore Operators Committee (OOC), the Independent Petroleum Association of America (IPAA), the National Ocean Industries Association (NOIA), the U.S. Coast Guard, and MMS. The workshops were developed in response to an industry-

MMS Engaged in Intertidal Study in California

wide SEMP survey conducted by API and OOC, which indicated that while most OCS operators were developing a SEMP plan for "hazards analysis," "operating procedures," and "management of change," were lagging behind other SEMP elements. The workshop focused on those three topics. The second survey was conducted in January, and will be reported on in the next issue of "MMS Today."

Transportation and Gathering--In December 1993, the Royalty Management Advisory Committee asked for additional guidance on the difference between transportation and gathering. The delineation of where gathering ends and transportation begins is an important royalty valuation issue. The Valuation and Standards Division of RMP is preparing detailed examples illustrating the decision processes to determine whether movement of production is gathering or transportation, and will be offering a day-long payor training session later in 1996.

MMS Establishes Joint Subcommittee on Environmental Information for Select OCS Areas Under Moratoria--In December, MMS established a Joint Subcommittee on Environmental Information for Select Outer Continental Shelf Areas Under Moratoria. The subcommittee will provide an independent review and evaluation of specific information needs for areas where controversy has led to Presidential or congressional restrictions on leasing on the OCS. The subcommittee will include members from the OCS Policy Committee and the OCS Scientific Committee of the Interior Department's Minerals Management Advisory Board.

The Trans-Gulf Migration
Continued from page 12

Dr. Gary Noel Ross is a native Louisianan with BS, MS, and PhD degrees in entomology from Louisiana State University. After a 24-year professional career in the Department of Biological Sciences at Southern University in Baton Rouge, he retired in 1992 to devote full time to researching and photographing butterflies.

MMS, one of the smallest bureaus in the Department of the Interior, is charged with managing America's offshore natural gas, oil and other mineral resources and collecting and disbursing about \$4 billion a year in revenues from onshore and offshore federal and Indian mineral leases. MMS is also engaged in valuable long-term biological studies along the west coast.

A team of scientists located in MMS's Pacific Regional Office is studying the rocky intertidal sections of the beaches of California. In 1992, these scientists formed an in-house team, (called the "MINT" team for "MMS Intertidal" team) so that long-term monitoring of several sites could continue along the California coast despite research budget cuts.

The goal of the team is the multiyear study of the plant and animal communities that reside in the splash zone, or intertidal zone, along the coast. One part of the effort is aimed at determining how much time is needed for communities of plant and animals living along the rocky shore to recover from man-made disturbances. The second part of the research focuses on monitoring communities to understand natural changes in the environment.

At a few locations along the coast, small sections of the algae and mussel beds were scraped clean (down to bare rock) in the mid-1980's. This experiment, now a decade in progress was done to mimic a severe man-made disturbance, such as a construction project. The growth of the new plants and animals in these cleared plots has been measured regularly for the past ten years.

The recovery study was originally contracted to Kinetic Laboratories, "but when the contract ran out, the mussels were still not close to recovery," said Mary Elaine Dunaway of the Pacific

OCS Region. "MMS did not want the study to stop or to lose the data that had already been collected, so we took the study over and began conducting it completely in-house." Data collected by the team indicate that the mussel beds are recovering, but at a slow pace. The team will be releasing a report with their findings in 1996.

The team is also involved in a cooperative effort with the University of California at Santa Barbara, where nine sites along the Santa Barbara County shoreline are monitored twice yearly. Sites are selected at 10-mile intervals in order to obtain a good geological characterization of the coast.

The MINT team often takes students as well as VIP's out on field expeditions to the monitoring sites. Most recently, the team took colleagues out with them from Tenera who are conducting intertidal monitoring of the coastline near Port San Luis.

The MINT team also networks with other scientists conducting similar work off California. For example, MMS scientists have assisted the National Park Service scientists on the Channel Islands and helped set up sites on Santa Cruz Island as a part of the California Coastal Commission shoreline monitoring study.

The work will continue, and the initial results from the Mussel Recovery Study should be published early next year. Other sources of information available include "The Inventory of Shoreline Resources Database," now available on diskette; and, a handbook on the Resources of Santa Barbara County. For more information, contact Mary Elaine Dunaway at (805) 389-7848.

—Mary Elaine Dunaway
—Donna Cedar-Southworth

1995: Leaps and Strides for Royalty Management

RMP Paves the Way for Electronic Commerce in MMS.

The increasing use of electronic commerce technology is already proving itself as an answer to MMS's goal to achieve greater efficiency, lower costs, and improve its day-to-day service.

RMP, which processes millions of lines of information and billions of dollars annually, now offers a variety of electronic reporting and paying options to its customers.

Electronic commerce simplifies and eases reporting burdens; enhances communication and reporting quality; improves reporting timeliness and expedites error correction; reduces error rates; reduces customer data processing costs; utilizes electronically received data more rapidly, and less expensively than data received on paper; maximizes time by allowing for customers to send reports and payments precisely when they are due; and, reduces the volume of paper exchanged and associated processing costs.

MMS Saves \$97,000 in Contractor Costs.

In October 1995, RMP's Data Management Division (DMD) initiated a series of process improvement and reengineering recommendations that will save \$97,000 in contractor costs during fiscal year 96 alone.

Operators of mines containing federal or Indian leases are required to submit monthly production reports to RMP's automated Production Accounting and Auditing System (PAAS). Reports submitted with errors require analysts to correct them and update the PAAS.

In March 1995, RMP with the assistance of the National Performance Review Common Reference Data Reengineering Laboratory, analyzed PAAS solid minerals processes that were performed by a contractor and determined that the current DMD solid minerals staff could complete the error

correction processes using existing resources. Bringing this process in house reduced MMS's contractor costs by \$97,000.

37 States Receive \$552 Million in Fiscal Year 1995 as Share of Federal Mineral Revenues.

MMS distributed more than \$552 million to 37 states in fiscal year 1995. The money represents the states' cumulative share of revenues collected for mineral production on federal lands located within their borders and from federal offshore oil and gas tracts adjacent to their shores.

Alabama	\$7,766,339.94
Alaska	\$14,006,803.81
Arizona	\$87,473.33
Arkansas	\$831,411.72
California	\$50,810,873.87
Colorado	\$35,488,952.09
Florida	\$97,666.01
Idaho	\$2,351,083.31
Illinois	\$94,571.30
Indiana	\$98.80
Kansas	\$810,559.06
Kentucky	\$72,534.53
Louisiana	\$15,765,350.96
Michigan	\$884,684.03
Minnesota	\$242,554.99
Mississippi	\$596,978.50
Missouri	\$1,013,270.34
Montana	\$24,612,224.39
Nebraska	\$13,662.63
Nevada	\$8,119,089.21
New Mexico	\$118,903,520.83
North Carolina	\$744.19
North Dakota	\$2,489,301.47
Ohio	\$242,662.00
Oklahoma	\$1,834,115.78
Oregon	\$43,390.64
Pennsylvania	\$22,613.46
South Carolina	\$1,958.69
South Dakota	\$800,073.59
Tennessee	\$63.38
Texas	\$18,467,393.44
Utah	\$31,083,602.32
Virginia	\$89,040.06
Washington	\$371,231.34
West Virginia	\$197,049.62
Wisconsin	\$1,004.39
Wyoming	\$213,974,066.53
Total	\$552,248,836.41

MMS Awards States, Indian Tribes \$5.9 Million for Audit Assistance.

MMS will award \$5.9 million to ten states and eight Indian tribes in fiscal year 1996 as reimbursement for audits of mineral leases on federal and tribal lands.

The money will be used to fund work plans agreed to under Sections 202 and 205 of the Federal Oil and Gas Royalty Management Act (FOGRMA) of 1982. Under the agreements, participating state officials perform audits and other related reviews on federal onshore oil, gas, coal and other solid mineral or geothermal leases located in their respective state. Participating Indian tribes perform similar tasks for their respective tribal lands.

MMS reimburses states and tribes for the costs of audits, such as salaries and travel expenses. Participating states include:

California	\$855,482
Colorado	\$710,833
Louisiana	\$105,000
Montana	\$247,626
New Mexico	\$387,608
North Dakota	\$273,892
Oklahoma	\$321,054
Texas	\$198,117
Utah	\$465,716
Wyoming	\$808,817

Indian Tribes with audit agreements include:

Navajo Nation	\$363,677
Blackfeet	\$149,117
Jicarilla Apache	\$122,100
Ute	\$200,883
Southern Ute	\$213,435
Ute Mountain Ute	\$109,900

Two other Tribes, the Arapaho and the Shoshone, will share \$184,100 under a combined agreement.

Technical Papers & Presentations.

Barbara J. Bascle, Philip C. Smith.
Pliocene Trend in the Deep-Water, Garden Banks Area of the Gulf of Mexico.

R.D. Baud, J.L. Haglund, J.L. Hunt, R.L. Roque, and A.P. Daigle. An Emplacement Model for Allochthonous Salt Sheets with Implications Toward Subsalt Exploration.

Jeff Brooke, David Marin, Eric Kazanis.
Chronostratigraphic Hydrocarbon Plays and Depositional Styles in the Northern Gulf of Mexico.

Andrew J. Petty, Ferry Lake, Rodessa, and Punta Gorda Anhydrite Bed Correlations, Lower Cretaceous, Offshore Eastern Gulf of Mexico.

Michael A. Smith. Assessment of U.S. Atlantic Hydrocarbon Resources Using New Geochemical Technology.

OPCPlot 6.0. Gulf of Mexico regional oceanographer, Dr. Murray Brown was invited to attend the Intergovernmental Oceanographic Commissions' (IOC) fifteenth annual session on international oceanographic data and information exchange in Athens, Greece, January 23-31. Since 1990, Dr. Brown has been a member of the IOC's "Ocean PC Project" organized to identify, interface, or (if necessary) write ocean data management software for use by government agencies worldwide.

His OPCPlot program is a general-purpose map-drawing utility that is compatible with a large number of data formats and with WordPerfect. A recent upgrade of the program, demonstrated in Athens is an interface to the global, high resolution Defense Mapping Agency databases that Brown arranged during a recent detail to NOAA. The Ocean PCS team has taught the Ocean PC software package to international students in workshops in Kuala Lumpur, Mombasa, and Copenhagen over the past three years, resulting in OPCPlot's current usage in about 35 countries.

Available from OMM Headquarters:
381 Eiden Street
Herndon, VA 22070-4817
(703) 787-1080

Evaluation of Hurricane-Induced Damage to Offshore Pipelines. MMS. 1995. OCS Report. MMS 95-0044.

Oil-Spill Risk Analysis: Outer Continental Shelf Lease Sale 144, Beaufort Sea. MMS. 1995. OCS Report. MMS 95-0046.

Monitoring Assessment of Long-term Changes in Biological Communities in the Santa Maria Basin: Phase III, Final Report. MMS. 1995. OCS Study. MMS 95-0049.

Outer Continental Shelf Draft Proposed Oil and Gas Leasing Program 1997 to 2002 July 1995. MMS. 1995.

Available from Alaska Region:
949 East 36th Avenue, Room 110
Anchorage, AK 99508-4302
1-800-764-2627

Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 1994. MMS. 1995. OCS Study. MMS 95-0033.

Available from Gulf Of Mexico Region:
1201 Elmwood Park Boulevard
New Orleans, LA 70123-2394
1-800-200-GULF

Investigation of Loss of Well Control Well B-2, South Marsh Island Block 90 Lease OCS-G 8684 March 15, 1994. MMS. 1995. OCS Report. MMS 95-0041.

Gulf of Mexico Offshore Operations Monitoring Experiment, Final Report Phase I: Sublethal Responses to Contaminant Exposure. MMS. 1995. OCS Study. MMS 95-0045.

Estimated Proved Oil and Gas Reserves, Gulf of Mexico, December 31, 1994. MMS. 1995. OCS Report. MMS 95-0050.

Available from Pacific Region:
770 Paseo Camarillo
Camarillo, CA 93010
(805) 389-7520

Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 5 of 14. MMS. 1995. MMS 95-0016.

Disturbance of Deep-Water Reef Communities by Exploratory Oil and Gas Operations. MMS. 1995. MMS 95-0030.

Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 12 of 14. MMS. 1995. MMS 95-0034.

California Offshore Oil and Gas Energy Resources (COOGER), Consolidated Public Proposal. MMS. 1995. MMS 95-0059.

Available from the Royalty Management Program:
Mail Stop 3060
P.O. Box 25165
Denver, CO 80224-0165
(303) 231-3230

1994 Mineral Revenues Report on Receipts from Federal and Indian Leases. Booklet reports on 1994 activities of RMP, including collection of \$4.2 billion in bonuses, rents and royalties from Indian and federal offshore and onshore mineral leases. Includes tables and statistics relating to the generation, distribution and history of revenues obtained under this program.

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