

MMS OCEAN SCIENCE

VOLUME 2 ISSUE 2
MARCH/APRIL 2005

THE SCIENCE & TECHNOLOGY JOURNAL OF THE MINERALS MANAGEMENT SERVICE

**Titans
of the Deep –
Thunder Horse
and Atlantis**

**MMS Follows
the Mission**

**Deepwater
Operations**

**Preproduction
Inspection**

**The Role
of MMS**

**District Offices
Ensure
Production
Safety**

**Growing
Support
Industry**



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MMS OCEAN SCIENCE is published bi-monthly by the Minerals Management Service to communicate recent ocean science and technological information and issues of interest related to offshore mineral recovery, ocean stewardship, and mineral revenues.



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ABOUT THE COVER

Top:

Thunder Horse topsides being assembled in Corpus Christi.
Courtesy BP Exploration & Production.

Bottom:

(L to R): Perry Jennings, Jarvis Outlaw,
Phil McLean, Bryan Domangue, Stephen Dessauer, Jack
Schneider, and Mike O'Brien, the MMS Thunder Horse
Preproduction inspection team and their guides.

*All photos courtesy of Minerals Management Service
unless otherwise noted.*

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“MMS inspectors carefully watch each phase.”

Left: The MMS inspecting the safety devices on the departing pipeline of the new Thunder Horse semi-submersible production platform.

Below: BP’s Thunder Horse Production, Drilling and Quarters unit (PDQ) at Kiewit’s Fabrication Yard, Ingleside, Texas.



MMS FOLLOWS THE MISSION

Exciting recent developments in technology for producing oil and gas have opened new opportunities in domestic sources of oil located in the deepwater of the Gulf of Mexico (GOM). One facility that will begin production this year is Thunder Horse. This amazing facility is projected to produce over twice as much as what is normally considered a high-volume platform!

This issue of *Ocean Science* touches the different ways the Minerals Management Service (MMS) works with industry operations in the GOM from the beginning to the end of the oil and gas project cycle.

The MMS teams with oil and gas industry players right from the start to ensure that natural resources are protected, taxpayers get a fair price on the lease of U.S. lands, and the industry produces safely. The MMS also moves into a regulator mode to promote safety and environmental protection and can intervene to shut down the project.

Before an oil and gas company can explore for new oil deposits on the

FROM START TO FINISH



Atlantis floating production platform under construction in Korea. Photo courtesy of BP Exploration & Production.

Outer Continental Shelf (OCS), they must share their plans with MMS. Leases are approved through MMS and a fair price is determined. Once a company has determined the site of an oil and gas deposit and wants to begin exploration and development, they must submit several sets of plans in increasing detail so that MMS can examine them for compliance with Federal regulations and sound practices that minimize any potential harm to humans and the environment.

While a production platform is being built, MMS inspectors carefully watch

each phase. An installed production facility drawing first oil is also frequently inspected and regulated by MMS. Finally, an old facility that is no longer useful will also be regulated by MMS, whether dismantled or approved for use as an artificial reef for sea life.

The MMS keeps up with cutting edge technologies in relatively new fields, such as deep, ultra-deepwater, and shallow-water deep gas production so that workers in these fields enjoy the highest possible safety standards both for themselves and the surrounding atmosphere, ocean waters, and ocean floor.

With its diverse, talented team of scientists, engineers, and professionals, MMS is dedicated to an important mission in the GOM: stewardship of the ocean environment while securing the energy supply and the best economic value for the Nation. This issue is packed with information on how MMS works with industry to achieve this mission.

DEEPWATER OPERATIONS

The Deep Water Operations Plan (DWOP) is designed to address industry and MMS concerns by allowing an operator to know, well in advance of significant spending, that his proposed methods of dealing with situations not specifically addressed in the regulations are acceptable to MMS. The DWOP provides MMS with information specific to deepwater/subsea equipment issues to demonstrate that a deepwater project is being developed in an acceptable manner as mandated in the regulations. The MMS reviews deepwater development activities from a total system perspective, emphasizing the operational safety,



MMS inspectors examine the incoming flowline risers of the Thunder Horse semisubmersible production platform.

environmental protection, and conservation of natural resources.

There are three phases to the DWOP process: conceptual, preliminary, and final. Several MMS offices, including the

Office of Structural and Technical Support, Technical Assessment and Operations Support, the Field Operations Plans Section, Leasing and Environment office, Field Operations Pipeline Section, and the District office, review the documentation of these phases. The DWOP is reviewed for its compliance with the Code of Federal Regulations, and safety, equipment, new innovations, and environmental concerns.

One production facility going through the DWOP process is BP's Thunder Horse. Currently, the Preliminary DWOP and two amendments to it have been approved.

THUNDER HORSE PREPRODUCTION INSPECTION REVIEW AND VERIFY

The Minerals Management Service (MMS) inspects oil and gas production facilities at every stage, from planning to post-operations. A preproduction inspection of the Thunder Horse facility was recently conducted by an MMS team consisting of Facility Engineers Stephen P. Dessauer, Bryan Domangue, and Jarvis Outlaw, as well as Inspectors Perry Jennings and Phil McLean.

The normal process for the review of offshore production facility applications entails analyzing schematics of safety systems, piping systems, fire-fighting systems, electrical systems, etc., to be installed on a production facility. Once the review is completed, preproduction inspections are conducted in the field to verify physical installation of the safety systems as outlined in submitted documents.

"For the smaller facilities, the team usually just consists of a facility engineer and an inspector. For large deepwater platforms, it's normally a total of three,

but in this case we had three facility engineers and two inspectors," said Dessauer, explaining that the team for the Thunder Horse was larger than usual because the facility is so big.

The inspection of Thunder Horse lasted five days. The team inspected the control room in the Production, Drilling, and Quarters (PDQ) and made sure all the required safety devices were present. They also checked the living quarters for smoke detectors, gas detectors, and other safety devices.

Production equipment was also inspected during the visit. Some of the components the team inspected are:

- Incoming and departing pipelines and their safety devices
- Separators
- Glycol contactor
- Fuel gas system
- Recovered oil system
- Sump system
- Chemical and water injection system
- Emergency shut-down stations



The MMS inspectors and a guide on the heliport of the Thunder Horse platform in Ingleside, Texas. In the background is the derrick.

The operator of an oil and gas facility benefits from the preproduction inspection process. "The good part is that, if changes need to be made, it's easier and cheaper to make them onshore than offshore. Also, it's good to do the preproduction inspection in the shipyard, because the people who designed the equipment are usually onsite to answer any equipment-related questions," states Dessauer.

The MMS inspectors work with operators to protect the workers on the offshore facilities and the environment that surrounds them.

THE ROLE OF MMS

As with all production projects in the Gulf of Mexico (GOM), BP Exploration & Production, Inc.'s (BP) Thunder Horse project began with exploration. Before it drilled the first well, BP submitted an Exploration Plan (EP) to the Minerals Management Service (MMS). The first EP for Mississippi Canyon Blocks 776, 777, and 778 was approved in 1998. A separate EP for Block 822 was approved in 1999. The EP's were revised and eventually 12 more exploratory wells were approved by MMS.

The purpose of an EP is to help MMS, in accordance with the Outer Continental Shelf Lands Act, to determine if any proposed activities will cause harm to life, national security, property, other mineral deposits (leased or not), or the coastal, marine, or human environment. In addition, MMS reviews EP's to check for compliance with Federal laws and regulations (such as the Clean Air Act, Endangered Species Act, Coastal Zone Management Act, and the National Environmental Policy Act). Finally, MMS ensures that the



exploration will not unreasonably interfere with other uses of the area (such as fishing) or other oil and gas operations, create hazardous or unsafe conditions, create pollution, or disturb any site, object, or structure of historical or archaeological importance.

The Thunder Horse Development Operations Coordination Document (DOCD) to develop the reservoirs discovered during exploration was filed in October 2002 and approved by MMS in March 2003. This approval included installation of the platform, 10 development wells, and 17 remote and

An MMS inspector examines a console in the control room of the Thunder Horse platform. subsea wells. Conservation, safety, and environmental reviews are in each DOCD. In addition to the regular safety, conservation, and environmental reviews given to every plan, MMS prepared a comprehensive Environmental Assessment of the activities proposed in this DOCD, because it was the first production facility in the area. This included an assessment of the environmental impacts of not only this project but also future similar projects.

Exploration for oil and gas is as exciting today as it was in the early days. With MMS there every step of the way, today's oil and gas industry is operating safer than ever for all human and ocean life.

District Offices Ensure Production Safety

Safety is a critical component of oil and gas production, especially in offshore facilities. The Minerals Management Service's (MMS) District Office with jurisdiction in a particular platform's location is in charge of reviewing and approving production safety systems. Some of the documents reviewed in this process include Facility Mechanical Flow Diagrams, Safety Flow Diagrams, Facility Electrical Classification Diagrams, Safety Analysis and Function Evaluation (SAFE) Charts, and Facility Safety Equipment Location Diagrams. There are several Federal regulations and standards these documents must comply with, and the District Office reviews all of these documents to ensure compliance.

A sampling of the various Federal regulations and industry standards reviewed against these documents by the District Office include

Title 30 CFR 250 Subpart H	API RP 14C	API RP 14G
Title 33 CFR Subpart I	API RP 14F	API RP 500
Title 33 CFR Subpart N	API RP 14FZ	API RP 505

The District Offices of MMS play a vital role in ensuring safe drilling, production, and living quarters by reviewing platform safety systems and sharing these findings with producers.

How are blocks named?

The name associated with a specific Block is based on a unique geological feature located within that area, such as a basin, canal, or canyon. All names are approved by the U.S. Board of Geographic Names. The MMS Mapping and Boundary Branch perform complex computations and prepare various maps and diagrams of the area in accordance with Federal regulations. The number following the individual area block name within the area is based on these computations; for example, Mississippi Canyon Area Block 776 or MC 776.



Thunder Horse facility at night. Photo courtesy of BP Exploration & Production.

THUNDER HORSE RACES TO PRODUCTION

TITANS OF THE DEEP

Ask an oil producer how much a large production facility in the Gulf of Mexico (GOM) would produce each day, and you're likely to get an answer of about 100,000 barrels of oil per day (bpd). That's an estimate for a high-producing offshore platform. However, a new facility expected to begin production this year, Thunder Horse, is about to change the definition of "large" in the oil and gas industry. This monster facility is projected to produce an incredible 250,000 bpd. By comparison, the entire state of Wyoming only produced 144,000 bpd in 2003!

In 2003, of the total GOM production, about 60 percent of oil and 30 percent of natural gas produced were from GOM deepwater. Only 10 years ago, deepwater production was relatively rare. Several major projects in the GOM have a projected combined production of 580,000 barrels of oil and 510 million

cubic feet of gas each day. One of those projects is the Thunder Horse field.

The Thunder Horse field, about 150 miles from New Orleans, is an exciting discovery for those in the oil and gas industry. Found in 1999, the field is located 6,000 feet below the ocean surface and is the largest GOM discovery so far. The field is actually two separate reservoirs: Thunder Horse North (Mississippi Canyon 775, 776, 819, and 820) and Thunder Horse South (Mississippi Canyon 777, 778, 821, and 822).

BP Exploration & Production, Inc. (BP) operates the project with

ExxonMobil Inc. as partner. Over 100 new and remarkable technological innovations are part of the project through a joint effort of BP and industry suppliers. These new solutions were developed to handle the special challenges associated with deepwater work.

This astonishing facility, the result of a successful partnership between industry and the Minerals Management Service, is an innovative project that will significantly increase our Nation's supply of domestically produced oil and gas for many years to come. Thunder Horse is truly one of the Titans of the deep.

Thunder Horse Facts

- Thunder Horse is the largest semisubmersible floating production, drilling, and quarters (PDQ) unit in the world.
- Location: Approximately 150 miles southeast of New Orleans
- Processing capability: Oil - 250,000 barrels of oil per day
Gas - 200 million cubic feet per day
- Size of main deck: 367 x 446 feet – bigger than a football field!

Record Gulf of Mexico Deepwater Production Projections

ATLANTIS – CITY ON THE RISE

Another Titan of the deep is Atlantis, one of the largest deepwater gas discoveries made to date. BP Exploration & Production, Inc. (BP) is the operator of this field along with a partner, BHP Billiton Petroleum Deepwater. This field is projected to go into production in late 2006, with a production life of approximately 15 years.

The field was discovered in 1998 and is located about 130 miles from the coastline of Louisiana in 6,500 feet of water. The projected production capacity for Atlantis is enormous: 150,000 barrels of oil per day and 180 million cubic feet of gas each day!

A new deepwater innovation solves the problem of how to get oil and gas from platforms located far from the nearest pipeline. Atlantis will be served by a new transportation system designed to carry the oil and gas to its destination. When the system's construction is

completed in 2006, it will be the largest, highest capacity, deepwater pipeline system in the world.

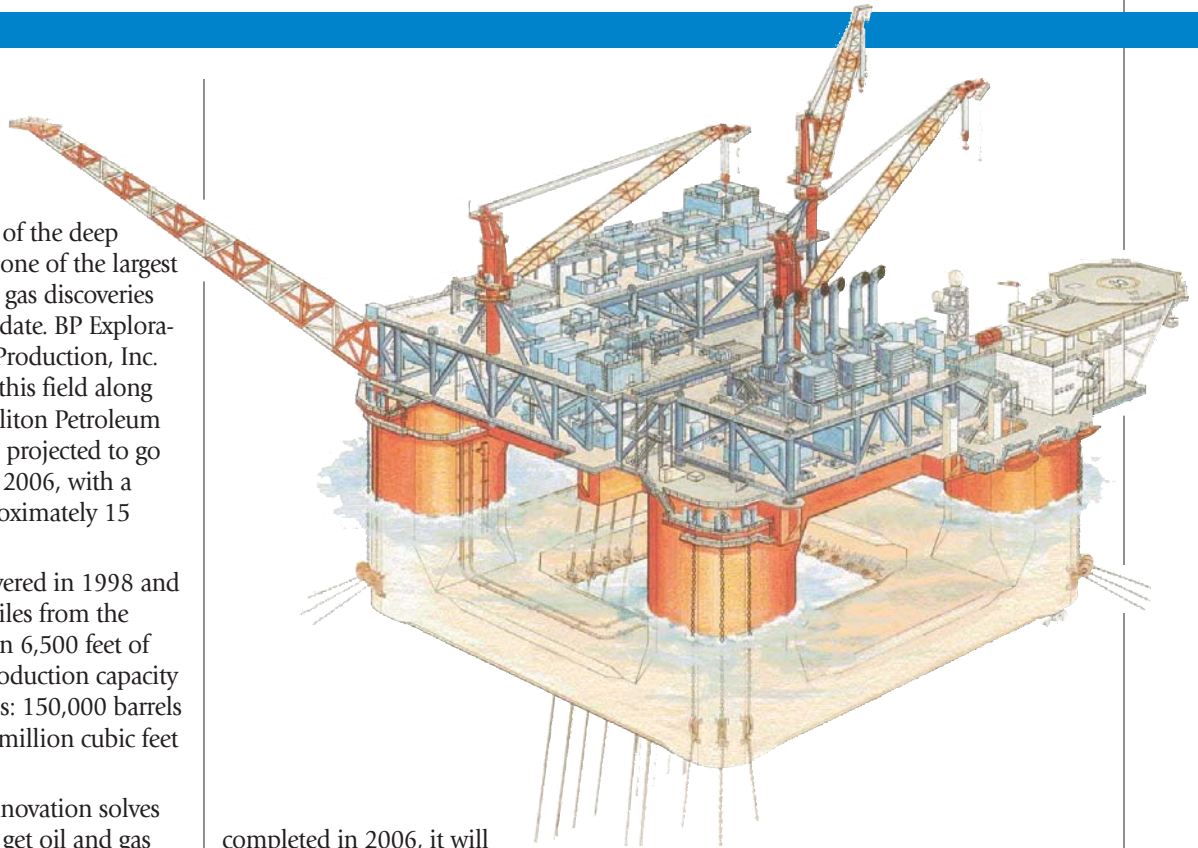
The Minerals Management Service (MMS) estimates that, by 2006, oil production from both deepwater and

shallow water in the GOM will be over 2 million barrels a day...a huge boost to the domestic energy supply of the Nation.

The MMS works with industry to make sure new facilities such as Atlantis produce abundant energy for the Nation from domestic sources while protecting the environment and making sure taxpayers get a fair price for Federal land leases.

Atlantis Facts

- Atlantis Field is about 130 miles south of New Orleans in the Gulf of Mexico.
- Operator is BP Exploration & Production, Inc. with BHP Billiton Petroleum Deepwater as partner.
- Atlantis field is located on the edge of the Sigsbee Escarpment.
- Production should begin in the third quarter of 2006 and should last about 15 years.



Atlantis floating production platform under construction in Korea. Photo and artist rendition courtesy of BP Exploration & Production.

PEOPLE, ENVIRONMENT, AND PROPERTY ENSURING THE SAFETY

Many types of industries use third-party companies to assist in achieving and maintaining compliance with existing industry standards. For example, large companies may use outside accounting firms to audit and verify compliance with accounting standards. In the oil and gas industry, outside organizations may be used to verify compliance with industry and regulatory safety standards. The Minerals Management Service's (MMS) structural safety program for offshore oil and gas production platforms uses Certified Verification Agents (CVA) for this purpose.

A CVA is an organization that is not allied with either industry or a government agency. It is a third-party organization that helps MMS and industry in determining that structures in the Gulf of Mexico (GOM) meet appropriate safety standards.

A CVA organization is nominated by the gas and oil lessee and approved by the MMS Regional Supervisor, Office of Field Operations. The operator of a GOM production project chooses an approved CVA to provide reports to MMS. The engineers conducting the review must be licensed Professional Engineers (PE). Once a project is complete and installed, the CVA's work is finished in that capacity. Other agencies, such as the U.S. Coast Guard, may use reports from the CVA. Though they may not have regular involvement once a project is complete, CVA's may also help MMS and operators in special situations such as hurricanes.

The CVA for the Atlantis and Thunder Horse projects is American Bureau of Shipping (ABS). Founded in 1862 to certify ship masters, it is now an international classification society establishing standards for the design, construction, and operational maintenance of ships and offshore facilities. Other companies also do CVA work; however, ABS, headquartered in



The Thunder Horse Project Manager for ABS, Kent Dangtran, discusses the project in a meeting.

Houston, Texas, is the most frequently used CVA for floating production projects in the GOM.

Lynnda Pekel, the ABS Project Manager for Atlantis, emphasizes that the society's primary mission is safety: "We care that things out there (in the

...to verify compliance with industry and regulatory safety standards.

GOM) are safe. We are not employees of the government or the oil company. We stay with our own mission, which is the safety of people, the environment, and property. This goes hand in hand with MMS's own mission."

The MMS requires that a CVA be named for projects that use non-traditional technology. The CVA is paid for by the company but reports to MMS. Contracted by British Petroleum, the operator of the Thunder Horse and Atlantis fields, ABS provides MMS with a status report at each step of the project. According to Kent Dangtran, the

Thunder Horse Project Manager for ABS, "There are three phases to each CVA program: design, fabrication, and installation. We get involved from the beginning. We look at the piping, the electrical system, structural stability, every facet of the design and construction. We write a CVA report at the end of each phase back to MMS, describing what we have done to verify structural adequacy and conformance with the relevant standard, and we recommend MMS accept, reject, or accept (that phase of the project) with noted conditions."

Dangtran said that some phases, such as the design and fabrication phases, may overlap.

"We bring an international team approach to the project to avoid duplication and smooth the overall development," said Dangtran. Each engineering design verification team reviews the calculations and drawings in a specific area, such as the topsides structure. Once the design has been approved, fabrication of the hull and topsides takes place in shipyards. Both Thunder Horse and Atlantis are international projects, as their hulls were/are being fabricated in Korea, with topsides constructed in Morgan City, Louisiana, and final assembly in Corpus Christi, Texas. Pekel noted that ABS has three separate teams of surveyors reviewing work at the three different sites during the fabrication phase, but overall coordination is maintained by the Project Manager.

The hull, the topsides, and the piles (how the structure is anchored to the seafloor) are the three separate sections of the project to be reviewed. "What happens on Atlantis is that each element within the structure goes through those three phases (design, fabrication, installation). We've been working on it since 2002 and the project won't go online and start producing oil and/or gas until 2006. It's very spread out. To make sure we keep MMS informed, we file a lot of intermediate reports with the agency."

ABS will also have teams inspecting the installation of Thunder Horse and Atlantis. For Thunder Horse and Atlantis, the installation will take place in two phases, the piles and the platform itself. Dangtran said that there is typically one team for the platform and one team for the piles. Each team reports its findings to ABS, which in turn files a collated report to MMS, detailing progress and accomplishments according to the approved designs. At the end of each phase, including



Lynnda Pekel, the Project Manager for Atlantis, works in her office at ABS.

installation, the CVA reports to MMS, recommending that the agency accept, reject, or accept the project with conditions.

CVA companies work toward the same goal as MMS: to protect the environment, people, and property. The MMS is also responsible for making sure that taxpayers get a fair price for the lease of government land and ensure that the Nation is supplied with energy in a timely and safe fashion.

SECRETARY NORTON PARTICIPATES THUNDER HORSE DEDICATION

Department of the Interior (DOI) Secretary Gale Norton recently joined British Petroleum officials in dedicating the Thunder Horse platform, which will be used to tap into a huge reserve of oil and gas deep under the Gulf of Mexico (GOM).

The Thunder Horse platform is about 50 percent larger than the next largest floating semisubmersible rig in the world. It includes advanced technology that will enable it to process 250,000 barrels of oil and 200 million cubic feet of natural gas per day – enough energy to provide daily energy needs for 6.5 million American homes.

The energy used by the platform itself will be produced from natural gas from the field below. To maximize efficiency, the platform will capture waste heat through heat recovery units. This energy will then be used in the production process.

Under the President's National Energy Plan, DOI has been providing

incentives to energy companies to take the financial risk of exploring in deepwater and deep-shelf areas of the GOM. These incentives, which take the form of royalty relief, ensure taxpayers a fair return while making it worth the risk for companies to pursue hard-to-reach reserves.

The DOI expects the incentives to boost peak oil production in the GOM by 43 percent and natural gas production by 13 percent over the next decade.

"We estimate the deepwater regions of the Gulf may contain over 56 billion barrels of oil equivalent," said Minerals Management Service Director Johnnie



DOI Secretary Gale Norton participates in the dedication of Thunder Horse, the world's largest offshore oil platform.

Burton. "Huge deepwater projects like BP's Thunder Horse and others are expected to increase our Gulf production to more than 2 million barrels per day within the next two years. The Thunder Horse project is contributing not only to the Nation's energy security but also to its economy by providing thousands of jobs," she said.

GROWING SUPPORT INDUSTRY

In 1933 a prototype was created for the world's first submersible oil platform. This design, called "Giliasso" after the patent holder and inventor Louis Giliasso, was based on a concept by G.E. McBride, who was credited with envisioning the world's first submersible oil platform. The design included barges as floating vessels that carried a platform for equipment and a rig or derrick. It was to be towed to the drilling location and sunk, where it would act as a foundation for an above-water platform.

This new platform design was revolutionary and the beginning of many new exciting advances for the oil and gas industry during that period. However, the development of new ways to drill for oil also presented new challenges, such as how to house a crew on a marsh and how to store and transport the oil with no pipeline nearby.

These challenges gave rise to a support industry that still grows and changes today, right along with the oil and gas industry companies. Two interesting areas of such growth are fabrication yards and ports.



Above: Cable used for moorings.

Fabrication yards are private businesses along the coast that build components, such as jackets (the web of metal under the water on a fixed platform), platforms, and special areas such as housing for work crews who go on the platforms. As of 2001, there were over 40 fabrication yards on the Gulf.

The largest producing offshore fixed platform is Shell Offshore's Bullwinkle, at 1,615 feet tall. Compare it to the Sears Tower, the largest building in North America, at 1,450 feet. As offshore rigs get larger with the exploration of deepwater, the fabrication yards must be big enough to handle such massive structures. Two of the largest yards are J. Ray McDermott's Morgan City facility at 287 acres, and Gulf Island Fabrication at 250 acres, both located in Louisiana.

Most fabrication yards specialize in production of a particular type of platform or component, such as living quarters, decks, or modules. Only 12 yards along the Gulf coast can make platforms for over 1,000 feet of water. Almost all fabrication facilities are interdependent, as few complete entire projects in their own yard, but instead rely on outsourcing. Traditionally, yards have been located onshore with water access, but some are locating offshore to provide components nearer to the platforms they serve, becoming what might be viewed as a sort of industry version of a convenience store.

While fabrication yards enjoy success when the industry's production booms, they also feel the bust times. In an attempt to prevent the loss of skilled

Taking a Look at Right-of-Way Pipelines

Before pipelines that carry petroleum products from a rig to dry land are installed, the Minerals Management Service (MMS) evaluates the pipeline structure and infrastructure through a detailed set of permits.

Pipelines requiring that right-of-ways be granted are called right-of-way (ROW) pipelines. The ROW pipeline review process helps MMS ensure that the pipelines are compliant with MMS regulations, the Outer Continental Shelf Lands Act, and other Federal laws and regulations.

When reviewing the Thunder Horse ROW pipelines, MMS evaluated the pipelines' ability to withstand pressure; cathodic protection systems and internal and external coating systems that are meant to protect the pipeline from corrosion; safety flow schematics for safety devices on the pipelines; the routes of the pipeline; any environmental impact of pipeline activities; the applicant's qualifications, filing fees, rentals, and financial security; and modification and repair requests once the pipelines are in use.

The MMS helps the oil and gas industry by ensuring that pipelines are as safe and efficient as possible, which ultimately improves the industry's bottom line and protects the environment.



Above: Port Fourchon, Louisiana.

labor when there is no oil rig work to be done in yards, some yards are attempting to diversify their products.

Another group immediately affected by the industry's ups and downs are the Nation's ports. Because almost 44 percent of total waterborne commerce in the U.S. is attributed to petroleum and petroleum products, ports are vital to the smooth flow of these products in and out of the country. Of the two types of ports (deep-draft seaports and inland river and intracoastal waterway ports), deep-draft seaports can accommodate oceangoing vessels that serve offshore platforms.

These ports are needed not only for ships carrying petroleum products, but also for support vessels such as desk barges, drilling tenders, pipe carriers, salvage tugs, supply vessels, well stimulation vessels, and anchor-handling

tugs. Once a platform is operational, continued support, such as food, personnel, and maintenance equipment, is required from the coast.

As in the fabrication industry, the rapidly advancing technology and changing needs of the oil and gas industry are putting greater demands on the Nation's ports. First, as vessel sizes increase, so does the need for deeper channels. Second, the volume of trade moving through ports is increasing. Third, ports must consider the environmental impact of expanding their operations. Finally, funds must be found to provide capital improvements for these ports, most of which are run by local or State government.

Other ripple effects include the need for better infrastructure on land, such as better and wider highways to avoid

bottlenecks when the product is transported inland. Even public schools are affected by the influx of workers to port cities, straining the capacities of local schools. Increased commerce causes a need for increased infrastructure, balanced by a need to protect the environment from rapid expansion.

The Minerals Management Service leads the way in managing the fine balance between facilitating the growth of commerce for the Nation's economic health and protecting the environmental health of the OCS (Outer Continental Shelf). To learn more, see the MMS report *OCS-Related Infrastructure in the Gulf of Mexico Fact Book* at <http://www.gomr.mms.gov/homepg/whatsnew/techann/2004/2004-027.html>.

MMS – A Leader in Securing the Nation’s Domestic Energy Supply



Piratic flycatcher from Mexico stops to rest on an offshore platform. This is the fourth known occurrence of this bird’s migration.

NEW WAVES Late-breaking News & Information

Study Offers Insight into Migratory Birds and Platforms

Every year during the spring and fall, hundreds of millions of birds migrate across the Gulf of Mexico (GOM). These migrations have evolved despite the absence of natural islands that could serve as a stopover site on the route of migration. The installation of artificial islands in the form of oil and gas production platforms over the past five decades has provided an important aid for trans-Gulf migration.

Recently, the Minerals Management Service (MMS) funded a project to study the spring and fall migrations of these birds and the

influence of oil and gas platforms on trans-Gulf migration. Over the course of this three-year study, observers lived on 13 platforms during the spring and fall migrations. The study addressed a series of questions, including the following: Which species are migrants? Are there specific migration routes? When do migrants use platforms for stopovers and how does the timing of platform use relate to seasonal and daily timing and weather? Do migrants use platforms in predictable ways?

The study found that platforms appear to be a suitable stopover habitat for most species, and most of

the migrants that stopped over on the platforms benefited from their stay, particularly in spring. The migrants used the platforms in nonrandom ways and the structures facilitated the trans-Gulf migration by providing “steppingstones” across the Gulf of Mexico.

Read more about this study at <http://www.gomr.mms.gov/homepg/whatsnew/stories/BirdsonWing.html>. MMS 2005-009, *Interactions Between Migrating Birds and Offshore Oil and Gas Platforms in the Northern Gulf of Mexico*.

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