

STUDY TITLE: Deepwater Program: OCS-Related Infrastructure in the Gulf of Mexico

REPORT TITLE: Deepwater Program: OCS-Related Infrastructure in the Gulf of Mexico Fact Book

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SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA(S): Western, Central, and Eastern Gulf of Mexico

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PROJECT MANAGER: J. Reidenauer

AFFILIATION: The Louis Berger Group, Inc.

ADDRESS: 100 Halsted Street, East Orange, NJ 07018

PRINCIPAL INVESTIGATORS: J. Reidenauer, D. Dismukes, D. Mesyanzhinov, S. Mobley

KEY WORDS: Deepwater Program, OCS, infrastructure, platform fabrication yards, ports, shipyards, supply bases, repair and maintenance yards, waste management facilities, pipelines, pipe coating yards, natural gas processing facilities, natural gas storage facilities, refineries, petrochemical plants, Geographic Information System (GIS)

BACKGROUND: Oil and gas exploration and production have occurred in portions of the Gulf of Mexico rim states for over 100 years. Activity in coastal waters and on the Outer Continental Shelf (OCS) has occurred for the last 50 years. During this period, a network of support facilities, ports, pipelines, and processing facilities has been developed to support offshore production. In the mid-1990's, activity in the Gulf experienced a dramatic shift spurred in large part by the passage of the Deepwater Royalty Relief Act. Because of its statutory responsibilities, MMS must; (1) produce lease-sale Environmental Impact Statements (EISs) that depict existing, OCS-related infrastructure and its future growth and trends; (2) make permitting decisions that consider existing, future, and past infrastructure, and (3) guide and monitor long-range planning and development of OCS activities.

OBJECTIVES: (1) To collect pertinent data concerning existing OCS-related infrastructure in the coastal areas of the states of Texas, Louisiana, Mississippi, Alabama, and Florida; (2) to develop a database on the infrastructure in the study area;

(3) to make the collected data compliant with the MMS Technical Information Management System (TIMS), and to assist in integrating that data into MMS's GIS; (4) to describe the existing infrastructure; and (5) to analyze historical data to identify past trends and to identify possible future trends in the construction, use and retirement of OCS-related infrastructure.

DESCRIPTION: The purpose of the Fact Book is to describe the existing infrastructure in the GOM and how it supports offshore activities. The Fact Book describes the existing OCS-related infrastructure within the study area and incorporates data collected as part of the GIS database developed for the project. These data were collected in 2000 and 2001. The Fact Book also examines historical data to identify past trends and to identify future trends in the construction, use and retirement of OCS-related infrastructure.

Eleven major infrastructure categories were identified and described in this study. They include:

- **Platform Fabrication Yards:** Facilities in which platforms are constructed and assembled for transportation to offshore areas. Facilities can also be used for maintenance and storage.
- **Port Facilities:** Major maritime staging areas for movement between onshore industries and infrastructure classifications and offshore leases.
- **Shipyards and Shipbuilding Yards:** Facilities in which ships, drilling platforms, and crew boats are constructed and maintained.
- **Support and Transport Facilities:** Facilities and services that support the offshore activities. This includes repair and maintenance yards, supply bases, crew services, and heliports.
- **Waste Management Facilities:** Sites that process drilling and production wastes associated with offshore oil and gas activities.
- **Pipelines:** Infrastructure that is used to transport oil and gas from offshore facilities to onshore processing sites, and ultimately to end users.
- **Pipe Coating Yards:** Sites that condition and coat pipelines used to transport oil and gas from offshore production locations.
- **Natural Gas Processing Facilities:** Sites which process natural gas and separate its component parts for the market.
- **Natural Gas Storage Facilities:** Sites that store processed natural gas for use during peak periods.
- **Refineries:** Industrial facilities that process crude oil into numerous end-use and intermediate use products.
- **Petrochemical Facilities:** Industrial facilities that intensively use oil and natural gas, and their associated by-products, for fuel and feedstock purposes.

The chapters of the Fact Book discuss each of these critical infrastructure areas and their relationship with offshore oil and gas activities. Each chapter outlines:

- **Description and Typical Facilities:** This section examines the infrastructure in question, and provides a description of its unique features. Typical facilities, or common characteristics, are also discussed.
- **Industry Characteristics:** This section discusses the industry characteristics associated with the infrastructure under examination.
- **Regulations:** This section discusses the salient regulations associated with the infrastructure.
- **Industry Trends and Outlook:** This section examines the current trends and future outlook of infrastructure development in the Gulf.

Data sources included Federal and state agency reports and databases, trade journals, industry directories, as well as information from industry contacts. Where available, data collected and entered into the GIS database for the infrastructure types included; facility name, location (lat/long), street address, contact information, date constructed/operation date, and size/area occupied, production/capacity/throughput data.

SIGNIFICANT CONCLUSIONS: One of the challenges in preparing the Fact Book was in the categorization and presentation of information. While the 11 categories presented seem straightforward, they fail to note the important interaction between infrastructure types. For example, ports, in particular, is an infrastructure category for which separating the interactions can be almost impossible. All supplies must be transported from land-based facilities to marine vessels or helicopters to reach offshore destinations. This utilizes both water and air transportation modes. The intermodal nature of the entire operation gives ports (which traditionally have water, rail and highway access) a natural advantage as an ideal location for onshore activities and intermodal transfer points.

The interactions between infrastructure types can be highlighted more clearly if they are thought more in terms of their functions, relative to offshore activities, than their physical characteristics. There are two major functions for most all onshore infrastructure types on the GOM: (1) those areas of infrastructure that support oil and gas activities, and (2) those areas that are supported by offshore oil and gas activities. The fortunes of the infrastructure businesses are closely tied to the offshore industry. When the offshore industry experiences a downturn, so too do the supporting infrastructure businesses.

STUDY RESULTS: Ports play a vital role as the point of departure to offshore regions. Basically, two types of ports provide this supply base. Private ports operate as dedicated terminals to support the operation of an individual company. They often integrate both fabrication and offshore transport into their activities. Public ports lease space to individual business ventures and derive benefit through leases, fees charged and jobs created. These benefits spread throughout the entire area and are viewed as economic development impacts. Thus the public ports play a dual role by functioning as offshore supply points and as industrial or economic development districts.

Supply bases, as well as repair and maintenance yards, usually housed at or very near port facilities, are major staging points for moving the significant amounts of equipment and materials needed to run an offshore oil and gas operation. Shipyards, on the other hand, are important pieces of support infrastructure since many drill ships, drilling platforms, and crew boats are constructed and maintained at these facilities.

The fluctuations in the platform fabrication industry have been closely tied to the fortunes of the oil and gas industry. Drilling and production activities are sensitive to the changing prices for oil and gas. This sensitivity, in turn, is translated into “boom and bust” cycles for the fabrication industry, when a period of no work follows a period of more fabrication orders than a yard can complete. In order to shield themselves from the volatility inherent in the oil and gas industry, platform fabrication yards in the U.S. Gulf of Mexico have started to implement various diversification strategies. These diversification strategies, coupled with the new challenges brought about by the deepwater oil and gas exploration and development, are significantly changing the industry.

There is currently over 12,000 miles of offshore pipeline in the Gulf of Mexico. Almost 88 percent are off the coast of Louisiana, with Central and Western Louisiana making up the greatest proportion (71 percent). Ninety-two percent of pipe over 27 inches in diameter is found off the coast of Louisiana, the greatest amount (66 percent) from Western Louisiana. Texas accounts for 8 percent of pipe greater than 27 inches in diameter.

There are other significant pieces of onshore infrastructure that are highly dependent upon offshore oil and gas activities. These industries facilitate the processing and transportation of oil and gas resources to the market. For instance, pipe coating facilities treat the exterior and interior of pipes to protect them against corrosion and other damage. Waste management facilities process the waste associated with the production process in offshore areas. Refineries, on the other hand, take crude oil, transported to their facilities via pipeline, and process it into various petroleum products. Natural gas is typically stored in facilities along the Gulf during off-peak periods for use during peak-periods. There are three principal types of reservoirs common to underground storage of natural gas: (1) depleted reservoirs in oil and/or gas fields; (2) aquifers which are water bearing rock formations conditioned to hold natural gas; and (3) caverns hollowed out in salt “bed” or “dome” formations. After crude oil is refined and natural gas processed, the non-fuel raw materials remaining are known as petrochemicals. Petrochemical plants convert these raw materials into more than 70,000 different products.

STUDY PRODUCT(S): The Louis Berger Group, Inc. 2004. Deepwater Program: OCS-Related Infrastructure in the Gulf of Mexico: Fact Book. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2004-027. 248 pp.

GIS database of the eleven infrastructure categories.