

**STUDY TITLE:** Deepwater Program: Supply Logistics of OCS Oil and Gas Development in the Gulf of Mexico – Evaluation of Technological and Economic Parameters of Ports as Supply and Manufacturing Bases

**REPORT TITLE:** Supply Network for Deepwater Oil and Gas Development in the Gulf of Mexico: An Empirical Analysis of Demand for Port Services

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**BACKGROUND:** Ports and port-associated support facilities provide critical staging areas for OCS oil and gas related activities. This supply network has expanded greatly in size, complexity, and sophistication since the installation of the first offshore platform in 18 feet of water off the Louisiana coast in 1947. As indicated in recent MMS-funded research on Port Fourchon, LA, the expansion of the offshore industry into deepwater has imposed new challenges on the exiting logistical system. Ports must be understood as a physical infrastructure, as intermodal foci of transportation networks, and as institutions operating in the context of fluctuating industry demand, consolidation of functions, and competition for business, services, and development funds.

**OBJECTIVE(S):** The objectives of this study are to analyze the logistics of the offshore oil and gas industry's transportation support system in the Gulf of Mexico by:

1. analyzing in detail, the operations of three Louisiana ports: Port Fourchon (a service base port), Port of Iberia (a fabrication port), and Port of Morgan City (both a service base and a fabrication port) and one Texas port: Galveston (a service port);
2. defining technological procedures of a port providing services and or fabricated equipment to the offshore industry;
3. analyzing the transportation network supporting the system from inland destinations to the ports, and modes of transport offshore;
4. analyzing interrelationships among various economic sectors and the oil and gas industry based on transport volumes and activities; and,
5. delineating major supply and demand relationships relating to transportation demand and offshore output.

**DESCRIPTION:** This report presents an empirical analysis of the demand for port services generated by the deepwater oil and gas industry during its phenomenal growth during the last decade. During this period, the deepwater oil production registered a nine-fold increase while the gas production increased sixteen fold. In addition, technological developments in seismic data acquisition, large deepwater field discoveries, and the innovative production systems completely transformed the industry and the logistical support network. Although the logistical support system is a vital component of the industry, empirical studies analyzing the supply network adjustments from the perspective of port services are currently not available. Therefore, the demand analysis in this report fills a void and is intended to be useful for port planning and investment decisions.

The methodological approach followed in the analysis was determined by the nature of port activities at each port and data availability. For example, for Port Fourchon the demand for port services was estimated using time-series data from 1992 to 2001. The variable relationships between several industry variables and port services such as port tonnage, truck traffic and inland barge traffic were estimated using regression analysis. Similarly, for the Port of Morgan City specializing in shipbuilding, the demand relationships for vessel traffic on the Atchafalaya River and the industry variables were estimated.

The regression models for Port Fourchon indicated that for every additional OCS well drilled the truck traffic at the port will increase by about 673 trips a year, inland barge traffic by 7 trips, and the tonnage handled at the port by 11,400 tons. Similarly, another model predicted that for every mile of pipeline approved, truck traffic will increase by 217 trips, barge traffic by 3 trips, and port tonnage by 46,000 tons.

**SIGNIFICANT CONCLUSIONS:** Based on all the information in this report, it is evident that the ports have expanded infrastructure investment to meet the growing needs of the deepwater oil and gas industry. As the industry grew at a faster pace

than the supply of port services during the period, the ports have enjoyed higher returns resulting in better financial performance. However, as the deepwater oil and gas industry reaches a plateau, more information is needed in port investment and planning decisions. This report is an attempt to provide such information.

**STUDY RESULTS:** Using empirical estimates, demand forecasts were developed through 2010 for each variable. According to these estimates, truck traffic is expected to grow by 67 percent between 2001 and 2010, barge traffic by 25 percent and the port tonnage by 100 percent.

The regression models estimated for the Port of Morgan City indicated that for every additional OCS well rigged the number of non-self propelled vessels on the Atchafalaya will increase by about 12 trips. The traffic forecasts through 2010 indicated a 62 percent growth for the period 2001 to 2010.

With more than 60 percent of the port tenants engaged in OCS related services, the Port of Iberia experienced continuous growth in the 1990's. Since activities at the Port of Iberia are concentrated on the assembly of prefabricated structures, repair and maintenance, a quantitative database with relevant demand and supply was not available. However, analytical models developed on port financial performance and infrastructure expansion indicated increasing demand for offshore services. The OCS service activities at the Port of Galveston have emerged as an important sector with an increasing share of waterfront land devoted to offshore activities and the location of several large-scale tenant operations in recent years.

A qualitative analysis of different port variables also indicate the extent of adjustments made by the ports during the period. For example during the 1992-2001 period, port tonnage handled increased seven-fold and port operating revenues increased by 82 percent at Port Fourchon. The operating revenues at the Port of Iberia increased three-fold during 1992-2000 the period. The amount of waterfront land allotted to OCS activities at the Port of Galveston increased twenty-fold during the same period.

**STUDY PRODUCT(S):** Jayawardana, J. and A. Hochstein. 2004. Supply Network for Deepwater Oil and Gas Development in the Gulf of Mexico: An Empirical Analysis of Demand for Port Services; Final Report. Prepared by UNO National Ports and Waterways Institute. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2004-047 98 pp.