

STUDY TITLE: Post Hurricane Assessment of OCS-Related Infrastructure and Communities in the GOMR

REPORT TITLE: OCS-Related Infrastructure Fact Book: Volume I: Post-Hurricane Impact Assessment and Volume II: Communities in the Gulf of Mexico

CONTRACT NUMBER: M08AC12280 (1435-01-04-CA-32806-39641)

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Gulfwide

FISCAL YEARS OF PROJECT FUNDING: 2006, 2007, 2008, & 2009

COMPLETION DATE OF REPORT: December 2011

COSTS: FY 2006: \$68,320.65; FY 2007: \$85,350.91; FY 2008: \$69,081.61; FY 2009: \$2,083.83; **CUMULATIVE PROJECT COST:** \$224,837.00

PROJECT MANAGER: D.E. Dismukes

AFFILIATION: Louisiana State University, Center for Energy Studies

ADDRESS: Energy, Coast & Environment Bldg., Nicholson Extension, Baton Rouge, Louisiana 70803.

PRINCIPAL INVESTIGATOR: D.E. Dismukes

KEY WORDS: Gulf of Mexico; outer continental shelf; offshore structures; shipyards; port facilities; pipelines; natural gas processing; refineries; petrochemical plants; liquefied natural gas

BACKGROUND: While the origins of oil and natural gas exploration and production (E&P) date back to the turn of the 20th century along the Gulf Coast, the history of the offshore oil and gas business is commonly dated to 1947 when Kerr McGee, an Oklahoma independent oil and gas company, drilled the first well out of the sight of land in the Gulf of Mexico (GOM or Gulf). Since that time, the offshore GOM has been a vibrant area of oil and gas exploration, development, and production with an ever increasing share of this activity being devoted to exploring the new frontier areas in the deepwater depths of the region.

A significant challenge in reaching these new deepwater frontier areas, as it was at the turn of the last century, is getting labor, equipment, and supplies to remote production facilities. An equally large reciprocal challenge is getting the production from these areas (crude oil, natural gas) back onshore. Over the years, a network of support

facilities, ports, roads, pipelines, and processing stations have arisen to support offshore production.

The GOM region is an inseparable part of the North American energy value chain and the supporting infrastructure in the region is an invaluable link in connecting important fossil fuel supplies with the North American energy market. Even a moderate severance of any link, impacts and weakens the entire chain and its ability to distribute critical energy supplies to the nation.

OBJECTIVES: The purpose of this research has been to examine the wide range of energy infrastructure assets along the Gulf of Mexico (GOM) that supports, or is supported by, offshore oil and gas production. The sectors and infrastructure examined include: platform fabrication yards; shipyards and shipbuilding yards; port facilities; support and transport facilities; waste management facilities; pipelines; pipe-coating yards; liquefied natural gas (LNG) facilities; natural gas processing facilities; natural gas storage facilities; refineries; petrochemical plants; and electric power infrastructure.

A number of issues and aspects were examined for each of these sectors that includes a basic description of the industry and the types of services provided; typical industry characteristics that includes an examination of the typical types of facilities, the geographical distribution of the firms and their location along the Gulf of Mexico, and identification of typical or leading firms in those particular sectors; and regulation of the industry.

DESCRIPTION: An earlier study sponsored by the Bureau of Ocean Energy Management (BOEM) surveyed a wide range of existing onshore infrastructure supporting offshore activities. An Infrastructure Fact Book was completed in June 2004, and a good portion of the research supporting this project was conducted during the 2001-2003 time period. A number of changes have occurred in the industry since this time period necessitating an update.

SIGNIFICANT CONCLUSIONS: The conclusion of the report is that the region's energy infrastructure is an important component of the overall value chain of North American energy production, refining, transportation, and distribution. A disruption in the region's infrastructure can have dramatic implications for not only domestic, but world-wide energy markets.

STUDY RESULTS: With an increase in annual spending in the GOM and the growth of deepwater activity, the platform fabrication industry will remain strong. The companies that are capable of producing platforms for deepwater will most likely have a competitive advantage.

Some of the growth in the GOM shipbuilding market can be attributed to offshore supply vessels (OSVs). The OSV market is of particular importance to the GOM shipbuilding and repair industry. With the offshore exploration and production move to deeper waters, newer boats will be needed. The new generation of boats that is being built

includes boats that are technologically and physically advanced in comparison to older boats. The new boats are bigger and more robust: they have stronger winching power, horsepower, higher speeds and typically employ GPS controlled dynamic thrusters, allowing for greater structure-side control.

Gulf of Mexico ports vary considerably by size, specialty, and defining characteristics. In general, however, there are two major types of port facilities: 1) deep-draft seaports; and 2) inland river and intracoastal waterways port facilities.

Support and transport facilities are crucial to the oil and gas industry. They provide large parts of the management, personnel, construction and design needed for the industry to survive. As energy prices and consequent capital investment have risen, support and transport services have been in greater and greater demand. In order for the increasing work to be completed, all of the supporting companies need to be able to complete their jobs, by lining up their personnel, their materials and their processes.

There is limited information indicating that there were any constraints associated with landfills or oil and gas disposal sites along the Gulf of Mexico because of the disposal of offshore platforms. No capacity constraints have been identified for the future, and no capacity constraints have been identified as being specifically created by OCS oil and gas activities. This included pre-hurricane and post-hurricane activities.

The U.S. natural gas prices remain sufficiently strong to keep large infrastructure projects such as pipelines moving forward, particularly when coupled with expectations of continued growth in demand. Much of the increased demand of natural gas will be met by imports of LNG. As net imports of LNG increases, it will have to be brought to the end-user via pipeline.

Activity for the pipe coating industry is expected to grow. Some companies are expanding their facilities to keep up with anticipated demand.

Currently, there are four LNG import facilities located on the Atlantic and Gulf coast and one offshore terminal in the Gulf of Mexico. All four shore-based facilities have been expanded in recent years and each have a peak sendout of one Bcf per day or more.

Although the processing/treatment segment of the natural gas industry generally receives little public attention, its overall importance to the natural gas industry became readily apparent in the aftermath of hurricanes Katrina and Rita in August and September 2005. Damage caused by the hurricanes resulted in a number of shut-ins to gas processing plants. Causes of the shut-ins varied—based on either internal or external conditions.

A number of new natural gas storage facilities have been certificated by FERC over the past few years. Some are being developed to accommodate the natural gas supplies coming from LNG. Like pipelines, these storage investments represent additional dollars in local communities, and additions to supporting infrastructure.

The impacts that Hurricane Katrina had on refined product markets was perhaps one of the most watched consequences associated with the storm. Refined product markets were exceptionally strained in the peak demand summer months leading up to Katrina's landfall. A number of plans have been announced for refinery expansions and upgrades in the U.S.

In the Gulf Coast area, the petrochemical industry is heavily concentrated in coastal Texas, South Louisiana, and various counties along the Alabama, Mississippi, and Florida coast. The Houston area is one of the world's largest manufacturing centers for petrochemicals, and six of the top 10 largest ethylene production complexes in the world are found on the Gulf Coast.

According to the Department of Energy's Energy Information Administration, total electricity sales are projected to increase significantly over the next 25 years. The largest increase will be seen in the commercial sector, as service industries continue to drive growth.

STUDY PRODUCT: Dismukes, D.E. 2011. OCS-related infrastructure fact book: Volume I: Post-hurricane impact assessment and Volume II: Communities in the Gulf of Mexico. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2011-043. 381 pp and BOEM 2011-044. 171 pp.