ACCESS NUMBER: 39324

STUDY TITLE: An Assessment of the Opportunities for Alternative Uses of the Hydrocarbon Infrastructure in the Gulf of Mexico

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CONTRACT NUMBER: 1435-01-04-CA-32806-39324 (M05AC12278)

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Western, Central, & Eastern

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

COMPLETION DATE OF REPORT: July 2011

COSTS: FY 2006: $1,101.24; FY 2007: $44,308.48; FY 2008: $64,374.32; FY 2009: $75,742.96; CUMULATIVE PROJECT COST: $185,527.00

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KEY WORDS: Gulf of Mexico; offshore structures

BACKGROUND: When an operator is granted a lease to develop oil and gas resources on the Outer Continental Shelf (OCS) of the Gulf of Mexico (GOM), they are required to remove structures on the lease area within one year of the end of production on the lease. There are approximately 3,830 offshore oil and gas structures in the GOM as of July 2008. Over the next decade, the number of structures in the GOM is expected to decline by about 1,500, thus, there is a great deal of interest among both regulators and operators in finding new uses for these structures.

OBJECTIVES: Currently, most of the offshore structures that have been decommissioned are brought to shore and used for scrap with a small number being reused as oil and gas foundations. The most likely alternative applications for this infrastructure are as artificial reefs, bases for mariculture, or foundations for offshore wind farms. In this report we analyze the relative merits of each of these alternative uses based on their technological and economic feasibility.

DESCRIPTION: We first review decommissioning in general and artificial reef programs in Louisiana and Texas. We then describe the impacts of the 2005 hurricane season on the Louisiana Artificial Reef Program. We discuss the platform-based mariculture industry in general and model its economic profitability through net present value analysis. We conclude with a discussion of offshore wind power including a comparison of its development in the U.S. and Europe, an overview of its costs and benefits, a discussion of the tradeoffs associated with its regulation, and a commentary on the problems and potentials with using oil and gas infrastructure in the wind industry.

SIGNIFICANT CONCLUSIONS: Platform based mariculture, while technically feasible, is plagued by economic issues that make it unlikely to be profitable while oil and gas infrastructure is generally not suited for the offshore wind industry due to scale economies and other technical issues. It is possible that both mariculture and offshore wind could use oil and gas infrastructure in the future, and we discuss the circumstances under which this might occur. We find that only the use of platforms as artificial reefs is a realistic near term destination for existing infrastructure.

STUDY RESULTS: Removing a platform can be expensive under ideal conditions, and if the structure is toppled by a hurricane, it can be financially ruinous. If a hurricane destroyed a platform-based mariculture operation, it would not only bankrupt the mariculture operator, but after collecting the value of any assets and bonds from the mariculture company, the federal government would hold the original operator liable. This provides a disincentive to oil operators to sell structures to mariculturists.

Much of the GOM is not well suited for the use of oil and gas infrastructure in mariculture operations. This is most notable along the shallow continental shelf offshore western Louisiana and eastern Texas from Timbalier Bay to Galveston. These areas are unlikely to be suitable for offshore aquaculture due to their shallow water and susceptibility to low dissolved oxygen levels. However, there are more suitable areas to the south and west of the mouth of the Mississippi, and offshore Texas from Port O'Connor to Corpus Christi. Both of these areas have relatively strong currents, high minimum dissolved oxygen and deep water.

Even if the first offshore wind developments in the U.S. are successful and the profitability of offshore wind farms in the U.S. is increased through increased government subsidies, the different wind conditions and population densities in Europe and the U.S. will ensure that offshore wind is more common in Europe than the U.S. The fact that onshore wind resource sites are still widely available in the U.S. and that the onshore environment is inherently less costly and risky will cause offshore wind to be at best a small contributor to electricity production in the U.S. for the foreseeable future.

Decreasing commodity costs or legislation capping greenhouse gas emissions could increase the profitability of offshore wind but would not change the fact that onshore wind will be a less expensive alternative, even when transmission costs are included.

Until land use conflicts in high wind onshore sites become severe, or the technology develops so that the higher offshore winds balance the higher costs of installation, there seems to be little incentive for a large offshore wind industry in the U.S. In sum, we do not envision offshore wind producing a significant portion of the U.S. electricity production until at least 2020.

It is possible that a few of the oil and gas platforms decommissioned in the GOM could be used as either ESPs in offshore wind farms or as bases for wind turbines for intra-oil field electrical generation or for test platforms for resource evaluation. It seems unlikely that large numbers of platforms will be used for these purposes. It is possible that a developer could collect a number of similar jacketed structures and relocate them for use in an offshore wind farm, however, this has so far proven impractical. If an offshore wind industry does develop in the GOM, it seems most likely that the decommissioned oil and gas infrastructure will serve as a source of steel. In sum then, the use of oil and gas infrastructure for offshore wind farms may provide a local market for scrap steel, but it is very unlikely that large numbers of oil and gas platforms will become foundations for offshore wind turbines.

STUDY PRODUCT: Kaiser, M.J, B. Snyder, Y. Yu, and A.G. Pulsipher. 2011. An Assessment of Opportunities for Alternative Uses of Hydrocarbon Infrastructure in the Gulf of Mexico. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Regulation, and Enforcement, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2011-028. 287 pp.