

# Economic Impacts of Proposed Modification and Revocation of Jones Act Ruling Letters Related to Offshore Oil and Natural Gas Activities

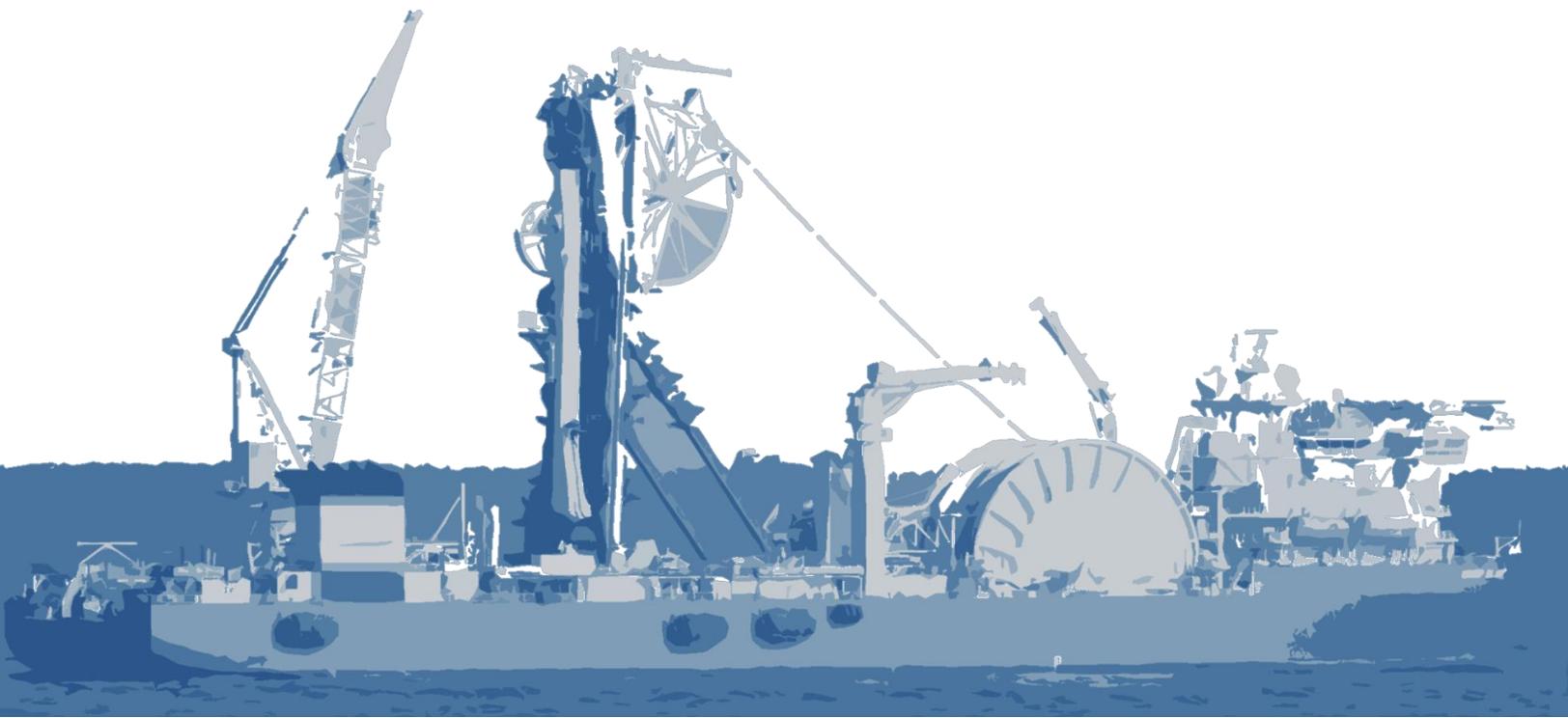
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## Executive Summary

### Introduction

The Customs and Border Protection Agency (CBP) announced proposed modifications and revocations to around 30 identified rulings, as well as additional unidentified rulings, related to the use of Jones Act (coastwise) vessels in offshore oil and natural gas activities on January 18, 2017. The modifications and revocations change long-standing rulings related to vessels transporting and using specialized equipment used in the oil and natural gas industry. The proposed modifications and revocations would likely fundamentally impact and change the development of offshore oil and natural gas projects on the U.S. Outer Continental Shelf (OCS).

Calash was commissioned by the American Petroleum Institute (API), to provide an independent evaluation of the potential impacts on offshore oil and natural gas project development and spending associated with the proposed changes. In addition, potential impacts on Gulf of Mexico oil and natural gas production, supported employment, gross domestic product, and government revenue were also projected. The conclusions set forth in this study are based solely upon government and other publicly-available data and Calash's own expertise and analysis.

Overall, given the time constraints and conservative assumptions associated with this study, it is likely that the costs and economic impacts presented represent a conservative projection of the impact of the proposed modifications and revocations. The impacts presented could be imprecise by as much as 10% or more for a variety of reasons, including government agency interpretations and enforcement decisions.

### Impact of Proposed Modifications and Revocations on Gulf of Mexico Oil and Natural Gas Development

If the proposed revocations and modifications are finalized, the study projects a potential reduction in the total amount of Gulf of Mexico oil and natural gas activity, as well as the domestic content of future projects. The proposal would likely negatively influence development, as projects that are under development or have not been installed are delayed, and project economics and risk profiles are negatively impacted. The largest impact of the proposed changes is likely to be due to the inability to use foreign flagged subsea construction, reel lay, and heavy lift vessels to develop U.S. offshore oil and natural gas projects. Depending on the interpretation of the proposed modifications and revocations, a wide variety of vessels including mobile offshore drilling rigs, shallow and deepwater crane and lay vessels and well stimulation vessels may also be affected. Additionally, while U.S. installation content may increase, some activities which previously took place in the U.S. may move to other countries, impacting U.S. employment (e.g.

reeling of pipe, manufacturing subsea hardware and umbilicals and fabricating topsides and modules).

Total cumulative spending on offshore oil and natural gas development in the Gulf of Mexico OCS is projected to be in the range of \$460 billion between 2017 and 2030 or in the range of \$33 billion per year. If the proposed changes are adopted, the study projects cumulative spending from 2017 to 2030 to be in the range of \$385 billion, an average reduction in the range of \$5.4 billion (15 percent) per year.

### **Economic Impact of Proposed Modifications and Revocations**

The study projects total employment supported from the Gulf of Mexico offshore oil and natural gas industry to rise from employment in the range of 300 thousand in 2017 to employment in the range of 520 thousand by 2030 under the base development scenario. The adoption of the proposal is projected to lead to a reduction in industry supported employment in 2017 in the range of 30 thousand jobs as projects are delayed, and a reduction in the range of 125 thousand jobs in 2030 due to reduced activity and U.S. content.

The Gulf of Mexico offshore oil and natural gas industry is expected to contribute an estimated \$25.2 billion annually to U.S. GDP in 2017, and is projected to grow to over \$42 billion by 2030. The proposed modifications and revocations, if adopted as written, are projected to lead to a reduction of GDP supported by Gulf of Mexico oil and natural gas activities of \$9 billion annually by 2030. The cumulative lost GDP burden of the proposal from 2017 to 2030 is estimated at \$91.5 billion.

Annual government revenues from Gulf of Mexico lease sales, rents, and royalties are expected to rise from about \$5.6 billion in 2017 to \$8.8 billion by 2030 under the base development scenario. Reduced oil and natural gas development projected under the proposed modifications and revocations is projected to lead to lower overall government revenues. This is primarily because of fewer production royalties being collected due to lower production volumes of an average of around 575 thousand barrels of oil equivalent per day (a 23 percent reduction). Reduced government revenues are projected to average around \$1.9 billion per year from 2017 to 2030.

Adoption of the proposed revisions and revocation of Jones Act ruling letters related to the use of non-coastwise vessels for offshore oil and natural gas activities in the U.S. OCS is projected to lead to significant delays in offshore exploration and development projects, reduced overall activity levels, and reduced U.S. content. This is further projected to lead to reduced activity and spending, which is projected to lower production, employment levels, and growth in GDP and government revenues.

## Study Limitations

This paper has been limited in scope to the assessment of the effects of the currently proposed revisions and modifications to Jones Act rulings affecting offshore oil and natural gas development activity. Any further revisions to rulings are likely to have increased limiting effects on oil and natural gas activities in the U.S. OCS. Additionally, if the currently proposed revisions are interpreted in such a way that further decreases the ability of non-coastwise vessels to operate in support of oil and natural gas activities in the OCS then the effects of these revisions would likely be larger than what is outlined in this report. This would include changes which construe incidental movement as coastwise transport, and decreased drilling efficiency and availability if mobile drilling units are required to offload either consumables (casing, mud, etc.) or vessel equipment (marine riser, etc.).

The study also excludes potential supply chain reductions due to reduced activity levels in the Gulf as projects are delayed due to the adoption of the proposed revocations and revisions, as well as potential disruptions to the supply chain if larger marine construction companies which possess in house engineering and project management consequently exit the region.

The study has also excluded the impacts of activity in the Alaskan, Pacific, Eastern Gulf and Atlantic OCS regions, which would be greater if changes to the currently proposed 2017-2022 OCS Oil and Gas Leasing Program are made. As such, exploration and production activities in these OCS areas are projected to see similar disruptions under the proposed changes. The study also excludes potential impacts of expired leases due to project delays.

Overall, given the constraints and assumptions discussed above, it is likely that the costs and economic impacts presented in this study represent a conservative projection of the impact of the proposed modifications and revocations. The impacts presented could be imprecise by as much as 10% or more for a variety of reasons, including government agency interpretations and enforcement decisions.

## Impact Summary

This study projects that the following impacts may result if the proposed modifications and revocations are implemented:

- A loss of up to 30 thousand jobs in 2017 and average decreased employment of over 80 thousand jobs from 2017 to 2030.
- Between 2017 and 2030, decreased Gulf of Mexico offshore oil and natural gas spending in the range of \$5.4 billion on average per year.

- An average reduction in oil and natural gas production in the range of 0.5 Million Barrels per day from 2017 to 2030.
- An average loss of more than \$4.3 billion of GDP from 2017 to 2030.
- An average loss of more than \$1.9 billion of government revenue per year from 2017 to 2030.

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## Section 1 – Introduction

### 1.1 Purpose of the Report

On January 18, 2017, the Customs and Border Protection Agency announced proposed modifications and revocations to around 30 identified rulings, as well as additional unidentified rulings, related to the use of Jones Act (coastwise) vessels in oil and natural gas drilling and construction activities. These previous rulings, some of which dated back forty years, clarified when and in what ways non-coastwise vessels could be used to support offshore oil and natural gas development activities. The proposed revisions would fundamentally alter the way offshore oil and natural gas activities take place in the U.S. OCS due to the specialized nature of the affected vessels.

Calash was commissioned by the American Petroleum Institute (API), to provide an independent evaluation of the potential impacts on project development and spending associated with the proposed modifications and revocations. In addition, Calash also projected potential impacts on Gulf of Mexico oil and natural gas production, supported employment, GDP, and government revenue. The conclusions set forth in this study are based solely upon government and other publicly-available data and Calash's own expertise and analysis.

### 1.2 Report Structure

In this report, Calash will first outline the study methodology including the development of data, the review of the modifications and revocations and their potential impacts on vessel types, the limitations of this study and how the two scenarios used in the report were developed. The next section will discuss the potential impact on offshore oil and natural gas development, including the impact on projects, production, and spending. The third section examines the potential economic impacts of the proposed modifications and revocations, including employment impacts, GDP impacts, and government revenue impacts. The final section concludes.

### 1.3 Excluded from This Study

This paper has been limited in scope to the assessment of the effects of the currently proposed changes to Jones Act rulings affecting offshore oil and natural gas development activity. The potential effects of the proposed modifications on MODUs has been excluded because this is likely to be highly dependent on CBP's interpretation of the proposed modifications and revocations. We do note that the domestic vessel industry has taken the position that MODUs are impacted, and any further revisions to rulings are likely to have increased adverse effects on oil and natural gas activities in the U.S. OCS. Additionally, if the currently proposed revisions are interpreted in such a way that further decreases the ability of non-coastwise vessels to operate in

support of oil and natural gas activities in the OCS then the effects of these revisions would likely be larger than what is outlined in this report.

The study also excludes potential supply chain reductions due to reduced activity levels in the Gulf as projects are delayed due to the adoption of the proposed revocations and revisions, as well as potential disruptions to the supply chain if larger marine construction companies which possess in house engineering and project management exit the region.

The study has also excluded the impacts of activity in the Alaskan, Pacific, Eastern Gulf<sup>1</sup> and Atlantic OCS regions, which would be greater if changes to the currently proposed 2017-2022 OCS Oil and Gas Leasing Program are made. It is a very likely possibility that exploration and production activities in these OCS areas would see similar disruptions under the proposed changes. The study also excludes potential impacts of expired leases due to project delays.

The study also does not attempt to calculate the effects of the proposed modifications and revocations on mid-stream or down-stream oil and natural gas entities. In addition, the calculated government revenue potential does not include personal income taxes, corporate income taxes or local property taxes.

Given the unpredictable nature of advancements in technology and innovation in the oil and natural gas industry, the scope of this paper was limited to the effects that new requirements would have on future activity with the assumption that the methods and equipment mentioned in the proposed revisions would still be in use at the end of the study period.

Overall, given the constraints and assumptions discussed above, it is likely that the costs and economic impacts presented in this study represent a conservative projection of the impact of the proposed modifications and revocations. The impacts presented could be imprecise by as much as 10% or more for a variety of reasons, including government agency interpretations and enforcement decisions.

## 1.4 About Calash

Since Calash's creation it has evolved from an oil and natural gas commercial and operational due diligence provider into an award-winning energy advisory firm providing strategy, business advisory, economic analysis, and mergers and acquisitions support services. As a function of Calash's core business, the company is engaged daily in the collection and analysis of data as it relates to the oil and natural gas industry. Calash serves the global community of operating oil and natural gas companies, their suppliers, financial firms, and many others by providing detailed analysis on projects, investments, capital investment and operational spending

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<sup>1</sup> The Economic Benefits of Increasing U.S. Access to Offshore Oil and Natural Gas Resources in the Eastern Gulf of Mexico, Quest Offshore, November 2014

undertaken by the onshore and offshore industries. Calash analyzes market data from a variety of sources at the project level for projects throughout the world.

## Section 2 – Study Methodology

### 2.1 Data Development

The authors of this report have undertaken a detailed review and analysis of proposed revisions to rulings related to the use of Jones Act (coastwise) vessels in oil and natural gas drilling and construction activities. As the effects of these revisions are open to a wide interpretation, the authors have made a good faith effort to provide a reasonable interpretation of how these revisions would likely be interpreted and enforced. This study is in no way exhaustive, especially considering the relatively short period available to develop this analysis and the high degree of uncertainty around the implementation of these revisions.

This analysis focuses on the likely operational effects of these revisions on project development activity, and considers the potential operational changes oil and natural gas operators and contractors could implement to minimize the effects of the revisions. As such, this analysis is essentially forward looking and potentially subject to significant changes based on the interpretation and enforcement of the revisions by the Customs and Border Protection Agency who is responsible for enforcement of the Jones Act.

Due to the limited time available to prepare this report, as well as the significant uncertainties about the way revisions would be implemented and interpreted if adopted, the projected costs, engineering requirements and operational burdens for all the proposed revisions are not included in this report. Additionally, the internal costs to CBP of implementing and administering the proposed revisions are not calculated in this report.

### 2.2 Requirements Review and Vessel Fleet

The Merchant Marine Act of 1920, also known as the Jones Act, is a United States federal statute that regulates maritime commerce in U.S. waters and between U.S. points. Amongst other things, the Jones Act defines cabotage requirements for U.S. waters requiring that all goods transported by water between U.S. points be carried on U.S.-flag ships, which were constructed in the United States, are owned by U.S. citizens, and are crewed by U.S. citizens and/or U.S. permanent residents. Historically, rulings by CBP held that the Jones Act did not apply to certain types of drilling, pipelay, heavy lift and other construction vessels that operate in the Gulf of Mexico and other OCS areas. Despite these rulings, the vast majority of vessels operating in support of offshore oil and natural gas activities have been coastwise vessels; CBP requires that vessels transporting persons and supplies to offshore drilling rigs and platforms, such as platform supply vessels and crewboats, be coastwise vessels.

The proposed modifications and revocations to rulings including HQ 101925, HQ 108223, HQ 108442, HQ 113838, HQ 115185, HQ 115218, HQ 115311, HQ 115522, HQ 115771, HQ

105644, HQ 110402, HQ 111889, HQ 112218, HQ 113841, HQ 114305, HQ 114435, HQ 115333, HQ 115487, HQ 115938, HQ H004242, and others as well as “Any rulings raising the subject issues which may exist but have not been specifically identified”<sup>2</sup> (along with modifying (in an unspecified manner) HQ 11892, HQ 115381, HQ 116078, HQ 32757), would likely greatly alter the way offshore oil and natural gas projects are executed in the U.S. OCS. Specifically, the modifications and revocations would fundamentally alter the definition of vessel equipment that CBP has used in its coastwise trade rulings related to offshore oil and natural gas activity in the past. The amended interpretation would allow “portable articles necessary and appropriate for the navigation, operation or maintenance of the vessel and for the comfort and safety of the persons on board” to be transported on non-coastwise vessels but would revoke previous rulings which allowed these vessels to transport equipment which was considered “in furtherance of the mission”, “fundamental to the operation of the vessel”, “used by a vessel in the course of its business”, “necessary to carry out a vessel’s functions” or similar terminology which was used across various headquarters rulings.

Previously, headquarters rulings HQ 111889 and HQ 115938 stated that articles to be installed, such as templates, marine risers, oilfield equipment and structural components, are vessel equipment, while rulings HQ 112218 and HQ 113137 stated that cement, chemicals and other materials are also vessel equipment. This allowed non-coastwise vessels to participate in drilling and construction activities in the U.S. OCS and formed the basis for offshore oil and natural gas activities in the country. The considerable uncertainty around how these proposed revocations and modifications would be interpreted further increases the potential impacts to offshore oil and natural gas activities.

The following types of vessels used in offshore oil and natural gas activities are potentially affected by the modifications and revocations proposed by CBP.

### **Mobile Offshore Drilling Units (MODU)**

Mobile offshore drilling units, include jack-up drilling units, for use in shallow water (up to around 400 feet), as well as floating rigs, including drill ships and semi-submersibles, for use in water depths ranging from 500 to 12,000 feet. Floating rigs can be either moored to the sea bed or utilize dynamic positioning systems for station keeping. Currently there are around thirty MODUs active in the Gulf of Mexico. Of the total worldwide active or warm stacked MODU fleet of around 850 vessels, only a small number of older shallower water jack-up units (the majority of which are currently cold stacked) are coastwise qualified. No floating drilling rigs capable of

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<sup>2</sup> Customs Bulletin and Decisions, Vol. 51, No. 3, January 18, 2017., Proposed Modifications and Revocation of Ruling Letters Relating to Customs Application of the Jones Act to the Transportation of Certain Merchandise and Equipment Between Coastwise Points

operating in deep water are coastwise qualified<sup>3</sup>. The proposed modifications and revocations' effect on MODUs is likely to be highly dependent on CBP's interpretation of the proposed modifications and revocations. While these vessels do not typically transport equipment from shore and are resupplied by coastwise vessels, they frequently transit from well site to well site (some of which may be less than twenty feet away from other sites) with equipment such as pipe and drilling riser. For the purposes of this study, it is assumed that this type of activity will not be affected by the proposed changes. However, the domestic vessel industry has taken the position that such activity is deemed to be coastwise trade, and thus mobile drilling units must be offloaded and reloaded with respect to drilling materials and equipment (casing, mud, marine risers, blow-out preventers, etc.). Depending on the CBP's interpretation, this potentially could add seven to fifteen days per well (if it is even operationally feasible) potentially increasing annual drilling costs in the Gulf of Mexico in the range of \$715 million on average. This increase in costs would likely make some wells uneconomic to drill and some projects uneconomic to develop.

### Crane Barges

Crane Barges are non-self-propelled barges equipped with various cranes for lifting jackets, topsides, modules or other equipment. They are used in installation, decommissioning, and other non-oil and natural gas related construction activities. These barges must be moved to location using tug boats and are moored when in operation by anchoring to the sea bed (which prevents them from operating in deepwater). The effect of the proposed modifications and revocations on the ability of non-coastwise crane barges to operate will likely be less than on dynamically positioned heavy lift vessels as they are anchored to the sea bed and restricted to shallow water work and thus less likely to move while lifting. However, in cases where movement whilst lifting is required or possible this movement could be construed as coastwise transport. There are currently 17 coastwise crane barges, compared to a global fleet of 173. However, most of these vessels are located outside of the main oil and natural gas regions and are not equipped to engage in oil and natural gas activities. The largest of these crane vessels have lifting capacities of 800 to 1,000 tons which covers most shallow water lifts, but would be incapable of lifting the largest fixed platform jackets and topsides in the Gulf of Mexico. This restriction could be circumvented by increasing the number of lifts to install or decommission heavier items which would increase operational complexity, costs and safety risks. Alternatively, in some cases this could lead to operators fabricating topsides, jackets, or modules, which require a larger crane barge, outside the U.S. to avoid the potential that movement while lifting might be construed as coastwise transport under the proposed modifications and revocations.

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<sup>3</sup> The Helix Q4000 is Coastwise qualified and classed as a mobile offshore drilling unit but is generally employed for well intervention rather than drilling.

### **Shallow Water (Derrick) Pipelay**

Shallow water pipelay vessels are typically non-self-propelled barges utilizing a tensioner and a stinger to lay pipelines in under 500 feet of water. These vessels utilize anchors and tug boats to move while pipelines are welded on the barge and fed into the water. They can lay pipeline for shallow water projects as well as shallow water sections of pipelines from deeper water projects. These vessels typically receive pipe from transportation barges and are thus unlikely to be significantly affected by the proposed modifications and revocations. Currently, there are seven coastwise vessels of this type compared to around 120 worldwide.

### **Deepwater Pipelay**

Deepwater pipelay vessels perform a similar function to shallow water pipelay vessels but typically install larger diameter pipes greater than 12 inches, although some J-lay vessels are capable of installing smaller lines (for the purposes of this study reel deepwater pipelay vessels are included in the “Reel pipe, umbilical and cable lay category”). In contrast to shallow water pipelay vessels, deepwater vessels are self-propelled and possess dynamic positioning systems for station keeping. Under the currently proposed modifications and revocations these vessels are likely to see a minimal impact (due to increased offshore transfers) as they are typically equipped for offshore pipe transfer and welding from coastwise vessels. However, if the proposed modifications and revocations were to be interpreted to mean that the transportation of pipe while laying constituted coastwise transport, the use of non-coastwise vessels (none of the 19 active deepwater vessels are coastwise) would be prohibited and the effect on deepwater projects would likely be extremely significant. The small number of these vessels globally is a function of their extreme specialization and these vessels typically transit around the world for projects due to the lack of consistent demand in any one region.

### **Dive Support / Multipurpose Support / Remotely Operated Vehicle Support Vessels (DSV/MPSV/ROV)**

This category includes a wide variety of vessels which perform light construction work across water depths using divers, remotely operated vehicles (ROV), and smaller cranes. While some vessels in this category can perform only one of these roles, many are equipped, or can be equipped, to perform a variety of work. Diving vessels may be equipped for either air or saturation diving, ROV vessels typically have work class ROVs, and the cranes on these vessels typically can lift between 100 and 400 tons. Some of these cranes are equipped with special heave compensators to install equipment in deep waters. These vessels perform installation of subsea equipment, hookup, and other miscellaneous work for offshore oil and natural gas projects and frequently move while lifting for operational and safety purposes. Currently, across this category there are thirty-one coastwise vessels out of a global fleet of around 450. There is a specific lack

of larger coastwise vessels with lifting capacity of greater than 250 tons for use in deepwater, which with the required crane radius (lifting capacities are decreased for larger radiuses) makes coastwise vessels unsuitable for subsea lifts greater than 150 tons. Additionally, there is a lack of coastwise “DP3” vessels whose station keeping ability is more resilient in case of faults. The lack of larger cranes and more resilient station keeping ability may lead to larger subsea equipment being fabricated outside the U.S. to avoid coastwise requirements as well as delays to projects due to reengineering to avoid operationally difficult or unsafe lifts. If incidental movement were to be construed as coastwise transport at a later time, further reductions in the ability of foreign flagged DSV/MSV/ROV vessels’ ability to work in the US would be expected.

### **Reel Lay Pipe and Umbilical Lay Vessels**

These vessels load steel or flexible pipelines, umbilicals or cables onto vertical or horizontal reels or carousels, transport the product to the field and then install the product onto the seafloor. Reel vessels are typically used for deepwater projects but can in some cases install shallow water pipelines and umbilicals. Typically, the maximum diameter of pipelines these vessels can install is sixteen inches, which accounts for the majority of pipelines within fields. These vessels do not possess the capability to efficiently weld many sections of pipe onboard and thus typically load pipe at a manufacturing facility or spool base (typically a long strip of land on the water with a firing line of welding stations). These vessels possess powerful tensioners to spool the product as well as to hold it in place while laying. Most of these vessels do not have the ability to load reels offshore and these vessels are thus used for smaller diameter sections of pipe, which they can install much faster and more efficiently. There is currently only one coastwise vessel in this category, out of 82 worldwide, which is a barge utilized for laying shallow water power cables. If the currently proposed modifications and revocations are implemented, non-coastwise vessels in this category would be unable to load product from U.S. spool bases or manufacturing plants and install them in fields on the U.S. OCS as this would constitute coastwise transport. As there are no coastwise vessels currently capable of performing this, all deepwater projects requiring the use of these vessels (which would include all major deepwater projects) would be unable to proceed as currently engineered, contracted and planned. This would prevent these projects from moving forward until such a time as an alternative solution could be identified. Due to the specialized nature of individual vessels it is unlikely that U.S. activity alone would support new ship building activity in this sector. Alternative solutions, such as loading pipelines, umbilicals and other products outside the U.S., may be utilized.

## Heavy Lift Construction Vessels

Heavy lift construction vessels are large, often semi-submersible, vessels that can lift as much as fifteen thousand tons. These vessels are used to install topsides and modules, install moorings in deepwater, pull in risers, install subsea equipment, and perform decommissioning work. These vessels, which are typically dynamically positioned and self-propelled, are some of the costliest and most complex vessels involved in offshore oil and natural gas construction. There are 76 of these vessels in the global fleet, none of which are coastwise vessels. One coastwise vessel, the VB10,000 which uses an unusual barge-mounted dual truss system is capable of lifting fixed topsides and jackets up to 7,500 tons but is limited by its crane hook height when lifting topsides and modules and does therefore not typically undertake traditional heavy lift work. Worldwide, the number of vessels capable of performing the largest lifts in deepwater is less than ten. Use of these vessels is required for the largest deepwater projects, for many complex tasks in addition to classical topsides lifts, such as the installation of moorings and pulling in risers from extreme water depths. The proposed modifications and revocations would likely prevent these vessels from movement while lifting U.S. built topsides or equipment and would only permit these vessels to rotate their cranes while lifting. Although it is possible that some work could be completed under these conditions, it would be impossible to predict the need for movement for safety or operational purposes while lifting, thus falling afoul of the proposed modifications and revocations. Due to the specialized nature of these vessels, their tendency to work across the world's oil and natural gas areas, their high cost, and the lack of facilities capable of constructing these vessels in the U.S., it is unlikely that Jones Act compliant vessels would be constructed. Operators and contractors therefore may utilize non-U.S. yards and fabricators to construct potentially affected equipment to avoid conflicting with these modifications and revocations. If further changes to CBP rulings were to be adopted which considered incidental movement to be coastwise transport, further reductions in the ability of foreign flagged DSV/MSV/ROV vessels' ability to work in the US would be expected.

## Other Potentially Affected Vessels

In addition to the above vessel types, many other vessels are utilized in offshore oil natural and gas operations in the U.S. OCS. While some of these vessels, such as platform supply vessels and crewboats, are unlikely to be significantly affected by the changes as they were previously required to be coastwise and there is a large U.S. fleet, the effect on other vessel types will depend on the interpretation and enforcement of the proposed modifications and revocations. Other potentially affected vessel types include well stimulation vessels (if the transport of onboard fluids between well sites is deemed to be coastwise trade), seismic vessels (if the transport of streamers and other seismic equipment is deemed to be coastwise trade), and well intervention vessels (if the transport of coiled tubing or other intervention equipment is determined to be

coastwise trade). Due to the limited information available, and the wide effects of potential rulings these vessels have been excluded from the effects of this study. However, the potential for reduced project spending and economic activity as a result of the proposed changes exists depending on the interpretation of the proposed rulings and revocations and should be considered as part of the potential effects depending on the interpretation and enforcement of the proposed modifications and revocations.

### **2.3 Limitations of the Report**

The report's authors make no representation as to the effects of proposed revocations and rulings not addressed specifically in this report and do not discount the possibility that these proposed changes could impose significantly greater engineering, operational, cost or other burdens on industry or regulators. The report's authors' estimates herein of the effects that proposed revocations and rulings will have on current and future engineering, operations, and costs are an independent good faith qualitative view arising from a reasonable review of the proposed rulings and revocations. As these rulings are subject to interpretation by Customs and Border Protection (CBP) and other regulators the effects of these changes will be highly dependent on CBP's interpretation and enforcement. Calash provides this independent view expressly disclaiming any warranty, liability, or responsibility for completeness, accuracy, use, or fitness to any person for any reason.

### **2.4 Scenario Development**

The report's scenario development focused on constructing a tiered "bottom-up" model that separates the complete life cycle of offshore operations and subsequent effects into three main categories and five sub categories. The three main categories are as follows: 1) an "Activity" model that assesses potential reserve information in the context of estimating the possible number of projects within the Gulf of Mexico OCS and the currently forecasted projects and trends in exploration and project development in the region; 2) a "Spending" model based on the requirements to develop projects within the "Activity Forecast"; and 3) an "Economic" model focused on the economic impact on employment and government revenue from the "Spending" model. These categories include leasing activity, drilling, infrastructure & project development, and production & operation.

After the creation of the baseline model utilizing the oil and natural gas price strip and production profile from the Energy Information Administration's "Annual Energy Outlook 2017"<sup>4</sup>, the potential effects of the proposed revisions and revocation were considered on the basis of both potentially affected vessel types as well as potentially affected offshore oil and natural gas

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<sup>4</sup> Annual Energy Outlook 2017, Energy Information Administration

activities. Potential effects that were unclear or considered unlikely given a reasonable reading of the proposed changes were excluded from the study. The following potential effects were deemed most likely to impact U.S. OCS oil and natural gas activities based on direct impacts from affected vessels types. (Table 1)

**Table 1: Projected Direct Vessel Impacts from Proposed Modifications and Revocations**

Vessel Type	Potential Impact of Proposed Modifications and Revocations	Potential Effect
Crane Barges	Coastwise vessels available for lifts up to 1,000 tons only.	Largest projects (greater than 1,000 tons) delayed, postponed or cancelled due to lack of available vessels, increased engineering and operational complexity. Potential safe lifting issues. Fabrication of large topsides moved outside of US.
DSV/MPSV/ROV	Lack of available coastwise vessels to complete construction work especially lifting of larger equipment in deepwater.	Project currently underway but not installed delayed, postponed or cancelled. Increased engineering and operational complexity. Potential safe lifting issues. Fabrication of equipment moved outside of US.
Reel Lay Pipe and Umbilical Lay Vessels	Reel vessels unable to load pipe, umbilicals, or other product at US spool bases or manufacturing facilities.	Deepwater projects currently underway but not installed delayed, postponed or cancelled. Fabrication, manufacturing, welding and loading of reeled products moved outside of the US.
Heavy Lift Construction Vessels	Heavy lift construction vessels unable to move while lifting US built topsides, modules, moorings and other equipment.	Due to operational and safety issues larger projects delayed, postponed and cancelled. Fabrication of platform topsides, modules, moorings and other subsea equipment moved outside of the US.

Source: Calash

In addition to the potential direct impacts based on the above vessel types, further impacts due to the proposed modifications and revocations are likely due to the increased operational complexity of projects, planning, engineering and procurement issues, as well as due to operators' strategies for developing projects under the proposed changes. (Table 2)

**Table 2: Other Projected Impacts from Proposed Modifications and Revocations**

Cause of Impact	Potential Impact of Proposed Modifications and Revocations	Potential Effect
Engineering, Operational and Safety Impact	The proposed revisions and revocations would likely lead to increase engineering and operational complexity as well as potentially unsafe operations if work was performed by a less robust vessel with a smaller safety factor.	Operators may delay, postpone, or cancel projects where increased costs effect project economics or engineering, operational, or safety concerns increase risks.
Engineering Procurement and Planning Issues	Currently underway projects are delayed or postponed due to the need to plan, engineer, and contract these projects due to the proposed revocations and revision.	Delay of current projects will delay later projects out due to limited operator engineering, project management, and procurement resources.
Increased costs and complexity of projects affect project feasibility and economics	Potential project may fail to meet IRR thresholds compared to competing projects (Both US and International) and inability to meet operator safety/risk thresholds.	Larger and more complex projects may be permanently cancelled reducing overall project activity
Potential increased costs and complexity of projects affect offshore exploration activity	Potential exploration targets may fail to meet IRR thresholds compared to competing exploration targets (Both US and International) and inability to meet operator safety/risk thresholds.	Reduced explorations, discoveries, and project development activity
Fabrication and manufacturing moved outside of the US	To avoid coastwise equipment transport regulations operators and contractors may relocate spool bases, umbilical manufacturing, fabrication and other facilities outside the US.	Reduced domestic US content, spending and employment.
Increased US shipbuilding and local installation content	Vessel owners may order and deploy additional US construction vessels where demand is consistent enough to justify these orders (likely MSV/DSV/ROV vessels)	Increased US shipbuilding and increased US installation spending and employment after vessels are constructed.

Source: Calash

After the potential impacts of the proposed changes and revocations as discussed in the above tables were considered, the effects on near term projects were considered. Upcoming near term projects were classified based on if the major installation activity had been completed, and if, not how, this activity may be affected. For projects not yet installed, depending on the size and complexity of the project an appropriate delay (generally one to three years) was applied to the projects' timing. For projects not yet sanctioned, potential delays were calculated along with an estimation of the likelihood that the project could be postponed or cancelled. For exploration activity as well as potential projects from new discoveries, a general factor based on potential complexity was applied to account for projected reductions in activity due to increased complexity, costs and risk. The potential delays and reductions in activity were applied to the base scenario forecast resulting in the creation of the "Proposed Modifications and Revocations Scenario" which attempts to provide a reasonable projection of oil and natural gas exploration and development activity in the Gulf of Mexico OCS if the proposed modifications and revocations were adopted as currently proposed. After the development of this scenario, the scenario's potential implications for oil and natural gas production, employment, GDP, and government revenues were then calculated.

## Section 3 – Impact on Development

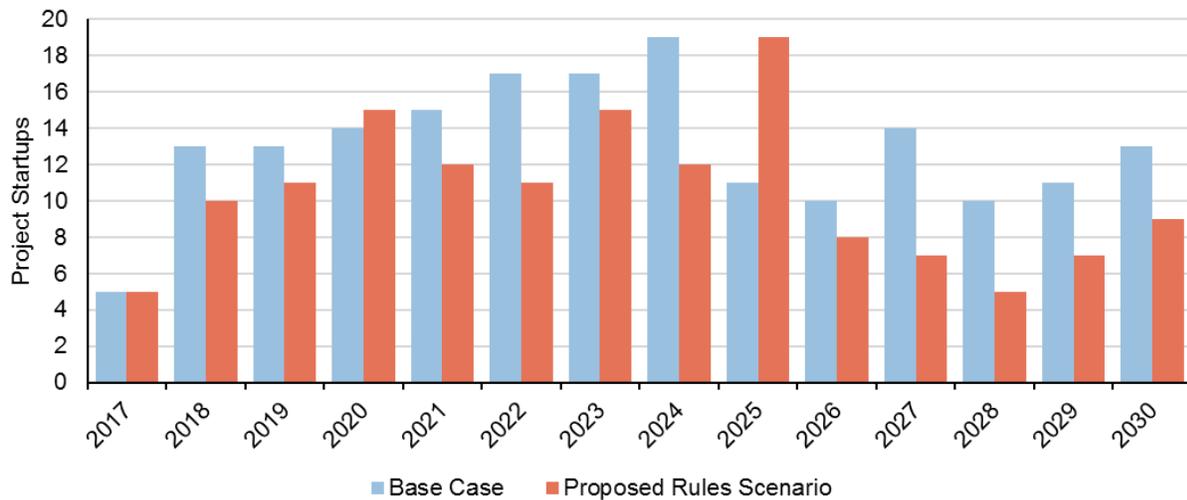
Natural gas and crude oil exploration and production activities in the U.S. OCS provide large contributions to employment, gross domestic product and state and federal government revenues. To quantify the effects of the proposed Jones Act modifications and revocations, the study forecasted activity levels for Gulf of Mexico OCS oil and natural gas activity with and without the proposed changes. The forecasted activity levels include the number of wells drilled, projects executed, total production, and spending. These activity forecasts drive the spending projections from which GDP, employment and government revenue effects are estimated.

### 3.1 Projects Executed

The development of an offshore oil and natural gas project is a complex process that requires a significant amount of time, planning and high levels of capital investment. Changes to project planning, engineering and contracting strategies typically lead to project delays as well as project cancellations due to changes in project economics and risk profiles. Project executions and their respective timelines are the best indicator of overall market health, as they can be viewed as representative of total trends in production, employment and revenue for the market.

Over the forecasted period of this study (2017-2030), the proposed modifications and revocations are projected to lead to a decline in the number of projects coming online in the range of twenty percent. A decrease in the number of projects coming online is projected as soon as 2018, and apart from one year (2025 as previously delayed projects begin production) this effect is projected to persist throughout the forecast period. (Figure 1)

**Figure 1: Projected Gulf of Mexico OCS Project Startups 2017-2030 Base Case and Proposed Modifications and Revocations Scenario**



Source: Calash

It should be noted that overall project numbers in both scenarios in the latter part of the forecast are lower than in the earlier part of the forecast due to a projected shift towards larger deepwater projects in the Gulf of Mexico. Larger deepwater projects are typically more complex and require more wells and a longer development period, in addition to requiring increased material resources and larger equipment such as platforms, production trees and pipelines. Smaller projects, on the other hand, often rely on larger projects for certain types of infrastructure such as pipelines or processing facilities. This leads to the spending, production and other effects on a per project basis to be highly variable.

### 3.2 Production

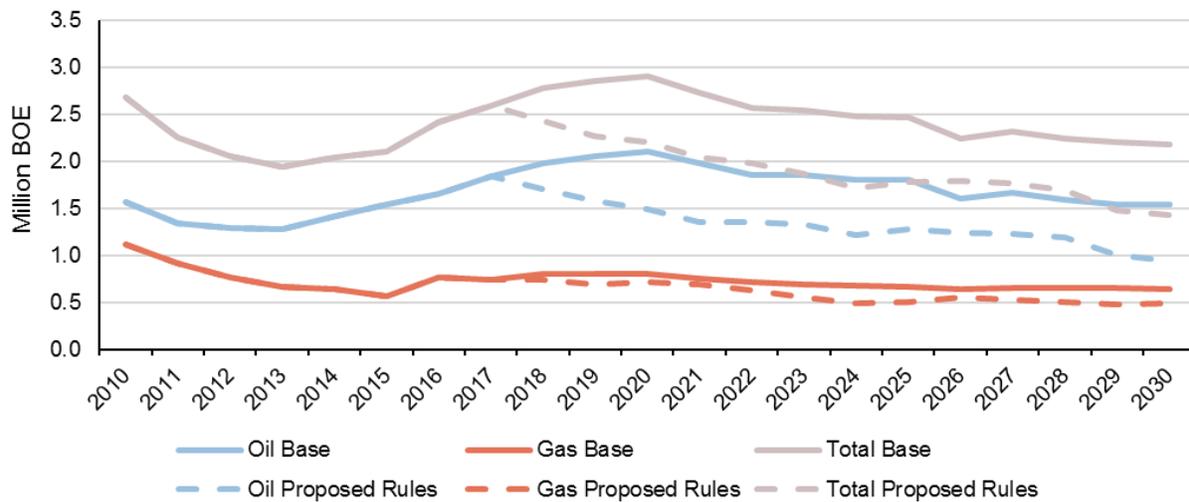
The number of projects developed, coupled with reservoir size, productivity and decline rates determines oil and natural gas production levels. Most oil and natural gas reservoirs contain a combination of oil, natural gas, water, and other substances. In order to forecast aggregate production, each project or potential project was modeled based on production curves for similar developments and reservoirs. The base case production curve for this report was modeled to be relatively in line with the projected offshore production forecast from the Energy Information Administration's "Annual Energy Outlook 2017".<sup>5</sup>

This study projects production in the Gulf of Mexico in the range of 2.6 million barrels of oil equivalent (BOE) per day in 2017, with production peaking in the range of 2.9 million BOE per day in 2020 in the base case before slowly declining throughout the forecast period.

<sup>5</sup> Annual Energy Outlook 2017, Energy Information Administration

Approximately 72 percent of production in 2020 is projected to be oil (2.1 million BOE per day), and approximately 28 percent of the production is projected to be natural gas (.8 million BOE per day). Under the proposed modifications and revocations, reductions in Gulf of Mexico production are projected to be in the range of 23 percent over the forecast period. (Figure 2)

**Figure 2: Projected Gulf of Mexico Oil and Natural Gas Production Base and Proposed Modifications and Revocations Scenarios**



Source: EIA, Calash

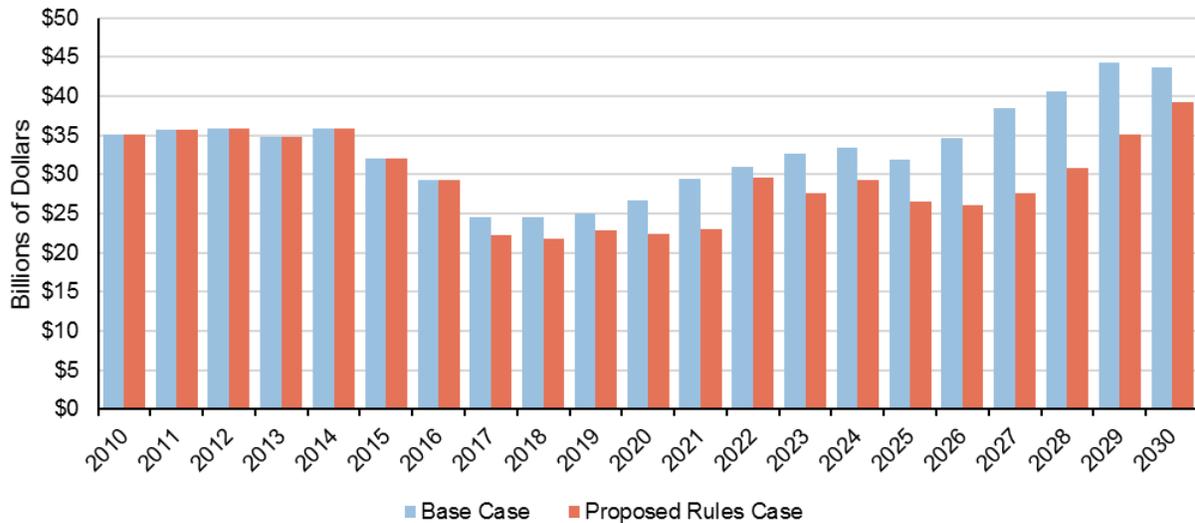
### 3.3 Spending

Offshore oil and natural gas exploration and development is a capital-intensive process. Offshore projects require exploratory seismic surveys, drilling, production equipment, engineering, and operational expenditures to maintain production. In the base case, cumulative spending from offshore oil and natural gas development from 2017 to 2030 is projected to be in the range of \$460 billion, compared to projected spending in the range of \$385 billion in the proposed modifications and revocations case. This represents a decline across the period of 17 percent, or projected spending in the range of \$27.5 billion per year compared to projected spending in the range of \$33 billion a year in the base case.

For the purposes of this report, spending is divided into seven main categories: Drilling, Engineering, G&G, Installation, OPEX, Platforms, and Subsea Umbilicals, Risers and Flowlines (SURF). Each category encompasses a major type of exploration and production activity and has a significant influence on overall spending. Both development scenarios estimate total spending amounts that rise slightly through the end of the decade, decline briefly, then recover due to normal project development cycles. Under the base case, spending on offshore oil and natural

gas is projected to stay relatively flat through 2019 before beginning to recover relatively strongly throughout the forecast period with some fluctuations due to normal project cycles. (Figure 3)

**Figure 3: Projected Total Offshore Oil and Natural Gas Spending Base and Proposed Modifications and Revocations Cases**



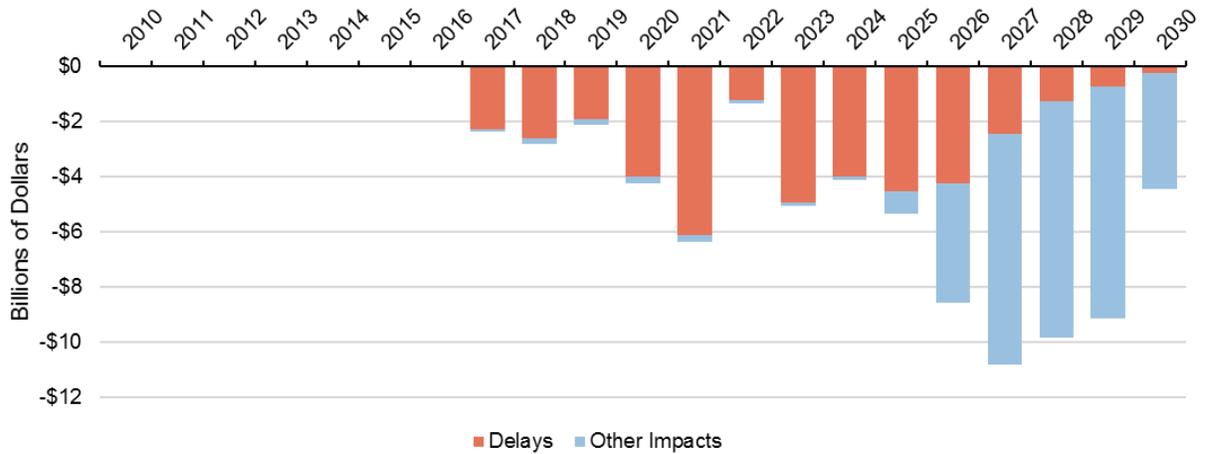
Source: Calash

In contrast, in the proposed modifications and revocations case spending is projected to drop below the base case this year (2017) as projects currently under development but not installed are delayed. Spending is projected to stay relatively flat through 2021 before beginning to recover. Spending is projected to remain below the base case spending levels throughout the forecast period, with spending trending towards the base case levels towards the end of the forecast as operators and contractors adapt to the changed operating environment resulting from the proposed modifications and revocations.

### 3.4 Lost Spending Analysis

Reduced spending because of the proposed modifications and revocations is projected due to project delays, as well as to reduced drilling and project activity due to failure to meet IRR thresholds compared to competing projects and exploration targets. Additionally, projects are projected to be delayed or canceled due to an inability of projects to meet operator safety/risk thresholds. According to this analysis 47 percent of lost spending across the forecast period is projected to be due to project delays, while 53 percent of lost spending is projected to be due to projects not executed or exploration wells not drilled. (Figure 4)

**Figure 4: Lost Spending Analysis – Projected Reduced Spending by Cause**



Source: Calash

Delays account for the vast majority of reduced spending in the early years of the forecast period. In 2026 they account for roughly half of reduced spending. After 2026, spending reduction due to project economics and risk profiles accounts for most reduced spending.

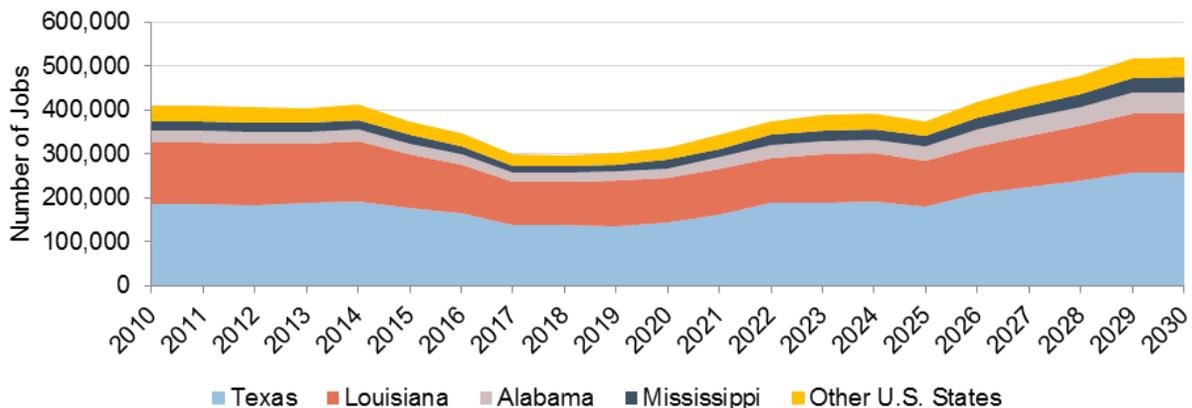
## Section 4 – Macro-Economic Impact Conclusions

### 4.1 Employment

The offshore oil and natural gas industry has a long history of significant employment in the United States, particularly in the Gulf Coast states. Continued investment in offshore infrastructure led to a large U.S. based supply chain that has provided high wages to large numbers of workers. Despite the major downturn in the global oil and natural gas industry, Calash estimates that the offshore oil and natural gas industry is likely to support nearly 300 thousand U.S. jobs in 2017 in the base case (including indirect and induced employment)<sup>6</sup>.

As the industry begins to recover, employment is projected to grow throughout the forecast, reaching total supported employment in the range of 520 thousand jobs in 2030 in the base case. In 2020, employment due to offshore oil and natural gas related activities is projected to be in the range of 260 thousand if the proposed modifications and revocations are adopted, compared to employment in the range of 310 thousand in the base case. (Figure 5)

**Figure 5: Projected Employment by State - Base Scenario**



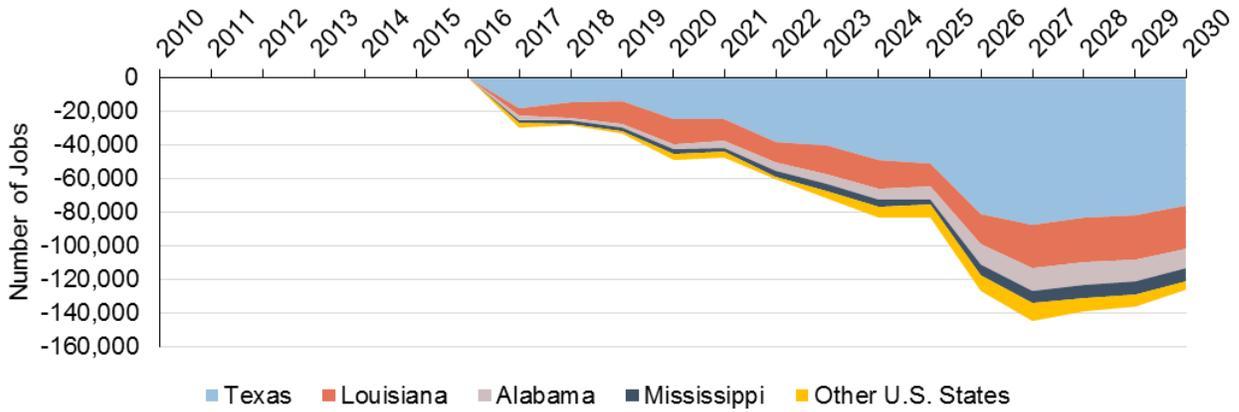
Source: Calash

In contrast, if the proposed modifications and revocations are adopted, average employment in 2017 is projected to drop to below 270 thousand jobs as projects are delayed and canceled due to the inability to execute them as they were planned, engineered and procured. By the end of the forecast period in 2030, employment due to offshore oil and natural gas activities is projected to be in the range of 390 thousand jobs due to reduced spending and the movement of spool bases, manufacturing of umbilicals and equipment and fabrication of some topsides

<sup>6</sup> Indirect jobs are those related to the oil and natural gas supply chain. Induced jobs are created from more income that is spent throughout the economy.

outside of the U.S. This decrease is net of increased employment in U.S. installation spending due to increased U.S. installation content. (Figure 6)

**Figure 6: Projected Jobs by State – Proposed Modifications and Revocations Scenario**

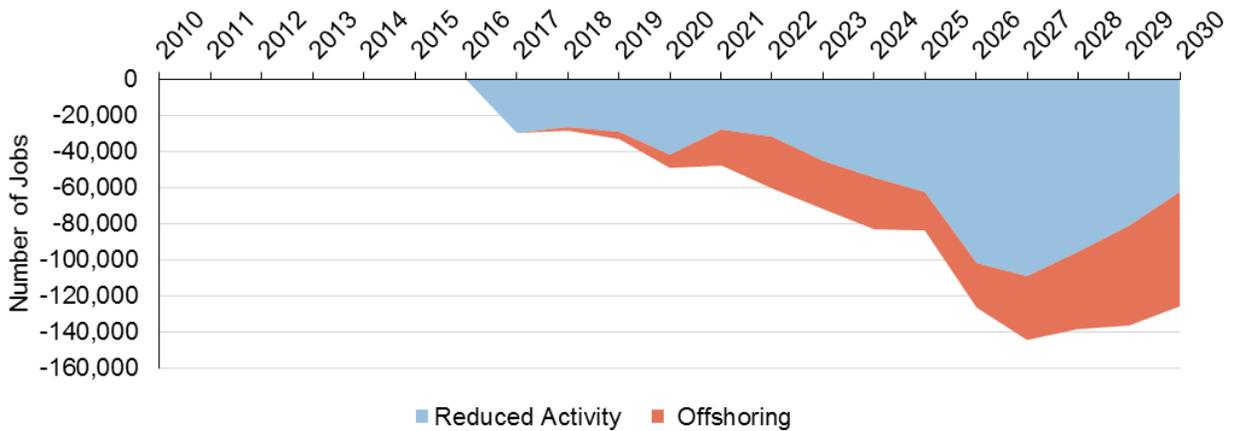


Source: Calash

## 4.2 Employment Impact Analysis

Decreased employment in the proposed modifications and revocations case is due both to decreased overall spending and activity levels as well as decreased U.S. content as certain activities, such as the reeling and welding of pipelines, manufacturing of umbilicals and fabrication of certain topsides and subsea equipment is moved to other countries. Although the exact strategies operators and contractors may employ to develop U.S. OCS projects if the proposed modifications and revocations are adopted will depend on a variety of factors, offshoring certain activities to countries such as Mexico (due to its proximity to U.S. Gulf of Mexico oil and natural gas activity), South Korea (due to its highly developed platform fabrication industry), or Brazil (due to its large capacity for manufacturing umbilicals and other subsea equipment) to enable projects to be economically developed may reduce overall U.S. content in U.S. OCS projects. This study projects that lost employment would average in the range of 82 thousand jobs over the forecast period, of which 69 percent on average is projected to be due to reduced spending (net of increased U.S. shipbuilding spending), while 31 percent on average is projected to be due to reduced U.S. content (net of increased U.S. installation content). (Figure 7)

**Figure 7: Lost Employment Analysis – Projected Reduced Employment by Cause**



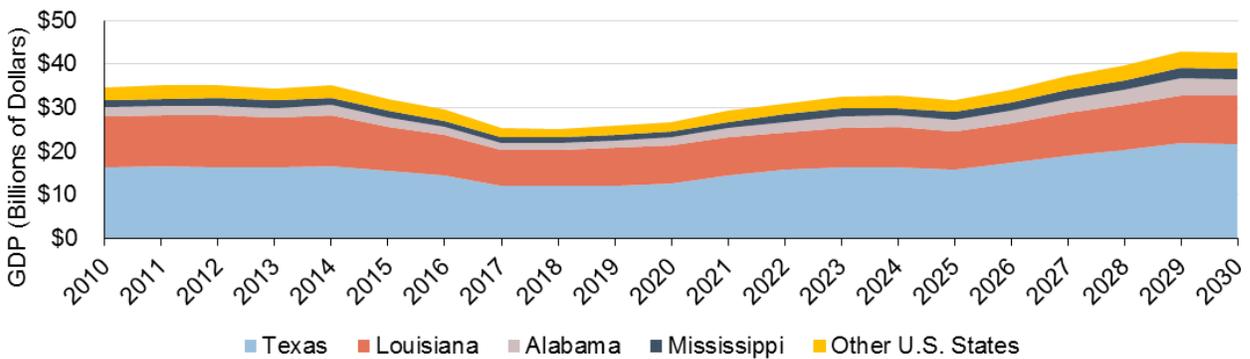
Source: Calash

### 4.3 GDP (Gross Domestic Product)

Potential gross domestic product (GDP) effects were calculated as a multiplier on spending within the U.S., further utilizing the BEA’s RIM II model. The estimated effects of proposed modifications and revocations are therefore likely to be strongly correlated to any shifts within spending, with international spending excluded, and mirror the shifts of employment.

The GDP impact of the Gulf of Mexico offshore oil and natural gas industry in the U.S. in the base case in 2017 is projected to be around \$25 billion, and is projected to continue to grow to around \$42.5 billion by 2030. (Figure 8)

**Figure 8: Projected GDP by State - Base Scenario**

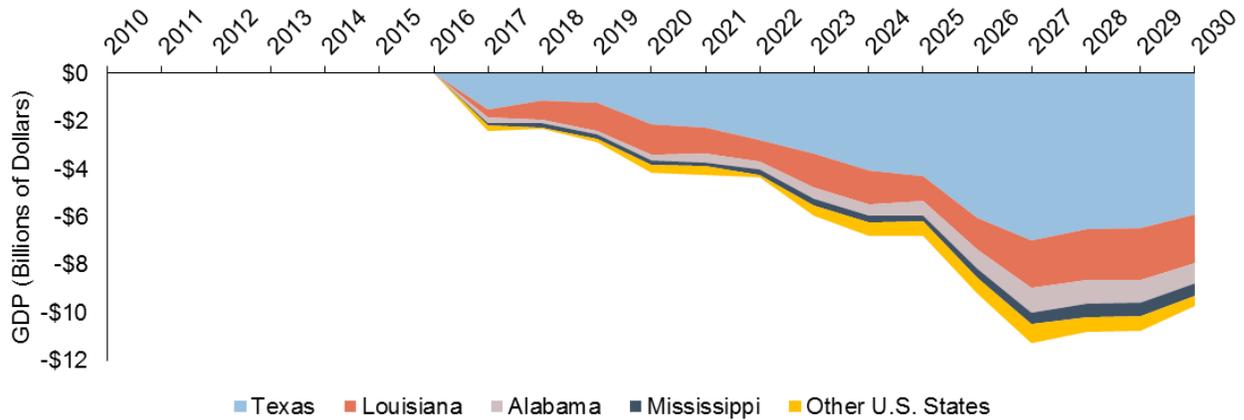


Source: Calash

The proposed modifications and revocations, if adopted as written, are projected to lower the GDP impact from Gulf of Mexico oil and natural gas activities by nearly \$2.4 billion in 2017,

and around \$7.7 billion in 2030. Cumulative lost GDP from 2017 to 2030 is projected to be around \$90 billion. (Figure 9)

**Figure 9: Projected Lost GDP by State – Proposed Modifications and Revocations Scenario**

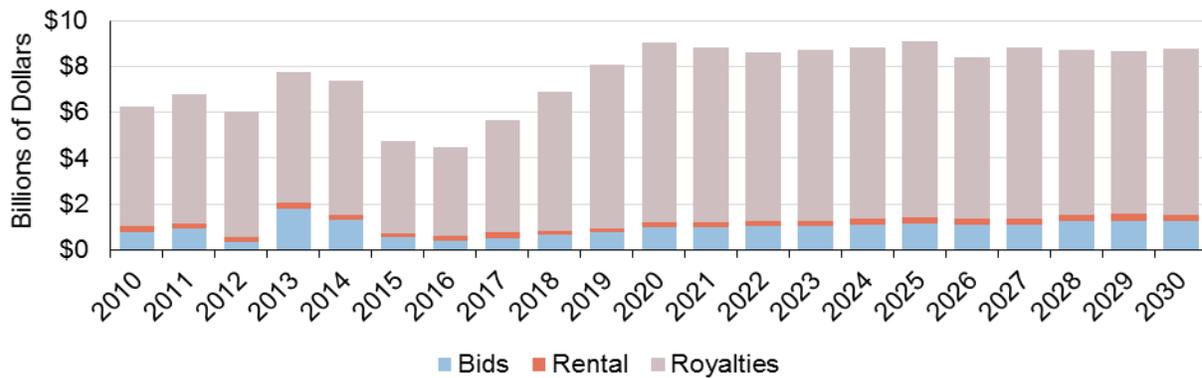


Source: Calash

#### 4.4 Government Revenues

Government revenues due to Gulf of Mexico offshore oil and natural gas operations are currently collected through three main revenue streams: revenue from lease sales, lease rental rates, and production royalties. The distribution of these revenue streams is heavily skewed towards production royalties, which account for around 80 percent of revenues from offshore oil and natural gas activities. Total government revenues from Gulf of Mexico offshore oil and natural gas royalties have been between \$4.5 and \$7.5 billion in recent years, lease sale revenues have been between \$300 million and \$1.5 billion, lease rental revenues have been approximately \$200 million per year, and production revenues have provided around \$4 to \$5 billion per year. (Figure 10)

**Figure 10: Projected Governmental Revenues – Base Development Scenario**

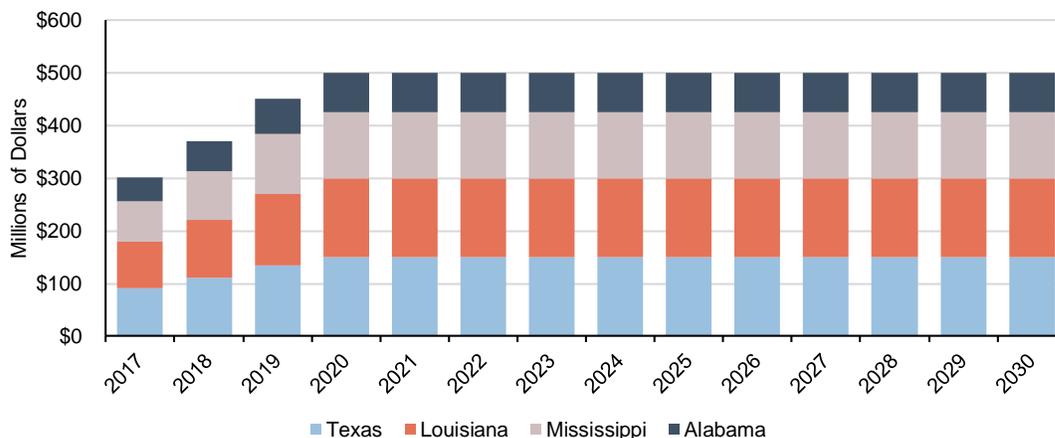


Source: Calash

Under the proposed modifications and revocations scenario, projected government revenues are projected to be around 23 percent lower, at \$6.4 billion per year on average compared to \$8.4 billion on average in the base case. Over the forecast period of 2017 to 2030, cumulative government revenues are projected to be around \$90 billion in the proposed modifications and revocations scenario, compared to around \$117 billion in the base case scenario.

State and Federal governments share in the revenue from Gulf of Mexico oil and natural gas development. Under the Gulf of Mexico Energy Security Act of 2006 (GOMESA) and implementing regulations, Gulf of Mexico offshore revenues are split between state and federal governments. The second phase of GOMESA will take effect in 2017, which includes a split of approximately 62.5% to 37.5% between state and federal governments with revenue capping provisions at \$500 million for states. In the base scenario, combined state revenues are projected to reach this cap by 2020. (Figure 11)

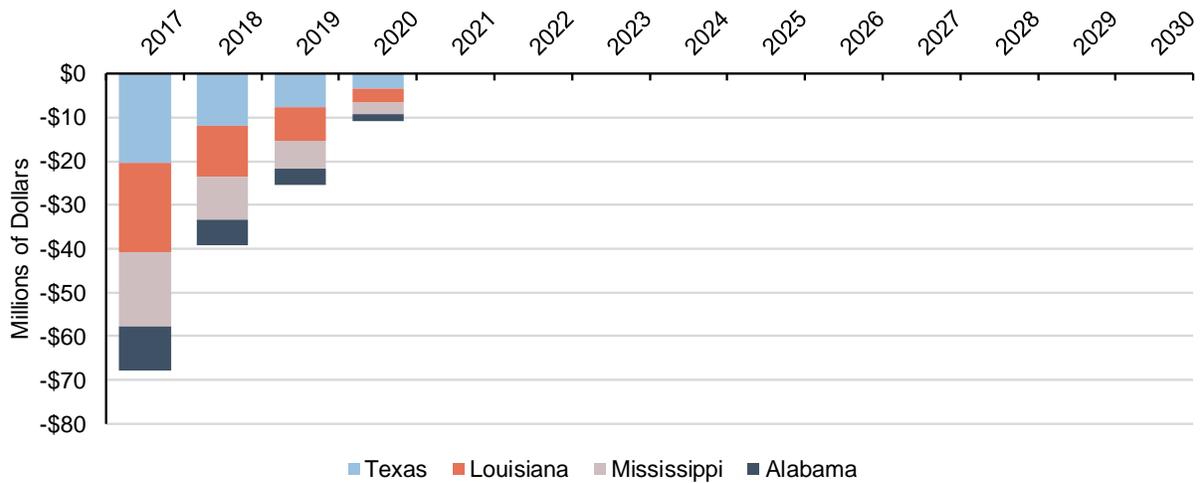
**Figure 11: Projected State Revenues – Base Development Scenario**



Source: Calash

In the proposed modifications and revocation scenario, state revenues are projected to reach the \$500 million cap in 2021, with cumulative lost revenue to states of over \$140 million. Under the proposed modifications and revocations scenario, both Texas and Louisiana are projected to lose a total of around \$43 million in total revenue while Mississippi is projected to lose nearly \$36 million in total revenue and Alabama is projected to lose around \$21 million in total revenue.

**Figure 12: Projected Lost Revenue by State – Proposed Modifications and Revocations Scenario**



Source: Calash

After 2021, state revenues are projected to be \$500 million per year in both scenarios due to revenue caps, however any changes to revenue sharing legislation which increases the share of potential state revenues would likely increase lost state revenues due to the proposed revocations and modifications.

## Section 5 – Conclusions

The oil and natural gas industry in the Gulf of Mexico has provided longstanding contributions to the economies of the Gulf coast states and the broader U.S., supporting hundreds of thousands of American jobs, providing revenues to many levels of the U.S. government and contributing to domestic energy production. Despite currently depressed activity levels due to low oil prices, the region is currently producing near record levels of oil and natural gas. Assuming that oil prices begin to stabilize and increase, activity levels are also projected to increase leading to an upward trend in spending and employment.

While some of the proposed modifications and revocations to Jones Act rulings are projected to have minimal impacts on U.S. OCS activity, the study concludes that others will, in their current forms, seriously limit the ability of operators, installation contractors, and service providers to safely, effectively, and economically operate in U.S. offshore areas, as well as decrease the domestic U.S. content of equipment and services used in offshore oil and natural gas activities. This decrease in activity and U.S. content would further damage an important industry that is already dealing with the repercussions of a volatile and challenging commodity price environment and may seriously impact the overall U.S. economy.

After analyzing the operational and economic impacts of the proposed modifications and revocations, as currently proposed by Customs and Border Protection, this study has projected that the following effects may result from their implementation:

- Delays in projects currently under development but not installed due to an inability to utilize foreign flagged vessels.
- Decreased development activity due to increased costs and risk profiles of offshore oil and natural gas projects.
- Decreased U.S. domestic content due to offshoring of certain parts of the supply chain such as reeling of pipe, manufacturing of umbilicals and some subsea equipment and fabrication of topsides and modules.
- Between 2017 and 2030, decreased Gulf of Mexico offshore oil and natural gas spending in the range of \$5.4 billion on average per year.
- An average reduction in oil and natural gas production in the range of 0.5 Million Barrels per day from 2017 to 2030.
- A loss of up to 30 thousand jobs in 2017 and average decreased employment of over 80 thousand jobs from 2017 to 2030.
- An average loss of more than \$4.3 billion of GDP from 2017 to 2030.

- An average loss of more than \$1.9 billion of government revenue per year from 2017 to 2030.
- The adoption of the proposed modifications and revocations to Jones Act rulings are projected to lead to reduced activity, spending, GDP, government revenue, domestic U.S. content, and employment that is due to the offshore oil and natural gas industry in the U.S.

## Section 6 – Appendices

### 6.1 Extended Methodology Appendix

#### General Methodology

Calash’s methodology focused on constructing a tiered “bottom-up” model that separated the complete life cycle of offshore operations and subsequent effects into four main categories – these categories are further developed into cases and presented as the base scenario and proposed modifications and revocations scenario within the paper. The four main categories are as follows;

- A “Proposed Modifications and Revocations” model that independently assesses the individual or combined effects of the proposed changes to Jones Act rulings affecting offshore oil and natural gas support activities
- An “Activity Forecast” model assessing Calash’s projects and project modeling information under which the number of expected projects is developed
- A “Spending” model based on the requirements of developing projects within the “Activity Forecast”
- An “Economic” model focusing on the economic impact on employment and government revenue from the “Spending” model.

Three (Activity Forecast, Spending, and Economic models) of the four individual subsections were further split into five additional criteria that create an individual “Project” model. These categories include seismic, leasing activity, drilling, infrastructure & project development, and production & operation.

In order to estimate the economic effects and project activity losses through the “Project” model, additional analysis was undertaken to understand which projects would be disrupted due to delays and changes to project economics and risk profiles. This was presented through additional analysis of the Base Development scenario and is provided as the Proposed Modifications and Revocations scenario.

#### Project Development Methodology

In order to account for both currently active projects within the Gulf of Mexico and longer-term prospects that will be developed towards the end of the forecast period into the study’s project development activity, Calash incorporated two models into the project development forecast. The near-term activity was developed on known projects or prospects currently under consideration for development, while a longer-term forecast was developed on top of the near-

term forecast through the analysis of reserves, oil prices, leasing trends, development trends, historic project sizes and other relevant factors.

Longer term projects were developed by applying historical and current trends within the region to future developments based on undiscovered oil and natural gas resources in order to apply the proper costs and timelines to the expected activity. Projects were still delineated by individual timelines and the development scenarios that may be expected of future activity within the region, but were calculated using assumptions on industry trends in production methods instead of on confirmed aspects of the specific projects.

With regards to the Proposed Modifications and Revocations scenario, projects were examined for potential hurdles that would be encountered under the proposed changes through several criteria identified from Calash's research. These were focused on how changes to the regulations affected specific vessels and how these changes would affect specific aspects of project development. These identified factors drove the forecasted possibility of delays or lost activity due to contracting and operational issues, project economics and changing risk profiles.

### **Project Spending Methodology**

This spending analysis accounts for all capital investment and operational spending through the entire "life cycle" of operations. Every offshore oil or natural gas project must go through a series of steps in order to be developed. Initial expenditures necessary to identify targets and estimate the potential recoverable resources in place include seismic surveys (G&G) and the drilling and evaluation of exploration & appraisal (E&A) wells. For projects that are commercially viable, the full range of above-surface and below-water (subsea) equipment must be designed and purchased. Offshore equipment includes production platforms and on-site processing facilities, as well as below-water equipment generally referred to as SURF (Subsea, Umbilicals, Risers and Flowlines). Finally, the equipment must be installed and additional development wells must be drilled. Once under production, further operational expenditures (OPEX) are required to perform ongoing maintenance, production operations and other life extension activities as necessary for continued field production and optimization.

Spending for individual projects was subdivided into sixteen categories covering the complete life cycle of a single offshore project, as well as two additional groups for natural gas processing and operation. Timing and cost for individual categories were assigned based on the previously mentioned project types where prices are scaled according to the complexity and size of the project.

Additional spending due to increased vessel construction activity as a result of the proposed modifications and revocations was also included, based on a standalone analysis of likely new buildings of offshore construction vessels as a result of the proposed changes.

Upon compiling the scenario of overall spending estimates, Calash deconstructed the “local content” of oil and natural gas operations within the studied region. Individual tasks were analyzed on a component-by-component basis to provide an estimate of the percentage of regional, national, and international construction required by offshore operations. Additionally, delineations were made at the regional level in order to project spending for individual states. Considerations were based on current oil and natural gas development, the proximity to reserves and production, strategic locations such as shore bases and ports, as well as Bureau of Economic Analysis (BEA) data pertaining to each state’s present economic distribution. For the Proposed Modifications and Revocations Scenario, these distributions were modified to account for likely changes to the offshore oil and natural gas supply chain as a result of the proposed changes including offshoring of work to other countries and increased U.S. domestic installation content.

### **Economic Methodology**

The study’s GDP and job data were calculated using the BEA’s RIMs II Model providing an input-output multiplier on spending at the industry and state levels for each defined category. Model outputs considered from spending effects include number of jobs and GDP multiplier effects. Further delineation is presented in the form of direct and indirect and induced job numbers, which encompass the number of jobs relating to the spending in that category versus indirect and induced jobs that are created from pass-through spending. For states considered within the study that contained no RIMs II multipliers for specific sectors, state multipliers from economies that most closely paralleled those in question were replicated.

Rims Categories used:

- Architectural, Engineering, and Related Services
- Construction
- Drilling Oil and Gas Wells
- Fabricated Metal Product Manufacturing
- Mining and Oil and Gas Field Machinery Manufacturing
- Oil and Gas Extraction
- Steel Product Manufacturing from Purchased Steel
- Support Activities for Oil and Gas Operations

## Governmental Revenue Development

Governmental revenue data is presented in three categories bonus bids from lease sales, rents from purchased but not yet developed leases, and royalty payments from producing leases. The projected revenue was calculated under the assumption that the current operating structure of the Gulf of Mexico would remain in place where applicable. Lease sales and rental rates were calculated through the simulation of yearly lease sales within each individual area, while the number of leases acquired was modeled on oil price forecasts, historical rates, and on the estimated amount of reserves in the western and central OCS regions.

The federal / state government revenue split of leases, rents and royalties were modeled under the application of GOMESA (Gulf of Mexico Energy Security Act). As Calash understands the rule and phase II beginning in 2017, GOMESA regulations would effectively split 37.5 percent of OCS bonus bid, rent, and royalty income between the appropriate states. GOMESA has an annual revenue cap of \$500 million for the Gulf States.

Production pricing were calculated using the EIA estimates for both West Texas Intermediate (WTI) spot and Henry Hub natural gas prices<sup>7</sup>. Additional governmental revenues such as income and corporate taxes were considered outside of the scope of this study, and are likely to provide additional government revenues throughout the studied period.

## 6.2 Glossary of Terms

**Coastwise vessel** – A vessel permitted to engage in Jones Act protected domestic trade between two or more coastwise points in the United States. Coastwise vessels are required to be U.S. built, crewed by U.S. Citizen mariners, U.S. owned, and issued a Coastwise Endorsement by the Coast Guard on the vessel's Certificate of Documentation

**Gross Domestic Product (GDP)** – The total dollar value of all goods and services produced over a specific time period

**Gulf of Mexico Energy Security Act (GOMESA)** – Act signed into law in 2006 which enhances OCS oil and natural gas leasing activities and revenue sharing in the Gulf of Mexico (GOM)

**Lease Sales** – Periodic sales of leases by the federal government to offshore areas for the purpose of developing oil, natural gas, and sulfur

**Mobile Offshore Drilling Rig** – A mobile vessel typically either a drillship or semi-submersible used for drilling offshore oil and natural gas wells

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<sup>7</sup> Annual Energy Outlook 2017, Energy Information Administration

**Module** – A part of a topside structure which can typically be lifted independently before being integrated into a topside

**Outer Continental Shelf (OCS)** – the submerged lands, subsoil, and seabed, lying between the seaward extent of the States' jurisdiction and the seaward extent of Federal jurisdiction

**Pipeline** – A conduit of steel or flexible pipes used to transport oil, natural gas, or other fluids between a well and a production platform or to shore

**Reel** – A vertical or horizontal cylinder used to transport and install pipelines, cables and umbilicals

**Rents** – Ongoing rental income paid by leaseholders to the federal government to maintain offshore oil and natural gas leases

**Riser** – A pipeline used to convey fluids between a subsea and a surface facility

**Royalties** – Ongoing payments to the federal government by leaseholders based on the value of produced oil and natural gas

**Spool Base** – A facility on the coast used to weld and reel steel pipelines onto offshore construction vessels

**Subsea Equipment** – Seabed placed equipment used in the production of oil and natural gas

**Topsides** – The upper part of a fixed or floating platform used to process oil, natural gas, water and other fluids, control production, and house workers

**Umbilical** – A collection of cables, tubes, and hoses used to control, monitor and provide communications, chemicals, hydraulic and electrical power to subsea oil and natural gas wells

**Warm Stacked** – A mobile drilling unit that has been taken out of service or put into storage with a reduction in usage of onboard systems and reduced manning to maintain the unit

**Plug and Abandonment** – The placement of cement plugs in a depleted well along with other steps required by law required to abandon and remediate a well



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