

From: Lindow, Emily
To: [William Douros - NOAA Federal](#)
Cc: [Michael Weiss - NOAA Federal](#); [Bowman, Randal](#)
Subject: Re: Follow on NOAA Questions - EO 13795
Date: Monday, September 11, 2017 11:01:46 AM
Attachments: [Sanctuary and Monument Review Follow Up Responses 9 11 17 final.docx](#)

Hi Bill - BOEM responses to your follow up questions are attached. Thanks, Emily

On Thu, Aug 24, 2017 at 4:45 PM, William Douros - NOAA Federal
<william.douros@noaa.gov> wrote:

Good afternoon Emily.

About a week ago Michael received and passed along DOI/BOEM's responses to questions we had posed back in June related to Executive Order 13795. Thank you for that material. As you can appreciate, BOEM's responses to our questions have generated the follow-on questions below. We have limited these to only the critical questions we need clarified so that we may complete the report directed by the President. All page numbers refer to the draft document provided to us dated August 5, 2017.

As we are scrambling with completing the section regarding opportunity costs, we appreciate in advance as rapid a turn around as you can provide. If you want to direct me to key staff people to get these resolved, happy to do that. Also we can take answers in pieces or batches, and no need to wait until all are answered.

Warm regards, Bill

1. Page 2 – Regarding NCSMN, can you provide more information about how wells drilled in Africa increase the confidence about potential oil and gas resource estimates off New England?
2. Page 2 – Regarding NCSMN, unless BOEM can provide more specific estimates of “risked mean undiscovered technically recoverable oil and gas resources” for this monument, NOAA will calculate the percent of the North Atlantic OCS Planning Area that the monument overlays and assume this percentage of oil and gas resources are potentially within the monument. Please advise if you have a more accurate estimate.
3. Page 2 and 3 – Regarding NCSMN and Davidson Seamount/MBNMS, past NOAA analyses to expand MBNMS to include Davidson Seamount assumed, based in part on input from BOEM Pacific Region representatives, that historical volcanic activity at the seamount was not conducive to long term reservoir storage of hydrocarbon resources. Hence, why Davidson Seamount likely contains no recoverable oil and gas reserves, despite there being estimated reserves in adjacent yet somewhat distant basins. Does BOEM believe that is still an accurate assumption for Davidson Seamount? And if so, should NOAA extrapolate that assumption – about the impact of past volcanic activity degrading petroleum reserves – to the seamount area of NCSMN?
4. Page 4 – Regarding CBNMS and GFNMS, under NOAA Data Request 2, has BOEM identified any specific challenges to or difficulties with establishing a leasing/development

program for the Central California and Northern California planning areas, and if so, how are those challenges to be factored in to assessing confidence in developing these reserves?

5. Page 5 – Regarding CBNMS and GFNMS, the document assumes about 20% of the reserves within the Point Arena Basin and Bodega Basin lie within these two sanctuaries. However, the response regarding the economic value of those reserves does not reach any conclusion. Does BOEM believe it is accurate to assume 20% of the NEV for Central California Planning Area can be attributable to the expansion areas of GFNMS and CBNMS, assuming costs for developing necessary infrastructure are born by many, future development projects?

6. Page 8 – Regarding CBNMS and GFNMS, under NOAA Data Request 3, BOEM states that it cannot provide estimates of the net value of the offshore renewable energy potential in these sanctuaries' expansion areas, and that "project proponents are better suited to provide such estimates". BOEM then outlines some potential benefits of allowing offshore wind in these areas. It would be similarly beneficial to understand, like in BOEM's analysis for oil and gas, whether any challenges or difficulties with leasing offshore wind in these areas have also been identified (e.g., lack of efficient and cost effective technology, new infrastructure development, etc.).

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National Marine Sanctuaries and National Marine Monuments Review
BOEM Responses to NOAA Follow Up Questions (8/24/17)
September 11, 2017

NOAA Q1. Page 2 – Regarding NCSMNM, can you provide more information about how wells drilled in Africa increase the confidence about potential oil and gas resource estimates off New England?

Due to the lack of oil and gas field data on the Atlantic OCS margin, the BOEM assessment of undiscovered resources relies on information derived from accumulations found in analogs from around the world. Analogs considered appropriate for this U.S. Atlantic resource inventory are selected based on similar or equivalent tectonic or structural setting with comparable petroleum system elements, including source, reservoir, seal, environment of deposition, lithology, depth of burial, diagenetic history, porosity and permeability, and trap type. Because the Atlantic OCS began to form during the Late Triassic breakup of western Pangea when subsequent drifting apart of the North American and African conjugate margins resulted in the sea floor spreading and opening of the current Atlantic Ocean, BOEM looks to analogs off the present day coasts of Africa to provide information applicable to informing their resource assessment (see BOEM 2016-071, Inventory of Technically and Economically Recoverable Hydrocarbon Resources of the Atlantic Outer Continental Shelf as of January 1, 2014). Recent drilling has resulted in discoveries in analogous settings in Northwest Africa (Mauritania and Senegal), West Africa (Côte d'Ivoire), Northeast South America (Guyana and Brazil), and East Africa (Kenya, Tanzania, and Mozambique). Those and earlier discoveries have been delineated and tested in applicable analogous regions. This drilling activity has improved our understanding of discovery size and petroleum systems responsible for those analogs, thus increasing our confidence in oil and gas resource estimates on the Atlantic OCS.

NOAA Q2. Page 2 – Regarding NCSMNM, unless BOEM can provide more specific estimates of “risked mean undiscovered technically recoverable oil and gas resources” for this monument, NOAA will calculate the percent of the North Atlantic OCS Planning Area that the monument overlays and assume this percentage of oil and gas resources are potentially within the monument. Please advise if you have a more accurate estimate.

The entire North Atlantic Planning Area is estimated by BOEM to contain 1.77 billion barrels of oil and 11.76 trillion cu. ft. (3.86 billion barrels of oil equivalent (BOE)) of mean undiscovered technically recoverable oil and gas resources (UTRR). The BOEM estimate of oil and gas UTRR within the NCSMNM area equals 50 million barrels of oil and 400 billion cubic feet of natural gas (120 million BOE). This estimate equals approximately 3% of the North Atlantic OCS Planning Area UTRR on a BOE basis.

NOAA Q3. Page 2 and 3 – Regarding NCSMNM and Davidson Seamount/MBNMS, past NOAA analyses to expand MBNMS to include Davidson Seamount assumed, based in part on input from BOEM Pacific Region representatives, that historical volcanic activity at the

seamount was not conducive to long term reservoir storage of hydrocarbon resources. Hence, why Davidson Seamount likely contains no recoverable oil and gas reserves, despite there being estimated reserves in adjacent yet somewhat distant basins. Does BOEM believe that is still an accurate assumption for Davidson Seamount? And if so, should NOAA extrapolate that assumption – about the impact of past volcanic activity degrading petroleum reserves – to the seamount area of NCSMNM?

Yes, BOEM still holds that the Davidson Seamount/MBNMS Seamount geothermal regime and its historical volcanic activity are not compatible with commercially recoverable hydrocarbon resources. However, it would not be appropriate to extrapolate this interpretation to the Atlantic Region because the two hydrocarbon systems are fundamentally different.

NOAA Q4. Page 4 – Regarding CBNMS and GFNMS, under NOAA Data Request 2, has BOEM identified any specific challenges to or difficulties with establishing a leasing/development program for the Central California and Northern California planning areas, and if so, how are those challenges to be factored in to assessing confidence in developing these reserves?

BOEM has not identified any specific challenges to, or difficulties with, establishing a leasing and development program for the Central California and Northern California planning areas.

Section 18 of the OCSLA calls for the preparation of a nationwide oil and gas leasing program designed to best meet the Nation's energy needs and requires the Secretary to evaluate and consider for inclusion all 26 OCS planning areas in accordance with Section 18 factors for consideration and balancing. One of the factors includes geological characteristics with respect to resources and it has already been stated in BOEM's previous response that considerable oil and gas resources occur under OCS areas designated as marine sanctuaries.

NOAA Q5. Page 5 – Regarding CBNMS and GFNMS, the document assumes about 20% of the reserves within the Point Arena Basin and Bodega Basin lie within these two sanctuaries. However, the response regarding the economic value of those reserves does not reach any conclusion. Does BOEM believe it is accurate to assume 20% of the NEV for Central California Planning Area can be attributable to the expansion areas of GFNMS and CBNMS, assuming costs for developing necessary infrastructure are born by many, future development projects?

In total, the amount of undiscovered oil and gas resources removed from potential development in the CBNMS and GFNMS expansion areas is approximately 700 million barrels of oil and 700 billion cubic feet of natural gas (or 824 Million Barrels of Oil Equivalent). BOEM estimates that the Central California Planning Area contains a mean UTRR of 2,840 million BOE. Therefore the expansion area represents nearly 30% of the Central California Planning Area Resources on a BOE basis. Assuming costs for developing the necessary infrastructure are born by future exploration and development projects, it is reasonable to apply this percentage to the Central California NEV.

NOAA Q6. Page 8 – Regarding CBNMS and GFNMS, under NOAA Data Request 3, BOEM states that it cannot provide estimates of the net value of the offshore renewable energy potential in these sanctuaries’ expansion areas, and that “project proponents are better suited to provide such estimates”. BOEM then outlines some potential benefits of allowing offshore wind in these areas. It would be similarly beneficial to understand, like in BOEM's analysis for oil and gas, whether any challenges or difficulties with leasing offshore wind in these areas have also been identified (e.g., lack of efficient and cost effective technology, new infrastructure development, etc.).

Currently, the largest barriers to the establishment of offshore wind off the coast of California are the very large areas of ocean that have been designated as National Marine Sanctuaries. Section 388 of the Energy Policy Act of 2005 (EPAAct) authorized BOEM to issue leases, easements, and rights of way to allow for renewable energy development on the OCS. Under this law, BOEM is responsible for regulating offshore energy uses in federal waters, extending from 3 nautical miles (nm) offshore to the edge of the Exclusive Economic Zone ending at 200 nm offshore. However, the EPAAct also specifically states that the jurisdiction does not apply to any area on the OCS “within the exterior boundaries of any unit of the National Park System, National Wildlife Refuge System, or National Marine Sanctuary System, or any National Monument.” As such, BOEM is not able to conduct lease sales or provide regulatory oversight over offshore wind development within the 12,145 square miles of National Marine Sanctuaries located offshore California, despite the high renewable energy resource potential of these areas.

Offshore Wind (OSW) electricity generation contributes to a diverse energy portfolio. As with any other energy development, its implementation requires the thoughtful examination of the challenges or difficulties of implementation. Below are additional areas of consideration when trying to understand the potential for offshore wind in CBNMS and GFNMS:

Availability of Technology:

The OSW market is maturing quickly in Europe and Asia; as of the end of 2015, more than 12 GW of offshore wind capacity had been installed globally (see: http://www.gwec.net/wp-content/uploads/vip/GWEC-PRstats-2015_LR_corrected.pdf), and the cost of offshore wind energy is now trending downward in Europe through experience, increased competition in the OSW market, and innovation. Recent analysis suggests that much of the cost-reduction progress seen in European markets can translate to the United States as developers leverage best-available European technologies and adapt them to the unique conditions of the United States (see: <http://www.nrel.gov/docs/fy15osti/64283.pdf>).

In the U.S., OSW development has kicked off with the construction and operation of the 30 MW Block Island Wind Farm (<http://dwwind.com/project/block-island-wind-farm/>). Leasing off the east coast has begun in earnest, with industry interest expanding into the Pacific Region. On the east coast, shallow water depths allow for fixed-bottom foundations on which to support offshore wind turbines. However, the generally deeper waters of the Pacific Region require floating foundations to support offshore wind turbines.

OSW technology for deeper waters combines proven wind turbine technology with floating foundations commonly used in other marine industries. Currently, three different technology types comprise the floating foundation market for OSW: (1) spar buoy, (2) semi-submersible and (3) tension-leg platforms. In terms of demonstrations, the early floating foundation developer, Statoil, has been demonstrating their spar buoy technology (Hywind) in Norway since 2009. Statoil is currently installing a 30 MW floating offshore wind farm using their Hywind technology in Scotland. Statoil reports that “from the first pilot floating outside Karmøy, Norway in 2009 to the pilot wind farm offshore Peterhead in Aberdeenshire, Scotland, cost reductions of 60—70 % have been achieved. [Statoil] believe[s] a further 40—50 % cost reduction is realistic for future projects” (<https://www.statoil.com/en/what-we-do/hywind-where-the-wind-takes-us.html>).

Principle Power has been demonstrating their semi-submersible floating platform (WindFloat) in Portugal since 2011. Principle Power reports that the system has produced in excess of 16 GWh of electricity, delivered by sub-sea cable, to the local grid (<http://www.principlepowerinc.com/en/windfloat>). Principle power is developing a 25 MW project (WindFloat Atlantic project) off the coast of northern Portugal backed by a consortium of energy and industrial players including EDP Renewables, Trust Wind (a 50/50 joint venture between Engie and Marubeni), Chiyoda Corporation, Mitsubishi Corporation and Repsol (<http://www.offshorewind.biz/2016/11/28/portugal-okays-25mw-windfloat-atlantic/>).

Development and Permitting:

The development of OSW will require several permits and approvals prior to construction and operations. Various stakeholders would need to be included in the planning and permitting process. Accordingly, BOEM’s planning process begins very early and is conducted in collaboration with state, federal, local and tribal entities that may have an interest or would need to issue permits for anticipated projects. BOEM’s outreach for data, information, and interest in California is coordinated under the BOEM California Intergovernmental Renewable Energy Task Force, with membership including other federal agencies and state, local and tribal governments. BOEM has also assembled a permitting subgroup of federal agencies to facilitate issues and permitting for OSW projects. The development process is lengthy and requires the inputs from many parties, but is not unlike any other energy project onshore.

Infrastructure Needs of Projects:

The development of OSW projects will require infrastructure for construction and delivery of output. BOEM has funded a study to understand the port-related infrastructure needs to support offshore floating wind and marine hydrokinetic facilities on the U.S. West Coast and Hawaii. The study evaluated the current infrastructure and vessel requirements and capabilities existing on the U.S. West Coast and the Hawaiian islands of Oahu, Maui, and Kauai to support the offshore renewable energy industry. (Final Report (BOEM 2016-011): <http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5503.pdf>).

The CBNMS and GFNMS are within close proximity to electricity load centers in the Bay Area of California. With the strong winds located there, it is an attractive area for deploying OSW projects. There is existing infrastructure in the Bay Area that appears to be able to

accommodate OSW generation with some upgrades. The particular method of interconnection would be determined in concert with the California Independent System Operator (Cal ISO) and the purchaser of the power produced from an OSW project. Ultimately, the costs and economic viability of interconnection construction or upgrades would be determined by the project developers.