



January 23, 2017

**VIA Email (ITP.Laws@noaa.gov)**

Ms. Jolie Harrison  
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Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910

**Re: Comments on Revised Application for Marine Mammal Incidental Take  
Regulations for Geophysical Surveys in the Gulf of Mexico**

Dear Ms. Harrison:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC"), the American Petroleum Institute ("API"), the National Ocean Industries Association ("NOIA"), and the Offshore Operators Committee ("OOC") (collectively, the "Associations") in response to the National Marine Fisheries Service's ("NMFS") request for comments on the Bureau of Ocean Energy Management's ("BOEM") revised application for marine mammal incidental take regulations ("ITRs") for geophysical surveys in the Gulf of Mexico ("GOM") (the "Application"). See 81 Fed. Reg. 88,664 (Dec. 8, 2016). We appreciate NMFS's consideration of the comments set forth below.

## **I. THE ASSOCIATIONS**

IAGC is the international trade association representing the industry that provides geophysical services (geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, and associated services and product providers) to the oil and natural gas industry. IAGC member companies play an integral role in the successful exploration and development of offshore hydrocarbon resources through the acquisition and processing of geophysical data.

API is a national trade association representing over 625 member companies involved in all aspects of the oil and natural gas industry. API's members include producers, refiners, suppliers, pipeline operators, and marine transporters, as well as service and supply companies that support all segments of the industry. API and its members are dedicated to meeting environmental requirements, while economically developing and supplying energy resources for consumers.

NOIA is the only national trade association representing all segments of the offshore industry with an interest in the exploration and production of both traditional and renewable energy resources on the United States' outer continental shelf ("OCS"). NOIA's membership comprises more than 325 companies engaged in a variety of business activities, including production, drilling, engineering, marine and air transport, offshore construction, equipment manufacture and supply, telecommunications, finance and insurance, and renewable energy.

OOC is an organization of 47 producing companies and 61 service providers to the industry who conduct essentially all of the OCS oil and gas exploration and production activities in the GOM. Founded in 1948, the OOC is a technical advocate for the oil and gas industry regarding the regulation of offshore exploration, development, and producing operations in the GOM.<sup>1</sup>

## II. OVERVIEW

The GOM OCS is a significant source of oil and gas for the Nation's energy supply. In 2014, the GOM OCS region was responsible for 16% of the total United States crude oil production and 5% of dry natural gas production.<sup>2</sup> Likewise, GOM OCS leases are an important source of federal revenues, generating substantial bonuses, rentals, and royalties paid to the United States. Since 2008, lessees have paid over \$11 billion in bonus bids for lease sales in the GOM OCS.<sup>3</sup> Total oil and gas royalty revenues from the GOM OCS amounted to almost \$5 billion in fiscal year 2015 alone.<sup>4</sup> Moreover, BOEM has recently estimated the net economic value of future GOM leasing to be as high as \$197 billion.<sup>5</sup> Geological and geophysical survey activities ("G&G activities") are crucial to the discovery, development, and valuation of OCS resources that lead to such production.

For over 40 years, the federal government and academic scientists have studied the potential impacts of G&G activities on marine mammal populations and have concluded that any

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<sup>1</sup> By submitting this letter, the Associations do not intend to limit the ability of their individual member companies to submit separate comments or present their own views on the issues discussed in this letter.

<sup>2</sup> See U.S. Energy Information Administration, *Gulf of Mexico Fact Sheet* (June 22, 2016), [http://www.eia.gov/special/gulf\\_of\\_mexico/data.cfm](http://www.eia.gov/special/gulf_of_mexico/data.cfm).

<sup>3</sup> See BOEM, *Outer Continental Shelf Lease Sale Statistics, Gulf of Mexico Oil and Gas Lease Offerings* (Dec. 31, 2015), <http://www.boem.gov/Outer-Continental-Shelf-Lease-Sale-Statistics/>.

<sup>4</sup> See DOI, Office of Natural Resources Revenue, Statistical Information, <http://statistics.onrr.gov/ReportTool.aspx> (Reported Revenues [Single Year Only], FY2015, Accounting Year, Federal Offshore, Offshore Gulf).

<sup>5</sup> See BOEM, *2017-2022 OCS Oil and Gas Leasing Proposed Final Program*, at Table 5-8 (BOEM, Nov. 2016), <https://www.boem.gov/2017-2022-OCS-Oil-and-Gas-Leasing-PFP>.

such potential impacts are insignificant. This conclusion has been publicly reaffirmed on multiple occasions by BOEM:

To date, there has been no documented scientific evidence of noise from air guns used in geological and geophysical (G&G) seismic activities adversely affecting marine animal populations or coastal communities. This technology has been used for more than 30 years around the world. It is still used in U.S. waters off of the Gulf of Mexico with no known detrimental impact to marine animal populations or to commercial fishing.

In <http://www.boem.gov/BOEM-Science-Note-August-2014/> (*Science Notes*, Aug. 22, 2014); see also <https://www.boem.gov/BOEM-Science-Note-March-2015/> (*Science Notes*, Mar. 9, 2015) (there has been “no documented scientific evidence of noise from air guns used in geological and geophysical (G&G) seismic activities adversely affecting animal populations”). These statements accurately summarize the best available scientific information regarding the potential effects of G&G activities on marine mammals. There are no other data to the contrary.

We appreciate the hard work that BOEM has invested in the Application. Because there is no precedent for ITRs governing GOM geophysical activities, we understand the difficulties that presumably have been associated with the preparation of the Application. With that said, however, the Application contains significant and substantial flaws. These flaws are summarized as follows:

- The Application’s requested levels of incidental take are not supported by the best available science, ignore the beneficial effects of the mitigation measures included as part of the proposed action, and result from overly conservative modeling that BOEM admits does not accurately reflect the anticipated impact. Consequently, the Application does not accurately present “[t]he anticipated impact of the activity” or the number of incidental takes that are “likely to occur.” 50 C.F.R. § 216.104(6), (7) (emphasis added).
- The Application fails to utilize all of the best available science. Specifically, the Application does not sufficiently consider (1) the historical record showing that the known effects of geophysical activities on marine mammals are insignificant, (2) marine mammal monitoring data collected from numerous geophysical surveys in the GOM, and (3) new acoustic criteria for estimating incidental take by Level A harassment that may result from geophysical activities.
- The Application does not clearly present “[t]he species and number of marine mammals likely to be found within the activity area.” 50 C.F.R. § 216.104. The Application and the associated Appendix confusingly use different abundance values and different models for distributing the animals within the GOM. Moreover, some of the abundance values and distribution models used by BOEM are either

acknowledged to be flawed, have insufficient statistical inference to support the interpretation of modeled results, or are the product of untested modeling assumptions about habitat suitability and not direct field observation.

- The Application fails to present a practicability assessment (including a cost-benefit analysis) of the proposed mitigation measures. Additionally, some of the proposed mitigation measures are economically and operationally infeasible and are highly unlikely to result in benefits to marine mammals.
- The Application presents little information about the proposed monitoring plan. The Marine Mammal Protection Act (“MMPA”) does not authorize NMFS to require the operators of geophysical activities to carry out a large-scale, expansive monitoring plan that reaches beyond the time and area in which site-specific activities are undertaken. However, based upon the information presented in the Application, we cannot determine whether the contemplated monitoring plan is consistent with the MMPA’s scope of authority.

Our detailed comments on the Application, set forth below, address these overarching flaws along with several other important topics. Although we encourage BOEM and NMFS to proceed with this rulemaking on a schedule that is compliant with court-ordered deadlines, they must do so in a manner that is aligned with MMPA requirements and based upon an Application that is free of the substantial errors contained in the present version of the Application.<sup>6</sup> In order to do so, the Application, and particularly Chapters 6 and 7, must be substantially revised and resubmitted on a schedule that complies with litigation deadlines.

### **III. COMMENTS**

#### **A. G&G Activities Play a Critical Role in the Safe and Orderly Development of the Oil and Gas Resources of the GOM**

##### **1. Legal context**

The Outer Continental Shelf Lands Act (“OCSLA”) calls for the “expeditious and orderly development” of the OCS “subject to environmental safeguards.” 43 U.S.C. § 1332(3); see *California v. Watt*, 668 F.2d 1290, 1316 (D.C. Cir. 1981) (OCSLA’s primary purpose is “the expeditious development of OCS resources”). Congress enacted OCSLA to “achieve national

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<sup>6</sup> The Associations filed a comment letter, dated November 29, 2016, in response to BOEM’s draft programmatic environmental impact statement to evaluate the potential environmental effects of multiple G&G activities on the GOM OCS (“DPEIS”). See 81 Fed. Reg. 67,380 (Sept. 30, 2016). We hereby incorporate those comments by reference and expect the Association’s November 29, 2016 comment letter on the DPEIS to be included in the administrative record for the rulemaking initiated by the Application.

economic and energy policy goals, assure national security, reduce dependence on foreign sources, and maintain a favorable balance of payments in world trade.” 43 U.S.C. § 1802(1). Indeed, Congress expressly intended to “make [OCS] resources available to meet the Nation’s energy needs as rapidly as possible.” *Id.* § 1802(2)(A). “The first stated purpose of OCSLA, then, is to establish procedures to expedite exploration and development of the OCS. The remaining purposes primarily concern measures to eliminate or minimize the risks attendant to that exploration and development. Several of the purposes, in fact, candidly recognize that some degree of adverse impact is inevitable.” *Watt*, 668 F.2d at 1316.

Here, the geophysical activities to which the contemplated ITRs would apply are authorized by BOEM pursuant to OCSLA. *See* 43 U.S.C. § 1340. Neither OCSLA nor the MMPA requires an applicant for a G&G permit under OCSLA to obtain an incidental take authorization under the MMPA. However, unlawful incidental takes of marine mammals may be subject to MMPA-based penalties. *See* 16 U.S.C. § 1375. Marine mammal incidental take authorizations for GOM G&G activities in the GOM have rarely, if ever, been issued by NMFS. As indicated in the Application, applications for ITRs for GOM geophysical activities have been pending or in various stages of preparation since 2002.

Notwithstanding the lack of GOM-specific ITRs, industry operators have for years complied with measures imposed under the terms of seismic activity authorizations to protect marine mammals. *See* Joint Notice to Lessees (“NTL”) No. 2016-G02 (previously NTL No. 2012-G02 and NTL No. 2007-G02).<sup>7</sup> By all accounts, these measures have been successful. Based on the best available scientific information, there has been no demonstration of any biologically significant negative impacts to marine life from G&G activities in the GOM. *See supra* <http://www.boem.gov/BOEM-Science-Note-August-2014/> (*Science Notes*, Aug. 22, 2014); <https://www.boem.gov/BOEM-Science-Note-March-2015/> (*Science Notes*, Mar. 9, 2015). In fact, BOEM recently reconfirmed that “G&G surveys have been ongoing in the northern GOM for many years, with no direct information indicating reduced fitness in individuals or populations.” DPEIS at 4-57 (emphasis added).

On June 30, 2010, a consortium of environmental advocacy groups filed a federal lawsuit challenging BOEM’s determination that the authorization of G&G activities in the GOM does not require the preparation of an environmental impact statement (“EIS”). *See NRDC et al. v. Jewell et al.*, No. 2:10-cv-01882, Dkt. 1 (E.D. La.) (“*NRDC v. Jewell*”). The claims asserted in *NRDC v. Jewell* have been resolved through a settlement agreement dated June 18, 2013 (“Settlement Agreement”), as amended by a stipulation dated February 8, 2016 (“Stipulation to Amend”). *See NRDC v. Jewell*, Dkts. 118-2 (Settlement Agreement), 127-2 (Stipulation to Amend); *see also id.*, Dkts. 119 and 128 (court orders granting approval of Settlement Agreement and Stipulation to Amend, respectively).

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<sup>7</sup> In this comment letter, we refer to these measures as the “Standard Mitigation Measures.”

The Settlement Agreement addresses, *inter alia*, BOEM's application for ITRs for GOM geophysical activities and programmatic NEPA analysis of the potential effects of such activities. Under the terms of the Settlement Agreement and the Stipulation to Amend, G&G operators are required to implement a suite of "interim" mitigation measures that substantially expand upon the Standard Mitigation Measures. However, the parties to the Settlement Agreement and the Stipulation to Amend did not agree, and there has otherwise been no demonstration, that the mitigation measures imposed pursuant to the Settlement Agreement and Stipulation to Amend are feasible, appropriate, supported by the best available science, or otherwise required by law.<sup>8</sup>

The G&G industry has performed the terms of the Settlement Agreement and Stipulation to Amend in good faith. The Associations have also constructively participated in the regulatory processes pertaining to the Application and the DPEIS.<sup>9</sup> However, notwithstanding the Associations' diligent participation in the pending judicial and regulatory processes, we cannot support applications for ITRs, or ITRs, that are not faithful to the law or consistent with the best available science. Similarly, we cannot support mitigation measures that are infeasible, impracticable, or of no demonstrated benefit to marine mammal populations.<sup>10</sup>

## **2. Operational context**

Seismic surveying has been and continues to be essential to achieving OCSLA's goals because it is the only feasible technology available to accurately image the subsurface of the OCS before a single well is drilled. Industry has made significant improvements in acquisition

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<sup>8</sup> See *NRDC v. Jewel*, Dkt. 118-2, Section IX ("Intervenor-Defendants do not agree that all of the measures described in paragraph IX.A and IX.B are feasible or appropriate. Intervenor-Defendants shall be free to challenge any such measures should one or more of the Federal Defendants develop and implement them."); *id.* at Dkt. 127-2, Section G ("The terms of this Stipulation have been agreed to for purposes of compromise. No party concedes by entering into this Stipulation that any of the permit requirements described above are warranted by scientific evidence or should be imposed after the Stay expires, or that these requirements are sufficient to achieve legal compliance or reduce biological risk over the long term.").

<sup>9</sup> IAGC and API are "applicants" in the Endangered Species Act ("ESA") Section 7 consultation that will be initiated to address the effects of the contemplated ITRs on ESA-listed species. See 50 C.F.R. § 402.02 (definition for "applicant"). IAGC and API requested confirmation of their applicant status in May 2016 and are still awaiting a response. We again request confirmation of our applicant status.

<sup>10</sup> The Associations request that the contemplated ITRs provide flexibility for letter of authorization ("LOA") applicants to obtain LOAs for any periods of time not exceeding the expiration date of the regulations and for reasonable renewals and modifications of LOAs. See, e.g., 50 C.F.R. §§ 216.17-.18, 216.66-.67.

efficiency in recent years. Using standard hardware, we now acquire more and better quality data due to advancements in vessels, configurations, acquisition planning and execution, and data processing. Additional advancements in geophysical technology—including seismic reflection and refraction, gravity, magnetics, and electromagnetics—afford industry significant precision in subsurface imaging and will continue to provide more realistic estimates of potential resources. By utilizing these tools and applying increasingly accurate and effective interpretation practices, industry can better locate and dissect prospective areas for exploration.

Furthermore, modern geophysical imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and by decreasing the number of wells that need to be drilled in a given area, thereby reducing associated safety and environmental risks and the overall environmental footprint for exploration. For example, subsurface imaging can predict potentially hazardous over-pressurized zones in a reservoir and thus allow an operator to better design a well to reduce its associated types and levels of risk. As technology advances, the geophysical industry can continue to reduce drilling risk and increase potential production. Just as physicians today may use MRI technology to image an area that previously had been imaged by X-ray technology, geophysical experts are actively using and enhancing the most modern technology to make improved evaluations. Moreover, because G&G activities are temporary and transitory, seismic surveying is the least intrusive and most cost-effective means to determine the likely locations of recoverable oil and gas resources in the GOM.

Finally, seismic air sources remain the most effective, commercially available technology to obtain necessary, accurate sub-surface data. Although alternative technologies, including marine vibroseis, continue to be explored, such technology is not yet commercialized and has not yet been shown to provide comparable seismic data quality. The substantial cost to modify vessels and to use vibroseis requires a significant market to make the technology commercially viable. Moreover, the hypothetical environmental benefits of alternative technologies have not been demonstrated.

## **B. Chapters 6 and 7 of the Application Are Substantially Flawed**

The MMPA implementing regulations require an application for ITRs to describe, among other things:

- “The type of incidental taking authorization that is being requested . . . and the method of incidental taking” (50 C.F.R. § 216.104(5));
- “[T]he number of marine mammals (by species) that may be taken by each type of taking . . . and the number of times such takes by each type of taking are likely to occur” (*id.* § 216.104(6)); and
- “The anticipated impact of the activity upon the species or stock of marine mammal” (*id.* § 216.104(7)).

The purpose of this information is to allow NMFS to assess the impacts that are “reasonably likely” or “reasonably expected” to occur based on the best scientific information available. 50 C.F.R. §§ 216.102(a), 216.103.

Unfortunately, the Application presents an unrealistic and inaccurate assessment of the number of marine mammals that may be incidentally taken and the associated impacts. Specifically, the Application (1) is intentionally designed to overestimate take, (2) is based upon biased modeling derived from flawed assumptions, (3) does not utilize all of the best available scientific information, and (4) improperly fails to incorporate the known beneficial effects of mitigation measures. As a result, the Application does not present the number of incidental takes that are “likely to occur,” does not describe the “anticipated” impact of the geophysical activities, and ultimately prevents NMFS’s from determining the “reasonably expected” or “reasonably likely” impacts of the contemplated ITRs. These flaws are addressed in the following subsections.

**1. Chapter 6 is designed to substantially overestimate the amount of potential incidental takes**

By BOEM’s admission, the modeling used to estimate the anticipated number of incidental takes is intentionally designed to overestimate takes and impacts. *See* Application at 93 (the “modeling results are meant to be precautionary and likely overestimate ‘exposures’ and therefore ‘takes’”; “modeling inputs and results are purposely precautionary in order to avoid underestimating potential impacts to marine mammals”). BOEM candidly describes the modeling effort in the DPEIS as follows:<sup>11</sup>

This estimate alone does not reflect BOEM’s determination of the actual expected physical or behavioral impacts to marine mammals but rather an overly conservative upper limit because none of the mitigations examined in this Programmatic EIS were modeled. Biological significance to marine mammals is left to interpretation by the subject-matter experts.

DPEIS at 1-16.

The estimates of “exposures” that are used in the Application as surrogates for estimated takes “are based on acoustic and impact models that are, by their nature, conservative and complex.” DPEIS at 1-19. Indeed, “[e]ach of the inputs into the models is purposely developed to be conservative, and this conservativeness accumulates throughout the analysis.” *Id.* (emphasis added). As a result, the exposure estimates are “higher than BOEM expects would

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<sup>11</sup> The same modeling results were used for both the DPEIS and the Application. These results are described in Appendix D to the DPEIS and in the Appendix to the Application, which are identical.

actually occur in a real world environment.” *Id.*; *id.* at 1-20 (“This estimate does not reflect an actual expectation that marine mammals will be injured or disturbed. It is an overly conservative estimate.”). BOEM has further admitted that using this methodology “requires accepting a worst-case scenario, which ultimately overestimates the numbers of ‘take’ under the MMPA by equating those numbers with the exposures identified in the modeling rather than real world conditions.” *Id.* (emphasis added).<sup>12</sup>

The Associations appreciate BOEM’s candor in describing the substantial shortcomings of the exposure modeling. However, such candor does not excuse BOEM from accurately estimating the number of likely takes and the associated anticipated impacts, as is required by the MMPA’s implementing regulations. An estimate that “does not reflect BOEM’s determination of the actual expected physical or behavioral impacts to marine mammals” is plainly not a description of the “anticipated” impact or the number of incidental takes that are “likely to occur.” 50 C.F.R. § 216.104(6), (7). Chapters 6 and 7 of the Application (and the Appendix) are intentionally designed to be inaccurate by evaluating the worst possible consequences that could hypothetically result from unmitigated seismic surveying, based on overly conservative modeling. By taking this approach, BOEM has skirted the regulatory requirements for MMPA incidental take authorization applications.

## **2. The modeling relied upon by BOEM is biased and premised upon unrealistic scenarios that are unsupported by actual data**

The exposure modeling set forth in the Appendix makes many biased assumptions that substantially contribute to the inaccuracy of the Application’s take and impact analyses. Specifically, the modeling analyses in the Appendix contain multiple layers of precaution that aggregate in the annual and 10-year estimates. Attachment A to this letter provides a more detailed assessment of the overly conservative (*i.e.*, unrealistic) assumptions used in the modeling. These assumptions result in an exposures outcome that is anywhere from 10% to multiple orders of magnitude above the mean or most likely exposures outcome (*i.e.*, 100 to 1,000 times the “most likely” number of exposures) for any given single variable. In the

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<sup>12</sup> This “worst-case scenario” includes repeated exposures, but does not identify the number of repeated exposures. Instead, the Application simply presents a total number of estimated exposures by species. Application at 97 (“the numbers of exposures in the following tables does not equate to the number of individual animals exposed”). This generalized presentation of exposures is insufficient because the MMPA’s “small numbers” standard is based upon the number of marine mammals that are anticipated to be incidentally taken, regardless of how many times each of those marine mammals may be taken. The Application must separately present (1) the total number of anticipated incidental takes, including repeats (for the “negligible impact” assessment) and (2) the number of marine mammals, by species, anticipated to be incidentally taken, regardless of repeats (for the “small numbers” assessment). See 16 U.S.C. § 1371(a)(5)(A); 50 C.F.R. § 216.104(6).

aggregate, these compounding conservative assumptions produce a predicted number of exposures across all variables together that is thousands to millions of times greater than the average or most likely outcome.

For example, the Phase II model assumes a seismic source array of 8,000 cubic inches. This is at, or very near, the upper limit of the largest source arrays used in the GOM. See Appendix at D-25. The actual distribution of array sizes in the GOM ranges from 8,400 cubic inches to less than 2,000 cubic inches, with a mean value of 5,600 cubic inches. The scaling differences in the range to threshold criteria produced by an overestimated array size of 8,000 cubic inches cascade down through the calculations, so that when a threshold range four times larger than produced by a typical survey source is established using hearing injury thresholds 10 or 100 times lower than actual measured thresholds, and applied to numbers of animals that can be up to 10 times higher than any previous federal estimates (*see infra* § III.C), the outcome is a prediction that 10,000 to 100,000 times more exposures might occur than use of the “best available data” values might otherwise have calculated. See Attachment A. Instead of this overly precautionary and unrealistic approach, BOEM could have used the data for all array sizes used in the GOM in the past 10 or 20 years, plotted them on a typical bell-shaped curve, and calculated the mean or median and variance.

Further overestimation is caused by the accumulation of sound without hearing recovery during calculation of both  $SPL_{rms}$  and SEL exposure thresholds, for which sound is summed over 24 hours. See Appendix, Section 6.5.1.2.2, page D-64. For an intermittent source, such as a seismic survey, there is a considerable interval of 10-20 seconds or longer between individual pulses that are only a fraction of a second in duration. However, the model inappropriately sums multiple exposures that may be many hours apart as if the separate exposures are one continuous block of sound. This is not a biologically realistic assumption—hearing recovery takes place during intervals as short as a few seconds and exposures separated by hours are almost certain to involve full recovery from prior sub-threshold encounters. See Finneran (2015).<sup>13</sup> The result of this biologically unrealistic assumption that SEL accumulates without recovery over a 24-hour window is an overestimation of SEL threshold exceedance that may be at least twice the actual value and possibly many times greater. The fact that the exact hearing recovery function has not yet been empirically derived for marine mammals should not be used to ignore this well-known aspect of mammalian hearing that has been repeatedly observed during the temporary threshold shift (“TTS”) data collections that form the basis for NOAA’s *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (Aug. 2016) (the “Guidance”). See *infra* note 21 (including comments in referenced attachment).

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<sup>13</sup> Finneran J. J. 2015. Noise-induced hearing loss in marine mammals: A review of temporary threshold shift studies from 1996 to 2015. *J. Acoust. Soc. Am.*, 138 (3): 1702-26. <http://dx.doi.org/10.1121/1.4927418>.

Additionally, as Section 6.5.1.3.2 of the Appendix acknowledges, the single-day overestimates are then used in a way that creates additional overestimation during the calculation of takes for a survey period of 30 days or more. Paradoxically, BOEM states on page D-65 of the Appendix that this simple multiplication of 24-hour values should not be done: “It is, therefore, inappropriate to scale the 24 h exceedance times to estimate the exceedance times for longer durations.” Nonetheless, this method is used in the Phase II modeling (Appendix at D-180) to produce the final exposure estimates (Appendix, Section 7.3.4).

Next, Section 6.5.2 of the Appendix analyzes potential contributions to uncertainty from the sound source characterization modeling, and from sound speed profiles, geoacoustic parameters, bathymetric data, and sea state inputs to the acoustic propagation modeling. This analysis concludes that the various uncertainties in the acoustic field represent a “multi-dimensional envelope” and that these different dimensions “cannot be summed to yield a ‘total’ uncertainty as this would be a meaningless quantity.” However, this conclusion is incorrect. There are ways to quantify the uncertainty in a meaningful way despite challenges to directly calculating the total uncertainty (or statistical variance). For example, the combined uncertainty contributed by environmental and model parameters could be further evaluated by comparing the outputs from multiple runs of the entire modeling process (both acoustic propagation modeling and exposure modeling) in which one or more of the parameters are adjusted across reasonable levels in each competing model run. The parameter-specific uncertainty analyses presented in Phase I of the Appendix are useful for identifying which parameters to adjust within the competing full modeling runs, but alone they only reinforce the fact that significant uncertainty is present at many steps within the modeling process. Multiple runs of the full modeling process using alternative parameter estimates should be conducted to improve the understanding of the total uncertainty surrounding the final results.

Furthermore, the analyses set forth in Section 6.5.2 of the Appendix use various methods to assess uncertainty around the parameters used in acoustic propagation modeling. However, in all examples, only the “typical” (average or median) and “worst case” values are evaluated. As a result, uncertainties are only characterized in one direction from the typical or expected result, and that direction results in longer-range propagation of sounds. When characterizing uncertainty around estimates, it is common practice to not only report the upper confidence limits (“worst case” results in this example), but to also report the lower confidence limits. Without an understanding of the lower confidence limit values, it is not possible to properly bound and assess the range of outcomes from the modeling and interpret the likelihood of potential impacts. The failure to characterize the lower confidence limits results in a flawed and significantly biased analysis.

In sum, BOEM summarizes the significant biases of the modeling as follows:

The existing modeling largely does not account for uncertainty in the data inputs and also selects highly conservative data inputs. This bias often produces unrealistically high exposure numbers and “takes” that exponentially increase uncertainty throughout each

step of the modeling. The modeling does not incorporate mitigation or risk reduction measures designed to limit exposure. The modeling is an overestimate and should be viewed with that understanding.

DPEIS at 4-47 (emphases added). As demonstrated above, these biases result in modeled overestimates of exposures that are thousands to millions of times greater than the average or most likely outcome. Again, this approach is contrary to the MMPA regulations, which require BOEM to estimate the number of takes that are “likely to occur” and the “anticipated” impact. 50 C.F.R. § 216.104(6), (7).<sup>14</sup>

**3. The Application’s take estimates and impact analyses are not based upon all of the best available scientific information**

As addressed above, and in Attachment A, Chapters 6 and 7 of the Application are based on overly conservative, unrealistic, and biased modeling of “exposures.” Aside from the legal and methodological flaws with this approach, there is a wealth of available information, including new acoustic criteria, as forth in the Guidance, that actually informs the analysis of the reasonably anticipated impacts of geophysical activities. This information, as addressed below, is either minimized or not addressed at all in the Application.

**a. The history of formal assessments of offshore seismic activities**

The history of formal assessments of offshore seismic activities demonstrates that levels of actual incidental take are far smaller than even the most balanced pre-operation estimates of incidental take.<sup>15</sup> Indeed, more than four decades of worldwide seismic surveying and scientific

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<sup>14</sup> The Application also erroneously requests take authorization for all estimated exposures even though, as BOEM acknowledges, not all exposures result in incidental take. Application at 93; see 75 Fed. Reg. 49,709, 49,716 (Aug. 13, 2010) (“Although it is possible that marine mammals could react to any sound levels detectable above the ambient noise level within the animals’ respective frequency response range, this does not mean that such animals would react in a biologically significant way. According to experts on marine mammal behavior, the degree of reaction which constitutes a take, *i.e.*, a reaction deemed to be biologically significant that could potentially disrupt the migration, breathing, nursing, breeding, feeding, or sheltering, etc., of a marine mammal is complex and context specific, and it depends on several variables in addition to the received level of the sound by the animals.”). Again, the numbers of incidental takes that are “likely to occur” are not reported in the Application. Table 7-4 of the Appendix appears to vaguely address the topic of translating exposures into incidental takes, but it is not apparent whether or how this table is considered in the Application.

<sup>15</sup> See, *e.g.*, BOEM, *Final EIS for Gulf of Mexico OCS Oil and Gas Eastern Planning Area Lease Sales 225 and 226*, at 2-22 (2013), <http://www.boem.gov/BOEM-2013-200-v1/>

(continued . . .)

research indicate that the risk of physical injury to marine life from seismic survey activities is extremely low. *See supra* § II. As BOEM concludes in the DPEIS, “within the GOM, there is a long-standing and well-developed OCS [oil and gas] Program (more than 50 years) and there are

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(. . . continued)

(“Within the CPA, which is directly adjacent to the EPA, there is a long-standing and well developed OCS Program (more than 50 years); there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations.”); BOEM, *Final EIS for Gulf of Mexico OCS Oil and Gas Western Planning Area (WPA) Lease Sales 229, 233, 238, 246, and 248 and Central Planning Area (CPA) Lease Sales 227, 231, 235, 241, and 247*, at 4-203 (v.1) (2012), [http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019\\_v1.aspx](http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019_v1.aspx) (WPA); *id.* at 4-710 (v.2), [http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019\\_v2.aspx](http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019_v2.aspx) (CPA) (“Although there will always be some level of incomplete information on the effects from routine activities under a WPA proposed action on marine mammals, there is credible scientific information, applied using acceptable scientific methodologies, to support the conclusion that any realized impacts would be sublethal in nature and not in themselves rise to the level of reasonably foreseeable significant adverse (population-level) effects.”); BOEM, *Final Supplemental EIS for Gulf of Mexico OCS Oil and Gas WPA Lease Sales 233 and CPA Lease Sale 231*, at 4-30, 4-130 (2013), [http://www.boem.gov/uploadedFiles/BOEM/BOEM\\_Newsroom/Library/Publications/2013/BOEM%202013-0118.pdf](http://www.boem.gov/uploadedFiles/BOEM/BOEM_Newsroom/Library/Publications/2013/BOEM%202013-0118.pdf) (reiterating conclusions noted above); MMS, *Final Programmatic EA, G&G Exploration on Gulf of Mexico OCS*, at III-9, II-14 (2004), [http://www.nmfs.noaa.gov/pr/pdfs/permits/mms\\_pea2004.pdf](http://www.nmfs.noaa.gov/pr/pdfs/permits/mms_pea2004.pdf) (“There have been no documented instances of deaths, physical injuries, or auditory (physiological) effects on marine mammals from seismic surveys.”); *id.* at III-23 (“At this point, there is no evidence that adverse behavioral impacts at the local population level are occurring in the GOM.”); LGL Ltd., *Environmental Assessment of a Low-Energy Marine Geophysical Survey by the US Geological Survey in the Northwestern Gulf of Mexico*, at 30 (Apr.-May 2013), [http://www.nmfs.noaa.gov/pr/pdfs/permits/usgs\\_gom\\_ea.pdf](http://www.nmfs.noaa.gov/pr/pdfs/permits/usgs_gom_ea.pdf) (“[T]here has been no specific documentation of TTS let alone permanent hearing damage, i.e., PTS, in free-ranging marine mammals exposed to sequences of airgun pulses during realistic field conditions.”); 75 Fed. Reg. 49,759, 49,795 (Aug. 13, 2010) (issuance of IHA for Chukchi Sea seismic activities (“[T]o date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays.”)); MMS, *Draft Programmatic EIS for OCS Oil & Gas Leasing Program, 2007-2012*, at V-64 (Apr. 2007) (citing 2005 NRC Report), <http://www.boem.gov/Oil-and-Gas-Energy-Program/Leasing/Five-Year-Program/5and6-ConsultationPreparers-pdf.aspx> (MMS agreed with the National Academy of Sciences’ National Research Council that “there are no documented or known population-level effects due to sound,” and “there have been no known instances of injury, mortality, or population level effects on marine mammals from seismic exposure”).

no data to suggest that activities from the previous OCS Program are significantly impacting marine mammal populations.” DPEIS at 4-77 (emphasis added).

In addition, the 2016 report from the National Academy of Sciences, Ocean Studies Board (the “NAS Report”),<sup>16</sup> makes the following findings regarding marine sound from seismic acoustic sources:

- “The National Research Council report Marine Mammal Populations and Ocean Noise (NRC, 2005) noted that: ‘No scientific studies have conclusively demonstrated a link between exposure to sound and adverse effects on a marine mammal population.’ That statement is still true....” (NAS Report at 16);
- “Evidence of the effects of noise on marine mammal populations is largely circumstantial or conjectural” (NAS Report at 28);
- “The probability of marine mammals experiencing PTS [injury] from anthropogenic activities will likely be sufficiently low as to preclude any population-level effects” (NAS Report at 35);
- “Miller et al. (2009) conducted controlled approaches of a commercial seismic survey vessel to make pass-by’s of sperm whales in the Gulf of Mexico. The whales, which were exposed to received levels varying from 120-147 dBRMS at ranges varying from 1.4-12.8 km, did not change their direction of travel or behavioral state in response to exposure, but did decrease the energy they put into swimming and showed a trend for reduced foraging. Madsen et al. (2002) studied responses of sperm whales in Norwegian waters to seismic surveys at ranges > 20 km, and reported no responses at exposure ranging up to 123-130 dBRMS.” (NAS Report at 56).

Consistent with the NAS Report’s findings, there are well-documented examples of long-term exposures of acoustically sensitive species where no biologically significant chronic or cumulative impacts have occurred. For example, oil and gas seismic exploration activities have been regularly conducted in the Beaufort and Chukchi Seas of the Arctic Ocean for decades, with regular monitoring and reporting to NMFS under the auspices of MMPA incidental take authorizations issued since the early 1990s. During this lengthy period of acoustic exposures, and despite annual lethal takes by Alaska Natives engaged in subsistence activities, bowhead whales have consistently increased in abundance to the point that they are believed to have

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<sup>16</sup> National Academies of Sciences, Engineering, and Medicine. 2016. Approaches to Understanding the Cumulative Effects of Stressors on Marine Mammals. Washington, DC: The National Academies Press. doi: 10.17226/23479. <https://www.nap.edu/download/23479#>.

reached carrying capacity. Similarly, no effects of G&G activities have been observed in Arctic ice seal populations.<sup>17</sup>

Finally, BOEM's Environmental Studies Program has spent more than \$50 million on protected species and sound-related research over more than four decades without finding evidence of adverse effects. See <http://www.boem.gov/BOEM-Science-Note-August-2014/> (*Science Notes*, Aug. 22, 2014) ("Since 1998, BOEM has partnered with academia and other experts to invest more than \$50 million on protected species and noise-related research."). The geophysical and oil and gas industries, the National Science Foundation, the U.S. Navy, and others have spent a comparable amount of money on researching potential impacts of seismic surveys on marine life and have found no evidence of significant effects. See [http://www.scandoil.com/moxie\\_issue-bm2/bm.doc/sogm\\_1-2-16\\_sml-jip.pdf](http://www.scandoil.com/moxie_issue-bm2/bm.doc/sogm_1-2-16_sml-jip.pdf); [www.soundandmarinelife.org](http://www.soundandmarinelife.org).

None of the information above is meaningfully discussed in the Application. Yet, this information is plainly relevant to the development of an accurate assessment of the "anticipated" impacts of geophysical activities on marine mammals in the GOM. 50 C.F.R. § 216.104(7). This information is also indisputably part of the best available scientific information relevant to the Application.

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<sup>17</sup> See, e.g., 84 Fed. Reg. 25,829, 25,834 (May 1, 2012) ("Bowhead whales have continued to travel to the eastern Beaufort Sea each summer despite seismic exploration in their summer and autumn range for many years (Richardson *et al.* 1987), and their numbers have increased notably (Allen and Angliss 2010). Bowheads also have been observed over periods of days or weeks in areas ensonified repeatedly by seismic pulses (Richardson *et al.* 1987; Harris *et al.* 2007)."); *id.* at 25,837 ("There is no specific evidence that exposure to pulses of air-gun sound can cause PTS [physical injury] in any marine mammal, even with large arrays of air-guns."); *id.* at 25,838 ("To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to air-gun pulses, even in the case of large air-gun arrays."); *id.* at 25,839 ("Thus, the proposed activity is not expected to have any habitat-related effects on prey species that could cause significant or long-term consequences for individual marine mammals or their populations."); 75 Fed. Reg. 49,760, 49,795 (Aug. 13, 2010) ("To date, there is no evidence that serious injury, death or stranding by marine mammals can occur from exposure to air-gun pulses, even in the case of large air-gun arrays."); see also Reichmuth, C., Ghoul, A., Sills, J., Rouse, A. and B. Southall. 2016. Low-frequency temporary threshold shift not observed in spotted or ringed seals exposed to single air gun impulses, *J. Acoust. Soc. Am.*, 140: 2646-2658 ("There was no evidence that these single seismic exposures altered hearing – including in the highest exposure condition, which matched previous predictions of temporary threshold shift (TTS) onset .... The absence of observed TTS confirms that regulatory guidelines (based on M-weighting) for single impulse noise exposures are conservative for seals.").

**b. PSO monitoring data**

The Application also fails to present and consider the accumulated observational data collected by Protected Species Observers (“PSOs”) on survey vessels in the GOM. This information is clearly relevant to the assessment of the potential effects of seismic vessels operating in the GOM. Not surprisingly, the PSO data indicate a negligible level of effects that undermines the results of the exposure modeling presented in the Appendix. For example, the Application implausibly concludes that many thousands of marine mammals will experience incidental take as a result of seismic activities. These estimates would result in tens of thousands of shutdown events per year. However, based on actual monitoring data, as reported in relatively recent environmental assessments, an average of only 55 shutdowns occur per year in the GOM with operations conducted under the Standard Mitigation Measures. *See also Attachment B; Barkaszi et al. (2012) (reporting a total of 144 shutdowns from 2002 to 2008, or 24 per year).*<sup>18</sup> The PSO data must be fully disclosed and evaluated in the Application because they are relevant to an accurate estimate of the incidental takes that are “likely to occur” and the “anticipated” impact. 50 C.F.R. § 216.104(7).<sup>19</sup> These data are also part of the best available science.

**c. The take estimates and impact analyses are not based on the best available acoustic criteria**

The Guidance establishes acoustic criteria for evaluating Level A harassment and TTS. Despite the availability of drafts of the Guidance and the scientific basis for the Guidance for many months prior to August 2016, the Application’s exposure modeling analysis does not use the Guidance:

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<sup>18</sup> A study of more than a decade’s worth of marine mammal observation data performed by the Joint Nature Conservation Committee (“JNCC”) demonstrates that mitigation measures significantly reduce the effects of seismic activities on marine mammals. The JNCC study’s results should be addressed in the Application. *See* <http://jncc.defra.gov.uk/page-6985>.

<sup>19</sup> Under the MMPA, Level A harassment is defined as “any act of pursuit, torment, or annoyance which . . . has the potential to injure a marine mammal or marine mammal stock in the wild.” 16 U.S.C. § 1362(18)(A)(i) (emphasis added); *see also* 50 C.F.R. § 216.3. As described above, there is no scientific evidence demonstrating that G&G activities have resulted in the injury of marine mammals. Rather, the record shows that commonly employed avoidance and mitigation measures are effective in avoiding Level A harassment and minimizing the amount of Level B harassment. For this additional reason, the Associations are opposed to the modeled Level A exposures presented in the Application. At the very most, a *de minimus* amount of Level A incidental takes could be requested based on an approach that calculates a rate of reported shutdowns during seismic surveys in the GOM over the past several years and applies that rate to the levels of activity projected in the Application, using a multiplier to address the potential unmitigated exposures that may occur.

The NMFS has advised BOEM that the use of the previous acoustic criteria to model exposure estimates is acceptable given the timing of the petition being complete and the issuance of the revised acoustic guidelines. BOEM does anticipate, however, that the July 2016 changes to NMFS' acoustic criteria likely mean the Level A exposures predicted in the modeling used for the [DPEIS and the Application] are, in most cases, overestimates.

Application at 94-95. The Application does present estimates using metrics similar to those set forth in the Guidance, but the amount of Level A incidental take for which the Application requests authorization is inexplicably based upon the outdated 1995 criteria. See Application, Table 6-14. Similarly, the Application presents Level B incidental take estimates generated from both the outdated 1995 criteria and newer criteria based upon Wood et al. (2012). However, again, the amount of Level B incidental take for which authorization is requested is inexplicably based upon the 1995 criteria. *Id.*

Additionally, the analytical methods and criteria that are used in the acoustic analyses supporting the Appendix modeling are less than straightforward. For example, the Appendix uses the outdated 1995 criteria, but applies Southall et al. (2007) M-1 weighting to those values, which were originally unweighted values. The Appendix modeling also uses Southall et al. (2007) SPL peak Permanent Threshold Shift ("PTS") onset values, but for low-frequency cetaceans creates its own PTS onset threshold of 192 dB re 1  $\mu\text{Pa}^2$  s SEL by subtracting 6 dB from the mid-frequency cetacean onset value of 198 dB re 1  $\mu\text{Pa}^2$  s (another precaution layered on top of already precautionary numbers). Appendix at D-55. Another example of unclear development of a threshold value appears in the very next paragraph where the analysis cites a value of 187 dB SEL as the mid-frequency cetacean threshold, derived by using a beluga TTS onset of 186 dB, applying Finneran and Jenkins (2012) Type II M-weighting to derive a weighted value of 172 dB and then adding 15 dB to produce a PTS threshold for mid-frequency cetaceans of 187 dB. In short, the methods for deriving the criteria used in the analysis are hardly clear.

BOEM is required to use the best available scientific information when preparing the application. See 50 C.F.R. §§ 216.102(a), 216.104(c), 216.105(c). It is undisputed that NMFS's 1995 acoustic criteria for Level A and Level B incidental take by harassment are no longer the best available science. For Level A incidental take (and TTS), the best available science is, by NMFS's own assertion, currently the Guidance. For Level B incidental take, the criteria set forth in Wood et al. (2012) is more current than NMFS's 1995 criteria and more consistent with a large number of similar behavioral effects models (*e.g.*, as cited in Southall et al. (2016)<sup>20</sup>).

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<sup>20</sup> Southall, B., Nowacek, D., Miller P., and Tyack, P. 2016. Experimental field studies to measure behavioral responses of cetaceans to sonar. *Endangered Species Res.* 31:293-315. doi: 10.3354/esr00764.

Accordingly, the Application, and the subsequent rulemaking, must use the more current sources of information that are the “best available.”<sup>21</sup>

#### **4. The Application’s incidental take estimates and impact analyses improperly ignore mitigation measures**

By BOEM’s admission, the Application’s incidental take estimates and impact analysis do not take into account the beneficial effects of the mitigation measures that will be required of operators who receive authorizations under the contemplated ITRs. See Application at 93 (“the model is not able to consider the effect of reduction of exposures from any of the 19 mitigation measures analyzed in the associated [DPEIS]”); *id.* at 129 (the mitigation measures are “meant to decrease and reduce the potential for Level A and Level B exposures[, but] [t]he modeled exposures largely do not take into account the effect these mitigations have in reducing exposures (and therefore potential for take).”<sup>22</sup>

BOEM’s decision to ignore the beneficial effects of mitigation measures is particularly arbitrary because BOEM knows—unconditionally—that the mitigation measures will substantially decrease any adverse effects postulated by the overly conservative exposure modeling. See, e.g., Application at 83, 129. In addition, the Appendix demonstrates the likely effectiveness of currently employed mitigation measures. Specifically, in Phase I of the exposure modeling described in the Appendix where various modeling methods, inputs, and assumptions are assessed, Sections 6.5.3 and 6.5.4 consider the effects of incorporating mitigation measures and aversive responses into the exposure modeling. Tables 40 and 44 show that the implementation of shutdowns may reduce the number of estimated Level A exposures by 10% to 80%.<sup>23</sup> Similarly, the effect of modeling aversive responses by marine mammals also

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<sup>21</sup> As the Associations addressed in three comment letters submitted during the process for developing the Guidance, there are technical flaws in the Guidance. We have attached those three comment letters to this letter, and request that they be included in the administrative record for the contemplated ITRs. See Attachment C. There are also flaws with Wood et al. (2012), but that paper is more current than the 1995 criteria.

<sup>22</sup> See also DPEIS at 1-16 (“The modeling is conservative because it did not apply any of the 19 different mitigations analyzed in [the DPEIS].”); *id.* at 1-19 (“The modeling effort in Appendix D does not, for example, take into account any mitigation measures incorporated into the alternatives because the effect of those measures cannot be quantified with statistical confidence at this time.”); *id.* at 4-14 (mitigation measures not considered as part of effects analysis).

<sup>23</sup> The effectiveness of mitigation varies by species as it is related to the probability of detecting each species; however, those species that form large groups and/or are most abundant are the ones for which mitigation is most effective. Thus, the percent reduction in estimated exposures is likely greatest for the species with the highest absolute estimated exposures.

shows potentially large reductions in the percentages of animals exposed above Level A criteria (40% to 85% for the peak SPL criteria and 14% to 20% for the rms SPL).

Despite these demonstrations of significant and meaningful reductions in the number of estimated exposures as a result of mitigation measures and aversive responses, and the fact that both are very likely to occur, they are inexplicably not included in the final (Phase II) modeling used to estimate exposures for the impact assessments and ultimately not considered as part of the effects analysis. Although there are uncertainties associated with including these measures in the modeling process, those uncertainties are not substantially different than uncertainties associated with other inputs to the modeling process, and they should not be disqualified from use for that reason.

BOEM's failure to incorporate the known benefits of mitigation measures, many of which are standard best practices that the geophysical industry already implements, results in take estimates that, by BOEM's admission, are not "likely to occur" and an assessment of impacts that are not "anticipated." *See, e.g.,* DPEIS at 1-16 ("This estimate alone does not reflect BOEM's determination of the actual expected physical or behavioral impacts to marine mammals but rather an overly conservative upper limit because none of the mitigations examined in this Programmatic EIS were modeled."). BOEM's approach is arbitrary, unsupported, and contrary to the MMPA. *See* 50 C.F.R. § 216.104(6), (7).

## **5. Conclusions—Chapters 6 and 7**

As set forth above, the estimates, analyses, and conclusions presented in Chapters 6 and 7 are unrealistic, flawed, incomplete, and unlawful. The conclusions are exclusively based upon a modeling exercise that uses a multiplicative series of conservatively biased assumptions for all uncertain parameter inputs. These assumptions lead to accumulating bias as the cumulative conservative assumptions add up to increasingly unlikely statistical probabilities that are not remotely representative of real-world conditions. Consequently, the results quickly become little more than improbable worst case scenarios—not fair simulations or representations of likely effects.

Aside from being scientifically and legally indefensible, BOEM's conclusions are not supported by the best available information, which demonstrates that no significant impacts to marine mammal populations from seismic activities have occurred in the GOM. Furthermore, the scenario presented in the Application is unrealistic and not representative of real-world activities as there is no meaningful consideration of mitigation measures and their effectiveness. Insofar as we are aware, no seismic activities in the United States OCS have caused impacts amounting to anything more than temporary changes in behavior, without any known injury, mortality, or other biologically significant consequence to any marine mammal species or

stocks.<sup>24</sup> For the reasons detailed above, Chapters 6 and 7 of the Application must be substantially revised and resubmitted, on the schedule set forth in the Settlement Agreement and the Stipulation to Amend, to comply with applicable MMPA regulations.<sup>25</sup>

### **C. The Application Fails to Clearly Present Marine Mammal Population Information**

In the Application, BOEM is required to report “[t]he species and number of marine mammals likely to be found within the activity area.” 50 C.F.R. § 216.104. However, as set forth below, the Application fails to clearly present this required information and sufficiently explain how the alternative sources are used in the impact analysis.

The Application provides two abundance values for each species based upon the 2016 Duke habitat-correlated density modeling (“Duke model”)<sup>26</sup> and NMFS’s stock assessment reports (“SARs”). See Application, Table 3-1. The Phase I modeling set forth in the Appendix uses Navy Operating Area Density Estimates (“NODES”) and population data from the SARs. The Phase II modeling in the Appendix uses the Duke model values. The following summarizes some of the problems associated with the Application and Appendix’s use of different datasets and models related to marine mammal abundance and density.

First, habitat-correlated density modeling may not capture all of the habitat variables that are important to the animals and consequently places modeled animals in areas where they are never or rarely present. For example, Bryde’s whales are rarely observed outside the region around and south of De Soto Canyon,<sup>27</sup> yet the Duke model places modeled Bryde’s whales in

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<sup>24</sup> The Associations’ position that there are currently no demonstrated adverse effects from seismic surveys on marine mammal populations does not preclude our taking a proactive and environmentally responsible approach by actively investigating legitimate concerns raised by subject matter authorities, and doing so in the best traditions of independent, peer-reviewed scientific study. See E&P Sound and Marine Life Joint Industry Programme, [www.soundandmarinelife.org](http://www.soundandmarinelife.org)).

<sup>25</sup> Additional technical comments are provided in Attachment D to this letter.

<sup>26</sup> See Roberts JJ, Best BD, Mannocci L, Fujioka E, Halpin PN, Palka DL, Garrison LP, Mullin KD, Cole TVN, Khan CB, McLellan WM, Pabst DA, Lockhart GG. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. *Scientific Reports* 6: 22615. doi: 10.1038/srep22615. <http://seamap.env.duke.edu/models/Duke-EC-GOM-2015/>.

<sup>27</sup> See Waring, G., Josephson, E., Maze-Foley, K, and Rosel, P., eds. 2016. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments-2015. NOAA Technical Memorandum NMFS-NE-238. [http://www.nmfs.noaa.gov/pr/sars/pdf/atlantic2015\\_final.pdf](http://www.nmfs.noaa.gov/pr/sars/pdf/atlantic2015_final.pdf). (“The vast majority of the small number of Bryde’s whale sightings from each survey occurred in a very restricted area of the northeastern Gulf (Figure 1) during surveys that uniformly sampled the entire oceanic northern Gulf.”).

relatively high density at the continental shelf edge from Texas to the Florida Straits because the habitat suitability model indicates that they “could” use those places. The Duke model thus results in the calculation of densities of Bryde’s whales in Zone 4 of the Appendix’s seven zone system when that clearly is not supported by the available sighting data.

Second, the Appendix makes unsupported revisions to some of the results from the Duke model. For example, the Appendix modeling pushes all sperm whales into 1,000 m water depth, causing a discrepancy between the Duke model results as well as the actual observations of whales (Waring et al. 2015).

Third, the Appendix modeling evenly spreads species for which little data are available (e.g., killer whales, false killer whales, Fraser’s dolphins) across all habitats that the modelers deem appropriate (generally deeper water, Zones 4-7). Some species, such as Fraser’s dolphins and false killer whales, are therefore assumed to be abundant and widespread in areas where they are historically seldom seen.<sup>28</sup>

Fourth, rather than use a specific value for each 100 km<sup>2</sup>, the Appendix modeling averages the values from each 100 km<sup>2</sup> box across an entire zone containing hundreds or thousands of 100 km<sup>2</sup> boxes. This enables the placement of animals into the outermost Zone 7 where there is little or no data and therefore no modeling by Duke. By expanding the Duke model averages into areas outside the scope of the model, the Appendix increases the total number of animals present beyond the predictions of the SARs, NODES, or the Duke model. The Appendix presents the averaged values as a minimum, maximum, and mean, which is an appropriate way to convey some of the statistical uncertainty about the model numbers. See Appendix at D-201. However, there is insufficient information to determine how these values were obtained from the source information.<sup>29</sup>

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<sup>28</sup> See Waring, G., Josephson, E., Maze-Foley, K, and Rosel, P., eds. 2013. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments-2012. Fraser’s Dolphin. <http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2012dofr-gmxn.pdf> (“sightings of groups of Fraser’s dolphins have historically been uncommon to rare”); see also Roberts JJ, Best BD, Mannocci L, Fujioka E, Halpin PN, Palka DL, Garrison LP, Mullin KD, Cole TVN, Khan CB, McLellan WM, Pabst DA, Lockhart GG (2015) Density Model for Fraser’s Dolphin (*Lagenodelphis hosei*) for the U.S. Gulf of Mexico Version 1.3, 2015-09-26, and Supplementary Report. Marine Geospatial Ecology Lab, Duke University, Durham, North Carolina. <http://seamap.env.duke.edu/models/Duke-EC-GOM-2015/> (“Because this taxon was sighted too infrequently to fit a detection function to its sightings alone, we fit a detection function to the pooled sightings of several other species that we believed would exhibit similar detectability.”).

<sup>29</sup> The Appendix also refers to a set of Excel workbooks (see, e.g., Appendix at D-213) that cannot be found on the BOEM website and for which a link is not otherwise provided.

In sum, the Application's presentation and use of "[t]he species and number of marine mammals likely to be found within the activity area" in estimating incidental takes is unclear and premised on erroneous assumptions and data. Regardless of what specific dataset is used to generate the population estimates for marine mammal species and stocks, it is imperative that the same dataset be used by NMFS when it assesses whether the requested incidental take levels will impact "small numbers" of marine mammals and have a "negligible impact" on marine mammal species and stocks. It would be arbitrary and capricious, and in violation of the MMPA and the Administrative Procedure Act, if NMFS were to use one dataset for the purpose of estimating the population sizes of relevant marine mammal species and stocks and another dataset for the purpose of determining whether the requested incidental take levels satisfy the MMPA's "small numbers" and "negligible impact" standards.<sup>30</sup>

#### **D. The Application's Presentation of Mitigation Measures is Flawed**

The record demonstrates that the Standard Mitigation Measures, as applied to geophysical operations in the GOM, are already more than adequate to protect marine mammals in a manner consistent with the MMPA.<sup>31</sup> Despite this record, the Application recommends certain mitigation measures that are more stringent (and less supported) than the measures that have already been successfully implemented. As described below, the Application's

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<sup>30</sup> As NMFS prepares the proposed rule, the Associations direct NMFS's attention to *Ctr. for Biological Diversity v. Salazar*, 695 F.3d 893 (9th Cir. 2012). This decision provides the most current statement of the law regarding various aspects of MMPA Section 101(a)(5)(A) in the specific context of offshore oil and gas exploration. The Ninth Circuit held, *inter alia*, that the federal agency issuing the regulations is not required "to quantify or estimate the number of mammals that would be taken." *Id.* at 906. The court upheld the agency's "small numbers" finding based upon a reasonable qualitative analysis performed by the agency. *Id.* at 906-07.

<sup>31</sup> See *supra* note 15; see also Mary Jo Barkaszi et al., *Seismic Survey Mitigation Measures and Marine Mammal Observer Reports* (2012); A. Jochens et al., *Sperm Whale Seismic Study in the Gulf of Mexico: Synthesis Report*, at 12 (2008) ("There appeared to be no horizontal avoidance to controlled exposure of seismic airgun sounds by sperm whales in the main SWSS study area."); 78 Fed. Reg. 11,821, 11,827, 11,830 (Feb. 20, 2013) ("it is unlikely that the proposed project [a USGS seismic project] would result in any cases of temporary or permanent hearing impairment, or any significant non-auditory physical or physiological effects"; "The history of coexistence between seismic surveys and baleen whales suggests that brief exposures to sound pulses from any single seismic survey are unlikely to result in prolonged effects."); 79 Fed. Reg. 14,779, 14,789 (Mar. 17, 2014) ("There has been no specific documentation of temporary threshold shift let alone permanent hearing damage[] (i.e., permanent threshold shift, in free ranging marine mammals exposed to sequences of airgun pulses during realistic field conditions."); 79 Fed. Reg. 12,160, 12,166 (Mar. 4, 2014) ("To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to air gun pulses, even in the case of large air gun arrays.").

presentation of mitigation measures is flawed because it (1) contains no practicability assessment and (2) proposes some mitigation measures that are impracticable, unnecessary, and otherwise without support.

**1. The Application fails to provide a practicability assessment, contrary to applicable regulations**

The Application must describe the “[t]he availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks. . . .” 50 C.F.R. § 216.104(a)(11) (emphasis added). Identification of the measures sufficient to effect the “least practicable adverse impact” necessarily requires an assessment of what measures are “practicable” in the first place, including a cost-benefit analysis. However, by BOEM’s admission, the Application fails to present any such assessment. See Application at 139 (“The analysis of these measures does not include issues of operational practicability or cost.”). As a result, the Application is deficient and the public is unable to sufficiently comment on the practicability of the mitigation measures that NMFS will consider as it prepares a proposed rule.<sup>32</sup>

**2. Certain mitigation measures proposed in the Application are impracticable, unnecessary, and without support**

As addressed in the following subsections, the Application proposes some measures that are not practicable. If implemented, these measures will have substantial adverse effects on offshore geophysical operations and substantial economic impacts, thereby threatening the economic viability of G&G activities in the GOM. Seismic surveys not conducted because of operational inefficiencies, seasonal shutdown, survey restrictions, or area closures are not simply displaced to other times or areas. With unreasonable mitigation measures continually in place, surveys originally planned for Year 1 would replace surveys that would have occurred in Year 2, while even more Year 2 planned surveys would be pushed to Year 3, and so on. Over time, the

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<sup>32</sup> A practicability assessment must take into account, *inter alia*, the number of wells that will not be drilled as a result of certain mitigation measures and how reduced drilling will have significant negative impacts on production, government revenue, gross domestic product, and employment. The potential economic impact would be dependent on the number of quality oil and gas targets in the four areas. In addition, there are at least 5,350 active leases in areas for which potential value would be greatly compromised. Any current investment in these areas would be essentially stranded and the value of lost revenue could be in the billions of dollars, yet BOEM has not provided estimates for these lost opportunities. We are concerned that the contemplated ITRs could have an annual effect of \$100 million or more on the economy and/or a significant adverse effect on the supply, distribution, or use of energy. Accordingly, analyses under Executive Orders 12866 and 13211 should be conducted.

ripple effect of delayed or forgone surveys will reduce overall seismic data collection, adversely impacting the industry's ability to drill new wells and curtailing future production. Timing delays large enough to affect drilling schedules are more important to potential economic impacts than seismic cost increases. Additionally, these impracticable measures will result in increased survey duration, which, in turn, can increase the potential exposure of marine mammals to sound from seismic surveys and the potential for interference with other users of the GOM.<sup>33</sup>

**a. Seasonal restriction for coastal waters**

The Application includes a seasonal restriction for seismic surveys "in Federal coastal waters of the GOM shoreward of the 20-m (67-ft) depth contour to the State-Federal boundary between January 1 and April 30 to protect calving dolphins." Application at 141. However, this proposed restriction is unsupported for a number of reasons, as set forth below. For these reasons, we request that the seasonal restriction be eliminated from further consideration.

First, the rationale originally offered by the plaintiff parties to the Settlement Agreement for the nearshore restriction was in response to coastal bottlenose strandings and mortalities (*i.e.*, the Northern GOM UME). However, the UME has since been closed. *See* [http://www.nmfs.noaa.gov/pr/health/mmume/cetacean\\_gulfofmexico.htm](http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico.htm). Moreover, none of the strandings or deaths in the UME have been attributed to deep penetration seismic survey activities. Instead, recent research demonstrates that seismic impulses at even higher thresholds fail to induce even TTS in dolphin hearing. *See* Finneran J.J. et al. (2015). There are no data suggesting that sound is a problem for the bottlenose dolphin population in general or the mother-calf pairs in particular, and it is equally, if not more, plausible that the animals are completely unaffected by sound. The fact that these populations may be affected by coastal pollution, vessel traffic in the estuaries, or endemic diseases is not a basis for restricting an activity that has no demonstrated adverse effect. Accordingly, no relevant scientific evidence supports a further restriction of deep penetration seismic surveys, let alone suggests that such a restriction would result in any meaningful benefit to coastal bottlenose dolphin populations.

Second, another possible rationale for the nearshore restriction is that seismic activity is an additional stressor to an already stressed bottlenose dolphin population in the UME, and that such additional stress may impact dolphin breeding rates. However, there is no evidence that sound from deep penetration seismic surveys is a stressor to coastal bottlenose dolphin populations or contributes in any way to dolphin late-term pregnancy complications or to perinatal and postnatal responses that would lead to increased calf mortality, or UMEs. *See* Litz et al. (2014); Venn-Watson et al. (2015).

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<sup>33</sup> The mitigation measures also increase the amount of time the vessel spends surveying because shutdowns and delays necessarily result in overall increased surveying time to preserve data quality and integrity.

Third, there are unleased blocks within the area covered by the seasonal restriction. Because existing seismic data in these areas is outdated and inadequate to inform decisions regarding future lease sales, such a restriction would significantly impede industry's and BOEM's evaluation of blocks for planned future lease sales. Moreover, given the amount of time required to acquire additional seismic data, the proposed seasonal exclusion significantly increases the likelihood that it will not be feasible for an affected deep penetration seismic survey to be completed within its one-year permit term, thereby increasing the overall number of surveys that will need to be conducted.

**b. Reduced activity levels**

The Application mentions reduced levels of deep-penetration, multi-client seismic activities by either 10% or 25%, but leaves it ambiguous as to whether BOEM or NMFS will attempt to mandate these reduced levels through issuance of the contemplated ITRs. See Application at 121-22. The purpose or likelihood of this "measure" is not discussed anywhere in the Application. However, it is addressed in the DPEIS, which states that the measure would be a "Gulfwide strategy designed to reduce overall exposures and sound levels," the stated purpose of which is to "reduc[e] protected species cumulative sound exposures because a reduced number of surveys would be performed." DPEIS at 2-47. To the extent BOEM or NMFS plans to implement the contemplated 10% or 25% activity reductions through the contemplated ITRs, the Associations strongly object because they have no legal basis and are arbitrary.

First, under the MMPA, NMFS has the authority to grant or deny, or to reasonably condition, marine mammal incidental take authorizations. See *Ctr. for Biological Diversity v. Salazar*, 695 F.3d 893, 916 (9th Cir. 2012) (MMPA incidental take authorizations only authorize incidental take, not the underlying activity). Accordingly, any mitigation measures premised upon NMFS's MMPA authority may only address the proposed MMPA action—i.e., authorization of incidental take, not the actual exploration activities. See *id.*; see also 16 U.S.C. § 1371(a)(5)(A)(i) (Secretary "shall allow" incidental taking that meets applicable statutory standards). Thus, there is no authority under the MMPA for NMFS to impose generalized reduction measures on the underlying activities through the contemplated ITRs.

Second, the contemplated activity reductions also present practical implementation problems. For example, one could perform a 3D survey with a 4,000 cubic inch array or a 2D survey with 10 km track spacing and have half or fewer the number of incidental takes in the same number of track miles. In this example, would 50,000 track miles at half the exposure levels be translated into 25,000 track miles for purposes of calculating the remaining allocations available? How would the reductions be fairly apportioned among the various applicants over the course of a year? Such questions are not addressed at all in the Application (or the DPEIS), further highlighting the impracticability of the contemplated measure.

Third, as detailed in Sections II and III.B.3.a *supra*, even if NMFS did have authority to require activity reductions (which it does not), there is no demonstrated need for such reductions because all of the best available information shows that the potential impacts of G&G activities

on marine mammal populations are insignificant. Any such reductions would also directly contradict the “first stated purpose of OCSLA,” which is “to establish procedures to expedite exploration and development of the OCS.” *Watt*, 668 F.2d at 1316.

**c. Exclusion zones**

The Application does not address how the size of exclusion zones will be established. However, the DPEIS explains that exclusion zones “will be dependent upon the source levels, array configuration, operational parameters, and environmental and oceanographic conditions” and that the “actual extent of the acoustic isopleths around the sound source will depend on the source level, source configuration, water depth, bottom properties, and sound propagation through the immediate environment.” *Id.* The DPEIS’s suggested approach for exclusion zones will require a substantial modeling effort and will result in exclusion zones that are many times greater than those that have typically been implemented (with success) in the GOM. Any such expanded exclusion zones are especially concerning because they will ultimately be dictated by the marine mammal hearing group with the largest modeled radii once new group-specific acoustic criteria are implemented. Because the Application does not address this issue in any detail, we are unable to provide more specific comments.

Any exclusion zone measures included in the proposed rule should be based on the best available information, and if that information demonstrates that exclusions zones of less than 500 meters are warranted, then there is no basis for arbitrarily requiring a minimum exclusion zone of 500 m (if the Application intends for 500 m to be a minimum). *See* Application at 147. If a minimum 500 m exclusion zone requirement is not applied, the Associations would support the incorporation of power-down procedures to mitigate any potential effects. Power-down procedures acceptable to the Associations are a modified version of the procedures described at 79 Fed. Reg. 14,780, 14,797 (Mar. 17, 2014) (“Langseth IHA”).<sup>34</sup>

**d. Passive acoustic monitoring**

BOEM proposes to require Passive Acoustic Monitoring (“PAM”) in certain circumstances. *See* Application at 142-43. PAM is one of several monitoring techniques that offers a monitoring capability during periods of poor visibility or night conditions. PAM complements (rather than replaces) traditional visual monitoring. Mandatory use of PAM may substantially increase survey cost, require the placement of more personnel on vessels (*i.e.*, four dedicated PAM observers onboard), and potentially increase entanglement risk due to more gear

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<sup>34</sup> Specifically, the Associations would support power-down procedures similar to those in the Langseth IHA provided that: (1) power-down would be implemented only if a marine mammal is observed in or entering (not “likely” to enter) the exclusion zone; (2) power-down procedures may involve a reduction in the volume and/or pressure of the array; and (3) if a marine mammal is observed within the 500 m exclusion zone, then the reduced array would be shut down and shutdown procedures would apply.

being towed in the water. The Associations therefore urge NMFS to propose the use of PAM as a mitigation option that can be elected by an LOA applicant on a case-by-case basis.

**e. National standards for PSOs**

The Application proposes to apply the observer qualifications addressed in NOAA Technical Memorandum NMFS-OPR-49, *National Standards for a Protected Species Observer and Data Management Program: A Model Using Geological and Geophysical Surveys* (Nov. 2013) (the “Observer Standards”). See Application at 143, 145. However, the Observer Standards are flawed in a number of respects. It is imperative that the agencies consider public input on the Observer Standards and make the revisions necessary to ensure that the standards are workable, accurate, and appropriate before they are required. The standards should encourage adaptive technology, remote monitoring, reduction of health, safety, and environmental risks, and use of an updated reporting form that provides substantive data from observations to inform the need (if any) for additional or revised mitigation measures. The letter by IAGC, API, and NOIA, dated May 2, 2014, addressing the Observer Standards more specifically states our concerns with the Observer Standards and offers constructive solutions. See Attachment E. We appreciate the agencies’ consideration of our concerns.<sup>35</sup>

**E. The Adaptive Monitoring Plan Must Be Consistent with Applicable Law**

The Application states that BOEM and NMFS are presently developing an adaptive monitoring plan that will be implemented for the life of the contemplated ITR, the “overarching goal” of which is to “inform our understanding of how geophysical activities may affect marine mammals in the GOM.” Application at 152. However, the Application includes very little additional information about the monitoring plan.

The Associations have a strong interest in environmental monitoring—both to better understand the environment in which our members work and to mitigate potential risks of activities to living marine resources. The Associations support efforts that improve the quantity and quality of information related to determining the nature and magnitude of the potential effects of offshore geophysical activities on marine mammals. Such information assists with developing reasonable and workable incidental take authorizations, including appropriate mitigation measures to minimize incidental take, and correctly assessing the type and amount of incidental take that occurs in the course of geophysical operations. In this light, the Associations support both ongoing and future research endeavors by industry and its partners that help to inform the understanding and mitigation of potential effects of geophysical activities on marine mammals in the GOM. We also support agency efforts to improve the collection and use of the best available science consistent with the requirements and limits of the MMPA.

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<sup>35</sup> We agree with BOEM’s decision to not propose buffer zones between concurrent surveys or shutdown requirements applicable to dolphins. As stated in our comments on the DPEIS, there is no support for either of these hypothetical measures.

Nonetheless, the Associations have expressed concern on multiple occasions that the agencies' envisioned monitoring requirements for the contemplated ITR will exceed the authority granted to NMFS. We have explained in detail that the MMPA does not authorize NMFS to require as a condition of an incidental take authorization the preparation or development of a large-scale, expansive monitoring plan that reaches beyond the time and area in which site-specific activities are undertaken or the performance of actions related to such a plan. Our comments detailing these concerns are attached as Attachment F so that they may be included in the administrative record for the contemplated ITR. The Associations look forward to working collaboratively with BOEM and NMFS to complete the preparation of a legally compliant and operationally effective monitoring plan.

#### IV. CONCLUSION

As explained above, the performance of G&G activities is critical to the federally mandated "expeditious and orderly development" of the GOM OCS. A wealth of data and information demonstrates that the geophysical activities addressed by the Application will have no more than a temporary, localized, and negligible impact on marine life. Unfortunately, the information presented in the Application is not consistent with this well-established record and erroneously requests authorization for incidental take at levels that are exponentially higher than the levels that are reasonably anticipated to occur based upon the best available science. Because the Application is so deeply flawed, and the exposure estimates so inaccurate, the Application must be substantially revised and resubmitted on a schedule that complies with the Settlement Agreement and the Stipulation to Amend.

We appreciate your consideration of all of the comments set forth in this letter, which are intended to be constructive and to facilitate the improvement of the scientific and legal integrity of the Application and the contemplated ITR. Should you have any questions, please do not hesitate to contact Nikki Martin (713.957.5068) or Andy Radford (202.682.8584).

Sincerely,



Nikki Martin  
International Association of Geophysical Contractors  
President



Andy Radford  
American Petroleum Institute  
Sr. Policy Advisor – Offshore

Ms. Jolie Harrison  
January 23, 2017  
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A handwritten signature in black ink, appearing to read "Jeff Vorberger". The signature is fluid and cursive, with the first name "Jeff" and last name "Vorberger" clearly distinguishable.

Jeff Vorberger  
National Ocean Industries Association  
Vice President Policy and Government Affairs

A handwritten signature in black ink, appearing to read "Greg Southworth". The signature is fluid and cursive, with the first name "Greg" and last name "Southworth" clearly distinguishable.

Greg Southworth  
Offshore Operators Committee  
Associate Director