UNITED STATES DEPARTMENT OF THE INTERIOR
OFFICE OF HEARINGS AND APPEALS
INTERIOR BOARD OF LAND APPEALS

IBLA 2017-135, *et al.*	**E14-001, *et al.***
TGS, *et al.*	**Offshore Oil & Gas Exploration Permit Denied**
	DECLARATION OF NIKKI C. MARTIN

DECLARATION OF NIKKI C. MARTIN

1. My name is Nikki C. Martin. I make this Declaration on the basis of personal knowledge and am competent to testify to the matters stated in this Declaration, which are true and correct to the best of my knowledge, information, and belief.

2. I am the President of the International Association of Geophysical Contractors ("IAGC") and have served in that position since 2015.

3. IAGC is a private non-profit trade association, based in Houston, Texas, that represents approximately 100 members from all segments of the geophysical industry. The geophysical industry is essential to the discovery and delivery of the world's energy resources. IAGC is the global leader in geophysical technical and operational expertise for both land and marine operations. IAGC's mission is to optimize the business and regulatory climate for its members, enhance public understanding of the geophysical industry, and ensure a strong, viable geophysical industry. IAGC has existed for more than 45 years, and is the only trade organization solely dedicated to the geophysical industry.

4. IAGC works vigorously on behalf of its members on issues of common interest and industry-wide topics and initiatives that support the continued vitality of the geophysical industry. Through advocacy, outreach, and development of industry guidelines, IAGC focuses

on issues that affect the core businesses of the geophysical industry, including issues involving the ability of its members to conduct exploratory activities on the U.S. Outer Continental Shelf ("OCS") and, specifically, the Atlantic OCS. For example, IAGC (i) engages government and regulatory entities with credible scientific, technical, and legal analyses to both protect the environment and develop essential energy supplies; (ii) educates its members on regulatory initiatives and policies affecting the geophysical industry; (iii) organizes consistent industry positions on emerging policy and regulatory issues; (iv) participates in regulatory proceedings affecting its members and the geophysical industry; and (v) when necessary, engages in litigation on matters that affect its members and the geophysical industry.

5. IAGC and its members have longstanding and fundamental interests in the conduct and regulation of geological and geophysical ("G&G") exploration activities, including seismic exploration activities on the Atlantic OCS. The federal government's regulation of seismic exploration activities on the Atlantic OCS and, specifically, the federal government's consideration of five permit applications—filed by TGS, WesternGeco LLC, CGG Services (U.S.) Inc., Spectrum Geo Inc., and MultiKlient Invest AS ("Applicants")—to perform seismic exploration activities on the Atlantic OCS ("Applications") is a matter that necessarily and directly implicates, and is germane to, the core interests of IAGC and its members. Each of the Applicants is a member of IAGC.

6. In light of these interests, IAGC fully participated in, and submitted detailed public comments regarding, all administrative processes relevant to the government's consideration of the Applications. The following summarizes IAGC's key points of participation in these administrative processes.

a. On March 30, 2012, the Bureau of Ocean Energy Management ("BOEM") published a Federal Register notice announcing the publication of the Draft Programmatic Environmental Impact Statement ("PEIS") for Proposed G&G Exploration on the Mid- and South Atlantic OCS. 77 Fed. Reg. 19,321 (Mar. 30, 2012). On July 2, 2012, IAGC, in conjunction with other industry associations, filed detailed comments on the Draft PEIS in response to the notice. A true and correct copy of the July 2, 2012 comment letter is attached to this Declaration as Exhibit A.

b. On March 7, 2014, BOEM issued a Federal Register notice requesting comments on its Final PEIS for Proposed G&G Exploration on the Mid- and South Atlantic OCS. 79 Fed. Reg. 13,074 (Mar. 7, 2014). On May 7, 2014, IAGC filed detailed comments on the Final PEIS in response to the notice. A true and correct copy of the May 7, 2014 comment letter is attached to this Declaration as Exhibit B.

c. On September 3, 2014, IAGC submitted a detailed comment letter to the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management in response to the requests from Atlantic coastal states to review the proposed G&G survey activities on the Mid- and South Atlantic OCS, pursuant to the Coastal Zone Management Act ("CZMA"). A true and correct copy of the September 3, 2014 comment letter is attached to this Declaration as Exhibit C. In addition to the September 3, 2014 letter, IAGC submitted detailed written comments to each state that performed a CZMA review and IAGC also participated in related public hearings.

d. On March 31, 2015, BOEM requested public comments on pending G&G permit applications for the Mid- and South Atlantic OCS, including all of the Applications. On April 29, 2015, IAGC, in conjunction with other trade associations, filed a detailed comment

letter expressing, among other things, IAGC's support for the approval of the permit applications and addressing a variety of issues relevant to BOEM's consideration of those applications. A true and correct copy of the April 29, 2015 comment letter is attached to this Declaration as Exhibit D.

e. On July 29, 2015, the National Marine Fisheries Service ("NMFS") issued a Federal Register notice requesting public comments on four pending applications for marine mammal incidental harassment authorizations ("IHA") relating to the pending G&G permit applications for the Mid- and South Atlantic OCS. 80 Fed. Reg. 45,195 (July 29, 2015). These IHA applications included those submitted by some of the Applicants. On August 28, 2015, IAGC, in conjunction with other trade associations, filed comments supporting the issuance of the requested IHAs and addressing a variety of issues relevant to NMFS's consideration of the IHA applications. A true and correct copy of the August 28, 2015 comment letter is attached to this Declaration as Exhibit E.

7. On January 6, 2017, BOEM denied in whole each of the Applications in Decision No. GM333C ("Denial Decision"). As a direct consequence of the Denial Decision, NMFS informed each of the IHA applicants that the agency did not intend to continue processing any of their IHA applications.

8. IAGC and the Applicants have a definite and immediate interest in, and are directly and adversely affected by, the Denial Decision. The Denial Decision presents a substantial adverse obstacle to IAGC's mission and to the Applicants' desire and efforts to conduct seismic exploration surveys on the Atlantic OCS. Specifically, the Denial Decision prevents the Permit Applicants from lawfully conducting seismic surveys on the Atlantic OCS. The Denial Decision also presents a substantial obstacle to the authorization of any seismic

surveys by any of IAGC's members before at least the year 2022. In addition, Denial Decision is based on BOEM's unprecedented interpretation of the Outer Continental Shelf Lands Act ("OCSLA"), which, if allowed to stand, would create substantial negative precedent for the geophysical industry as a whole, including for IAGC and its members. Accordingly, the Denial Decision directly, significantly, and negatively affects IAGC's and its members' current interests in the lawful exploration of the Atlantic OCS, as well as their respective future interests in the lawful exploration of the Atlantic OCS and the broader United States OCS.

9. IAGC is the organizational entity formed to, among other things, serve, represent, and defend the interests of its members in regulatory matters, such as those presented in this administrative appeal. The relief sought by IAGC and its members in this appeal, if granted, would reverse an agency decision that violates the Administrative Procedure Act and OCSLA, and that directly and immediately harms the interests of IAGC and its members. A favorable outcome in this appeal would create an opportunity for the lawful exploration of the Atlantic OCS by IAGC's members and eliminate the substantial negative precedent of the Denial Decision to the benefit of IAGC and its members. More generally, a favorable outcome would also help IAGC achieve its mission to ensure the long-term viability of the geophysical industry in a manner that both protects the environment based on sound science and allows for the well-planned development of essential energy supplies. Finally, a favorable outcome would further IAGC's interest in the responsible and correct application of existing federal regulations and laws, thereby providing more regulatory, economic, and conservation certainty for the geophysical industry and for those who depend upon it.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my information and belief.

EXECUTED in Houston, Texas this 19th day of April, 2017.

NIKKI C. MARTIN

CERTIFICATE OF SERVICE

I certify that on April 19, 2017 the forgoing Declaration of Nikki C. Martin was sent by email to:

Pedro Melendez-arreaga
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Ryan P. Steen

EXHIBIT A

July 2, 2012

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Leasing and Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Comments on the Draft PEIS for Atlantic G&G Activities
Via E-mail to GGEIS@BOEM.gov

Dear Mr. Goeke:

The American Petroleum Institute (API), the International Association of Geophysical Contractors (IAGC), and the National Ocean Industries Association (NOIA) offer the following comments on the U.S. Department of Interior Bureau of Ocean Energy Management's (BOEM's) Draft Programmatic Environmental Impact Statement (DPEIS) for Geological and Geophysical (G&G) Exploration on the Atlantic Outer Continental Shelf (OCS). On March 30, 2012, BOEM published the *Notice of Availability* in the *Federal Register* announcing publication of the DPEIS and requesting comments on or before May 30, 2012, a deadline subsequently extended to July 2, 2012. These comments are submitted as a supplement to comments provided during the public hearings held in April 2012.

The API is a national trade association that represents over 490 members involved in all aspects of the oil and natural gas industry, including exploring for and developing oil and natural gas resources in the GOM– a vital part of our nation's economy. The industry supports millions of American jobs and delivers billions of dollars in annual revenue to our government. Last year, it directly contributed more than $470 billion to the U.S. economy in spending, wages and dividends, and it is one of the few industries creating jobs throughout the recession and the ongoing national economic downturn.

The IAGC is the international trade association representing the industry that provides geophysical services (geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, 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.

The NOIA, founded in 1972, represents more than 270 companies among all segments of the offshore industry with an interest in the exploration and production of both traditional and renewable energy resources on the nation's outer continental shelf. NOIA's mission is to secure

reliable access and a fair regulatory and economic environment for the companies that develop the nation's valuable offshore energy resources in an environmentally responsible manner.

BOEM's DPEIS addresses potential environmental effects of multiple Geological and Geophysical (G&G) activities in the Mid- and South Atlantic Planning Areas of the OCS. These activities include, but are not limited to, seismic surveys, sidescan-sonar surveys, electromagnetic surveys, geological and geochemical sampling, and remote sensing. These activities are critically important and are needed to provide information that will be used to update existing oil and natural gas resource assessments, and should a lease sale be scheduled for the Atlantic OCS, to inform company decisions on areas of interest for future exploration. Therefore, IAGC member companies that actually perform the activities noted above and API member companies that use the data collected during these activities are keenly interested in the DPEIS and the timely completion of the Final PEIS.

Industry has been supportive of the need for oil and gas exploration on the Atlantic OCS. However, it is critical to note that anticipated industry G&G activity will be significantly related to future leasing opportunities. At present no lease sale is scheduled for the Atlantic OCS under the proposed 2012-2017 5-year Leasing Program. It is important to remember that the government does not generate this necessary data; geophysical companies do. And they generally do this on a speculative basis, hoping to sell the data to operators who plan to purchase leases in an area. With no lease sale scheduled in the Atlantic, and thus no potential customers, companies have little incentive to gather new G&G data.

Comment Overview and Structure

In recent months, the Associations have reviewed and provided comment on separate environmental documents/regulatory actions that considered the acoustic effects of seismic surveys and other industry activities. These actions include the BOEM Petition for Incidental Take Authorization for the Gulf of Mexico [*Federal Register, Vol. 76, No. 114. p.34656*] and the DEIS for Effects of Oil and Gas Activities in the Arctic Ocean [*Federal Register, Vol. 77, No. 11, pp. 2513-14*]. Our review of this DPEIS is taken in the context of our comments filed on the Federal Register notices mentioned above. We recognize that while there are unique aspects associated with the Atlantic OCS, there are both technical and policy issues that should be consistent from region to region. The industry has used the following principles to evaluate the documents issued by the BOEM and National Marine Fisheries Service (NMFS):

- The U.S. needs to encourage energy resource development to meet its national economic security interests.
- Development should proceed with reasonable and balanced environmental protection.
- Industry has acknowledged subsistence use, has supported reasonable balance of competing uses and reasonable requirements to satisfy the Marine Mammal Protection Act (MMPA) requirement for no "unmitigable adverse effects" on the subsistence harvests of these species.
- The nature and scope of the conventional energy industry's activities must be accurately described and regulated using the same criteria as applied to other ocean users.
- Assessment of the environmental consequences must use scientifically accepted information and risk characterization/assessment methodologies and identify reasonable probabilities of risk and uncertainty.

- Agency decisions regarding U.S. Atlantic development should be made using clearly stated, legally supported criteria yielding results that can be scientifically replicated.

This transmittal letter provides an overview of our technical comments and comments dealing with the legal aspects of the DPEIS that we feel need to be addressed by BOEM before the issuance of the Final PEIS. Detailed legal comments are included as Appendix 1 and technical comments are included as Appendix 2 to this letter. In addition, we provide a brief examination of the practical impacts of one of the proposed mitigation measures, shutdown requirements, one of several measures that we believe are based on flawed analysis that do not take into account the best available science.

I. Summary of Industry Positions and Technical Comments

A. Geographic Scope:

The DPEIS specifies that the Area of Interest (AOI) includes the Mid- and South Atlantic OCS Planning Areas, as well as adjacent State waters (outside of estuaries) and waters beyond the Exclusive Economic Zone (EEZ) extending to 350 nautical miles (nmi) (648 kilometers [km]) from shore (Figure 1-1). [Page 1-5]. As recommended in our previous comments on the scope of the DPEIS, we believe that the AOI should be expanded to include the North Atlantic Planning Area. Undertaking an environmental assessment of this area now would remove a potential impediment to future exploration and lease sales in an area adjacent to Canadian OCS waters that have yielded successful oil and gas exploration, development and production.

B. Action alternatives

We recommend that BOEM provide another alternative without closure areas prior to issuance of the final PEIS. We strongly encourage that both the range of alternatives analyzed and their evaluation reflect the nature and extent of the known causes of injury and mortality faced by various protected species. In addition, for the reasons explained further in these comments, we oppose as unwarranted several of the mitigation measures proposed as part of Alternative A. Further, we believe that Alternative B is unwarranted for a number of reasons including the finding in the DPEIS that doubling the size of the closure area does not provide additional protection for right whales or marine life generally.

If BOEM does not provide a new alternative that provides no closure areas and reasonable mitigation measures, the Associations believe that Alternative A is the least objectionable of the three alternatives presented in the current DPEIS.

C. Equivalent Use Principal for High Resolution Geophysical (HRG)

The approach to High Resolution Geophysical activities would be improved if the DPEIS recognized that this type of survey equipment is also used by many other sectors not identified in the DPEIS. The DPEIS should explain why a wide range of sectors can use these technologies during certain times and in locations where the oil and natural gas E&P industry could not. Since the environmental consequences of a survey tool's use do not vary by who is using it, there

is no apparent basis for this discriminatory treatment, particularly if it shows lack of effect. Industry would note that a wide range of marine users, including scientific researchers, routinely apply one or more of these or similar tools.

The DPEIS also proposes to require unprecedented observation and shut-down zone requirements for HRG but does not provide necessary environmental impact information that would indicate adverse effects of a nature to warrant requiring such zones. The shut-down requirements are in industry's opinion, not warranted, scientifically substantiated nor feasible in many circumstances, including but not limited to, HRG activities conducted by Autonomous Underwater Vehicles (AUVs) that collect data only a few feet above the sea bed.

D. Assessment of Seismic Survey Environmental Effects

Industry appreciates the agency's acknowledgment of the difficulty of assessing acoustic impacts on various species. The DPEIS's selection of sound characterization and propagation model components is more geared toward a portrayal of the size of the sound field rather than the actual impact of that sound. Industry has pointed out in recent months a variety of methodological flaws where the agency's choices in acoustic propagation models, the use of frequency weighting, and acoustic thresholds can result in individual differences in take estimates that vary by several orders of magnitude.

Improving models to better portray 3-D sound fields and animal exposures is a step in the right direction, but nevertheless, these model efforts as utilized in the DPEIS predict unrealistic Level A takes and proportionally greater numbers of Level B takes, using the simplistic 20 dB decrease from 180 dB to 160 dB. Marine Mammal Observer data does not support these model predictions, and in fact, provide no verification of takes the model predicts. Based on both field observations and recent studies, injury or death of marine mammals exposed to airguns seems increasingly unlikely (Richardson et al 2010).

The DPEIS draws conclusions based on model predictions, notably a finding of "moderate" impact, yet fails to provide any basis for an apparent confidence in model results in the face of contradictory observations. The size of the gap between presented estimates of incidental takes and observed few-to-no mortalities/injuries or population level effects undermines the credibility of the assessment. The gap between predictions and the observations provided in IHA observer reports is substantial. [1]This PEIS further highlights the gap between the estimated take numbers and the observational data by presenting large numbers of estimated dolphin takes despite extensive observations of dolphins choosing to bow ride seismic vessels.

The size of the gap between presented estimates of incidental takes based only on exposure and no observation of mortalities/injuries or population level effects undermine the credibility of the assessment. This PEIS notes that injury or death is not an expected or likely outcome yet uses contradictory Level A predictions to support conclusions of impact. The gap between predictions and the observations provided in IHA observer reports is substantial.

[1] http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5177.pdf

A good example of where exposure does not equal take as defined under the MMPA is in the estimation of dolphin takes. There is extensive documentation of dolphins choosing to bow ride seismic vessels.[2,3] This is a seemingly normal behavioral pattern frequently observed regardless of vessel type, where the animal displays a behavioral response that is not consistent with a response to harassment.

The DPEIS does a better job than some other recent NEPA documents in discussing acoustic impact analysis. However, the PEIS should contain agency explanations of all the steps, choices and assumptions that were made in impact determinations. The effects of these choices are not adequately disclosed nor discussed in the environmental consequences assessment. In the end, industry believes that the DPEIS 1) does not employ the best available science, 2) grossly overestimates the number of Level A and Level B takes, and 3) that these overestimations lead to incorrect choices in the Alternatives presented and the mitigation measures proposed.

These are not new requests. Industry has long requested transparent guidance, for example, on acoustic threshold criteria that uses widely accepted science. The industry's confidence is further eroded by repeated requests from both industry and environmental conservation organizations for clear guidance on how the agencies apply judgment to these estimates of takes to arrive at their "small number of takes" and "negligible impact" determinations. Inconsistencies in agency methods, model components, and inputs from one regulatory action to another do not instill confidence. It appears that the absence of such guidance, for example, allows various agency contractors developing NEPA documents to make choices on behalf of the agency. Variations in methods evaluation criteria, modeling components and data inputs from one agency assessment to the next naturally leads to questions about whether decisions exceed agency discretion.

Technical input on various factors in the calculation of take estimates is offered in Appendix 2.

E. North Atlantic right whale Risk Assessment & Closure Areas.

Industry shares the stated concern regarding the health of the North Atlantic right whale population. The DPEIS properly identifies the long recognized and documented major risks to this species – vessel strikes[4,5] and fishing gear entanglement. In contrast, there are no documented injuries, deaths, or significant disturbances from airguns for one of the most studied

[2] Moulton, V.D. and Miller, G.W. 2005. Marine mammal monitoring of a seismic survey on the Scotian Slope, 2003. In *Acoustic Monitoring and Marine Mammal Surveys in The Gully and Outer Scotian Shelf before and during Active Seismic Programs*, ed. Lee, K., H. Bain, and G.V. Hurley. Environmental Studies Research Funds Report No. 151, pp. 29-39.

[3] Weir et al. 2011. Cetacean encounters around the island of Montserrat (Caribbean Sea) during 2007 and 2010, including new species state records. *Marine Biodiversity Records*, 4:e42

[4] Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (Eubalaena glacialis) in the western North Atlantic Ocean. J. Cetacean Res. Manage. (Special Issue) 2:193-208.

[5] Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science, 17(1):35-75.

whale populations in the world. In the absence of such observed impacts, the basis for the proposed closure areas disappears. The DPEIS would be improved by placing hypothetical seismic survey risks in a context relative to the significant known risks. So doing, for example, would note that the speeds of working seismic survey vessels are less than half of the current regulatory limit of 10 knots. Industry believes that the evaluation of the need for closure areas would be different if this analysis were conducted.

Moreover, the size of the proposed closure areas is premised upon defining areas of habitat critical for life function that includes not only breeding and foraging, but also migration pathways. These three components comprise the totality of activities for these animals rather than critical habitat. The critical habitat designation for North Atlantic right whales determined in 1994 considered but rejected migration routes as inconsistent with the ESA approach to critical habitat. Although there is a petition to revise critical habitat, no decision has been made. BOEM should clearly state on what basis and under what authority it proposes to regulate using migration pathways. Industry does not agree that such regulation is permissible.

Required levels of protection and mitigation standards should be risk based, practicable in implementation and equally applied to all ocean users.

II. Implications of proposed shutdown requirements

If we consider one specific proposed mitigation, the shutdown requirement, to demonstrate just how impactful the incorrect analysis and selection of alternatives and mitigation measures can be, we believe it to be so great as to cast into doubt the very feasibility of conducting seismic activities.

The proposed mitigation measures are designed to respond to and mitigate projected Type A and Type B takes. But because the DPEIS greatly overstates the number of Type A and Type B takes and exclusion zones for potential takes it greatly overstates the risk and extent for reasonable mitigation measures. This is of critical importance, because, based on predictions, some of the proposed mitigation measures would impose potentially high costs, greatly impede or altogether preclude the conduct of seismic surveys and geohazard and cultural resource identification, and deeply frustrate the achievement of the goals of the OCS Lands Act.

The outcome of decision making in the absence of sound science is manifested in the proposed mitigation measure that would: (a) greatly expand the size of the vessel exclusion zone, (b) extend it to include dolphins, and (c) apply discriminately to high resolution geophysical surveys conducted for oil and gas operators only.

Both Alternatives set forth in the DPEIS would substantially expand, by an enormous amount, the spatial area covered by the exclusion zone. This is clearly shown in Table D-21, set forth on p. D-51 of Volume II, which lists the various scenarios examined by BOEM and the resultant exclusion zone. These scenarios establish different exclusion zone radii, based upon the size of the airgun array, the water depth, the bottom type, and the time of year. **Every single scenario would materially expand the exclusion zone beyond the currently allowed 500 meter radius, whenever a large airgun array is being employed.** In some scenarios, the exclusion zone radius would be **over 2,100 meters,** meaning that **the spatial area covered by the**

exclusion zone would be 17 times larger than the current exclusion zone under Joint NTL 2012-G02. New findings of acoustic impacts or a scientific basis for such an increase in regulatory requirements is absent. What recent research does indicate is that thresholds for possible hearing damage (PTS) from an airgun source are above the antiquated 180 dB standard.[6]

That change, plus the expansion of shutdown requirements to include not only whales, as is provided by Joint NTL 2012-G02, but also dolphins, could greatly increase the number of mandatory shutdowns over that experienced under Joint NTL 2012-G02 (and previously under NTL 2007-G02).

The practical consequences of the proposed changes for the conduct of seismic surveying are enormous. We are highly doubtful that seismic survey operations could even be attempted were shutdowns to be required with anything approaching the frequency estimated in the DPEIS.

A more detailed discussion of this topic is found in Appendix 1.

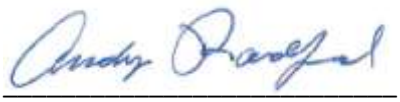
In conclusion, industry has offered specific comments on the DPEIS. However, this input should not distract from higher level issues. Do seismic surveys significantly and adversely affect the marine environment relative to other well known risks? The industry does not believe they do, based on the absence of observed effects and recently released BOEM marine mammal observer data.

To build its case that seismic does have significant adverse effects, BOEM relies on models that have not been validated against field data to create unrealistic estimates of incidental takes. Further, the estimate of the number of takes is only achievable by using acoustic threshold criteria based on 15-year old obsolete data that does not meet the NEPA requirement to use the best available science. In addition, in the face of no observable injury/mortality data and no population level behavioral effect, the DPEIS demands more and more unreasonable mitigation measures, including six-month area closures and the addition of dolphins (who at times intentionally approach seismic vessels) to the list of animals that require operations to shut down. Not only is there little to no basis for these demands, the DPEIS will require the conventional energy industry to comply with operational mitigations that industries having known causes of cetacean mortality do not. In so doing, the agency decision-making is not only impossible to justify but also discriminatory.

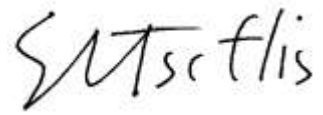
We appreciate the work done by BOEM in developing this DPEIS. We request that BOEM review the DPEIS in light of the comments made herein and revise the DPEIS as appropriate prior to issuance of the final PEIS. If you should have any questions on these comments, please contact Andy Radford at 202-682-8584 or radforda@api.org.

[6] Finneran, US Navy Marine Mammal Program at the Acoustical Society of America meeting, October 2011

Sincerely,



Andy Radford, API



Sarah L. Tsoflias, IAGC

Luke Johnson, NOIA

Appendix 1

Legal and Economic Issues

Several key legal principles and economic considerations must guide the preparation of this PEIS.

I. Legal Aspects

A. The DPEIS must be based on best available science

The scientific analysis set forth in the DPEIS, and upon which alternatives and recommendations set forth in the DPEIS are developed, must be based upon the best available science. This obligation stems from two separate legal mandates.

First, NEPA itself requires that an agency "utilize 'high quality' science in preparing EISs." *Sierra Club v. Marita*, 46 F.3d 606, 621 (7th Cir. 1995), citing 40 C.F.R. § 1500.1(b). "Accurate scientific analysis [is] essential to implementing NEPA." *Environmental Defense v. U.S. Army Corps of Engineers*, 515 F. Supp. 2d 69, 78 (D.D.C. 2007).

Second, the use of the best available science is mandated by Presidential Executive Order 13563 (Jan. 18, 2011). Section 1(a) of that Order provides that "[o]ur regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation. It must be based on the best available science."

Accordingly, as one example, BOEM must apply the best available evidence in assessing the sound levels at which Level A or Level B harassments may occur. It is entirely inappropriate for BOEM instead to rely upon historical practice at DOI or any other federal agency. "Accurate scientific evidence remains essential to an Environmental Impact Statement, and…an agency [can]not rely on 'stale' scientific evidence." *City of Carmel–By–the–Sea v. U.S. Dep't of Transportation*, 123 F.3d 1142, 1151 (9th Cir. 1997). BOEM therefore must assess the currently available science, and reach sound conclusions based upon the best available scientific evidence.

As discussed in detail in these comments, the DPEIS does not utilize the best available scientific evidence, and the conclusions reached on critical issues are therefore simply wrong. Specifically, the DPEIS errs when it concludes that exposure to sound levels in excess of 180 dB re: 1 μPa (rms) results in Level A harassment, and that exposure to sound levels in excess of 160 dB re: 1 μPa (rms) results in Level B harassment. Nor is an adequate scientific basis provided for the proposed expansion of shutdown requirements to include delphinids, the proposed expansion of the shutdown zones, or the proposed separation requirement for seismic vessels conducting simultaneous operations.

Further to this, industry does not believe the principle of equating received sound levels to takes has been subjected to public comment or peer review as is required for rulemaking. In addition, this interpretive application of exposure as a proxy for incidental take is not supported by the MMPA, which requires that harassment must take place. 16 U.S.C. 1362(18)(A). In the case of Level B Harassment, the disturbance must be related to a disruption in behavioral patterns, not

just behavioral change. 16 U.S.C. 1362(18)(A)(ii), 1362(18)(D). Bow-riding by dolphins is an excellent example of a normal behavioral pattern and should not therefore be assessed as a take based on received sound levels, using any metric. Finally, there is no jurisdictional precedent defining whether sound occurring at a certain level constitutes take. It is simply not enough for an animal to be exposed to a sound. For there to be a "take" based on harassment, there must be "disruption" of a "pattern" of behavior and it must be caused by an act of pursuit, torment or annoyance. 16 U.S.C. 1362(18)(A).

B. The DPEIS must reflect programmatic needs and goals

Congress has been quite explicit in its programmatic goals under the OCS Lands Act. The OCS Lands Act's organizing principle is the "*expedited exploration* and development of the Outer Continental Shelf in order to achieve national 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) (emphasis added); *see also* 43 U.S.C. § 1332(3) (the OCS "should be made available for *expeditious and orderly development*, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs" (emphasis added)).

Congress mandated these programmatic goals when it substantially amended the OCS Lands Act in 1978 for the express purpose of "promot[ing] the *swift, orderly and efficient* exploitation of our almost untapped domestic oil and gas resources in the Outer Continental Shelf." H.R. Rep. No. 95-590, at 8 (1977), *reprinted in* 1978 U.S.C.C.A.N. 1450, 1460 (emphasis added). As the D.C. Circuit observed soon thereafter, "the Act has an objective — the expeditious development of OCS resources." *California v. Watt*, 668 F.2d 1290, 1316 (D.C. Cir. 1981).

Despite these clear statements of Congressional intentions and programmatic goals, the PEIS lacks any analysis of the Congressional purpose enshrined in the OCS Lands Act; the manner in which the seismic surveying at issue in the DPEIS advances those goals; and the question whether Alternative A versus Alternative B, or the proposed mitigation measures contained in both Alternative A and Alternative B would have a materially negative impact upon the accomplishment of those goals. This is a fundamental flaw in the DPEIS, and one that leads to the inclusion of inappropriate proposed mitigation measures.

"NEPA itself does not mandate particular results, but simply prescribes the necessary process." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989); accord *Winter v. Natural Resources Defense Council, Inc*., 555 U.S. 7, 48 (2008); *accord Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). Furthermore, while an agency must consider mitigation measures as part of its assessment of alternatives, NEPA neither "require[s] agencies to discuss any particular mitigation plans that they might put in place," nor … require[s] agencies—or third parties—to effect any." *Theodore Roosevelt Conservation Partnership v. Salazar*, 616 F.3d 497, 503 (D.C. Cir. 2010). Moreover, "[i]f the adverse environmental effects of the proposed action are adequately identified and evaluated, the agency is not constrained by NEPA from deciding that other values outweigh the environmental costs." *Robertson*, 490 U.S. at 350.

In conducting a NEPA environmental evaluation, an agency is *not* required to consider alternatives "inconsistent with the [government's] policy objective" in undertaking the program that is under NEPA review. *Kootenai Tribe of Idaho v. Veneman,* 313 F.3d 1094, 1121 (9th Cir. 2002) (Forest Service "not required under NEPA to consider alternatives in the DEIS and FEIS that were inconsistent with its basic policy objectives.").

The courts have been adamant on this point: an agency's only NEPA obligation is to evaluate "reasonable alternatives," 40 C.F.R. 1502.14(a), and a '"proposed alternative is reasonable only if it will bring about the ends of the federal action' measured by whether it achieves the goals the agency sets out to achieve." *National Resources Defense Council, Inc. v. Pena*, 972 F. Supp. 9, 17 (D.D.C. 1997), *quoting Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991).

What is a "reasonable alternative" is evaluated in light of the "purpose and need of the project." *Audubon Naturalist Society of the Central Atlantic States, Inc. v. U.S. Dep't of Transportation*, 524 F. Supp. 2d 642, 671 (D. Md. 2007), citing *City of Alexandria v. Slater,* 198 F.3d 862, 868 (D.C. Cir. 1999). "Alternatives addressing different purposes and goals are inherently unreasonable or infeasible." *Id.* at 671 n. 26. A federal agency may therefore eliminate alternatives and mitigation measures that do not meet the purposes and needs of the project. *Biodiversity Conservation Alliance v. BLM,* 608 F.3d 709, 715 (10th Cir. 2010); *accord City of Richfield, Minn. v. F.A.A.,* 152 F.3d 905, 907 (8th Cir.1998) ("Under NEPA, an EIS must examine 'reasonable alternatives' to a project.... An alternative is unreasonable if it does not fulfill the purpose of the project.").

Furthermore, in determining programmatic goals, and hence what proposed alternatives are "reasonable," an "agency's *evaluation of its objectives is heavily influenced by the agency's consideration of "the views of Congress, expressed*, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other congressional directives." *Pena*, 972 F. Supp. at 18 (emphasis added).

C. The DPEIS must focus upon reasonably likely effects, not merely potential effects

BOEM's only obligation is to assess reasonably likely environmental impacts, *South Fork Band Council of Western Shoshone of Nevada v. DOI*, 588 F.3d 718, 727 (9th Cir. 2009), not impacts that are simply a mere possibility. "An EIS need not discuss…conjectural consequences," *Sierra Club v. Hodel*, 544 F.2d 1036, 1039 (9th Cir. 1976), and alternatives and mitigation measures therefore cannot be imposed to counteract purported effects for which there exists no credible scientific proof. The Draft PEIS violates these precepts in, for example, its establishment of exclusions zones based upon conjectural impacts of exposure to arbitrarily selected sound thresholds.

III. Economic Considerations

A. The DPEIS must assess economic effects

An associated but separate requirement is that an agency appropriately "consider alternatives in a manner that is consistent with the economic goals of a project's sponsor." *Weiss v. Kempthorne*, 683 F. Supp. 2d 549, 567 (W.D. Mich. 2010) *aff'd in part and vacated in part on other grounds*, 2012 WL 204494 (6th Cir. Jan. 25, 2012). Indeed, "the consideration of alternatives may accord substantial weight to the preferences of the applicant and/or sponsor in the . . .design of the project." *Id*. at 568 (citations omitted); *see also Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1030 (10th Cir. 2002) (where a private party's proposal triggers a project, the agency may "give substantial weight to the goals and objectives of that private actor").

Thus, in considering alternatives and possible mitigation measures, the agency "may legitimately consider such facts as cost to the applicant and logistics." *Sylvester v. U.S. Army Corps of Engineers*, 882 F.2d 407 (9th Cir. 1989). Indeed, the agency "has a *duty* to take into account the objectives of the applicant's project," and the effect of proposed alternatives on the achievement of those objectives. *Id*., quoting *Louisiana Wildlife Fed'n, Inc. v. York,* 761 F.2d 1044, 1048 (5th Cir.1985) (per curiam). This includes consideration whether possible alternatives would allow the project to remain "economically advantageous." *Id*.

Here, private parties are proposing to engage in seismic surveying in order to determine the presence of commercially recoverable hydrocarbons, with the intent that the leasing, exploration and production of such hydrocarbons may be fostered. "[I]t is appropriate for the agency to give substantial weight to the goals and objectives of [such] private actor[s]" when considering which alternatives are to be evaluated in the EIS and conducting that evaluation. *Fuel Safe Washington v. FERC*, 389 F.3d 1313, 1324 (10th Cir. 2004). Yet the DPEIS contains no discussion of the effect of the proposed alternatives and mitigation measures upon project economics.

B. The DPEIS must contain a cost-benefit analysis

The required consideration of economic costs must include a cost-benefit analysis. Section 1(b) of Executive Order 13563 explicitly mandates that "to the extent permitted by law, each agency must…propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs…" Section 1(c) of the Order further dictates that the agency "use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible."

Nothing in the law prohibits BOEM's inclusion of a cost benefit analysis in the DPEIS, *see also Cape May Greene, Inc. v. Warren*, 698 F.2d 179, 187 (3rd Cir. 1993) ("[T]he National Environmental Policy Act requires a balancing between environmental costs and economic and technical benefits."). Thus, under the Executive Order, the PEIS should contain a cost-benefit analysis but the DPEIS does not.

C. Operational and economic implications of the proposed shutdown requirements

Industry discusses the proposed mitigations in detail in the attached technical analysis. We focus here on one specific proposed mitigation, the shutdown requirement, to demonstrate just how impactful the incorrect analysis and selection of alternatives and mitigation measures can be.

These impacts can be so great as to cast into doubt the very feasibility of conducting seismic activities.

The proposed mitigation measures are designed to respond to and mitigate projected Type A and Type B takes. But because the DPEIS greatly overstates the number of Type A and Type B takes using a flawed sound exposure equals take argument it greatly overstates the need for mitigation measures. Put another way, because the environmental impact of G&G activities is based on inaccurate science (for example, does not utilize Southall et al. 2007) and greatly overstated, the need for mitigation measures is also greatly overstated.

This is of critical importance, because some of the proposed mitigation measures would impose potentially high costs, greatly impede or altogether preclude the conduct of seismic surveys and geohazard and cultural resource identification, and deeply frustrate the achievement of the goals of the OCS Lands Act. This is antithetical to core legal principles discussed in II.B above, which require that the DPEIS, and the alternatives and proposed mitigation measures, be consonant with the programmatic goals established by Congress under the OCSLA. Fostering the expedited exploration and development of OCS resources is at the core of those goals.

The outcome of decision making in the absence of sound science that leads to decisions that are not aligned with the intent of the law is manifested in the proposed mitigation measure that would: (a) greatly expand the size of the vessel exclusion zone, (b) extend it to include dolphins, and (c) discriminately include high resolution geophysical surveys for oil and gas operators only.

Under current Joint Notice to Lessees ("NTL") 2012-G02, as well as under its predecessor notice, NTL 2007-G02, a seismic survey operator must shut down seismic operations whenever a marine mammal (except delphinids and manatees) or a sea turtle sighted within a 500 meter radius "exclusion zone," measured from the center of the airgun array and the area within the immediate vicinity of the survey vessel. The operator cannot recommence seismic operations for 30 minutes, or until the animal is no longer sighted within the 500 meter radius, whichever takes longer.

Both Alternatives set forth in the DPEIS would substantially expand, by an enormous amount, the spatial area covered by the exclusion zone. This is clearly shown in Table D-21, set forth on p. D-51 of Volume II, which lists the various scenarios examined by BOEM and the resultant exclusion zone. Additional details about these scenarios are set forth in Table D-19 on p. D-42 of Volume II, and in Vol. II, pp. D-58 through D-67.

These scenarios establish different exclusion zone radii, based upon the size of the airgun array, the water depth, the bottom type, and the time of year. **Every single scenario would materially expand the exclusion zone beyond the currently allowed 500 meter radius, whenever a large airgun array is being employed.** In some scenarios, the exclusion zone radius would be **over 2,100 meters,** meaning that **the spatial area covered by the exclusion zone would be 17 times larger** than the current exclusion zone under Joint NTL 2012-G02.

That change, plus the expansion of shutdown requirements to include not only whales, as is provided by Joint NTL 2012-G02, but also dolphins, could lead to at least a 450-fold increase in

the number of mandatory shutdowns over what that experienced under Joint NTL 2012-G02 (and previously under NTL 2007-G02).[7] **The differences are not supported by the evidence.** In recent Supplemental Environmental Assessments associated with the permitting of seismic surveying in the Gulf of Mexico, BOEM has stated that there have been a total of approximately **55** required shutdowns in a typical year, due to a whale being within the 500 meter radius shutdown zone.

By contrast, BOEM in the DPEIS has estimated that there will be literally thousands of occasions a year in which a marine mammal will come within the proposed expanded exclusion zone radius surrounding an active seismic vessel and its arrays, thus triggering a shutdown of at least 30 minutes and possibly longer. Specifically, Table 4-10, found in Volume II, page Tables-32, shows that there would be **over 26,000** such shutdown events in 2016, as contrasted with the roughly **55** such events per year under current NTL requirements.[8] These estimates reflect the Government's modeling of Atlantic survey activities and marine mammal movement patterns, and are likely overstated based on the assumptions that went into that modeling. Nonetheless, the estimates do indicate the enormous effect of the proposed changes to the size of the exclusion zone and the hypothetical number of marine mammals subject to the shutdown requirement.

The fact that dolphins engaged in bow riding would not trigger a shutdown requirement, as stated in the draft PEIS at, *e.g.*, Volume II, p. C-11, does not significantly ameliorate the problem. BOEM has stated in its recent SEAs that approximately 33% of dolphins within 500 meters of a survey vessel were exhibiting bow-riding behavior.[9] Thus, the bow riding exception would at most apply approximately one-third of the time, and probably less, given that the ability to determine that a dolphin is exhibiting bow riding behavior is arguably diminished if the exclusion zone is expanded beyond the 500 meters radius, and that determination must therefore be made when the dolphin is at a considerably greater distance from the survey vessel. Further, the illogical contradiction that dolphins that do not happen to bow ride require a different mitigation strategy makes no sense. The fact that they do bow ride during seismic surveys has been observed for decades as a behavioral indicator that the surveys do not in fact cause them harm. There is no empirical evidence to the contrary.

The practical consequences of the proposed changes for the conduct of seismic surveying are enormous. We are highly doubtful that seismic survey operations could even be attempted were shutdowns to be required with anything approaching the frequency estimated in the DPEIS.

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[7] Table 4-10, Volume II, page Tables-32, indicates over 26,000 such shutdown events in 2016 versus approximately 55 such events reported under current BOEM NTL requirements.

[8] Table 4-10 sets forth "Annual Level A Take Estimates," using (incorrectly for the reasons stated in these comments) an exposure to sound at a decibel level greater than 180 dB as establishing a Level A take. And, the proposed exclusion zone radius is set at the distance from the array at which sound levels are thought to drop to 180 dB. Therefore, in setting forth the projected number of Level A Takes (using the 180 dB criteria), Table 4-10 is simultaneously setting forth the number of projected occasions a year on which a marine mammal is expected to come within the exclusion zone, and trigger a shutdown requirement.

[9] *Site-Specific Environmental Assessment of G&G Survey Application No. L11-023* (Jan. 26, 2012), at 7.

Appendix 2
Detailed Technical Discussion

I. Industry activity

Given the lack of active leases and planned lease sales, the DPEIS greatly overstates the anticipated level of industry seismic activity. The projected activity estimates submitted in May 2010 are no longer endorsed by the geophysical industry and should not be used in the development of the DPEIS.

Table 3-3 projects the acquisition of 321,600 line-kilometers and 141,700 line-kilometers of 2D seismic for the mid and south Atlantic planning areas respectively, for the first 5 years of the 9-year period covering 2012-2020. By comparison, submitted industry (IAGC) estimates were significantly less – by 36% (298,200 line-kilometers).

Accordingly, regardless of when seismic acquisition begins, the DPEIS has overstated the amount of 2D seismic that will be acquired. Although E&P companies continue to have interest in exploring the Atlantic OCS, their level of interest will likely not manifest itself into supporting and licensing (buying) non-exclusive seismic data since these areas are not included in the proposed 5-year leasing plan (2012-2017).

The industry estimates also assumed that the DPEIS would be completed in a timely manner (April 2012) with G&G permits approved in 2012 and each of the subsequent years through 2016 in support of future lease sales. Notwithstanding Secretary Salazar's statement at the time the PEIS was released that the DPEIS would be final by the end of this year, it is highly unlikely that the MMPA rulemaking and ESA section 7 consultation will be completed – pushing back the start of any geophysical activity (if any) well beyond 2012. At best, assuming Atlantic acreage is included in a 5-year leasing plan for 2017-2022, geophysical activity may commence in 2015 or 2016.

The proposed 5-year leasing plan (2012-2017) does not propose any lease sales in the mid- and south Atlantic OCS. Additionally, although the oil and gas industry believes that there are hydrocarbon resources underlying these areas and that new geophysical seismic data will illuminate those resources, lacking a commitment from the Federal Government to hold lease sales in the future (2017 and beyond), as well as support from the coastal states (Delaware, Maryland, Virginia, North Carolina, South Carolina) for lease sales and exploration and production, it is unrealistic to expect significant, if any, geophysical activity within this timeframe.

Several geophysical companies have submitted G&G permit applications to the former MMS in response to the then (2010) high level of interest expressed by E&P companies. The permit applications remain in the "queue" at BOEM. However, BOEM should not interpret this to mean that because none of the permit applications have been withdrawn that there remains a high level of interest in acquiring seismic data in the mid- and south Atlantic OCS planning areas. If a geophysical company with a permit application covering these areas were asked if they want to withdraw their application, the response would be

"no". The geophysical company has already paid the cost of submitting a permit application to BOEM and there is no additional cost for it to remain with BOEM pending review. Furthermore, unless and until E&P companies clearly indicate an interest in licensing seismic data, survey activities allowed under any issued the permit would not be conducted.

II. Environmental Benefits of Geological & Geophysical Technologies

The accuracy of the DPEIS would be enhanced by more fully characterizing the important role that geophysical imaging technologies offer E&P operations toward increasing safety and reducing environmental risks in E&P operations, particularly during drilling operations. At present, there are no commercially available and viable alternatives to current geophysical imaging technologies, which have been employed and continuously refined over the last six decades to be more efficient and emit less sound energy.

Geophysical imaging technologies such as 2D and 3D seismic surveys, near surface / shallow hazard surveys and electromagnetic surveys help reduce the safety and environmental risks of future exploration activities. Vast improvements in these technologies in recent years now afford the E&P industry significant precision in subsurface imaging, resulting in significant environmental benefits. Over the E&P lifecycle, these benefits include: siting wells, facilities and pipelines at safe locations on the seafloor; the need for fewer wells and fewer facilities due to improved drilling success; the ability to predict hazardous over-pressurized zones, and thus to be able to better design wells that manage the associated risks; and improved overall safety of operations.

As a result, wells are drilled at safe locations, platforms and other facilities are placed in safe locations, and operators can route pipelines safely and around archeologically sensitive areas.

Today, conventional oil and gas companies are able to predict the pore pressures of rocks through which a well is drilled, and the predictions are improved when able to combine attributes provided by geophysical imaging technologies with subsurface information.

III. The Alternatives

The DPEIS notes the requirement for reasonable alternatives:

> *These regulations (40 CFR 1500-1508) provide for the use of the NEPA process to identify and assess reasonable alternatives to a proposed action that avoid or mitigate adverse effects of a given action upon the quality of the human environment. [Page 1-11]*

The range of alternatives should include one without the closure areas for the North Atlantic right whales. This would address the agency's NEPA requirements to include a reasonable range of alternatives. In addition, for the reasons explained in Industry's cover letter and in these comments, the proposed mitigation measures should not expand the

seismic airgun survey protocol beyond what already appears in NTL 2012-G02.

Of the alternatives presented, industry favors Alternative A as the most reasonable but would note that the Alternative proposes a range of protective measures that, in some cases, exceed those required for the Gulf of Mexico. [Page 2-3].

> *Alternative A includes the following mitigation measures developed specifically for this Draft Programmatic EIS (Table 2-1):*
>
> - *a time-area closure for North Atlantic right whales;*
> - *a seismic airgun survey protocol;*
> - *an HRG survey protocol (for renewable energy and marine minerals sites);*
> - *guidance for vessel strike avoidance;*
> - *guidance for marine debris awareness;*
> - *avoidance and reporting of historic and prehistoric sites;*
> - *avoidance of sensitive benthic communities;*
> - *guidance for activities in or near National Marine Sanctuaries (NMSs);*
> - *guidance for military and National Aeronautics and Space Administration (NASA) coordination.*

BOEM notes in the DPEIS that the range of alternatives and their evaluation was significantly influenced by concern over protected species particularly the North Atlantic right whale. Industry supports this sensitivity but would encourage the BOEM to ensure a comparative risk assessment reflecting the nature and extent of the known causes of injury and mortality faced and placing the risk of industry activities within this context. The primary reason for establishing the North Atlantic right whale Seasonal Management Areas was to reduce ship strikes on this highly endangered species. The conditions that make them highly vulnerable to ships traveling greater than 10 knots – i.e., slow movements, time spent at the surface, and time spent near the coast – makes it easier for an observer to see these whales and avoid them during seismic operations. Based upon the DPEIS evaluation of the relative risks, industry does not believe that Alternative B is warranted. Industry comments will address the proposal for closure areas in greater detail later in this Appendix.

IV. DPEIS Scope, Utility and Regulatory Consistency

It is a fundamental tenet of NEPA law that an EIS is not a decisional document – such that it requires an agency to take a specific action. NEPA analyses are intended to look at the consequences of proposed actions and suggest a reasonable range of feasible alternatives. NEPA analyses are intended to inform subsequent agency decisions. The DPEIS scoping must reflect the range of decisions that may be brought forward and the DPEIS itself must be informed by and consistent with regulatory standards and the requirements of <u>all</u> Federal statutes under which the agencies make their decisions. The Atlantic DPEIS does identify and reference the Outer Continental Shelf Lands Act, the Marine Mammal Protection Act and the Endangered Species Act but industry suggests a more clear statement of the

requirement to balance the three statutes and guidance to resource managers on how to achieve that balance.

There are no regulations defining the term "potential effects". The DPEIS analysis provides extensive attention to potential effects, many of which are questionable due the lack of scientific certainty, and in some critical areas – the virtual absence of knowledge. Furthermore, the DPEIS in several key respects fails to utilize the best scientific evidence that does exist. Moreover, it gives too little attention to the probability of impact. Next, the DPEIS provides little attention to the potential severity of effects. The DPEIS provides an improvement over other recent seismic survey evaluations such as the Arctic DEIS. However, more work needs to be done to avoid a situation in which the DPEIS presents an extensive list of "potential effects" as if they are likelihoods or even certainties and then demands they be mitigated. This makes it impossible for the DPEIS to inform, guide or instruct agency managers on how to differentiate between activities that have no effect, minor or major effect to a few animals, or to an entire population.

The different purposes and considerations of MMPA/ESA/OCSLA require balancing judgments by multi-agency decision-makers. The accuracy of the underlying environmental consequences analysis is critical to this proper balancing. The DPEIS provides extensive information regarding potential impacts of industry activities on marine life. Industry would continue to encourage much greater and appropriate attention in the DPEIS to the impacts the alternatives and mitigation measures would have on development of OCS resources and whether they are warranted. This should include information on lost opportunity costs and the effect of time and area closures, which under various alternatives could amount to six months per year of important areas in the AOI. The same analysis is needed with respect to mitigation measures.

V. The Environmental Consequences Methodology

A. Overview: The characterization of risk is highly subjective and is not based on sound science. This results in overstatement of impact from the industry operations and proposed mitigation measures that inappropriately allocate resources and are in conflict with the historical reality of no meaningful effect.

The comments in the cover letter identified a number of shortcomings in the gap between the assessments of environmental consequences, including the estimate of takes. These problems to a significant degree are not merely disputes over specific data issues or modeling approaches, although this itself is certainly an area in which improvements are needed. Rather they are related to a flawed environmental consequence analysis.

The DPEIS itself validates industry's concern over the modeled overestimate of takes, the ability to create representative model information and the inconsistency with actual observable effects.

> "Ultimately, the accuracy of the task relies less on the accuracy of the models and more on the accuracy of the modeler's ability to estimate these representative or average conditions. To date, probably the best measurement of this need to estimate representative or average conditions is the annually reported level of impacts for any given year of operations; as compared to that year's take authorization number. To the best of our knowledge, this has not been done officially, but anecdotal information and experience with years of annual reports has shown that typically the number of animals observed at sea is less than predicted, and their potential impacts appear lower since they are seldom observed near the sources." (DPEIS at E-69)

The DPEIS presents an environmental consequences analysis that incorrectly assesses the environmental effects of seismic operations on both an absolute basis and equally importantly on a comparative basis with other known sources of risk to individual animals and populations.

The analysis appears to give equivalent weight to potential risks, which are not equivalent – Level A (mortality/injury) and Level B (behavioral effect many of which are likely short-term and transitory). These low behavioral effect levels are then labeled as a greater risk ("Moderate") than non-industry activities such as vessel strikes and fishing gear entanglements involving mortality to marine mammals of concern, which are labeled as "Minor" environmental effects.[10]

Conflicting standards in the environmental consequence yields an internally contradicted DPEIS assessment of risks regarding a multitude of activities. Minor and short-term behavioral effects associated with seismic surveys appear to be judged more consequential than known causes of animal mortality, such as ship strikes.

B. Methodology

The DPEIS does properly concede the difficulty in evaluating acoustic risk to marine mammals and thus should require the agency to be especially vigilant and attentive in characterizing and calculating risk. The methodology outlined is inadequate and suffers from multiple problems. Industry would encourage BOEM risk assessors to consider other ecological risk assessment experiences and approaches conducted by NOAA, EPA, OMB and other agencies that are able to inform development of an improved methodology.

An improved DPEIS would better explain in the Environmental Consequence analysis how the inaccurate proxy of the incidental takes estimates progresses from assertions of single-animal effects to the population-level effect. It is not clear how this

[10] NMFS reported 272 vessel strikes from 1972-2002, with recognition that total number of vessel strikes is unknown and only a small fraction of ship strikes reported and verified. Jensen, A.S. and G.K. Silber. 2003. Large Whale Ship Strike Database. NOAA Technical Memorandum, U.S. Department of Commerce. NMFS-OPR. 37 pp.

determination is made, (e.g., whether the analysis is premised on a deterministic approach, a probabilistic approach, or some other method).

i. The Mechanics of Assessment

The EIS describes "potential" impacts of the alternatives. Definitions of Individual Effect Criteria – the "criteria" for characterizing impact are not clear and do not adequately differentiate between "minor" and "moderate" and "moderate and "severe". To some degree they appear to be distinctions without a difference.

Moreover, the criteria used to assess acoustic effects vary from NEPA document to NEPA document, creating additional confusion. See the table below for a comparison of the criteria used on the 2012 Arctic DEIS and the 2012 Atlantic G&G DPEIS.

	Atlantic DPEIS (3/30/12)	Arctic DEIS (12/22/11)
Negligible	Little or no measurable / detectable impact	Impacts are generally extremely low in intensity (often they cannot be measured or observed), are temporary, localized, and do not affect unique resources.
Minor	Impacts are detectable, short-term, extensive or localized, but less than severe	Impacts tend to be low in intensity, of short duration, and limited extent, although common resources may experience more intense, longer-term impacts
Moderate	Impacts are detectable, short-term, extensive and severe; or impacts are detectable, short-term or long-lasting, localized and severe; or impacts are detectable, long-lasting, extensive or localized, but less than severe	Impacts can be of any intensity or duration, although common resources may be affected by higher intensity, longer-term, or broader extent impacts while unique resources may be affected by medium or low intensity, shorter duration, local or regional impacts.
Severe	Impacts are detectable, long-lasting, extensive, and severe	Impacts are generally medium or high intensity, long-term, or permanent in duration, a regional or state-wide extent, and affect important or unique resources

Thus, there is no objective or reproducible scientific basis for agency personnel to

make decisions. The DPEIS process would inherently require agency decision makers to make **arbitrary** decisions not based upon objective boundaries. There needs to be consistency between the BOEM regions and NMFS on how the effects criteria are defined and how the impacts are analyzed.

ii. Characterization of Aggregated Effect

The second step in the assessment process provides for a relative judgment about Intensity versus Duration versus Extent versus Context. The same problem outlined above becomes an order of magnitude worse since there is no reproducible scientific process.

The net result is an assessment with a wide potential range of outcomes. Based upon this system, the DPEIS asserts that the effect of industry seismic activity is "Moderate" on marine mammals. If the effect of seismic is moderate, what is the assessment of risks from vessel strikes or a host of other activities? Industry would like to see the comparative assessment. These identified problems in the risk assessment make it virtually impossible to meet the NEPA requirements and guidelines requiring objective decision-making procedures. More importantly, it would yield inconsistent assessments from reviewer to reviewer. No matter how conscientious a decision maker is, there are no objective boundaries for making determinations. A minimum test is whether decisions are 1) internally consistent and 2) consistent from decision to decision. On both counts this decision making process would exceed agency discretion – in violation of both NEPA and the Administrative Procedures Act requirements.

The characterizations of risk are highly subjective and appear to be dependent upon the selection of the evaluator, who would be authorized to use his/her own, individual scientific understanding, views and biases. Thus, the assessments do not appear able to be replicated.

The DPEIS itself seems to acknowledge the inconsistency from assessment to assessment. This creates a situation in which the DPEIS determines that otherwise minor effects from industry operations (ranging from non-detectable to short-term behavioral effects with no demonstrated population-level effects) are judged to be a higher-rated risk to the species than known causes of mortality such as vessel strikes and entanglements. Thus, the projection of acoustic risk is inconsistent with reality of effect.

iii. Use of data that is not best available science.

The DPEIS acknowledges the requirement to utilize best available science and assert the agencies have met this requirement. Industry does not share that assessment.

With respect to marine mammal noise exposure criteria, industry and many scientists believe that the best available science is Southall et al. 2007, which proposes thresholds above the 160/180 dB levels for assessing Level B and Level A takes, for pulsed-sound sources such as airguns. The NMFS-initiated expert panel likewise substantially argued that the 190/180/160 dB re: 1 μPa (rms) criteria are inadequate and improved criteria are needed. Additional new information since 2007 further shows the inadequacy of the present thresholds and should contribute to a revised acoustic criteria. Historical precedent is an entirely inadequate justification for continuing to apply these thresholds because they fail to reflect the best available science. Industry is pleased that the DPEIS did include one table for estimated takes based upon Southall et al. 2007. However, other approaches are also reflected and it is not clear which approach BOEM and NMFS will ultimately utilize. The mitigation measures incorporated into the proposed alternatives do not reflect the Southall et al. 2007 conclusions.

The NMFS acoustic threshold of 180 dB re: 1 μPa (rms) for Level A takes is a dated initial criterion long overdue for revision. Again, the expert panel created by NMFS clearly provides more recent science on acoustic criteria (Southall et al 2007) and recommends a Level A sound pressure level threshold of 230 dB re: 1 μPa (peak) (flat) (or sound exposure level of 198 dB re: 1 μPa2-s) for a pulsed sound source. However, the question of sound pressure level or sound energy level as the more accurate predictor of potential injury is also discussed. The use of 160 dB re: 1 μPa (rms) as a threshold for Level B takes is a NMFS guideline. For potential disruption of behavioral patterns, the question of a dose-response versus a context-response is very much in question.

More important to the concept of take and marine mammal well being, is the question, "What responses actually represent a biologically significant impact?" Richardson et al. (2011) provides a review of potential impacts on marine mammals that concludes injury (i.e., permanent hearing damage) from airguns is extremely unlikely and behavioral responses are both highly variable and short-term. In a NMFS October 5, 2006 notice to Lamont-Doherty Earth Observatory (LDEO), the agency stated in the Disturbance Reactions section that "Simple exposure to sound, or brief reactions that do not disrupt behavioral patterns in a potentially significant manner, do not constitute harassment or "taking". By potentially significant, we mean "in a manner that might have deleterious effects to the well-being of individual marine mammals or their populations".[11] The DPEIS reverts to dated acoustic thresholds and ignores significant and more recent recommendations on improving criteria. The agency should not use outdated criteria, but should in the final PEIS utilize this more recent and far more reliable information.

iv. Probabilities of Effect Ignored

[11] 71 Fed. Reg. at 58790

The environmental consequences analyses are burdened by increasing attention given to more and more speculative "potential" effects without adequate consideration to probability of occurrence or applying the required "reasonable likelihood" standard or utilizing standard "weight of the evidence" tests.

v. Uncertainty & Use of Conservative Factors

The discussion of acoustics and acoustic effects suggests – but does not explicitly say --that "precautionary factors" were injected at various points in its consideration of noise criteria and acoustic effects to offset the absence of adequate information.

The Associations urge NMFS/BOEM to examine this process to handle uncertainty and to include in a revised DPEIS the assumptions and precautionary factors applied that are associated with each step of this process such as: 1) estimates of seismic activity, 2) source sizes and characterizations, 3) underwater sound propagation, 4) population estimates and densities of marine mammals, 5) noise exposure criteria, 6) marine mammal behavior, including the context of a behavioral reaction. Until the agencies document and communicate these underlying decisions in a transparent fashion neither the industry nor agency resource managers can know and understand how such decisions are made and therefore the range and rate of error. The DPEIS as presently written presents an "on the one hand; on the other" approach which does not inform the issue for agency resource managers.

The use of precautionary principles that are not reflected in actual scientific knowledge is particularly inappropriate given their fundamental inconsistency with the programmatic goals of encouraging the expeditious exploration of the OCS.

vi. Socio-Economic Considerations

The Environmental Consequences analysis must more fully consider essential economic factors, to properly evaluate and to give appropriate consideration to socio-economic impacts as required by NEPA and necessary for subsequent regulatory decisions under OCSLA. The DPEIS should, for example, discuss economic effects that would result from leasing and successful exploration that leads to production. The positive economic experiences in more mature areas such as the Gulf of Mexico should be included.

The environmental consequences analysis as noted earlier does not properly address the relative evaluation of effects (biological, physical, socio-economic). For example, the evaluation system suggests that a "Minor" biological effect and a "Minor" Socio-Economic effect would be equivalent. Industry would assert that the analysis not only does not appear to arrive at this conclusion but the DPEIS analysis does not provide a basis for assessing the relative costs and benefits of the alternatives.

As Industry observed in its cover letter to these comments, under Executive Order 13563 and controlling case law, the PEIS should include a cost benefit analysis, must take into account programmatic goals, and must also take into account the goals sought to be achieved by the private parties that will be conducting the seismic surveys. None of these are reflected in the draft PEIS.

VI. Acoustics

A. Acoustic Issues Overview

After increasing public attention to the potential impact of marine sound, the Marine Mammal Noise Exposure Criteria Work Group (the Southall Work Group) (Southall et al. 2007) was formed in the early 2000's to review the body of scientific evidence and recommend thresholds that regulators could employ. The Southall Work Group examined the prior work by the High Energy Seismic Survey (HESS) team, (HESS, 1999) and determined that those levels were "precautionary estimates" below which physical injury was considered unlikely (Southall et al. 2007). After reviewing all the available research, the Southall Work Group proposed a sound pressure level threshold for Level A injury of 230 dB re: 1 μPa (peak) (flat) (or 198 dB re 1 μPa^2-s, sound exposure level). The Southall Work Group also repeatedly stated that precaution factors had also been applied in creating its own new proposed criteria.

This represents the best scientific evidence on this question, and it should form the starting point for assessing alternatives and mitigation measures.

As previously noted the issue of acoustic-related incidental takes has suffered from the absence of a clear risk characterization and assessment. At a minimum, it is necessary for the DPEIS to clearly define what constitutes a take and why and what thresholds will be utilized in the rulemaking. If for example, there is a reason for differing thresholds (e.g. for commercial or military vessels versus seismic survey vessels), those differences should be clearly communicated and their rationale thoroughly explained.

B. Industry recommends that the DPEIS:

- Clearly differentiate the difference between the sound field, the animals exposed to sound and injury or behavioral exposure.

- Adopt the Southall Criteria (Southall, et al. 2007), which would establish the following thresholds: Level A at 198 dB re: 1 μPa2-s with M-weighting embedded in calculated RL's SEL (Sound Exposure Level); Level B at the lowest level of TTS-onset as a proxy until better data is developed.

The DPEIS does not clearly establish and communicate this information. In fact NMFS has been unable to clearly communicate that sound exposure does not equal a take although that position is often inferred. Instead, the DPEIS often uses, in our

opinion, significantly inflated model predictions of takes to justify concern. This has been an issue for more than a decade. NMFS has also been unable to make a decision about utilizing Southall et al. (2007) – which has been published in a peer reviewed journal, peer reviewed by other panels and under consideration by BOEM and NMFS officials for four years. Industry believes that these are the first necessary steps in addressing the acoustics/incidental take issue. We encourage BOEM to use Southall et al. 2007 in estimating takes in the Atlantic DPEIS as it represents the best available science and not rely on the outdated, historically used 180 and 160 dB re: 1 µPa (rms) criteria.

C. Estimates of Potential Level A and B "Takes"

i. Level A: The growing scientific consensus is that seismic sources pose little risk of Level A takes (Southall et al., 2010; Richardson et al. 2011)[12]. Southall et al. (2010) and Richardson et al. (2011) recommend a Level A threshold, 230 dB re: 1 µPa (peak) (flat) (or 198 dB re 1 µPa2-s, sound exposure level). The National Research Council's expert panel assessment (NRC 2005) and further review, as discussed by Richardson et al., (2011) also support the Associations' position that this be the level adopted.

Utilizing the Southall approach greatly reduces the estimated number of Level A takes, as shown in Table 4-9 of Volume II of the DPEIS. This correction properly eliminates the proposed revisions to the established and effective shutdown requirements now set forth in NTL 2012-G02.

ii. Level B: The level of sound exposure that will induce behavioral responses may not directly equate to biologically significant disturbance; therefore additional consideration must be directed at response and significance (NRC 2005; Richardson et al. 2011; Ellison et al., 2011) [13]. To further complicate a determination of an acoustic Level B take, the animals' surroundings and/or the activity (feeding, migrating, etc.) being conducted at the time they receive the sound rather than solely intensity levels may be as important for behavioral responses (Richardson et al., 2011).

The Southall Work Group also questioned the relevance of the 160 dB re: 1 µPa disturbance criterion noting that thresholds for odontocetes and pinnipeds exposed to pulsed sounds is not at all well-established …" (Southall et al. 2007, Page 417).

Further, the Southall Work Group recognized that a difference existed between "a significant behavioral response from [and] an insignificant, momentary alteration in behavior." (See also Richardson et al., 2011). The Southall Work Group went on to

[12] Southall 2010 is a further extension of the work undertaken by Southall 2007

[13] W.T. Ellison, B.L. Southall, C.W. Clark, and A.S. Frankel. 2011. A new context-based approach to assess marine mammal behavioral response to anthropogenic sounds. *Conservation Biology.*

propose that "[c]onsequently, upon exposure to a single pulse, the onset of significant behavioral disturbance is proposed to occur at the lowest level of noise exposure that has a measurable transient effect on hearing (i.e., TTS-onset). We recognize that this is not a behavioral effect per se, but we use this auditory effect as a de facto behavioral threshold until better measures are identified."

D. Factors Impacting Thresholds

Other considerations should be recognized in establishing thresholds:

The biological significance of sound may also depend more so on how long the sound persists (Richardson et al. 2011). The DPEIS fails to allow for the fact that 3D seismic surveys are typically acquired in a racetrack pattern resulting in lower chances of an individual animal being exposed to loud sounds for extended periods of time. In other words, given that the seismic vessel is moving in and out of a localized area and the fact that animals are believed to avoid vessel traffic and seismic sounds, cumulative sound exposure is again likely being overestimated in the DPEIS. The acoustic integration model (AIM©) further does not address avoidance and, for purposes of the model limitations, does not allow animals (animats) to move out of the area. Seismic operations are most often in timescales of weeks to months which reduces the possibility of significant displacement since they do not persist in an area for an extended period of time. However, little evidence of area-wide displacement exists or has been demonstrated. For typical scales of habitat displacement studies, seismic surveys are short-term and impacts are localized.

The DPEIS analysis does not adequately consider the fact that many animals avoid vessels regardless of whether they are emitting loud sounds and may increase that avoidance distance during seismic operations (Richardson et al. 2011). Therefore, it should be a reasonable assumption that natural avoidance serves to provide another level of protection to the animals.

While crude dive profiles are included in AIM© exposure modeling, the profiling does not incorporate any animal response to the 3D sound field predicted exposures. Yet observations clearly indicate that another likely behavioral response (if the animal does not simply depart) is a change in diving behavior. Changing water depth, orientation to the source, and even an increasingly better understood mechanism of "built-in ear plugs" (stapedial reflex) all amount to significant loud noise responses (or reflexes) that reduce exposure risks.

As previously noted, the DPEIS is unclear about what constitutes an incidental taking. The MMPA defines Level B takes in the context of behavioral change, not in the context of sound exposure levels, or RMS Sound Pressure Levels. It is debatable whether behavioral changes are dose-responses or context-responses. There are also indications that some animals change their behavior in the presence of RMS Sound Pressure Levels of 160 dB re: 1 μPa (rms) or lower. In other cases of exposure to sounds of 160 dB (and higher), there is no evidence of behavioral change. It is neither

logical nor reasonable to assume that every exposure to 160 dB re: 1 μPa (rms) or higher results in a behavioral change of biologically significant impact equating to a Level B take (Southall et al., 2007; Ellison et al, 2012).

There is also mounting scientific evidence that behavioral reactions are dependent upon the species and often the individual animal (Stone and Tasker, 2006) and can vary due to biological and environmental context (Wartzok et al., 2004; Frost et al., 1984; Finley et al., 1990; Richardson et al., 2011; Miller et al., 2005; Richardson et al., 1999). Most behavioral studies conducted to date have not recorded the received sound pressure levels nor is it clear that sound pressure level (rms) is the best measurement to use for behavioral studies (Southall et al. 2007). In other words, there is not enough scientific evidence to provide a convincing argument that 160 dB re: 1 μPa (rms) should be used as behavioral "take" criteria. In the base case, it is highly likely, just as the case where 180 dB re: 1 μPa (rms) was previously used, that 160 dB re: 1 μPa (rms) is overly cautious and results in an exceedingly high number of "takes".

In other rulemakings, NMFS has asserted that animals within calculated isopleths of sound above 160 dB re: 1 μPA (rms) are considered a take[14]. This basic rationale (independent of uncertainties in numbers) also likely overestimates actual take numbers and therefore should be rejected (exposure of an animal to a sound is not necessarily equivalent to the animal being taken).

Southall et al (2007) went to great effort to define functional groups in terms of sound sources and the specialized hearing characteristics of marine mammal species. Industry remains concerned with the use of the antiquated 160 dB re: 1 μPa (rms) guideline for Level B take estimation and, to a great extent, the inability to define a more reasoned criterion, which rests with an inability to document and quantify marine mammal responses to known sound levels and, more so, what response constitutes a biologically significant effect (NRC 2005). The Associations strongly encourage BOEM in the DPEIS analysis to consider the frequency component, nature of the sound source, cetacean hearing sensitivities, and biological significance when determining what constitutes a Level B incidental take.

E. Using and Explaining The Appropriate Acoustic Units of Measure

To foster meaningful dialogue and avoid confusion and poor decisions regarding industry acoustics issues, the DPEIS should adequately and accurately describe acoustic source levels.

Evaluation of acoustic effects should include both the cumulative energy criterion in Southall et al., (2007) as well as proposed cumulative energy criterion. Southall et al. indicates that, for impulse sounds, any cetacean exposed to either a peak pressure ≥230 dB re 1 μPa or a cumulative sound exposure level (energy) of 198 dB re 1 μPa2 -sec might incur auditory injury. The DPEIS should explicitly note the SEL criteria, which

[14] Federal Register/Vol. 75, No. 95/Tuesday, May 18, 2010 at Page 27712

is the one that will almost always (if not always) be the determining factor. The document in several places relies on Root Mean Square (RMS) Sound Pressure Level criteria for acoustic impacts. The most recent research has questioned the adequacy of these criteria.[15] Instead, they should be replaced by a combination of Sound Exposure Level limits and Peak (not RMS) Sound Pressure Levels or other metric being considered.

Seismic source levels are regularly quoted but they require explanation in order for the reader to have a clear understanding of what the numbers mean. Failure to do so can lead many unfamiliar with acoustics to make inaccurate judgments about the effect of seismic surveys (for example by taking 255 dB minus 180 dB as an indicator of the risk). That approach is flawed but left unexplained, the DPEIS would contribute to presentation of inaccurate information and discussion. The emitted sound pressure level close to the source array is lower than that calculated using the 'far field' calculation.

These source levels are the back-calculated, modeled sound pressure values and are not actually realized at any point in the water column. In virtually all cases they are derived from modeling and are an over-estimate of the true source sound level (sound output from a seismic source array at 1 meter distance from the array). This is an extremely significant point and we suggest BOEM add the following text or similar and a graphic to further expand upon this important point:

> *"It is difficult to measure the actual sound pressure level close to a full source array that is being activated, due to the physical environment surrounding an active seismic array. Therefore assumptions are made that enable the response of a given source array to be modeled."*

The far field assumption suggests that at some distance away from a source array, which is much greater than the dimensions of the source array, the peak energy pulses from the various individual source elements (near field signature) arrive at the same time and add together constructively to form the far field response of the source. This response is corrected or back-projected to one meter from the source array to produce the far field signature of the source at one meter, which is a standard modeled measure of a source array output. It is well known that the peak energy pulses from individual source elements no longer align at locations close to the seismic source array (in the near field) as a seismic source array is a distributed, rather than a point source.

F. Frequency Weighting

The PEIS should incorporate frequency weighting in development of incidental take estimates. Hearing (frequency) varies from species to species and among the cetaceans discussed in the DPEIS. Not all the frequencies used by industry fall within an animal's functional hearing range. In assessing the effects of noise, the M-weighted curve is

[15] Ellison et. al 2011; Madsen, P.T., Marine Mammals and Noise: Problems with Root Mean Square Sound Pressure Levels for Transients; Acoustical Society of America, 2005

applied to correct the sound-level measurement for the frequency-dependent hearing function. (Southall et al., 2007)

Without these frequency-weighted hearing curves, "extremely low- and high-frequency sound sources that are detected poorly, if at all, might be subject to unrealistic criteria." (Southall et al., 2007, pg.413)

The primary application of the M-weighting curve is for predicting auditory damage or a dose-response situation. It should be noted that the M-weighting functions are "quite precautionary" but nevertheless are superior to flat weighting to estimate dose-response exposure.

The DPEIS should make clear whether frequency weighting to account for the hearing ranges of the species was applied in the Environmental Consequences analysis. We understand NMFS has not yet publicly accepted that M- (or similar) weighting should be applied when estimating takes during seismic surveys. At an absolute minimum, BOEM should provide examples of the potential effects of M-weighting on dose response (Level A) takes and a rationale for excluding this significant factor should have been provided.

Aggregating all frequencies for the purpose of calculating exclusion zone (safety radii) for baleen whales which are believed to have hearing sensitivity in the lower frequencies is scientifically supportable. However, it is not supportable with respect to dolphins and other odontocetes known to be mid-frequency hearing specialists. If BOEM ignores this and proceeds to require shutdowns for these species, no more than a 500 meter exclusion zone should be used which is conservative and precautionary.

VII. Biology Issues

Dolphins

The Atlantic DPEIS highlights the issue of dolphins and exclusions zones. From a biology standpoint dolphins are important in the discussion of Mid and South Atlantic G&G activities. The DPEIS notes that there are several strategic stocks of dolphins. There are large numbers of these animals. They comprise a very large percentage of the modeled estimate of Level A and Level B incidental takes.

The biology of dolphin hearing mechanisms should be considered in the DPEIS. It is well known in the Gulf of Mexico and other regions that dolphins frequently enter the seismic exclusion zone to bow ride seismic vessels.

It has also been long recognized that often cetaceans emit sounds as they echolocate that are well above the regulatory protective levels of 180/160 dB re: 1 μPa (rms). Repeated dolphin clicks have been measured up to 230dB (Au, et al 1978).

Alexander Supin and Paul Nachtigall developed a way of measuring the hearing of cetaceans during echolocation by examining the brain wave patterns of the animals to both the outgoing echolocation signal and the echo that returned from that signal (Supin et al, 2003; Nachtigall and Supin 2008).

Research into harbor porpoise (Linnenschmidt et al, 2012), and the bottlenose dolphin (Li et al, 2011, 2012) suggest hearing control may apply to a number of different species of echo locating whales and dolphins.

The DPEIS should consider this new research regarding animal sound tolerance. An example of this is the recent work conducted by Jim Finneran and his colleagues that investigated the auditory effects of multiple underwater impulses produced by a seismic airgun. The pre- and post-exposure hearing thresholds in exposed dolphins were compared to determine the amount of temporary hearing loss, called a temporary threshold shift (TTS), as a function of exposure level and the number of impulses. The research shows that dolphins exposed to airguns up to 186 dB dB re 1 μPa2 -sec (SEL) show ZERO temporary threshold shift (Finneran, US Navy Marine Mammal Program at the Acoustical Society of America meeting, October 2011). The DPEIS would be improved by a discussion of research specifically exploring the hearing control of dolphins and cetaceans. There are indications that animals naturally reduce their hearing sensitivity and therefore the estimates of incidental takes should be reduced. These results would further explain why dolphins may bow ride seismic vessels with no injury.

As mentioned previously, the PEIS should incorporate frequency weighting. It is well documented that dolphins are mid-frequency hearing specialists. Failure to incorporate frequency weighting likely results in overestimating dolphin incidental takes by at least a factor of two.

VIII. Mitigation Measures

The DPEIS proposes to require standard mitigation measures for all action alternatives. It also then proposes consideration of future optional mitigation measures.

Consideration of mitigating measures cannot be disassociated from the risks they are intended to mitigate and requirements that they be effective. In fact, a Council on Environmental Quality memorandum notes that if agencies cannot determine if mitigation was implemented or effective, mitigation requirements fail to advance NEPA objectives of informed and transparent decision-making. [CEQ 2011] Decisions regarding mitigation come through a variety of channels as the DPEIS notes and decisions about mitigation measures should be respectful of the procedures and jurisdictions that have historically evaluated and implemented mitigation requirements.

A. Considering Mitigation Effects

The DPEIS spends considerable time talking about the need for mitigation and the effects of observation zones and shut-down requirements. The DPEIS explicitly

notes that it does not do so. Industry requests that BOEM consider the effects of standard required mitigation measures and reduce its takes estimates accordingly.

The Level A incidental takes predicted by the AIM© modeling do not take into account the operational mitigation measures included in the seismic airgun survey protocol to ensure that marine mammals are not present within the 180-dB exclusion zone. Although these measures are not expected to be 100 percent effective, they are expected to significantly reduce the risk of Level A harassment to marine mammals. The exclusion zone could extend up to 2.1 km (1.3 mi) from a large airgun array (5,400 in3) and up to 186 m (610 ft) from a small airgun array (90 in3). If the operational mitigation measures were100 percent successful, then all Level A harassment of marine mammals would be avoided. [Page 2-13]

B. Adaptive Management Considerations

The DPEIS mentions adaptive management on page ES-34 and elsewhere. The implication is that mitigation requirements could be altered over time. Industry has supported the application of adaptive management in a number of contexts. However, in the DPEIS the term is positioned toward the use of adaptive management to further restrict activities and it does not leave room for adaptive management to reduce restrictions. Adaptive management should also be applied to the need for corrections, if new science alters existing understandings. If monitoring shows undetectable or limited impacts, an adaptive management strategy should allow for decreased restrictions on oil and gas exploration. The conditions under which decreased restrictions will occur should be plainly stated in the discussion of adaptive management.

C. Right Whale Closure Area Proposal

The DPEIS proposes a six-month right whale closure area for Alternative A. An expanded closure area is proposed for Alternative B. The proposals are shown below:

Alternative A:

The total closure area under Alternative A would be 7,589,594 acres (ac) (30,714 square kilometers [km2]), or approximately 4 percent of the AOI. No G&G surveys using airguns would be authorized within the right whale critical habitat area from November 15 through April 15 nor within the Mid-Atlantic and Southeast U.S. Seasonal Management Areas (SMAs) during the times when vessel speed restrictions are in effect under the Right Whale Ship Strike Reduction Rule (50 CFR 224.105). [Page 2-4]

Alternative B:

Alternative B includes one additional mitigation measure developed specifically to reduce impacts on marine mammals: an expanded time-area closure for North Atlantic right whales. The time-area closure would be expanded to a continuous 37-km (20-nmi) wide zone extending from Delaware Bay to the southern limit of

the AOI (Figure 2-3). No G&G surveys using airguns would be authorized within the designated Right Whale critical habitat area from November 15 through to April 15, nor within the Mid-Atlantic and Southeast U.S. SMAs or the additional 37-km (20-nmi) closure areas during the times when vessel speed restrictions are in effect under 50 CFR 224.105.

The DPEIS explains the rationale for the Alternative A closure below. This logic would of course also extend to the expanded closure of Alternative B.

Alternative A includes a time-area closure intended to avoid most impacts from vessel strikes ***or ensonification of the water column [emphasis added]*** *on North Atlantic right whales. It is estimated that this closure would avoid about two-thirds of the incidental takes of North Atlantic right whales by active acoustic sound sources over the period of the Draft Programmatic EIS.* [Page 2-4]

The DPEIS observes that seismic vessels travel at notionally 5 knots/hour (or half the mandatory vessel speed limit under the right whale ship strike reduction rule) and the seismic vessels are required to have onboard dedicated marine mammal observers. The proposal raises the obvious questions:

- Does BOEM believe that seismic vessels should be held to a standard even more restrictive than one that is twice as restrictive as every other vessel operating in these management zones along the Mid- and South Atlantic?

- If the proposal is based not on vessel strike risks but rather acoustic effects, should the agencies revise the many risk assessments that include vessel strikes and fishing gear entanglements to include acoustic noise as an equivalent level threat before applying a six-month no-activity requirement?

The proposal to establish a six-month no-seismic activity zone is a significant step. BOEM should initiate rulemaking to enable sufficient study and public comment before requiring it. Such a proposal would need to consider other sound producers. Assuming that such a proposal is warranted, would such a restriction apply for example to all NOAA vessels or do the agencies propose selectively enforcing such a requirement only on one set of vessels?

The Alternative B proposal is largely based upon attention to migration routes. At present, the Critical Habitat Designation for North Atlantic Right Whales does not include these areas. Establishing migration pathways as opposed to aggregation areas for critical life functions of feeding, calving, etc. is a significant step. What basis does BOEM have in proposing such a step and has it considered rulemaking to ensure there is adequate consideration of all the factors before implementing such a regime?

D. <u>Seismic Airgun Survey Protocol</u>

The DPEIS proposes a Seismic Airgun Survey Protocol [Page 2-5 and Appendix C]. This and associated proposals in the DPEIS would require important changes in the historic operation of observation and shut-down zones including (a) shut-down zone dimensions larger than 500-meters; (b) use of the zones in waters under 200-meters, and (c) extending the use of zones from whales to dolphins. Each warrants discussion and further consideration regarding the need for such protective measures and their practicability.

E. Exclusion zone size

The DPEIS proposes that: *The radius of the exclusion zone would be calculated on a survey-specific basis but would not be less than 500 m (1,640 ft). Based on calculations in Appendix D, the 180-dB zone for a large airgun array (5,400 in3) ranges from 799 to 2,109 m (2,622 to 6,920 ft), with a mean of 1,086 m (3,563 ft).* [Page 2-5 and Appendix C]

If sound source modeling is to be required and be used to increase the size of the exclusion zone – then it should also be available to reduce the size of the exclusion zone. The DPEIS should also be more specific as to how sound measurements are to be conducted. In addition, the proposal does not explain how long such a requirement would be in place. Experience in other areas including the U.S. Arctic have shown that after a few such field source verification tests the size of such zones are well established and there is adequate knowledge of them. Requiring verification tests after such a point brings no new knowledge and is not warranted.

Finally, the DPEIS notes the size of the zone, particularly for Level B effects, may be large and impractical to visually monitor.

F. Separation between simultaneous airgun surveys

Alternative B would establish a 40-km (25-mi) separation distance between simultaneously operating seismic airgun surveys. This is in contrast to Alternative A, which does not require any geographic separation of concurrent seismic surveys. However, in practice, operators typically maintain a separation of about 17.5 km (9.5 nmi) between concurrent surveys to avoid interference (i.e., overlapping reflections received from multiple source arrays). The separation distance under Alternative B was created by rounding up this typical "operational" separation distance to 20 km (10.8 nmi), then doubling it. The purpose of this measure is to limit ensonification of large areas of the AOI at the same time by specifying a conservative separation distance between simultaneous surveys. The largest exposure radii estimated for the 160-dB threshold for a large airgun array is approximately 15 km …" [Page 29]

The need for such a requirement and the manner in which it was calculated are questionable. A separation requirement for seismic surveys should therefore not be established at this time.

NMFS has noted that "[i]n general, NMFS expects the masking effects of seismic pulses to be minor, given the normally intermittent nature of seismic pulses." 76 Fed. Reg. at 6438

The DPEIS notes that seismic survey vessels already maintain separation distances of more than 15 kilometers, which limit overlapping ensonified areas. It is noted there is a desire is to establish a "conservative separation distance". Beyond whether there is a need are questions about what standards are used to establish the need for that additional distance. The DPEIS acoustics risk assessments do not adequately address the issue of overlapping sound fields. The stated procedure of "rounding up to 20 and then doubling" does not convey a well thought out approach.

By comparison, the Final Programmatic Environmental Assessment for Arctic Ocean Outer Continental Shelf Seismic Surveys resulted in standard seismic-survey G&G stipulations providing that "operators must maintain a minimum spacing of 15 miles [24 kilometers] between the seismic-source vessels for separate operations." [16]. Thus, the DPEIS proposes a separation distance two and one-half times greater than that required in the Arctic – even though conditions in the Atlantic OCS would be expected to result in shorter sound propagation distances.

G. Dolphins Shut-down Factors

Use of observation/shut-down zones have historically been applied to cetaceans, excluding dolphins. BOEM's existing requirements are documented in NTL 2012-G02 and were premised upon a 2002 NMFS Biological Opinion.

BOEM has itself previously recognized that extending the shutdown requirement to delphinids is unwarranted. In its recent Supplemental Environmental Assessment for a specific seismic survey permit in the Gulf of Mexico, BOEM concluded that "From a biological standpoint, the best available information suggests that delphinids are considered mid-frequency specialists (i.e., auditory bandwith of 150 Hz to 160 kHz) (Southall et al., 2007). Low frequency seismic arrays, such as the ones considered for use under this proposed action, generally operate in the frequency range of 20 Hz to 20 kHz (Goold and Fish, 1998) and may extend well into the ultrasonic range up to 50 kHz (Sodal, 1999). Therefore, while the majority of the seismic noise occurs at frequencies below that of delphinids, there are some components that may enter into the hearing range of delphinids (Goold and Fish, 1998). These higher frequency components would be at lower intensity levels (i.e., not as loud). It is unclear, though, from a scientific standpoint whether any of the seismic noise that might be heard by delphinids is in fact disruptive."

[16] Minerals Management Service, Final Programmatic Environmental Assessment, Arctic Ocean Outer Continental Shelf Seismic Surveys - 2006 (OCS EIS/EA MMS 2006-038), at p. 235.

BOEM also noted the disruptive effect of a shutdown requirement on seismic operations: "Unlike other sound producing activities (e.g., sonar), seismic surveys occur on specified tracklines that need to be followed in order to meet the data quality objectives of the survey. In other words, seismic vessels in operation cannot simply divert away from nearby marine mammals without a loss in data quality." Site-Specific Environmental Assessment of G&G Survey Application No. L11-020 (Jan. 23, 2012), at 7-8. *See also* Site-Specific Environmental Assessment of G&G Survey Application No. L11-023 (Jan. 26, 2012), at 6-7; Site-Specific Environmental Assessment of G&G Survey Application No. L11-007 (Sept. 16, 2011), at 7-8; Site-Specific Environmental Assessment of G&G Survey Application No. L10-048 (Sept. 16, 2011), at 7-8.

While BOEM in these Supplemental SEISs left open the possibility of examining the issue further in a PEIS, the fact is that none of the scientific data presented in the draft PEIS for the Atlantic OCS calls into question the conclusions reached in these Supplemental SEISs.

The DPEIS nonetheless proposes adding dolphins to the shut-down requirement. It is not clear on what basis BOEM proposes such a change. The DPEIS should include a biological assessment indicating that the acoustic risks to dolphins warrant such a change.

It has been commonly observed, in fact, that dolphins seek to "bow ride" seismic and other vessels, challenging assertions of harm to the animals. The fact that various marine mammals want to approach and enter the ensonified area raises serious questions about the basic validity of a regulatory approach that rigidly established proximity to sound as its basis.

As discussed more fully in the Biology Factors section of this Appendix, recent science on the stapedial reflex is providing insight into why various animals in ensonified zones may not be adversely affected.

The DPEIS recognizes this issue of forcing shut-downs for animals that want to be in the exclusion zone: *However, shutdown would not be required for dolphins approaching the vessel or towed equipment at a speed and vector that indicates voluntary approach to bow-ride or chase towed equipment. If a dolphin voluntarily moves into the exclusion zone after the airguns are operating, it is reasoned that the sound pressure level is not negatively affecting that particular animal*. [Appendix C-11]

Industry suggests that rather than adding dolphins to the survey protocol, BOEM should provide similar provisions to not shut-down when cetaceans are voluntarily in the observation zone.

H. Whale Shut Down Factors

On page C-16, section 3.4, *Guidance for Vessel Strike Avoidance,* key element

number 6 states:

> *"Whales may surface in unpredictable locations or approach slowly moving vessels. When animals are sighted in the vessel's path or in close proximity to a moving vessel, the vessel must reduce speed and shift the engine to neutral. The engines must not be engaged until the animals are clear of the area"*

As the motion of the vessel is required to provide the hydrodynamic force to keep the streamer cables in position, putting the engines in neutral for more than a moment, will result in a potential streamer cable tangle. These are very serious incidents. One recent one in French Guiana resulted in about one month of downtime and dozens of small boat sorties to untangle. The Association recommends the wording should be changed to "steer the vessel away from the whale." With the streamers in the water, a seismic vessel is traveling at 4 to 5 knots and is not at high speed.

I. Passive Acoustic Monitoring (PAM) and Protected Species Observers

Though there are limitations to current PAM technology, there are also limitations to visual observations. PAM offers another tool, in addition to visual observers, for use in monitoring. We support the use of PAM as a monitoring tool during certain conditions.

The capability of any PAM system to detect vocalizing marine mammals is dependent on various factors including level of background noise levels, animal vocalization source levels relative to background noise conditions and the experience of personnel operating the PAM system. PAM is useful under certain conditions and for certain species which have somewhat regular vocalization patterns. However, at this time, standard PAM systems are not able to reliably and accurately determine the location of the vocalizing animal automatically. In addition, the species identification capability of the PAM systems varies. The PAM system may not correctly differentiate between species of concern and other marine mammals. Current PAM systems are not able to determine if the vocalizing animal is a calf. A significant amount of research and effort is underway to improve the localization and species classification capabilities of PAM systems.

We recommend that basic training criteria, such as that specified by many countries for marine mammal observers (MMOs), be developed and required for PAM operators. In addition, minimum requirements for PAM equipment (including capabilities of software and hardware) should also be considered.

A period of confidence in the current PAM capabilities, understanding of limitations, and experienced operator capacity-building is needed before government agencies consider requiring PAM as a mandatory monitoring tool during seismic operations.

On page C-11 of Appendix C, it suggests there would be up to three PSOs plus a PAM operator on a shift together. With a typical limit of four hours per shift with a

two hour break, this implies a large number of PSOs on board. With bunk space limits on vessels – usually stipulated by the USCG or other regulatory agencies – this may be an infeasible requirement.

EXHIBIT B

May 7, 2014

Via Federal eRulemaking Portal

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123–2394

Re: Comments on Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS

Dear Mr. Goeke:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC") in response to the Bureau of Ocean Energy Management's ("BOEM") Notice and Request for Comments on its Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS ("PEIS"). *See* 79 Fed. Reg. 13,074 (Mar. 7, 2014). We appreciate BOEM's consideration of the comments set forth below.

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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and some IAGC members have already filed applications for authorizations relating to such activities.[1]

[1] In a joint letter with the American Petroleum Institute ("API") and the National Ocean Industries Association ("NOIA"), IAGC earlier commented on the draft PEIS ("DPEIS"). *See* Letter from Andy Radford, Sarah Tsoflias, and Luke Johnson to Gary D. Goeke (July 2, 2012) ("DPEIS Comment Letter"). API, NOIA, and IAGC have also submitted a comment letter dated

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Seismic surveys are the only feasible technology available to accurately image the subsurface before a single well is drilled. BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 3.3 billion barrels of oil and 31.3 trillion cubic feet of natural gas. Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology – including seismic reflection and refraction, gravity, magnetics, and electromagnetic – will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, IAGC's members can better locate and dissect prospective areas for exploration.

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

I. OVERVIEW

IAGC supports BOEM's plan to authorize exploratory activities on the Atlantic OCS consistent with the Outer Continental Shelf Lands Act ("OCSLA"), which calls for the "expeditious and orderly development" of the OCS "subject to environmental safeguards." 43 U.S.C. § 1332(3). However, the PEIS undermines OCSLA's mandate, as well as the requirements of other applicable laws, such as the Marine Mammal Protection Act ("MMPA"), in a number of ways. In general, a fundamental flaw with the PEIS is its establishment of an unrealistic scenario in which exploration activities are projected to result in thousands of incidental takes of marine mammals, which BOEM admits will not actually occur. The supposed effects of this "worst case" hypothetical scenario are then addressed in the PEIS with mitigation measures, many of which are similarly unrealistic because they mitigate inaccurately presumed effects. This approach is contrary to both the best available scientific information and applicable law.

Many of the mitigation measures recommended in the PEIS are infeasible, will impose serious burdens on industry, may discourage exploration of the Atlantic, and will result in no benefits to protected species (because they address unrealistic effects). IAGC can and will support mitigation measures that are well supported by the best available science, consistent with existing practices that are proven to be effective and operationally feasible. However, we cannot

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May 7, 2014 (the "Joint Trades Letter"), in response to the PEIS, which IAGC incorporates by reference.

support mitigation measures with no basis in fact or science, which are intended to address effects that will not occur, and which will result in less exploration of the OCS, contrary to OCSLA.

Accordingly, we strongly urge BOEM to include in its Record of Decision ("ROD") the modifications suggested in the comments set forth below. With respect to the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested below are incorporated into the ROD. All of these suggested modifications are within the scope of the analyses contained in the PEIS. *See Great Old Broads for Wilderness v. Kimbell*, 709 F.3d 836, 854-55 (9th Cir. 2013) (modified alternative in ROD upheld because all relevant impacts analyzed in NEPA document); *see also W. Watersheds Project v. BLM*, 721 F.3d 1264, 1277-78 (10th Cir. 2013) (same).

II. DETAILED COMMENTS

A. The PEIS's Marine Mammal Impact Analyses Are Factually and Legally Flawed

The PEIS's analysis of marine mammal impacts is, by BOEM's admission, an unrealistic assessment of the potential impacts of geophysical surveys on marine mammals that is purposefully constructed to overestimate levels of incidental take. The PEIS explains:

> The acoustic and impact modeling conducted to develop these [incidental take] estimates is by its very nature complex and demands numerous specific details be identified and used during calculations[.] However, it must be emphasized that each of these assumptions are purposely developed to be conservative and accumulate throughout the analysis (e.g., representative sound source is modeled at highest sound levels and always at maximum power and operation, sound levels received by an animal are calculated at highest levels, marine mammal density values used likely exceed actual densities, and models do not include the effect of all mitigations in reducing take estimates). Therefore, the results of the modeling predictions will overestimate take.

PEIS at 1-5 (emphases added); *see also* PEIS at 4-62 ("BOEM emphasizes that these estimates should be seen as highly conservative of potential take without the consideration of most mitigation with the exception of the time-area closure described in Alternative A."). The results of this hypothetical "worst case" scenario analysis are strikingly divergent from the record of actual observed marine mammal impacts related to offshore exploration activities. *See* DPEIS Comment Letter §§ I, II & Appx. 1. For example, the PEIS implausibly concludes that thousands of marine mammals will experience Level A incidental take, and that hundreds of thousands of marine mammals will experience Level B incidental take, as a result of seismic

activities. PEIS at Tables 4-9, 4-10, 4-11, 4-12. These take estimates would result in tens of thousands of shutdown events per year, in contrast to the average 55 shutdowns that are required per year in the Gulf of Mexico under existing operations, monitoring, and mitigation.[2] *See* DPEIS Comment Letter, Appx. 1.

We are aware of no federal agency assessment of the effects of seismic activities on marine mammals that results in incidental take estimates that are remotely similar to those stated in the PEIS. Moreover, the history of incidental take authorizations for offshore seismic activities demonstrates that levels of actual incidental take are far smaller than even the most balanced pre-operation estimates of incidental take. *See* DEIS at E-69.[3] The PEIS's flawed

[2] Aggregating the estimated takes presented in Table 43 of the PEIS yields a total of 26,000 estimated takes.

[3] *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/ ("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."); *id*. at 2-23 (with respect to sea turtles, "no significant cumulative impacts to sea turtles would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area"); 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 (WPA); *id*. at 4-710 (v.2), 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."); *id*. at 4-235, 4-741 ("[T]here are no data to suggest that routine activities from the preexisting OCS Program are significantly impacting sea turtle populations."); 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 (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 ("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

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approach to assessing the impacts of seismic activities on marine mammals results in a number of significant legal and factual errors, as set forth below.

1. The PEIS unlawfully analyzes a worst case scenario

Prior to 1986, NEPA regulations required a lead agency to prepare a "worst case analysis" of impacts for which there is incomplete or unavailable information. *See* 51 Fed. Reg. 15,618 (Apr. 25, 1986).[4] However, this requirement was expressly rescinded decades ago because it was found to be "an unproductive and ineffective method of achieving [NEPA's] goals; one which can breed endless hypothesis and speculation." *Id*.; *see Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354-56 (1989) (U.S. Supreme Court confirming that worst case analysis is no longer applicable). In place of the worst case analysis requirement, the federal Council on Environmental Quality ("CEQ") promulgated "a wiser and more manageable approach to the evaluation of reasonably foreseeable significant adverse impacts in the face of incomplete or unavailable information in an EIS." 51 Fed. Reg. at 15,620. The new (and current) approach, codified in 40 C.F.R. § 1502.22, requires federal lead agencies to disclose such impacts and perform a "carefully conducted" evaluation based upon "credible scientific evidence." *Id*.; 40 C.F.R. § 1502.22(b)(1). In developing this requirement, CEQ explained that "credible" means "capable of being believed" and stated that "[i]nformation which is unworthy of belief should not be included in an EIS." 51 Fed. Reg. at 15,622-23 (responses to comments) (emphasis added).

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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 ("[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 ").

[4] In the PEIS, BOEM determines that there is incomplete or unavailable information for a full assessment of the impacts of the proposed activities on marine mammals. *See* PEIS at 4-6, 4-47.

By performing an analysis of marine mammal impacts that is "purposely developed to be conservative," based on the "highest" sound levels and erroneously high marine mammal densities, and intended to "overestimate take," BOEM has performed precisely the same type of "worst case analysis" that was rejected by both CEQ and the U.S. Supreme Court many years ago. By its terms, and as expressly stated in the PEIS, the analysis of marine mammal impacts is purposely designed to be inaccurate and to evaluate the worst possible consequences that could hypothetically result from unmitigated seismic surveying. Indeed, it is hard to imagine an analysis that presents a scenario worse than the hundreds of thousands of incidental takings that are erroneously predicted by the PEIS. The PEIS's analysis of marine mammal effects is plainly not credible, it evaluates effects that, by BOEM's admission, will not occur, and, therefore, it is "unworthy of belief." The PEIS's assessment of marine mammal impacts unlawfully applies a "worst case" analysis and does not comply with NEPA or currently applicable CEQ regulations (40 C.F.R. § 1502.22).

2. The PEIS does not present an accurate scientific analysis

An EIS must rely upon "high quality" information and "accurate scientific analysis." 40 C.F.R. § 1500.1(b); *Conservation Nw. v. Rey*, 674 F. Supp. 2d 1232, 1249 (W.D. Wash. 2009); *Envtl. Def. v. U.S. Army Corps of Eng'rs*, 515 F. Supp. 2d 69, 78 (D.D.C. 2007) ("Accurate scientific analysis [is] essential to implementing NEPA."). It also must have "professional integrity, including scientific integrity" and may not rely on "incorrect assumptions or data" or "highly speculative harms" that "distort[] the decisionmaking process." *See Theodore Roosevelt Conservation P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010); 40 C.F.R. § 1502.24; 73 Fed. Reg. 61,292, 61,299 (Oct. 15, 2008) (CEQ regulations require "high quality" information and "scientific integrity"); *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005); *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005) (internal citations omitted).[5] To be sure, courts have invalided EISs that did not meet these standards, that were based on "stale scientific evidence . . . and false assumptions," or that failed to disclose the "potential weakness" of relied-upon modeling. *See, e.g., Seattle Audubon Soc'y v. Espy*, 998 F.2d 699, 704 (9th Cir. 1998); *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 897 (9th Cir. 2007) (citations omitted).

Respectfully, the PEIS fails to satisfy any of these important NEPA principles. An analysis that, by the agency's admission, overestimates take and relies upon incorrect assumptions, is, by definition, "inaccurate." Moreover, the PEIS's analysis of marine mammal impacts is, at best, "highly speculative" because it is based on scenarios and assumptions that will not occur.

[5] *See also CBD v. BLM*, 937 F. Supp. 2d 1140, 1155 (N.D. Cal. 2013) (principle that reasonably foreseeable environmental effects may not include "highly speculative harms" is equally applicable to direct and indirect effects).

3. The conclusions of the PEIS fail to consider, and are contrary to, the MMPA

The PEIS's assessment of marine mammal impacts is directly contrary to the MMPA. BOEM has defined the proposed action to include only those activities that have first received incidental take authorizations under the MMPA. *See* PEIS at 1-14, 1-25. As a prerequisite to incidental take authorization, the MMPA requires the permitting agency to find that the authorized take will have a "negligible impact" on marine mammals. 16 U.S.C. § 1371(a)(5)(A), (D). Accordingly, by definition, the proposed action analyzed in the PEIS should include only those seismic activities causing incidental take at levels that NMFS has expressly determined result in a "negligible impact" to marine mammal stocks. However, in sharp contrast, the PEIS concludes that the impacts of airguns on marine mammals under the proposed action are "moderate." PEIS at Table 2-4. By concluding that "moderate" impacts will result from seismic operations, BOEM has incorrectly analyzed the proposed action that is defined in the PEIS. Moreover, this discrepancy highlights the significant flaws that result from the PEIS's erroneous analysis of marine mammal impacts.[6] BOEM must analyze the effects of the action it has proposed, which includes offshore seismic operations that will receive incidental take authorizations under the MMPA and, by definition, will have no more than a negligible impact on marine mammal stocks. Based on 40 years of experience and recent scientific research and observational data, BOEM should find in the ROD that the impacts of seismic exploration are indeed negligible.

B. Certain Mitigation Measures Recommended in the PEIS Are Unsupported and Unreasonable

The record demonstrates that the scope of mitigation measures applied to offshore operations in the Gulf of Mexico is already more than adequate to protect marine mammals and sea turtles in a manner consistent with federal laws.[7] Despite this record, the PEIS recommends

[6] The PEIS's "moderate" impact finding is also factually inconsistent. "Moderate" impacts are defined in the PEIS as "detectable, short-term, extensive, and severe; or … detectable, short-term or long-lasting, localized, and severe; or … detectable, long-lasting, extensive or localized, but less than severe." PEIS at x. Accordingly, a "moderate" seismic impact must be either "long-lasting" or "severe." However, insofar as we are aware, no seismic activities that have received MMPA incidental take authorizations have caused impacts amounting to anything more than temporary changes in behavior, without any known injury, mortality, or other adverse consequence to any marine mammal species or stocks. *See supra* note 3.

[7] *See supra* note 3; *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) ("[I]t is unlikely that the

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certain mitigation measures that have never been required for offshore exploratory operations, and that are more stringent (and less supported) than the measures that have already been successfully implemented. The unprecedented measures recommended in the PEIS are a direct result of BOEM's flawed impact assessments. For example, as described above, the PEIS creates a hypothetical worst case scenario for marine mammal impacts, determines that the projected adverse effects in that scenario will be substantial, and then recommends mitigation measures to address those supposed effects. However, because the adverse effects identified in the PEIS are inaccurate and unrealistic, the mitigation measures intended to address those effects are similarly flawed and without any factual or scientific support.

The mitigation measures that particularly concern IAGC are addressed in detail below. Without question, these measures, if implemented, will have substantial adverse effects on offshore geophysical operations. These measures will result in increased survey duration, which, in turn, can increase the potential exposure of marine mammals to seismic-related effects.[8] We strongly urge BOEM to reconsider these mitigation measures as it prepares the ROD.[9]

1. Dolphin shutdowns

The PEIS recommends a mitigation measure calling for the shutdown of operations if a dolphin enters the acoustic exclusion zone unless the dolphin is determined by the observer to be

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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, 14789 (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.").

[8] 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.

[9] The effects analysis contained in NMFS's associated biological opinion suffers from the same flaws as the PEIS's effects analysis. In addition, the terms and conditions stated in the biological opinion (which mitigate the inaccurate effects conclusions) lack a rational basis for the reasons stated in this letter with respect to the PEIS's corresponding mitigation measures. IAGC requests that BOEM work with NMFS to similarly reconsider and modify the biological opinion's terms and conditions.

voluntarily approaching the vessel. PEIS at 2-11.[10] This proposed measure is contrary to the best available science, impractical, arbitrary, and unsupported for at least the following reasons.

First, dolphins are mid- to high-frequency specialists and, therefore, insensitive to the low frequency impulse sounds emitted by seismic operations. The E&P Sound and Marine Life Joint Industry Program has supported research to study the effects of multiple airgun pulses in odontocetes and, specifically, to study whether bottlenose dolphin exposure to airgun impulses results in temporary threshold shift ("TTS").[11] As the public abstract from the study explains, "subjects participated in over 180 exposure sessions with no significant TTS observed at any test frequency, for any combinations of range, volume or pressure during behavioral tests." [12] Even at ranges as close as 3.9 m and with the air gun operating at 150 in^3 and 2000 psi, resulting in cumulative Sound Exposure Levels of 189-195 dB re 1μPa^2s, the impulses did not result in detectable TTS in any dolphin tested. As a result of the relative low-frequency content of airgun impulses compared to the relative high-frequency hearing ability of dolphins, no injuries or significant behavioral responses were observed in this study.[13] Industry observations corroborate this scientific evidence. For example, dolphins are frequently observed by personnel on seismic vessels to approach the vessels during operations to bow-ride and chase towed equipment – a direct indication of insensitivity to seismic sound generation. PSO observation reports indicate that there is no statistically significant difference between the frequency of dolphin sightings and

[10] "Voluntary approach" is defined as "a clear and purposeful approach toward the vessel by delphinid(s) with a speed and vector that indicates that the delphinid(s) is approaching the vessel and remains near the vessel or towed equipment." PEIS at 2-11.

[11] James J. Finneran et al., *Final Report* (2013). TTS in odontocetes in response to multiple airgun impulses. (IAGC understands that a copy of this Final Report has been furnished by the author to NMFS).

[12] C.E. Schlundt et al., *Auditory Effects of Multiple Impulses from a Seismic Airgun on Bottlenose Dolphins*, presentation at the Effects of Noise on Aquatic Life Third International Conference, Budapest, Hungary (Aug. 11-16, 2013) (emphasis added). The results of this study also are useful to support inclusion of frequency weighting in updated acoustic criteria.

[13] In a 2011 Programmatic EIS, the National Science Foundation recognized that "[t]here has been no specific documentation that TTS occurs for marine mammals exposed to sequences of air-gun pulses during operational seismic surveys." Programmatic EIS/OEIS for NSF-Funded & USGS Marine Seismic Research, at 3-133 (June 2011), http://www.nsf.gov/geo/oce/envcomp/usgs-nsf-marine-seismic-research/nsf-usgs-final-eis-oeis_3june2011.pdf (recognizing 180 dB re 1 uPa (rms) criterion for cetaceans "is actually probably quite precautionary, i.e., lower than necessary to avoid TTS at least for delphinids, belugas and similar species").

acoustic detections during seismic operations when the source is active or silent. *See* Attachment A.[14]

Second, even if there were scientific justification for the proposed dolphin shutdown mitigation measure (which there is not), implementation of the measure is impractical. We are aware of no mitigation measures applicable to offshore exploration activities in which an observer is required to subjectively determine the intent of a marine mammal. Determining marine mammal intent from great distances is very difficult for experienced marine mammal biologists in staged scientific experiments, let alone for observers who will be attempting to determine dolphin intent over vast distances in the ocean environment. Based on observation reports, PSOs will be unable to confidently assess animal behavior or "intentions" because they cannot accurately determine species within the expanded exclusion zone.[15] The result is that observers will likely, out of caution, call for shutdowns in almost all instances where dolphins are observed within the exclusion zone.

Third, in areas of high-density dolphin populations, such as the Atlantic Ocean and the Gulf of Mexico, shutdown requirements for a species that enjoys bow-riding and approaching vessels could effectively bring all seismic activity to a halt. Implementation of this proposed measure will substantially increase the number of shutdowns and delays in ramp-ups, which will result in much longer surveys and significantly increased costs with no environmental benefit. *See* Barkaszi, *supra*, note 7, at 1 (75% of delays in ramp-ups due to presence of protected species in exclusion zone during 30 minutes prior to ramp-up were due to dolphins).

Fourth, the proposed measure is without precedent. Under Joint NTL No. 2012-G02 (and previously NTL No. 2007-G02), BOEM required seismic operators in the Gulf of Mexico to shut down for any whale observed in the exclusion zone. BOEM defined "whales" as all marine mammals except dolphins and manatees. In the June 2013 settlement of litigation challenging BOEM's permitting of seismic activity in the Gulf of Mexico, the U.S. District Court for the Eastern District of Louisiana extended the shutdown requirements to manatees. In short, no

[14] *See also* A. MacGillivray et al., *Marine Mammal Audibility of Selected Shallow-Water Survey Sources*, J. Acoustical Soc'y of Am. 135(1) (Jan. 2014).

[15] *See* Attachment A. It is well known that different species will exhibit different behaviors. For example, Risso's dolphins generally avoid vessels and rarely bow-ride, rough-toothed dolphins generally avoid vessels but do bow-ride, and common dolphins are avid bow-riders. *See* K. Wynn & M. Schwartz, *Guide to Marine Mammals and Turtles of the U.S. Atlantic and Gulf of Mexico* (2009).

dolphin shutdown provision, as recommended in the PEIS, has ever been required by any federal agency.[16]

Finally, there is no legal basis for the proposed dolphin shutdown measure. Under the MMPA, mitigation measures attached to incidental take authorizations must address the reduction of incidental take. *See* 16 U.S.C. §§ 1371(a)(5)(A), (a)(5)(D); 50 C.F.R. § 216.104(a)(13). However, as set forth above, there is no scientific evidence demonstrating that active acoustic seismic surveys result in any incidental takes of dolphins. Accordingly, there is no statutory basis for recommending the dolphin shutdown mitigation measure.

In sum, the proposed dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support. IAGC respectfully requests that BOEM, in its ROD, expressly find that this recommended measure is unsupported and unnecessary, and exclude the measure from the ROD's recommended mitigation measures. The ROD should also affirmatively clarify that shutdown is not required for dolphins within the exclusion zone in all circumstances, regardless of whether dolphins are exhibiting bow-riding behavior or any other behavior.

2. 40 km buffer zone between concurrent surveys[17]

In Alternative B, BOEM recommends an expanded 40 km buffer zone between concurrent seismic surveys. The rationale for this expanded buffer is "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is below Level B thresholds and approaching ambient levels." PEIS at 2-37. The agency's stated scientific basis for this proposed measure is, at best, ambiguous: "New information suggests that, in some circumstances, airgun noise can be detected at great distances from the sound source, such as across ocean basins (Nieukirk et al., 2012), yet it is unknown if detection of sound at these distances has any effect on marine mammals or other marine species." PEIS at 2-38. No other scientific evidence, no published studies, and no other rationale are provided for this proposed measure, which is given a half-page explanation in Appendix C. In addition, this proposed

[16] For example, in the Gulf of Mexico, the average shutdown lasts for 58 minutes, *see, e.g.*, Barkaszi, *supra*, note 7, which the PEIS would extend by at least 30 minutes by increasing the visual monitoring period following a shutdown from 30 to 60 minutes. Multiplying a rough 1.5-hour average shutdown by 26,000 shutdowns would yield roughly 39,000 hours of shutdowns or approximately 1625 days. Because the typical seismic survey operation costs roughly $1.5 million per day, the total potential costs arising from the PEIS's assumptions equal a staggering $2.5 billion.

[17] This measure, as well as the 60-minute "all clear" period addressed below, were not addressed anywhere in the DPEIS. This is the first opportunity the regulatory community has had to comment on these measures.

measure is not mentioned at all in the biological opinion.

In contrast, the best available scientific information supports a buffer zone, if any, of 17.5 km, which is the standard separation distance maintained by seismic operators. The modeling performed by JASCO (*see* PEIS at Appx. D) demonstrates that the typical exposure radius for the 160 dB threshold is 10 km. The largest observed exposure radius was 15 km, but this occurred in less than 10% of the modeled cases. The lowest observed exposure radius was 5 km. Current technology has enabled many operators to decrease typical exposure radii to 7 to 9 km.

A buffer zone that more than doubles the highest possible exposure radii is clearly not reasonable or scientifically supportable – i.e., it is arbitrary. Moreover, the PEIS's reference to airgun noise detections at "great distances" does not support the proposed buffer zone because those detections occur (if at all) at very low levels that are well below the thresholds NMFS has established for Level B harassment.

The recommendations and analyses in an EIS must be "accurate," not speculative, and grounded in "high quality" scientific information. *See supra* Section II.A.2. The recommended 40 km buffer zone fails all of these standards. There is literally no scientific information that supports this measure, and, as explained above, the best available information contradicts it. To our knowledge, no buffer zones even approaching this magnitude have ever been required as a condition of offshore seismic authorizations.[18] To make matters worse, BOEM admits in the PEIS that implementation of the 40 km buffer would result in no additional benefits to protected species. PEIS at xxiv (40 km buffer "would not be expected to change any impact ratings"). Consequently, BOEM must decline to adopt the 40 km buffer zone mitigation measure in the ROD and, instead, recommend either no buffer zone, as recommended in Alternative A, or, alternatively, a 17.5 km buffer zone, consistent with standard practice.

3. 60-minute "all clear" period

The PEIS recommends that monitoring of the exclusion zone shall "begin no less than 60 min prior to start-up" and that restarting of equipment after a shutdown "may only occur following confirmation that the exclusion zone is clear of all marine mammals and sea turtles for 60 min." PEIS at C-29. However, again, BOEM has provided no factual or scientific support for this measure, nor is any meaningful supporting information provided in the biological opinion. To our knowledge, a 60-minute "all clear" period has never been required as a condition of any offshore seismic authorization in the United States. In fact, the routine and proven-to-be-effective practice is to require a 30-minute "all clear" period – for marine mammals

[18] *See, e.g.*, 78 Fed. Reg. 35,364, 35,423 (June 12, 2014) (vessel spacing of 24 km required to avoid any effects of multiple surveys on migrating or foraging walruses).

generally and for ESA-listed species.[19] There is no available information suggesting that the standard practice has not been effective and, to the contrary, all available information demonstrates that the standard practice has been very successful in protecting marine mammals.

Expanding the standard 30-minute "all clear" period to 60 minutes will substantially increase the duration and cost of seismic surveys, which, in turn, increases safety and environmental risks. Extrapolated over all surveys that will be performed over a five-year period, the increased time and expenses resulting from this mitigation measure alone will be dramatic. Increased survey time will also increase the amount of time that protected species are exposed to the potential effects associated with the presence of vessels. The PEIS contains no analysis of the increased operational or environmental effects associated with the 60-minute "all clear" period, compared to the standard 30-minute period (and sometimes 15-minute period) that has successfully been implemented in all offshore seismic operations to date.[20] Accordingly, in the ROD, BOEM should decline to adopt the 60-minute period as unsupported and unprecedented and, instead, adopt the standard 30-minute period.

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[19] *See Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 79 Fed. Reg. 13,626, 13,636-37 (Mar. 11, 2014) (requiring 30-minute observation period before startup and after sightings of killer and ESA-listed beluga whales and large odontocetes, but only 15-minute period after sightings of pinnipeds and small odontocetes); *Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 78 Fed. Reg. 12,720, 12,732-33 (Feb. 25, 2013) (providing same requirements, and specifying that the shorter 15-minute clearance period applies to harbor porpoises); *Issuance of IHA to TGS-Nopec for Seismic Survey in Chukchi Sea*, 78 Fed. Reg. 51,147, 51,154, 51,160 (Aug. 20, 2013) (same); *Issuance of IHA to Shell and WesternGeco for Seismic Surveys in the Beaufort and Chukchi Seas*, 73 Fed. Reg. 66,106, 66,135-36 (Nov. 6, 2008) (requiring 30-minute observation period before ramp-up and 15- or 30-minute delay of ramp-up for sightings of small odontocetes and pinnipeds, or baleen whales and large odontocetes, including ESA-listed species, respectively); *Issuance of ITR for Oil and Gas Activity in Chukchi Sea*, 78 Fed. Reg. 35,364, 35,424, 35,425 (June 12, 2013) (requiring monitoring period of 30 minutes for walruses and ESA-listed polar bears before startup and after sighting); *Issuance of ITR for Oil and Gas Activity in Beaufort Sea*, 76 Fed. Reg. 47,010, 47,052 (Aug. 3, 2011) (same).

[20] Pre-ramp-up and post-shutdown, the vessel is still moving and likely would move 8-9 km at 3-5 knots in a 60-minute period, bypassing any established exclusion zone several times. *See* 79 Fed. Reg. at 14,797 (NMFS stating that ramp-up is unnecessary "[b]ecause the vessel has transited away from the vicinity of the original sighting during the 8-minute period, implementing ramp-up procedures for the full array after an extended power-down (i.e. transiting for an additional 35 minutes from the location of initial sighting) would not meaningfully increase the effectiveness of observing marine mammals approaching or entering the exclusion zone for the full source level and would not further minimize the potential for take").

4. Exclusion zones greater than 500 meters

The PEIS explains that exclusion zones "shall be calculated independently and shall be based on the configuration of the array and the ambient acoustic environment, but shall not have a radius of less than 500 m…." PEIS at 2-10. BOEM's suggested approach for exclusion zones will require 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 Gulf of Mexico. *See supra* note 3. The expanded exclusion zones are especially concerning because they will ultimately be dictated by the hearing group with the largest modeled radii once new group-specific acoustic criteria are implemented. High-frequency cetaceans, particularly delphinids, will therefore determine the size of the exclusion zone in most instances. Since BOEM is applying shutdown requirements to delphinids, and, as described above, because the exception to those requirements will rarely be applied in practice, this will result in numerous shutdowns due to the observation of delphinids within the large exclusion zone.

Moreover, these shutdowns will serve no environmental benefit because, as explained above, the best available science and information demonstrates that delphinids are unaffected by the lower frequency sounds produced by seismic operations. Exclusion zones should be based on the best available science and modeling and, if that modeling 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 minimum 500 m exclusion zone requirement is not applied, IAGC would support the incorporation of power-down procedures to mitigate any potential effects. Power-down procedures acceptable to IAGC are a modified version of the procedures described at 79 Fed. Reg. 14,780, 14,797 (Mar. 17, 2014) ("Langseth IHA").[21]

5. Turtle shutdowns

The PEIS applies exclusion zone shutdown criteria equally to marine mammals and sea turtles. However, the PEIS does not meaningfully address the fact that sea turtles are much more difficult to observe than marine mammals. Sea turtles can be reasonably observed at distances of 100 m to 300 m from a vessel, but it is very unlikely that sea turtles can be reliably observed at greater distances. *See* Attachment A (most turtle observations within 100 m). In addition, if a sea turtle is observed within the exclusion zone (triggering a shutdown of airguns), assuming the vessel is moving at 3 to 5 knots, the observed turtle will be outside of the exclusion zone within approximately 15 minutes because sea turtles swim very slowly compared to marine mammals.

[21] Specifically, IAGC 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.

In such circumstances, a 60-minute "all clear" requirement would plainly be unnecessary (setting aside the fact that it is unnecessary in all circumstances).

Because turtles are difficult to observe at distances greater than 300 m, application of the exclusion zone shutdown to sea turtles is infeasible and will very likely result in unwarranted shutdowns because observers, acting out of precaution, will call for shutdowns when anything resembling a sea turtle is observed. There is also no existing scientific basis for the proposed turtle shutdown requirement, and none is provided in the PEIS. *See supra* note 3. The ROD should therefore recommend a reduced exclusion zone for sea turtles that is feasible and practical. Such a reduction is also consistent with the best available science, which indicates that sea turtles are not as sensitive to sound as marine mammal species. *See* PEIS, Appx. I. IAGC recommends a 300 m exclusion zone for all sea turtle species.

6. Expanded NARW time-area closure and DMAs[22]

As part of Alternative B, BOEM recommends an expansion of the time-area closure applicable to North Atlantic Right Whales ("NARW") to a continuous 37 km-wide zone extending from Delaware Bay to the southern limit of the programmatic area. PEIS at C-32. It appears that BOEM intends this closure to be applied to <u>any</u> sound produced by seismic vessels such that no portion of a vessel's ensonification zone may enter the closed area. The result is that the proposed NARW time-area closure will be much larger than what is described in the PEIS. Because NARWs are primarily threatened by ship strikes and fishing entanglement – not seismic sound – BOEM should clarify in its ROD that the NARW time-area closure applies to the <u>presence of vessels, not a vessel's ensonified zone.</u> BOEM should also clarify in its ROD that vessels may transit through the closure area when seismic equipment is not active.

In addition, the PEIS includes time-area closure measures in areas designated as Dynamic Management Areas ("DMAs") under NMFS's ship-strike reduction regulations. *See* PEIS at C-16. These measures are very problematic, and unwarranted, for at least the following reasons:

- DMAs were created to address ship strike situations, which involve vessels traveling at high rates of speed (12-20 knots). Indeed, NMFS has indicated that vessel speeds of less than 10 knots are sufficiently protective. *See* 78 Fed. Reg. 73,726 (Dec. 9, 2013). BOEM's proposed application of DMAs to seismic operations is therefore contrary to both the original purpose of DMAs (to address ship strikes, not potential acoustic impacts) and NMFS's recent finding. Moreover, the proposed application to seismic vessels is particularly arbitrary because BOEM intends to broadly apply it to the vessel's 160 dB ensonified zone.

[22] The DMA-related measures were also not included for public review in the DPEIS.

- Nowhere has either BOEM or NMFS evaluated the operational practicability or effectiveness of applying DMAs to seismic operations.

- Unlike NMFS's approach to DMAs, BOEM appears to propose to make seismic industry compliance with DMAs mandatory. There is no basis for such a measure, especially given that NMFS has taken no such step for the vessels that DMAs were intended to address.

- DMAs are unpredictable and the identification of DMAs on short notice will compromise the implementation of seismic survey operations that have been carefully planned over a substantial period of time, with no corresponding benefit.

7. Vessel strike avoidance

The PEIS's recommended vessel strike avoidance measures for ESA-listed whales present serious operational and safety problems, and must be modified. Specifically, the PEIS recommends that if a vessel comes within 100 m of an ESA-listed whale species, it "must reduce speed and shift the engine to neutral, and must not engage the engines until the whale(s) has moved outside of the vessel's path and the minimum separation distance has been established." PEIS at C-9. Respectfully, this measure fails to consider that seismic vessels are significantly different than typical vessels due to the substantial amount of highly specialized equipment that is towed behind a seismic vessel. Operationally, a seismic vessel must maintain forward motion to sustain the equipment spread or the whole system will collapse. The consequence of immediately shifting the engine into neutral could be significant equipment damage in the tens of millions of dollars, and weeks of vessel downtime. As a practical matter, a seismic vessel moving at 3 to 5 knots is very unlikely to strike an ESA-listed marine mammal. In the event of a sighting of an ESA-listed whale within 100 m of the vessel, the vessel could slow (to no less than 3 knots) and turn gently away from the animal, which would both avoid a collision and lessen the risk of damage to seismic equipment. In its ROD, BOEM must decline to adopt the vessel strike avoidance mitigation measure.

8. Passive acoustic monitoring

Under Alternative B, BOEM would require the use of Passive Acoustic Monitoring ("PAM") as part of the Seismic Airgun Survey Protocol. IAGC encourages consideration of PAM during periods of low visibility in its 2011 best practices guidelines. PAM is one of several monitoring techniques that compliments (rather than replaces) traditional visual monitoring. However, commercially available PAM systems can be highly variable, the equipment is unreliable, and PAM's utility as a secondary monitoring source during daylight observations has not been proven. Overall performance and capabilities of PAM are highly dependent on factors such as technical specification of equipment, operational setting, availability of experienced and trained personnel, and the species of marine mammals present in a given area. Mandatory use of PAM will increase survey cost, require the placement of more

personnel on vessels (i.e., four dedicated PAM observers onboard), and increase entanglement risk due to more gear being towed in the water.

IAGC therefore urges BOEM to either make the use of PAM optional, as recommended in Alternative A, or require PAM only for operations at night and in periods of low visibility.[23] This is reasonable given BOEM's admission that "it is difficult to quantify any difference in impact level [of Alternative B] relative to Alternative A." PEIS at 2-40; *see also* PEIS at xxiv ("The degree of improvement [due to making PAM mandatory] has not been estimated but would not be expected to change any impact ratings."). IAGC encourages BOEM to use risk-based mitigation and monitoring measures based on the best available information and promote development of technologies that can best accomplish effective detection and monitoring of marine mammals.

9. National standards for protected species observers

The PEIS and biological opinion purport to adopt the recommendations described 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) ("Observer Standards"). However, this document was never released for public review and comment and was not referenced in the PEIS. Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, 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. 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 (attached) more specifically addresses our concerns with the Observer Standards and offers constructive solutions. We appreciate BOEM's consideration of our concerns.

C. The Adaptive Management Provisions Must Be Clarified and Improved

Although the PEIS states that BOEM will consider future data regarding the efficacy of mitigation measures and will adjust requirements for individual surveys, the PEIS appears to establish minimum standards that can only become more stringent through adaptive management. *See* PEIS at 2-39 (adaptive management at the site-specific level "would analyze the best available information and apply additional mitigation, depending on the site-specific proposed action" (emphasis added)); *see also* PEIS at 1-27 to 1-28 (examples largely focus on

[23] NMFS's biological opinion (page 308) only requires PAM for ramp-up at night or in periods of low visibility.

"additional" measures). As just one example, BOEM has established 500 m as a minimum exclusion zone and indicates that it will not set exclusion zones less than 500 m even if a smaller zone is supported by data and modeling.

The ROD must clarify that BOEM will implement "adaptive management" in the true sense of the term – i.e., site-specific requirements may be adjusted to be either less restrictive or more restrictive based on the project-specific information, the species present in the project area, the assessment of relevant risks, and the best available information.

III. CONCLUSION

IAGC appreciates this opportunity to comment on the PEIS. Although we support BOEM's plan to authorize exploratory activities on the Atlantic OCS, there are several aspects of the PEIS that are not supported by science or by law, or are otherwise infeasible. Of the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested in these comments are incorporated into the ROD. We appreciate your consideration of our comments and sincerely hope that BOEM will prepare a ROD that addresses the concerns set forth above. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Karen St. John
Group Vice President - Environment

International Association of Geophysical Contractors

cc: Mr. Walter Cruickshank (Walter.Cruickshank@boem.gov)
Ms. Jill Lewandowski (Jill.Lewandowski@boem.gov)

ATTACHMENT A

PSO Data 2009 - March 2014: Dolphin Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 23% of total vessel activity days in the GOM since 2009.[1]***		
Species Identification		
% of Unidentified Dolphin	69%	In many reports, PSOs contribute sea state, distance, or the sun's glare as a key factor for not being able to identify species.
% of Identified Dolphin	31%	
PAM		
% of PAM Detections	60%	PAM detections accounted for over half of the total dolphin sightings/detection reports. However, only 3% of the acoustic detections made identified a specific dolphin species. The majority of this small percentage is due to the PSO visually confirming the acoustic detection.
Source Activity Comparison		
% of sightings and/or acoustic detections – source active	54%	The frequency of sightings and acoustic detections are proportional regardless of whether the source is active.
% of sightings and/or acoustic detections –source silent	46%	
Animal Behavior		
% of sightings when bow-riding was observed (active or silent)	12%	The data indicates source status (active or silent) had no impact on dolphin bow-riding. The number of dolphins observed when the source was silent was proportional to when the source was active.
Average Distance of Animal at Initial Sighting	560m	Average sighting distance between 500m and 800m.

PSO Data 2009 - March 2014: Turtle Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 23% of total vessel activity days in the GOM since 2009.[2]***		
Total Sightings	335	335 sea turtles were observed overall.
Average Distance of Animal at Initial Sighting	42m	Analysis of turtle sightings indicates observations are typically within 100m.

[1] Estimated calculation based on level of activity from January 2009 to March 2014 from IHS SeismicBase Vessel Search Database.

[2] *Id.*

Via Electronic Mail

May 2, 2014

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Subject: Comments of the American Petroleum Institute, the International Association of Geophysical Contractors, and the National Ocean Industries Association on NOAA Technical Memorandum NMFS-OPR-49, *National Standards for a Protected Species Observer and Data Management Program: A Model Using Geological and Geophysical Surveys*

Mr. Baker,

This letter provides the comments of the American Petroleum Institute ("API"), the International Association of Geophysical Contractors ("IAGC"), and the National Ocean Industries Association ("NOIA") (collectively, the "Associations") on the National Oceanic and Atmospheric Administration ("NOAA") Technical Memorandum NMFS-OPR-49, *National Standards for a Protected Species Observer and Data Management Program: A Model Using Geological and Geophysical Surveys* ("Observer Standards"). We appreciate your consideration of the comments set forth below.

API is a national trade association representing over 600 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. API is a longstanding supporter of the Marine Mammal Protection Act ("MMPA") regulatory process as an effective means of balancing and rationalizing responsible oil and gas activities with the conservation of marine mammals. We continue to support issuance of incidental take authorizations under the MMPA because, for example, it has been demonstrably effective in the Arctic in protecting marine mammal species without unduly and unnecessarily burdening industry.

IAGC is the international trade association representing the industry that provides geophysical services (geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, 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.

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 U.S. Outer Continental Shelf ("OCS"). The NOIA membership comprises more than 275 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.

General Comments

The Associations commend NOAA's National Marine Fisheries Service ("NMFS"), together with the Bureau of Ocean Energy Management ("BOEM") and the Bureau of Safety and Environmental Enforcement ("BSEE"), (collectively "the agencies") for providing recommendations for a Protected Species Observer and Data Management Program ("PSO program"). We understand that a technical memorandum is used for timely documentation and communication of preliminary results, interim reports, or more localized or special purpose information that may not have received formal outside peer reviews or detailed editing and that there is not a formal comment process. It is evident, however, that the agencies intend the recommendations in this technical memorandum to be immediately implemented for G&G surveys in the US OCS, and have incorporated the Observer Standards in the Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Final Programmatic Environmental Impact Statement ("Atlantic PEIS"). The Atlantic PEIS "Seismic Airgun Survey Protocol" requires that protected species observers complete a PSO training program "in accordance with the recommendations described in [the Observer Standards]."

In general, we are supportive of a process to standardize PSO eligibility requirements, training courses, data collection and reporting requirements. After carefully reviewing the Observer Standards, however, we have identified a number of concerns and opportunities for improvement, which are briefly summarized below and described in more detail in the following sections of this letter. Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, 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. The standards should encourage adaptive technology, such as remote visual and acoustic monitoring and infrared technology, reduction of health and safety risks, and also the use of an updated reporting form that would be able to provide substantive data from observations to substantiate the implementation of appropriate mitigation measures.

The Associations' comments are intended to be constructive and further the goal of improving the PSO Program for G&G surveys consistent with the best available science and technology, clearly written, transparently implemented, and fully informed by the public.

Role of the US Fish and Wildlife Service

With jurisdiction over several marine mammals, the US Fish and Wildlife Service (USFWS) is an important stakeholder to the PSO process; however, it does not appear that USFWS was a part the Protected Species Working Group or that USFWS provided any input into the development of the Observer Standards. While the Observer Standards provide recommendations of report requirements for PSO sightings of polar bear and walrus (*see* p.31), the Observer Standards specifically exclude these species and all other species under USFWS jurisdiction from the purview of the standards (*see* p.v). A comprehensive national PSO program necessitates the review and input of the USFWS in addition to NMFS.

Establishment of a PSO Standardized Training Program

The Associations generally support the establishment of a standardized training program for PSOs and are interested in working with the agencies to ensure that appropriate standards are set for the "approved" vendors. We are concerned, however, that some of the recommendations for the program are based on unsupported assertions that current PSO training and reporting is inconsistent. The agencies should provide context to these assertions so that stakeholders can better understand the improvement the recommendations seek to achieve.

The Observer Standards recommend that any standardized training program should not only provide training in mitigation and monitoring requirements, but also provide health and safety considerations. The Associations agree. All PSOs should be trained to ensure complete compliance with all applicable safety procedures. A standardized training program should cover knowledge of the heightened risks working offshore on a vessel in remote locations with no or limited shore side infrastructure, and should teach personnel how to minimize risks. Training should also include information on safe travel, logistics, onboard medical infrastructure, and security including International Ship and Port Facility Security (ISPS) information.

As the Observer Standards acknowledge, many geophysical companies will also have specific requirements related to health and safety risks associated with their operations. The PSO is required to adhere to those requirements as well as any PSO provider or agency requirements. The Observer Standards should note, and any PSO training program should advise, that industry standards often exceed those of the federal agencies. Most oil and gas companies and geophysical companies require contractors to provide evidence of safety programs and requirements that meet those defined through company management systems. This should be acknowledged in any discussion of health and safety, and the agencies should also clarify whether the program intends to include medical and helicopter underwater egress training (HUET) typically required of PSOs by the industry.

The Observer Standards recommend that as part of "health and safety training," a vessel owner should "allow a PSO to briefly walk through the vessel to ensure no hazardous conditions exist

according to a safety checklist, and to visually examine any safety item, upon request." PSOs are not, however, safety professionals qualified to conduct safety walkthroughs or inspections on every vessel to which they are assigned. The agencies should provide additional information on what information will be included on the safety checklist to clarify what the PSO would be looking for during this initial walkthrough to prevent misunderstandings and unnecessary effort.

The Associations suggest that a standardized training program for PSOs should include a course in effective communications. It is vital that PSOs establish direct communications with the instrument room on a seismic vessel to prevent problems and delays in the event of sightings that trigger shutdown requirements and to ensure the visual observation timeframes are adhered to before ramp up and after shutdown. All parties must work effectively together to ensure compliance: PSO, Seismic Technicians, Vessel Captain, and crew.

In addition, as the use of Passive Acoustic Monitoring ("PAM") to identify marine mammals increases in geophysical operations, the PSO Program should also include a course specific to PAM operations. PAM is a highly specialized skill and it is not appropriate to expect PSOs to possess those skills. If PAM is included in the program, training should also include rigging, mobilization and demobilization of equipment.

Finally, while the Observer Standards provide opportunity for PSO candidates who do not successfully pass an approved training course to reapply, there should be a limit on the number of times a potential PSO candidate can reapply for training.

Recommendations for BOEM/BSEE

The Observer Standards provide a list of recommendations for BOEM and BSEE to satisfy the objectives of the national standards. The Associations respectfully request that as BOEM and BSEE act on these recommendations, they solicit input from industry stakeholders and consider the following comments.

The Observer Standards recommend that BOEM and BSEE "develop permits or agreements detailing expectations and data collection and reporting of third-party PSO provider companies, including performance standards, conflicts of interest, and standards of conduct." The Associations respectfully request the agencies provide additional information and opportunity for stakeholder input regarding any proposed permitting program for PSO provider companies, including the requirements, process times, reporting requirements, and any penalties for alleged permit violations. Without well-defined boundaries, an open-ended PSO provider permitting program will provide little utility.

In addition, the Observer Standards recommend that BOEM and BSEE "develop a mechanism, procedure, or regulation to ensure that selected PSO providers are being compensated prior to deployment of approved observers." The Observer Standards do not, however, provide sufficient explanation of the need for PSO provider compensation prior to deployment of observers. More information would need to be provided to support the development of any requirement for prior compensation.

Development of Permit Fees

The Observer Standards recommend that BOEM and BSEE "consider assessing permit fees to financially support the PSO program needed for industry activities." It is unclear how the agencies would determine the amount of the fees or how the fees would be assessed. The Associations recommend that all monies generated from any such permit fees be developed solely for, and directly benefit, the PSO program and not be used for any other, non-related federal activities. Because other industries conduct similar activities requiring PSOs, the agencies should also ensure that any permitting fees are equitable to supporting the PSO program.

Recommended PSO Eligibility Requirements

In addition to a national PSO training course and PSO eligibility standards, the Observer Standards recommend the development of a policy for national PSO qualifications and eligibility. The difference between these two objectives is not immediately apparent. Qualifications, including education and competency, should be satisfied with completion of the training program. An additional policy on qualifications and eligibility is unnecessary and the Associations are concerned that limiting qualified PSO candidates to those who possess a science degree would result in a shortage of personnel.

In the recommended PSO training and provider services model, *NMFS-Approved Private Sector PSO Trainers and PSO Providers*, the Observer Standards explain that "PSO providers and PSO eligibility requirements would be defined by NMFS." While the Associations agree that the recommended mechanism for PSO training would provide more flexibility and less concern of the availability of PSO staff than the other mechanisms analyzed (*see* p.10), the agencies should clarify that NMFS' definition of PSO providers would only entail identification of those providers that meet eligibility requirements.

In the recommended waiver of education and experience requirements for PSOs, PSO candidates can provide proof of previous work experience as a PSO overseas. Some additional detail or information should be required for eligibility based on overseas work as programs and processes in other countries can vary substantially from what is expected/required for US programs. The Observer Standards also provide that the approving federal agency official has the sole discretion to waive eligibility requirements on a case-by-case basis after reviewing a waiver request and written justification. The Associations are concerned that the agency can waive "some or all of the education/experience requirements on a case-by-case basis if a lack of qualified PSOs is demonstrated." It would not be in the best interests of the regulators or the geophysical industry to employ PSOs who lack some critical or all necessary qualifications or experience. The Associations respectfully request that the waiver request, supporting justification and agency decision be made available to the PSO provider to ensure that a complete record of a PSO's experience is on file should issues arise.

The Associations agree that PSO candidates should also be in good health and have no physical impairments that would prevent them from performing their assigned tasks. The agencies should

clarify, however, whether documentation or medical certification would be required similar to the *National Minimum Eligibility Standards for Marine Fisheries Observers*.

PSO Demand & Cost Estimates

The Observer Standards estimate that currently 30 PSOs are needed on a daily basis for G&G surveys in the Gulf of Mexico, with an average of 15 PSOs at sea on any given day. Based on 2009 data in the GOM, the total estimated annual costs are $2,116,547. BOEM and BSEE indicate, however, that future demand for PSOs is likely to "significantly increase over the next 5 years, and many G&G surveys are expected to occur in federal water of the Atlantic EEZ." Accordingly, the Observer Standards severely underestimate the costs and level of PSO demand. Assuming daily rates of $700.00 for each PSO, a reasonable estimate of 30 PSOs would cost $21,000 per day or $3.8M for 6 months. Travel, reporting, and health insurance would likely entail additional costs. The Associations request that the agencies update the cost and level of demand estimates with more recent data.

In addition, the Observer Standards estimate the training for each PSO in the Gulf of Mexico to cost $3,000.00. The agencies should provide a description of the various training costs detailed in this estimate, as described in Table 3, recognizing the uncertainties/unknowns associated with each estimate. For example, the estimated costs of safety training and medical examination appear lower than the industry standard.

PSO Evaluation During Permit/Authorization Approval

The Observer Standards specify that the recommended time to evaluate PSO coverage required for all G&G projects is during BOEM's permit application review or when applications for incidental take authorizations are submitted to NMFS. When weighing factors to determine the number of PSOs required for each survey, in addition to vessel size, the agencies should consider the number of bunks available on board the survey vessel.

Once the number of required PSOs is determined, the agencies assert that a single entity responsible for scheduling and deploying PSOs would result in "a greater level of consistency in many aspects of the PSO program…including maintaining an appropriate number of PSOs to meet scheduling and deployment needs." The Associations are concerned, however, that the selection of a single entity, whether a third-party provider or federal agency, to meet PSO scheduling demand would be inefficient and would result in a strain on the ability to timely contract with and obtain the number of PSOs required for each geophysical survey.

In addition, the Associations are concerned that requiring a senior-level (or lead) PSO who has specific experience observing protected species in the proposed survey geographic area will drastically limit the number of available senior-level PSOs, potentially resulting in unnecessary project delays.

During monitoring, the Observer Standards recommend that in order to reduce bias, observation periods should be limited to "favorable viewing conditions." It is unclear what is meant by unfavorable viewing conditions. During periods of "low visibility" PAM is currently required in

water depths greater than 100 meters (328 feet) in the Gulf of Mexico. The agencies should be careful not to define unfavorable conditions as anything different than low visibility or nighttime to ensure there is no gap in monitoring coverage.

Conflicts of Interest

Throughout the Observer Standards, the agencies reference "inherent conflicts of interests" between PSO providers and industry, allegedly influencing accurate reporting of data. There are several unsupported assertions of inappropriate influence and pressure by industry. These assertions are unsubstantiated, and in the absence of supporting statements or examples provided by the agencies, should be deleted. If a statement denying conflict of interest is required from the PSOs prior to deployment as recommended, the statement should also include language to the effect that the PSO will conduct all their activities and report all data in full compliance with all applicable laws and regulations.

The Observer Standards defines "a direct financial interest" as payment or compensation received directly from the owner of the seismic survey's vessel, the G&G surveying company, or associated shore-based facility. The definition should also include any entity or leaseholder who employs or contracts with the survey company.

Standardized Data Collection

The Associations agree with and reaffirm the recommendation of the agencies to implement "standardization including data collection methods, standardized electronic forms, and software used in collaboration with NMFS and non-federal stakeholders." Collaboration with NMFS should result in a form that produces data the agency can use and rely on to assess population numbers, stock assessments, and effects on marine species. The Associations note that Industry best practices already recommend the use of a standard reporting form, *the Marine Mammal Recording Form*, developed under a project funded by the Exploration and Production (E&P) Sound and Marine Life Joint Industry Programme.[1] The Associations would be interesting in working with the agencies to update current reporting forms to enable the reporting of substantive data from observations that could substantiate the implementation of appropriate mitigation measures.

Creation of PSO Database

The Associations support the creation and maintenance of a database to manage PSO data for geological and geophysical surveys. This information is already supplied to NMFS and BSEE, but it would be useful for interested stakeholders to have full and timely access to such a database as a means to assess PSO activities and monitor their effectiveness.

[1] *See* Barton, Carolyn J.S., Jaques, Robert, and Mason, Mike. 2008. Identification of Potential Utility of Collation of Existing Marine Mammal Observer Data. RSK Environmental Ltd., Cheshire, UK. The Marine Mammal Recording Form can be accessed at: http://www.iagc.org/files/3193/.

Conclusion

We appreciate the effort that the agencies have devoted to the development of PSO and data management programs for geological and geophysical surveys. We support this effort generally but, as detailed above, we have a number of concerns about the implementation of the recommendations. We respectfully request that the agencies engage with stakeholders prior to taking action on many of the recommendations, including the development of a PSO provider permit program, and system for permitting fees. We also encourage the agencies to pursue a program that encourages technology and remote monitoring, reducing health and safety risks. In addition, any program established should provide opportunity for feedback not only from PSOs, but also industry stakeholders. The Associations look forward to working with the agencies towards implementation of a PSO Program for geophysical surveys that is consistent with the best available science and technology, clearly written, transparently implemented, and fully informed by interested stakeholders.

Should you have any questions, please contact the undersigned at 202.682.8584, or via e-mail at radforda@api.org. Thank you for considering and responding to these comments.

Sincerely,

Andy Radford
American Petroleum Institute

Karen St. John
International Association of Geophysical Contractors

Jeffrey Vorberger
National Ocean Industries Association

cc: Deborah Epperson, BSEE Environmental Enforcement Division
Gregg Gitschlag, NMFS Southeast Fisheries Science Center
Howard Goldstein, NMFS Office of Protected Resources

Jill Lewandowski, BOEM Environmental Assessment Division
Kimberly Skrupky, BOEM Environmental Assessment Division
Brad Smith, NMFS Alaska Region Office
Teresa Turk, NMFS Office of Science and Technology

EXHIBIT C

September 3, 2014

Paul Scholz, Acting Director, *via e-mail*
Office of Ocean and Coastal Resource Management
National Ocean and Atmospheric Administration
1305 East-West Highway, Room 11321
Silver Spring, MD 20910-3281

Re: Comments on States' Unlisted Activity Review Requests for BOEM Permit Nos. E14-001 thru E14-009

Dear Mr. Scholz:

The International Association of Geophysical Contractors ("IAGC") appreciates the opportunity to comment on requests from Atlantic coastal states to review proposed geological and geophysical survey activities ("G&G activities") in the Mid- and South Atlantic (i.e., BOEM Permit Nos. E14-001 thru E14-009). IAGC is the international trade association representing the industry that provides geophysical services (geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, 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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and the current applicants with pending G&G permits before Bureau of Ocean Energy Management ("BOEM") are IAGC members. We appreciate consideration of the comments set forth below.

Pursuant to 15 CFR 930.54, states may request the Office of Coastal Resource Management's ("OCRM") approval to review unlisted federally permitted activities, such as G&G activities, with an assertion that the proposed activities' coastal effects are "reasonably foreseeable." The sole basis for OCRM's approval or disapproval of a state's request depends on "whether the proposed activity's coastal effects are reasonably foreseeable." Federal regulations define "coastal effect" as "any reasonably foreseeable effect on any coastal use or resource" resulting from the proposed activity. In their requests for review, many of the states assert a lack of information regarding the proposed G&G operations and state concerns regarding presumed environmental effects to fish and marine mammal populations. IAGC's members take concerns related to the potential impact of their surveys seriously and are committed to conducting their operations in an

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environmentally responsible manner. Experience shows that seismic activities, tourism, fisheries, and marine life can and do coexist successfully.[1]

I. DESCRIPTION OF GEOPHYSICAL SURVEYS

Seismic surveys are the only feasible technology available to accurately image the subsurface before a single well is drilled. BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 4.72 billion barrels of oil and 37.5 trillion cubic feet of natural gas. Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology – including seismic reflection and refraction, gravity, magnetics, and electromagnetic – will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, IAGC's members can better locate and dissect prospective areas for exploration.

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. The use of modern seismic technology is similar to ultrasound technology—a non-invasive mapping technique built upon the simple properties of sound waves. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

To carry out these surveys, marine vessels use acoustic arrays, most commonly as a set of compressed air chambers, to create seismic pulses. A predominantly low-frequency sound pulse is generated by releasing compressed air into the water as the vessel is moving. The pulses are bounced off the layers of rock beneath the ocean floor. The returning sound waves are detected and recorded by hydrophones that are spaced along a series of cables that are towed behind the survey ship. Seismologists then analyze the information with computers to visualize the features that make up the underground structure of the ocean floor. Once the data is processed, geophysicists interpret it and integrate other geoscientific information to make assessments of where oil and gas reservoirs may be accumulated. Based largely on this information, exploration companies will decide where, or if, to conduct further exploration for oil and gas.

Currently, three types of surveys are proposed in the Atlantic OCS: 2D seismic surveys, a 3D seismic survey, and an airborne gravity and magnetic survey. These surveys are described in more detail below.

[1] *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) ("Within the [Central Planning Area], which is directly adjacent to the [Eastern Planning Area], 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.").

A. 2D Seismic Surveys – Towed Streamers

Two-dimensional surveys are so-called because they only provide a 2D cross-sectional image of the Earth's structure. These surveys are typically used for geologic research, initial exploration of a new region, and to determine data quality in an area before investing in a 3D survey. 2D towed-streamer surveys are acquired with a single vessel usually towing a single air source array and a single streamer cable. The streamer is a polyurethane-jacketed cable containing several hundred to several thousand sensors, most commonly hydrophones. The air source array directs energy downward towards the ocean floor. An integrated navigational system is used to keep track of where the air sources are activated, the positions of the streamer cable, and the depth of the streamer cable. The end of the cable is tracked with global positioning system (GPS) satellites, and tail buoys are attached at the end. Radar reflectors are routinely placed on tail buoys for detection by other vessels, and automatic identification system (AIS) devices are also routinely integrated into the tail buoys.

Ships conducting 2D surveys are typically 30-90 m (100-300 ft) long and tow a single-source array 200-300 m (656-984 ft) behind them approximately 5-10 m (16-33 ft) below the sea surface. The source array often consists of three subarrays, with six to twelve air source elements each, and measures approximately 12.5-18 m (41-60 ft) long and 16-36 m (52-118 ft) wide. Following behind the source array by 100-200 m (328-656 ft) is a single streamer approximately 5 to 12 or more km (3.1-7.5 mi) long. The ship tows this apparatus at a speed of approximately 3 to 5 knots. Approximately every 10-15 seconds (i.e., a distance of 23-35 m [75-115 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), the air source array is activated. The actual time between activations varies depending on ship speed and the desired spacing.

Typical spacing between ship-track lines for 2D surveys, which is also the spacing between adjacent streamer line positions, is greater than a kilometer. Lines can transect each other and can be parallel, oblique or perpendicular to each other. 2D towed-streamer surveys are normally regional, covering a large area of ocean so that activity is not always limited to a particular area. 2D surveys can provide high resolution imaging with tight line spacing intervals in shallow areas.

2D surveys can cover a larger area with less data density in less detail, resulting in a lower cost per area covered. Geophysical contractors often have proprietary methods of data acquisition that may vary depending on their seismic target and data-processing capabilities, making each contractor's dataset unique. While surveying, and after a prescribed ramp-up of the output of the array to full-operation intensity, a vessel will travel along a linear track for a period of time until a full line of data is acquired. Upon reaching the end of the track, the ship takes typically 2 - 6 hr to turn around and start along another track, varying depending on the spacing between track lines, the length of track lines, and the objectives of a specific survey. Some 2D surveys might include only a single long line. Others may have numerous lines, with line spacings of 2 km in some cases, and 10 km in other cases. Data acquisition generally takes place day and night and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20 to 30 percent

of non-operational downtime due to a variety of factors, including technical or mechanical problems, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

B. 3D Seismic Surveys – Towed Streamers

3D towed-streamer seismic surveys enable industry to image the subsurface geology with much greater clarity than 2D data because of the much denser data coverage. The quality is such that 3D data can often indicate hydrocarbon-bearing zones from water-bearing zones. Because 3D seismic data has been continuously and rapidly improving since its introduction in the 1970's, areas covered by 3D data shot only a few years ago may be reshot with current, improved technology, offering greater clarity than previous surveys. In addition, areas already covered using 2D techniques may be resurveyed with 3D. Further, 3D surveys may be repeated over producing fields at successive calendar times (at 6-month to several-year intervals) to better characterize and record changes over producing reservoirs. These 4D, or time-lapse 3D, surveys are used predominantly as a reservoir monitoring tool to detect and evaluate reservoir changes over time. Conventional, single-vessel 3D surveys are referred to as narrow azimuth 3D surveys.

The current state-of-the-art ships conducting 3D surveys are purpose-built vessels with much greater towing capability than the vessels conducting 2D surveys. While these vessels are generally 60 - 120 m long, with the largest vessels over 120 m (ft) in length and greater than 65 m (230 ft) wide at the back deck. These seismic ships typically tow two parallel source arrays 200-300 m (656-984 ft) behind them. The two source arrays are identical to each other and are the same as those used in the 2D surveys described previously. Following 100-200 m (328-656 ft) behind the dual source arrays are the streamers.

Most 3D ships can tow eight or more streamers at a time, with the total length of streamers (number of streamers multiplied by the length of each one) exceeding 80 km (50 mi). The theoretical towing maximum today is 24 streamers, each of which can be up to 12 km (7.5 mi) long, for a total of 288 km (179 mi). Towing 8-14 streamers that are each 3-8 km (1.9-5 mi) long is normal practice. Towing 10 streamers that are separated by 75-150 m (246-492 ft) means that a swath 675-1,350 m (2,215-4,429 ft) wide is covered on the sea surface in one pass of the ship along its track line. Other streamer configurations (number of streamers and their separation distance) can produce narrower or wider swaths. The survey ship tows the apparatus at a speed of 3 to 5.5 kn during production. Approximately every 11 - 15 s (i.e., a distance of 25 m [82 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), one of the dual air source arrays is fired. The other array is fired 11 - 15 s later. To achieve the desired spacing, the time between firings depends on the ship speed. While surveying, a ship travels along a track for 12-20 hr (i.e., a distance of 100-167 km [62 - 104 mi] at 4.5 kn [8.3 km/hr]), depending on the size of the survey area. Upon reaching the end of the track, the ship takes 3 to 5 hr to turn around and start along another track. This procedure takes place day and night, and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20 to 30 percent of non-

operational downtime due to a variety of factors, including technical or mechanical problems, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

C. Non-Seismic Gravity and Magnetic Surveys

Both conventional gravity surveys and gravity gradiometry surveys are conducted today, most often by fixed-wing aircraft, or where required, by marine vessel deployment. There is no sound source associated with gravity or magnetic surveys. The dimensions of the gravity instruments and stand are approximately 1 m by 1 m by 1.5 m high (3 ft by 3 ft by 5 ft) and the total weight is approximately 150 kg (330 lb). The survey acquisition grid is similar to ship-based seismic surveys, generally with flight-line spacing of 0.5-3 km (0.3-2 mi). Surveys of 500 sq. km (180 sq. mi) can be completed in a few hours, with the aircraft flying at an altitude of 70-300 m (230-1,000 ft). The objectives of the survey will determine the flight-line spacing (distance between flight lines) and the altitude at which the survey will be conducted.

Measurements of the earth's magnetic field are useful in helping to determine geologic structures and stratigraphy in the subsurface in frontier exploration areas, such as the Atlantic OCS, and as a complement to existing seismic data. There are at least five types of magnetometers, three of which are commonly used in airborne magnetic surveying. In addition to the different types of magnetometers, there are also several different configurations that can be used on the aircraft. These configurations include: (1) a single sensor, typically a tail installation; (2) two horizontally separated magnetometers, usually wingtip pod sensors; (3) two vertically separated sensors, usually tail-mounted; and (4) a total magnetic intensity configuration, typically involving three, but potentially four, magnetic sensors. The sensor pods are cylindrical in shape, and typically 1-2 m (3.3-6.6 ft) long and several centimeters (several inches) in diameter.

The objectives of the survey (such as the amount of area to be covered, the desired detail to be obtained, etc.) and the cost determine three of the most important factors to be specified for any given survey: (1) the altitude at which the survey will be conducted; (2) the flight-line separation; and (3) the flight-line orientation, or direction. Recent surveys done in the Gulf of Mexico have been flown at altitudes of 60-300 m (200-1,000 ft), at speeds of 110 knots (250 km/hr), and with line spacings of 0.5-2 km (0.3-1.3 mi). Similar surveys were recently completed offshore Greenland and offshore Honduras.

II. MARINE MAMMALS & SEA TURTLES

More than four decades of worldwide seismic surveying and scientific research indicate that the risk of direct physical injury to marine mammals is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts on marine life populations. *See, e.g.*, 77 Fed. Reg. 25,829, 25,838 (May 1, 2012) (issuance of IHA for Beaufort Sea seismic activities ("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."); *DEIS for Gulf of Mexico OCS Eastern*

Planning Areas Lease Sales 225 and 226 (BOEM 2013-0116) ("Within the [Gulf of Mexico Central Planning Area],...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."); LGL Ltd., *Environmental Assessment of a Low-Energy Marine Geophysical Survey in the Northwestern Gulf of Mexico*, at 30 (Apr.- May 2013) ("[T]here 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.").

While seismic operations can be detected at great distances under certain oceanographic conditions and locations, so can sound waves generated by earthquakes and baleen whale calls.[2] The deep sound channel in the Atlantic OCS, often cited for the notion that sound from seismic operations can be detected outside of a survey's established exclusion zone, does not extend onto the continental shelf off the mid-Atlantic region. Furthermore, marine animals would need to be present in the deep sound channel to receive the higher levels of sound in the deep sound channel and few species dive that deep in the Atlantic sites of interest; this is especially true for the baleen whale species of greatest concern. Seismic sound is expected to decline to ambient levels within tens of kilometers, not thousands. The seismic air source array is engineered to direct its energy downward, rather than laterally, which the National Marine Fisheries Service admits is in itself a mitigation measure.[3] In addition, seismic energy sources are predominantly low frequency, below the hearing range of many marine species. For any sound that is transmitted horizontally, the signal strength decreases rapidly and even in these unusual circumstances, is at such low frequency that it does not cause injury to marine mammals. Sound that is below 100 dB in water – even if it travels hundreds or thousands of km – is about the equivalent to a whisper, since normal baseline sound levels in the ocean, at frequencies below 200-300 HZ, are generally 80-90 dB (in some areas such as the busy ports of the Atlantic coast, ambient sound may be as high as 110-120 dB due to ship noise).[4]

What evidence there is of potential behavioral disturbance from seismic operations suggests minor and transitory effects, such as temporarily leaving the survey area, and these

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[2] Nieukirk, SL, Mellinger DK, Moore SE, Klinck K, Dziak RP, and Goslin J. 2012. Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009. J Acoust Soc Am 131(2):1102-1112; Munk W, Worcester P, and Wunsch C. 1995. Ocean Acoustic Tomography. Cambridge U Press, Cambridge, UK.

[3] *New Jersey v. National Science Foundation*, 3:14-cv-0429 (US Dist. Ct. New Jersey), Federal Defendants' Brief in Opposition to Plaintiffs' Motion for Declaratory and Injunctive Relief at 25 (July 7, 2014).

[4] Richardson WJ, Greene Jr. CR, Malme CI, and Thomson DH. 1995. Marine Mammals and Noise. Academic Press, NY. *See also* Acoustic Ecology Institute, *Seismic Surveys at Sea: The contributions of airguns to ocean noise.* August 2005 (An air source array with a source level of 200 – 230 dB "drops quickly to under 180 dB (usually within 50- 500 m depending on source level and local conditions), and continues to drop more gradually over the next few kilometers, until leveling off at somewhere near 100 dB."); IAGC. 2014. Fundamentals of Sound in the Marine Environment (Due to the different environmental properties of water and air, "62 dB must be subtracted from any sound measurement under water to make it equal to the same sound level in the air."), available at: http://www.iagc.org/files/5043/; University of Rhode Island, *Sound levels of common sounds in air re 20 µPa*¸ 2013, available at: http://www.dosits.org/science/soundsinthesea/airwater.

effects "have not been linked to negative impacts on populations."[5] Nevertheless, industry funds independent research to further our understanding of the effects of seismic surveys on marine life. This is helping to remove uncertainties about possible effects of seismic surveys.

In addition, the best available science indicates that seismic surveys, even in preexisting active OCS programs in the Gulf of Mexico, do not result in any significant impact to sea turtles. *See supra* note 1 at 2-23 ("no significant cumulative impacts to sea turtles would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area"); BOEM, *Final EIS for Gulf of Mexico OCS Oil and Gas Western Planning Area Lease Sales 229, 233, 238, 246, and 248 and Central Planning Area (CPA) Lease Sales 227, 231, 235, 241, and 247*, at 4-235, 4-741 ("[T]here are no data to suggest that routine activities from the preexisting OCS Program are significantly impacting sea turtle populations."). Furthermore, sea turtles are not as sensitive to sound as marine mammal species. *See* PEIS, Appx. I. Regardless, seismic surveys shutdown for sea turtles detected within a designated exclusion zone and work with NMFS to employ any necessary protective measures, such as time-area closure for nesting sea turtles off of Brevard County, Florida.

Finally, site-specific environmental assessments and consultation pursuant to the Endangered Species Act will be conducted for each proposed G&G permit, and the permittee must obtain a Marine Mammal Protection Act ("MMPA") authorization ensuring the proposed surveys will have no more than a negligible impact on marine mammal stocks.

III. FISH & INVERTEBRATES[6]

Marine seismic surveys have been conducted since the 1950s and experience shows that fisheries and seismic activities can and do coexist. There has been no observation of direct physical injury or death to free-ranging fish caused by seismic survey activity, and there is no conclusive evidence showing long-term or permanent displacement of fish. Any impacts to fish from seismic surveys are short-term, localized and are not expected to lead to significant impacts on a population scale.

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[5] BOEM, *The Science Behind the Decision: Answers to Frequently Asked Questions about the Atlantic Geological and Geophysical Activities Programmatic Environmental Impact Statement*, August 22, 2014.

[6] For more information, *see* Science for Environment Policy, Future Brief: Underwater Noise, European Commission, June 2013: http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB7.pdf; "Stocks at a Glance – Status of Stocks" 2011, U.S.Department of Commerce, NOAA: www.nmfs.noaa.gov/stories/2012/05/05_14; Boeger, W.A., Pie, M.R., Ostrensky, A., Cardoso, M.F., 2006. The Effect of Exposure to Seismic Prospecting on Coral Reef Fishes; Brazil. J. Oceanogr. 54, 235-239; 3D marine seismic survey, no measurable effects on species richness or abundance of a coral reef associated fish community. Mar. Pollut. Bull. (2013), http://dx.doi.org/10.1016/j.marpolbul.2013.10.031; Hassel, A., Knutsen, T., Dalen, J., Skaar, K., Lokkeborg, S., Misund, O.A., Osten, O., Fonn, M., Haugland, E.K., 2004. Influence of seismic shooting on the lesser sand eel. ICES J. Mar. Sci. 61, 1165-1173; Pena, H., Handegard, N.O. and Ona, E. 2013. Feeding herring schools do not react to seismic air gun surveys. ICES J. Mar. Sci, http://icesjms.oxfordjournals.org/content/70/6/1174.short?rss=1; Saetre, R. and E. Ona, 1996. Seismic investigations and damages on fish eggs and larvae; an evaluation of possible effects on stock level. Fisken og Havet 1996:1-17, 1-8.

As discussed in detail above, seismic vessels move along a survey tract in the water creating a line of seismic impulses. As the seismic vessel is in motion, each signal is short in duration, local and transient. Fish will often react to these pulses by temporarily swimming away from the seismic air source. Since seismic surveys are a moving sound source, impacts on fish are inherently local and short-term. While some studies have shown that various life stages of fish and invertebrate can be physically affected by exposure to seismic surveys, in all of these cases, the subjects were very close to the seismic source or subjected to exposures that are virtually impossible to occur under natural conditions. In addition, many marine crustaceans such as horseshoe crabs congregate in bays and nearshore areas where seismic activities are not proposed to occur.

In the past it was often speculated that sounds from seismic surveys could harm fish, especially eggs and larvae, over long distances. However, recent studies have shown that this only can occur at extreme short-ranges. Fish eggs, larvae and fry do not have the ability to move away from a loud sound source, and may be injured if they are within a few meters of the seismic source. The impact of this damage, however, is insignificant on a population scale compare to the high natural mortality rate of eggs, larvae and fry.

Sounds from active acoustic sound sources such as seismic surveys may result in fish temporarily moving away from the sound source, potentially causing a localized reduction in fish catch in close proximity to the seismic source. There is no conclusive evidence, however, showing long-term or permanent displacement of fish. Similar seismic surveys conducted for research in the Atlantic OCS in the past did not result in any noticeable effects on commercial or recreational fish catches (based on a review of NMFS data from months surveys were conducted and noting "there was absolutely no evidence of harm to marine species" nor fish).[7] During seismic surveys, a vessel exclusion zone is maintained around the survey vessel and its towed streamer arrays to avoid interruption of commercial fishing operations, including setting of fishing gear.

In addition, because the sound output from a seismic survey is immediate and local, there is no contaminate residue or destruction of habitat. However, prior to G&G permit approval in the Atlantic OCS, site-specific environmental assessments will include an Essential Fish Habitat ("EFH") assessment to determine whether the specific activity and location would cause a significant adverse effect to fisheries and EFH.

IV. MITIGATION MEASURES

IAGC supports implementation of mitigation measures that are commensurate to the potential risk and supported by the best available science, and its members comply with mitigation and monitoring measures required after BOEM and NMFS conduct site-specific environmental assessments. Measures commonly used by the seismic industry including timing seismic surveys to avoid known areas of biological significance, such as whale foraging or breeding areas or avoiding seasonal marine life occurrences and known migration areas, such as the North Atlantic Right Whale time-area closures identified in the Final Programmatic Environmental Impact Statement for Proposed G&G Activities in the Mid- and South Atlantic OCS ("PEIS"). *See* 79 Fed. Reg. 13,074 (Mar. 7, 2014).

[7] *See*, *supra*, note 3 at 25-26, citing Exhibit D, Higgins Decl. ¶ 21, Exhibit D, Mountain Decl. ¶ 8.

Before a seismic survey begins, visual monitoring is undertaken to check for the presence of marine mammals and other marine species within a specific precautionary, or exclusion zone, often using dedicated marine mammal observers (MMOs) or protected species observers (PSOs). Soft-start, or ramp-up, procedures provide a gradual build-up of the seismic sound source and allow marine life to swim away before starting the survey. Further monitoring may be conducted using passive acoustic monitoring technology (PAM), which may detect vocalizing marine mammals during periods of low visibility. In the event marine mammals are detected in the exclusion zone, seismic operations will not begin for a certain time period until the marine mammal moves away. Similarly, a seismic survey will shut down if the marine mammal is observed entering the exclusion zone once operations have begun.

The mitigation measures implemented in the Atlantic OCS will be similar, if not more stringent, than measures previously employed by the industry. And in these past surveys, there have been no observations of injury, death, or stranding to marine life. Conservative acoustic thresholds adopted by the agencies and preventative mitigation measures are intended to prevent any potential impact to marine life. Subsequent environmental impact assessment specific to each pending G&G permit will satisfy NEPA, MMPA and ESA requirements, including evaluation of essential fish habitat and avoidance of disturbance to "special areas, such as sensitive benthic (seafloor) biological communities, national marine sanctuaries, historic and prehistoric sites, and cable or other infrastructure."[8] Extensive mitigation and monitoring efforts will ensure any significant impacts will be avoided and seismic activities will have no more than a negligible impact on marine mammal stocks.

Thank you for the opportunity to comment on requests from Atlantic coastal states to review proposed G&G activities in the mid- and south Atlantic OCS. IAGC may submit supplemental comments as additional state requests are filed. Should you wish to discuss our submission in more detail please do not hesitate to contact myself or Nikki Martin, Director- Environmental Regulatory & Legal Affairs (Nikki.martin@iagc.org).

Yours sincerely,

Karen St. John
Group VP - Environment
T: +1 713 957 8080
Email: Karen.stjohn@iagc.org

[8] BOEM. Record of Decision, Atlantic OCS Proposed Geological and Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement, at 2 (August 11, 2014). In addition, BOEM's Record of Decision and PEIS outlines guidance to prevent discharge of trash and marine debris and requires coordination with Department of Defense and NASA to avoid conflicts with military operations.

CC: Kerry Kehoe, OCRM
Jackie Rolleri, OCRM

EXHIBIT D

April 29, 2015

VIA Federal eRulemaking Portal

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123–2394

Re: Comments on Applications for G&G Permits in the Mid- and South Atlantic OCS

Dear Mr. Goeke:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC"), the American Petroleum Institute ("API"), and the National Ocean Industries Association ("NOIA") (collectively, the "Associations") in response to the Bureau of Ocean Energy Management's ("BOEM") request for comments on the pending Geological and Geophysical ("G&G") permit applications for the Mid- and South Atlantic Outer Continental Shelf ("OCS"). We appreciate BOEM'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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and some IAGC members have already filed applications for authorizations relating to such activities.

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 U.S. OCS. The NOIA 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.

II. COMMENTS

A. Contextual Background

BOEM's plan to authorize exploratory activities on the Atlantic OCS is consistent with the Outer Continental Shelf Lands Act, which mandates the "expeditious and orderly development" of the OCS "subject to environmental safeguards." 43 U.S.C. § 1332(3). BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 4.72 billion barrels of oil and 37.51 trillion cubic feet of natural gas.[1] Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology—including specifically and primarily seismic reflection technology, but also complimentary gravity, magnetics, and electromagnetic technology—will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, industry operators can better locate and dissect prospective areas for exploration. In short, seismic and other geophysical surveys are the only feasible technologies available to accurately image the subsurface before a single well is drilled. Allowing the pending geophysical survey proposals to proceed, subject to appropriate "environmental safeguards," facilitates—indeed, makes possible—the orderly development of the Mid- and South Atlantic OCS.

For the energy industry, modern geophysical imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, which reduces the overall footprint for exploration. Because survey activities are temporary and transitory, they are the least

[1] *See* http://www.boem.gov/Assessment-of-Oil-and-Gas-Resources-2014-Update/.

intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.[2]

In addition, more than four decades of worldwide seismic surveying and scientific research indicate that the risk of direct physical injury to marine life as a result of seismic survey activities is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts to marine life. As BOEM stated in its August 22, 2014 *Science Note*:

> 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.

Moreover, IAGC, together with the oil and gas industry, funds independent research to further our understanding of the effects of seismic surveys on marine life. This is helping to reduce uncertainties about the possible effects of seismic surveys. Some of this research, in addition to other frequently cited references regarding the effects of sound on marine life, is reviewed in the annotated bibliography included as Attachment A to this letter.[3]

B. Seismic Survey Activities in the Mid- and South Atlantic OCS Will Have, at Most, a Negligible Impact on Marine Mammals

During the administrative process related to BOEM's issuance of its Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS ("PEIS"),[4] the Associations provided comments that, among other things, explained why BOEM's assessment of marine mammal impacts was flawed and why

[2] Although different surveys for different purposes may cover the same general area, these surveys are spread out in space and in time. If two or more surveys occur in the same place over a period of time, they are generating different information, designed to appeal to specific, unique customer needs not met by other surveys.

[3] Additional technical information regarding different types of seismic surveys is provided in Attachment B.

[4] BOEM, *Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS* (Mar. 2014).

some of the mitigation measures proposed by BOEM were unnecessary and impractical. The Associations incorporate those comments by reference, and we have included a copy of IAGC's comment letter to the final PEIS as Attachment C. We also provide the following information, which is intended to supplement the information and positions presented in the PEIS comments.[5]

1. BOEM's site-specific environmental assessments should provide an accurate evaluation of expected marine mammal impacts

As explained in our PEIS comments, BOEM's evaluation of potential marine mammal impacts at the programmatic level is flawed because it is premised upon an unrealistic scenario in which exploration activities are projected to result in thousands of incidental takes of marine mammals, which BOEM has definitively stated will not actually occur. Indeed, in its response to comments in the Record of Decision associated with the PEIS ("ROD"), BOEM states very clearly that "the numbers estimated for incidental take are higher than BOEM expects would actually occur." ROD at 12; *see also id*. ("the take estimates are based on acoustic and impact models that are by design conservative, which results in an over-estimate of take"). The supposed effects of this "worst case" hypothetical scenario are then addressed in the PEIS with mitigation measures, many of which are similarly unrealistic because they mitigate inaccurately presumed effects.

Setting aside our continuing disagreement with BOEM's approach to the evaluation of marine mammal impacts in the PEIS, we respectfully request that BOEM perform a proper NEPA analysis in its site-specific environmental assessments and evaluate the <u>actual</u> environmental impacts that are <u>expected</u> to occur. For the reasons stated in our comments on the PEIS, such an approach would be consistent with both the law and the best available science. *See* IAGC PEIS Comment Letter § II.A (Attachment C).

2. A 40-km buffer between surveys is unnecessary and impractical

The PEIS recommends an expanded 40-km buffer zone between concurrent seismic surveys "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is below Level B thresholds and approaching ambient levels." PEIS at 2-37. In the PEIS, BOEM acknowledges that there is "uncertainty about [the] effectiveness" of a 40-km buffer requirement and, in its ROD, BOEM states that it will "assess the value of this measure in site-specific environmental analyses . . . and decide whether to include it as a

[5] Consistent with BOEM's commitment "to adaptive management and the modification of mitigations if warranted by the facts at the site-specific level" (ROD at 11), we encourage BOEM to reconsider the data and information presented in the Associations' comments on the final PEIS as well as the information presented in this comment letter.

condition of a permit or other authorization." ROD at 10. We reiterate that a 40-km buffer is unnecessary and impractical for the reasons stated in the Associations' comments on the PEIS. *See* IAGC PEIS Comment Letter § II.B.2. We also provide the following additional points, and request that BOEM consider this information, in addition to our PEIS comments, as it conducts its site-specific analyses.

Although seismic operations can be detected at great distances under certain oceanographic conditions and locations, so can sound waves generated by earthquakes and baleen whale calls.[6] The deep sound channel in the Atlantic OCS, often cited for the notion that sound from seismic operations can be detected outside of a survey's established exclusion zone, does not extend onto the continental shelf off the mid-Atlantic region. Furthermore, this notion is only applicable if protected species and marine animals are present in the deep sound channel to receive the higher levels of sound. Few species dive that deep in the areas of the Atlantic Ocean under consideration. In particular, baleen whale species of greatest concern are not known to be present in waters at those depths.

The seismic sound source is engineered to direct its energy downward, rather than laterally, which the National Marine Fisheries Service ("NMFS") has admitted is itself a mitigation measure.[7] For any energy that is transmitted laterally, the signal strength decreases rapidly, well below the thresholds NMFS has established for Level B harassment and at such low frequency that it does not cause injury to marine mammals.[8] Consistent with this information, what evidence there is of potential behavioral disturbance from seismic operations suggests minor and transitory effects, such as temporarily leaving the survey area, and these effects have not been linked to negative or biologically significant impacts on marine mammal populations.

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[6] Nieukirk, S.L., Mellinger D.K., Moore S.E., Klinck K., Dziak R.P., and Goslin J. 2012. Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009. J. Acoust. Soc. Am. 131(2):1102-1112; Munk W., Worcester P., and Wunsch C. 1995. Ocean Acoustic Tomography. Cambridge U Press, Cambridge, UK.

[7] *See New Jersey v. National Science Foundation*, 3:14-cv-0429 (D. N.J.), Federal Defendants' Brief in Opposition to Plaintiffs' Motion for Declaratory and Injunctive Relief at 25 (July 7, 2014).

[8] Richardson W.J., Greene Jr. C.R., Malme C.I., and Thomson D.H. 1995. Marine Mammals and Noise. Academic Press, NY. *See also* Acoustic Ecology Institute, *Seismic Surveys at Sea: The contributions of airguns to ocean noise.* August 2005 (An air source array with a source level of 200 – 230 dB "drops quickly to under 180 dB (usually within 50- 500 m depending on source level and local conditions), and continues to drop more gradually over the next few kilometers, until leveling off at somewhere near 100 dB.").

Neither BOEM nor NMFS has yet to provide any scientifically supported rationale for the proposed 40-km buffer. Instead, the PEIS concluded the measure "would only potentially slightly reduce acoustic impacts on marine mammals, sea turtles, and other marine biota," but even then, the effectiveness of the measure is uncertain. ROD at 6. Accordingly, we respectfully request that BOEM decline to adopt the 40-km buffer zone in site-specific environmental assessments and, instead, recommend either no buffer zone or, alternatively, a 17.5-km buffer zone, consistent with standard practice and the best available science. *See* IAGC PEIS Comment Letter § II.B.2.

3. New research demonstrates that seismic impulses have insignificant effects on dolphins

The PEIS recommends a mitigation measure calling for the shutdown of operations if a dolphin enters the acoustic exclusion zone, unless the dolphin is determined by the observer to be voluntarily approaching the vessel. PEIS at 2-11. In our comments on the PEIS, we provided substantial information demonstrating that this proposed measure is contrary to the best available science, impractical, and otherwise unsupported. In those comments, we also directed BOEM to current research being conducted with the support of the E&P Sound and Marine Life Joint Industry Program to study the effects of multiple airgun pulses in odontocetes and, specifically, to study whether bottlenose dolphin exposure to airgun impulses results in temporary threshold shift ("TTS").[9] *See* IAGC PEIS Comment Letter § II.B.1. As the public abstract from the study states, "subjects participated in over 180 exposure sessions with no significant TTS observed at any test frequency, for any combinations of range, volume or pressure during behavioral tests."[10] This research will be published very soon in a peer-reviewed scientific journal.[11] We will provide the published paper to BOEM promptly upon its publication, and we request that it be included in the administrative record and considered by BOEM during the permitting process.

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[9] James J. Finneran et al., *Final Report* (2013). TTS in odontocetes in response to multiple airgun impulses. (The Associations understand that a copy of this Final Report was provided by the author to NMFS.)

[10] C.E. Schlundt et al., *Auditory Effects of Multiple Impulses from a Seismic Airgun on Bottlenose Dolphins*, presentation at the Effects of Noise on Aquatic Life Third International Conference, Budapest, Hungary (Aug. 11-16, 2013). The results of this study also are useful to support inclusion of frequency weighting in updated acoustic criteria.

[11] Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. Effects of multiple impulses from a seismic air gun on bottlenose dolphin hearing and behavior. Submitted to J. Acoust. Soc. Am. (in review).

Additionally, PSO observation reports continue to indicate that there is no statistically significant difference between the frequency of dolphin sightings and acoustic detections during seismic operations, whether the source is active or silent. Enclosed with this letter as Attachment D is an updated version of an attachment to IAGC's PEIS comments, which includes additional data confirming this conclusion.

In sum, the proposed dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support. For the reasons presented in this letter and in our comments on the PEIS, the Associations respectfully request that BOEM make an express finding that this recommended measure is unsupported and unnecessary.[12] In conjunction with this finding, we also request that BOEM clarify that shutdown is not required for dolphins within the exclusion zone in all circumstances, regardless of whether dolphins are exhibiting bow-riding behavior or any other behavior.

4. BOEM should modify the proposed 60-minute "all clear" requirement

The PEIS recommends that monitoring of the exclusion zone shall "begin no less than 60 min prior to start-up" and that restarting of equipment after a shutdown "may only occur following confirmation that the exclusion zone is clear of all marine mammals and sea turtles for 60 min." PEIS at C-29. As explained in our comments on the PEIS, this proposed measure is unprecedented and without factual or scientific support. Specifically, IAGC provided numerous examples confirming that the routine, and proven-to-be-effective, practice is to require 15- and 30-minute "all clear" periods—for marine mammals and for ESA-listed species. *See* IAGC PEIS Comment Letter § II.B.3. In its ROD, BOEM provides no substantive response to this indisputable information. Indeed, since the ROD was issued, additional MMPA incidental take authorizations that include 15- and 30-minute "all clear" periods have been proposed by NMFS.[13]

We sincerely hope that BOEM will reconsider this proposed requirement and work with NMFS to ensure that a reasonable 15- / 30-minute "all clear" requirement is included in the federal authorizations related to seismic activities in the Atlantic Ocean, consistent with

[12] Although BOEM notes that this and other measures were addressed in the draft PEIS, it still must consider comments on these measures as part of its site-specific analyses for the proposed surveys, and it may adjust mitigation requirements based upon those analyses.

[13] *See, e.g.*, 80 Fed. Reg. 9510, 9524 (Feb. 23, 2015) (proposed Cook Inlet incidental take authorization calling for a 15-minute "all clear" period for small odontocetes and pinnipeds and a 30-minute "all clear" period for large odontocetes); 80 Fed. Reg. 20,084, 20,097 (Apr. 14, 2015) (same provision for proposed Beaufort Sea incidental take authorization).

the well-supported current practice. Expanding the standard 15- / 30-minute "all clear" period to 60 minutes will substantially increase the duration and cost of seismic surveys, which, in turn, increases potential risks. *See* IAGC PEIS Comment Letter § II.B.3.[14]

5. There will be no cumulatively significant impact from the proposed surveys

As stated in our PEIS comments, there has been no demonstration of population level effects to marine life from seismic or other geophysical survey activity, individually or cumulatively. BOEM expressly recognizes this fact in its August 22, 2014 *Science Note*, in which it states that "[w]ithin the [Gulf of Mexico Central Planning Area] . . . 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 similarly concluded in its March 9, 2015 *Science Note* that 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." Moreover, BOEM has spent more than $50 million on protected species and noise-related research without finding evidence of adverse effects. The geophysical and oil and gas industries, the National Science Foundation, the U.S. Navy, and others have spent a comparable amount on researching impacts of seismic surveys on marine life and have found no evidence of cumulatively significant effects. In short, for the reasons stated in our comments on the PEIS, and as consistent with the well-established record and BOEM's public findings, there will be no cumulatively significant impact from the surveys that have been proposed for the Mid- and South Atlantic OCS.

C. Seismic Survey Activities in the Mid- and South Atlantic OCS Will Have, at Most, a Negligible Impact on Fish Populations and Fish Habitat

As part of the G&G permitting process in the Atlantic OCS, site-specific environmental assessments will include an Essential Fish Habitat ("EFH") assessment to determine whether the specific activity and location would cause a significant adverse effect

[14] The impact of this and other measures addressed by the Associations is magnified when coupled with the proposed expanded exclusion zones. The Associations reiterate their previous comments that exclusion zones should be based on the best available science, including when the science demonstrates that an exclusion zone of less than 500 m is appropriate. If the minimum 500 m exclusion zone requirement is not applied, IAGC would support the incorporation of power-down procedures to mitigate any potential effects, as described in IAGC's PEIS comments. *See* Attachment C, footnote 21; *see also, e.g.*, 80 Fed. Reg. at 9524 (Cook Inlet proposed incidental take regulations); 80 Fed. Reg. at 20,097 (Beaufort Sea proposed IHA); 80 Fed. Reg. 14,913, 14,928 (Mar. 20, 2015) (Cook Inlet Proposed IHA); 79 Fed. Reg. 36,730, 36,735 (June 30, 2014) (Notice of Issuance of Beaufort Sea IHA).

to fisheries and EFH. Because the sound output from a seismic survey is immediate and local, there is no contaminate residue or destruction of habitat, and therefore no significant adverse effect to EFH. For the reasons set forth below, seismic survey activities will also not result in any significant adverse effects to fish populations or to fisheries.

Marine seismic surveys have been conducted since the 1950s and experience demonstrates that fisheries and seismic activities can and do coexist. There has been no observation of direct physical injury or death to free-ranging fish caused by seismic survey activity, and there is no conclusive evidence showing long-term or permanent displacement of fish. Any impacts to fish from seismic surveys are short term, localized, and not expected to lead to significant impacts on a population scale.[15]

Seismic source vessels move along a survey tract in the water creating a line of seismic impulses. As the seismic source vessel is in motion, each signal is short in duration, local, and transient. Since seismic surveys are a moving sound source, any impacts to fish are inherently local and short term, potentially causing a localized reduction in fish abundance within close proximity to the seismic source.[16] There is no conclusive evidence,

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[15] *See* Attachment A; *see also* Science for Environment Policy, Future Brief: Underwater Noise, European Commission, June 2013: http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB7.pdf; "Stocks at a Glance – Status of Stocks" 2011, U.S. Department of Commerce, NOAA: www.nmfs.noaa.gov/stories/2012/05/05_14; Boeger, W.A., Pie, M.R., Ostrensky, A., Cardoso, M.F., 2006. The Effect of Exposure to Seismic Prospecting on Coral Reef Fishes; Brazil. J. Oceanogr. 54, 235-239; 3D marine seismic survey, no measurable effects on species richness or abundance of a coral reef associated fish community. Mar. Pollut. Bull. (2013), http://dx.doi.org/10.1016/j.marpolbul.2013.10.031; Hassel, A., Knutsen, T., Dalen, J., Skaar, K., Lokkeborg, S., Misund, O.A., Osten, O., Fonn, M., Haugland, E.K., 2004. Influence of seismic shooting on the lesser sand eel. ICES J. Mar. Sci. 61, 1165-1173; Pena, H., Handegard, N.O. and Ona, E. 2013. Feeding herring schools do not react to seismic air gun surveys. ICES J. Mar. Sci, http://icesjms.oxfordjournals.org/content/70/6/1174.short?rss=1; Saetre, R. and E. Ona, 1996. Seismic investigations and damages on fish eggs and larvae; an evaluation of possible effects on stock level. Fisken og Havet 1996:1-17, 1-8.

[16] Although some studies have shown that various life stages of fish and invertebrate species can be physically affected by exposure to sound, in all of these cases, the subjects were very close to the seismic source or subjected to exposures that are virtually impossible to occur under natural conditions. For example, frequently cited experimental studies such as Skalski et al. (1992), Lokkeborg et al. (2010), Engas (1996), and Wardle (2001) employed artificially concentrated sound within hundreds of meters of the fish under observation and the fishing vessels. As Lokkeborg et al. (2012) noted in a recent review of the literature, "Seismic air gun emissions distributed over a large area may thus produce lower sound

(continued . . .)

however, showing long-term or permanent displacement of fish. Similar seismic surveys conducted for research in the Atlantic OCS in the past did not result in any detectable effects on commercial or recreational fish catch, based on a review of NMFS's data from months surveys were conducted, which noted that "there was absolutely no evidence of harm to marine species" (including fish).[17] Additionally, in the Gulf of Mexico, where G&G activities have routinely occurred for over 40 years, seafood harvested from the OCS is worth approximately $980 million annually and the fishing industry directly supports in excess of 120,000 jobs, suggesting that G&G activities can occur without negatively impacting commercial fisheries.

Finally, seismic and other geophysical surveys also do not result in closing areas to commercial or recreational fishing. During surveys, the survey crews work diligently to maintain a vessel exclusion zone around the survey vessel and its towed streamer arrays to avoid any interruption of fishing operations, including the setting of fishing gear. As with all combined uses of offshore waters, there must be a certain level of coordination by all parties. At sea, coordination is regulated by the U.S. Coast Guard under the International Regulations for Preventing Collisions at Sea, requiring a Local Notice to Mariners specifying survey dates and locations. BOEM has concluded that "there is only a limited potential for space-use conflicts between G&G activities and commercial fishing operations within the area of interest" and any impacts "would be intermittent, temporary, and short term." PEIS at 4-160, 4-161.

III. CONCLUSION

As explained above, the performance of seismic and other geophysical surveys is critical to the federally mandated "expeditious and orderly development" of the Mid- and South Atlantic OCS. A wealth of data and information demonstrates that these surveys will have no more than a temporary, localized, and negligible impact on marine life. The Associations respectfully encourage BOEM to proceed with approving the pending permit applications and to work with NMFS to ensure that only reasonable, well-supported, and effective mitigation measures are included as conditions of the permits and the related federal authorizations.

(. . . continued)
exposure levels and thus have less impact on commercial fisheries." As another example, Aguilar de Soto (2013) exposed scallop larvae to noise at loud volume for up to 90 hours at a distance of 9 centimeters, which is virtually impossible to occur outside of experimental settings.

[17] *New Jersey v. National Science Foundation*, No. 3:14-cv-0429 (D. N.J.), Federal Defendants' Brief in Opposition to Plaintiffs' Motion for Declaratory and Injunctive Relief at 25-26, citing Exhibit D, Higgins Decl. ¶ 21, Exhibit D, Mountain Decl. ¶ 8 (July 7, 2014).

We appreciate your consideration of our comments. Should you have any questions, please do not hesitate to contact Nikki Martin at (713) 957-8080.

Sincerely,

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ATTACHMENT A

ANTHROPOGENIC SOUND AND IMPACTS TO MARINE LIFE:
An Annotated Bibliography of Selected & Frequently Cited References

IAGC, together with the oil and gas industry, funds independent research to further our understanding of the effects of seismic surveys on marine life. This is helping to remove uncertainties about the possible effects of seismic surveys. Some of this research, in addition to other frequently cited references regarding the effects of sound on marine life, is reviewed in the attached annotated bibliography.

More than four decades of worldwide seismic surveying and scientific research indicate that the risk of direct physical injury to marine life is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts to marine life. As BOEM stated in its August 22, 2014 *Science Note*, "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."

There has been no observation of direct physical injury or death to free-ranging fish caused by seismic survey activity, and there is no conclusive evidence showing long-term or permanent displacement of fish. Any impacts to fish from seismic surveys are short-term, localized and are not expected to lead to significant impacts on a population scale or to commercial and recreational fishing activities.

The seismic sound source is engineered to direct its energy downward, rather than laterally. For any energy that is transmitted laterally, the signal strength decreases rapidly and would not cause injury to marine mammals. Research indicates that in-water sounds received at 110-90 dB SPL are comparable to a whisper or soft speech, even if it travels hundreds or thousands of kilometers in water. In some areas, such as the busy ports of the Atlantic coast, ambient sound in the frequencies produced by seismic sources may be as high as 110-120 dB due to ship noise, thereby masking any additional contribution from distant seismic surveys. What evidence there is of potential behavioral disturbance from seismic operations suggests minor and transitory effects, such as temporarily leaving the survey area, and these effects have not been linked to negative biologically significant impacts on populations.

More information on our commitment to science can be found at www.soundandmarinelife.org.

Aguilar de Soto N, Delorme N, Atkins J, Howard S, Williams J, Johnson M. 2013. Anthropogenic noise causes body malformations and delays development in marine larvae. Scientific Reports 3, 2831. DOI 10: 1038/srep02831. www.nature.com/scientificreports.

Purports to demonstrate that airgun sound affects development of scallop larvae at levels of 160 dB SPL or lower. But the work has many flaws; an unrealistically long sound, played at much shorter than normal intervals for as much as 90 hours continuous. The sound source used in the experiment was not able to accurately replicate the actual seismic sound and was placed only 9 cm from the test subjects, producing large particle displacement effects of 4-6mm/s velocity, comparable to an SPL of 195 dB SPL. The latter value translates to a distance of a few hundred meters from an actual source, not the hundreds of square kilometers postulated by the authors. The best laboratory culture methods typically yield some variation in survival and development, but this study reported perfect scores for all controls at all stages. The work needs to be replicated by an independent and expert experimentalist.

André M, Solé M, Lenoir M, Durfort M, Quero C, Mas A, Lombarte A, van der Schaar M, López-Bejar M, Morell M, Zaugg S, and Houégnignan L. 2011. Low-frequency sounds induce acoustic trauma in cephalopods. Front Ecol Environ 2011; doi: 10.1890/100124. www.frontiersinecology.org. The Ecological Society of America.

Another study where it is difficult to know what to make of the data because of the way the sound was presented and measured. The reported received level is 157 dB re 1 µPa, so one can presume that the measurement is of pressure, but whether this is averaged, spectrum level, total energy under the envelope is unclear. Levels up to 175 dB re 1 µPa are also reported but it is not clear if that is a single frequency peak or whether the received levels fluctuated around 157 dB to as high as 175 dB. Thus the actual exposure history as SEL for the two hours of exposure is unknown. The sound source is in air and its properties are not provided. Given the impedence mismatch of water the source would have had to be extremely loud to get as much as 157-175 dB SPL into the water. Squid do not have swim bladders or air spaces associated with the ears, so the appropriate value to report is actually particle velocity. This is especially true since the containers were so much smaller than the wavelengths of sound in water at those frequencies (4-30 meters). The sound field inside the containers is bound to be complex and should have been measured. What is most probable is that the squid experienced considerable vibratory motion for two hours, leading to the damage observed; damage that could have never occurred in an open water environment where pressure and particle velocity would never be experienced at those levels for that duration.

Bartol, S.M. and Bartol, I.K. 2011. Hearing Capabilities of Loggerhead Sea Turtles (Caretta caretta) throughout Ontogeny: An Integrative Approach involving Behavioral and Electrophysiological Techniques. Final Report, JIP Grant No.22 07-14. Available online at http://www.soundandmarinelife.org/research-categories/physical-and-physiological-effects-and-hearing/hearing-capabilities-of-loggerhead-sea-turtles-throughout-ontogeny.aspx

Bolle LJ, de Jong CAF, Bierman SM, van Beek PJG, van Keeken OA, Wessels PW, van Damme CJG, Winter HV, de Haan D, Dekeling RPA. 2012. Common Sole Larvae Survive High Levels of Pile-Driving Sound in Controlled Exposure Experiments. PLoS One 7(3): e33052. Doi 10:1371/journal.pone.0033052.

This is a well-designed and properly measured sound exposure experiment, although claims that recordings played from a speaker are able to replicate the impulse time amplitude signature should always be treated with skepticism. Exposures up to 206 dB SEL_{cum} did not produce mortality, with single strike SELs of 186 dB and zero to peak pressures of 32 kPa, erroneously reported as 210 dB re $1\mu Pa^2$ in the abstract.

Booman, C., Dalen, J., Leivestad, H, Levsen, A., van der Meeren, T. and Toklum, K. 1996. Effects from airgun shooting on eggs, larvae, and fry. Experiments at the Institute of Marine Research and Zoological Laboratorium, University of Bergen. (In Norwegian. English summary and figure legends). Fisken og havet No. 3. 83 pp. as reviewed in:

Dalen, J, Dragsund E, Næss A, and Sand O. 2007. Effects of seismic surveys on fish, fish catches and sea mammals. Report for the Cooperation group – Fishery Industry and Petroleum Industry, Report No. 2007-0512. Available at https://www.norskoljeoggass.no/PageFiles/6574/Effects%20of%20seismic%20surveys%20on%20fish,%20fish%20catches%20and%20sea%20mammals.pdf?epslanguage=no

Observed effects on eggs and larvae only extended 1 to 5 meters from a full seismic array, suggesting that powerful particle motion effects were responsible for damaging the microscopic eggs and larvae. The net effect would be a pencil line damage zone in the wake of the array that would conceivably account for some tiny fraction of 1% of pelagic eggs and larvae distributed in the larger region of interest. Considering that more than 99% of eggs and larvae typically never make it to adulthood, this is an inconsequential effect compared to predation, disease and many other natural density-dependent or density independent causes of mortality.

Castellote, M., Clark, C.W., and Lammers, M.O. 2012. Acoustic and behavioural changes by fin whales (*Balaenoptera physalus*) in response to shipping and airgun noise. Biological Conservation 147: 115–122.

The authors make a slim statistical case that calls were altered by the presence of shipping noise and in one case a seismic survey. Measured and modeled acoustic data in the Straits of Gibraltar, a very unusual acoustic environment, were extrapolated as a more general case to predict effects of seismic on fin and other related whales generally. This speculation should be supported with data. Inferences of whale displacement by sound were from reductions in numbers of vocalizations, not actual observed movement or changes in distribution.

Engås A, Løkkeborg S, Soldal AV, and Ona E. 1996a. Comparative fishing trials for cod and haddock using commercial trawl and longline at two different stock levels. J Northw Atl Fish Sci 19: 83-90. http://journal.nafo.int.

Commercial bottom trawl and longline vessels fished 7 days before, 5 days during, and 5 days after a seismic survey was conducted in the area. Acoustic surveys of fish populations were also conducted, along with a sampling bottom trawl of different dimensions and mesh size than the commercial trawl. Only before and after data were analysed in this paper; "during" data were omitted but are reported in Engås et al (1996b). Because multiple fishing methods were employed on two species of fish, the matrix of data are somewhat complicated: generally, catches declined, smaller fish were caught after the seismic survey, and the ratio of haddock to cod increased after survey. It is difficult to know what to make of the results given the number of uncontrolled and possibly contributing variables that could have confounded the results, including the unusual prolonged proximity of survey vessels to fishing, and the amount of continuous fishing in one place that may have contributed to reduced catches and smaller size fish being caught over time.

Engås A, Løkkeborg S, Ona E, and Soldal AV. 1996b. Effects of seismic shooting on local abundance and catch rates of cod (Gadus morhua) and haddock (Melanogrammus aeglifinus). Can J Fish Aquat Sci 53:2238-2249.

Same study as above but includes data during the survey and more spatial information showing the effects described above tended to be greatest near the seismic survey and less out to the borders of the study area. An independent re-analysis of the data (JRHGeo, unpublished) suggest a different interpretation of declining catches during the before-exposure period suggestive of depletion of stocks within the unusually heavy, concentrated fishing effort within the test area, followed by clearly decreased catches within 1 km of the survey but smooth

decline through pre- and during exposure periods, suggesting little to no effect beyond 1 km. In the 5 days following seismic survey there is a rebound of catch at both the < 1 km and 1-3 km ranges, which suggests that there may have indeed been an effect from the seismic sound on catches, but catches recovered immediately afterward, confounded by the ongoing 10-15 days of continuous intensive fishing in the area. The re-analysis suggests that the data may have been confounded by variables other than sound, and that the original clearcut conclusions in Engas et al 1996a,b are perhaps not quite as pronounced as initially stated.

Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. (2013). Temporary threshold shift (TTS) in odontocetes in response to multiple air gun impulses. Final Report for JIP Project 2.1.1., 51 pp. Available online at http://www.soundandmarinelifejip.org/index.php?doc=docmeta&id=3695

Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. (in review). Effects of multiple impulses from a seismic air gun on bottlenose dolphin hearing and behavior. Submitted to J. Acoust. Soc. Am.

Gross JA, Irvine KM, Wilmoth S, Wagner TL, Shields PA and Fox JR . 2013. The Effects of Pulse Pressure from Seismic Water Gun Technology on Northern Pike. *Trans Am Fish Soc* 142: 1335-1346. ISSN: 0002-8487 print / 1548-8659 online DOI: 10.1080/00028487.2013.802252.

The study assessed the probability of mortality of pike (freshwater) when exposed to two pulses at 3, 6 and 9 meters distance from either a 343 cu in water gun or a 120 cu in water gun, both pressurized at 2000 psi. Measures of peak and peak to peak pressure were made as well as $SEL_{cum.}$ SEL_{cum} was used as the metric for effects in most of the results and discussion since it seemed to correlate best with levels of injury and mortality. Mortality within 72-168 hours was correlated with SELs in excess of 195 dB. Gas bladder rupture was observed at 199 dB SEL; 100% of fish at 3-6 meters and 87% of fish at 9 meters. Given the history of water guns producing greater injury and mortality than airguns, these results with two pulses from good sized single guns, indicate that fish would need to be within a few meters of a single airgun or full array to achieve comparable effects.

Harrington JJ, McAllister J, and Semmens JM. 2010. Assessing the short term impact of seismic surveys on adult commercial scallops (Pecten fumatus) in Bass Strait: Final Report. Tasmanian Aquaculture and Fisheries Institute, U. of Tasmania

Scallops were sampled from control and exposure sites before and after an extensive 2-D seismic survey. No statistical differences were found between control and exposed populations, neither in survival nor body condition. Exposure levels were not recorded. The paper also reviews several prior studies of seismic effects on scallops in Ireland and other sites, all also with no effect. One cited paper reported that one of three scallops experienced a split in its shell at distance of 2 meters from an airgun.

Higgins SM. 2014. Declaration; State of New Jersey, Dept of Environmental Protection vs National Science Foundation, et al. United States Federal District Court, District of New Jersey. Case 3:14-cv-04249-PGS-LHG, Document 6-7, filed 07/07/14, pageID 1520-1527

Contains a comparison of annual commercial and recreational fishery catches for years and months in which seismic surveys were conducted off the New Jersey coast, relative to the same months in other years, between 1990-2004. No discernable differences were found between periods with seismic survey and without. (Fishery statistical data from NMFS 2014, http://www.st.nmfs.noaa.gov/).

Lavender, A.L., Bartol, S.M., and Bartol, I.K. (2014). Ontogenetic investigation of underwater hearing capabilities in loggerhead sea turtles (*Caretta caretta)* using a dual testing approach. J. Exp. Biol., 2014, 217(14):2580-2589.

Løkkeborg S, Ona E, Vold A, and Salthaug A. 2012. Effects of sounds from seismic air guns on fish behaviour and catch rates. In A.N. Popper and A. Hawkins (eds.), *The Effects of Noise on Aquatic Life*, Advances in Experimental Medicine and Biology 730, DOI 10.1007/978-1-4419-7311-5_95, pp. 415-419. Springer, NY NY.

This paper provides a good review of prior behavioral studies. They also report recent data from what is arguably the most realistic and thorough study to date; monitoring of two fisheries (gillnet and longline) for four species of fish; a halibut, two gadids (pollack and haddock) and a seabass (Sebastes marinus), along with acoustic (HF sonar) surveys of the fish populations. Gillnet catches of halibut and seabass increased during and after survey, possibly due to increased swimming activity, while longline catches of halibut and pollack decreased. Acoustic surveys revealed decreases in pollack abundance, but not other species, consistent with prior study by Engås et al (1996a,b).

McCauley RD, Kent CS, Archer M. 2008. Impacts of seismic survey pass-bys on fish and zooplankton, Scott Reef Lagoon, Western Australia: Full report of Curtin University findings. Center for Marine Science and Technology, Curtin University, Perth WA. 92 pp. CMST Report 2008-32.

An extensive research effort involving a real seismic survey over a thoroughly monitored reef lagoon. Caged snapper and damselfish were exposed to seismic passes as close as 45-74 meters with 1% loss of hearing hair cells, later fully recovered. Behavioral reaction was observed at 155-165 dB SPL sound exposure levels but avoidance only occurred out to 200 meters on either side of survey. There was no effect on normal fish sound choruses.

McCauley RD, Fewtrell J and Popper AN. 2003. High intensity anthropogenic sound damages fish ears. J Acoust Soc Am 113(1):638-642 DOI: 10.1121/1.1527962

The authors were able to produce considerable unrecovered damage to the sensory structures of a typical fish ear (Pink snapper) after seven close passes (5-15 meters) by a towed 20 cubic inch seismic air source in the span of four hours. Although no cumulative Sound Exposure Level (SEL) or peak pressure or particle velocity measures were reported, the graphical display of the passes indicates multiple exposures over short periods of time at levels in excess of 180 dB SPL $rms_{0.95}$. The fish were caged and the authors noted that their movements indicated that the fish would have moved away from the sound source if possible, thus preventing the artificially high levels of exposure experienced.

Miller I. and Cripps E. 2013. Three dimensional marine seismic survey has no measurable effect on species richness or abundance of a coral reef associated fish community. Mar Pol Bull. Elsevier Press. http://dx.doi.org/10.1016/j.marpolbul.2013.10.031

No change in abundance or species composition was found in a natural reef community of resident reef fishes (emphasis on damselfishes) and mobile demersal fishes (emphasis on snappers of the Family Lutjanidae). Multiple passes by a full working seismic array were separated by about 6 hours between pass. Minimum stand-off distances from the reef were 400 meters on the outside and 800 meters inside the reef lagoon. Estimated exposures were generally around 187 dB SEL with some exposures as high as 200 dB SEL. Instantaneous peak or average SPL or particle velocity/acceleration were not measured.

Moein, S. E., Musick, J. A., Keinath, J. A., Barnard, D. E., Lenhardt, M. L. & George, R. 1995. Evaluation of seismic sources for repelling sea turtles from hopper dredges. In *Sea Turtle Research Program: Summary Report*. (Ed. Hales, L. Z.) pp 90-93. Technical

Report CERC-95.

National Research Council (NRC). 2005. Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects. National Academy Press, Washington DC. www.nap.edu.

This NRC report lays out a framework for estimating long term, cumulative population consequences from behavioral disturbance by sound, and by extension, any source of behavioral perturbation, individually or cumulatively. While developed for marine mammals, the principles of the Population Consequences of Acoustic Disturbance (PCAD) model are appropriate to any biological population.

Parry GD and Gason A. 2006. The effect of seismic surveys on catch rates of rock lobsters in western Victoria, Australia. Fisheries Research 79 (2006): 272-284.

A statistical comparison of changes in commercial catch rates (Catch Per Unit Effort, CPUE) coincident with seismic survey effort. No correlation was found in a two way analysis of variance, although the authors do note that most survey effort was in deep water away from the shallow water fishery, and that one survey in shallow water was in an area of low lobster abundance.

Peña H, Handegard NO, and Ona E. 2013. Feeding herring schools do not react to seismic air gun surveys. ICES J Marine Science, doi:10.1093/icesjms/fst079. 7 pp. http://icesjms.oxfordjournals.org/

A full 3-D seismic survey array was used to assess responses of herring monitored by an omnidirectional fisheries sonar. The source vessel approached the fish school from a distance of 26 km to a close approach at 2 km without any effect on the swimming and schooling behavior of the fish.

Popper AN, Smith ME, Cott PA, Hanna BW, MacGillivray AO, Austin ME and Mann DA. 2005. Effects of exposure to seismic airgun use on hearing of three fish species. J Acoust Soc Am 117:3958-3971.

Whitefish and juvenile pike did not show any TTS after exposure to five seismic playbacks of about 209 dB SPL_{peak} or 180 dB SEL, and particle displacements of 139 db SVL re 1nm/s (it is not possible to determine which physical property was responsible for any TTS observed in any of the tests). Adult pike under similar exposure conditions showed a TTS of about 20 dB at 400 Hz, which was recovered within 18 hours. Chub, also under similar exposure levels, showed slightly higher levels of TTS, about 25 dB at 200 Hz and 35 dB at 400 Hz, similar for 5 playbacks or 20 playbacks, and fully recovered within 18 hours. Chub are members of a hearing specialist family of freshwater fishes with no marine species.

Santulli A, Modica A, Messina C, Ceffa L, Curatolo A, Rivas G, Fabi G, D'Amelio V. 1999. Biochemical Responses of European Sea Bass (Dicentrarchus labrax L.) to the Stress Induced by Off Shore Experimental Seismic Prospecting. *Marine Pollution Bulletin*, Volume 38, Issue 12, December 1999, Pages 1105-1114.

This study involved exposure of caged fish to very close and very prolonged seismic air source in order to obtain physiological responses typical of stress. The fish returned to baseline levels within 72 hours, with no injury and no apparent lasting effect, despite the unusually high and prolonged sound exposures.

Song, J., D.A. Mann, P.A. Cott, B.W. Hanna, and A.N. Popper. 2008. The inner ears of Northern Canadian freshwater fishes following exposure to seismic air gun sounds**. J. Acoust. Soc. Am.** 124(2):1360-1366.

No damage was found to any of the ears of the test fish from Popper et al (2005), despite findings of Temporary Threshold Shift in two cases where peak pressure exceeded 205-209 dB re 1µPa SPL (peak) or 176-180 dB re 1 μPa^2-s single impulse (shot) SEL.

United States Navy. 2013. Atlantic Fleet Training and Testing Final Environmental Impact Statement / Overseas Environmental Impact Statement. Available online at http://aftteis.com/DocumentsandReferences/AFTTDocuments/FinalEISOEIS.aspx

Wardle CS, Carter TJ, Urquhart GG, Johnstone ADF, Ziolkowski AM, Hampson G, Mackie D (2001) Effects of seismic air guns on marine fish. Cont Shelf Res 21:1005–1027.

A study of free swimming cod, pollack and hake on a reef, using a fixed seismic source. C-start but no movement away from the source was observed at exposure levels up to 195 dB SPL at a distance of 109 meters. The authors speculate on possible reasons for the lack of response, including site fidelity to the unique reef environment at which the study was performed.

ATTACHMENT B

ATTACHMENT B

Currently, three types of surveys are proposed in the Atlantic OCS: 2D seismic surveys, a 3D seismic survey, and an airborne gravity and magnetic survey. These surveys are described in more detail below.

A. Seismic Surveys – Towed Streamers

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. The use of modern seismic technology is similar to ultrasound technology—a non-invasive mapping technique built upon the simple properties of sound waves. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

To carry out these surveys, marine vessels use acoustic arrays, most commonly as a set of compressed air chambers, to create seismic pulses. A predominantly low-frequency sound pulse is generated by releasing compressed air into the water as the vessel is moving. The pulses are bounced off the layers of rock beneath the ocean floor. The returning sound waves are detected and recorded by hydrophones that are spaced along a series of cables that are towed behind the survey ship. Seismologists then analyze the information with computers to visualize the features that make up the underground structure of the ocean floor. Geophysical contractors often have proprietary methods of data acquisition that may vary depending on their seismic target and data-processing capabilities, making each contractor's dataset unique. Once the data is processed, geophysicists interpret it and integrate other geoscientific information to make assessments of where oil and gas reservoirs may be accumulated. Based largely on this information, exploration companies will decide where, or if, to conduct further exploration for oil and gas.

2D Seismic Surveys

Two-dimensional surveys are so-called because they only provide a 2D cross-sectional image of the Earth's structure. These surveys are typically used for geologic research, initial exploration of a new region, and to determine data quality in an area before investing in a 3D survey. 2D towed-streamer surveys are acquired with a single vessel usually towing a single air source array and a single streamer cable. The streamer is a polyurethane-jacketed cable containing several hundred to several thousand sensors, most commonly hydrophones. The air source array directs energy downward towards the ocean floor. An integrated navigational system is used to keep track of where the air sources are activated, the positions of the streamer cable, and the depth of the streamer cable. The end of the cable is tracked with global positioning system (GPS) satellites, and tail buoys are attached at the end. Radar reflectors are routinely placed on tail buoys for detection by other vessels, and automatic identification system (AIS) devices are also routinely integrated into the tail buoys.

Ships conducting 2D surveys are typically 30-90 m (100-300 ft) long and tow a single-source array 200-300 m (656-984 ft) behind them approximately 5-10 m (16-33 ft) below the sea surface. The source array often consists of three subarrays, with six to twelve air source elements each, and measures approximately 12.5-18 m (41-60 ft) long and 16-36 m (52-118 ft) wide. Following behind the source array by 100-200 m (328-656 ft) is a single streamer approximately 5 to 12 or more km (3.1-7.5 mi) long. The ship tows this apparatus at a speed of approximately 3 to 5 knots. Approximately every 10-15 seconds (i.e., a distance of 23-35 m [75-115 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), the air source array is activated. The actual time between activations varies depending on ship speed and the desired spacing.

Typical spacing between ship-track lines for 2D surveys, which is also the spacing between adjacent streamer line positions, is greater than a kilometer. Lines can transect each other and can be parallel, oblique or perpendicular to each other. 2D towed-streamer surveys are normally regional, covering a large area of ocean so that activity is not always limited to a particular area. 2D surveys can provide high resolution imaging with tight line spacing intervals in shallow areas.

2D surveys can cover a larger area with less data density in less detail, resulting in a lower cost per area covered. While surveying, and after a prescribed ramp-up of the output of the array to full-operation intensity, a vessel will travel along a linear track for a period of time until a full line of data is acquired. Upon reaching the end of the track, the ship takes typically 2 - 6 hours to turn around and start along another track, varying depending on the spacing between track lines, the length of track lines, and the objectives of a specific survey. Some 2D surveys might include only a single long line. Others may have numerous lines, with line spacings of 2 km in some cases, and 10 km in other cases. Data acquisition generally takes place day and night and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20 to 30 percent of non-operational downtime due to a variety of factors, including technical requirements or mechanical maintenance, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

3D Seismic Surveys

3D towed-streamer seismic surveys enable industry to image the subsurface geology with much greater clarity than 2D data because of the much denser data coverage. The quality is such that 3D data can often indicate hydrocarbon-bearing zones from water-bearing zones. Because 3D seismic data has been continuously and rapidly improving since its introduction in the 1970s, areas covered by 3D data shot only a few years ago may be reshot with current, improved technology, offering greater clarity than previous surveys. In addition, areas already covered using 2D techniques may be resurveyed with 3D. Further, 3D surveys may be repeated over producing fields at successive calendar times (at 6-month to several-year intervals) to better characterize and record changes over producing reservoirs. These 4D, or time-lapse 3D, surveys are used predominantly as a reservoir monitoring tool to detect and evaluate reservoir changes over time. Conventional, single-vessel 3D surveys are referred to as narrow azimuth 3D surveys.

The current state-of-the-art ships conducting 3D surveys are purpose-built vessels with much greater towing capability than the vessels conducting 2D surveys. While these vessels are generally 60 - 120 m long, with the largest vessels over 120 m (ft) in length and greater than 65 m (230 ft) wide at the back deck. These seismic ships typically tow two parallel source arrays 200-300 m (656-984 ft) behind them. The two source arrays are identical to each other and are the same as those used in the 2D surveys described previously. Following 100-200 m (328-656 ft) behind the dual source arrays are the streamers.

Most 3D ships can tow eight or more streamers at a time, with the total length of streamers (number of streamers multiplied by the length of each one) exceeding 80 km (50 mi). The theoretical towing maximum today is 24 streamers, each of which can be up to 12 km (7.5 mi) long, for a total of 288 km (179 mi). Towing 8-14 streamers that are each 3-8 km (1.9-5 mi) long is normal practice. Towing 10 streamers that are separated by 75-150 m (246-492 ft) means that a swath 675-1,350 m (2,215-4,429 ft) wide is covered on the sea surface in one pass of the ship along its track line. Other streamer configurations (number of streamers and their separation distance) can produce narrower or wider swaths.

The survey ship tows the apparatus at a speed of 3 to 5.5 kn during production. Approximately every 11 - 15 s (i.e., a distance of 25 m [82 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), one of the dual air source arrays is fired. The other array is fired 11 - 15 s later. To achieve the desired spacing, the time between firings depends on the ship speed. While surveying, a ship travels along a track for 12-20 hours (i.e., a distance of 100-167 km [62 - 104 mi] at 4.5 kn [8.3 km/hr]), depending on the size of the survey area. Upon reaching the end of the track, the ship takes 3 to 5 hours to turn around and start along another track. This procedure takes place day and night, and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20-to-30 percent of non-operational downtime due to a variety of factors, including technical or mechanical problems, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

B. Non-Seismic Gravity and Magnetic Surveys

Both conventional gravity surveys and gravity gradiometry surveys are conducted today, most often by fixed-wing aircraft, or where necessary, by marine vessel deployment. There is no sound source associated with gravity or magnetic surveys. The dimensions of the gravity instruments and stand are approximately 1 m by 1 m by 1.5 m high (3 ft by 3 ft by 5 ft) and the total weight is approximately 150 kg (330 lb). The survey acquisition grid is similar to ship-based seismic surveys, generally with flight-line spacing of 0.5-3 km (0.3-2 mi). Surveys of 500 sq. km (180 sq. mi) can be completed in a few hours, with the aircraft flying at an altitude of 70-300 m (230-1,000 ft). The objectives of the survey will determine the flight-line spacing (distance between flight lines) and the altitude at which the survey will be conducted.

Measurements of the earth's magnetic field are useful in helping to determine geologic structures and stratigraphy in the subsurface in frontier exploration areas, such as the Atlantic OCS, and as a complement to existing seismic data. There are at least five types of

magnetometers, three of which are commonly used in airborne magnetic surveying. In addition to the different types of magnetometers, there are also several different configurations that can be used on the aircraft. These configurations include: (1) a single sensor, typically a tail installation; (2) two horizontally separated magnetometers, usually wingtip pod sensors; (3) two vertically separated sensors, usually tail-mounted; and (4) a total magnetic intensity configuration, typically involving three, but potentially four, magnetic sensors. The sensor pods are cylindrical in shape, and typically 1-2 m (3.3-6.6 ft) long and several centimeters (several inches) in diameter.

The objectives of the survey (such as the amount of area to be covered, the desired detail to be obtained, etc.) and the cost determine three of the most important factors to be specified for any given survey: (1) the altitude at which the survey will be conducted; (2) the flight-line separation; and (3) the flight-line orientation, or direction. Recent surveys done in the Gulf of Mexico have been flown at altitudes of 60-300 m (200-1,000 ft), at speeds of 110 knots (250 km/hr), and with line spacings of 0.5-2 km (0.3-1.3 mi). Similar surveys were recently completed offshore Greenland and offshore Honduras.

ATTACHMENT C

May 7, 2014

Via Federal eRulemaking Portal

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123–2394

Re: Comments on Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS

Dear Mr. Goeke:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC") in response to the Bureau of Ocean Energy Management's ("BOEM") Notice and Request for Comments on its Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS ("PEIS"). *See* 79 Fed. Reg. 13,074 (Mar. 7, 2014). We appreciate BOEM's consideration of the comments set forth below.

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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and some IAGC members have already filed applications for authorizations relating to such activities.[1]

[1] In a joint letter with the American Petroleum Institute ("API") and the National Ocean Industries Association ("NOIA"), IAGC earlier commented on the draft PEIS ("DPEIS"). *See* Letter from Andy Radford, Sarah Tsoflias, and Luke Johnson to Gary D. Goeke (July 2, 2012) ("DPEIS Comment Letter"). API, NOIA, and IAGC have also submitted a comment letter dated

(continued . . .)

Seismic surveys are the only feasible technology available to accurately image the subsurface before a single well is drilled. BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 3.3 billion barrels of oil and 31.3 trillion cubic feet of natural gas. Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology – including seismic reflection and refraction, gravity, magnetics, and electromagnetic – will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, IAGC's members can better locate and dissect prospective areas for exploration.

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

I. OVERVIEW

IAGC supports BOEM's plan to authorize exploratory activities on the Atlantic OCS consistent with the Outer Continental Shelf Lands Act ("OCSLA"), which calls for the "expeditious and orderly development" of the OCS "subject to environmental safeguards." 43 U.S.C. § 1332(3). However, the PEIS undermines OCSLA's mandate, as well as the requirements of other applicable laws, such as the Marine Mammal Protection Act ("MMPA"), in a number of ways. In general, a fundamental flaw with the PEIS is its establishment of an unrealistic scenario in which exploration activities are projected to result in thousands of incidental takes of marine mammals, which BOEM admits will not actually occur. The supposed effects of this "worst case" hypothetical scenario are then addressed in the PEIS with mitigation measures, many of which are similarly unrealistic because they mitigate inaccurately presumed effects. This approach is contrary to both the best available scientific information and applicable law.

Many of the mitigation measures recommended in the PEIS are infeasible, will impose serious burdens on industry, may discourage exploration of the Atlantic, and will result in no benefits to protected species (because they address unrealistic effects). IAGC can and will support mitigation measures that are well supported by the best available science, consistent with existing practices that are proven to be effective and operationally feasible. However, we cannot

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(. . . continued)
May 7, 2014 (the "Joint Trades Letter"), in response to the PEIS, which IAGC incorporates by reference.

support mitigation measures with no basis in fact or science, which are intended to address effects that will not occur, and which will result in less exploration of the OCS, contrary to OCSLA.

Accordingly, we strongly urge BOEM to include in its Record of Decision ("ROD") the modifications suggested in the comments set forth below. With respect to the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested below are incorporated into the ROD. All of these suggested modifications are within the scope of the analyses contained in the PEIS. *See Great Old Broads for Wilderness v. Kimbell*, 709 F.3d 836, 854-55 (9th Cir. 2013) (modified alternative in ROD upheld because all relevant impacts analyzed in NEPA document); *see also W. Watersheds Project v. BLM*, 721 F.3d 1264, 1277-78 (10th Cir. 2013) (same).

II. DETAILED COMMENTS

A. The PEIS's Marine Mammal Impact Analyses Are Factually and Legally Flawed

The PEIS's analysis of marine mammal impacts is, by BOEM's admission, an unrealistic assessment of the potential impacts of geophysical surveys on marine mammals that is purposefully constructed to overestimate levels of incidental take. The PEIS explains:

> The acoustic and impact modeling conducted to develop these [incidental take] estimates is by its very nature complex and demands numerous specific details be identified and used during calculations[.] However, it must be emphasized that each of these assumptions are purposely developed to be conservative and accumulate throughout the analysis (e.g., representative sound source is modeled at highest sound levels and always at maximum power and operation, sound levels received by an animal are calculated at highest levels, marine mammal density values used likely exceed actual densities, and models do not include the effect of all mitigations in reducing take estimates). Therefore, the results of the modeling predictions will overestimate take.

PEIS at 1-5 (emphases added); *see also* PEIS at 4-62 ("BOEM emphasizes that these estimates should be seen as highly conservative of potential take without the consideration of most mitigation with the exception of the time-area closure described in Alternative A."). The results of this hypothetical "worst case" scenario analysis are strikingly divergent from the record of actual observed marine mammal impacts related to offshore exploration activities. *See* DPEIS Comment Letter §§ I, II & Appx. 1. For example, the PEIS implausibly concludes that thousands of marine mammals will experience Level A incidental take, and that hundreds of thousands of marine mammals will experience Level B incidental take, as a result of seismic

activities. PEIS at Tables 4-9, 4-10, 4-11, 4-12. These take estimates would result in tens of thousands of shutdown events per year, in contrast to the average 55 shutdowns that are required per year in the Gulf of Mexico under existing operations, monitoring, and mitigation.[2] *See* DPEIS Comment Letter, Appx. 1.

We are aware of no federal agency assessment of the effects of seismic activities on marine mammals that results in incidental take estimates that are remotely similar to those stated in the PEIS. Moreover, the history of incidental take authorizations for offshore seismic activities demonstrates that levels of actual incidental take are far smaller than even the most balanced pre-operation estimates of incidental take. *See* DEIS at E-69.[3] The PEIS's flawed

[2] Aggregating the estimated takes presented in Table 43 of the PEIS yields a total of 26,000 estimated takes.

[3] *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/ ("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."); *id*. at 2-23 (with respect to sea turtles, "no significant cumulative impacts to sea turtles would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area"); 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 (WPA); *id*. at 4-710 (v.2), 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."); *id*. at 4-235, 4-741 ("[T]here are no data to suggest that routine activities from the preexisting OCS Program are significantly impacting sea turtle populations."); 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 (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 ("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

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approach to assessing the impacts of seismic activities on marine mammals results in a number of significant legal and factual errors, as set forth below.

1. The PEIS unlawfully analyzes a worst case scenario

Prior to 1986, NEPA regulations required a lead agency to prepare a "worst case analysis" of impacts for which there is incomplete or unavailable information. *See* 51 Fed. Reg. 15,618 (Apr. 25, 1986).[4] However, this requirement was expressly rescinded decades ago because it was found to be "an unproductive and ineffective method of achieving [NEPA's] goals; one which can breed endless hypothesis and speculation." *Id*.; *see Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354-56 (1989) (U.S. Supreme Court confirming that worst case analysis is no longer applicable). In place of the worst case analysis requirement, the federal Council on Environmental Quality ("CEQ") promulgated "a wiser and more manageable approach to the evaluation of reasonably foreseeable significant adverse impacts in the face of incomplete or unavailable information in an EIS." 51 Fed. Reg. at 15,620. The new (and current) approach, codified in 40 C.F.R. § 1502.22, requires federal lead agencies to disclose such impacts and perform a "carefully conducted" evaluation based upon "credible scientific evidence." *Id*.; 40 C.F.R. § 1502.22(b)(1). In developing this requirement, CEQ explained that "credible" means "capable of being believed" and stated that "[i]nformation which is unworthy of belief should not be included in an EIS." 51 Fed. Reg. at 15,622-23 (responses to comments) (emphasis added).

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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 ("[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 ").

[4] In the PEIS, BOEM determines that there is incomplete or unavailable information for a full assessment of the impacts of the proposed activities on marine mammals. *See* PEIS at 4-6, 4-47.

By performing an analysis of marine mammal impacts that is "purposely developed to be conservative," based on the "highest" sound levels and erroneously high marine mammal densities, and intended to "overestimate take," BOEM has performed precisely the same type of "worst case analysis" that was rejected by both CEQ and the U.S. Supreme Court many years ago. By its terms, and as expressly stated in the PEIS, the analysis of marine mammal impacts is purposely designed to be inaccurate and to evaluate the worst possible consequences that could hypothetically result from unmitigated seismic surveying. Indeed, it is hard to imagine an analysis that presents a scenario worse than the hundreds of thousands of incidental takings that are erroneously predicted by the PEIS. The PEIS's analysis of marine mammal effects is plainly not credible, it evaluates effects that, by BOEM's admission, will not occur, and, therefore, it is "unworthy of belief." The PEIS's assessment of marine mammal impacts unlawfully applies a "worst case" analysis and does not comply with NEPA or currently applicable CEQ regulations (40 C.F.R. § 1502.22).

2. The PEIS does not present an accurate scientific analysis

An EIS must rely upon "high quality" information and "accurate scientific analysis." 40 C.F.R. § 1500.1(b); *Conservation Nw. v. Rey*, 674 F. Supp. 2d 1232, 1249 (W.D. Wash. 2009); *Envtl. Def. v. U.S. Army Corps of Eng'rs*, 515 F. Supp. 2d 69, 78 (D.D.C. 2007) ("Accurate scientific analysis [is] essential to implementing NEPA."). It also must have "professional integrity, including scientific integrity" and may not rely on "incorrect assumptions or data" or "highly speculative harms" that "distort[] the decisionmaking process." *See Theodore Roosevelt Conservation P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010); 40 C.F.R. § 1502.24; 73 Fed. Reg. 61,292, 61,299 (Oct. 15, 2008) (CEQ regulations require "high quality" information and "scientific integrity"); *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005); *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005) (internal citations omitted).[5] To be sure, courts have invalided EISs that did not meet these standards, that were based on "stale scientific evidence . . . and false assumptions," or that failed to disclose the "potential weakness" of relied-upon modeling. *See, e.g., Seattle Audubon Soc'y v. Espy*, 998 F.2d 699, 704 (9th Cir. 1998); *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 897 (9th Cir. 2007) (citations omitted).

Respectfully, the PEIS fails to satisfy any of these important NEPA principles. An analysis that, by the agency's admission, overestimates take and relies upon incorrect assumptions, is, by definition, "inaccurate." Moreover, the PEIS's analysis of marine mammal impacts is, at best, "highly speculative" because it is based on scenarios and assumptions that will not occur.

[5] *See also CBD v. BLM*, 937 F. Supp. 2d 1140, 1155 (N.D. Cal. 2013) (principle that reasonably foreseeable environmental effects may not include "highly speculative harms" is equally applicable to direct and indirect effects).

3. The conclusions of the PEIS fail to consider, and are contrary to, the MMPA

The PEIS's assessment of marine mammal impacts is directly contrary to the MMPA. BOEM has defined the proposed action to include only those activities that have first received incidental take authorizations under the MMPA. *See* PEIS at 1-14, 1-25. As a prerequisite to incidental take authorization, the MMPA requires the permitting agency to find that the authorized take will have a "negligible impact" on marine mammals. 16 U.S.C. § 1371(a)(5)(A), (D). Accordingly, by definition, the proposed action analyzed in the PEIS should include only those seismic activities causing incidental take at levels that NMFS has expressly determined result in a "negligible impact" to marine mammal stocks. However, in sharp contrast, the PEIS concludes that the impacts of airguns on marine mammals under the proposed action are "moderate." PEIS at Table 2-4. By concluding that "moderate" impacts will result from seismic operations, BOEM has incorrectly analyzed the proposed action that is defined in the PEIS. Moreover, this discrepancy highlights the significant flaws that result from the PEIS's erroneous analysis of marine mammal impacts.[6] BOEM must analyze the effects of the action it has proposed, which includes offshore seismic operations that will receive incidental take authorizations under the MMPA and, by definition, will have no more than a negligible impact on marine mammal stocks. Based on 40 years of experience and recent scientific research and observational data, BOEM should find in the ROD that the impacts of seismic exploration are indeed negligible.

B. Certain Mitigation Measures Recommended in the PEIS Are Unsupported and Unreasonable

The record demonstrates that the scope of mitigation measures applied to offshore operations in the Gulf of Mexico is already more than adequate to protect marine mammals and sea turtles in a manner consistent with federal laws.[7] Despite this record, the PEIS recommends

[6] The PEIS's "moderate" impact finding is also factually inconsistent. "Moderate" impacts are defined in the PEIS as "detectable, short-term, extensive, and severe; or … detectable, short-term or long-lasting, localized, and severe; or … detectable, long-lasting, extensive or localized, but less than severe." PEIS at x. Accordingly, a "moderate" seismic impact must be either "long-lasting" or "severe." However, insofar as we are aware, no seismic activities that have received MMPA incidental take authorizations have caused impacts amounting to anything more than temporary changes in behavior, without any known injury, mortality, or other adverse consequence to any marine mammal species or stocks. *See supra* note 3.

[7] *See supra* note 3; *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) ("[I]t is unlikely that the

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certain mitigation measures that have never been required for offshore exploratory operations, and that are more stringent (and less supported) than the measures that have already been successfully implemented. The unprecedented measures recommended in the PEIS are a direct result of BOEM's flawed impact assessments. For example, as described above, the PEIS creates a hypothetical worst case scenario for marine mammal impacts, determines that the projected adverse effects in that scenario will be substantial, and then recommends mitigation measures to address those supposed effects. However, because the adverse effects identified in the PEIS are inaccurate and unrealistic, the mitigation measures intended to address those effects are similarly flawed and without any factual or scientific support.

The mitigation measures that particularly concern IAGC are addressed in detail below. Without question, these measures, if implemented, will have substantial adverse effects on offshore geophysical operations. These measures will result in increased survey duration, which, in turn, can increase the potential exposure of marine mammals to seismic-related effects.[8] We strongly urge BOEM to reconsider these mitigation measures as it prepares the ROD.[9]

1. Dolphin shutdowns

The PEIS recommends a mitigation measure calling for the shutdown of operations if a dolphin enters the acoustic exclusion zone unless the dolphin is determined by the observer to be

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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, 14789 (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.").

[8] 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.

[9] The effects analysis contained in NMFS's associated biological opinion suffers from the same flaws as the PEIS's effects analysis. In addition, the terms and conditions stated in the biological opinion (which mitigate the inaccurate effects conclusions) lack a rational basis for the reasons stated in this letter with respect to the PEIS's corresponding mitigation measures. IAGC requests that BOEM work with NMFS to similarly reconsider and modify the biological opinion's terms and conditions.

voluntarily approaching the vessel. PEIS at 2-11.[10] This proposed measure is contrary to the best available science, impractical, arbitrary, and unsupported for at least the following reasons.

First, dolphins are mid- to high-frequency specialists and, therefore, insensitive to the low frequency impulse sounds emitted by seismic operations. The E&P Sound and Marine Life Joint Industry Program has supported research to study the effects of multiple airgun pulses in odontocetes and, specifically, to study whether bottlenose dolphin exposure to airgun impulses results in temporary threshold shift ("TTS").[11] As the public abstract from the study explains, "subjects participated in over 180 exposure sessions with no significant TTS observed at any test frequency, for any combinations of range, volume or pressure during behavioral tests." [12] Even at ranges as close as 3.9 m and with the air gun operating at 150 in^3 and 2000 psi, resulting in cumulative Sound Exposure Levels of 189-195 dB re 1μPa^2s, the impulses did not result in detectable TTS in any dolphin tested. As a result of the relative low-frequency content of airgun impulses compared to the relative high-frequency hearing ability of dolphins, no injuries or significant behavioral responses were observed in this study.[13] Industry observations corroborate this scientific evidence. For example, dolphins are frequently observed by personnel on seismic vessels to approach the vessels during operations to bow-ride and chase towed equipment – a direct indication of insensitivity to seismic sound generation. PSO observation reports indicate that there is no statistically significant difference between the frequency of dolphin sightings and

[10] "Voluntary approach" is defined as "a clear and purposeful approach toward the vessel by delphinid(s) with a speed and vector that indicates that the delphinid(s) is approaching the vessel and remains near the vessel or towed equipment." PEIS at 2-11.

[11] James J. Finneran et al., *Final Report* (2013). TTS in odontocetes in response to multiple airgun impulses. (IAGC understands that a copy of this Final Report has been furnished by the author to NMFS).

[12] C.E. Schlundt et al., *Auditory Effects of Multiple Impulses from a Seismic Airgun on Bottlenose Dolphins*, presentation at the Effects of Noise on Aquatic Life Third International Conference, Budapest, Hungary (Aug. 11-16, 2013) (emphasis added). The results of this study also are useful to support inclusion of frequency weighting in updated acoustic criteria.

[13] In a 2011 Programmatic EIS, the National Science Foundation recognized that "[t]here has been no specific documentation that TTS occurs for marine mammals exposed to sequences of air-gun pulses during operational seismic surveys." Programmatic EIS/OEIS for NSF-Funded & USGS Marine Seismic Research, at 3-133 (June 2011), http://www.nsf.gov/geo/oce/envcomp/usgs-nsf-marine-seismic-research/nsf-usgs-final-eis-oeis_3june2011.pdf (recognizing 180 dB re 1 uPa (rms) criterion for cetaceans "is actually probably quite precautionary, i.e., lower than necessary to avoid TTS at least for delphinids, belugas and similar species").

acoustic detections during seismic operations when the source is active or silent. *See* Attachment A.[14]

Second, even if there were scientific justification for the proposed dolphin shutdown mitigation measure (which there is not), implementation of the measure is impractical. We are aware of no mitigation measures applicable to offshore exploration activities in which an observer is required to subjectively determine the intent of a marine mammal. Determining marine mammal intent from great distances is very difficult for experienced marine mammal biologists in staged scientific experiments, let alone for observers who will be attempting to determine dolphin intent over vast distances in the ocean environment. Based on observation reports, PSOs will be unable to confidently assess animal behavior or "intentions" because they cannot accurately determine species within the expanded exclusion zone.[15] The result is that observers will likely, out of caution, call for shutdowns in almost all instances where dolphins are observed within the exclusion zone.

Third, in areas of high-density dolphin populations, such as the Atlantic Ocean and the Gulf of Mexico, shutdown requirements for a species that enjoys bow-riding and approaching vessels could effectively bring all seismic activity to a halt. Implementation of this proposed measure will substantially increase the number of shutdowns and delays in ramp-ups, which will result in much longer surveys and significantly increased costs with no environmental benefit. *See* Barkaszi, *supra*, note 7, at 1 (75% of delays in ramp-ups due to presence of protected species in exclusion zone during 30 minutes prior to ramp-up were due to dolphins).

Fourth, the proposed measure is without precedent. Under Joint NTL No. 2012-G02 (and previously NTL No. 2007-G02), BOEM required seismic operators in the Gulf of Mexico to shut down for any whale observed in the exclusion zone. BOEM defined "whales" as all marine mammals except dolphins and manatees. In the June 2013 settlement of litigation challenging BOEM's permitting of seismic activity in the Gulf of Mexico, the U.S. District Court for the Eastern District of Louisiana extended the shutdown requirements to manatees. In short, no

[14] *See also* A. MacGillivray et al., *Marine Mammal Audibility of Selected Shallow-Water Survey Sources*, J. Acoustical Soc'y of Am. 135(1) (Jan. 2014).

[15] *See* Attachment A. It is well known that different species will exhibit different behaviors. For example, Risso's dolphins generally avoid vessels and rarely bow-ride, rough-toothed dolphins generally avoid vessels but do bow-ride, and common dolphins are avid bow-riders. *See* K. Wynn & M. Schwartz, *Guide to Marine Mammals and Turtles of the U.S. Atlantic and Gulf of Mexico* (2009).

dolphin shutdown provision, as recommended in the PEIS, has ever been required by any federal agency.[16]

Finally, there is no legal basis for the proposed dolphin shutdown measure. Under the MMPA, mitigation measures attached to incidental take authorizations must address the reduction of incidental take. *See* 16 U.S.C. §§ 1371(a)(5)(A), (a)(5)(D); 50 C.F.R. § 216.104(a)(13). However, as set forth above, there is no scientific evidence demonstrating that active acoustic seismic surveys result in any incidental takes of dolphins. Accordingly, there is no statutory basis for recommending the dolphin shutdown mitigation measure.

In sum, the proposed dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support. IAGC respectfully requests that BOEM, in its ROD, expressly find that this recommended measure is unsupported and unnecessary, and exclude the measure from the ROD's recommended mitigation measures. The ROD should also affirmatively clarify that shutdown is not required for dolphins within the exclusion zone in all circumstances, regardless of whether dolphins are exhibiting bow-riding behavior or any other behavior.

2. 40 km buffer zone between concurrent surveys[17]

In Alternative B, BOEM recommends an expanded 40 km buffer zone between concurrent seismic surveys. The rationale for this expanded buffer is "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is below Level B thresholds and approaching ambient levels." PEIS at 2-37. The agency's stated scientific basis for this proposed measure is, at best, ambiguous: "New information suggests that, in some circumstances, airgun noise can be detected at great distances from the sound source, such as across ocean basins (Nieukirk et al., 2012), yet it is unknown if detection of sound at these distances has any effect on marine mammals or other marine species." PEIS at 2-38. No other scientific evidence, no published studies, and no other rationale are provided for this proposed measure, which is given a half-page explanation in Appendix C. In addition, this proposed

[16] For example, in the Gulf of Mexico, the average shutdown lasts for 58 minutes, *see, e.g.*, Barkaszi, *supra*, note 7, which the PEIS would extend by at least 30 minutes by increasing the visual monitoring period following a shutdown from 30 to 60 minutes. Multiplying a rough 1.5-hour average shutdown by 26,000 shutdowns would yield roughly 39,000 hours of shutdowns or approximately 1625 days. Because the typical seismic survey operation costs roughly $1.5 million per day, the total potential costs arising from the PEIS's assumptions equal a staggering $2.5 billion.

[17] This measure, as well as the 60-minute "all clear" period addressed below, were not addressed anywhere in the DPEIS. This is the first opportunity the regulatory community has had to comment on these measures.

measure is not mentioned at all in the biological opinion.

In contrast, the best available scientific information supports a buffer zone, if any, of 17.5 km, which is the standard separation distance maintained by seismic operators. The modeling performed by JASCO (*see* PEIS at Appx. D) demonstrates that the typical exposure radius for the 160 dB threshold is 10 km. The largest observed exposure radius was 15 km, but this occurred in less than 10% of the modeled cases. The lowest observed exposure radius was 5 km. Current technology has enabled many operators to decrease typical exposure radii to 7 to 9 km.

A buffer zone that more than doubles the highest possible exposure radii is clearly not reasonable or scientifically supportable – i.e., it is arbitrary. Moreover, the PEIS's reference to airgun noise detections at "great distances" does not support the proposed buffer zone because those detections occur (if at all) at very low levels that are well below the thresholds NMFS has established for Level B harassment.

The recommendations and analyses in an EIS must be "accurate," not speculative, and grounded in "high quality" scientific information. *See supra* Section II.A.2. The recommended 40 km buffer zone fails all of these standards. There is literally no scientific information that supports this measure, and, as explained above, the best available information contradicts it. To our knowledge, no buffer zones even approaching this magnitude have ever been required as a condition of offshore seismic authorizations.[18] To make matters worse, BOEM admits in the PEIS that implementation of the 40 km buffer would result in no additional benefits to protected species. PEIS at xxiv (40 km buffer "would not be expected to change any impact ratings"). Consequently, BOEM must decline to adopt the 40 km buffer zone mitigation measure in the ROD and, instead, recommend either no buffer zone, as recommended in Alternative A, or, alternatively, a 17.5 km buffer zone, consistent with standard practice.

3. 60-minute "all clear" period

The PEIS recommends that monitoring of the exclusion zone shall "begin no less than 60 min prior to start-up" and that restarting of equipment after a shutdown "may only occur following confirmation that the exclusion zone is clear of all marine mammals and sea turtles for 60 min." PEIS at C-29. However, again, BOEM has provided no factual or scientific support for this measure, nor is any meaningful supporting information provided in the biological opinion. To our knowledge, a 60-minute "all clear" period has never been required as a condition of any offshore seismic authorization in the United States. In fact, the routine and proven-to-be-effective practice is to require a 30-minute "all clear" period – for marine mammals

[18] *See, e.g.*, 78 Fed. Reg. 35,364, 35,423 (June 12, 2014) (vessel spacing of 24 km required to avoid any effects of multiple surveys on migrating or foraging walruses).

generally and for ESA-listed species.[19] There is no available information suggesting that the standard practice has not been effective and, to the contrary, all available information demonstrates that the standard practice has been very successful in protecting marine mammals.

Expanding the standard 30-minute "all clear" period to 60 minutes will substantially increase the duration and cost of seismic surveys, which, in turn, increases safety and environmental risks. Extrapolated over all surveys that will be performed over a five-year period, the increased time and expenses resulting from this mitigation measure alone will be dramatic. Increased survey time will also increase the amount of time that protected species are exposed to the potential effects associated with the presence of vessels. The PEIS contains no analysis of the increased operational or environmental effects associated with the 60-minute "all clear" period, compared to the standard 30-minute period (and sometimes 15-minute period) that has successfully been implemented in all offshore seismic operations to date.[20] Accordingly, in the ROD, BOEM should decline to adopt the 60-minute period as unsupported and unprecedented and, instead, adopt the standard 30-minute period.

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[19] *See Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 79 Fed. Reg. 13,626, 13,636-37 (Mar. 11, 2014) (requiring 30-minute observation period before startup and after sightings of killer and ESA-listed beluga whales and large odontocetes, but only 15-minute period after sightings of pinnipeds and small odontocetes); *Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 78 Fed. Reg. 12,720, 12,732-33 (Feb. 25, 2013) (providing same requirements, and specifying that the shorter 15-minute clearance period applies to harbor porpoises); *Issuance of IHA to TGS-Nopec for Seismic Survey in Chukchi Sea*, 78 Fed. Reg. 51,147, 51,154, 51,160 (Aug. 20, 2013) (same); *Issuance of IHA to Shell and WesternGeco for Seismic Surveys in the Beaufort and Chukchi Seas*, 73 Fed. Reg. 66,106, 66,135-36 (Nov. 6, 2008) (requiring 30-minute observation period before ramp-up and 15- or 30-minute delay of ramp-up for sightings of small odontocetes and pinnipeds, or baleen whales and large odontocetes, including ESA-listed species, respectively); *Issuance of ITR for Oil and Gas Activity in Chukchi Sea*, 78 Fed. Reg. 35,364, 35,424, 35,425 (June 12, 2013) (requiring monitoring period of 30 minutes for walruses and ESA-listed polar bears before startup and after sighting); *Issuance of ITR for Oil and Gas Activity in Beaufort Sea*, 76 Fed. Reg. 47,010, 47,052 (Aug. 3, 2011) (same).

[20] Pre-ramp-up and post-shutdown, the vessel is still moving and likely would move 8-9 km at 3-5 knots in a 60-minute period, bypassing any established exclusion zone several times. *See* 79 Fed. Reg. at 14,797 (NMFS stating that ramp-up is unnecessary "[b]ecause the vessel has transited away from the vicinity of the original sighting during the 8-minute period, implementing ramp-up procedures for the full array after an extended power-down (i.e. transiting for an additional 35 minutes from the location of initial sighting) would not meaningfully increase the effectiveness of observing marine mammals approaching or entering the exclusion zone for the full source level and would not further minimize the potential for take").

4. Exclusion zones greater than 500 meters

The PEIS explains that exclusion zones "shall be calculated independently and shall be based on the configuration of the array and the ambient acoustic environment, but shall not have a radius of less than 500 m…." PEIS at 2-10. BOEM's suggested approach for exclusion zones will require 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 Gulf of Mexico. *See supra* note 3. The expanded exclusion zones are especially concerning because they will ultimately be dictated by the hearing group with the largest modeled radii once new group-specific acoustic criteria are implemented. High-frequency cetaceans, particularly delphinids, will therefore determine the size of the exclusion zone in most instances. Since BOEM is applying shutdown requirements to delphinids, and, as described above, because the exception to those requirements will rarely be applied in practice, this will result in numerous shutdowns due to the observation of delphinids within the large exclusion zone.

Moreover, these shutdowns will serve no environmental benefit because, as explained above, the best available science and information demonstrates that delphinids are unaffected by the lower frequency sounds produced by seismic operations. Exclusion zones should be based on the best available science and modeling and, if that modeling 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 minimum 500 m exclusion zone requirement is not applied, IAGC would support the incorporation of power-down procedures to mitigate any potential effects. Power-down procedures acceptable to IAGC are a modified version of the procedures described at 79 Fed. Reg. 14,780, 14,797 (Mar. 17, 2014) ("Langseth IHA").[21]

5. Turtle shutdowns

The PEIS applies exclusion zone shutdown criteria equally to marine mammals and sea turtles. However, the PEIS does not meaningfully address the fact that sea turtles are much more difficult to observe than marine mammals. Sea turtles can be reasonably observed at distances of 100 m to 300 m from a vessel, but it is very unlikely that sea turtles can be reliably observed at greater distances. *See* Attachment A (most turtle observations within 100 m). In addition, if a sea turtle is observed within the exclusion zone (triggering a shutdown of airguns), assuming the vessel is moving at 3 to 5 knots, the observed turtle will be outside of the exclusion zone within approximately 15 minutes because sea turtles swim very slowly compared to marine mammals.

[21] Specifically, IAGC 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.

In such circumstances, a 60-minute "all clear" requirement would plainly be unnecessary (setting aside the fact that it is unnecessary in all circumstances).

Because turtles are difficult to observe at distances greater than 300 m, application of the exclusion zone shutdown to sea turtles is infeasible and will very likely result in unwarranted shutdowns because observers, acting out of precaution, will call for shutdowns when anything resembling a sea turtle is observed. There is also no existing scientific basis for the proposed turtle shutdown requirement, and none is provided in the PEIS. *See supra* note 3. The ROD should therefore recommend a reduced exclusion zone for sea turtles that is feasible and practical. Such a reduction is also consistent with the best available science, which indicates that sea turtles are not as sensitive to sound as marine mammal species. *See* PEIS, Appx. I. IAGC recommends a 300 m exclusion zone for all sea turtle species.

6. Expanded NARW time-area closure and DMAs[22]

As part of Alternative B, BOEM recommends an expansion of the time-area closure applicable to North Atlantic Right Whales ("NARW") to a continuous 37 km-wide zone extending from Delaware Bay to the southern limit of the programmatic area. PEIS at C-32. It appears that BOEM intends this closure to be applied to <u>any</u> sound produced by seismic vessels such that no portion of a vessel's ensonification zone may enter the closed area. The result is that the proposed NARW time-area closure will be much larger than what is described in the PEIS. Because NARWs are primarily threatened by ship strikes and fishing entanglement – not seismic sound – BOEM should clarify in its ROD that the NARW time-area closure applies to the <u>presence of vessels, not a vessel's ensonified zone.</u> BOEM should also clarify in its ROD that vessels may transit through the closure area when seismic equipment is not active.

In addition, the PEIS includes time-area closure measures in areas designated as Dynamic Management Areas ("DMAs") under NMFS's ship-strike reduction regulations. *See* PEIS at C-16. These measures are very problematic, and unwarranted, for at least the following reasons:

- DMAs were created to address ship strike situations, which involve vessels traveling at high rates of speed (12-20 knots). Indeed, NMFS has indicated that vessel speeds of less than 10 knots are sufficiently protective. *See* 78 Fed. Reg. 73,726 (Dec. 9, 2013). BOEM's proposed application of DMAs to seismic operations is therefore contrary to both the original purpose of DMAs (to address ship strikes, not potential acoustic impacts) and NMFS's recent finding. Moreover, the proposed application to seismic vessels is particularly arbitrary because BOEM intends to broadly apply it to the vessel's 160 dB ensonified zone.

[22] The DMA-related measures were also not included for public review in the DPEIS.

- Nowhere has either BOEM or NMFS evaluated the operational practicability or effectiveness of applying DMAs to seismic operations.

- Unlike NMFS's approach to DMAs, BOEM appears to propose to make seismic industry compliance with DMAs mandatory. There is no basis for such a measure, especially given that NMFS has taken no such step for the vessels that DMAs were intended to address.

- DMAs are unpredictable and the identification of DMAs on short notice will compromise the implementation of seismic survey operations that have been carefully planned over a substantial period of time, with no corresponding benefit.

7. Vessel strike avoidance

The PEIS's recommended vessel strike avoidance measures for ESA-listed whales present serious operational and safety problems, and must be modified. Specifically, the PEIS recommends that if a vessel comes within 100 m of an ESA-listed whale species, it "must reduce speed and shift the engine to neutral, and must not engage the engines until the whale(s) has moved outside of the vessel's path and the minimum separation distance has been established." PEIS at C-9. Respectfully, this measure fails to consider that seismic vessels are significantly different than typical vessels due to the substantial amount of highly specialized equipment that is towed behind a seismic vessel. Operationally, a seismic vessel must maintain forward motion to sustain the equipment spread or the whole system will collapse. The consequence of immediately shifting the engine into neutral could be significant equipment damage in the tens of millions of dollars, and weeks of vessel downtime. As a practical matter, a seismic vessel moving at 3 to 5 knots is very unlikely to strike an ESA-listed marine mammal. In the event of a sighting of an ESA-listed whale within 100 m of the vessel, the vessel could slow (to no less than 3 knots) and turn gently away from the animal, which would both avoid a collision and lessen the risk of damage to seismic equipment. In its ROD, BOEM must decline to adopt the vessel strike avoidance mitigation measure.

8. Passive acoustic monitoring

Under Alternative B, BOEM would require the use of Passive Acoustic Monitoring ("PAM") as part of the Seismic Airgun Survey Protocol. IAGC encourages consideration of PAM during periods of low visibility in its 2011 best practices guidelines. PAM is one of several monitoring techniques that compliments (rather than replaces) traditional visual monitoring. However, commercially available PAM systems can be highly variable, the equipment is unreliable, and PAM's utility as a secondary monitoring source during daylight observations has not been proven. Overall performance and capabilities of PAM are highly dependent on factors such as technical specification of equipment, operational setting, availability of experienced and trained personnel, and the species of marine mammals present in a given area. Mandatory use of PAM will increase survey cost, require the placement of more

personnel on vessels (i.e., four dedicated PAM observers onboard), and increase entanglement risk due to more gear being towed in the water.

IAGC therefore urges BOEM to either make the use of PAM optional, as recommended in Alternative A, or require PAM only for operations at night and in periods of low visibility.[23] This is reasonable given BOEM's admission that "it is difficult to quantify any difference in impact level [of Alternative B] relative to Alternative A." PEIS at 2-40; *see also* PEIS at xxiv ("The degree of improvement [due to making PAM mandatory] has not been estimated but would not be expected to change any impact ratings."). IAGC encourages BOEM to use risk-based mitigation and monitoring measures based on the best available information and promote development of technologies that can best accomplish effective detection and monitoring of marine mammals.

9. National standards for protected species observers

The PEIS and biological opinion purport to adopt the recommendations described 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) ("Observer Standards"). However, this document was never released for public review and comment and was not referenced in the PEIS. Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, 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. 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 (attached) more specifically addresses our concerns with the Observer Standards and offers constructive solutions. We appreciate BOEM's consideration of our concerns.

C. The Adaptive Management Provisions Must Be Clarified and Improved

Although the PEIS states that BOEM will consider future data regarding the efficacy of mitigation measures and will adjust requirements for individual surveys, the PEIS appears to establish minimum standards that can only become more stringent through adaptive management. *See* PEIS at 2-39 (adaptive management at the site-specific level "would analyze the best available information and apply additional mitigation, depending on the site-specific proposed action" (emphasis added)); *see also* PEIS at 1-27 to 1-28 (examples largely focus on

[23] NMFS's biological opinion (page 308) only requires PAM for ramp-up at night or in periods of low visibility.

"additional" measures). As just one example, BOEM has established 500 m as a minimum exclusion zone and indicates that it will not set exclusion zones less than 500 m even if a smaller zone is supported by data and modeling.

The ROD must clarify that BOEM will implement "adaptive management" in the true sense of the term – i.e., site-specific requirements may be adjusted to be either less restrictive or more restrictive based on the project-specific information, the species present in the project area, the assessment of relevant risks, and the best available information.

III. CONCLUSION

IAGC appreciates this opportunity to comment on the PEIS. Although we support BOEM's plan to authorize exploratory activities on the Atlantic OCS, there are several aspects of the PEIS that are not supported by science or by law, or are otherwise infeasible. Of the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested in these comments are incorporated into the ROD. We appreciate your consideration of our comments and sincerely hope that BOEM will prepare a ROD that addresses the concerns set forth above. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Karen St. John
Group Vice President - Environment

International Association of Geophysical Contractors

cc: Mr. Walter Cruickshank (Walter.Cruickshank@boem.gov)
Ms. Jill Lewandowski (Jill.Lewandowski@boem.gov)

ATTACHMENT D

ATTACHMENT D

PSO Data 2013 - March 2015: Dolphin Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 33% of total vessel activity days in the GOM since 2013.[1] Data prior to 2013 is not included in this analysis because PAM was not used consistently until this point.***		
Species Identification		
% of Unidentified Dolphin	85%	In many reports, PSOs contribute sea state, distance, or the sun's glare as a key factor for not being able to identify species. The significant number of acoustic detections without confirmed species identification is also a main contributor.
% of Identified Dolphin	15%	
PAM		
% of PAM Detections	78%	PAM detections accounted for a majority of the total dolphin sightings and detection reports. However, only 1% of the acoustic detections successfully identified a specific dolphin species. Visual corroboration was necessary to identity the species about 25% of the time.
Source Activity Comparison		
% of sightings and/or acoustic detections – source active	55%	The frequency of sightings and acoustic detections are almost proportional when the source is active or silent.
% of sightings and/or acoustic detections –source silent	45%	
Animal Behavior		
% of sightings when bow-riding was observed (active or silent)	6%	The data indicates an estimated 2% variance in observed bow-riding when the source was active versus when the source was silent. Fewer PSO observations when the source is silent could account for some variance. The values are close enough to conclude the frequency of animal engagement with the vessel is not specific to source status.
Average Distance of Animal at Initial Sighting	570m	Initial sightings and detections are made most often at a distance between 500m and 800m.

PSO Data 2013 - March 2015: Turtle Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 33% of total vessel activity days in the GOM since 2013.[2] Data is taken from 2013 to be consistent with Dolphin sighting period.***		
Total Sightings	410	410 sea turtles were observed overall.
Average Distance of Animal at Initial Sighting	53m	Analysis of turtle sightings indicates observations are typically within 100m. It is often difficult to ascertain if an object in the water is a turtle or floating debris at further ranges.

[1] Estimated calculation based on level of activity from January 2013 to March 2015 from IHS SeismicBase Vessel Search Database.

[2] *Id.*

EXHIBIT E

August 28, 2015

VIA EMAIL (ITP.Laws@NOAA.gov)

Jolie Harrison
Chief, Permits and Conservation Division Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Re: Comments on Incidental Harassment Authorization Applications for the Incidental Taking of Marine Mammals During Geophysical Surveys in the Atlantic Ocean

Dear Ms. Harrison:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC"), the American Petroleum Institute ("API"), and the National Ocean Industries Association ("NOIA") (collectively, the "Associations") in response to the National Marine Fisheries Service's ("NMFS") request for comments on four pending Incidental Harassment Authorization ("IHA") applications for geophysical surveys in the outer continental shelf ("OCS") of the Atlantic Ocean. We appreciate this opportunity to preliminarily comment on the pending applications, and we strongly support geophysical surveying in the Mid- and South Atlantic OCS, which furthers our common interest in the safe and responsible development of domestic oil and gas reserves.

I. THE ASSOCIATIONS

IAGC is the international trade association representing geophysical services companies that support and provide critical data to the oil and natural gas industry. IAGC members (including companies engaged in geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, and associated services and product providers) play an integral role in the successful exploration and development of offshore hydrocarbon resources through the acquisition and processing of geophysical data. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and all three of the seismic survey IHA applicants are IAGC members.

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 U.S. OCS. The NOIA membership comprises more than 325 companies engaged in a variety of business activities, including seismic surveying, production, drilling, engineering, marine and air transport, offshore construction, equipment manufacture and supply, telecommunications, finance and insurance, and renewable energy.

II. COMMENTS

A. Approval of IHA applications for Atlantic surveys is consistent with the MMPA and furthers Congressional directives to develop oil and gas reserves in the OCS.

The Marine Mammal Protection Act ("MMPA"), 16 U.S.C. §§ 1361-1407, provides mechanisms for the authorization of the incidental taking of small numbers of marine mammals. 16 U.S.C. § 1371(a)(5)(A)(i); 50 C.F.R. § 216.107. To issue an incidental take authorization, NMFS must find that the proposed activity (i) is limited to a "specified geographical region," (ii) would result in the incidental take of "small numbers" of marine mammals, and (iii) have no more than a "negligible impact" on a marine mammal species or stock. 16 U.S.C. § 1371(a)(5)(A). NMFS has a long and successful history of issuing such authorizations for seismic surveys in the Beaufort and Chukchi Seas, and in Cook Inlet, Alaska.

NMFS's authorization of marine mammal take incidental to exploratory activities in the Atlantic OCS is consistent with the Outer Continental Shelf Lands Act ("OCSLA"), which mandates the "expeditious and orderly development" of the OCS "subject to environmental safeguards," such as those provided under the MMPA. 43 U.S.C. § 1332(3). The U.S. Bureau of Ocean Energy Management ("BOEM") currently estimates that the Mid- and South Atlantic OCS holds at least 4.72 billion barrels of oil and 37.51 trillion cubic feet of natural gas.[1] Although these estimates are impressive, it is widely believed that modern seismic imaging—the only feasible technology that accurately creates a subsurface image before a well is drilled—will aid in better locating and dissecting prospective areas for exploration and provide more realistic estimates of the potential resource. The pending geophysical survey proposals will facilitate the safe and orderly development of oil and gas reserves in the Mid- and South Atlantic OCS.

[1] *See* http://www.boem.gov/Assessment-of-Oil-and-Gas-Resources-2014-Update/.

Seismic modeling not only helps to delineate reserves, it also significantly reduces environmental risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area. This reduces the overall environmental impact of oil and gas development by limiting the footprint of exploration. Because survey activities are temporary and transitory, they are the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

In addition, more than four decades of worldwide seismic surveying and scientific research indicate that the risk of physical injury to marine life from seismic survey activities is extremely low. Currently, there is no scientific evidence demonstrating biologically significant negative impacts to marine life from seismic surveying. As stated by BOEM in its August 22, 2014, *Science Note*:

> 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.

http://www.boem.gov/BOEM-Science-Note-August-2014/.

Finally, it bears mention that IAGC, API, and the oil and gas industry fund independent research to further our understanding of the potential effects of seismic surveys on marine animals including mammals. This helps to reduce uncertainties about the possible effects of seismic surveys. Some of this research, in addition to other frequently cited references regarding the effects of sound on marine life, is reviewed in the annotated bibliography included as Attachment A to the April 29, 2015 comment letter of IAGC, API, and NOIA (which is included in the Appendix attached hereto).

B. The best available science demonstrates that seismic surveys do not cause Level A harassment and, therefore, authorization of Level A harassment is not required.

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. In addition, NMFS is required to base marine mammal incidental take authorizations on the "best scientific evidence available." 50 C.F.R. § 216.102(a). We are aware of no scientific evidence demonstrating that seismic activities have resulted in the injury of marine mammals. To the contrary, the history of incidental take authorizations for offshore seismic activities shows that seismic operations have negligible impacts to individual marine mammals and to marine

mammal stocks, and that levels of actual incidental take (Level B) are far smaller than even the most balanced pre-operation estimates of incidental take.[2]

[2] *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/ ("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 (WPA); *id*. at 4-710 (v.2), 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 (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 ("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 ("[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 ").

Given this well-established scientific record, the Associations firmly take the position that the authorization of Level A harassment incidental to seismic surveys is not consistent with the best available science and, therefore, is not warranted or appropriate. In this context, the Associations note that one of the four Atlantic IHA applications requests authorization for Level A harassment. For the reasons stated above and below, the Associations disagree with the projections of Level A harassment set forth in that application.

As a general matter, the Level A take estimates described in the application improperly equate projected received sound levels to take. Potential exposure to certain sound levels does not necessitate that injury may occur. For example, the application estimates 9,017 Level A takes of bottlenose dolphins based only on potential exposures. However, even if 9,017 exposures to 180 dB SPL rms occurs, the best available science demonstrates that temporary threshold shift ("TTS") will not occur to bottlenose dolphins at this level of exposure. *See infra* § II.C.1. Moreover, it is well-accepted that the assumption that exposure to 180 dB SPL rms causes injury to marine mammals is incorrect and contrary to the best available science.[3] NMFS is not bound by this outdated acoustic criteria and, instead, must determine the potential type and levels of take that are "reasonably likely" or "reasonably expected" to occur based on the best scientific evidence available. 50 C.F.R. §§ 216.102(a), 216.103.[4]

More specifically, the subject IHA application appears to contain a number of incorrect assumptions that contribute to incorrect estimates of Level A harassment. Some of these assumptions are as follows:

- The application does not take into account the fact that many, if not all, animals will react to sound and leave an area before they enter areas with sounds levels exceeding the threshold that NMFS assumes will result in Level A harassment. The models used in the application do not appear to incorporate animal behaviors, such as avoidance to "ramping up" sound sources, which would substantially reduce the

[3] *See* Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene, Jr., C.R., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack P.L. 2007. Marine mammal noise exposure criteria: Initial scientific recommendations. *Aquatic Mammals*, 33:411-521; Finneran, J.J., and Jenkins, A.K. 2012. Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis. San Diego, California: SPAWAR Systems Center Pacific.

[4] In fact, NMFS has used other criteria as the basis for recent MMPA incidental take authorizations. *See* 80 Fed. Reg. 46,112, 46,148-49 (Aug. 3, 2015); 80 Fed. Reg. 13,264, 13,280-81 (Mar. 13, 2015).

estimated number of exposures (which, in any event, do not equate to take, as described above).[5]

- The application assumes that Level A take will occur beyond 500 meters from the sound source, but does not propose to power down or shut down operations for detections beyond 500 meters. It is well-established that marine mammal observations can be made well past 500 meters and seismic operators have a longstanding history of successfully employing power down and shut down procedures for marine mammal observations beyond 500 meters and, thereby, avoiding exposure at levels that NMFS incorrectly assumes will result in Level A harassment.

- The application appears to make overly conservative assumptions in its source characterization, which result in abnormally large acoustic propagation ranges. In some cases, these assumed acoustic propagation ranges are more than double the size of the ranges calculated in the other two seismic survey applications, which increases the assumed affected area by a factor of four.[6]

Finally, except for very limited exceptions,[7] incidental take authorizations have been issued for seismic survey operations for only Level B harassment, not Level A harassment. The extensive record from these authorizations, including substantial monitoring documentation, demonstrates that commonly employed avoidance and mitigation measures (that are less stringent than those proposed in the pending applications) are effective in avoiding Level A harassment and minimizing the amount of Level B harassment. Again, we are aware of no information demonstrating that seismic survey operations have resulted in documented Level A harassment. Based on the extensive scientific record, multiple agency findings, and well-documented monitoring records, the Associations firmly take the position that (1) with the use of

[5] *See, e.g., Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 79 Fed. Reg. 13,626, 13,636-37 (Mar. 11, 2014); *Issuance of IHA to TGS-Nopec for Seismic Survey in Chukchi Sea*, 78 Fed. Reg. 51,147, 51,160 (Aug. 20, 2013).

[6] We note that the applicant may correct these, and other, assumptions by submitting a revised IHA application for NMFS's consideration. Such a revised application would appropriately request authorization for only Level B harassment and propose mitigation measures that effectively avoid Level A harassment.

[7] *See, e.g.*, 80 Fed. Reg. 40,016 (July 13, 2015) (SAExploration IHA for Beaufort Sea survey); 77 Fed. Reg. 65,060 (Oct. 24, 2012) (ION Geophysical IHA for Beaufort Sea and Chukchi Sea survey). In both of these instances, the applicant requested authorization for only Level B harassment, but NMFS nonetheless authorized Level A harassment in the IHA.

proper mitigation measures, seismic survey operations can and do avoid Level A harassment; and (2) the authorization of Level A take incidental to seismic survey operations is therefore not warranted or appropriate.

C. Mitigation programs are effective in limiting and preventing the incidental take of marine mammals.

The best available scientific data and information demonstrate that mitigation programs can effectively minimize and avoid the incidental take of marine mammals as a result of offshore geophysical survey operations. Insofar as we are aware, no seismic activities that have received MMPA incidental take authorizations have caused impacts beyond a temporary change in behavior and there are no known injuries, mortalities, or other adverse consequences to any marine mammal species or stocks.

The majority of IHA applications currently under consideration by NMFS incorporate some of the mitigation measures recommended in the preferred alternative of BOEM's Atlantic Geological and Geophysical Activities Programmatic Environmental Impact Statement ("PEIS").[8] The Associations commented in detail on these proposed measures. *See* Appendix. For the reasons stated in our previous comment letters, some of the measures proposed by BOEM are not consistent with the best available science and/or are unnecessarily overbroad. Notably, however, BOEM has stated that it will not apply those measures uniformly, but rather will apply certain mitigation measures to fit specific circumstances. We encourage NMFS to also apply only those mitigation measures that are appropriate for specific circumstances and that result in the least practicable adverse impact. Although the IHA applicants are free to voluntarily propose some of the mitigation measures recommended by BOEM, we restate below the reasons why some of those measures are either overly broad or not based on the best available science. We also adopt by reference our previous comments with respect to mitigation measures (*see* Appendix).

1. Exclusion zones

All of the IHA applicants commit to using exclusion zones to prevent marine mammal exposure to sound pressure levels of 180 dB re 1 µPa rms or more for cetaceans and 190 dB re 1 µPa rms for pinnipeds. Although the PEIS recommends a minimum exclusion zone of 500 m, exclusion zones should be based on the best available science and modeling, and if that modeling demonstrates that exclusion zones of less than 500 meters are warranted, then there is no basis for arbitrarily requiring a minimum exclusion zone of 500 m. This flexibility is consistent with both NMFS's and BOEM's commitments to adaptive management.

[8] *See* Record of Decision, BOEM PEIS, available at http://www.boem.gov/Record-of-Decision-Atlantic-G-G/. The full PEIS, including appendices, is available at http://www.boem.gov/BOEM-2014-001-v1/.

The applicants also commit to shutting down seismic arrays where marine mammals are detected in the exclusion zone. The PEIS contains one exception to its proposed mandatory shut down policy—for dolphins that voluntarily enter the exclusion zone. Although this measure is adopted by multiple IHA applicants, we would like to emphasize, for reasons stated in our previous comments, that any shutdown for dolphins that enter the exclusion zone is unwarranted. A recently published study that investigated whether bottlenose dolphin exposure to seismic air pulse at cumulative sound exposure levels of 185-196 dB re 1 μPa^2-s results in a noise-induced TTS found that, even at that level of exposure, there was no evidence of TTS.[9] Additionally, observation reports continue to indicate that there is no significant difference between the frequency of dolphin sightings and acoustic detections during seismic operations, whether the source is active or silent.[10] In sum, mandatory dolphin shutdown mitigation measures, even when the animal does not "voluntarily" enter the exclusion zone, would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support.

2. Buffer zones between concurrent surveys

Generally, the IHA applicants propose 40 km buffer zones between seismic operations (as recommended in the PEIS), and one applicant proposes a 60 km buffer zone between concurrent surveys. Consistent with our comments on the PEIS, we reiterate here that the best available scientific information does not support buffer zones of 40 km. This measure was not included in NMFS's Biological Opinion (associated with the PEIS), and BOEM has offered no evidence to support its underlying assumption that marine mammals would utilize the "corridor" that the separation requirement is designed to create. Indeed, in its Record of Decision, BOEM acknowledges "uncertainty about [the] effectiveness of this measure." Record of Decision at 6.

The IHA applicants are, of course, free to propose mitigation buffer zones that are appropriate for their specific surveys, and to the extent they propose the 40 km buffer zone recommended in the PEIS, they are agreeing to mitigation measures that go above and beyond what is necessary based upon the best available scientific information. The Associations also wish to clarify that they do not support the proposal for 60 km buffer zones, which clearly are not required based on the extensive scientific record. As stated in previous comments, the

[9] Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. Effects of multiple impulses from a seismic air gun on bottlenose dolphin hearing and behavior. 137 J. Acoust. Soc. Am. 1634-46 (April 2015).

[10] *See* Barkaszi, M.J., M. Butler, R. Compton, A. Unietis, and B. Bennet. 2012. Seismic survey mitigation measures and marine mammal observer reports. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2012-015. *See also* Attachment D to April 29, 2015 letter of IAGC, API, and NOIA (included in Appendix).

Associations recommend either no buffer zone or, alternatively, a 17.5 km buffer zone consistent with standard industry practice.

3. Mandatory "all clear" periods

All of the IHA applicants propose mandatory "all clear" periods, but two of the applicants propose a 30-minute window as opposed to the 60-minute "all clear" period proposed by BOEM in the PEIS. As a practical matter, expanding the standard 30-minute "all clear" period to 60 minutes would substantially increase the duration and cost of seismic surveys, which, in turn, increases safety and environmental risks. Increased survey time will also increase the amount of time that protected species are exposed to the potential effects associated with the presence of vessels.

Moreover, a mandatory 60-minute "all clear" period would be both novel and not supported by the best available science. To our knowledge, a 60-minute "all clear" period has never been required as a condition of any offshore seismic authorization in the United States. In fact, the routine and proven practice is to require a 30-minute or less "all clear" period for marine mammals.[11] There is no available information suggesting that the standard practice has not been effective and, to the contrary, all available information demonstrates that the standard practice has been very successful in protecting marine mammals. *See* footnotes 2 and 11. Mitigation measures required in an IHA must be supported by the best available science and limited to those that effect the "least practicable adverse" impact. A 60-minute "all clear" period is not supported

[11] Since the ROD was issued, additional MMPA incidental take authorizations that include 15- and 30-minute "all clear" periods have been proposed by NMFS. *See Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 79 Fed. Reg. 13,626, 13,636-37 (Mar. 11, 2014) (requiring 30-minute observation period before startup and after sightings of killer and ESA-listed beluga whales and large odontocetes, but only 15-minute period after sightings of pinnipeds and small odontocetes); *Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 78 Fed. Reg. 12,720, 12,732-33 (Feb. 25, 2013) (providing same requirements, and specifying that the shorter 15-minute clearance period applies to harbor porpoises); *Issuance of IHA to TGS-Nopec for Seismic Survey in Chukchi Sea*, 78 Fed. Reg. 51,147, 51,154, 51,160 (Aug. 20, 2013) (same); *Issuance of IHA to Shell and WesternGeco for Seismic Surveys in the Beaufort and Chukchi Seas*, 73 Fed. Reg. 66,106, 66,135-36 (Nov. 6, 2008) (requiring 30-minute observation period before ramp-up and 15- or 30-minute delay of ramp-up for sightings of small odontocetes and pinnipeds, or baleen whales and large odontocetes, including ESA-listed species, respectively); *Issuance of ITR for Oil and Gas Activity in Chukchi Sea*, 78 Fed. Reg. 35,364, 35,424, 35,425 (June 12, 2013) (requiring monitoring period of 30 minutes for walruses and ESA-listed polar bears before startup and after sighting); *Issuance of ITR for Oil and Gas Activity in Beaufort Sea*, 76 Fed. Reg. 47,010, 47,052 (Aug. 3, 2011) (same).

by the best available science and is not necessary to achieve the least practicable adverse impact.[12]

4. Vessel Strike Avoidance

In general, the pending IHA applications propose vessel strike avoidance measures that are more than adequate to effectively avoid vessel strikes. For example, the following measures are adopted in the majority of the pending IHA applications:

- Reducing speed to 10 knots or less when transiting across designated areas closed to active seismic operations for North Atlantic Right Whales ("NARW");
- Maintaining a 500 meter distance from any NARW and a 100 meter distance from any species listed under the Endangered Species Act ("ESA"); and
- Utilizing avoidance measures (e.g., vessel direction or speed alteration) if an ESA-listed species is seen within 100 m of the vessel.

The necessity of these proposed measures should be evaluated in the proper context. Seismic vessels are different than typical vessels due to the substantial amount of specialized equipment that they tow. Operationally, a seismic vessel must maintain forward motion to sustain the equipment spread. The consequence of immediately shifting the engine into neutral due to a marine mammal sighting could be significant equipment damage (potentially in the tens of millions of dollars), weeks of vessel downtime, and additional related safety risks to crew members. As a practical matter, a seismic vessel moving at 3 to 5 knots is very unlikely to strike an ESA-listed marine mammal. For instance, in the event of a sighting of an ESA-listed whale within 100 m of the vessel, the vessel could reasonably be expected to slow (to no less than 3 knots) and turn gently away from the animal, which would effectively avoid a collision and lessen the risk of damage to seismic equipment.[13]

[12] Although a 60-minute "all clear" period is referenced in BOEM's Record of Decision, BOEM also indicated that "mitigation measures themselves will be reviewed as part of BOEM's commitment to adaptive management" in "subsequent environmental reviews of site-specific action." Record of Decision at 8. Moreover, BOEM's Record of Decision does not dictate the content of MMPA authorizations issued by NMFS, which must be based on the most rational conclusions that NMFS can draw from the best available science.

[13] *See, e.g., Issuance of IHA to SAExploration, Inc. for Seismic Survey in Cook Inlet,* 80 Fed. Reg. 29,162, 29,176 (May 20, 2015) ("NMFS neither anticipates nor authorizes takes of marine mammals from ship strikes."); PEIS at xiv ("It is unlikely that survey vessels would strike marine mammals because they would travel slowly during surveys (typically between 4.5-6 knots [kn]).").

We do not object to the IHA applicants proposing the above-listed vessel avoidance measures so long as they are practical and feasible for the operators. Indeed, some of the IHA applications reasonably provide that these measures will be implemented "when safety allows" or "to the extent practicable." This acknowledges the inherent limitations of fully operating seismic vessels and important safety concerns balanced against the very low strike risk posed by seismic vessels.

5. Protected species observers ("PSOs")

All four IHA applications commit to employing trained PSOs to maintain watch for marine mammals, including those protected under the ESA. The use of PSOs is a long-established, effective means of limiting the potential incidental take of cetaceans and pinnipeds.

More broadly, however, we recommend that NMFS not uniformly require implementation of the recommendations described 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) ("Observer Standards"). Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, we believe the Observer Standards are flawed in a number of respects and have not yet been subject to public review and input. *See* May 7, 2014 comment letter of IAGC, API, and NOIA, Attachment A (included in Appendix). Among other things, 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. Although one of the IHA applicants has voluntarily proposed to adopt the Observer Standards, NMFS should not impose those standards on other current or future applicants.

6. Passive acoustic monitoring ("PAM")

Three of the four pending IHA applications commit to the use of PAM during all survey activities, whether or not visibility is compromised. The Associations recognize the utility of PAM during periods of low visibility. PAM is one of several monitoring techniques that complements (rather than replaces) traditional visual monitoring. Overall performance and capabilities of PAM are highly dependent on factors such as technical specification of equipment, operational setting, availability of experienced and trained personnel, and the species of marine mammals present in a given area. Use of PAM is therefore not always logistically possible. Moreover, mandatory use of PAM will increase survey cost and require the placement of more personnel on vessels (i.e., four dedicated PAM observers onboard). Accordingly, the Associations urge NMFS to either make the use of PAM optional, or require PAM only for operations at night and in periods of low visibility.

7. Special area avoidance and time-area closures

The four pending IHA applications present varied approaches to special area avoidance and time-area closures, all of which are reasonable means of minimizing and avoiding incidental take. NMFS should evaluate time-area closures on a case-by-case basis and should not require unsupported, blanket restrictions that may or may not apply to a given applicant's proposed program. Each application should be evaluated for the specific program proposed and the mitigation (time-area closures) should be narrowly tailored to only the activities proposed in a given IHA application.

D. Seismic surveys in the Atlantic OCS will not cause cumulatively significant impacts.

There has been no demonstration of population-level effects to marine life from seismic or other geophysical survey activity, individually or cumulatively. BOEM expressly recognizes this fact in its August 22, 2014 *Science Note*, in which it states that "[w]ithin the [Gulf of Mexico Central Planning Area] . . . 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."[14] BOEM similarly concluded in its March 9, 2015, *Science Note* that 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." http://www.boem.gov/BOEM-Science-Note-March-2015/. Moreover, BOEM has spent more than $50 million on protected species and noise-related research without finding evidence of adverse effects. The geophysical and oil and gas industries, the National Science Foundation, the U.S. Navy, and others have spent a comparable amount on researching impacts of seismic surveys on marine life and have found no evidence of cumulatively significant effects. In short, the best available data and information strongly support a conclusion that there will be no cumulatively significant impact from the surveys that have been proposed for the Mid- and South Atlantic OCS. *See* PEIS § 4.3.2.

[14] http://www.boem.gov/BOEM-Science-Note-August-2014/. Moreover, it is well documented that some marine mammal populations, such as the western Arctic bowhead whale population, have continued to grow in areas where seismic survey occurs. *See* Allen, B. M., and R. P. Angliss, 2013 Stock Assessment Reports, NOAA-TM-AFSC-277, available at: http://www.nmfs.noaa.gov/pr/sars/2013/ak2013_bowhead.pdf (from 1978 to 2001, Arctic bowhead whale abundance "doubled from approximately 5,000 to approximately 10,000 whales" is growing at a rate of over 3% per year).

III. CONCLUSION

The Associations appreciate NMFS's review of the IHA applications and consideration of these comments. Building on decades of industry experience, the four pending IHA applications set forth aggressive mitigation programs designed to effectively avoid and limit incidental take. Many of the proposed mitigation measures are more stringent than measures that have commonly been employed and, indeed, some of the proposed mitigation measures are unnecessary, based on the best available scientific information. With the use of proper mitigation measures, seismic survey operations can and do avoid Level A harassment and, therefore, the authorization of Level A harassment is not warranted or appropriate. The Associations support the issuance of IHAs for Level B harassment that prescribe mitigation measures that are effective and consistent with the best available data and information.

Sincerely,

Nikki Martin
International Association of Geophysical Contractors
President

Andy Radford
American Petroleum Institute
Sr. Policy Advisor – Offshore

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

APPENDIX

April 29, 2015

VIA Federal eRulemaking Portal

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123–2394

Re: Comments on Applications for G&G Permits in the Mid- and South Atlantic OCS

Dear Mr. Goeke:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC"), the American Petroleum Institute ("API"), and the National Ocean Industries Association ("NOIA") (collectively, the "Associations") in response to the Bureau of Ocean Energy Management's ("BOEM") request for comments on the pending Geological and Geophysical ("G&G") permit applications for the Mid- and South Atlantic Outer Continental Shelf ("OCS"). We appreciate BOEM'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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and some IAGC members have already filed applications for authorizations relating to such activities.

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 U.S. OCS. The NOIA 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.

II. COMMENTS

A. Contextual Background

BOEM's plan to authorize exploratory activities on the Atlantic OCS is consistent with the Outer Continental Shelf Lands Act, which mandates the "expeditious and orderly development" of the OCS "subject to environmental safeguards." 43 U.S.C. § 1332(3). BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 4.72 billion barrels of oil and 37.51 trillion cubic feet of natural gas.[1] Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology—including specifically and primarily seismic reflection technology, but also complimentary gravity, magnetics, and electromagnetic technology—will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, industry operators can better locate and dissect prospective areas for exploration. In short, seismic and other geophysical surveys are the only feasible technologies available to accurately image the subsurface before a single well is drilled. Allowing the pending geophysical survey proposals to proceed, subject to appropriate "environmental safeguards," facilitates—indeed, makes possible—the orderly development of the Mid- and South Atlantic OCS.

For the energy industry, modern geophysical imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, which reduces the overall footprint for exploration. Because survey activities are temporary and transitory, they are the least

[1] *See* http://www.boem.gov/Assessment-of-Oil-and-Gas-Resources-2014-Update/.

intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.[2]

In addition, more than four decades of worldwide seismic surveying and scientific research indicate that the risk of direct physical injury to marine life as a result of seismic survey activities is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts to marine life. As BOEM stated in its August 22, 2014 *Science Note*:

> 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.

Moreover, IAGC, together with the oil and gas industry, funds independent research to further our understanding of the effects of seismic surveys on marine life. This is helping to reduce uncertainties about the possible effects of seismic surveys. Some of this research, in addition to other frequently cited references regarding the effects of sound on marine life, is reviewed in the annotated bibliography included as Attachment A to this letter.[3]

B. Seismic Survey Activities in the Mid- and South Atlantic OCS Will Have, at Most, a Negligible Impact on Marine Mammals

During the administrative process related to BOEM's issuance of its Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS ("PEIS"),[4] the Associations provided comments that, among other things, explained why BOEM's assessment of marine mammal impacts was flawed and why

[2] Although different surveys for different purposes may cover the same general area, these surveys are spread out in space and in time. If two or more surveys occur in the same place over a period of time, they are generating different information, designed to appeal to specific, unique customer needs not met by other surveys.

[3] Additional technical information regarding different types of seismic surveys is provided in Attachment B.

[4] BOEM, *Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS* (Mar. 2014).

some of the mitigation measures proposed by BOEM were unnecessary and impractical. The Associations incorporate those comments by reference, and we have included a copy of IAGC's comment letter to the final PEIS as Attachment C. We also provide the following information, which is intended to supplement the information and positions presented in the PEIS comments.[5]

1. BOEM's site-specific environmental assessments should provide an accurate evaluation of expected marine mammal impacts

As explained in our PEIS comments, BOEM's evaluation of potential marine mammal impacts at the programmatic level is flawed because it is premised upon an unrealistic scenario in which exploration activities are projected to result in thousands of incidental takes of marine mammals, which BOEM has definitively stated will not actually occur. Indeed, in its response to comments in the Record of Decision associated with the PEIS ("ROD"), BOEM states very clearly that "the numbers estimated for incidental take are higher than BOEM expects would actually occur." ROD at 12; *see also id*. ("the take estimates are based on acoustic and impact models that are by design conservative, which results in an over-estimate of take"). The supposed effects of this "worst case" hypothetical scenario are then addressed in the PEIS with mitigation measures, many of which are similarly unrealistic because they mitigate inaccurately presumed effects.

Setting aside our continuing disagreement with BOEM's approach to the evaluation of marine mammal impacts in the PEIS, we respectfully request that BOEM perform a proper NEPA analysis in its site-specific environmental assessments and evaluate the <u>actual</u> environmental impacts that are <u>expected</u> to occur. For the reasons stated in our comments on the PEIS, such an approach would be consistent with both the law and the best available science. *See* IAGC PEIS Comment Letter § II.A (Attachment C).

2. A 40-km buffer between surveys is unnecessary and impractical

The PEIS recommends an expanded 40-km buffer zone between concurrent seismic surveys "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is below Level B thresholds and approaching ambient levels." PEIS at 2-37. In the PEIS, BOEM acknowledges that there is "uncertainty about [the] effectiveness" of a 40-km buffer requirement and, in its ROD, BOEM states that it will "assess the value of this measure in site-specific environmental analyses . . . and decide whether to include it as a

[5] Consistent with BOEM's commitment "to adaptive management and the modification of mitigations if warranted by the facts at the site-specific level" (ROD at 11), we encourage BOEM to reconsider the data and information presented in the Associations' comments on the final PEIS as well as the information presented in this comment letter.

condition of a permit or other authorization." ROD at 10. We reiterate that a 40-km buffer is unnecessary and impractical for the reasons stated in the Associations' comments on the PEIS. *See* IAGC PEIS Comment Letter § II.B.2. We also provide the following additional points, and request that BOEM consider this information, in addition to our PEIS comments, as it conducts its site-specific analyses.

Although seismic operations can be detected at great distances under certain oceanographic conditions and locations, so can sound waves generated by earthquakes and baleen whale calls.[6] The deep sound channel in the Atlantic OCS, often cited for the notion that sound from seismic operations can be detected outside of a survey's established exclusion zone, does not extend onto the continental shelf off the mid-Atlantic region. Furthermore, this notion is only applicable if protected species and marine animals are present in the deep sound channel to receive the higher levels of sound. Few species dive that deep in the areas of the Atlantic Ocean under consideration. In particular, baleen whale species of greatest concern are not known to be present in waters at those depths.

The seismic sound source is engineered to direct its energy downward, rather than laterally, which the National Marine Fisheries Service ("NMFS") has admitted is itself a mitigation measure.[7] For any energy that is transmitted laterally, the signal strength decreases rapidly, well below the thresholds NMFS has established for Level B harassment and at such low frequency that it does not cause injury to marine mammals.[8] Consistent with this information, what evidence there is of potential behavioral disturbance from seismic operations suggests minor and transitory effects, such as temporarily leaving the survey area, and these effects have not been linked to negative or biologically significant impacts on marine mammal populations.

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[6] Nieukirk, S.L., Mellinger D.K., Moore S.E., Klinck K., Dziak R.P., and Goslin J. 2012. Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009. J. Acoust. Soc. Am. 131(2):1102-1112; Munk W., Worcester P., and Wunsch C. 1995. Ocean Acoustic Tomography. Cambridge U Press, Cambridge, UK.

[7] *See New Jersey v. National Science Foundation*, 3:14-cv-0429 (D. N.J.), Federal Defendants' Brief in Opposition to Plaintiffs' Motion for Declaratory and Injunctive Relief at 25 (July 7, 2014).

[8] Richardson W.J., Greene Jr. C.R., Malme C.I., and Thomson D.H. 1995. Marine Mammals and Noise. Academic Press, NY. *See also* Acoustic Ecology Institute, *Seismic Surveys at Sea: The contributions of airguns to ocean noise.* August 2005 (An air source array with a source level of 200 – 230 dB "drops quickly to under 180 dB (usually within 50- 500 m depending on source level and local conditions), and continues to drop more gradually over the next few kilometers, until leveling off at somewhere near 100 dB.").

Neither BOEM nor NMFS has yet to provide any scientifically supported rationale for the proposed 40-km buffer. Instead, the PEIS concluded the measure "would only potentially slightly reduce acoustic impacts on marine mammals, sea turtles, and other marine biota," but even then, the effectiveness of the measure is uncertain. ROD at 6. Accordingly, we respectfully request that BOEM decline to adopt the 40-km buffer zone in site-specific environmental assessments and, instead, recommend either no buffer zone or, alternatively, a 17.5-km buffer zone, consistent with standard practice and the best available science. *See* IAGC PEIS Comment Letter § II.B.2.

3. New research demonstrates that seismic impulses have insignificant effects on dolphins

The PEIS recommends a mitigation measure calling for the shutdown of operations if a dolphin enters the acoustic exclusion zone, unless the dolphin is determined by the observer to be voluntarily approaching the vessel. PEIS at 2-11. In our comments on the PEIS, we provided substantial information demonstrating that this proposed measure is contrary to the best available science, impractical, and otherwise unsupported. In those comments, we also directed BOEM to current research being conducted with the support of the E&P Sound and Marine Life Joint Industry Program to study the effects of multiple airgun pulses in odontocetes and, specifically, to study whether bottlenose dolphin exposure to airgun impulses results in temporary threshold shift ("TTS").[9] *See* IAGC PEIS Comment Letter § II.B.1. As the public abstract from the study states, "subjects participated in over 180 exposure sessions with no significant TTS observed at any test frequency, for any combinations of range, volume or pressure during behavioral tests."[10] This research will be published very soon in a peer-reviewed scientific journal.[11] We will provide the published paper to BOEM promptly upon its publication, and we request that it be included in the administrative record and considered by BOEM during the permitting process.

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[9] James J. Finneran et al., *Final Report* (2013). TTS in odontocetes in response to multiple airgun impulses. (The Associations understand that a copy of this Final Report was provided by the author to NMFS.)

[10] C.E. Schlundt et al., *Auditory Effects of Multiple Impulses from a Seismic Airgun on Bottlenose Dolphins*, presentation at the Effects of Noise on Aquatic Life Third International Conference, Budapest, Hungary (Aug. 11-16, 2013). The results of this study also are useful to support inclusion of frequency weighting in updated acoustic criteria.

[11] Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. Effects of multiple impulses from a seismic air gun on bottlenose dolphin hearing and behavior. Submitted to J. Acoust. Soc. Am. (in review).

Additionally, PSO observation reports continue to indicate that there is no statistically significant difference between the frequency of dolphin sightings and acoustic detections during seismic operations, whether the source is active or silent. Enclosed with this letter as Attachment D is an updated version of an attachment to IAGC's PEIS comments, which includes additional data confirming this conclusion.

In sum, the proposed dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support. For the reasons presented in this letter and in our comments on the PEIS, the Associations respectfully request that BOEM make an express finding that this recommended measure is unsupported and unnecessary.[12] In conjunction with this finding, we also request that BOEM clarify that shutdown is not required for dolphins within the exclusion zone in all circumstances, regardless of whether dolphins are exhibiting bow-riding behavior or any other behavior.

4. BOEM should modify the proposed 60-minute "all clear" requirement

The PEIS recommends that monitoring of the exclusion zone shall "begin no less than 60 min prior to start-up" and that restarting of equipment after a shutdown "may only occur following confirmation that the exclusion zone is clear of all marine mammals and sea turtles for 60 min." PEIS at C-29. As explained in our comments on the PEIS, this proposed measure is unprecedented and without factual or scientific support. Specifically, IAGC provided numerous examples confirming that the routine, and proven-to-be-effective, practice is to require 15- and 30-minute "all clear" periods—for marine mammals and for ESA-listed species. *See* IAGC PEIS Comment Letter § II.B.3. In its ROD, BOEM provides no substantive response to this indisputable information. Indeed, since the ROD was issued, additional MMPA incidental take authorizations that include 15- and 30-minute "all clear" periods have been proposed by NMFS.[13]

We sincerely hope that BOEM will reconsider this proposed requirement and work with NMFS to ensure that a reasonable 15- / 30-minute "all clear" requirement is included in the federal authorizations related to seismic activities in the Atlantic Ocean, consistent with

[12] Although BOEM notes that this and other measures were addressed in the draft PEIS, it still must consider comments on these measures as part of its site-specific analyses for the proposed surveys, and it may adjust mitigation requirements based upon those analyses.

[13] *See, e.g.*, 80 Fed. Reg. 9510, 9524 (Feb. 23, 2015) (proposed Cook Inlet incidental take authorization calling for a 15-minute "all clear" period for small odontocetes and pinnipeds and a 30-minute "all clear" period for large odontocetes); 80 Fed. Reg. 20,084, 20,097 (Apr. 14, 2015) (same provision for proposed Beaufort Sea incidental take authorization).

the well-supported current practice. Expanding the standard 15- / 30-minute "all clear" period to 60 minutes will substantially increase the duration and cost of seismic surveys, which, in turn, increases potential risks. *See* IAGC PEIS Comment Letter § II.B.3.[14]

5. There will be no cumulatively significant impact from the proposed surveys

As stated in our PEIS comments, there has been no demonstration of population level effects to marine life from seismic or other geophysical survey activity, individually or cumulatively. BOEM expressly recognizes this fact in its August 22, 2014 *Science Note*, in which it states that "[w]ithin the [Gulf of Mexico Central Planning Area] . . . 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 similarly concluded in its March 9, 2015 *Science Note* that 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." Moreover, BOEM has spent more than $50 million on protected species and noise-related research without finding evidence of adverse effects. The geophysical and oil and gas industries, the National Science Foundation, the U.S. Navy, and others have spent a comparable amount on researching impacts of seismic surveys on marine life and have found no evidence of cumulatively significant effects. In short, for the reasons stated in our comments on the PEIS, and as consistent with the well-established record and BOEM's public findings, there will be no cumulatively significant impact from the surveys that have been proposed for the Mid- and South Atlantic OCS.

C. Seismic Survey Activities in the Mid- and South Atlantic OCS Will Have, at Most, a Negligible Impact on Fish Populations and Fish Habitat

As part of the G&G permitting process in the Atlantic OCS, site-specific environmental assessments will include an Essential Fish Habitat ("EFH") assessment to determine whether the specific activity and location would cause a significant adverse effect

[14] The impact of this and other measures addressed by the Associations is magnified when coupled with the proposed expanded exclusion zones. The Associations reiterate their previous comments that exclusion zones should be based on the best available science, including when the science demonstrates that an exclusion zone of less than 500 m is appropriate. If the minimum 500 m exclusion zone requirement is not applied, IAGC would support the incorporation of power-down procedures to mitigate any potential effects, as described in IAGC's PEIS comments. *See* Attachment C, footnote 21; *see also, e.g.*, 80 Fed. Reg. at 9524 (Cook Inlet proposed incidental take regulations); 80 Fed. Reg. at 20,097 (Beaufort Sea proposed IHA); 80 Fed. Reg. 14,913, 14,928 (Mar. 20, 2015) (Cook Inlet Proposed IHA); 79 Fed. Reg. 36,730, 36,735 (June 30, 2014) (Notice of Issuance of Beaufort Sea IHA).

to fisheries and EFH. Because the sound output from a seismic survey is immediate and local, there is no contaminate residue or destruction of habitat, and therefore no significant adverse effect to EFH. For the reasons set forth below, seismic survey activities will also not result in any significant adverse effects to fish populations or to fisheries.

Marine seismic surveys have been conducted since the 1950s and experience demonstrates that fisheries and seismic activities can and do coexist. There has been no observation of direct physical injury or death to free-ranging fish caused by seismic survey activity, and there is no conclusive evidence showing long-term or permanent displacement of fish. Any impacts to fish from seismic surveys are short term, localized, and not expected to lead to significant impacts on a population scale.[15]

Seismic source vessels move along a survey tract in the water creating a line of seismic impulses. As the seismic source vessel is in motion, each signal is short in duration, local, and transient. Since seismic surveys are a moving sound source, any impacts to fish are inherently local and short term, potentially causing a localized reduction in fish abundance within close proximity to the seismic source.[16] There is no conclusive evidence,

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[15] *See* Attachment A; *see also* Science for Environment Policy, Future Brief: Underwater Noise, European Commission, June 2013: http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB7.pdf; "Stocks at a Glance – Status of Stocks" 2011, U.S. Department of Commerce, NOAA: www.nmfs.noaa.gov/stories/2012/05/05_14; Boeger, W.A., Pie, M.R., Ostrensky, A., Cardoso, M.F., 2006. The Effect of Exposure to Seismic Prospecting on Coral Reef Fishes; Brazil. J. Oceanogr. 54, 235-239; 3D marine seismic survey, no measurable effects on species richness or abundance of a coral reef associated fish community. Mar. Pollut. Bull. (2013), http://dx.doi.org/10.1016/j.marpolbul.2013.10.031; Hassel, A., Knutsen, T., Dalen, J., Skaar, K., Lokkeborg, S., Misund, O.A., Osten, O., Fonn, M., Haugland, E.K., 2004. Influence of seismic shooting on the lesser sand eel. ICES J. Mar. Sci. 61, 1165-1173; Pena, H., Handegard, N.O. and Ona, E. 2013. Feeding herring schools do not react to seismic air gun surveys. ICES J. Mar. Sci, http://icesjms.oxfordjournals.org/content/70/6/1174.short?rss=1; Saetre, R. and E. Ona, 1996. Seismic investigations and damages on fish eggs and larvae; an evaluation of possible effects on stock level. Fisken og Havet 1996:1-17, 1-8.

[16] Although some studies have shown that various life stages of fish and invertebrate species can be physically affected by exposure to sound, in all of these cases, the subjects were very close to the seismic source or subjected to exposures that are virtually impossible to occur under natural conditions. For example, frequently cited experimental studies such as Skalski et al. (1992), Lokkeborg et al. (2010), Engas (1996), and Wardle (2001) employed artificially concentrated sound within hundreds of meters of the fish under observation and the fishing vessels. As Lokkeborg et al. (2012) noted in a recent review of the literature, "Seismic air gun emissions distributed over a large area may thus produce lower sound

(continued . . .)

however, showing long-term or permanent displacement of fish. Similar seismic surveys conducted for research in the Atlantic OCS in the past did not result in any detectable effects on commercial or recreational fish catch, based on a review of NMFS's data from months surveys were conducted, which noted that "there was absolutely no evidence of harm to marine species" (including fish).[17] Additionally, in the Gulf of Mexico, where G&G activities have routinely occurred for over 40 years, seafood harvested from the OCS is worth approximately $980 million annually and the fishing industry directly supports in excess of 120,000 jobs, suggesting that G&G activities can occur without negatively impacting commercial fisheries.

Finally, seismic and other geophysical surveys also do not result in closing areas to commercial or recreational fishing. During surveys, the survey crews work diligently to maintain a vessel exclusion zone around the survey vessel and its towed streamer arrays to avoid any interruption of fishing operations, including the setting of fishing gear. As with all combined uses of offshore waters, there must be a certain level of coordination by all parties. At sea, coordination is regulated by the U.S. Coast Guard under the International Regulations for Preventing Collisions at Sea, requiring a Local Notice to Mariners specifying survey dates and locations. BOEM has concluded that "there is only a limited potential for space-use conflicts between G&G activities and commercial fishing operations within the area of interest" and any impacts "would be intermittent, temporary, and short term." PEIS at 4-160, 4-161.

III. CONCLUSION

As explained above, the performance of seismic and other geophysical surveys is critical to the federally mandated "expeditious and orderly development" of the Mid- and South Atlantic OCS. A wealth of data and information demonstrates that these surveys will have no more than a temporary, localized, and negligible impact on marine life. The Associations respectfully encourage BOEM to proceed with approving the pending permit applications and to work with NMFS to ensure that only reasonable, well-supported, and effective mitigation measures are included as conditions of the permits and the related federal authorizations.

(. . . continued)
exposure levels and thus have less impact on commercial fisheries." As another example, Aguilar de Soto (2013) exposed scallop larvae to noise at loud volume for up to 90 hours at a distance of 9 centimeters, which is virtually impossible to occur outside of experimental settings.

[17] *New Jersey v. National Science Foundation*, No. 3:14-cv-0429 (D. N.J.), Federal Defendants' Brief in Opposition to Plaintiffs' Motion for Declaratory and Injunctive Relief at 25-26, citing Exhibit D, Higgins Decl. ¶ 21, Exhibit D, Mountain Decl. ¶ 8 (July 7, 2014).

We appreciate your consideration of our comments. Should you have any questions, please do not hesitate to contact Nikki Martin at (713) 957-8080.

Sincerely,

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ATTACHMENT A

ANTHROPOGENIC SOUND AND IMPACTS TO MARINE LIFE:
An Annotated Bibliography of Selected & Frequently Cited References

IAGC, together with the oil and gas industry, funds independent research to further our understanding of the effects of seismic surveys on marine life. This is helping to remove uncertainties about the possible effects of seismic surveys. Some of this research, in addition to other frequently cited references regarding the effects of sound on marine life, is reviewed in the attached annotated bibliography.

More than four decades of worldwide seismic surveying and scientific research indicate that the risk of direct physical injury to marine life is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts to marine life. As BOEM stated in its August 22, 2014 *Science Note*, "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."

There has been no observation of direct physical injury or death to free-ranging fish caused by seismic survey activity, and there is no conclusive evidence showing long-term or permanent displacement of fish. Any impacts to fish from seismic surveys are short-term, localized and are not expected to lead to significant impacts on a population scale or to commercial and recreational fishing activities.

The seismic sound source is engineered to direct its energy downward, rather than laterally. For any energy that is transmitted laterally, the signal strength decreases rapidly and would not cause injury to marine mammals. Research indicates that in-water sounds received at 110-90 dB SPL are comparable to a whisper or soft speech, even if it travels hundreds or thousands of kilometers in water. In some areas, such as the busy ports of the Atlantic coast, ambient sound in the frequencies produced by seismic sources may be as high as 110-120 dB due to ship noise, thereby masking any additional contribution from distant seismic surveys. What evidence there is of potential behavioral disturbance from seismic operations suggests minor and transitory effects, such as temporarily leaving the survey area, and these effects have not been linked to negative biologically significant impacts on populations.

More information on our commitment to science can be found at www.soundandmarinelife.org.

Aguilar de Soto N, Delorme N, Atkins J, Howard S, Williams J, Johnson M. 2013. Anthropogenic noise causes body malformations and delays development in marine larvae. Scientific Reports 3, 2831. DOI 10: 1038/srep02831. www.nature.com/scientificreports.

Purports to demonstrate that airgun sound affects development of scallop larvae at levels of 160 dB SPL or lower. But the work has many flaws; an unrealistically long sound, played at much shorter than normal intervals for as much as 90 hours continuous. The sound source used in the experiment was not able to accurately replicate the actual seismic sound and was placed only 9 cm from the test subjects, producing large particle displacement effects of 4-6mm/s velocity, comparable to an SPL of 195 dB SPL. The latter value translates to a distance of a few hundred meters from an actual source, not the hundreds of square kilometers postulated by the authors. The best laboratory culture methods typically yield some variation in survival and development, but this study reported perfect scores for all controls at all stages. The work needs to be replicated by an independent and expert experimentalist.

André M, Solé M, Lenoir M, Durfort M, Quero C, Mas A, Lombarte A, van der Schaar M, López-Bejar M, Morell M, Zaugg S, and Houégnignan L. 2011. Low-frequency sounds induce acoustic trauma in cephalopods. Front Ecol Environ 2011; doi: 10.1890/100124. www.frontiersinecology.org. The Ecological Society of America.

Another study where it is difficult to know what to make of the data because of the way the sound was presented and measured. The reported received level is 157 dB re 1 µPa, so one can presume that the measurement is of pressure, but whether this is averaged, spectrum level, total energy under the envelope is unclear. Levels up to 175 dB re 1 µPa are also reported but it is not clear if that is a single frequency peak or whether the received levels fluctuated around 157 dB to as high as 175 dB. Thus the actual exposure history as SEL for the two hours of exposure is unknown. The sound source is in air and its properties are not provided. Given the impedence mismatch of water the source would have had to be extremely loud to get as much as 157-175 dB SPL into the water. Squid do not have swim bladders or air spaces associated with the ears, so the appropriate value to report is actually particle velocity. This is especially true since the containers were so much smaller than the wavelengths of sound in water at those frequencies (4-30 meters). The sound field inside the containers is bound to be complex and should have been measured. What is most probable is that the squid experienced considerable vibratory motion for two hours, leading to the damage observed; damage that could have never occurred in an open water environment where pressure and particle velocity would never be experienced at those levels for that duration.

Bartol, S.M. and Bartol, I.K. 2011. Hearing Capabilities of Loggerhead Sea Turtles (Caretta caretta) throughout Ontogeny: An Integrative Approach involving Behavioral and Electrophysiological Techniques. Final Report, JIP Grant No.22 07-14. Available online at http://www.soundandmarinelife.org/research-categories/physical-and-physiological-effects-and-hearing/hearing-capabilities-of-loggerhead-sea-turtles-throughout-ontogeny.aspx

Bolle LJ, de Jong CAF, Bierman SM, van Beek PJG, van Keeken OA, Wessels PW, van Damme CJG, Winter HV, de Haan D, Dekeling RPA. 2012. Common Sole Larvae Survive High Levels of Pile-Driving Sound in Controlled Exposure Experiments. PLoS One 7(3): e33052. Doi 10:1371/journal.pone.0033052.

This is a well-designed and properly measured sound exposure experiment, although claims that recordings played from a speaker are able to replicate the impulse time amplitude signature should always be treated with skepticism. Exposures up to 206 dB SEL_{cum} did not produce mortality, with single strike SELs of 186 dB and zero to peak pressures of 32 kPa, erroneously reported as 210 dB re $1\mu Pa^2$ in the abstract.

Booman, C., Dalen, J., Leivestad, H, Levsen, A., van der Meeren, T. and Toklum, K. 1996. Effects from airgun shooting on eggs, larvae, and fry. Experiments at the Institute of Marine Research and Zoological Laboratorium, University of Bergen. (In Norwegian. English summary and figure legends). Fisken og havet No. 3. 83 pp. as reviewed in:

Dalen, J, Dragsund E, Næss A, and Sand O. 2007. Effects of seismic surveys on fish, fish catches and sea mammals. Report for the Cooperation group – Fishery Industry and Petroleum Industry, Report No. 2007-0512. Available at https://www.norskoljeoggass.no/PageFiles/6574/Effects%20of%20seismic%20surveys%20on%20fish,%20fish%20catches%20and%20sea%20mammals.pdf?epslanguage=no

Observed effects on eggs and larvae only extended 1 to 5 meters from a full seismic array, suggesting that powerful particle motion effects were responsible for damaging the microscopic eggs and larvae. The net effect would be a pencil line damage zone in the wake of the array that would conceivably account for some tiny fraction of 1% of pelagic eggs and larvae distributed in the larger region of interest. Considering that more than 99% of eggs and larvae typically never make it to adulthood, this is an inconsequential effect compared to predation, disease and many other natural density-dependent or density independent causes of mortality.

Castellote, M., Clark, C.W., and Lammers, M.O. 2012. Acoustic and behavioural changes by fin whales (*Balaenoptera physalus*) in response to shipping and airgun noise. Biological Conservation 147: 115–122.

The authors make a slim statistical case that calls were altered by the presence of shipping noise and in one case a seismic survey. Measured and modeled acoustic data in the Straits of Gibraltar, a very unusual acoustic environment, were extrapolated as a more general case to predict effects of seismic on fin and other related whales generally. This speculation should be supported with data. Inferences of whale displacement by sound were from reductions in numbers of vocalizations, not actual observed movement or changes in distribution.

Engås A, Løkkeborg S, Soldal AV, and Ona E. 1996a. Comparative fishing trials for cod and haddock using commercial trawl and longline at two different stock levels. J Northw Atl Fish Sci 19: 83-90. http://journal.nafo.int.

Commercial bottom trawl and longline vessels fished 7 days before, 5 days during, and 5 days after a seismic survey was conducted in the area. Acoustic surveys of fish populations were also conducted, along with a sampling bottom trawl of different dimensions and mesh size than the commercial trawl. Only before and after data were analysed in this paper; "during" data were omitted but are reported in Engås et al (1996b). Because multiple fishing methods were employed on two species of fish, the matrix of data are somewhat complicated: generally, catches declined, smaller fish were caught after the seismic survey, and the ratio of haddock to cod increased after survey. It is difficult to know what to make of the results given the number of uncontrolled and possibly contributing variables that could have confounded the results, including the unusual prolonged proximity of survey vessels to fishing, and the amount of continuous fishing in one place that may have contributed to reduced catches and smaller size fish being caught over time.

Engås A, Løkkeborg S, Ona E, and Soldal AV. 1996b. Effects of seismic shooting on local abundance and catch rates of cod (Gadus morhua) and haddock (Melanogrammus aeglifinus). Can J Fish Aquat Sci 53:2238-2249.

Same study as above but includes data during the survey and more spatial information showing the effects described above tended to be greatest near the seismic survey and less out to the borders of the study area. An independent re-analysis of the data (JRHGeo, unpublished) suggest a different interpretation of declining catches during the before-exposure period suggestive of depletion of stocks within the unusually heavy, concentrated fishing effort within the test area, followed by clearly decreased catches within 1 km of the survey but smooth

decline through pre- and during exposure periods, suggesting little to no effect beyond 1 km. In the 5 days following seismic survey there is a rebound of catch at both the < 1 km and 1-3 km ranges, which suggests that there may have indeed been an effect from the seismic sound on catches, but catches recovered immediately afterward, confounded by the ongoing 10-15 days of continuous intensive fishing in the area. The re-analysis suggests that the data may have been confounded by variables other than sound, and that the original clearcut conclusions in Engas et al 1996a,b are perhaps not quite as pronounced as initially stated.

Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. (2013). Temporary threshold shift (TTS) in odontocetes in response to multiple air gun impulses. Final Report for JIP Project 2.1.1., 51 pp. Available online at http://www.soundandmarinelifejip.org/index.php?doc=docmeta&id=3695

Finneran J.J., Schlundt C.E., Branstetter, B.K., Trickey, J.S., Bowman, V., and Jenkins, K. (in review). Effects of multiple impulses from a seismic air gun on bottlenose dolphin hearing and behavior. Submitted to J. Acoust. Soc. Am.

Gross JA, Irvine KM, Wilmoth S, Wagner TL, Shields PA and Fox JR . 2013. The Effects of Pulse Pressure from Seismic Water Gun Technology on Northern Pike. *Trans Am Fish Soc* 142: 1335-1346. ISSN: 0002-8487 print / 1548-8659 online DOI: 10.1080/00028487.2013.802252.

The study assessed the probability of mortality of pike (freshwater) when exposed to two pulses at 3, 6 and 9 meters distance from either a 343 cu in water gun or a 120 cu in water gun, both pressurized at 2000 psi. Measures of peak and peak to peak pressure were made as well as $SEL_{cum.}$ SEL_{cum} was used as the metric for effects in most of the results and discussion since it seemed to correlate best with levels of injury and mortality. Mortality within 72-168 hours was correlated with SELs in excess of 195 dB. Gas bladder rupture was observed at 199 dB SEL; 100% of fish at 3-6 meters and 87% of fish at 9 meters. Given the history of water guns producing greater injury and mortality than airguns, these results with two pulses from good sized single guns, indicate that fish would need to be within a few meters of a single airgun or full array to achieve comparable effects.

Harrington JJ, McAllister J, and Semmens JM. 2010. Assessing the short term impact of seismic surveys on adult commercial scallops (Pecten fumatus) in Bass Strait: Final Report. Tasmanian Aquaculture and Fisheries Institute, U. of Tasmania

Scallops were sampled from control and exposure sites before and after an extensive 2-D seismic survey. No statistical differences were found between control and exposed populations, neither in survival nor body condition. Exposure levels were not recorded. The paper also reviews several prior studies of seismic effects on scallops in Ireland and other sites, all also with no effect. One cited paper reported that one of three scallops experienced a split in its shell at distance of 2 meters from an airgun.

Higgins SM. 2014. Declaration; State of New Jersey, Dept of Environmental Protection vs National Science Foundation, et al. United States Federal District Court, District of New Jersey. Case 3:14-cv-04249-PGS-LHG, Document 6-7, filed 07/07/14, pageID 1520-1527

Contains a comparison of annual commercial and recreational fishery catches for years and months in which seismic surveys were conducted off the New Jersey coast, relative to the same months in other years, between 1990-2004. No discernable differences were found between periods with seismic survey and without. (Fishery statistical data from NMFS 2014, http://www.st.nmfs.noaa.gov/).

Lavender, A.L., Bartol, S.M., and Bartol, I.K. (2014). Ontogenetic investigation of underwater hearing capabilities in loggerhead sea turtles (*Caretta caretta)* using a dual testing approach. J. Exp. Biol., 2014, 217(14):2580-2589.

Løkkeborg S, Ona E, Vold A, and Salthaug A. 2012. Effects of sounds from seismic air guns on fish behaviour and catch rates. In A.N. Popper and A. Hawkins (eds.), *The Effects of Noise on Aquatic Life*, Advances in Experimental Medicine and Biology 730, DOI 10.1007/978-1-4419-7311-5_95, pp. 415-419. Springer, NY NY.

This paper provides a good review of prior behavioral studies. They also report recent data from what is arguably the most realistic and thorough study to date; monitoring of two fisheries (gillnet and longline) for four species of fish; a halibut, two gadids (pollack and haddock) and a seabass (Sebastes marinus), along with acoustic (HF sonar) surveys of the fish populations. Gillnet catches of halibut and seabass increased during and after survey, possibly due to increased swimming activity, while longline catches of halibut and pollack decreased. Acoustic surveys revealed decreases in pollack abundance, but not other species, consistent with prior study by Engås et al (1996a,b).

McCauley RD, Kent CS, Archer M. 2008. Impacts of seismic survey pass-bys on fish and zooplankton, Scott Reef Lagoon, Western Australia: Full report of Curtin University findings. Center for Marine Science and Technology, Curtin University, Perth WA. 92 pp. CMST Report 2008-32.

An extensive research effort involving a real seismic survey over a thoroughly monitored reef lagoon. Caged snapper and damselfish were exposed to seismic passes as close as 45-74 meters with 1% loss of hearing hair cells, later fully recovered. Behavioral reaction was observed at 155-165 dB SPL sound exposure levels but avoidance only occurred out to 200 meters on either side of survey. There was no effect on normal fish sound choruses.

McCauley RD, Fewtrell J and Popper AN. 2003. High intensity anthropogenic sound damages fish ears. J Acoust Soc Am 113(1):638-642 DOI: 10.1121/1.1527962

The authors were able to produce considerable unrecovered damage to the sensory structures of a typical fish ear (Pink snapper) after seven close passes (5-15 meters) by a towed 20 cubic inch seismic air source in the span of four hours. Although no cumulative Sound Exposure Level (SEL) or peak pressure or particle velocity measures were reported, the graphical display of the passes indicates multiple exposures over short periods of time at levels in excess of 180 dB SPL $rms_{0.95}$. The fish were caged and the authors noted that their movements indicated that the fish would have moved away from the sound source if possible, thus preventing the artificially high levels of exposure experienced.

Miller I. and Cripps E. 2013. Three dimensional marine seismic survey has no measurable effect on species richness or abundance of a coral reef associated fish community. Mar Pol Bull. Elsevier Press. http://dx.doi.org/10.1016/j.marpolbul.2013.10.031

No change in abundance or species composition was found in a natural reef community of resident reef fishes (emphasis on damselfishes) and mobile demersal fishes (emphasis on snappers of the Family Lutjanidae). Multiple passes by a full working seismic array were separated by about 6 hours between pass. Minimum stand-off distances from the reef were 400 meters on the outside and 800 meters inside the reef lagoon. Estimated exposures were generally around 187 dB SEL with some exposures as high as 200 dB SEL. Instantaneous peak or average SPL or particle velocity/acceleration were not measured.

Moein, S. E., Musick, J. A., Keinath, J. A., Barnard, D. E., Lenhardt, M. L. & George, R. 1995. Evaluation of seismic sources for repelling sea turtles from hopper dredges. In *Sea Turtle Research Program: Summary Report*. (Ed. Hales, L. Z.) pp 90-93. Technical

Report CERC-95.

National Research Council (NRC). 2005. Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects. National Academy Press, Washington DC. www.nap.edu.

This NRC report lays out a framework for estimating long term, cumulative population consequences from behavioral disturbance by sound, and by extension, any source of behavioral perturbation, individually or cumulatively. While developed for marine mammals, the principles of the Population Consequences of Acoustic Disturbance (PCAD) model are appropriate to any biological population.

Parry GD and Gason A. 2006. The effect of seismic surveys on catch rates of rock lobsters in western Victoria, Australia. Fisheries Research 79 (2006): 272-284.

A statistical comparison of changes in commercial catch rates (Catch Per Unit Effort, CPUE) coincident with seismic survey effort. No correlation was found in a two way analysis of variance, although the authors do note that most survey effort was in deep water away from the shallow water fishery, and that one survey in shallow water was in an area of low lobster abundance.

Peña H, Handegard NO, and Ona E. 2013. Feeding herring schools do not react to seismic air gun surveys. ICES J Marine Science, doi:10.1093/icesjms/fst079. 7 pp. http://icesjms.oxfordjournals.org/

A full 3-D seismic survey array was used to assess responses of herring monitored by an omnidirectional fisheries sonar. The source vessel approached the fish school from a distance of 26 km to a close approach at 2 km without any effect on the swimming and schooling behavior of the fish.

Popper AN, Smith ME, Cott PA, Hanna BW, MacGillivray AO, Austin ME and Mann DA. 2005. Effects of exposure to seismic airgun use on hearing of three fish species. J Acoust Soc Am 117:3958-3971.

Whitefish and juvenile pike did not show any TTS after exposure to five seismic playbacks of about 209 dB SPL_{peak} or 180 dB SEL, and particle displacements of 139 db SVL re 1nm/s (it is not possible to determine which physical property was responsible for any TTS observed in any of the tests). Adult pike under similar exposure conditions showed a TTS of about 20 dB at 400 Hz, which was recovered within 18 hours. Chub, also under similar exposure levels, showed slightly higher levels of TTS, about 25 dB at 200 Hz and 35 dB at 400 Hz, similar for 5 playbacks or 20 playbacks, and fully recovered within 18 hours. Chub are members of a hearing specialist family of freshwater fishes with no marine species.

Santulli A, Modica A, Messina C, Ceffa L, Curatolo A, Rivas G, Fabi G, D'Amelio V. 1999. Biochemical Responses of European Sea Bass (Dicentrarchus labrax L.) to the Stress Induced by Off Shore Experimental Seismic Prospecting. *Marine Pollution Bulletin*, Volume 38, Issue 12, December 1999, Pages 1105-1114.

This study involved exposure of caged fish to very close and very prolonged seismic air source in order to obtain physiological responses typical of stress. The fish returned to baseline levels within 72 hours, with no injury and no apparent lasting effect, despite the unusually high and prolonged sound exposures.

Song, J., D.A. Mann, P.A. Cott, B.W. Hanna, and A.N. Popper. 2008. The inner ears of Northern Canadian freshwater fishes following exposure to seismic air gun sounds**. J. Acoust. Soc. Am.** 124(2):1360-1366.

No damage was found to any of the ears of the test fish from Popper et al (2005), despite findings of Temporary Threshold Shift in two cases where peak pressure exceeded 205-209 dB re 1µPa SPL (peak) or 176-180 dB re 1 μPa^2-s single impulse (shot) SEL.

United States Navy. 2013. Atlantic Fleet Training and Testing Final Environmental Impact Statement / Overseas Environmental Impact Statement. Available online at http://aftteis.com/DocumentsandReferences/AFTTDocuments/FinalEISOEIS.aspx

Wardle CS, Carter TJ, Urquhart GG, Johnstone ADF, Ziolkowski AM, Hampson G, Mackie D (2001) Effects of seismic air guns on marine fish. Cont Shelf Res 21:1005–1027.

A study of free swimming cod, pollack and hake on a reef, using a fixed seismic source. C-start but no movement away from the source was observed at exposure levels up to 195 dB SPL at a distance of 109 meters. The authors speculate on possible reasons for the lack of response, including site fidelity to the unique reef environment at which the study was performed.

ATTACHMENT B

ATTACHMENT B

Currently, three types of surveys are proposed in the Atlantic OCS: 2D seismic surveys, a 3D seismic survey, and an airborne gravity and magnetic survey. These surveys are described in more detail below.

A. Seismic Surveys – Towed Streamers

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. The use of modern seismic technology is similar to ultrasound technology—a non-invasive mapping technique built upon the simple properties of sound waves. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

To carry out these surveys, marine vessels use acoustic arrays, most commonly as a set of compressed air chambers, to create seismic pulses. A predominantly low-frequency sound pulse is generated by releasing compressed air into the water as the vessel is moving. The pulses are bounced off the layers of rock beneath the ocean floor. The returning sound waves are detected and recorded by hydrophones that are spaced along a series of cables that are towed behind the survey ship. Seismologists then analyze the information with computers to visualize the features that make up the underground structure of the ocean floor. Geophysical contractors often have proprietary methods of data acquisition that may vary depending on their seismic target and data-processing capabilities, making each contractor's dataset unique. Once the data is processed, geophysicists interpret it and integrate other geoscientific information to make assessments of where oil and gas reservoirs may be accumulated. Based largely on this information, exploration companies will decide where, or if, to conduct further exploration for oil and gas.

2D Seismic Surveys

Two-dimensional surveys are so-called because they only provide a 2D cross-sectional image of the Earth's structure. These surveys are typically used for geologic research, initial exploration of a new region, and to determine data quality in an area before investing in a 3D survey. 2D towed-streamer surveys are acquired with a single vessel usually towing a single air source array and a single streamer cable. The streamer is a polyurethane-jacketed cable containing several hundred to several thousand sensors, most commonly hydrophones. The air source array directs energy downward towards the ocean floor. An integrated navigational system is used to keep track of where the air sources are activated, the positions of the streamer cable, and the depth of the streamer cable. The end of the cable is tracked with global positioning system (GPS) satellites, and tail buoys are attached at the end. Radar reflectors are routinely placed on tail buoys for detection by other vessels, and automatic identification system (AIS) devices are also routinely integrated into the tail buoys.

Ships conducting 2D surveys are typically 30-90 m (100-300 ft) long and tow a single-source array 200-300 m (656-984 ft) behind them approximately 5-10 m (16-33 ft) below the sea surface. The source array often consists of three subarrays, with six to twelve air source elements each, and measures approximately 12.5-18 m (41-60 ft) long and 16-36 m (52-118 ft) wide. Following behind the source array by 100-200 m (328-656 ft) is a single streamer approximately 5 to 12 or more km (3.1-7.5 mi) long. The ship tows this apparatus at a speed of approximately 3 to 5 knots. Approximately every 10-15 seconds (i.e., a distance of 23-35 m [75-115 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), the air source array is activated. The actual time between activations varies depending on ship speed and the desired spacing.

Typical spacing between ship-track lines for 2D surveys, which is also the spacing between adjacent streamer line positions, is greater than a kilometer. Lines can transect each other and can be parallel, oblique or perpendicular to each other. 2D towed-streamer surveys are normally regional, covering a large area of ocean so that activity is not always limited to a particular area. 2D surveys can provide high resolution imaging with tight line spacing intervals in shallow areas.

2D surveys can cover a larger area with less data density in less detail, resulting in a lower cost per area covered. While surveying, and after a prescribed ramp-up of the output of the array to full-operation intensity, a vessel will travel along a linear track for a period of time until a full line of data is acquired. Upon reaching the end of the track, the ship takes typically 2 - 6 hours to turn around and start along another track, varying depending on the spacing between track lines, the length of track lines, and the objectives of a specific survey. Some 2D surveys might include only a single long line. Others may have numerous lines, with line spacings of 2 km in some cases, and 10 km in other cases. Data acquisition generally takes place day and night and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20 to 30 percent of non-operational downtime due to a variety of factors, including technical requirements or mechanical maintenance, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

3D Seismic Surveys

3D towed-streamer seismic surveys enable industry to image the subsurface geology with much greater clarity than 2D data because of the much denser data coverage. The quality is such that 3D data can often indicate hydrocarbon-bearing zones from water-bearing zones. Because 3D seismic data has been continuously and rapidly improving since its introduction in the 1970s, areas covered by 3D data shot only a few years ago may be reshot with current, improved technology, offering greater clarity than previous surveys. In addition, areas already covered using 2D techniques may be resurveyed with 3D. Further, 3D surveys may be repeated over producing fields at successive calendar times (at 6-month to several-year intervals) to better characterize and record changes over producing reservoirs. These 4D, or time-lapse 3D, surveys are used predominantly as a reservoir monitoring tool to detect and evaluate reservoir changes over time. Conventional, single-vessel 3D surveys are referred to as narrow azimuth 3D surveys.

The current state-of-the-art ships conducting 3D surveys are purpose-built vessels with much greater towing capability than the vessels conducting 2D surveys. While these vessels are generally 60 - 120 m long, with the largest vessels over 120 m (ft) in length and greater than 65 m (230 ft) wide at the back deck. These seismic ships typically tow two parallel source arrays 200-300 m (656-984 ft) behind them. The two source arrays are identical to each other and are the same as those used in the 2D surveys described previously. Following 100-200 m (328-656 ft) behind the dual source arrays are the streamers.

Most 3D ships can tow eight or more streamers at a time, with the total length of streamers (number of streamers multiplied by the length of each one) exceeding 80 km (50 mi). The theoretical towing maximum today is 24 streamers, each of which can be up to 12 km (7.5 mi) long, for a total of 288 km (179 mi). Towing 8-14 streamers that are each 3-8 km (1.9-5 mi) long is normal practice. Towing 10 streamers that are separated by 75-150 m (246-492 ft) means that a swath 675-1,350 m (2,215-4,429 ft) wide is covered on the sea surface in one pass of the ship along its track line. Other streamer configurations (number of streamers and their separation distance) can produce narrower or wider swaths.

The survey ship tows the apparatus at a speed of 3 to 5.5 kn during production. Approximately every 11 - 15 s (i.e., a distance of 25 m [82 ft] for a vessel traveling at 4.5 kn [8.3 km/hr]), one of the dual air source arrays is fired. The other array is fired 11 - 15 s later. To achieve the desired spacing, the time between firings depends on the ship speed. While surveying, a ship travels along a track for 12-20 hours (i.e., a distance of 100-167 km [62 - 104 mi] at 4.5 kn [8.3 km/hr]), depending on the size of the survey area. Upon reaching the end of the track, the ship takes 3 to 5 hours to turn around and start along another track. This procedure takes place day and night, and may continue for days, weeks, or months, depending on the size of the survey area. Data acquisition is not, however, continuous. A typical seismic survey experiences approximately 20-to-30 percent of non-operational downtime due to a variety of factors, including technical or mechanical problems, standby for weather or other interferences, and performance of mitigation measures (e.g., ramp-up, pre-survey visual observation periods, and shutdowns).

B. Non-Seismic Gravity and Magnetic Surveys

Both conventional gravity surveys and gravity gradiometry surveys are conducted today, most often by fixed-wing aircraft, or where necessary, by marine vessel deployment. There is no sound source associated with gravity or magnetic surveys. The dimensions of the gravity instruments and stand are approximately 1 m by 1 m by 1.5 m high (3 ft by 3 ft by 5 ft) and the total weight is approximately 150 kg (330 lb). The survey acquisition grid is similar to ship-based seismic surveys, generally with flight-line spacing of 0.5-3 km (0.3-2 mi). Surveys of 500 sq. km (180 sq. mi) can be completed in a few hours, with the aircraft flying at an altitude of 70-300 m (230-1,000 ft). The objectives of the survey will determine the flight-line spacing (distance between flight lines) and the altitude at which the survey will be conducted.

Measurements of the earth's magnetic field are useful in helping to determine geologic structures and stratigraphy in the subsurface in frontier exploration areas, such as the Atlantic OCS, and as a complement to existing seismic data. There are at least five types of

magnetometers, three of which are commonly used in airborne magnetic surveying. In addition to the different types of magnetometers, there are also several different configurations that can be used on the aircraft. These configurations include: (1) a single sensor, typically a tail installation; (2) two horizontally separated magnetometers, usually wingtip pod sensors; (3) two vertically separated sensors, usually tail-mounted; and (4) a total magnetic intensity configuration, typically involving three, but potentially four, magnetic sensors. The sensor pods are cylindrical in shape, and typically 1-2 m (3.3-6.6 ft) long and several centimeters (several inches) in diameter.

The objectives of the survey (such as the amount of area to be covered, the desired detail to be obtained, etc.) and the cost determine three of the most important factors to be specified for any given survey: (1) the altitude at which the survey will be conducted; (2) the flight-line separation; and (3) the flight-line orientation, or direction. Recent surveys done in the Gulf of Mexico have been flown at altitudes of 60-300 m (200-1,000 ft), at speeds of 110 knots (250 km/hr), and with line spacings of 0.5-2 km (0.3-1.3 mi). Similar surveys were recently completed offshore Greenland and offshore Honduras.

ATTACHMENT C

May 7, 2014

Via Federal eRulemaking Portal

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123–2394

Re: Comments on Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS

Dear Mr. Goeke:

This letter provides the comments of the International Association of Geophysical Contractors ("IAGC") in response to the Bureau of Ocean Energy Management's ("BOEM") Notice and Request for Comments on its Final Programmatic Environmental Impact Statement for Proposed G&G Activities on the Mid- and South Atlantic OCS ("PEIS"). *See* 79 Fed. Reg. 13,074 (Mar. 7, 2014). We appreciate BOEM's consideration of the comments set forth below.

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. IAGC members have expressed interest in conducting geophysical activities on the Atlantic OCS, and some IAGC members have already filed applications for authorizations relating to such activities.[1]

[1] In a joint letter with the American Petroleum Institute ("API") and the National Ocean Industries Association ("NOIA"), IAGC earlier commented on the draft PEIS ("DPEIS"). *See* Letter from Andy Radford, Sarah Tsoflias, and Luke Johnson to Gary D. Goeke (July 2, 2012) ("DPEIS Comment Letter"). API, NOIA, and IAGC have also submitted a comment letter dated

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Seismic surveys are the only feasible technology available to accurately image the subsurface before a single well is drilled. BOEM currently estimates that the Mid- and South Atlantic OCS holds at least 3.3 billion barrels of oil and 31.3 trillion cubic feet of natural gas. Although these estimates are impressive, it is widely believed that modern seismic imaging using the latest technology will enable BOEM to more accurately evaluate the Atlantic OCS resource base. The industry's advancements in geophysical technology – including seismic reflection and refraction, gravity, magnetics, and electromagnetic – will provide more realistic estimates of the potential resource. By utilizing these tools and by applying increasingly accurate and effective interpretation practices, IAGC's members can better locate and dissect prospective areas for exploration.

For the energy industry, modern seismic imaging reduces risk by increasing the likelihood that exploratory wells will successfully tap hydrocarbons and decreasing the number of wells that need to be drilled in a given area, reducing associated safety and environmental risks and the overall footprint for exploration. Because survey activities are temporary and transitory, it is the least intrusive and most cost-effective means to understanding where recoverable oil and gas resources likely exist in the Mid- and South Atlantic OCS.

I. OVERVIEW

IAGC supports BOEM's plan to authorize exploratory activities on the Atlantic OCS consistent with the Outer Continental Shelf Lands Act ("OCSLA"), which calls for the "expeditious and orderly development" of the OCS "subject to environmental safeguards." 43 U.S.C. § 1332(3). However, the PEIS undermines OCSLA's mandate, as well as the requirements of other applicable laws, such as the Marine Mammal Protection Act ("MMPA"), in a number of ways. In general, a fundamental flaw with the PEIS is its establishment of an unrealistic scenario in which exploration activities are projected to result in thousands of incidental takes of marine mammals, which BOEM admits will not actually occur. The supposed effects of this "worst case" hypothetical scenario are then addressed in the PEIS with mitigation measures, many of which are similarly unrealistic because they mitigate inaccurately presumed effects. This approach is contrary to both the best available scientific information and applicable law.

Many of the mitigation measures recommended in the PEIS are infeasible, will impose serious burdens on industry, may discourage exploration of the Atlantic, and will result in no benefits to protected species (because they address unrealistic effects). IAGC can and will support mitigation measures that are well supported by the best available science, consistent with existing practices that are proven to be effective and operationally feasible. However, we cannot

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May 7, 2014 (the "Joint Trades Letter"), in response to the PEIS, which IAGC incorporates by reference.

support mitigation measures with no basis in fact or science, which are intended to address effects that will not occur, and which will result in less exploration of the OCS, contrary to OCSLA.

Accordingly, we strongly urge BOEM to include in its Record of Decision ("ROD") the modifications suggested in the comments set forth below. With respect to the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested below are incorporated into the ROD. All of these suggested modifications are within the scope of the analyses contained in the PEIS. *See Great Old Broads for Wilderness v. Kimbell*, 709 F.3d 836, 854-55 (9th Cir. 2013) (modified alternative in ROD upheld because all relevant impacts analyzed in NEPA document); *see also W. Watersheds Project v. BLM*, 721 F.3d 1264, 1277-78 (10th Cir. 2013) (same).

II. DETAILED COMMENTS

A. The PEIS's Marine Mammal Impact Analyses Are Factually and Legally Flawed

The PEIS's analysis of marine mammal impacts is, by BOEM's admission, an unrealistic assessment of the potential impacts of geophysical surveys on marine mammals that is purposefully constructed to overestimate levels of incidental take. The PEIS explains:

> The acoustic and impact modeling conducted to develop these [incidental take] estimates is by its very nature complex and demands numerous specific details be identified and used during calculations[.] However, it must be emphasized that each of these assumptions are purposely developed to be conservative and accumulate throughout the analysis (e.g., representative sound source is modeled at highest sound levels and always at maximum power and operation, sound levels received by an animal are calculated at highest levels, marine mammal density values used likely exceed actual densities, and models do not include the effect of all mitigations in reducing take estimates). Therefore, the results of the modeling predictions will overestimate take.

PEIS at 1-5 (emphases added); *see also* PEIS at 4-62 ("BOEM emphasizes that these estimates should be seen as highly conservative of potential take without the consideration of most mitigation with the exception of the time-area closure described in Alternative A."). The results of this hypothetical "worst case" scenario analysis are strikingly divergent from the record of actual observed marine mammal impacts related to offshore exploration activities. *See* DPEIS Comment Letter §§ I, II & Appx. 1. For example, the PEIS implausibly concludes that thousands of marine mammals will experience Level A incidental take, and that hundreds of thousands of marine mammals will experience Level B incidental take, as a result of seismic

activities. PEIS at Tables 4-9, 4-10, 4-11, 4-12. These take estimates would result in tens of thousands of shutdown events per year, in contrast to the average 55 shutdowns that are required per year in the Gulf of Mexico under existing operations, monitoring, and mitigation.[2] *See* DPEIS Comment Letter, Appx. 1.

We are aware of no federal agency assessment of the effects of seismic activities on marine mammals that results in incidental take estimates that are remotely similar to those stated in the PEIS. Moreover, the history of incidental take authorizations for offshore seismic activities demonstrates that levels of actual incidental take are far smaller than even the most balanced pre-operation estimates of incidental take. *See* DEIS at E-69.[3] The PEIS's flawed

[2] Aggregating the estimated takes presented in Table 43 of the PEIS yields a total of 26,000 estimated takes.

[3] *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/ ("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."); *id*. at 2-23 (with respect to sea turtles, "no significant cumulative impacts to sea turtles would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area"); 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 (WPA); *id*. at 4-710 (v.2), 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."); *id*. at 4-235, 4-741 ("[T]here are no data to suggest that routine activities from the preexisting OCS Program are significantly impacting sea turtle populations."); 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 (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 ("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

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approach to assessing the impacts of seismic activities on marine mammals results in a number of significant legal and factual errors, as set forth below.

1. The PEIS unlawfully analyzes a worst case scenario

Prior to 1986, NEPA regulations required a lead agency to prepare a "worst case analysis" of impacts for which there is incomplete or unavailable information. *See* 51 Fed. Reg. 15,618 (Apr. 25, 1986).[4] However, this requirement was expressly rescinded decades ago because it was found to be "an unproductive and ineffective method of achieving [NEPA's] goals; one which can breed endless hypothesis and speculation." *Id*.; *see Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354-56 (1989) (U.S. Supreme Court confirming that worst case analysis is no longer applicable). In place of the worst case analysis requirement, the federal Council on Environmental Quality ("CEQ") promulgated "a wiser and more manageable approach to the evaluation of reasonably foreseeable significant adverse impacts in the face of incomplete or unavailable information in an EIS." 51 Fed. Reg. at 15,620. The new (and current) approach, codified in 40 C.F.R. § 1502.22, requires federal lead agencies to disclose such impacts and perform a "carefully conducted" evaluation based upon "credible scientific evidence." *Id*.; 40 C.F.R. § 1502.22(b)(1). In developing this requirement, CEQ explained that "credible" means "capable of being believed" and stated that "[i]nformation which is unworthy of belief should not be included in an EIS." 51 Fed. Reg. at 15,622-23 (responses to comments) (emphasis added).

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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 ("[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 ").

[4] In the PEIS, BOEM determines that there is incomplete or unavailable information for a full assessment of the impacts of the proposed activities on marine mammals. *See* PEIS at 4-6, 4-47.

By performing an analysis of marine mammal impacts that is "purposely developed to be conservative," based on the "highest" sound levels and erroneously high marine mammal densities, and intended to "overestimate take," BOEM has performed precisely the same type of "worst case analysis" that was rejected by both CEQ and the U.S. Supreme Court many years ago. By its terms, and as expressly stated in the PEIS, the analysis of marine mammal impacts is purposely designed to be inaccurate and to evaluate the worst possible consequences that could hypothetically result from unmitigated seismic surveying. Indeed, it is hard to imagine an analysis that presents a scenario worse than the hundreds of thousands of incidental takings that are erroneously predicted by the PEIS. The PEIS's analysis of marine mammal effects is plainly not credible, it evaluates effects that, by BOEM's admission, will not occur, and, therefore, it is "unworthy of belief." The PEIS's assessment of marine mammal impacts unlawfully applies a "worst case" analysis and does not comply with NEPA or currently applicable CEQ regulations (40 C.F.R. § 1502.22).

2. The PEIS does not present an accurate scientific analysis

An EIS must rely upon "high quality" information and "accurate scientific analysis." 40 C.F.R. § 1500.1(b); *Conservation Nw. v. Rey*, 674 F. Supp. 2d 1232, 1249 (W.D. Wash. 2009); *Envtl. Def. v. U.S. Army Corps of Eng'rs*, 515 F. Supp. 2d 69, 78 (D.D.C. 2007) ("Accurate scientific analysis [is] essential to implementing NEPA."). It also must have "professional integrity, including scientific integrity" and may not rely on "incorrect assumptions or data" or "highly speculative harms" that "distort[] the decisionmaking process." *See Theodore Roosevelt Conservation P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010); 40 C.F.R. § 1502.24; 73 Fed. Reg. 61,292, 61,299 (Oct. 15, 2008) (CEQ regulations require "high quality" information and "scientific integrity"); *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005); *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005) (internal citations omitted).[5] To be sure, courts have invalided EISs that did not meet these standards, that were based on "stale scientific evidence . . . and false assumptions," or that failed to disclose the "potential weakness" of relied-upon modeling. *See, e.g., Seattle Audubon Soc'y v. Espy*, 998 F.2d 699, 704 (9th Cir. 1998); *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 897 (9th Cir. 2007) (citations omitted).

Respectfully, the PEIS fails to satisfy any of these important NEPA principles. An analysis that, by the agency's admission, overestimates take and relies upon incorrect assumptions, is, by definition, "inaccurate." Moreover, the PEIS's analysis of marine mammal impacts is, at best, "highly speculative" because it is based on scenarios and assumptions that will not occur.

[5] *See also CBD v. BLM*, 937 F. Supp. 2d 1140, 1155 (N.D. Cal. 2013) (principle that reasonably foreseeable environmental effects may not include "highly speculative harms" is equally applicable to direct and indirect effects).

3. The conclusions of the PEIS fail to consider, and are contrary to, the MMPA

The PEIS's assessment of marine mammal impacts is directly contrary to the MMPA. BOEM has defined the proposed action to include only those activities that have first received incidental take authorizations under the MMPA. *See* PEIS at 1-14, 1-25. As a prerequisite to incidental take authorization, the MMPA requires the permitting agency to find that the authorized take will have a "negligible impact" on marine mammals. 16 U.S.C. § 1371(a)(5)(A), (D). Accordingly, by definition, the proposed action analyzed in the PEIS should include only those seismic activities causing incidental take at levels that NMFS has expressly determined result in a "negligible impact" to marine mammal stocks. However, in sharp contrast, the PEIS concludes that the impacts of airguns on marine mammals under the proposed action are "moderate." PEIS at Table 2-4. By concluding that "moderate" impacts will result from seismic operations, BOEM has incorrectly analyzed the proposed action that is defined in the PEIS. Moreover, this discrepancy highlights the significant flaws that result from the PEIS's erroneous analysis of marine mammal impacts.[6] BOEM must analyze the effects of the action it has proposed, which includes offshore seismic operations that will receive incidental take authorizations under the MMPA and, by definition, will have no more than a negligible impact on marine mammal stocks. Based on 40 years of experience and recent scientific research and observational data, BOEM should find in the ROD that the impacts of seismic exploration are indeed negligible.

B. Certain Mitigation Measures Recommended in the PEIS Are Unsupported and Unreasonable

The record demonstrates that the scope of mitigation measures applied to offshore operations in the Gulf of Mexico is already more than adequate to protect marine mammals and sea turtles in a manner consistent with federal laws.[7] Despite this record, the PEIS recommends

[6] The PEIS's "moderate" impact finding is also factually inconsistent. "Moderate" impacts are defined in the PEIS as "detectable, short-term, extensive, and severe; or … detectable, short-term or long-lasting, localized, and severe; or … detectable, long-lasting, extensive or localized, but less than severe." PEIS at x. Accordingly, a "moderate" seismic impact must be either "long-lasting" or "severe." However, insofar as we are aware, no seismic activities that have received MMPA incidental take authorizations have caused impacts amounting to anything more than temporary changes in behavior, without any known injury, mortality, or other adverse consequence to any marine mammal species or stocks. *See supra* note 3.

[7] *See supra* note 3; *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) ("[I]t is unlikely that the

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certain mitigation measures that have never been required for offshore exploratory operations, and that are more stringent (and less supported) than the measures that have already been successfully implemented. The unprecedented measures recommended in the PEIS are a direct result of BOEM's flawed impact assessments. For example, as described above, the PEIS creates a hypothetical worst case scenario for marine mammal impacts, determines that the projected adverse effects in that scenario will be substantial, and then recommends mitigation measures to address those supposed effects. However, because the adverse effects identified in the PEIS are inaccurate and unrealistic, the mitigation measures intended to address those effects are similarly flawed and without any factual or scientific support.

The mitigation measures that particularly concern IAGC are addressed in detail below. Without question, these measures, if implemented, will have substantial adverse effects on offshore geophysical operations. These measures will result in increased survey duration, which, in turn, can increase the potential exposure of marine mammals to seismic-related effects.[8] We strongly urge BOEM to reconsider these mitigation measures as it prepares the ROD.[9]

1. Dolphin shutdowns

The PEIS recommends a mitigation measure calling for the shutdown of operations if a dolphin enters the acoustic exclusion zone unless the dolphin is determined by the observer to be

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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, 14789 (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.").

[8] 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.

[9] The effects analysis contained in NMFS's associated biological opinion suffers from the same flaws as the PEIS's effects analysis. In addition, the terms and conditions stated in the biological opinion (which mitigate the inaccurate effects conclusions) lack a rational basis for the reasons stated in this letter with respect to the PEIS's corresponding mitigation measures. IAGC requests that BOEM work with NMFS to similarly reconsider and modify the biological opinion's terms and conditions.

voluntarily approaching the vessel. PEIS at 2-11.[10] This proposed measure is contrary to the best available science, impractical, arbitrary, and unsupported for at least the following reasons.

First, dolphins are mid- to high-frequency specialists and, therefore, insensitive to the low frequency impulse sounds emitted by seismic operations. The E&P Sound and Marine Life Joint Industry Program has supported research to study the effects of multiple airgun pulses in odontocetes and, specifically, to study whether bottlenose dolphin exposure to airgun impulses results in temporary threshold shift ("TTS").[11] As the public abstract from the study explains, "subjects participated in over 180 exposure sessions with no significant TTS observed at any test frequency, for any combinations of range, volume or pressure during behavioral tests." [12] Even at ranges as close as 3.9 m and with the air gun operating at 150 in^3 and 2000 psi, resulting in cumulative Sound Exposure Levels of 189-195 dB re 1μPa^2s, the impulses did not result in detectable TTS in any dolphin tested. As a result of the relative low-frequency content of airgun impulses compared to the relative high-frequency hearing ability of dolphins, no injuries or significant behavioral responses were observed in this study.[13] Industry observations corroborate this scientific evidence. For example, dolphins are frequently observed by personnel on seismic vessels to approach the vessels during operations to bow-ride and chase towed equipment – a direct indication of insensitivity to seismic sound generation. PSO observation reports indicate that there is no statistically significant difference between the frequency of dolphin sightings and

[10] "Voluntary approach" is defined as "a clear and purposeful approach toward the vessel by delphinid(s) with a speed and vector that indicates that the delphinid(s) is approaching the vessel and remains near the vessel or towed equipment." PEIS at 2-11.

[11] James J. Finneran et al., *Final Report* (2013). TTS in odontocetes in response to multiple airgun impulses. (IAGC understands that a copy of this Final Report has been furnished by the author to NMFS).

[12] C.E. Schlundt et al., *Auditory Effects of Multiple Impulses from a Seismic Airgun on Bottlenose Dolphins*, presentation at the Effects of Noise on Aquatic Life Third International Conference, Budapest, Hungary (Aug. 11-16, 2013) (emphasis added). The results of this study also are useful to support inclusion of frequency weighting in updated acoustic criteria.

[13] In a 2011 Programmatic EIS, the National Science Foundation recognized that "[t]here has been no specific documentation that TTS occurs for marine mammals exposed to sequences of air-gun pulses during operational seismic surveys." Programmatic EIS/OEIS for NSF-Funded & USGS Marine Seismic Research, at 3-133 (June 2011), http://www.nsf.gov/geo/oce/envcomp/usgs-nsf-marine-seismic-research/nsf-usgs-final-eis-oeis_3june2011.pdf (recognizing 180 dB re 1 uPa (rms) criterion for cetaceans "is actually probably quite precautionary, i.e., lower than necessary to avoid TTS at least for delphinids, belugas and similar species").

acoustic detections during seismic operations when the source is active or silent. *See* Attachment A.[14]

Second, even if there were scientific justification for the proposed dolphin shutdown mitigation measure (which there is not), implementation of the measure is impractical. We are aware of no mitigation measures applicable to offshore exploration activities in which an observer is required to subjectively determine the intent of a marine mammal. Determining marine mammal intent from great distances is very difficult for experienced marine mammal biologists in staged scientific experiments, let alone for observers who will be attempting to determine dolphin intent over vast distances in the ocean environment. Based on observation reports, PSOs will be unable to confidently assess animal behavior or "intentions" because they cannot accurately determine species within the expanded exclusion zone.[15] The result is that observers will likely, out of caution, call for shutdowns in almost all instances where dolphins are observed within the exclusion zone.

Third, in areas of high-density dolphin populations, such as the Atlantic Ocean and the Gulf of Mexico, shutdown requirements for a species that enjoys bow-riding and approaching vessels could effectively bring all seismic activity to a halt. Implementation of this proposed measure will substantially increase the number of shutdowns and delays in ramp-ups, which will result in much longer surveys and significantly increased costs with no environmental benefit. *See* Barkaszi, *supra*, note 7, at 1 (75% of delays in ramp-ups due to presence of protected species in exclusion zone during 30 minutes prior to ramp-up were due to dolphins).

Fourth, the proposed measure is without precedent. Under Joint NTL No. 2012-G02 (and previously NTL No. 2007-G02), BOEM required seismic operators in the Gulf of Mexico to shut down for any whale observed in the exclusion zone. BOEM defined "whales" as all marine mammals except dolphins and manatees. In the June 2013 settlement of litigation challenging BOEM's permitting of seismic activity in the Gulf of Mexico, the U.S. District Court for the Eastern District of Louisiana extended the shutdown requirements to manatees. In short, no

[14] *See also* A. MacGillivray et al., *Marine Mammal Audibility of Selected Shallow-Water Survey Sources*, J. Acoustical Soc'y of Am. 135(1) (Jan. 2014).

[15] *See* Attachment A. It is well known that different species will exhibit different behaviors. For example, Risso's dolphins generally avoid vessels and rarely bow-ride, rough-toothed dolphins generally avoid vessels but do bow-ride, and common dolphins are avid bow-riders. *See* K. Wynn & M. Schwartz, *Guide to Marine Mammals and Turtles of the U.S. Atlantic and Gulf of Mexico* (2009).

dolphin shutdown provision, as recommended in the PEIS, has ever been required by any federal agency.[16]

Finally, there is no legal basis for the proposed dolphin shutdown measure. Under the MMPA, mitigation measures attached to incidental take authorizations must address the reduction of incidental take. *See* 16 U.S.C. §§ 1371(a)(5)(A), (a)(5)(D); 50 C.F.R. § 216.104(a)(13). However, as set forth above, there is no scientific evidence demonstrating that active acoustic seismic surveys result in any incidental takes of dolphins. Accordingly, there is no statutory basis for recommending the dolphin shutdown mitigation measure.

In sum, the proposed dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support. IAGC respectfully requests that BOEM, in its ROD, expressly find that this recommended measure is unsupported and unnecessary, and exclude the measure from the ROD's recommended mitigation measures. The ROD should also affirmatively clarify that shutdown is not required for dolphins within the exclusion zone in all circumstances, regardless of whether dolphins are exhibiting bow-riding behavior or any other behavior.

2. 40 km buffer zone between concurrent surveys[17]

In Alternative B, BOEM recommends an expanded 40 km buffer zone between concurrent seismic surveys. The rationale for this expanded buffer is "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is below Level B thresholds and approaching ambient levels." PEIS at 2-37. The agency's stated scientific basis for this proposed measure is, at best, ambiguous: "New information suggests that, in some circumstances, airgun noise can be detected at great distances from the sound source, such as across ocean basins (Nieukirk et al., 2012), yet it is unknown if detection of sound at these distances has any effect on marine mammals or other marine species." PEIS at 2-38. No other scientific evidence, no published studies, and no other rationale are provided for this proposed measure, which is given a half-page explanation in Appendix C. In addition, this proposed

[16] For example, in the Gulf of Mexico, the average shutdown lasts for 58 minutes, *see, e.g.*, Barkaszi, *supra*, note 7, which the PEIS would extend by at least 30 minutes by increasing the visual monitoring period following a shutdown from 30 to 60 minutes. Multiplying a rough 1.5-hour average shutdown by 26,000 shutdowns would yield roughly 39,000 hours of shutdowns or approximately 1625 days. Because the typical seismic survey operation costs roughly $1.5 million per day, the total potential costs arising from the PEIS's assumptions equal a staggering $2.5 billion.

[17] This measure, as well as the 60-minute "all clear" period addressed below, were not addressed anywhere in the DPEIS. This is the first opportunity the regulatory community has had to comment on these measures.

measure is not mentioned at all in the biological opinion.

In contrast, the best available scientific information supports a buffer zone, if any, of 17.5 km, which is the standard separation distance maintained by seismic operators. The modeling performed by JASCO (*see* PEIS at Appx. D) demonstrates that the typical exposure radius for the 160 dB threshold is 10 km. The largest observed exposure radius was 15 km, but this occurred in less than 10% of the modeled cases. The lowest observed exposure radius was 5 km. Current technology has enabled many operators to decrease typical exposure radii to 7 to 9 km.

A buffer zone that more than doubles the highest possible exposure radii is clearly not reasonable or scientifically supportable – i.e., it is arbitrary. Moreover, the PEIS's reference to airgun noise detections at "great distances" does not support the proposed buffer zone because those detections occur (if at all) at very low levels that are well below the thresholds NMFS has established for Level B harassment.

The recommendations and analyses in an EIS must be "accurate," not speculative, and grounded in "high quality" scientific information. *See supra* Section II.A.2. The recommended 40 km buffer zone fails all of these standards. There is literally no scientific information that supports this measure, and, as explained above, the best available information contradicts it. To our knowledge, no buffer zones even approaching this magnitude have ever been required as a condition of offshore seismic authorizations.[18] To make matters worse, BOEM admits in the PEIS that implementation of the 40 km buffer would result in no additional benefits to protected species. PEIS at xxiv (40 km buffer "would not be expected to change any impact ratings"). Consequently, BOEM must decline to adopt the 40 km buffer zone mitigation measure in the ROD and, instead, recommend either no buffer zone, as recommended in Alternative A, or, alternatively, a 17.5 km buffer zone, consistent with standard practice.

3. 60-minute "all clear" period

The PEIS recommends that monitoring of the exclusion zone shall "begin no less than 60 min prior to start-up" and that restarting of equipment after a shutdown "may only occur following confirmation that the exclusion zone is clear of all marine mammals and sea turtles for 60 min." PEIS at C-29. However, again, BOEM has provided no factual or scientific support for this measure, nor is any meaningful supporting information provided in the biological opinion. To our knowledge, a 60-minute "all clear" period has never been required as a condition of any offshore seismic authorization in the United States. In fact, the routine and proven-to-be-effective practice is to require a 30-minute "all clear" period – for marine mammals

[18] *See, e.g.*, 78 Fed. Reg. 35,364, 35,423 (June 12, 2014) (vessel spacing of 24 km required to avoid any effects of multiple surveys on migrating or foraging walruses).

generally and for ESA-listed species.[19] There is no available information suggesting that the standard practice has not been effective and, to the contrary, all available information demonstrates that the standard practice has been very successful in protecting marine mammals.

Expanding the standard 30-minute "all clear" period to 60 minutes will substantially increase the duration and cost of seismic surveys, which, in turn, increases safety and environmental risks. Extrapolated over all surveys that will be performed over a five-year period, the increased time and expenses resulting from this mitigation measure alone will be dramatic. Increased survey time will also increase the amount of time that protected species are exposed to the potential effects associated with the presence of vessels. The PEIS contains no analysis of the increased operational or environmental effects associated with the 60-minute "all clear" period, compared to the standard 30-minute period (and sometimes 15-minute period) that has successfully been implemented in all offshore seismic operations to date.[20] Accordingly, in the ROD, BOEM should decline to adopt the 60-minute period as unsupported and unprecedented and, instead, adopt the standard 30-minute period.

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[19] *See Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 79 Fed. Reg. 13,626, 13,636-37 (Mar. 11, 2014) (requiring 30-minute observation period before startup and after sightings of killer and ESA-listed beluga whales and large odontocetes, but only 15-minute period after sightings of pinnipeds and small odontocetes); *Issuance of IHA to Apache Alaska Corp. for Seismic Survey in Cook Inlet*, 78 Fed. Reg. 12,720, 12,732-33 (Feb. 25, 2013) (providing same requirements, and specifying that the shorter 15-minute clearance period applies to harbor porpoises); *Issuance of IHA to TGS-Nopec for Seismic Survey in Chukchi Sea*, 78 Fed. Reg. 51,147, 51,154, 51,160 (Aug. 20, 2013) (same); *Issuance of IHA to Shell and WesternGeco for Seismic Surveys in the Beaufort and Chukchi Seas*, 73 Fed. Reg. 66,106, 66,135-36 (Nov. 6, 2008) (requiring 30-minute observation period before ramp-up and 15- or 30-minute delay of ramp-up for sightings of small odontocetes and pinnipeds, or baleen whales and large odontocetes, including ESA-listed species, respectively); *Issuance of ITR for Oil and Gas Activity in Chukchi Sea*, 78 Fed. Reg. 35,364, 35,424, 35,425 (June 12, 2013) (requiring monitoring period of 30 minutes for walruses and ESA-listed polar bears before startup and after sighting); *Issuance of ITR for Oil and Gas Activity in Beaufort Sea*, 76 Fed. Reg. 47,010, 47,052 (Aug. 3, 2011) (same).

[20] Pre-ramp-up and post-shutdown, the vessel is still moving and likely would move 8-9 km at 3-5 knots in a 60-minute period, bypassing any established exclusion zone several times. *See* 79 Fed. Reg. at 14,797 (NMFS stating that ramp-up is unnecessary "[b]ecause the vessel has transited away from the vicinity of the original sighting during the 8-minute period, implementing ramp-up procedures for the full array after an extended power-down (i.e. transiting for an additional 35 minutes from the location of initial sighting) would not meaningfully increase the effectiveness of observing marine mammals approaching or entering the exclusion zone for the full source level and would not further minimize the potential for take").

4. Exclusion zones greater than 500 meters

The PEIS explains that exclusion zones "shall be calculated independently and shall be based on the configuration of the array and the ambient acoustic environment, but shall not have a radius of less than 500 m…." PEIS at 2-10. BOEM's suggested approach for exclusion zones will require 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 Gulf of Mexico. *See supra* note 3. The expanded exclusion zones are especially concerning because they will ultimately be dictated by the hearing group with the largest modeled radii once new group-specific acoustic criteria are implemented. High-frequency cetaceans, particularly delphinids, will therefore determine the size of the exclusion zone in most instances. Since BOEM is applying shutdown requirements to delphinids, and, as described above, because the exception to those requirements will rarely be applied in practice, this will result in numerous shutdowns due to the observation of delphinids within the large exclusion zone.

Moreover, these shutdowns will serve no environmental benefit because, as explained above, the best available science and information demonstrates that delphinids are unaffected by the lower frequency sounds produced by seismic operations. Exclusion zones should be based on the best available science and modeling and, if that modeling 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 minimum 500 m exclusion zone requirement is not applied, IAGC would support the incorporation of power-down procedures to mitigate any potential effects. Power-down procedures acceptable to IAGC are a modified version of the procedures described at 79 Fed. Reg. 14,780, 14,797 (Mar. 17, 2014) ("Langseth IHA").[21]

5. Turtle shutdowns

The PEIS applies exclusion zone shutdown criteria equally to marine mammals and sea turtles. However, the PEIS does not meaningfully address the fact that sea turtles are much more difficult to observe than marine mammals. Sea turtles can be reasonably observed at distances of 100 m to 300 m from a vessel, but it is very unlikely that sea turtles can be reliably observed at greater distances. *See* Attachment A (most turtle observations within 100 m). In addition, if a sea turtle is observed within the exclusion zone (triggering a shutdown of airguns), assuming the vessel is moving at 3 to 5 knots, the observed turtle will be outside of the exclusion zone within approximately 15 minutes because sea turtles swim very slowly compared to marine mammals.

[21] Specifically, IAGC 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.

In such circumstances, a 60-minute "all clear" requirement would plainly be unnecessary (setting aside the fact that it is unnecessary in all circumstances).

Because turtles are difficult to observe at distances greater than 300 m, application of the exclusion zone shutdown to sea turtles is infeasible and will very likely result in unwarranted shutdowns because observers, acting out of precaution, will call for shutdowns when anything resembling a sea turtle is observed. There is also no existing scientific basis for the proposed turtle shutdown requirement, and none is provided in the PEIS. *See supra* note 3. The ROD should therefore recommend a reduced exclusion zone for sea turtles that is feasible and practical. Such a reduction is also consistent with the best available science, which indicates that sea turtles are not as sensitive to sound as marine mammal species. *See* PEIS, Appx. I. IAGC recommends a 300 m exclusion zone for all sea turtle species.

6. Expanded NARW time-area closure and DMAs[22]

As part of Alternative B, BOEM recommends an expansion of the time-area closure applicable to North Atlantic Right Whales ("NARW") to a continuous 37 km-wide zone extending from Delaware Bay to the southern limit of the programmatic area. PEIS at C-32. It appears that BOEM intends this closure to be applied to <u>any</u> sound produced by seismic vessels such that no portion of a vessel's ensonification zone may enter the closed area. The result is that the proposed NARW time-area closure will be much larger than what is described in the PEIS. Because NARWs are primarily threatened by ship strikes and fishing entanglement – not seismic sound – BOEM should clarify in its ROD that the NARW time-area closure applies to the <u>presence of vessels, not a vessel's ensonified zone.</u> BOEM should also clarify in its ROD that vessels may transit through the closure area when seismic equipment is not active.

In addition, the PEIS includes time-area closure measures in areas designated as Dynamic Management Areas ("DMAs") under NMFS's ship-strike reduction regulations. *See* PEIS at C-16. These measures are very problematic, and unwarranted, for at least the following reasons:

- DMAs were created to address ship strike situations, which involve vessels traveling at high rates of speed (12-20 knots). Indeed, NMFS has indicated that vessel speeds of less than 10 knots are sufficiently protective. *See* 78 Fed. Reg. 73,726 (Dec. 9, 2013). BOEM's proposed application of DMAs to seismic operations is therefore contrary to both the original purpose of DMAs (to address ship strikes, not potential acoustic impacts) and NMFS's recent finding. Moreover, the proposed application to seismic vessels is particularly arbitrary because BOEM intends to broadly apply it to the vessel's 160 dB ensonified zone.

[22] The DMA-related measures were also not included for public review in the DPEIS.

- Nowhere has either BOEM or NMFS evaluated the operational practicability or effectiveness of applying DMAs to seismic operations.

- Unlike NMFS's approach to DMAs, BOEM appears to propose to make seismic industry compliance with DMAs mandatory. There is no basis for such a measure, especially given that NMFS has taken no such step for the vessels that DMAs were intended to address.

- DMAs are unpredictable and the identification of DMAs on short notice will compromise the implementation of seismic survey operations that have been carefully planned over a substantial period of time, with no corresponding benefit.

7. Vessel strike avoidance

The PEIS's recommended vessel strike avoidance measures for ESA-listed whales present serious operational and safety problems, and must be modified. Specifically, the PEIS recommends that if a vessel comes within 100 m of an ESA-listed whale species, it "must reduce speed and shift the engine to neutral, and must not engage the engines until the whale(s) has moved outside of the vessel's path and the minimum separation distance has been established." PEIS at C-9. Respectfully, this measure fails to consider that seismic vessels are significantly different than typical vessels due to the substantial amount of highly specialized equipment that is towed behind a seismic vessel. Operationally, a seismic vessel must maintain forward motion to sustain the equipment spread or the whole system will collapse. The consequence of immediately shifting the engine into neutral could be significant equipment damage in the tens of millions of dollars, and weeks of vessel downtime. As a practical matter, a seismic vessel moving at 3 to 5 knots is very unlikely to strike an ESA-listed marine mammal. In the event of a sighting of an ESA-listed whale within 100 m of the vessel, the vessel could slow (to no less than 3 knots) and turn gently away from the animal, which would both avoid a collision and lessen the risk of damage to seismic equipment. In its ROD, BOEM must decline to adopt the vessel strike avoidance mitigation measure.

8. Passive acoustic monitoring

Under Alternative B, BOEM would require the use of Passive Acoustic Monitoring ("PAM") as part of the Seismic Airgun Survey Protocol. IAGC encourages consideration of PAM during periods of low visibility in its 2011 best practices guidelines. PAM is one of several monitoring techniques that compliments (rather than replaces) traditional visual monitoring. However, commercially available PAM systems can be highly variable, the equipment is unreliable, and PAM's utility as a secondary monitoring source during daylight observations has not been proven. Overall performance and capabilities of PAM are highly dependent on factors such as technical specification of equipment, operational setting, availability of experienced and trained personnel, and the species of marine mammals present in a given area. Mandatory use of PAM will increase survey cost, require the placement of more

personnel on vessels (i.e., four dedicated PAM observers onboard), and increase entanglement risk due to more gear being towed in the water.

IAGC therefore urges BOEM to either make the use of PAM optional, as recommended in Alternative A, or require PAM only for operations at night and in periods of low visibility.[23] This is reasonable given BOEM's admission that "it is difficult to quantify any difference in impact level [of Alternative B] relative to Alternative A." PEIS at 2-40; *see also* PEIS at xxiv ("The degree of improvement [due to making PAM mandatory] has not been estimated but would not be expected to change any impact ratings."). IAGC encourages BOEM to use risk-based mitigation and monitoring measures based on the best available information and promote development of technologies that can best accomplish effective detection and monitoring of marine mammals.

9. National standards for protected species observers

The PEIS and biological opinion purport to adopt the recommendations described 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) ("Observer Standards"). However, this document was never released for public review and comment and was not referenced in the PEIS. Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, 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. 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 (attached) more specifically addresses our concerns with the Observer Standards and offers constructive solutions. We appreciate BOEM's consideration of our concerns.

C. The Adaptive Management Provisions Must Be Clarified and Improved

Although the PEIS states that BOEM will consider future data regarding the efficacy of mitigation measures and will adjust requirements for individual surveys, the PEIS appears to establish minimum standards that can only become more stringent through adaptive management. *See* PEIS at 2-39 (adaptive management at the site-specific level "would analyze the best available information and apply additional mitigation, depending on the site-specific proposed action" (emphasis added)); *see also* PEIS at 1-27 to 1-28 (examples largely focus on

[23] NMFS's biological opinion (page 308) only requires PAM for ramp-up at night or in periods of low visibility.

"additional" measures). As just one example, BOEM has established 500 m as a minimum exclusion zone and indicates that it will not set exclusion zones less than 500 m even if a smaller zone is supported by data and modeling.

The ROD must clarify that BOEM will implement "adaptive management" in the true sense of the term – i.e., site-specific requirements may be adjusted to be either less restrictive or more restrictive based on the project-specific information, the species present in the project area, the assessment of relevant risks, and the best available information.

III. CONCLUSION

IAGC appreciates this opportunity to comment on the PEIS. Although we support BOEM's plan to authorize exploratory activities on the Atlantic OCS, there are several aspects of the PEIS that are not supported by science or by law, or are otherwise infeasible. Of the alternatives presented in the PEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, IAGC would support BOEM's adoption of Alternative B only so long as all of the modifications suggested in these comments are incorporated into the ROD. We appreciate your consideration of our comments and sincerely hope that BOEM will prepare a ROD that addresses the concerns set forth above. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Karen St. John
Group Vice President - Environment

International Association of Geophysical Contractors

cc: Mr. Walter Cruickshank (Walter.Cruickshank@boem.gov)
Ms. Jill Lewandowski (Jill.Lewandowski@boem.gov)

ATTACHMENT D

ATTACHMENT D

PSO Data 2013 - March 2015: Dolphin Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 33% of total vessel activity days in the GOM since 2013.[1] Data prior to 2013 is not included in this analysis because PAM was not used consistently until this point.***		
Species Identification		
% of Unidentified Dolphin	85%	In many reports, PSOs contribute sea state, distance, or the sun's glare as a key factor for not being able to identify species. The significant number of acoustic detections without confirmed species identification is also a main contributor.
% of Identified Dolphin	15%	
PAM		
% of PAM Detections	78%	PAM detections accounted for a majority of the total dolphin sightings and detection reports. However, only 1% of the acoustic detections successfully identified a specific dolphin species. Visual corroboration was necessary to identity the species about 25% of the time.
Source Activity Comparison		
% of sightings and/or acoustic detections – source active	55%	The frequency of sightings and acoustic detections are almost proportional when the source is active or silent.
% of sightings and/or acoustic detections –source silent	45%	
Animal Behavior		
% of sightings when bow-riding was observed (active or silent)	6%	The data indicates an estimated 2% variance in observed bow-riding when the source was active versus when the source was silent. Fewer PSO observations when the source is silent could account for some variance. The values are close enough to conclude the frequency of animal engagement with the vessel is not specific to source status.
Average Distance of Animal at Initial Sighting	570m	Initial sightings and detections are made most often at a distance between 500m and 800m.

PSO Data 2013 - March 2015: Turtle Sightings ***Provided by CGG based on MMO reports submitted to BOEM during this period representing approximately 33% of total vessel activity days in the GOM since 2013.[2] Data is taken from 2013 to be consistent with Dolphin sighting period.***		
Total Sightings	410	410 sea turtles were observed overall.
Average Distance of Animal at Initial Sighting	53m	Analysis of turtle sightings indicates observations are typically within 100m. It is often difficult to ascertain if an object in the water is a turtle or floating debris at further ranges.

[1] Estimated calculation based on level of activity from January 2013 to March 2015 from IHS SeismicBase Vessel Search Database.

[2] *Id.*

May 7, 2014

Mr. Gary D. Goeke
Chief, Environmental Assessment Section
Office of Environment (GM623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Submitted via email: *ggeis@boem.gov*

Re: Comments on the Final Programmatic EIS for the Mid- and South Atlantic

Dear Mr. Goeke:

This letter provides the comments of the American Petroleum Institute ("API"), the International Association of Geophysical Contractors ("IAGC"), and the National Ocean Industries Association ("NOIA"), in response to the Bureau of Ocean Energy Management's ("BOEM") Notice of Availability and Request for Comments on its Final Programmatic Environmental Impact Statement (EIS) for proposed Geological and Geophysical ("G&G") Activities on the Mid- and South Atlantic Outer Continental Shelf ("OCS"). *See* 79 Fed. Reg. 13,074 (March 7, 2014). We appreciate BOEM's consideration of the comments set forth below.

API is a national trade association representing over 600 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. API is a longstanding supporter of allowing new exploration in the Atlantic OCS and the Final Programmatic Environmental Impact Statement ("FPEIS") is the first step toward the much needed collection of new and improved data on potential oil and natural gas resources in the Mid-and South Atlantic OCS Planning Areas.

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.

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 U.S. Outer Continental Shelf ("OCS"). The NOIA membership comprises more than 275 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.

The Associations support BOEM's plan to authorize exploratory activities on the Atlantic OCS consistent with the Outer Continental Shelf Lands Act ("OCSLA"); however, the FPEIS undermines OCSLA's mandate to expeditiously and orderly develop the natural resources of the OCS, and the requirements of other applicable laws such as the Marine Mammal Protection Act, in a number of ways. We feel that the FPEIS establishes an unsupported, unobserved, and unrealistic scenario where G&G activities are projected unrealistically to result in thousands of incidental takes of marine mammals – incidental takes that, in fact, BOEM admits will not actually occur. From this fundamentally flawed and inaccurate approach, the FPEIS develops and analyzes unrealistic mitigation measures to address the effects of a "worst case" hypothetical scenario. This approach is contrary to both the best available scientific information and applicable law. The Associations respectfully recommend that BOEM's Record of Decision (ROD) reflect a revised agency judgment on these issues.

Because G&G activities have little documented impact on marine mammals, the mitigation measures endorsed by Alternative B employ speculation to impose potentially substantial operational and economic burdens on future G&G activities that undermine Congress's clear policy mandate that the Department of Interior facilitate expeditious development of the OCS.

The results of our detailed review of the FPEIS are presented in Appendix 1 attached to this letter, but we have included an overview of the key points contained in the appendix:

1. The FPEIS and future permitting decisions must consider the statutory and environmental context of G&G activities, including the OCSLA. Geological and geophysical activities are critical to the expedited development of OCS resources and the national economic and energy policy goals mandated by OCSLA. The FPEIS omits and undermines much of the critical substantive context and plain congressional directives for the G&G activities analyzed, and it also fails to adequately consider the critical importance of G&G data to OCS development and to the reduction of risks. The ROD that will be prepared based on the FPEIS must consider all relevant factors in balancing the importance of the activities to be permitted, which are critical to the essential purpose of OCSLA.

2. The FPEIS does not incorporate all of the best available science. BOEM discounts observational data that contradict its modeled quantification of G&G impacts and instead relies on unrealistic assumptions regarding sound exposure that are not supported by the best science currently available.

3. Alternative B encourages BOEM to impose unnecessary, arbitrary, and impracticable mitigation measures lacking scientific justification, including the following:

- The FPEIS's expansion of the exclusion zone – compounded by the extension of the shutdown requirement to delphinids – will significantly increase the number of array shutdowns required during a seismic survey, and thereby substantially impact the economics and operations of conducting a seismic survey in the Atlantic. The establishment of a 500-meter minimum is an arbitrary departure from BOEM's rationale for amending the exclusion zone provision. Because BOEM justifies the new exclusion zone provision on the modeled footprint of the individual array's characteristics and site-specific ambient noise conditions, the exclusion zone should always be based upon the modeled output of the array, even if the modeled output results in an exclusion zone of less than 500 meters.
- The FPEIS extends the visual monitoring period for ramp-up of the airgun array – both prior to beginning the survey and after a shutdown – from 30 minutes to 60 minutes. The extension of the visual monitoring period compounds the other operational difficulties Alternative B imposes on seismic surveys. The FPEIS itself offers no justification for the extension of the visual monitoring period.
- The FPEIS extends shutdown requirement to include delphinids. Both the Associations' 2012 DPEIS comments, and BOEM's approval of past seismic survey applications illustrate that extending the shutdown requirement to delphinids is not scientifically justified because delphinids are mid-frequency hearing specialists, with an effective hearing range largely outside of the low frequency range characteristic of airgun arrays. Implementation of this proposed measure will substantially increase the number of shutdowns with no proven environmental benefit.
- The proposed geographic separation between simultaneous seismic airgun surveys is scientifically unsupported. Because the separation distance rests on NMFS's exposure criteria for Level B takes, it suffers from the same flaws as NMFS's thresholds (most notably that the thresholds do not represent the best available science). In addition, this measure is not included in the NMFS Biological Opinion and BOEM offers no evidence to support its underlying assumption that marine mammals would utilize the "corridor" that the separation requirement is designed to create.

4. The Expanded Time-Area Closure provisions for North Atlantic Right Whales lack sufficient basis in existing data, and are otherwise unsupported and unjustified. Similarly, the addition of an acoustic buffer zone around closure zones and the inclusion of Dynamic Management Areas ("DMAs") in the FPEIS are unsupported by the science. The fact that DMAs and acoustic buffer zone mitigations were not included in the Draft EIS has precluded the opportunity for public evaluation and comment.

5. The FPEIS proposes unprecedented observation and shutdown requirements for High Resolution Geophysical (HRG) activities that mimic closely those required of seismic surveys, despite the fact they are significantly different in many ways.

In addition, we note that the FPEIS incorporates the recently published NMFS-OPR-49, *National Standards for Protected Species Observers and Data Management: A Model Using Geological and Geophysical Surveys* ("Observer Standards"). The Associations recently sent a letter to

agency staff regarding changes that we would like to see incorporated into the Observer Standards and we have included that letter as Attachment A in our comments on the FPEIS.

The Associations feel that BOEM has failed to provide a reasoned justification for choosing Alternative B as the preferred alternative. While BOEM justifies Alternative B as providing the "highest practicable" level of mitigation measures, it is not required to make its selection based on this standard at the expense of other valid concerns necessary for achieving balance as required under OCSLA. Moreover, many of the mitigation measures recommended in the FPEIS are infeasible, will impose serious burdens on industry, may discourage exploration of the Atlantic, and will result in no benefits to protected species because they address unreal and unsupported effects. The Associations support mitigation measures that are based on the best available science, consistent with existing practices that are proven to be effective, and are operationally feasible. However, we cannot support mitigation measures with no basis in fact or science, that address effects that have not been observed, and will result in less exploration of the OCS.

The Associations appreciate the opportunity to comment on the FPEIS. Although we support BOEM's plan to authorize exploratory activities on the Atlantic OCS, there are a number of aspects of the PEIS that are not supported by science or by law, or are otherwise infeasible. Of the Alternatives presented in the FPEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, the Associations would support BOEM's adoption of Alternative B so long as all of the modifications suggested in separate comments to the FPEIS submitted by the IAGC (see Attachment B) are incorporated into the ROD. All of these suggested modifications are within the scope of the analyses contained in the PEIS. *See Great Old Broads for Wilderness v. Kimbell*, 709 F.3d 836, 854-55 (9th Cir. 2013) (modified alternative in ROD upheld because all relevant impacts analyzed in NEPA document); *see also W. Watersheds Project v. BLM*, 721 F.3d 1264, 1277-78 (10th Cir. 2013) (same).

We appreciate your consideration of our comments and sincerely hope that BOEM will prepare a ROD that addresses our concerns. Further, we hope that the ROD will be issued as soon as possible so that much needed seismic surveys in the Atlantic can be initiated. Should you have any questions please contact Andy Radford at (202)682-8584 or radforda@api.org.

Sincerely,

Andy Radford
American Petroleum Institute

Karen St. John

International Association of Geophysical Contractors

Jeffrey Vorberger
National Ocean Industries Association

Appendix 1

Comments of the American Petroleum Institute, International Association of Geophysical Contractors, and National Ocean Industries Association

API, IAGC, and NOIA (collectively, "the Associations") respectfully request that BOEM revise the FPEIS to effectuate the purposes of the Outer Continental Shelf Lands Act (OCSLA) and the agency's obligations under the National Environmental Policy Act (NEPA). For the reasons set forth below, in the accompanying documents, and in prior comments to BOEM, the Associations believe the FPEIS's selection of Alternative B as the preferred alternative violates BOEM's obligations under NEPA and OCSLA. Because G&G activities have little documented impact on marine mammals, the mitigation measures endorsed by Alternative B employ speculation to impose potentially prohibitive operational and economic burdens on future G&G activities that undermine Congress's clear policy mandate that the Department of Interior facilitate expeditious development of the OCS.

Of the Alternatives presented in the FPEIS, Alternative A presents the option that is most supported by the best available science and applicable law. However, the Associations would support BOEM's adoption of Alternative B so long as all of the modifications suggested in separate comments to the FPEIS submitted by the IAGC (see Attachment B) are incorporated into the ROD. All of these suggested modifications are within the scope of the analyses contained in the PEIS. *See Great Old Broads for Wilderness v. Kimbell*, 709 F.3d 836, 854-55 (9th Cir. 2013) (modified alternative in ROD upheld because all relevant impacts analyzed in NEPA document); *see also W. Watersheds Project v. BLM*, 721 F.3d 1264, 1277-78 (10th Cir. 2013) (same).

I. The FPEIS Must Consider the Statutory and Environmental Context of G&G Activities.

NEPA is a purely procedural statute that "does not mandate particular results, but simply prescribes the necessary process." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). "If the adverse environmental effects of the proposed action are adequately identified and evaluated, the agency is not constrained by NEPA from deciding that other values outweigh the environmental costs." *Id*. *See also Utahns for Better Transportation v. U.S. Dep't of Transportation*, 305 F.3d 1152, 1162–63 (10th Cir. 2002) ("[A]gencies are not required to elevate environmental concerns over other valid concerns"). Because NEPA itself provides no substantive guide for consideration of the underlying action—here, the conduct of G&G activities—the "statutory context" of the underlying action must inform the analysis of costs and benefits in an EIS. *See, e.g., League of Wilderness Defenders—Blue Mountains Biodiversity Project v. U.S. Forest Serv*., 689 F.3d 1060, 1070 (9th Cir. 2012).

Consideration of the statutory context informs an entire EIS. For example, "the goals of an action delimit the universe of the action's reasonable alternatives." *City of Alexandria, Va. v. Slater*, 198 F.3d 862, 867 (D.C. Cir. 1999) (quotation omitted). *See also, e.g., Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1121 (9th Cir. 2002) (Forest Service "not required under NEPA to consider alternatives . . . that were inconsistent with its basic policy objectives").

Indeed, an agency may eliminate both alternatives and mitigation measures that do not meet the purposes and needs of a project. *See Biodiversity Conservation Alliance v. BLM*, 608 F.3d 709, 715 (10th Cir. 2010). And the goals must be "heavily influenced by the agency's consideration of the views of Congress, expressed, to the extent the agency can determine them, in the agency's statutory authorization act, as well as in other congressional directives." *Natural Resources Defense Council, Inc. v. Pena*, 972 F. Supp. 9, 18 (D.D.C. 1997) (quotation omitted).

As set forth below, the FPEIS omits and undermines much of the critical substantive context and plain congressional directives for the G&G activities analyzed.

A. G&G Activities Are Critical to the Expedited Development of OCS Resources Mandated by OCSLA.

"Where an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS." *Westlands Water District v. U.S. Dep't of the Interior*, 376 F.3d 853, 866 (9th Cir. 2004). Here, OCSLA provides the specific statutory authorization of G&G activities. *See* 43 U.S.C. § 1340. While Chapter 1.4.2 of the FPEIS defines the purpose and need of G&G activities with reference to development of "oil and gas reserves," BOEM's generalized discussion of purpose neglects the strong statutory objectives Congress identified in OCSLA. *See* FPEIS at 1-9. That omission is critical.

Congress enacted OCSLA to promote and ensure the "expedited exploration and development of the [OCS] in order to achieve national 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); *see also id*. § 1332(3) (the OCS "should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs"). Indeed, Congress specified that it wished to "make [OCS] resources available to meet the Nation's energy needs as rapidly as possible." *Id*. § 1802(2)(A). OCSLA accordingly "has an objective—the expeditious development of OCS resources . . . ." *California v. Watt*, 668 F.2d 1290, 1316 (D.C. Cir. 1981). Because "[t]he first stated purpose of the Act . . . is to establish procedures to expedite exploration and development of the OCS," OCSLA's 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." *Id*.[1] *Cf.* Executive Order 13212 (May 18, 2001) (directing that "executive departments and agencies . . . shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy").

While the FPEIS concedes that G&G activities generate data that contribute to "informed" and "orderly" development decisions by industry and Government, *see* FPEIS at 1-8–1-9; *see also* FPEIS at 3-3 (noting importance of G&G data), BOEM's choice of Alternative B undercuts the

[1] The FPEIS concludes that the majority of impacts from the proposed G&G activities will be "negligible" or "minor." *See* FPEIS at x–xiv (summarizing anticipated impacts from Alternative A).

critical importance of G&G activities to expeditious OCS development and, thus, to OCSLA's animating purpose. And Alternative B endorses restrictive mitigation measures despite the generally "minor" impacts of G&G activities. As further explained *infra*, the operational and practical limitations imposed by the FPEIS threaten the viability of critical G&G activities and thereby directly undermine Congress's stated purpose to "promote the swift, orderly and efficient exploration" of OCS oil and gas resources.[2]

B. The FPEIS Fails To Adequately Consider the Critical Importance of G&G Activities to Development of OCS Oil and Gas Resources, and To the Reduction of Risks to Environmental Resources from OCS Development.

The FPEIS candidly acknowledges that "[t]he G&G surveys acquired during the period when Atlantic oil and gas leasing took place in the 1970's and 1980's have been eclipsed by newer instrumentation, technology, and data processing that make seismic data of that time period inferior," FPEIS at 1-9, and existing estimates of energy reserves in the Atlantic woefully out-of-date. Rather, "[n]ew surveys conducted with current technology would significantly improve the ability of both industry and Government predict where, and in what quantity, fossil fuel hydrocarbons are more likely to be found," and "allow the Government to place a fair and appropriate value on these resources for the Nation." FPEIS at 2-58.

Moreover, as the FPEIS concedes, "using . . . vintage surveys to optimally site an exploratory well or a well field, or to interpret the nature of formation fluids or gases, is generally not reasonable." FPEIS at 2-57. Having the most accurate and state-of-the-art seismic data for use in drilling and production activities reduces the environmental impact of exploration and production, by significantly reducing the number of unsuccessful wells and, thus, reducing the potential environmental impact of each well so avoided. As technology continues to advance, the seismic 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 seismic evaluations.

Indeed, vast improvements in geophysical imaging technologies in recent years now afford the oil and gas industry significant precision in subsurface imaging, which reduces environmental risks during drilling operations. For example, subsurface imaging provides a key input to help predict hazardous over-pressurized zones in a reservoir and thus allows an operator to better design a well to minimize its associated types and levels of risk.

G&G activities thus provide environmental benefits in the conduct of the expeditious OCS oil and gas development activities mandated by OCSLA.[3] The FPEIS, however, fails to consider the environmental benefits of improved G&G activities. Rather, BOEM disregards such benefits

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[2] H.R. Rep. No. 95-590, at 8, *reprinted in* 1978 U.S.C.C.A.N. 1450, 1460.

[3] *Cf.* Executive Order 12866, § 1(b)(6) (Sept. 30, 1993) ("Each agency shall assess both the costs and the benefits of the intended regulation and . . . propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.").

as "outside of the scope of the NEPA document." FPEIS Vol. III, Table L-6 at L-116 (response to comments of API, IAGC, and NOIA).

Contrary to BOEM's narrow view of G&G activities, "[t]he purpose of NEPA is to require agencies to consider ***environmentally significant aspects*** of a proposed action." *Utahns for Better Transportation v. U.S. Dep't of Transportation*, 305 F.3d 1152, 1162 (10th Cir. 2002) (emphasis added). *Cf. Utahns*, 305 F.3d. at 1174 ("An EIS must analyze not only the direct impacts of a proposed action, but also the indirect impacts of past, present, and reasonably foreseeable future actions . . . ."). By ignoring the environmental benefits of G&G activities to anticipated oil and gas development activities, the FPEIS fails to "adequately set[] forth sufficient information to allow the decisionmaker to consider alternatives and make a reasoned decision after balancing the risks of harm to the environment against the ***benefits*** of the proposed action." *Friends of the Boundary Waters Wilderness v. Dombeck*, 164 F.3d 1115, 1128 (8th Cir. 1999) (emphasis added). *See also Coal. for a Livable Westside v. U.S. Postal Serv.*, No. 99-cv-10873, 2000 WL 1264256, at *3 (S.D.N.Y. Sept. 7, 2000) (explaining that an EIS must "assess[]the environmental benefits and detriments of the proposed action").

II. The FPEIS Does Not Incorporate the Best Available Science.

As explained in the Associations' comments on the DPEIS ("2012 DPEIS Comments"), BOEM's scientific analysis must be based upon the best available science. *See* 2012 DPEIS Comments, Appendix 1 at 1 (identifying requirements of NEPA and Executive Order 13563). *See also* 40 C.F.R. § 1502.24 (requiring agency to "insure the professional integrity, including scientific integrity, of the discussions and analyses in the environmental impact statements"); *id.* § 1500.1(b). For the reasons identified in the Associations' 2012 DPEIS Comments, and as further set forth below, the FPEIS does not satisfy BOEM's obligation to use the best available science.

A. BOEM Discounts Marine Mammal Field Observational Data that Undermines its Modeled Quantification of G&G Impacts.

Data accumulated from Marine Mammal Observers demonstrate the absence of documented effects—in particular, injury or death to an animal—of seismic surveys on marine mammals. Nevertheless, the FPEIS estimates an enormous number of Level A and Level B takes from G&G activities in the Atlantic. Relying on the sound exposure criteria developed by the National Marine Fisheries Service (NMFS), the FPEIS predicts, for example, up to nearly 12,000 Level A takes of bottlenose dolphins per year from seismic survey operations, and over 1.1 million Level B takes. *See, e.g.*, FPEIS at xi. Because such estimates bear no relation to the minimal impacts actually observed from seismic survey activities, BOEM has apparently ignored the existing data on actual, observed impacts in derogation of its obligation to utilize the best available science. *Cf. San Juan Citizens Alliance v. Stiles*, No. 08-cv-144, 2010 WL 1780816, at *16 (D. Colo. May 3, 2010) (noting that Forest Service regulation requiring use of "best available science" means agency "cannot ignore existing data" (quotation omitted)); *Turtle Island Restoration Network v. U.S. Dep't of Commerce*, No. 12-cv-594, 2013 WL 4511314, at *22 (D. Hawai'i Aug. 23, 2013) (Under the ESA, "the 'best available data' requirement keeps agencies from ignoring available information."); *The Ecology Ctr., Inc. v. U.S. Forest Serv.*, 451

F.3d 1183, 1194 n.4 (10th Cir. 2006) (looking to meaning of "best available science" under other statutory regimes to inform meaning of requirement in National Forest Management Act).

Rather than rely on observational data, BOEM estimated impacts with a predictive computer model of sound propagation and exposure. *See* FPEIS at 2-17 & Appendices D, E. The FPEIS explains that Acoustic Integration Model (AIM), which is used to estimate takes, as "a 4D, individual-based, Monte Carlo statistical model" that "is by its very nature complex and requires numerous assumptions to predict results . . . ." FPEIS at 4-58. Even with that complexity, AIM does not incorporate animal behaviors, such as avoidance, which likely occur and would likely reduce the estimated number of exposures.

Notably, the D.C. Circuit has cautioned that "although computer modeling is a useful and often essential tool for performing the Herculean labors Congress imposes on administrative agencies, such models, despite their complex design and aura of scientific validity, are at best imperfect and subject to manipulation." *Gas Appliance Mfrs. Ass'n v. Dep't of Energy*, 998 F.2d 1041, 1045 (D.C. Cir. 1993) (quotation and alteration omitted). "Since the accuracy of any computer model hinges on whether the underlying assumptions reflect reality . . . [t]he agency's burden [to demonstrate the reasonableness of a model] becomes heavier when a method of prediction is being relied on to overcome adverse actual test data." *Id*. (quotations and alteration omitted).

Here, BOEM's modeling predicts levels of take that vastly exceed, *see infra*, the observational impact data accumulated by Marine Mammal Observers on survey vessels.[4] Far from supporting the FPEIS, the observed data conflicts with the enormous number of takes predicted by the models. *Cf. Conservation Congress v. U.S. Forest Serv.*, No. 10-17298, 489 F. App'x 151, 153 (9th Cir. June 4, 2012) (recognizing that agency's scientific support may be insufficient where scientific studies indicate the agency's "analysis is outdated or flawed or indicate any scientific information directly undermining" the agency's conclusion (quotation omitted)); *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005) ("To take the required 'hard look' at a proposed project's effects, an agency may not rely on incorrect assumptions or data in an EIS."). Thus, while a model fails to satisfy NEPA requirements if it "is so oversimplified that the agency's conclusions from it are unreasonable," *Small Refiner Lead Phase-Down Task Force v. U.S. EPA*, 705 F.2d 506, 535 (D.C. Cir. 1983), the FPEIS employs a model with the opposite, but equally fatal, flaw: complication that is not grounded in, and deviates significantly from, existing data.

Given the FPEIS's deviation from observed impact data, BOEM's defense of the FPEIS as providing "a detailed description for each step in the impact assessment process," FPEIS Vol II, Table L-6 at L-109, is non-responsive to the Association's concerns, *compare Montana Wilderness Ass'n v. McAllister*, No. 09-36051, 460 F. App'x 667, 670 (9th Cir. Dec. 1, 2011) (finding agency met its duty to respond to comments where is "adequately responded to the ***substance*** of . . . comments" (emphasis added)), or the agency's NEPA obligations.

[4] One BOEM review of Marine Mammal Observer data, for example, logged a total of 194,273 visual survey hours, with only 125.74 hours of down time attributed to protected species shutdowns. *See* BOEM, *Seismic Survey Mitigation Measures and Marine Mammal Observer Reports*, at 1 (June 2012).

In addition to its deviation from observed impacts, the FPEIS's underlying AIM model suffers from documented weaknesses. In 2006, NMFS initiated an independent peer review of the AIM model. *See* Summary Report: Review of Acoustic Integration Model (AIM), University of Miami Independent System for Peer Review at 1 (Dec. 11, 2006), *available at* http://www.nmfs.noaa.gov/pr/pdfs/permits/lfa_aim_review.pdf. The peer review did not reach a consensus on whether AIM meets the Council for Regulatory Monitoring (CREM) guidelines "since [AIM] is not an application model (but a tool for developing such models)." *Id*. (noting "there was some diversity of opinion"). Rather, the peer review noted "[t]he need for expertise in the use of AIM" as well as "the absence of appropriate uncertainty and sensitivity tests in the current applications of AIM." *Id*. While the peer review agreed that "the use of AIM ***can*** lead to models which will meet CREM guidelines . . ., such models, at this stage, would need to be evaluated on a case-by-case basis (i.e., merely using AIM is not sufficient . . .)." *Id*. (emphasis added). The FPEIS provides no verification that such a case-by-case analysis was undertaken of the use of AIM here. That lack of verification is particularly significant in this case because the peer review further identified the absence of data on "real" animal behavior as a fundamental limitation of AIM, *see id*. at 7–11 (noting "knowledge of marine mammals was identified as the weakest component"), and, as explained above, observed impact data undermines the model's predictions of G&G impacts.

Finally, BOEM's explanation that the sound "propagation models" employed by the FPEIS "have been extensively tested against field measurements," FPEIS Vol. III, Table L-6 at L-111–L-112, is likewise non-responsive to the Associations' concerns. The absence of observed impacts from seismic surveys relates to the sound exposure modeling conducted by BOEM, not the propagation modeling that is limited to determining the ways that sound moves through the ocean (and is an input in the exposure model). The fact that BOEM believes the propagation models are "appropriate" and "considered" acceptable, *see, e.g.*, FPEIS Vol. III, Table L-6 at L-109, fails to respond to the Association's showing that the sound exposure models are scientifically or practically flawed.

B. BOEM Relies on Assumptions Regarding Sound Exposure that Are Not Supported by the Best Available Science.

As explained in the Associations' 2012 DPEIS comments, BOEM's impact analysis improperly equates received sound levels to takes. *See, e.g.*, 2012 DPEIS Comments, Appendix 2 at 10–15. The FPEIS responds simply that the impact analysis is justified because it is (1) "conservative" and (2) based upon exposure criteria developed by NMFS that is beyond BOEM's control. *See, e.g.*, FPEIS Vol. III, Table L-6 at L-113; *id*. at L-111 (stating BOEM "cannot use the Southall criteria as the basis for take estimates because they have not been adopted by NMFS"); *id*. at L-112 (explaining that sound exposure criteria used to estimate take "are based on their acceptance by NMFS"); *id*. at L-114 ("[T]he choice of metric to use to determine takes was made by NMFS."); *id*. at L-118. The former explanation merely demonstrates BOEM's failure to adopt clear or consistent standards, and the latter abdication to NMFS violates BOEM's independent NEPA obligations.

First, the FPEIS simply states that its take estimates are "conservative" and the result of conservative—or "very conservative"—assumptions, "and this conservatism accumulates throughout the analysis." FPEIS at xii, xiii. The bare identification of an accumulated

conservatism does not itself justify BOEM's decision to employ such a conservative bias. Indeed, the FPEIS compounds its conservative bias by classifying the impacts of G&G activities on the majority of species as "negligible," but nonetheless choosing the more conservative Alternative B. *See* FPEIS at x–xxv. Yet the FPEIS offers no data as justification; rather, Marine Mammal Observer data indicates little seismic survey impact on marine mammals and provides no support for the FPEIS' conservatism. As the Associations' 2012 DPEIS comments make clear, BOEM's overly conservative impact analysis is exacerbated by BOEM's failure to use consistent or objective standards for assessing the severity of impacts on species, which often conflates "minor," "moderate," and "severe" impacts. *See* 2012 DPEIS Comments, Appendix 2 at 6.[5]

Second, the FPEIS's repeated invocations of NMFS's decisions to justify BOEM's impact analysis runs counter to the best available science on sound exposure impacts and improperly abdicates BOEM's NEPA obligations. As the Associations' demonstrated in their 2012 DPEIS Comments, NMFS's sound exposure criteria for Level A and Level B takes—180 dB re: 1µPA (rms) SPL for the former, 160 dB re: 1µPA (rms) SPL for the latter—improperly rest upon outdated data, *see, e.g.*, *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1086–87 (9th Cir. 2011) ("Reliance on data that is too stale to carry the weight assigned to it may be arbitrary and capricious."), and fail to incorporate the more current science on this question developed by the Marine Mammal Noise Exposure Criteria Work Group ("Southall Work Group"), *see, e.g.*, 2012 DPEIS Comments, Appendix 2 at 10.[6]

In contrast to the FPEIS, the Southall Work Group does not subjectively label animal responses to sound as "minor," "moderate," or "severe," but rather uses a nine-point continuum and thirty-four separate types of behavioral responses, and emphasizes "extreme degree of group, species, and individual variability in behavioral responses in various contexts and conditions . . .," (Southall et al. 2007) at 449. With respect to Level A takes, the Southall Work Group recommended an increase in the sound threshold to 230 dB re: 1µPA (rms) SPL, *see id*., at 442, and supports a more contextual approach to Level B takes, that is wholly absent from the FPEIS. Indeed, the Southall Work Group's analysis of what constitutes a Level B take is substantially more nuanced than the FPEIS's practice equating certain received levels of sound with takes. *See id*. at 447 (noting one must "differentiat[e] brief, minor, biologically unimportant reactions from profound, sustained, and/or biologically meaningful responses related to growth, survival, and reproduction").

While the FPEIS purports to provide analysis based on the Southall Work Group, *see* FPEIS Vol. III, Table L-6 at L-112, that analysis is, at best, incomplete because it is limited to Level A takes, *see, e.g.*, FPEIS at xi. Moreover, BOEM's principal response is that the FPEIS "cannot use the Southall criteria as the basis for take estimates because they have not been adopted by NMFS."

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[5] BOEM's lack of objective standards for categorizing effects will also foster arbitrary, and potentially conflicting, decisionmaking in assessing the vague boundaries between "minor," "moderate," and "severe" impacts. *See* 2012 DPEIS Comments, Appendix 2 at 6–7.

[6] Other reports on marine sound impacts released after the Southall Work Group, such as J.J. Finneran & A.K. Jenkins, *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis* (2012), do not consider "[t]he criteria and thresholds for . . . airguns," *id*. at 2.

FPEIS Vol. III, Table L-6 at L-111; *see also, e.g., id*. at L-112 (explaining that sound exposure criteria used to estimate take "are based on their acceptance by NMFS").[7] Such abdication to NMFS on an issue central to assessing the impacts of G&G activities falls short of BOEM's obligation to take a "hard look" at the environmental consequences of the proposed activities. "One agency cannot rely on another's examination of environmental effects under NEPA." *S. Or. Citizens Against Toxic Sprays, Inc. v. Clark*, 720 F.2d 1475, 1480 (9th Cir. 1983) (rejecting Interior Department's reliance on EPA decision with respect to herbicide) (quotation omitted). Rather, BOEM must "assess independently," *id*., the environmental effects of the proposed actions it considers.

C. BOEM's Impact Analysis Rests on Speculation.

Because the FPEIS ignores existing data demonstrating the absence of significant impacts—in particular, a lack of injuries—from G&G activities, and relies on thinly supported or outdated sound exposure assumptions, *see supra*, the FPEIS's impact analysis ultimately provides little more than speculation about potential adverse effects of seismic surveys without regard to the probabilities of either occurrence or scope of such effects. Even with its flawed assumptions, moreover, the FPEIS concedes that the impact analysis—and the resulting choices regarding required mitigation—rests on predicted "possibility" of harm. *See, e.g.*, FPEIS at 2-20 (explaining that models predicted "possibility" of Level A takes, but did not take into account proposed mitigation measures); *id*. at 2-41 (explaining choice of Alternative B's Brevard County time-area closure to "reduce the possibility of temporarily displacing breeding and nesting"). Yet BOEM has no obligation to assess such mere possibilities of harm. *See, e.g., S. Fork Band Council of W. Shoshone of Nevada v. Dep't of Interior*, 588 F.3d 718, 727 (9th Cir. 2009); *Wyoming v. U.S. Dep't of Agriculture*, 661 F.3d 1209, 1253 (10th Cir. 2011) (explaining that an agency is "not required to consider 'speculative' impacts"); *Sierra Club v. Hodel*, 544 F.2d 1036, 1039 (9th Cir. 1976).

III. Alternative B Encourages BOEM to Impose Unnecessary, Vague, and Impracticable Mitigation Measures.

The overarching errors in the FPEIS identified *supra* greatly overstate the impacts of G&G activities and, as a consequence, greatly overstate the alleged necessity for mitigation measures generally, and for the additional mitigation measures in BOEM's preferred Alternative B in particular. By comparison, the FPEIS concludes that "the impacts associated with Alternative A would result in a ***minor*** incremental increase in underwater noise and a ***minor*** increase [in] impacts to marine mammals under the cumulative scenario." FPEIS at 4-75 (emphases added). In light of the FPEIS's overstatement of G&G impacts and the admittedly "minor" effect of G&G activities under Alternative A, BOEM's choice of Alternative B is unjustified.

Moreover, viewed individually, the mitigation measures proposed in Alternative B are likewise unnecessary in light of the best available science, vaguely phrased in a manner that encourages arbitrary enforcement, and/or impose impractical operational burdens that threaten to

[7] The FPEIS similarly attributes BOEM's failure to consider the frequency weighting advocated by recent studies, *see* (Southall et al., 2007), to NMFS's policy. *See* FPEIS Vol. III, Table L-6 at L119.

significantly limit seismic surveying that is necessary to meet OCSLA's goals, and may even threaten the overall viability of G&G activities in the Atlantic. Further, The PEIS incorporates significant new mitigation measures including dynamic management areas, acoustic buffer zones around closure areas, and a doubling of the time period required for observation of the exclusion zone before start-up is authorized. There has been insufficient justification and no opportunity for public comment; therefore, these mitigations should not be adopted.

A. The Proposed Seismic Survey Protocol.

Joint NTL 2012-G02 currently defines the current standard, "Seismic Survey Mitigation Measures and Protected Species Observer Program," in the Gulf of Mexico where the bulk of seismic surveys are conducted in U.S. waters.[8] It has proven effective, and is therefore the best baseline for assessing proposed mitigation for G&G activities. Among other things, Joint NTL 2012-G02 (1) establishes a 500 meter exclusion zone surrounding the center of an airgun array; (2) permits the array to recommence operations only following a 30-minute visual clearance of the exclusion zone; and (3) requires the array to shut down if visual monitoring reveals a marine mammal (excluding dolphins) or sea turtle within the exclusion zone. The monitoring is conducted by a visual observer who has successfully completed a protected species observer training course.

The FPEIS proposes unjustified and unjustifiable changes to the baseline provisions of Joint NTL 2012-G02.

First, the FPEIS provides that the exclusion zone "shall be calculated independently and shall be based on the configuration of the array and the ambient acoustic environment, but shall not have a radius of less than 500 m . . . ." FPEIS at 2-10. In contrast to the current, fixed 500 meter exclusion zone, the FPEIS's proposal would result in enormously expanded exclusion zones. Indeed, the FPEIS calculates the exclusion zone—based upon NMFS's 180 dB re: 1µPA (rms) SPL criteria for Level A takes—that would be required in particular scenarios based on the size of the airgun array, resulting in exclusion zone radii ranging from 800 to over 2100 meters. *See* FPEIS Vol. II, Table D-22. The latter results in a spatial area more than 17 times larger than required by Joint NTL. 2012-G02. More recent scientific research, however, undercuts this expansion; using the Southall Work Group's Level A sound threshold of 230 dB re: 1µPA (rms) SPL, (Southall et al. 2007) at 449, would in many instances result in an exclusion zone less than 500 meters.

The FPEIS's expansion of the exclusion zone—compounded by the extension of the shutdown requirement to delphinids, *see infra*—will significantly increase the number of array shutdowns required during a seismic survey, and thereby threaten the economic and operational feasibility of conducting a seismic survey in the Atlantic. Among other things, survey vessels continue to move along their tracklines even after the airgun array is shutdown. Once the exclusion zone has been visually cleared of marine mammals for, under the FPEIS, at least 60 minutes, the array can resume operations. To acquire seismic data for the region between the shutdown and start-up

[8] U.S. Dep't of the Interior, Joint NTL No. 2012-G02, "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program, *available at* http://www.boem.gov/Regulations/Notices-To-Lessees/2012/2012-JOINT-G02-pdf.aspx.

positions of the array requires maneuvering the seismic survey vessels (and miles of trailing streamers) back to the shutdown position. An increase in the number of shutdowns thus increases downtime and wasteful maneuvering. Because a survey's data quality is also tied to acquiring data along specific tracklines, by breaking acquisition along a trackline, a shutdown potentially impairs data quality and prolongs the length of the survey, increasing exposure of human health, safety and environmental risks. *See, e.g.*, Site-Specific Environmental Assessment of G&G Survey Application No. L11-020 (Jan. 23, 2012), at 7–8.

The FPEIS estimates that over 26,000 Level A takes would occur—thus indicating the number of shutdown events that would be necessary assuming perfect observation of species in the exclusion zone—in 2016 alone. *See* FPEIS at Tables-43.[9] That figure dwarfs the 55 shutdowns that are typically caused by whale sightings in the Gulf of Mexico (baseline) in a year. Yet the FPEIS threatens the level or viability of seismic surveying in the Atlantic based solely on its scientifically flawed assessment of impacts, *see supra*, and expansion of the shutdown requirement to include delphinids, *see infra*. For example, in the Gulf of Mexico, the average shutdown lasts for 58 minutes, *see, e.g.*, BOEM, *Seismic Survey Mitigation Measures and Marine Mammal Observer Reports*, at 1 (June 2012), which the FPEIS would extend by at least 30 minutes by increasing the visual monitoring period following a shutdown from 30 to 60 minutes. *See infra*. Multiplying a rough 1.5-hour average shutdown by 26,000 shutdowns would yield roughly 39,000 hours of shutdowns, or approximately 1625 days. Because the typical seismic survey operation costs roughly $1.5 million per day, the total potential costs arising from the FPEIS's assumptions equal a staggering $2.5 billion.

BOEM's revision of the exclusion zone is, moreover, incomplete. While the FPEIS requires a survey operator to model its array in order to calculate the proper exclusion zone, the FPEIS also mandates that the zone "shall not have a radius of less than 500 m." FPEIS at 2-10. The establishment of a 500-meter floor is an arbitrary departure from BOEM's rationale for amending the exclusion zone provision. Because BOEM justifies the new exclusion zone provision on the modeled footprint of the individual array's sound, the exclusion zone should always be based upon the modeled output of the array, even if the modeled output results in an exclusion zone of less than 500 meters. *See also supra*. In other words, the FPEIS must be consistent in its reliance on calculations of the exclusion zone and follow BOEM's own justification to its logical conclusion.

Notably, in response to the Associations' 2012 DPEIS Comments, BOEM acknowledged the need for logical consistency in calculating the size of the exclusion zone by revising the FPEIS to acknowledge that "the modeling could increase or decrease the size of the exclusion zone." FPEIS Vol. III, Table L-6 at L021. While the revision properly acknowledges the logic of decreasing an exclusion zone on the basis of the array's modeling, BOEM has not provided a justification for its failure to extend this logic below a 500-meter exclusion zone radius. *See, e.g., Business Roundtable v. SEC*, 647 F.3d 1144, 1153 (D.C. Cir. 2011) (holding agency action arbitrary where discussion of issue was "internally inconsistent").

Second, the FPEIS extends the visual monitoring period for ramp-up of the airgun array—both prior to beginning the survey and after a shutdown—from 30 minutes to 60 minutes. *See* FPEIS

[9] The Associations aggregated the estimated takes presented in the FPEIS at Tables-43.

at 2-10–2-11. The extension of the visual monitoring period compounds the other operational difficulties Alternative B imposes on seismic surveys.

The FPEIS itself offers no justification for the extension of the visual monitoring period. *See, e.g.*, FPEIS at 2-9–2-12; FPEIS Vol. III, Appendix C. Rather, BOEM's revision appears to be based on a comment from the Georgia Department of Natural Resources that existing "visual detection mitigation techniques for right whales are inadequate due to the animal's ability to lie just under the surface and remain undetected." FPEIS Vol. III, Table L-6 at L-71–L-72. Despite the specific context of the question—related to right whales—BOEM nevertheless created a broad 60 minute monitoring period "to assist visual observers locate marine mammals during their normal dive (or subsurface rest) frequency." *Id*. BOEM did not provide any evidence demonstrating (or even indicating) that the existing 30-minute period is inadequate to identify any marine mammal.[10] Indeed, in response to the Georgia Department of Natural Resources, BOEM stated generally "[t]hough right whales may lie below the surface for periods of time, it is expected that trained PSOs would spot exhalation plumes and surface disturbances." FPEIS Vol. III, Table L-6 at L-71–L-72.

Third, the FPEIS extends NTL 2012-G02's shutdown requirement, which presently applies only to whales, to include delphinids. *See* FPEIS at 2-11. Both the Associations' 2012 DPEIS Comments, *see, e.g.*, 2012 DPEIS Comments, Appendix 2 at 20–21, and BOEM's approval of past seismic survey applications, *see*, *e.g.*, *id*., Appendix 1 at 6 n.9, illustrate that extending the shutdown requirement to delphinids is not scientifically justified because delphinids are mid-frequency specialists, with an effective hearing range largely outside of the low frequency range characteristic of airgun arrays. *E.g.* (Southall, et. al 2007) at 430–31. In response to the Associations' 2012 DPEIS Comments, BOEM again explained this provision based on NMFS's outdated sound exposure criteria. *See* FPEIS Vol. III, Table L-6 at L-122. Further, the illogical contradiction that dolphins that do not happen to bow ride require a different mitigation strategy makes no sense scientifically. Despite the lack of scientific justification, the FPEIS's extension of the shutdown requirement will vastly increase the likely number of shutdowns, with tens of thousands of shutdown events predicted for dolphins alone. *See* FPEIS, Table 4-10 at Tables 43.

Moreover, bow-riding of seismic survey vessels—a normal behavior seen with dolphins—further demonstrates the lack of injurious impact (or take) from seismic airguns. The FPEIS fails to analyze recent research into harbor porpoise (Linnenschmidt et al, 2012) and the bottlenose dolphin (Li et al, 2011, 2012) that suggest hearing control may apply to a number of different species of delphinids and cetaceans and that the animals have the ability to reduce their hearing sensitivity. The Associations appreciate BOEM's attempts, through creation of a bow-riding exception to shutdown requirements, to recognize the commonality of bow-riding and ameliorate the danger of unnecessary shutdowns brought-on by a dolphin's affirmative approach of a survey in order to bow-ride. *See*, *e.g.*, FPEIS Vol. III, Table L-6 at L-122. The proposed exception, however, offers little protection from unnecessary shutdowns. That exception provides:

[10] Likewise, NMFS's Biological Opinion for Programmatic G&G Activities in the Mid- and South Atlantic Planning Areas from 2013 to 2020 (July 19, 2013) simply recites the mitigation included in the FPEIS, *see* FPEIS, Appendix A, without justification for lengthening the visual monitoring period.

> Shutdown would not be required for delphinids approaching the vessel (or vessel's towed equipment) that indicates a "voluntary approach" on behalf of the delphinid. A "voluntary approach" is defined as a clear and ***purposeful*** approach toward the vessel by the delphinid(s) with a speed and vector that indicates that the delphinid(s) is approaching the vessels and remains near the vessel or towed equipment. ***The intent of the delphinid(s) would be subject to the determination of the PSO***. If the PSO determines that the delphinid(s) is actively trying to avoid the vessel or the towed equipment, the acoustic sources must be immediately [shutdown] as per his/her instruction.

FPEIS Vol. III, Appendix C at C-21 (emphases added). Even if implemented to preclude shutdowns for all purposefully approaching delphinids, BOEM has estimated that only roughly one-third of dolphins within 500 meters of a survey vessel exhibit bow-riding behavior, which still leaves many thousands of potential (and scientifically unjustified) shutdowns on account of delphinids.

However, the Associations doubt that the bow-riding exception could be implemented appropriately to preclude all purposeful approaches. Because a shutdown must occur upon a delphinid's entry into the exclusion zone, the determination as to the delphinid's "intent" must be made at a great distance—a distance the FPEIS now potentially extends up to more than 2000 meters. *See supra*. The decision as to the delphinid's intent, moreover, is left wholly to the subjective discretion of PSOs who (1) are likely to err on the side of precaution and order a shutdown when it does not prove necessary, and (2) are subject to training on NMFS's 2013 National Standards for a Protected Species Observer and Data Management Program, *see* FPEIS at 2-10, which may not be consistent with the best available science and technology, clearly written, transparently implemented, or fully informed by the public, *see* Attachment A.[11]

B. The Proposed Geographic Separation Between Simultaneous Seismic Airgun Surveys.

BOEM's choice of Alternative B "may establish a 40-km (25-mi) geographic separation between the sources of simultaneously operating seismic airgun surveys." FPEIS at 2-37. The FPEIS explains the creation of this separation requirement "to provide a corridor between vessels conducting simultaneous surveys where airgun noise is ***below Level B thresholds*** and approaching ambient levels such that animals ***may pass through*** rather than traveling larger distances to go around the survey vessels." *Id.* (emphases added). The FPEIS's justification, however, is scientifically unsupported. First, because the separation distance rests on NMFS's 160 dB re: 1µPA (rms) SPL exposure criteria for Level B takes,[12] it suffers from the same flaws

[11] Additionally, because the exception rests upon a PSO's discretionary assessment of a delphinid's subjective "intent" around and within the exclusion zone—as a proxy for the absence of harm to the animal—the PSO should have similar discretion to assess the intent of—and prevent a shutdown upon the purposeful approach of—other marine mammals.

[12] The absence of this measure from the Biological Opinion, *see* FPEIS, Appendix A, further undermines BOEM's reliance on NMFS to support a 40-km separation.

as NMFS's thresholds. *See supra*.[13] In addition, BOEM offers no evidence to support its underlying assumption that marine mammals would utilize the "corridor" that the separation requirement is designed to create.

The proposed 40-km separation is also inconsistent with BOEM practice in the Arctic. The 2006 Final Programmatic Environmental Assessment for Arctic Ocean OCS Seismic Surveys provided for a 24 kilometer separation between the seismic source vessels of simultaneous surveys.[14] Thus, the FPEIS imposes nearly twice the separation distance even though the physical environment of the Arctic—with its relatively shallow depth, rocky bottoms, and prevalent sea ice—results in greater sound propagation.

BOEM acknowledges that, even if seismic sound can theoretically propagate great distances, "it is unknown if detection of sound at these distances has any effect on marine mammals or other marine species." FPEIS at 2-38. Rather than question the propriety of its proposed 40-km separation distance, however, BOEM's sole concession to this scientific uncertainty is to claim the agency "will consider the value of this measure at the site-specific NEPA and environmental analyses level, as well as any new information available at that time. BOEM ***may not*** apply this specific mitigation measure programmatically." *Id*. (emphasis added). Setting aside the possibility that BOEM "may" actually employ the separation measure programmatically, the FPEIS does not explain how the uncertainty as to whether impacts occur at great distances can be resolved on site-specific information.

[13] BOEM's secondary reliance on the assertion that "in some circumstances, airgun noise can be detected at great distances from the sound source, such as across ocean basins (Neukirk et al., 2012)," FPEIS at 2-38, is no more availing. The FPEIS does not identify any sections of the Mid- or South Atlantic planning areas that meet the specific "circumstances" of the cited study; nor does the FPEIS account for the rate of energy loss (*i.e.*, transmission loss) in specific propagating conditions in the Atlantic.

[14] Mineral Management Service, Final Programmatic Environmental Assessment for Arctic Ocean OCS Seismic Surveys - 2006 (OCS EIS/EA MMS 2006-038), at p. 235.

C. The Expanded Time-Area Closure for North Atlantic Right Whales (NARW).

Alternative B prohibits seismic airgun surveys in (1) the Mid-Atlantic and South Atlantic Seasonal Management Areas (SMAs) from November 1 to April 30, *see* FPEIS, Appendix C at C-16; (2) the NARW critical habitat area from November 15 to April 15, *see id*.; and (3) in a continuous 37 km-wide zone extending from Delaware Bay to the southern limit of the programmatic area, *see id*. at C-32.[15] In addition, "G&G surveys using airguns would not be allowed in [an] active" Dynamic Management Area" (DMA) created by NMFS based on "a reliable sighting of a NARW." FPEIS, Appendix C at C-36. And surveys conducted outside of the closure areas "would be required to remain such distance that received levels at those boundaries do not exceed" 160 db re: 1µPA (rms). *Id*. The time-area closure provisions lack sufficient basis in existing data, and are otherwise unsupported and unjustified.

First, according to the FPEIS, "[t]he purpose of the expanded time-area closure," through implementation of a 37 km-wide zone extending south from Delaware Bay, "is to prevent impacts to NARWs along their entire migration route and calving and nursery grounds." *Id*. at C-32. While the Associations share BOEM's concern for the health of the NARW population, as the Associations' 2012 DPEIS Comments demonstrate, there are no documented injuries, deaths, or significant disturbances to NARWs from airguns (even though the NARW is among the most studied species of whale). *See* 2012 DPEIS Comments at 5; *id*., Appendix 2 at 3, 17–18. Rather, the primary documented risks to the NARW population are vessel strikes and fishing gear entanglement. *See id*. at 5 & nn. 4, 5. Yet, while the NARW is particularly susceptible to lethal strikes from vessels exceeding 10 knots, seismic survey vessels—operating to carefully gather data—travel only at 4 to 5 knots (or half the mandatory speed limit under the NARW ship strike reduction rule (50 C.F.R. § 224.105)), and would have visual observers on board. *See* 2012 DPEIS Comments, Appendix 2 at 18. No closure for the NARW is therefore warranted.[16]

Although the Associations raised these concerns in their 2012 DPEIS Comments, BOEM's subsequent explanation missed the point of the Associations' comments and was therefore non-responsive. BOEM stated that "the potential for vessel strikes was not the main reason for proposing the closures . . . ." FPEIS Vol. III, Table L-6 at L-109–L-110. The Associations did not contend that BOEM based the closures on vessel strikes or the applicability of the NARW vessel strike rule. Instead, the Associations have shown that vessel strikes—not the sound from airguns[17]—is the primary, known danger to the NARW, and that this primary danger is largely inapplicable to seismic surveys that operate at reduced speeds, *cf. Utahns*, 305 F.3d at 1180 (finding that agency improperly "ignored the primary concern" of commenters on the project),

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[15] Alternative A includes only the closures in the SMAs and critical habitat areas. *See* FPEIS, Appendix C at C-16.

[16] BOEM's response that it "would not be prudent based on the endangered status of these whales," *see* FPEIS Vol. III, Table L-6 at L-107, to issue an FPEIS without a time-area closure for the NARW is improperly conclusory in light of other species that do not similarly trigger a closure.

[17] To the extent the closure is "based" on impacts from acoustic sources, FPEIS Vol. III, Table L-6 at L-109–L-110, there is no documented evidence of any such impact.

and only "represent a small percentage (i.e., 1.5–2.9%) of the projected vessel activity" in the area of interest, FPEIS at 3-52.

Moreover, Alternative B's expansion nearly doubles the size of the closure area proposed in Alternative A. *See* FPEIS, Appendix C at C-16, C-32. Yet the FPEIS predicts, at most, only a 13 percentage point reduction in incidental takes of NARWs. *See*, *e.g.*, FPEIS at 2-66. Not only does BOEM fail to explain the differential between the expanded closure area and the predicted benefit, the FPEIS concedes that "incidental take was not modeled for Alternative B," and that the alleged benefit of doubling the time-area closures was only "estimated." FPEIS at 4-229.

Second, the FPEIS prohibits airgun surveys in DMAs without explaining the process by which a DMA is established. Rather, the FPEIS simply recites that the "locations vary as designated by NMFS," FPEIS, Appendix C at C-17, based on "a reliable sighting of a NARW," *id*. at C-36. The 15-day duration, *see id*. at C-23, of such vaguely established DMAs threatens severe disruption and significantly increased costs to surveys, *see supra* (describing data quality and economic burdens of survey interruption). The vague and discretionary DMA standard both lacks the requisite specificity necessary for BOEM to make a reasonable decision on implementation of the measure, and significantly hampers G&G activities despite the minimal danger G&G activities pose to the NARW. *See supra*. The unnecessary burdens also extend to HRG surveys, which must be "discontinued within 24 hr" of the establishment of a DMA in the survey area. *See* FPEIS, Appendix C at C-23.

Third, these problems with Alternative B's expanded time-area closures is exacerbated by the creation of a further buffer at "such distance that received levels at those boundaries do not exceed" 160 db re: 1µPA (rms). FPEIS, Appendix C at C-36. The buffer effectively extends the extends of the (already unjustified) time-area closures. This further extension is likewise unjustified given that (a) available evidence indicates that vessel strikes—rather than such sound levels—pose the primary danger to the NARW, *see supra*, (b) BOEM offers no evidence that any adverse effects are probable from such sound levels at the boundaries of the closure areas, *see supra*, and (c) the buffer assumes that NARW distribution along the closure area boundaries without actual PSO confirmation.

D. The High Resolution Geophysical (HRG) Protocol Requirements.

In addition to the new limitations placed on seismic airgun surveys, the FPEIS proposes unprecedented observation and shutdown requirements for HRG activities. *See* FPEIS at 2-12–2-15.

Survey Protocols for HRG activities mimic closely those required of deep penetration seismic surveys, despite the fact they are significantly different in many ways. Airgun seismic sources are almost exclusively deployed from surface, where sounds are propagated through the water column to image the subsurface. Imaging targets can be at great depths, requiring complementary frequencies and volumes that propagate throughout the water column.

By contrast, HRG surveys are frequently conducted subsea from autonomous underwater vehicles (AUVs) pre-programmed at surface to survey along set transects. The frequency of the sources is typically mid- to high-frequency, with the associated high transmission loss of those

wavelengths. Multibeam systems commonly employed on AUVs operate in the 200-400 kHz range (Reson 7125 or Kongsberg EM 2040). Sidescan systems operate in the same range or at even higher frequencies. Sub-bottom CHIRP profilers typically operate in the 1 – 12 kHz range (and use a 10-50 ms swept frequency pulse). AUV surveys are conducted 20 meters above seabed (maximum 40 meters) to maintain high resolution. At these depths, sound is refracted along the seabed, with minimal loss upward into the water column.

A survey protocol based on surface deployment does not consider activities conducted close to the sea floor, with little to no sound propagation into the water column. Employing Protected Species Observers and deploying passive acoustic monitoring from surface vessels during these types of HRG surveys is impractical and unwarranted. Additional protocols of ramp-up and shut-down for these surveys cannot be adopted for surveys that are pre-set prior to subsea deployment as direct communication with these vehicles is not always possible. Regardless, surface or near-surface activity of cetaceans would not be expected to be impacted by the activity of an autonomous vehicle deployed at depth and maneuvering at long distances from the deployment vessel along pre-programmed transects.

High-resolution AUV surveys are a key tool for identifying culturally sensitive areas, such as marine archaeological sites, environmentally sensitive areas, such as cold water corals, and complex seafloor topography that could pose a hazard for future seafloor installation or drilling operations. The ability to accurately identify these types of features is not always possible with surface based seismic or multibeam bathymetry surveys, especially in deeper water environments, so AUV surveys are an efficient, low power, method of collecting regulatory and safety-critical data beneficial to a wide range of regulatory agencies and future operations. In addition, AUV platforms can carry a wide payload of sensors, which all tend to benefit from integration with the acoustic bathymetry, backscatter, and sidescan data. The benefits of these payload systems, such as still cameras, turbidity sensors, ADCP's, methane sensors, and other environmental sensors would be reduced by restrictions placed on acoustic surveys.

Industry recommends that BOEM amend the Atlantic PEIS to exclude all AUV Surveys conducted at depth from the described HRG Survey Protocol.

E. BOEM's Commitment to Adaptive Management.

The Associations appreciate and encourage BOEM's general commitment to adaptive management. In particular, the Associations agree that "its use can ensure mitigation measures effectively match existing conditions and knowledge," FPEIS Vol. III, Table L-6 at L-120, and we feel it is very important to establish that adaptive management may be used to remove mitigation measures (in addition to adding them) where the circumstances do not warrant the measures. *See, e.g.*, 2012 DPEIS Comments, Appendix 2 at 17.

The FPEIS's discussion of adaptive management raises two further concerns. First, that the FPEIS uses the term as justification for the proposed imposition of mitigation measures, such as the 40-km separation distance between simultaneous surveys, *see* FPEIS Vol. III, Table L-6 at L-121–L-122, that otherwise lack scientific or practical justification. Second, it is not clear how BOEM intends to implement its planned adaptive management. While the FPEIS includes a general discussion of adaptive management from programmatic NEPA documents to site-

specific analyses, *see* FPEIS at 1-26–1-28, it is unclear how this process fits into BOEM's (or BSEE's) governing regulations. For example, would the agencies be required to implement adaptive management through a new rulemaking to ensure that the applicants' and Government's respective rights and obligations are clearly defined?

The Associations look forward to further discussions with BOEM regarding the effective, and balanced, implementation of adaptive management.

F. Imposing the Proposed Mitigation Measures Would Violate the Administrative Procedure Act.

In addition to the scientific and practical failings with the mitigation measures endorsed by Alternative B, because the FPEIS's measures would plainly "supplement existing law and . . . impose additional duties and requirements," their imposition may only be accomplished pursuant to Administrative Procedure Act (APA) notice-and-comment procedures. *See*, *e.g.*, *Ensco Offshore Co. v. Salazar*, 10-cv-1941, 2010 WL 4116892, at *5 (E.D. La. Oct. 19, 2010) (vacating NTL for failure to comply with notice and comment requirements).

That BOEM intends ultimately to apply the measures through site-specific NEPA analyses cannot evade the APA requirements because the notice and comment requirement "turns on an agency's intention to bind itself to a particular legal policy position." *U.S. Telephone Ass'n v. FCC*, 28 F.3d 1232, 1234 (D.C. Cir. 1994).[18] Consistent imposition of the measures through site-specific analyses represents the precise intent to be bound that triggers the notice-and-comment requirement. *See id*. at 1234–36 (FCC violated APA by issuing schedule for fines and consistently applying the schedule with limited departures). And the FPEIS fails to indicate any circumstances under which BOEM believes the measures may not be applied.

Similarly, that the FPEIS has been subject to comment does not cure this procedural defect. *Cf. In re Polar Bear Endangered Species Act Listing & § 4(D) Rule Litig*., 818 F. Supp. 2d 214, 236 (D.D.C. 2011) (rejecting argument that following APA notice-and-comment procedures satisfied NEPA comment procedures).

IV. BOEM Failed to Provide a Reasoned Justification for Choosing Alternative B as the Preferred Alternative.

Although the FPEIS justifies the choice of Alternative B as providing "the highest practicable level of mitigation measures . . .," FPEIS at 2-68, NEPA requires only "a discussion of 'all practicable means to avoid or minimize environmental harms,'" *The Protect Our Communities Foundation*, No. 12-cv-2211, 2013 WL 5947137, at *10 (S.D. Cal. Nov. 6, 2013) (quoting 40 C.F.R. § 1505.2(c)). By grafting "highest" onto its obligation to consider practicable mitigation, BOEM appears improperly "to elevate environmental concerns over other valid concerns." *Utahns for Better Transportation*, 305 F.3d at 1162–63.

[18] Nor are certain measures—such as the separation requirement and NARW time-area closure—clearly amenable to site-specific reevaluation. These measures apply on their face from the FPEIS *ab initio*.

Indeed, with respect to several additional mitigation measures proposed by Alternative B, BOEM failed properly to support the selection of mitigation beyond Alternative A. Rather, the FPEIS simply assumes that additional or expanded mitigations would necessarily achieve significant environmental benefits. For example, while Alternative B added a 40-km separation zone between surveys, "[t]he degree of improvement has not been estimated . . . ." *See* PEIS at xxiv. Because BOEM did not calculate any improvement, it did not conduct any balancing against the additional burdens placed upon applicants' operations, *see supra*, applicants' interests, *see infra*, or OCSLA's purpose to expedite development of the OCS, *see supra*.

V. The FPEIS Fails to Take into Account the Context and Economic Consequences of Alternative B's Proposed Mitigation Measures.

"Where the action subject to NEPA review is triggered by a proposal or application from a private party, it is appropriate to give substantial weight to the goals and objectives of that private actor." *Citizens' Committee to Save Our Canyons*, 297 F.3d at 1030. *See also, e.g.*, *Sylvester v. U.S. Army Corps of Eng'rs*, 882 F.2d 407, 409 (9th Cir. 1989) (explaining that agency has a duty to take into account objectives of applicant's project). An alternative considered in an EIS is not reasonable where it renders the applicant's proposed project "impractical," or not "technologically or economically feasible." *Citizens' Committee to Save Our Canyons*, 297 F.3d at 1031–32. *See also Sylvester*, 882 F.2d at 409 (explaining that agency must consider whether alternative is "economically advantageous" to applicant's objective). As demonstrated above, and in the Associations' 2012 DPEIS Comments, the mitigation measures imposed by the FPEIS's Alternative B threaten the operational and economic viability of G&G activities in the Mid- and South Atlantic.

BOEM concedes that "technical feasibility and economic viability" are necessary for an alternative to satisfy NEPA's reasonableness requirement. *See* FPEIS Vol. III, Table L-6 at L-115. Yet the FPEIS's only response to the Associations' showing that one of the many mitigation measures imposed by Alternative B is likely to render seismic surveys impractical is simply:

> BOEM and NMFS appreciate the comment and are committed to ensuring that mitigation requirements are feasible. The Programmatic EIS has been revised to clarify the shutdown requirement for delphinids.

FPEIS Vol. III, Table L-6, at L-110. It is not, however, a lack of clarity in the mitigation measures, but rather their substantive requirements, that threaten the viability of G&G activities. To take only the delphinid shutdown example; even the allegedly clarified provision is—by BOEM's own estimation—likely to result in tens of thousands of shutdowns. *See supra*. Under the operational conditions created by Alternative B, G&G surveys may no longer be practicable in exchange for little or no perceived environmental benefits. And the FPEIS both ignores this impracticability and fails to balance such cost against the alleged environmental benefits of Alternative B. *See Cape May Greene, Inc. v. Warren*, 698 F.2d 179, 187 (3rd Cir. 1993) (noting

NEPA "requires a balancing between environmental costs and economic and technical benefits").[19]

Indeed, BOEM's failure to fully consider the impact of mitigation measures on G&G activities compounds a second error in the FPEIS's analysis of impacts. As the Associations' 2012 DPEIS Comments illustrate, the FPEIS overstates the level of reasonably anticipated G&G activities because industry interest has decreased following exclusion of the Atlantic planning areas from the 2012-2017 OCS Leasing Program. *See* 2012 DPEIS Comments, Appendix 2 at 1–2 (noting "it is unrealistic to expect significant, if any, geophysical activity within this timeframe"). The significant operational limitations (and resulting economic costs) arising from Alternative B's required mitigation measures will further depress the number of G&G activities that will actually be conducted in the Atlantic. Accordingly, the FPEIS's estimate of anticipated industry activity—and resulting estimates of anticipated environmental impacts—is doubly overstated.

[19] BOEM's observation that "[t]here is no NEPA requirement for a cost-benefit analysis," FPEIS Vol. III, Table L-6 at L-116, is irrelevant because (1) BOEM acknowledges its obligation to consider non-environmental factors relevant to a proposed project, *see, e.g.*, *id.*, and (2) the observation ignores BOEM's independent obligations under Executive Order 13563, *see* 2012 DPEIS Comments, Appendix 1 at 4. Moreover, the Associations comments provide a general discussion on economic burdens. *See* FPEIS Vol. III, Table L-6 at L-116 (stating that cost benefit analysis not conducted "because of the proprietary nature of cost information").

Via Electronic Mail

May 2, 2014

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Subject: Comments of the American Petroleum Institute, the International Association of Geophysical Contractors, and the National Ocean Industries Association on NOAA Technical Memorandum NMFS-OPR-49, *National Standards for a Protected Species Observer and Data Management Program: A Model Using Geological and Geophysical Surveys*

Mr. Baker,

This letter provides the comments of the American Petroleum Institute ("API"), the International Association of Geophysical Contractors ("IAGC"), and the National Ocean Industries Association ("NOIA") (collectively, the "Associations") on the National Oceanic and Atmospheric Administration ("NOAA") Technical Memorandum NMFS-OPR-49, *National Standards for a Protected Species Observer and Data Management Program: A Model Using Geological and Geophysical Surveys* ("Observer Standards"). We appreciate your consideration of the comments set forth below.

API is a national trade association representing over 600 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. API is a longstanding supporter of the Marine Mammal Protection Act ("MMPA") regulatory process as an effective means of balancing and rationalizing responsible oil and gas activities with the conservation of marine mammals. We continue to support issuance of incidental take authorizations under the MMPA because, for example, it has been demonstrably effective in the Arctic in protecting marine mammal species without unduly and unnecessarily burdening industry.

IAGC is the international trade association representing the industry that provides geophysical services (geophysical data acquisition, processing and interpretation, geophysical information ownership and licensing, 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.

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 U.S. Outer Continental Shelf ("OCS"). The NOIA membership comprises more than 275 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.

General Comments

The Associations commend NOAA's National Marine Fisheries Service ("NMFS"), together with the Bureau of Ocean Energy Management ("BOEM") and the Bureau of Safety and Environmental Enforcement ("BSEE"), (collectively "the agencies") for providing recommendations for a Protected Species Observer and Data Management Program ("PSO program"). We understand that a technical memorandum is used for timely documentation and communication of preliminary results, interim reports, or more localized or special purpose information that may not have received formal outside peer reviews or detailed editing and that there is not a formal comment process. It is evident, however, that the agencies intend the recommendations in this technical memorandum to be immediately implemented for G&G surveys in the US OCS, and have incorporated the Observer Standards in the Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Final Programmatic Environmental Impact Statement ("Atlantic PEIS"). The Atlantic PEIS "Seismic Airgun Survey Protocol" requires that protected species observers complete a PSO training program "in accordance with the recommendations described in [the Observer Standards]."

In general, we are supportive of a process to standardize PSO eligibility requirements, training courses, data collection and reporting requirements. After carefully reviewing the Observer Standards, however, we have identified a number of concerns and opportunities for improvement, which are briefly summarized below and described in more detail in the following sections of this letter. Although we appreciate the agencies' attempt to clarify and standardize observer guidelines and requirements, 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. The standards should encourage adaptive technology, such as remote visual and acoustic monitoring and infrared technology, reduction of health and safety risks, and also the use of an updated reporting form that would be able to provide substantive data from observations to substantiate the implementation of appropriate mitigation measures.

The Associations' comments are intended to be constructive and further the goal of improving the PSO Program for G&G surveys consistent with the best available science and technology, clearly written, transparently implemented, and fully informed by the public.

Role of the US Fish and Wildlife Service

With jurisdiction over several marine mammals, the US Fish and Wildlife Service (USFWS) is an important stakeholder to the PSO process; however, it does not appear that USFWS was a part the Protected Species Working Group or that USFWS provided any input into the development of the Observer Standards. While the Observer Standards provide recommendations of report requirements for PSO sightings of polar bear and walrus (*see* p.31), the Observer Standards specifically exclude these species and all other species under USFWS jurisdiction from the purview of the standards (*see* p.v). A comprehensive national PSO program necessitates the review and input of the USFWS in addition to NMFS.

Establishment of a PSO Standardized Training Program

The Associations generally support the establishment of a standardized training program for PSOs and are interested in working with the agencies to ensure that appropriate standards are set for the "approved" vendors. We are concerned, however, that some of the recommendations for the program are based on unsupported assertions that current PSO training and reporting is inconsistent. The agencies should provide context to these assertions so that stakeholders can better understand the improvement the recommendations seek to achieve.

The Observer Standards recommend that any standardized training program should not only provide training in mitigation and monitoring requirements, but also provide health and safety considerations. The Associations agree. All PSOs should be trained to ensure complete compliance with all applicable safety procedures. A standardized training program should cover knowledge of the heightened risks working offshore on a vessel in remote locations with no or limited shore side infrastructure, and should teach personnel how to minimize risks. Training should also include information on safe travel, logistics, onboard medical infrastructure, and security including International Ship and Port Facility Security (ISPS) information.

As the Observer Standards acknowledge, many geophysical companies will also have specific requirements related to health and safety risks associated with their operations. The PSO is required to adhere to those requirements as well as any PSO provider or agency requirements. The Observer Standards should note, and any PSO training program should advise, that industry standards often exceed those of the federal agencies. Most oil and gas companies and geophysical companies require contractors to provide evidence of safety programs and requirements that meet those defined through company management systems. This should be acknowledged in any discussion of health and safety, and the agencies should also clarify whether the program intends to include medical and helicopter underwater egress training (HUET) typically required of PSOs by the industry.

The Observer Standards recommend that as part of "health and safety training," a vessel owner should "allow a PSO to briefly walk through the vessel to ensure no hazardous conditions exist

according to a safety checklist, and to visually examine any safety item, upon request." PSOs are not, however, safety professionals qualified to conduct safety walkthroughs or inspections on every vessel to which they are assigned. The agencies should provide additional information on what information will be included on the safety checklist to clarify what the PSO would be looking for during this initial walkthrough to prevent misunderstandings and unnecessary effort.

The Associations suggest that a standardized training program for PSOs should include a course in effective communications. It is vital that PSOs establish direct communications with the instrument room on a seismic vessel to prevent problems and delays in the event of sightings that trigger shutdown requirements and to ensure the visual observation timeframes are adhered to before ramp up and after shutdown. All parties must work effectively together to ensure compliance: PSO, Seismic Technicians, Vessel Captain, and crew.

In addition, as the use of Passive Acoustic Monitoring ("PAM") to identify marine mammals increases in geophysical operations, the PSO Program should also include a course specific to PAM operations. PAM is a highly specialized skill and it is not appropriate to expect PSOs to possess those skills. If PAM is included in the program, training should also include rigging, mobilization and demobilization of equipment.

Finally, while the Observer Standards provide opportunity for PSO candidates who do not successfully pass an approved training course to reapply, there should be a limit on the number of times a potential PSO candidate can reapply for training.

Recommendations for BOEM/BSEE

The Observer Standards provide a list of recommendations for BOEM and BSEE to satisfy the objectives of the national standards. The Associations respectfully request that as BOEM and BSEE act on these recommendations, they solicit input from industry stakeholders and consider the following comments.

The Observer Standards recommend that BOEM and BSEE "develop permits or agreements detailing expectations and data collection and reporting of third-party PSO provider companies, including performance standards, conflicts of interest, and standards of conduct." The Associations respectfully request the agencies provide additional information and opportunity for stakeholder input regarding any proposed permitting program for PSO provider companies, including the requirements, process times, reporting requirements, and any penalties for alleged permit violations. Without well-defined boundaries, an open-ended PSO provider permitting program will provide little utility.

In addition, the Observer Standards recommend that BOEM and BSEE "develop a mechanism, procedure, or regulation to ensure that selected PSO providers are being compensated prior to deployment of approved observers." The Observer Standards do not, however, provide sufficient explanation of the need for PSO provider compensation prior to deployment of observers. More information would need to be provided to support the development of any requirement for prior compensation.

Development of Permit Fees

The Observer Standards recommend that BOEM and BSEE "consider assessing permit fees to financially support the PSO program needed for industry activities." It is unclear how the agencies would determine the amount of the fees or how the fees would be assessed. The Associations recommend that all monies generated from any such permit fees be developed solely for, and directly benefit, the PSO program and not be used for any other, non-related federal activities. Because other industries conduct similar activities requiring PSOs, the agencies should also ensure that any permitting fees are equitable to supporting the PSO program.

Recommended PSO Eligibility Requirements

In addition to a national PSO training course and PSO eligibility standards, the Observer Standards recommend the development of a policy for national PSO qualifications and eligibility. The difference between these two objectives is not immediately apparent. Qualifications, including education and competency, should be satisfied with completion of the training program. An additional policy on qualifications and eligibility is unnecessary and the Associations are concerned that limiting qualified PSO candidates to those who possess a science degree would result in a shortage of personnel.

In the recommended PSO training and provider services model, *NMFS-Approved Private Sector PSO Trainers and PSO Providers*, the Observer Standards explain that "PSO providers and PSO eligibility requirements would be defined by NMFS." While the Associations agree that the recommended mechanism for PSO training would provide more flexibility and less concern of the availability of PSO staff than the other mechanisms analyzed (*see* p.10), the agencies should clarify that NMFS' definition of PSO providers would only entail identification of those providers that meet eligibility requirements.

In the recommended waiver of education and experience requirements for PSOs, PSO candidates can provide proof of previous work experience as a PSO overseas. Some additional detail or information should be required for eligibility based on overseas work as programs and processes in other countries can vary substantially from what is expected/required for US programs. The Observer Standards also provide that the approving federal agency official has the sole discretion to waive eligibility requirements on a case-by-case basis after reviewing a waiver request and written justification. The Associations are concerned that the agency can waive "some or all of the education/experience requirements on a case-by-case basis if a lack of qualified PSOs is demonstrated." It would not be in the best interests of the regulators or the geophysical industry to employ PSOs who lack some critical or all necessary qualifications or experience. The Associations respectfully request that the waiver request, supporting justification and agency decision be made available to the PSO provider to ensure that a complete record of a PSO's experience is on file should issues arise.

The Associations agree that PSO candidates should also be in good health and have no physical impairments that would prevent them from performing their assigned tasks. The agencies should

clarify, however, whether documentation or medical certification would be required similar to the *National Minimum Eligibility Standards for Marine Fisheries Observers*.

PSO Demand & Cost Estimates

The Observer Standards estimate that currently 30 PSOs are needed on a daily basis for G&G surveys in the Gulf of Mexico, with an average of 15 PSOs at sea on any given day. Based on 2009 data in the GOM, the total estimated annual costs are $2,116,547. BOEM and BSEE indicate, however, that future demand for PSOs is likely to "significantly increase over the next 5 years, and many G&G surveys are expected to occur in federal water of the Atlantic EEZ." Accordingly, the Observer Standards severely underestimate the costs and level of PSO demand. Assuming daily rates of $700.00 for each PSO, a reasonable estimate of 30 PSOs would cost $21,000 per day or $3.8M for 6 months. Travel, reporting, and health insurance would likely entail additional costs. The Associations request that the agencies update the cost and level of demand estimates with more recent data.

In addition, the Observer Standards estimate the training for each PSO in the Gulf of Mexico to cost $3,000.00. The agencies should provide a description of the various training costs detailed in this estimate, as described in Table 3, recognizing the uncertainties/unknowns associated with each estimate. For example, the estimated costs of safety training and medical examination appear lower than the industry standard.

PSO Evaluation During Permit/Authorization Approval

The Observer Standards specify that the recommended time to evaluate PSO coverage required for all G&G projects is during BOEM's permit application review or when applications for incidental take authorizations are submitted to NMFS. When weighing factors to determine the number of PSOs required for each survey, in addition to vessel size, the agencies should consider the number of bunks available on board the survey vessel.

Once the number of required PSOs is determined, the agencies assert that a single entity responsible for scheduling and deploying PSOs would result in "a greater level of consistency in many aspects of the PSO program…including maintaining an appropriate number of PSOs to meet scheduling and deployment needs." The Associations are concerned, however, that the selection of a single entity, whether a third-party provider or federal agency, to meet PSO scheduling demand would be inefficient and would result in a strain on the ability to timely contract with and obtain the number of PSOs required for each geophysical survey.

In addition, the Associations are concerned that requiring a senior-level (or lead) PSO who has specific experience observing protected species in the proposed survey geographic area will drastically limit the number of available senior-level PSOs, potentially resulting in unnecessary project delays.

During monitoring, the Observer Standards recommend that in order to reduce bias, observation periods should be limited to "favorable viewing conditions." It is unclear what is meant by unfavorable viewing conditions. During periods of "low visibility" PAM is currently required in

water depths greater than 100 meters (328 feet) in the Gulf of Mexico. The agencies should be careful not to define unfavorable conditions as anything different than low visibility or nighttime to ensure there is no gap in monitoring coverage.

Conflicts of Interest

Throughout the Observer Standards, the agencies reference "inherent conflicts of interests" between PSO providers and industry, allegedly influencing accurate reporting of data. There are several unsupported assertions of inappropriate influence and pressure by industry. These assertions are unsubstantiated, and in the absence of supporting statements or examples provided by the agencies, should be deleted. If a statement denying conflict of interest is required from the PSOs prior to deployment as recommended, the statement should also include language to the effect that the PSO will conduct all their activities and report all data in full compliance with all applicable laws and regulations.

The Observer Standards defines "a direct financial interest" as payment or compensation received directly from the owner of the seismic survey's vessel, the G&G surveying company, or associated shore-based facility. The definition should also include any entity or leaseholder who employs or contracts with the survey company.

Standardized Data Collection

The Associations agree with and reaffirm the recommendation of the agencies to implement "standardization including data collection methods, standardized electronic forms, and software used in collaboration with NMFS and non-federal stakeholders." Collaboration with NMFS should result in a form that produces data the agency can use and rely on to assess population numbers, stock assessments, and effects on marine species. The Associations note that Industry best practices already recommend the use of a standard reporting form, *the Marine Mammal Recording Form*, developed under a project funded by the Exploration and Production (E&P) Sound and Marine Life Joint Industry Programme.[1] The Associations would be interesting in working with the agencies to update current reporting forms to enable the reporting of substantive data from observations that could substantiate the implementation of appropriate mitigation measures.

Creation of PSO Database

The Associations support the creation and maintenance of a database to manage PSO data for geological and geophysical surveys. This information is already supplied to NMFS and BSEE, but it would be useful for interested stakeholders to have full and timely access to such a database as a means to assess PSO activities and monitor their effectiveness.

[1] *See* Barton, Carolyn J.S., Jaques, Robert, and Mason, Mike. 2008. Identification of Potential Utility of Collation of Existing Marine Mammal Observer Data. RSK Environmental Ltd., Cheshire, UK. The Marine Mammal Recording Form can be accessed at: http://www.iagc.org/files/3193/.

Conclusion

We appreciate the effort that the agencies have devoted to the development of PSO and data management programs for geological and geophysical surveys. We support this effort generally but, as detailed above, we have a number of concerns about the implementation of the recommendations. We respectfully request that the agencies engage with stakeholders prior to taking action on many of the recommendations, including the development of a PSO provider permit program, and system for permitting fees. We also encourage the agencies to pursue a program that encourages technology and remote monitoring, reducing health and safety risks. In addition, any program established should provide opportunity for feedback not only from PSOs, but also industry stakeholders. The Associations look forward to working with the agencies towards implementation of a PSO Program for geophysical surveys that is consistent with the best available science and technology, clearly written, transparently implemented, and fully informed by interested stakeholders.

Should you have any questions, please contact the undersigned at 202.682.8584, or via e-mail at radforda@api.org. Thank you for considering and responding to these comments.

Sincerely,

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American Petroleum Institute

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International Association of Geophysical Contractors

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