



November 8, 2017

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Via e-mail

Subject: Additional information regarding [add RIN Number]

This letter is in response to questions raised during recent meetings with the Office of Management and Budget (OMB) / Office of Information and Regulatory Affairs (OIRA) regarding the proposed rule titled “Taking Marine Mammals Incidental to Conducting Geological and Geophysical Exploration of Mineral and Energy Resources on the Outer Continental Shelf (OCS) in the Gulf of Mexico.” During these meetings, the American Petroleum Institute (API) and the International Association of Geophysical Contractors (IAGC) (collectively, the Associations) presented information on potential economic impacts of the proposed regulations for Gulf of Mexico (GOM) geological and geophysical (G&G) activities and the problems associated with the modeling used by the Bureau of Ocean Energy Management (BOEM) and the National Marine Fisheries Service (NMFS) (collectively, the Agencies) to estimate potential “takes” of marine mammals. During these meetings, OMB/OIRA staff posed questions to the Associations, some of which the Associations indicated would require follow-up communication. This letter provides additional information as requested by OMB/OIRA staff and generally addresses the following questions regarding the potential economic and environmental impacts of:

1. Shutting down (or “powering down”) seismic survey operations for dolphins observed entering the exclusion zone?
2. Coastal time / area closure?
3. Other time / area closures?
4. Newly introduced mitigation measures for survey protocols for non-airgun high resolution geophysical (HRG) surveys?

Much of the information provided in this letter is taken from comment letters that the Associations have filed with BOEM and NMFS in response to various National Environmental Policy Act document (*e.g.*, Environmental Impact Statements) and Marine Mammal Protection Act (MMPA) authorizations covering G&G activities in both the GOM and Atlantic OCS.

1. Dolphin Shutdowns

A. Overview

The question regarding potential economic and environmental impacts of dolphin shutdowns is multifaceted and requires a review of the science surrounding dolphin hearing capability and a discussion on the practicability of the mitigation measure. Using the NEPA documents and proposed MMPA Incidental Harassment Authorizations in the Atlantic as a guide, where dolphin shutdowns were first proposed as a mitigation measure, as a guide, the Associations believe that the Agencies have not incorporated all of the best available science. The Agencies discounted observational data that contradict their modeled quantification of G&G impacts and instead relied on unrealistic assumptions regarding sound exposure that are not supported by the best science currently available.

Dolphin species (delphinids) are classified as having the best hearing at mid-frequencies, relative to other marine mammals (NMFS 2016).¹ By working with trained dolphins, scientists have identified the range of frequencies within which these species are best able to hear. In general, dolphins are capable of hearing sounds anywhere between 150 Hz up to 160 kHz. However, their best (most sensitive) hearing is from 9 to 110 kHz (NMFS 2016). Most of the sound energy from seismic source arrays is between 10 and 150 Hz, with some additional energy up to 1 kHz (Richardson et al. 1995).² As a result, when accounting for the hearing abilities of mid-frequency cetaceans like dolphins, most of the sound energy in seismic pulses is heavily discounted when calculating sound exposure levels, which is a measure of sound energy commonly used to describe at what point impacts (either temporary or permanent) to hearing may occur (NMFS 2016). Because the frequencies of highest hearing sensitivity in dolphins do not significantly overlap with sounds produced by seismic sources, they are the least sensitive to impacts from seismic sounds relative to other marine mammal species such as baleen whales that hear better at lower frequencies (Southall et al. 2007).³

Research findings support this conclusion. A 2015 study published in the scientific peer-reviewed literature investigated whether bottlenose dolphin exposure to seismic impulses results in temporary threshold shift (TTS; *i.e.*, a temporary reduction in hearing sensitivity). The paper states that even the highest exposure, cumulative sound exposure levels of 185-195 dB re 1 μ Pa²-s, did not result in TTS in any of the subjects.⁴ Even at ranges as close as 3.9 m and with the air gun operating at 150 in³ and 2000 psi, resulting in cumulative Sound Exposure Levels of 189-195 dB re 1 μ Pa²s, the impulses did not result in detectable TTS in any dolphin tested. The

¹ [NMFS] National Marine Fisheries Service. 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Threshold for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p.

² Richardson, W.J., C.R. Greene Jr., C.I. Malme, D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press. San Diego, California. 576 p.

³ Southall, B.L., A.E. Bowles, W.T. Ellison, J.J. Finneran, R.L. Gentry, C.R. Greene, Jr., D. Kastak, D.R. Ketten, J.H. Miller, P.E. Nachtigall, W.J. Richardson, J.A. Thomas, and P.L. Tyack. 2007. Marine mammal noise exposure criteria: Initial scientific recommendations. *Aquatic Mammals*, 33:411-521.

⁴ 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 (Apr. 2015). The results of this study also support inclusion of frequency weighting in updated acoustic criteria.

relatively low frequency content in seismic impulses may also have lessened the auditory effects on dolphins, which have best hearing sensitivity at much higher frequencies.⁵

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 sounds. Observation reports by Protected Species Observers (PSO) indicate that there is no statistically significant difference between the frequency of dolphin sightings and acoustic detections during seismic operations when the source is active or silent.⁶

Even if we were to discount the lack of scientific justification for a proposed shutdown mitigation measure for dolphins, except those entering the exclusion zone with the intention of bow-riding, implementation of the measure is not practical. 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 at long distances.⁷ The result is that observers would likely, out of caution, call for shutdowns in almost all instances where dolphins are observed within the exclusion zone.

In areas of high-density dolphin populations, such as the Atlantic Ocean and the GOM, shutdown requirements for a species that is often seen bow-riding and approaching vessels could effectively bring all seismic activity to a halt. Implementation of such a 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 zones during 30 minutes prior to ramp-up were due to dolphins).

In the GOM and many other regions, the use of observation/shut-down zones has historically been applied to cetaceans, excluding dolphins. BOEM’s existing requirements are documented in Notice to Lessees (NTL) 2016-G02 and were premised upon a 2002 NMFS Biological Opinion. BOEM has previously recognized that extending the shutdown requirement to delphinids is unwarranted. In its recent Supplemental Environmental Assessment for a specific

⁵ 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-eisoeis> 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”).

⁶ Barkaszi, M.J., M. Butler, R. Compton, A. Unietis, and B. Bennet. 2012. Seismic survey mitigation measures and marine mammal observer report. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2012-015. 28 pp + apps.

⁷ 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 frequent bow-riders. *See* K. Wynn & M. Schwartz, *Guide to Marine Mammals and Turtles of the U.S. Atlantic and Gulf of Mexico* (2009).

seismic survey permit in the GOM, BOEM concluded that from a biological standpoint, the best available information suggests that delphinids are considered mid-frequency specialists (*i.e.*, auditory bandwidth of 150 Hz to 160 kHz) (Southall et al., 2007). Low frequency seismic arrays 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). However, the majority of sound energy in seismic signals is between 10 and 150 Hz (Richardson et al. 1995). Therefore, while the majority of the seismic sound occurs at frequencies below that of delphinid hearing, 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.

BOEM has 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.⁸

Finally, there is no legal basis for a 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 a dolphin shutdown mitigation measure.

In sum, a dolphin shutdown mitigation measure would broadly and substantially impact seismic operations without any corresponding environmental benefit and without any scientific support.

B. Shutdowns versus Power-downs

In the GOM, the current guidance (BOEM NTL 2016-02) requires a shutdown (complete cessation of seismic sources) whenever a whale is detected within 500 m of the center of the source array while the array is active (a “whale” is defined as a baleen [or mysticete] whale, beaked whale, sperm whale, or *Kogia* spp.). Activation of the seismic source array may recommence after the exclusion zone has been visually monitored for 30 minutes to ensure the absence of marine mammals and sea turtles. If the exclusion zone cannot be visually monitored for 30 minutes, *e.g.* due to darkness or poor visibility conditions, then the array must remain silent until the zone can be adequately monitored.

A power-down is when the full seismic source array is reduced to a single active source element, sometimes called a “mitigation source”. This is commonly performed by seismic operators during turns between seismic survey lines as a way to, theoretically, keep marine mammals

⁸ 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.

aware of and away from the seismic source array so that it can be ramped back up to full power, even if the exclusion zone cannot be monitored due to poor visibility conditions. A power-down can also be used to mitigate exposure of an animal that appears within the exclusion zone while the full array is operating (*e.g.*, NMFS 2010).⁹ The reduction of the full operating array to a single active source significantly reduces the size of the zone within which impacts to marine mammal hearing may occur. This is reflected by a corresponding reduction in the size of the exclusion zone from 500 m to perhaps tens of meters. Thus, if the animal observed within the exclusion zone of the full array would be outside of the exclusion zone of the single source, a power down could be performed rather than a complete shutdown. If the animal remains outside of the much smaller exclusion zone around the single source and is not observed again within the larger exclusion zone of the full array for a period of 30 minutes, then the array can be ramped up to full power.

C. Bow-riding Dolphins

From 2003–2008, there were 3,963 records of marine mammal or sea turtle sightings in the GOM PSO database. Of these, 3,378 were marine mammals and 2,057 were “dolphins” (excluding sightings of *Kogia* spp., killer whales, beaked whales, and mysticete whales). Thus, dolphin sightings represented 52% of all sightings, and 61% of marine mammal sightings. Of the dolphin sightings, 29% (602 sightings) were recorded as exhibiting bow-riding behavior.¹⁰

Assuming that most seismic source arrays are towed less than 300 m behind seismic source vessels and most seismic source vessels are approximately 100 m in length, dolphins that intentionally approach and bow-ride on vessels towing an active seismic source array would occur within the 500 m exclusion zone. The 500 m exclusion zone is loosely based on estimates of the distance within which peak sound pressure levels (SPLs) may be high enough to cause permanent hearing damage in some marine mammals (BOEM 2017-051: 2-42).¹¹ Estimates of distances to such SPL thresholds commonly use a cautionary method where the highest SPL at any depth in the water column is used to represent that distance (also known as “maximum-over-depth” method), regardless of the depth at which animals are likely to occur (BOEM 2017-051: Appendix D). However, it is well known that SPLs near the water surface are often much lower than at depth in the water column as a result of pressure release effects near the surface (Urick 1983:134; Richardson et al. 1995:74).¹² This is especially true when both the source and the receiver are at shallow depth. Several other factors, such as bow-null effect acoustic shadow zones (Gerstein and Blue 2005; Trevorrow et al. 2008; Allen 2012)^{13,14,15} and directionality of

⁹ [NMFS] National Marine Fisheries Service. 2010. Incidental Harassment Authorization issued to Statoil USA E&P Inc. by the NMFS Office of Protected Resources. August 6, 2010. 12 p.

¹⁰ Barkaszi et al. 2012

¹¹ [BOEM] Bureau of Ocean Energy Management. 2017. Gulf of Mexico OCS Proposed Geological and Geophysical Activities Western, Central, and Eastern Planning Areas Final Programmatic Environmental Impact Statement. OCS EIS/EA BOEM 2017-051. 4 Volumes

¹² Urick, R.J. 1983. Principles of Underwater Sound. 3rd ed. McGraw-Hill, New York. 423 p.

¹³ Gerstein, E.R. and J. E. Blue, 2005. The acoustical causes of collisions between marine mammals and ships, *In: Sounds in the Sea*, edited by H. Medwin. Cambridge University Press, New York, pp. 430–444.

¹⁴ Trevorrow, M.D., B. Vasiliev, and S. Vagle, 2008. Directionality and maneuvering effects on a surface ship underwater acoustic signature, *J. Acoust. Soc. Am.* 124(2): 767–778

¹⁵ Allen, J.K., M.L. Peterson, G.V. Sharrard, D.L. Wright, S.K. Todd. 2012. Radiated noise from commercial ships in the Gulf of Maine: Implications for whale/vessel collisions. *J. Acoustic. Soc. Am.* 132(3): 229-235.

acoustic energy from seismic source arrays (BOEM 2017-051: Appendix D, showing greater propagation in port/starboard direction than in the bow/stern direction from a typical seismic source array), may also reduce SPLs near the bow of seismic source vessels. Thus, bow-riding dolphins at or near the surface of the water would be exposed to much lower SPLs than acoustic modeling using the maximum-over-depth methods would indicate.

D. Conclusion

Dolphins are mid- to high-frequency specialists and, therefore, insensitive to the low frequency impulse sounds emitted by seismic sources. Shutting down or powering down seismic surveys in the presence of dolphins is not necessary or supported by field observations and current best available science. Because the environmental impact of G&G activities is based on inaccurate science and greatly overstated modeling estimates of “takes”, the need for mitigation measures is also greatly overstated. Shutting down operations for dolphins is without precedent. Under Joint NTL No. 2016-G02 (and previously NTLs No. 2012-G02 and 2007-G02), BOEM required seismic operators in the GOM to shut down for any whale observed in the exclusion zone. BOEM defined “whales” as all marine mammals except dolphins and manatees. In litigation challenging BOEM’s permitting of seismic operations in the GOM, a settlement agreed to for purposes of compromise among the parties (the “Settlement Agreement”)¹⁶ extended the shutdown requirements to manatees. In short, no dolphin shutdown provision, as recommended in BOEM’s Programmatic Environmental Impact Statement (PEIS) for GOM Geological and Geophysical Activities (BOEM 2017-051), has ever been required by any U.S. Federal Agency. A dolphin shutdown or power down requirement could have extensive impacts on seismic surveys, possibly to the point that these impacts could affect the feasibility of conducting seismic activities. There are considerable cost impacts that should be considered in the implementation of either of these mitigations. Neither is practical for dolphins for the reasons discussed in the previous section.

2. Coastal Time / Area Closures

A proposed seasonal coastal closure based on one identified in the PEIS for GOM Geological and Geophysical Activities (BOEM 2017-051) is arbitrary and unsupported, and will have adverse economic and operational consequences for industry. The PEIS included a proposed seasonal closure applicable to all seismic activities for all coastal waters in the GOM shoreward of the 20-meter isobath between February 1 and May 31 (“Coastal Closure”). BOEM stated that the Coastal Closure is intended to “afford protection to individual members of the bay, sound, and estuary stocks during their calving season, as well as coastal stocks of common bottlenose dolphins, Atlantic spotted dolphins, and individual manatees that may occur in coastal and inshore waters.” PEIS at xvii. However, as explained below, the Coastal Closure is not supported by the best available science, will increase exposure estimates for other marine mammal stocks, and will have significant adverse economic and operational consequences. Moreover, according to BOEM’s own conclusions, all of the additional mitigation measures included in Alternative C in the PEIS (Alternative A Plus Additional Mitigation Measures) would not reduce the overall level of impacts compared to Alternative A (Pre-Settlement (June 2013) Alternative).

¹⁶ See *NRDC et al. v. Jewell et al.*, No. 2:10-cv-01882 (E.D. La.) (Dkts. 118-2, 127-2, 143-2).

The genesis of the Coastal Closure is a term in the Settlement Agreement executed among the parties in pending litigation for purposes of compromise.¹⁷ Although API and IAGC disagree that this nearshore restriction was appropriate or necessary, the rationale for the restriction was in response to coastal bottlenose dolphin strandings and mortalities (*i.e.*, the northern GOM unusual mortality event (“UME”)). However, the UME has since been closed.¹⁸ Moreover, none of the strandings or deaths in the UME has been attributed to deep penetration seismic survey activities. *See* PEIS at 2-13. Instead, recent research demonstrates that seismic impulses at even higher thresholds fail to induce even temporary threshold shifts in dolphin hearing. *See* Finneran et al. (2015). No relevant scientific evidence supports a further restriction of deep penetration seismic surveys in coastal areas or suggests that such a restriction would result in any meaningful benefit to coastal bottlenose dolphin populations, and no contrary evidence or meaningful response is provided by BOEM in the PEIS.¹⁹

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

BOEM finds in the PEIS is that the Coastal Closure could result in higher exposure numbers for some marine mammal stocks if seismic activity increases outside the closed area. Specifically, PEIS Section 4.2.4.1.1 states that, in zones 1 and 2 (Florida, Alabama, Mississippi, and Louisiana continental shelf), all species other than bottlenose dolphins have increased exposure estimates as a result of the Coastal Closure. In zone 3 (Texas continental shelf), Atlantic spotted dolphins (among others) show increased exposure estimates, and manatees show little or no change, in response to the Coastal Closure. *Id.* According to BOEM’s analyses, the Coastal

¹⁷ *See NRDC et al. v. Jewell* at Dkt. 118-2, Section IX (“Intervenor-Defendants do not agree that all of the measures described in paragraph IX.A and IX.B are feasible or appropriate. Intervenor-Defendants shall be free to challenge any such measures should one or more of the Federal Defendants develop and implement them.”); *id.* at Dkt. 127-2, Section G (“The terms of this Stipulation have been agreed to for purposes of compromise. No party concedes by entering into this Stipulation that any of the permit requirements described above are warranted by scientific evidence or should be imposed after the Stay expires, or that these requirements are sufficient to achieve legal compliance or reduce biological risk over the long term.”); *id.* at Dkt. 143-2, Section 9 (“The terms of this Second Stipulation have been agreed to for purposes of compromise. No party concedes by entering into this Second Stipulation that any permit requirements heretofore agreed to are warranted by scientific evidence or should be imposed after the Stay expires, or that these requirements are sufficient to achieve legal compliance or reduce biological risk over the long term.”)

¹⁸ *See* http://www.nmfs.noaa.gov/pr/health/mmume/ctacean_gulfofmexico.htm.

¹⁹ There are no data to suggest that seismic-generated sound negatively impacts the bottlenose dolphin population in general or the mother-calf pairs in particular, and it is equally, if not more, plausible that the animals are completely unaffected by the sound. Moreover, as demonstrated in Section I.B above, modeling of potential acoustic exposures, based on most likely (as opposed to worst-case) assumptions, shows that bottlenose dolphin exposure to seismic sound will be minimal. The fact that these populations may be affected by coastal pollution, vessel traffic in the estuaries, or endemic diseases is not a basis for restricting an activity that has no demonstrated adverse effect

Closure will increase the potential effects on numerous marine mammal stocks while providing no established benefits to coastal bottlenose dolphins.

The Coastal Closure will have substantial negative economic and operational consequences. There are many unleased blocks within the area covered by the Coastal Closure. Because existing seismic data in these areas is outdated and inadequate to inform decisions regarding future lease sales, the Coastal Closure will impede industry's and BOEM's evaluations of blocks for future lease sales. As addressed below, the Coastal Closure significantly increases the likelihood that an affected deep penetration seismic survey will not be completed within its one-year permit term, thereby increasing the overall number of surveys that will need to be conducted, increasing costs, and decreasing overall efficiency.

BOEM incorrectly assumes that the Coastal Closure “is unlikely to affect the total level of survey effort because the survey effort may shift to seasons in which the coastal areas are available for exploration and would likely survey outside these areas during the closed seasons.” PEIS at 4-89, 4-90. The enormous, mostly unexplored area covered by the Coastal Closure requires certain specialized surveys—full azimuth, long offset, deep data seismic. The coastal offshore areas of Louisiana and Eastern Texas, in particular, require very specialized equipment—light ocean bottom nodes and ocean bottom cables.²⁰ Regular marine streamer crews will not be able to collect enough data or achieve the required spatial sampling to be able to adequately image the targeted section. These specialized node and ocean bottom cable crews are not designed for deeper, open-water exploration. Moreover, the vessels used in shallow water are often smaller and have shallower vessel drafts. Such vessels cannot be taken easily or safely into deep open-water environments. In short, the specialized operations required for the areas covered by the Coastal Closure cannot simply be shifted to other areas that do not require the same specialized operations.

Additionally, modern seismic imaging requires an entire aperture to be recorded before imaging can be performed—essentially, all data for a particular data project must be gathered as a whole before the final steps are performed to create the data image. This means, in many instances, that surveys within the Coastal Closure will be terminated early as a result of the four-month restriction. If crews are able to move to locations outside of the closure area (which will be difficult for the reasons stated above), it is very unlikely that those projects will last for exactly four months, which means that the delays to surveys in the Coastal Closure area are likely to last for much longer than four months (not including the substantial time required for mobilization and demobilization). Moreover, the four months of closure are the most operationally productive months in the GOM because the winter storms have ended and the summer tropical storms have not yet begun. Accordingly, the cost to operate in the area covered by the Coastal Closure would be substantially higher than other areas and would result in increased and inefficient survey effort overall.²¹

²⁰ Based on the limited information that is available, it is likely that coastal areas offshore Louisiana and East Texas contain very large quantities of natural gas. For example, just one prospect indicates recoverable reserves exceeding 1 trillion cubic feet. See http://www.offshore-mag.com/articles/print/volume-70/issue-6/Gulf_of_Mexico/davy-jones-a-new-era-for-gom-shelf-exploration.html. This area is a very prospective area, with infrastructure in place both to bring the gas onshore and to distribute it around the country.

²¹ Based on calculations from one of our member companies, the cost of shutting down a single crew for the proposed four-month closure season could be in the range of \$7,000,000. Based on those same calculations, lost

In sum, for the reasons stated above, the Associations respectfully request that any proposed regulations not adopt the Coastal Closure as a mitigation measure because any speculative benefit (which is unsubstantiated) is far outweighed by the environmental, operational, and economic costs of mandating the Coastal Closure. The Coastal Closure is not supported by the best available science, it will not benefit marine mammals, it will result in overall increased survey effort at a much higher cost to operators, and it will hamper the ability of the U.S. to develop nationally strategic natural gas reserves.

3. Other Time / Area Closures

As API highlighted in its recent meeting, if additional non-coastal, time/area closures in the GOM OCS are implemented, these measures will have substantial adverse effects on offshore geophysical operations and substantial economic impacts, thereby threatening the economic viability of G&G activities in the GOM. Any current investment in these areas would be essentially stranded and the value of lost revenue could be in the billions of dollars. Seismic surveys not conducted because of seasonal shutdown, survey restrictions, or area closures would not be simply displaced to other times or areas. With unreasonable mitigation measures continually in place, surveys originally planned for Year 1 would replace surveys that would have occurred in Year 2, while even more Year 2 planned surveys would be pushed to Year 3, and so on. Over time, the ripple effect of delayed or forgone surveys will reduce overall seismic data collection, adversely impacting the industry's ability to drill new wells and curtailing future production. Timing delays large enough to affect drilling schedules are more important to potential economic impacts than seismic cost increases. Additionally, these impracticable measures will result in increased survey duration, which, in turn, can increase the potential exposure of marine mammals to sound from seismic surveys and the potential for interference with other users of the GOM. As API's economic impact study demonstrated, the number of wells that will not be drilled as a result of certain mitigation measures and the subsequent reduction in drilling will have significant negative impacts on production, government revenue, gross domestic product, and employment.²²

4. Non-Airgun High-Resolution Geophysical (HRG) Surveys

The PEIS (BOEM 2017-051) Preferred Alternative C included "newly introduced measures for survey protocols for non-airgun HRG surveys" less than or equal to 200 kHz (the "Non-Airgun HRG Survey Protocol"). PEIS at xi; see id. § 4.2.4.1.4. This "newly introduced" protocol presents serious operational and cost concerns, and has not been fully vetted. The PEIS proposes unprecedented observation and shutdown requirements for HRG activities that mimic closely those required of seismic surveys, despite the fact they are significantly different in many ways. Likewise, if NMFS includes this protocol in its Proposed Rule for GOM Geophysical Activities Incidental Take Regulation (ITR), this will result in the same significant impact to industry.

revenues due to operating around a four-month closure over a 10-year period could range from \$300,000,000 to \$900,000,000.

²² Calash 2017, copy provided to OMB/OIRA at meeting on October 24.

There are also serious flaws with this new protocol and, in fact, it is not currently consistently applied (or applied at all) to the wide range of ocean users, including government agencies such as the National Ocean Service, that conduct these types of surveys. When proposing to broadly implement a new protocol, such as the Non-Airgun HRG Survey Protocol, BOEM and NMFS must evaluate the wide variety of surveys and situations to which it will apply as well as the cost-benefit impacts associated with implementing new mitigation measures. Indeed, the type of equipment, platform types and overall operational support vary substantially for different non-airgun HRG surveys employed in the oil and gas industry alone. However, none of this variability is evaluated in the PEIS nor is the Non-Airgun HRG Survey Protocol's application to different survey types and situations. The PEIS also does not consider the fact that many non-airgun HRG surveys are now conducted autonomously, which poses a major implementation impediment.

In addition, the proposed Non-Airgun HRG Survey Protocol presents serious safety and cost concerns, which have also not been fully vetted. For example, adding PSOs to the smaller vessels used for non-airgun HRG surveys will be challenging, costly to implement, and will present safety risks due to having more people onboard smaller vessels, in which many vessels used are supporting autonomous survey acquisitions. As to costs, the Associations roughly estimate that the PSO portion alone of the Non-Airgun HRG Survey Protocol will result, at a minimum, in an approximate 5-20% increase in overall cost per individual survey. Unlike large seismic source array surveys, these HRG surveys can occur as frequently as monthly, compounding the percent increase in cost and resulting in millions of dollars of added cost.

For the reasons cited above, we respectfully request that any proposed regulation either (i) removes the Non-Airgun HRG (≤ 200 kHz) Survey Protocol from the measures until the Protocol can be more fully analyzed and vetted, or (ii) clearly states that the Non-Airgun HRG (≤ 200 kHz) Survey Protocol is an optional measure that may be included on a case-by-case basis in future permits or authorizations, pending further analysis and input from the regulated community and the public.

5. Conclusion

In closing the Associations would like to reiterate the points made during our respective meetings with OMB/OIRA. In short, the estimated levels of incidental takes and resulting effects analysis presented in the PEIS (BOEM 2017-051) is almost exclusively based upon a modeling exercise that uses a cascading series of conservatively biased assumptions for all uncertain parameter inputs. These assumptions lead to accumulating bias as the cumulative conservative assumptions add up to increasingly unlikely statistical probabilities that are not representative of real-world conditions. Using this flawed methodology as a basis for determining proposed mitigation measures is not supported and must be remedied prior to NMFS publication of the proposed ITR for GOM G&G operations.

In addition, API's economic impact analysis of reduced G&G activity in the GOM shows the potential for significant economic impacts. Specifically, it is estimated that in 2035, closing a large portion of the Central GOM to seismic surveys could result in:

- 500,000 fewer barrels of oil equivalent a day of oil and natural gas production;
- Over 133,000 fewer jobs;
- \$10 billion less industry spending; and,
- Nearly \$2 billion less government revenue.

Based on industry's decades-long experience in the GOM with no demonstrated impacts to marine mammal populations, the prospect of closing large areas of the GOM to future seismic surveys, implementing dolphin shutdown mitigation measures, and the imposition of newly introduced measures for survey protocols for non-airgun HRG surveys are not justified.

Should you have any questions, please do not hesitate to contact Nikki Martin (713.957.5068) or Andy Radford (202.682.8584).

Sincerely,



Nikki Martin
International Association of Geophysical Contractors



Andy Radford
American Petroleum Institute

cc: Chris Oliver, NMFS, Assistant Administrator for Fisheries
Jolie Harrison, NMFS, Chief, Permits and Conservation Division
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