13 June 2018

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by Orsted LLC/Bay State Wind LLC (Orsted)[1] under section 101(a)(5)(D) of the Marine Mammal Protection Act (the MMPA). Orsted is seeking authorization to take small numbers of marine mammals by harassment incidental to marine site characterization surveys off the coast of Massachusetts. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 15 May 2018 notice (83 Fed. Reg. 22443) requesting comments on its proposal to issue the authorization, subject to certain conditions.

Background

Orsted is proposing to conduct high-resolution geophysical (HRG) and geotechnical surveys to obtain baseline seabed and sediment data to support the siting of its wind farm off the coast of Massachusetts and along potential cable routes between the lease area and possible landfall locations in Massachusetts. The surveys would occur on up to 60 days during the day and at night with up to four vessels[2] being used at a given time. Sub-bottom profilers (SBPs), multi-beam sonar, and side scan sonar would be used.

NMFS preliminarily has determined that the proposed activities could cause Level A and/or B harassment of small numbers of 11 marine mammal species. It also anticipates that any impact on the affected species and stocks would be negligible. NMFS does not anticipate any take of marine mammals by death or serious injury and believes that the potential for disturbance will be at the least practicable level because of the proposed mitigation measures. The proposed mitigation, monitoring, and reporting measures include—

- using protected species observers to monitor the exclusion zones and the Level B harassment zone before, during, and after the HRG surveys;
- using ramp-up, delay, and shut-down procedures;

[1] Formerly DONG Energy.
[2] Including autonomous underwater vehicles.

- using delay and shut-down procedures, if a species for which authorization has not been granted or a species for which authorization has been granted but the authorized number of takes are met approaches or is observed within the Level A and/or B harassment zone[3];
- using passive acoustic monitoring and night-vision equipment (with infrared capabilities) to detect marine mammals during nighttime operations;
- using standard vessel strike avoidance procedures and monitoring[4] the NMFS North Atlantic right whale reporting systems during all survey activities;
- working with NMFS to shut down and/or alter the survey activities if a Dynamic Management Area is established in the survey area;
- reporting injured and dead marine mammals to the Office of Protected Resources and the Greater Atlantic Regional Fisheries Office (GARFO) Stranding Coordinator[5] using NMFS's phased approach and suspending activities, if appropriate; and
- submitting a final report to NMFS.

Appropriate Level A harassment thresholds, zones, and take estimates

Level A harassment thresholds and resulting zones—The Commission informally noted that Orsted used the impulsive rather than non-impulsive threshold for estimating the Level A harassment zone for multiple non-impulsive sources[6] (i.e., the ultra-short baseline positioning system (UBPS)[7] and various types of SBPs). For the UBPS, both the impulsive and non-impulsive thresholds yielded Level A harassment zones of 0 m. However, the Level A harassment zones for the SBPs[8] were greatly overestimated by using the impulsive thresholds. The Level A harassment zone for the EdgeTech SBP (chirps) should have been 0.1 m rather than 5.3 m for high-frequency (HF) cetaceans, while the Level A harassment zone for the Innomar SBP[9] should have been much less than 10 m[10] rather than 75 m for HF cetaceans.

[3] The Commission informally noted that NMFS omitted this measure from the preamble and the proposed authorization. NMFS confirmed the measure would be included in the final authorization.
[4] The Commission additionally noted that NMFS included this standard measure in the preamble but omitted it from the proposed authorization. NMFS confirmed the measure would be included in the final authorization.
[5] The proposed authorization incorrectly specified the Northeast Regional Stranding Coordinator rather than the GARFO Stranding Coordinator as stipulated in the preamble. NMFS confirmed the measure would be revised in the final authorization.
[6] See Table 1 in Crocker and Fratantonio (2016) for source and signal types.
[7] i.e., a pinger. The Commission is not convinced that estimating the range to Level A harassment is necessary for this source, given that Level B harassment takes have yet to be authorized for acoustic sources such as pingers under incidental take authorizations.
[8] These types of SBPs are neither characterized by a broadband pulse nor a high peak sound pressure with rapid rise time and rapid decay, which are indicative of impulsive sources.
[9] Which is a narrow-beam, parametric SBP.
[10] Orsted used BELLHOP rather than NMFS's user spreadsheet to estimate the Level A harassment zone for the Innomar SBP. Orsted did not provide information on the sound speed profile, water depths/bathymetry, or sediment characteristics it used as inputs. Thus, the results cannot be recreated precisely. Similar to the Commission, NMFS conducted basic calculations that yielded Level A harassment zones of less than 5 m or approximately 2 percent of the original zone.

NMFS may have unknowingly allowed other action proponents to use the impulsive rather than non-impulsive Level A harassment thresholds for parametric SBPs and chirps[11]. In this instance, NMFS is aware that Orsted used the wrong threshold but doesn't think it is a major issue as it results in a more conservative estimate. Although the impulsive threshold is more conservative than the non-impulsive threshold, the correct threshold should have been used. Allowing action proponents to choose arbitrarily which thresholds to use undermines the intent of the acoustic thresholds and, thus, does not represent best available science. Therefore, the Commission recommends that NMFS prohibit Orsted and any other action proponent from using the impulsive Level A harassment thresholds for estimating the extents of the Level A harassment zones for non-impulsive sources (i.e., parametric SBPs, chirps, pingers, etc.).

Level A harassment takes—NMFS proposed to authorize 137 Level A harassment takes of harbor porpoises in Orsted's proposed authorization, which equated to more than two takes per day of activities. As noted herein, the Level A harassment zone for the Innomar SBP was greatly over-estimated at 75 m[12], because the wrong threshold was used. That estimate also did not account for the actual source level of the Innomar SBP[13] nor a beam width of 1 degree. NMFS has historically assumed that harbor porpoises display profound and sustained avoidance behavior to sounds greater than 140 dB re 1 μPa (Southall et al. 2007 and Department of the Navy 2017; 83 Fed. Reg. 11006). Thus, it would be unlikely that harbor porpoises would be within 75 m of a vessel nor have they been observed in the same general area during any previous HRG survey[14] or related activity. In addition, harbor porpoise average swim speeds range from 1.19 to 1.97 m/s (Otani et al. 1998 and 2001, Kastelein et al. 2018), which is less than the assumed vessel speed of 2.05 m/s. Therefore, it is not plausible to believe that a harbor porpoise would be approached by a vessel, remain within the 1-degree beam of the SBP directly under the vessel, and swim fast enough while remaining in that beam to accumulate enough energy/pulses to experience a permanent threshold shift (PTS). It is even less credible to propose that 137 harbor porpoises would follow the same course[15].

NMFS has not made such assumptions previously. In its authorizations involving similar HF sources used during fisheries research activities, NMFS indicated that the potential for PTS to occur for any species is so unlikely as to be discountable (81 Fed. Reg. 38544). NMFS also assumed, in another proposed authorization for HRG surveys to be conducted by Dominion Energy Virginia

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[11] It is unclear whether this occurred for Garden State Offshore Energy, LLC, and Deepwater Wind New England, LLC (see associated applications and references to impulsive sources). However, the largest Level A harassment zones estimated for those activities ultimately were based on sparkers rather than parametric SBPs and chirps.

[12] Curiously, it also was assumed that harbor porpoises could not be detected at 75 m, particularly at night. Thus, takes were considered to be warranted. However, at the same time it was assumed that Risso's dolphins, sei whales, Atlantic spotted dolphins, and long-finned pilot whales would be detected 100 percent of the time at a distance of 400 m, including at night, so as to avoid unauthorized taking.

[13] Orsted used the manufacturer specifications of 243 dB re 1 μPa at 1 m. Measured source levels for the other HRG sources were consistently 19 to 28 dB less than the manufacturer specifications (see Appendix A of Orsted's application).

[14] In review of the monitoring reports for all Deepwater Wind related activities, Cape Wind activities, and DONG activities, harbor porpoises have never been observed, which was similarly noted by NMFS.

[15] Although NMFS's basic calculation yielded 3 takes of harbor porpoise (assuming 2 percent of the original takes), NMFS indicated that it plans to authorize 20 takes as that number of takes would not affect its analysis or ability to make the relevant findings. The Commission agrees that NMFS can make the findings, as it has made those findings with numbers of takes orders of magnitude greater than 20. Rather, the Commission contends that any number of Level A harassment takes are unnecessary in this instance.

(Dominion), that Level A harassment is very unlikely to occur based on the 1-degree beam of the Innomar SBP[16] and that likelihood of Level A harassment is so low as to be discountable (83 Fed. Reg. 26982). Further, NMFS denied Deepwater Wind's request to authorize Level A harassment takes based on a similarly small zone of 5.3 m for last year's activities (82 Fed. Reg. 32331). It is unclear why the same assumptions were not made for this authorization involving the same equipment, same species, and same size zones. The Commission notes that this will be the first time NMFS authorizes Level A harassment takes for HRG-related sources, which is not only unnecessary but will ultimately set a precedent. For all these reasons, the Commission recommends that NMFS refrain from authorizing Level A harassment takes of harbor porpoises in Orsted's final authorization.

Appropriate Level B harassment thresholds, zones, and take estimates

Level B harassment thresholds—In lieu of an appropriate Level B harassment threshold for parametric SBPs and chirps, NMFS has characterized them as impulsive sources relative to 160-dB re 1 μPa threshold[17]. However, researchers have observed that various species of marine mammals respond to sound from sources with similar characteristics (including acoustic deterrent devices, acoustic harassment devices, pingers, echosounders, and sonars) at received levels below 160 dB re 1 μPa. The Commission has noted in previous letters regarding this matter that those sources have temporal and spectral characteristics suggesting that, until such time that NMFS updates its behavior thresholds, a lower, more precautionary Level B harassment threshold of 120 dB re 1 μPa would be more appropriate than the 160-dB re 1 μPa threshold.

The Commission remains concerned that NMFS's current behavior thresholds do not reflect the current state of understanding regarding the temporal and spectral characteristics of various sound sources and their impacts on marine mammals. Therefore, the Commission recommends that, *until* the behavior thresholds are updated, NMFS require applicants to use the 120- rather than 160-dB re 1 μPa threshold for acoustic, non-impulsive sources (e.g., parametric SBPs, chirps, echosounders, and other sonars including side-scan and fish-finding).

Extent of zones—Although the largest Level B harassment zone was estimated to be 400 m[18], NMFS has since informed the Commission that Orsted conducted sound source verification (SSV) on the triple boom plate resulting in a Level B harassment zone of 8 m. The Commission acknowledges that 400 m is conservative and unrealistic but is not convinced that 8 m is possible. SSVs have been conducted using the same source previously, and the Level B harassment zones were estimated to be 18 to 32 m when operating at the lowest setting of 100 J (Crocker and Fratantonio 2016). It is unclear why, if Orsted intended to use the triple boom plate at a lower energy output, it estimated the Level B harassment zones using the manufacturer's specifications rather than the measured source levels from Crocker and Fratantonio (2016). It also is unclear how the Level B harassment

[16] Dominion used the same input assumptions and model (i.e., BELLHOP) as Orsted but estimated smaller Level A and B harassment zones for HF cetaceans (50 and 100 m, respectively). The Commission assumes that the environmental parameters are responsible for the differences in the extents of the harassment zones but that has not been verified, as neither applicant provided information regarding the environmental parameters used.
[17] The general Level B harassment thresholds only relate to impulsive and continuous sources. Parametric SBPs and chirps are neither impulsive nor continuous sources, rather they are non-impulsive, intermittent sources.
[18] Which was based on manufacturer specifications for the triple boom plate and the assumed maximum output of 1,000 Joules.

zone was estimated to be only 8 m, which is smaller than any other reported zone for a triple boom plate or any other similar boomer. Since the Commission has not been provided the SSV report, it cannot comment further on this matter. However, the Commission recommends that NMFS provide the SSV report to its technical experts for review prior to allowing Orsted to implement an 8-m Level B harassment zone for the triple plate boom.

The Commission had informally noted that Orsted, and any other applicant using the Innomar SBP, should conduct an SSV to confirm the source level and extent of the Level B harassment zone. The Commission understands that Orsted indicated it would not be feasible or prudent to conduct SSVs for the Innomar SBP. Although it might be costly, the Commission contends that it is feasible to conduct such measurements since Orsted has done so for the triple boom plate. The Commission further asserts that it would be prudent to do so, since both NMFS and Orsted agree that the source levels used and Level B harassment zones estimated were overly conservative. Accordingly, the Commission *strongly* encourages Orsted and any other action proponent that proposes to use the Innomar SBP to conduct SSV measurements, as it is very likely that those measurements will yield Level B harassment zones on the order of 10s of meters or less.

Level B harassment takes— In addition to informally pointing out minor errors[19] in the take estimates, the Commission informally noted that NMFS used incorrect ensonified areas[20] for Lots 1 and 2[21] and the proposed numbers of takes for some species were missing altogether from Orsted's application and the *Federal Register* notice. Risso's dolphins were observed last year in the same general project area during an HRG survey conducted by Deepwater Wind, LLC (Deepwater Wind). A group of eight Risso's dolphins was observed at 400 m from the source, with the vessel having to actively avoid the animals to prevent unauthorized takes (Deepwater Wind 2018). When the Commission inquired about Orsted requesting takes of Risso's dolphins, NMFS indicated that it did not believe taking was warranted based on the shorter duration of Orsted's proposed activities as compared to Deepwater Wind's proposed activities (60 vs 200 days, respectively) and based on Deepwater Wind not requesting Risso's dolphin takes based on its modeling results. The Commission disagrees[22]. The number of days of activities and modeling results[23] are irrelevant in the case where a species has been observed in the same general area in the year prior. Therefore, the Commission recommends that NMFS include at least 20 Level B harassment takes[24] of Risso's dolphins based on encountering a group twice during the 60 days of Orsted's proposed activities.

The Commission also informally noted that Orsted did not request to take sei whales, Atlantic spotted dolphins, or long-finned pilot whales during its proposed HRG survey. Those species were included in the proposed authorization for Deepwater Wind (Table 7, 83 Fed. Reg. 19728). NMFS responded that takes again were not warranted, because Orsted's activities are much shorter in duration than Deepwater Wind's, the activities would occur in summer, and the densities were low, yielding less than 1 take of sei whales and Atlantic spotted dolphins and less than 3 takes

[19] Including that takes were increased for certain species to account for both group size *and* expected frequency of occurrence based on recent monitoring effort in the area and other typographical errors.
[20] NMFS further noted that the incorrect number of days of activities were assumed for Lot 1 as well.
[21] Resulting in fewer overall takes for certain species to be included in the final authorization.
[22] As it had in the Commission's 31 May 2018 letter on Deepwater Wind as well.
[23] It is unclear if Orsted's modeling results also yielded zero takes, as that information is not included in its application.
[24] Which also includes a buffer in case more individuals are observed this year.

of long-finned pilot whales[25]. Both Orsted's and Deepwater Wind's activities would occur in summer, and the number of days of activities are irrelevant when takes greater than 0 were estimated for those species. For sperm whales, NMFS took the opposite approach. Only 1 sperm whale take was estimated yet Orsted requested, and NMFS included, takes based on an average group size of 5. Takes should have been requested similarly for sei whales, spotted dolphins, and pilot whales.

NMFS noted that Orsted has not observed any of the three species during previous monitoring efforts. While that may be the case, NMFS does not base its authorization solely on those species observed during an activity[26]. NMFS bases its authorization on the 'potential' to injure or disturb (Level A and B harassment, respectively). The 'potential' exists for each of the three species. Additionally, NMFS seems to be indiscriminately determining when results from monitoring reports are relevant. In this instance, had Orsted observed sei whales, spotted dolphins, or pilot whales during previous monitoring efforts, takes might have been included. But, in the case of Risso's dolphins, which were observed during previous monitoring efforts, takes were determined not to be warranted. NMFS's rationale is inconsistent. The Commission recommends that NMFS include takes of sei whales, Atlantic spotted dolphins, and long-finned pilot whales in Orsted's final authorization and, if necessary, ensure that the number of takes authorized for each species is at least equal to the average group size of each species.

Rounding of take estimates

The method used to estimate the numbers of takes during the proposed activities, which summed fractions of takes for each species across project days, does not account for and negates the intent of NMFS's 24-hour reset policy. As the Commission has indicated in many previous letters regarding this matter[27], the issue at hand involves policy rather than mathematical accuracy. In this instance, Level A harassment takes were summed across all days of activities resulting in calculated takes that do not comport with real-world scenarios. Rounding takes across all days of activities is particularly problematic when estimating the numbers of Level A harassment takes. The Commission understands that NMFS has nearly completed revising its draft criteria and plans to share them with the Commission in the near future. The Commission again recommends that NMFS provide those criteria without further delay.

Take estimates in general

The Commission has repeatedly noted in recent letters that NMFS's proposed numbers of takes are often flawed and illogical. The Commission contends it is NMFS's responsibility to determine whether the proposals from applicants are scientifically sound and necessary from biological and ecological perspectives and then to work with the applicant to determine whether adjustments should be made. NMFS's reasoning for not revising a request should not be based merely on past practice, on what calculations yield, or on what applicants propose. Therefore, the Commission recommends that NMFS better evaluate the numbers of Level A and B harassment

[25] These data were not provided to be crosschecked so it is unclear if they were calculated appropriately.
[26] If that would be the case, very few species would be included in many of the authorizations NMFS issues. For example, NMFS authorized Deepwater Wind to take 18 species during last year's activities, but it ultimately took only 8 species (Deepwater Wind 2018).
[27] See the Commission's 29 November 2016 letter detailing this issue.

takes it plans to propose by considering both ecological/biological information and results from previous monitoring reports for all proposed authorizations prior to submitting them for publication in the *Federal Register*.

Mitigation and monitoring measures

NMFS stipulated inconsistent pre- and post-monitoring periods and clearance times[28] both within the *Federal Register* notice and with what have become standard mitigation requirements for other authorizations that involve HRG surveys. NMFS has required 30-minute pre- and post-monitoring periods and 15-minute clearance times for small cetaceans and pinnipeds and 30-minute clearance times for larger cetaceans after a delay or shut down. When the Commission inquired about the inconsistencies, NMFS noted that the longer timeframes were based on the stipulations in Orsted's lease and that Orsted would have to abide by those stipulations unless it gets a variance from the Bureau of Ocean Energy Management (BOEM).

The Commission had previously inquired with NMFS regarding differences between mitigation and monitoring measures specified by NMFS and BOEM. At that time, NMFS indicated that it must base the mitigation and monitoring measure requirements in the incidental take authorization on the best available science and, in some cases, the measures NMFS believes are warranted may differ from what BOEM has required in its lease[29]. The Commission agrees but is unsure why that approach was not taken for Orsted's proposed incidental harassment authorization. The Commission further notes that requiring 60-minute monitoring periods and clearance times are unnecessary for the proposed activities. As such, the Commission recommends that NMFS require Orsted to implement a 30-minute pre- and post-monitoring period and 15-minute clearance times for small cetaceans and pinnipeds and 30-minute clearance times for larger cetaceans after a delay or shut down rather than 60-minute monitoring periods and clearance times—these measures should be included consistently for all proposed authorizations involving HRG surveys.

Proposed one-year authorization renewals

NMFS has indicated that it may issue a one-year[30] incidental harassment authorization renewal for this and other future authorizations on a case-by-case basis without additional public notice or comment opportunity when (1) another year of identical, or nearly identical activities, as described in the 'Specified Activities' section of the *Federal Register* notice is planned or (2) the originally planned activities would not be completed by the time the incidental harassment authorization expires and a renewal would allow for completion of the authorized activities beyond the timeframe described in the 'Dates and Duration' section of the notice. NMFS would consider issuing a renewal only if—

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[28] 60-minute pre- and post-monitoring periods and 60-minute clearance times were stipulated in the preamble and a 30-minute pre- and post-monitoring period and 15- and 30-minute clearance times were stipulated, depending on the species, in the proposed authorization.

[29] Irrespective of whether the applicant had obtained the relevant variance from BOEM.

[30] In other proposed authorizations (e.g., 83 Fed. Reg. 8456), NMFS clarified that it would issue a *second* one-year authorization, which should have been specified in the proposed authorization. However, NMFS has yet to specify whether the renewal would be issued as a one-time opportunity, after which time a new authorization application would be required. These specific details should be included in all *Federal Register* notices that describe the proposed renewal process.

- the request for renewal is received no later than 60 days prior to the expiration of the current authorization;
- the activities to be conducted either are identical to the previously analyzed and authorized activities or include changes so minor (e.g., reduction in pile size) that they do not affect the previous analyses, take estimates, or mitigation and monitoring requirements;
- a preliminary monitoring report provides the results of the required monitoring to date and those results do not indicate impacts of a scale or nature not previously analyzed or authorized;
- the status of the affected species or stocks and any other pertinent information, including the mitigation and monitoring requirements, remain the same and appropriate; and
- the original determinations under the MMPA remain valid.

The Commission agrees that NMFS should take appropriate steps to streamline the authorization process under section 101(a)(5)(D) of the MMPA to the extent possible. However, the Commission is concerned that the renewal process proposed in the *Federal Register* notice is inconsistent with the statutory requirements. Section 101(a)(5)(D) clearly states that proposed authorizations are subject to publication in the *Federal Register* and elsewhere and that there be a presumably concurrent opportunity for public review and comment. NMFS's proposed renewal process would bypass the public notice and comment requirements when it is considering the renewal.

The Commission further notes that NMFS recently implemented an abbreviated authorization process by publishing the required information[31] via an abbreviated *Federal Register* notice and by referencing the relevant documents. The abbreviated process preserves the full opportunity for public review and comment, does not appear to be unduly burdensome on either the applicant or NMFS, and is much preferred over NMFS's proposed renewal process[32]. Thus, the Commission once again recommends that NMFS refrain from implementing its proposed renewal process and instead use abbreviated *Federal Register* notices and reference existing documents to streamline the incidental harassment authorization process.

If NMFS believes that its proposed renewal process is consistent with the applicable statutory requirements and intends that process to be generally applicable to all incidental harassment authorizations that meet the specified criteria, it should not seek to adopt such a process through a brief notice at the end of a specific proposed authorization. That process should be adopted through more general procedures, preferably a rulemaking, that provides NMFS's rationale and analysis regarding why it believes the proposed renewal process is consistent with the requirements of section 101(a)(5)(D) of the MMPA and adequate public notice and opportunity for comment. If NMFS adopts the proposed renewal process notwithstanding the Commission's recommendation, the Commission further recommends that NMFS provide the Commission and the public with a legal analysis supporting its conclusion that the process is consistent with the requirements under section 101(a)(5)(D) of the MMPA. Furthermore, if NMFS decides to bypass

[31] Including any changes to the proposed activities or assumptions made and results from the draft monitoring report.
[32] See the Commission's 30 April 2018 letter detailing this matter.

the notice and comment process in advance of issuing a renewal, it should nevertheless publish notice in the *Federal Register* whenever such a renewal has been issued.

Adequate opportunity to consider public comments

The Commission has repeatedly expressed concern over NMFS's failure to provide an adequate opportunity for public comment. The opportunity for public comment provided under section 101(a)(5)(D)(iii) of the MMPA should be a meaningful one that allows NMFS sufficient time not only to solicit public comments, but also to analyze, assess, and respond to those comments and revise, as appropriate, its proposed authorization and rationale in light of those comments. Thus, submittal of the necessary documentation by applicants and processing of applications by NMFS must be timelier, thus avoiding abbreviated timeframes in which NMFS is able to consider the comments received.

In this instance, the public comment period closes on 14 June 2018, two weeks *after* Orsted's activities were scheduled to begin[33]. Although Orsted submitted its application on 20 October 2017, the final version of the application was not submitted until 5 April 2018 or after. The Commission understands that the proposed action and analyses had changed over the course of the application being reviewed and finalized, which may have resulted in some of the issues noted herein. It seems clear that NMFS did not have sufficient time to review the final version of the application and draft the proposed authorization. Further, the Commission is not convinced that NMFS will have sufficient time to review the Commission's or the public's comments or to revise the proposed authorization accordingly. Therefore, the Commission again recommends that NMFS take all steps necessary to ensure that it publishes and finalizes proposed incidental harassment authorizations far enough in advance of the planned start date of the proposed activities to ensure full consideration is given to all comments received. This can only be accomplished if applicants provide complete applications at the outset and respond to any related inquiries from NMFS or others in a timely manner.

In closing, the Commission notes that HRG activities are some of the simplest activities for which authorizations are issued. Many of the issues discussed herein should have been recognized and addressed prior to the application being deemed complete[34] and to the notice being submitted for publication in *Federal Register*. Insofar as NMFS believes issuing authorizations is necessary for these types of activities[35], it must do a better job of analyzing them and drafting the proposed authorizations.

[33] The Commission understands that Orsted does not plan to begin its activities until the authorization is issued.
[34] Information and documentation provided during early review team meetings apparently have been insufficient, otherwise many of these issues would have been identified earlier in the process. Furthermore, NMFS's technical experts do not appear to be reviewing the proposed modeling methodologies and resulting extents of the Level A and B harassment zones. Their review should have alleviated some of these issues as well.
[35] The largest extent of the Level B harassment zone is less than 55 m for those sources that have been measured in the field. The Level B harassment zone for the sparker was 54 m, while the zones for the other sources were less than 10 m.

Please contact me if you have questions regarding the Commission's recommendations.

Sincerely,

Peter O. Thomas, Ph.D.,
Executive Director

References

Crocker, S.E., and F.D. Fratantonio. 2016. Characteristics of sounds emitted during high-resolution marine geophysical surveys. Naval Undersea Warfare Center Division, Newport, Rhode Island. 265 pages.

Department of the Navy. 2017. Quantifying acoustic impacts on marine mammals and sea turtles: Methods and analytical approach for Phase III Training and Testing. Space and Naval Warfare Systems Center Pacific, San Diego and Naval Undersea Warfare Center, Newport. 91 pages.

Kastelein, R.A., S. Van de Voorde, and N. Jennings. 2018. Swimming speed of a harbor porpoise (*Phocoena phocoena*) during playbacks of offshore pile driving sounds. Aquatic Mammals 44:92–99.

Otani, S., Y. Naito, A. Kawamura, M. Kawasaki, S. Nishiwaki, and A. Kato. 1998. Diving behaviour and performance of harbor porpoises, *Phocoena phocoena*, in Funka Bay, Hokkaido, Japan. Marine Mammal Science 14:209–220.

Otani, S., Y. Naito, A. Kato, and A. Kawamura. 2001. Oxygen consumption and swim speed of the harbor porpoise *Phocoena phocoena*. Fisheries Science 67:894–898.

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 recommendation. Aquatic Mammals 33:411–521.