8 July 2010

Mr. P. Michael Payne, Chief
Permits, Conservation, and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by the Statoil USA E&P, Inc., seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take small numbers of marine mammals by harassment. The taking would be incidental to a marine seismic survey in the Chukchi Sea, Alaska, during approximately 60 days between 15 July and 30 November 2010. The Commission also has reviewed the National Marine Fisheries Service's 8 June 2010 *Federal Register* notice announcing receipt of the application and proposing to issue the authorization, subject to certain conditions (75 Fed. Reg. 32379).

Statoil is funding Fugro-Geoteam, Inc., to collect seismic reflection data for assessing petroleum reserves in the Minerals Management Service's Outer Continental Shelf Lease Sale 193 area, which is located at 71°30' to 72°00' N latitude, 165°00' to 162°30' W longitude in the northern Chukchi Sea. Fugro-Geoteam, Inc., will conduct a three-dimensional (3-D) survey of 2,370 km^2 (915 mi^2) to better evaluate the evolution of the petroleum system at the basin level and a two-dimensional (2-D) survey of 675 km (420 mi) to integrate surrounding regional geology to the new high-resolution 3-D image. The surveys would occur in waters 30 to 50 m (100 to 165 ft) in depth. The applicant would use the M/V *Geo Celtic* (or similar vessel) towing two 26-airgun arrays (3,000 in^3 with a nominal source level of 245 dB re 1 µPa at 1 m). The vessel also would tow a receiving system of 12 hydrophone streamers 4 km (2.2 mi) in length. In addition, the applicant would operate a 55–95 kHz pinger to position the streamer array relative to the vessel.

RECOMMENDATIONS

The Marine Mammal Commission recommends that, before issuing the requested authorization, the National Marine Fisheries Service—

- clarify whether the 3-D and 2-D surveys will occur simultaneously or independent of one another and, if they will occur independently, recalculate the total exposed area and subsequent exposures for the 2-D surveys;
- require Statoil to revise its study design to include expanded pre- and post-seismic survey assessments sufficient to obtain reliable sighting data for comparing marine mammal abundance, distribution, and behavior under various conditions;
- require the applicant to collect data on the behavior and movements of any marine mammals present during all ramp-up and power-down procedures to help evaluate the effectiveness of these procedures as mitigation measures;

- undertake or prompt others to undertake studies needed to resolve questions regarding the effectiveness of ramp-up and power-down as mitigation measures;
- review the proposed monitoring measures and require the applicant (or its contractors) to collect and analyze information regarding all of the potentially important sources of sound and the complex sound field created by all of the activities associated with conducting the seismic survey;
- require the applicant to collect information to evaluate the assumption that 160 dB is the appropriate threshold at which harassment occurs for all marine mammals that occur in the survey area;
- determine, in consultation with Statoil, whether aerial surveys are safe to conduct and should be required and, if not, identify alternative monitoring strategies capable of providing reliable information on the presence of marine mammals and the impact of survey activities to the affected species and stocks;
- require Statoil to supplement its vessel-based monitoring with towed passive acoustics to provide a more reliable estimate of the species and number of marine mammals taken during the proposed seismic surveys; and
- require Statoil to halt its seismic survey and related activities and consult with the Service regarding any seriously injured or dead marine mammal when the injury or death may have resulted from Statoil's activities and allow resumption only after steps to avoid additional serious injuries or deaths have been implemented or such takings have been authorized under section 101(a)(5)(A) of the Marine Mammal Protection Act.

RATIONALE

The Service preliminarily has determined that the proposed activities would result, at most, in a temporary modification in the behavior of small numbers of up to 12 species of marine mammals and that any impact to the affected species would be negligible. The Service also anticipates no take of marine mammals by death or serious injury and believes that the potential for temporary or permanent hearing impairment will be avoided through the incorporation of the proposed mitigation measures.

2-D Survey Methodology

It is unclear in Statoil's application and the Service's *Federal Register* notice whether all of the planned 2-D survey line transects would occur independently of the 3-D survey. Both the Service and the applicant seem to be subtracting the 2-D area of exposure at 160 dB re 1 μPa (root mean square [rms]) that overlaps the 3-D area of exposure in determining the area of exposure for the 2-D survey. However, the only instance in which it would be appropriate to subtract the 2-D area of exposure from the 3-D area of exposure is if the 3-D and 2-D surveys occur simultaneously. The Marine Mammal Commission therefore recommends that the National Marine Fisheries Service clarify whether the 3-D and 2-D surveys will occur simultaneously or independent of one another and, if they will occur independently, recalculate the total exposed area and subsequent exposures for the 2-D surveys.

Monitoring and Mitigation

Whether informative comparisons can be made between marine mammal observations conducted when airguns are and are not firing depends, in part, on the length of time that the airguns have been silent before they begin or after they stop firing. If firing of airguns causes marine mammals to abandon an area or alter their behavior, a comparison after the airguns are silenced would be meaningful only if sufficient time had elapsed for the marine mammals in the area to return to their normal distribution and behavior. If the length of time is not sufficient to allow the animals to return to their normal distribution and behavior, then any comparison would be largely meaningless for assessing the effects of seismic surveys. A more meaningful approach would be to compare sighting rates in the survey area before, during, and periodically after the seismic survey (e.g., until the animals resume their pre-survey distribution and behavior) to determine how those rates differ. With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Statoil to revise its study design to include expanded pre- and post-seismic survey assessments sufficient to obtain reliable sighting data for comparing marine mammal abundance, distribution, and behavior under various conditions. To provide meaningful information, such assessments will need to be timed to avoid periods when marine mammals are migrating through the survey area or otherwise account for the confounding effects of such movements on the presence and abundance of migratory species.

Ramp-up and power-down procedures. As the Commission has noted in previous correspondence, the effectiveness of ramp-up and power-down procedures as mitigation measures has yet to be empirically verified. The Service should not continue to assume that ramp-up and power-down procedures constitute effective mitigation without such verification. Verification likely will require not only collecting opportunistic data as surveys are being conducted but also designing and carrying out dedicated field studies to test specific hypotheses regarding responses of marine mammals to various ramp-up and power-down scenarios. As an interim measure capable of furnishing some useful information, the Marine Mammal Commission recommends that the National Marine Fisheries Service require the applicant to collect data on the behavior and movements of any marine mammals present during all ramp-up and power-down procedures to evaluate the effectiveness of these procedures as mitigation measures. In addition, the Marine Mammal Commission recommends that the Service undertake or prompt others to undertake the types of studies needed to resolve questions regarding the effectiveness of ramp-up and power-down as mitigation measures. As noted in past correspondence, the Commission would be pleased to discuss with the Service the types of data that should be collected, the analyses that are needed, and the design of experiments that would promote a better understanding of the utility and shortcomings of these mitigation measures and that may identify ways to improve the current measures.

The peer-review panel convened by the Service after its March 2010 open-water meeting also made several recommendations for improving the planned mitigation and monitoring measures. One of those was that Statoil monitor not only the effects of its primary sound sources (e.g., airgun arrays) on marine mammals but also the effects of sounds introduced into the marine environment by sources related to various support activities, such as the ship used to pull the array, active sonar

used in ship navigation, and support vessels and helicopters. The panel noted that the marine mammals in the area will not just hear and react to the sound from the seismic airguns but to the entire suite of sounds from various sources associated with the activities and the complex sound field they create in combination (referred to as "soundscape" by the panel). To understand the animals' responses to that sound field requires that all major sources of sound are monitored and considered. The Marine Mammal Commission concurs with the panel's assessment and recommends that the National Marine Fisheries Service review the proposed monitoring measures and require the applicant (or its contractors) to collect and analyze information regarding all of the potentially important sources of sound and the complex sound field created by all of the activities associated with conducting the seismic survey.

The peer-review panel also questioned whether the use of a single sound threshold, such as 160 dB re 1 μPa (rms), constitutes an adequate basis for determining when certain effects (e.g., sufficient to constitute a taking by Level B harassment) will or will not occur (i.e., whether disturbance of marine mammal behavioral patterns occurs). The Service's *Federal Register* notice cites a summary of information regarding disturbance from Southall et al. (2007) as the basis for using 160 dB re 1 μPa (rms) to delineate the threshold below which it does not believe behavioral harassment would occur. However, that summary acknowledges that disturbance (presumably including disturbance that would constitute Level B harassment) may occur at a wide range of sound levels. Furthermore, the directive of section 101(a)(5)(D) of the Marine Mammal Protection Act is not just to determine whether the disturbance resulting from a stimulus at a certain threshold might result in the taking of marine mammals and whether the impact of such takings is negligible. Rather, the Act requires the Service to prescribe means of "effecting the least practicable impact" on the affected marine mammal species and stocks by, for example, minimizing any such disturbance to the extent practicable, irrespective of any presumed threshold. Although it may be reasonable to start with an assumption that, for some species, harassment is not likely to occur at sound levels less than 160 dB re 1 μPa (rms), for certain species (e.g., bowhead and beluga whales) the available information indicates behavioral responses at much lower sound levels. This being the case, the Marine Mammal Commission recommends that the applicant be required to collect information to evaluate the assumption that 160 dB is the appropriate threshold at which harassment occurs for all marine mammals that occur in the survey area. This assumption can and should be tested using in-situ measurements of sound propagation (which Statoil is planning to do at the beginning of the season) concurrent with observations of the responses of marine mammals exposed to such sounds. Such tests should be conducted using species-specific data, and test results should be used to inform decision makers regarding the applicability of the 160-dB re 1 μPa (rms) threshold for specific species and to improve future mitigation measures. The Service's *Federal Register* notice indicates that Statoil will conduct such tests, and the Marine Mammal Commission encourages it to do so.

Statoil intends to monitor for marine mammals using vessel-based observers and a prototype infrared radar during periods of poor visibility. Statoil contends that aerial surveys in the Chukchi Sea are not safe because they would be conducted too far from land. The Service's peer-review panel recognized that safety is always the primary consideration but also indicated that surveys have been and are being flown safely in this region by others. The Commission concurs that safety should be

the primary consideration but believes that a determination of what constitutes an unacceptable risk should not be left to the applicant alone. The Marine Mammal Commission recommends that such a determination be made in consultation with the Service, taking into account the safety record of others conducting surveys and providing aerial support for oil and gas activities in the area. If Statoil does not conduct aerial surveys, whether because of safety concerns or for other reasons, there is still a need for an adequate monitoring program. Therefore, if aerial surveys are not conducted, it is incumbent on the applicant and the Service to identify alternative monitoring strategies capable of providing reliable information on the presence of marine mammals and the impact of survey activities to the affected species and stocks.

For example, even if Statoil does not fly aerial surveys over potential production sites in the Chukchi Sea, it can still supplement its vessel-based observations using towed acoustic sensors. As has been demonstrated, passive acoustics can be used effectively to detect animals that otherwise spend little time or are inconspicuous at the surface. Passive acoustic monitoring would not improve the implementation of mitigation measures if data are not available on a real-time basis. Nevertheless, a retrospective analysis of such data would likely yield a more accurate estimate of the total number of marine mammals taken in the course of the seismic survey. For these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Statoil to supplement its vessel-based monitoring with towed passive acoustics to provide a more reliable estimate of the species and number of marine mammals taken during the proposed seismic surveys.

Serious Injury and Mortality

Statoil has decided to apply for an incidental harassment authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act. Such an authorization is valid for no more than one year at a time, does not require the promulgation of regulations, and cannot authorize taking by serious injury or death of a marine mammal. An alternative authorization under section 101(a)(5)(A) of the Act is available for up to five years and could allow for a certain number of takings by serious injury or death but would require the issuance of regulations. Statoil has indicated its intention to investigate the cause of death of any marine mammal found dead near its operations, including any unauthorized deaths that may have resulted from its operations. It is unclear, however, who would conduct such investigations and what qualifications they would have. This should be clarified. Investigations of all deaths are essential for evaluating the effects of the proposed activities and determining whether an authorization under section 101(a)(5)(A) is needed. It needs to be recognized, however, that conducting such investigations and determining the cause of death may be difficult under some circumstances. For example, collecting a dead bowhead whale can be time-consuming and logistically challenging. In some cases, even if a necropsy is done by a qualified veterinarian, the results might be equivocal. The Commission appreciates Statoil's willingness to investigate the causes of death of any dead marine mammal found near its operations. However, as no authorization for serious injury or mortality is being sought, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Statoil to halt its seismic survey and related activities and consult with the Service regarding any seriously injured or dead marine mammal found near its operations, when the death or injury may have resulted from Statoil's activities. Once the Service determines whether the injury or death likely resulted from Statoil's

activities, it can determine whether modifications to Statoil's activities can be taken to avoid additional injuries or deaths or whether Statoil needs to obtain a letter of authorization under section 101(a)(5)(A).

Please contact me if you have questions about the Commission's recommendations and comments.

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

Literature Cited

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