29 March 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 Lamont-Doherty Earth Observatory under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant is seeking authorization to take small numbers of marine mammals by harassment incidental to a marine seismic survey in waters of the Commonwealth of the Northern Mariana Islands. The Commission also has reviewed the National Marine Fisheries Service's 25 February 2010 *Federal Register* notice (75 Fed. Reg. 8652) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

The proposed seismic survey is scheduled to take place from 25 April to 6 June 2010 over the Mariana outer forearc, the trench, and the outer rise of the subducting and bending Pacific plate. The objective of the survey is to obtain information on the water cycle within subduction systems. The applicant would conduct the survey using the R/V *Marcus G. Langseth*, which would deploy a 36-airgun array (6,600 in^3) as an energy source. The array output is 265 dB re 1 µPa-m (peak-to-peak). Also, the applicant would operate a multibeam echosounder (10.5–13 kHz [usually 12 kHz], 242 dB re 1 µPa-m_{rms}) and a sub-bottom profiler (3.5 kHz, 204 dB re 1 µPa-m) on a continuous basis throughout the survey. The *Langseth* would tow a passive acoustic monitoring hydrophone array up to 6 km in length and deploy about 85 ocean-bottom seismometers. The array would be monitored 24 hours a day during airgun operations and during most periods when the *Langseth* is underway in the survey area and the airguns are not operating.

RECOMMENDATIONS

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

- provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified safety zones;
- clarify when passive acoustic monitoring would not be used to detect marine mammals or when two observers would not be on duty and the conditions under which these otherwise required components of the monitoring program would not be considered practicable;

- extend the required monitoring period at start-up to at least one hour before the initiation of seismic activities and one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone; and
- require that observers collect and analyze data on the effectiveness of ramp-up as a mitigation measure during all such procedures.

RATIONALE

The Service has preliminarily determined that the proposed activities would result at most in the temporary modification of the behavior of small numbers of up to 27 cetacean species and that any impact on the affected species is expected to be negligible. The Service also has preliminarily determined that no take of marine mammals by "injury, serious injury, or death" is anticipated and that the potential for temporary or permanent hearing impairment is very low and will be avoided through the incorporation of the proposed mitigation measures. The Service believes that these determinations are reasonable because, among other things, (1) given sufficient notice of the approaching sound source by means of slow ship speeds and ramp-up of the seismic array, marine mammals are expected to move away before the sound level becomes potentially injurious; (2) when the full array is in use at a depth of 9 m (29.5 ft), marine mammals would have to be closer than 3,850 m (2.4 mi) in deep water to be exposed to a sound level believed capable of causing a temporary threshold shift; (3) animals would need to be closer than 940 m (0.6 mi) to the sound source in deep water to be exposed to levels of sound capable of causing a permanent threshold shift; and (4) trained observers are highly likely to detect all marine mammals within these distances from the vessel.

Monitoring

As discussed in correspondence regarding previous requests by this and other applicants proposing to conduct similar activities, the Commission continues to be concerned that the proposed monitoring program is unlikely to be as effective at detecting marine mammals as the Service predicts. The presumed high detection rates are simply not consistent with extensive experience during scientific surveys for marine mammals. The Marine Mammal Commission therefore recommends that, prior to issuing the requested authorization, the National Marine Fisheries Service provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified safety zones. In particular, the Service should (1) identify those species that it believes can be detected within the safety zones with a high degree of confidence using visual monitoring alone and those species for which it is relying on the effectiveness of passive acoustic monitoring, (2) specify the detection probability as a function of distance from the observer or from the acoustic monitoring receiver, (3) describe changes in expected detection probability at night, and (4) indicate how close to the vessel marine mammals will need to be for observers to achieve the anticipated high nighttime detection rate. If such information is not available—and the Commission does not believe that it is— then the Service and the applicant bear a responsibility to ensure that the necessary verification studies are completed. If detection methods are, in fact, as low

as observed in scientific surveys, then the Service and applicant also bear responsibility for finding or promoting the development of complementary or better measures. Otherwise, these activities will simply continue absent a convincing basis for concluding that the affected marine mammals are being afforded the level of protection specified in the Marine Mammal Protection Act.

Visual and passive acoustic monitoring

In previous *Federal Register* notices regarding similar requests, the Service has acknowledged the limitations of visual monitoring. In its notice of this application, the Service states that "[v]isual monitoring typically is not effective during periods of poor visibility (e.g., bad weather) or at night, and even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range." As the Commission has noted previously (letter of 22 January 2009, enclosed), a study by Barlow 1999 supports this conclusion. That study found that "[a]ccounting for both submerged animals and animals that are otherwise missed by the observers in excellent survey conditions, only 23 percent of Cuvier's beaked whales and 45 percent of *Mesoplodon* beaked whales are estimated to be seen on ship surveys if they are located directly on the survey trackline."

The *Federal Register* notice states that the applicant will conduct vessel-based passive acoustic monitoring to augment visual monitoring during daytime operations and at night to help detect, locate, and identify marine mammals that may be present. The Commission supports the use of this alternative measure. However, as the Service acknowledges, such monitoring is useful only when marine mammals vocalize, and its value is limited by water depth and other environmental factors. The effectiveness of passive acoustic monitoring will depend on the acoustic system and the ability of its operators to locate vocalizing cetaceans and to determine whether a detected cetacean is within the shutdown radius or in a position such that the ship's movement will place it within the shutdown radius. Cetaceans that are on the trackline of the ship may be particularly difficult to detect but are of relatively greater concern because of their location.

The *Federal Register* notice also states that for the proposed survey, passive acoustic monitoring will complement the visual monitoring program, "*when practicable*…to alert visual observers (*if on duty*) when vocalizing cetaceans are detected" (emphasis added). It is unclear what the Service means by these qualifying phrases and what the practical effect of these limitations will be on the effectiveness of the proposed monitoring scheme. As such, the Service should clarify when the use of passive acoustic monitoring would be considered impracticable and when visual observers would not be on duty to make use of the information obtained using passive monitoring. In addition, the *Federal Register* notice states that five marine mammal observers will be onboard the *Langseth* and that at least one observer, and "when practical" two observers, will monitor for marine mammals and other protected species near the seismic vessel during ongoing daytime operations and nighttime start-ups of the airguns. The term "when practical" also needs to be explained in this context. Under what conditions would it be considered impractical to have two observers on duty and how frequently does the Service expect these conditions to arise? The Marine Mammal Commission recommends that, before issuing the requested authorization, the National Marine Fisheries Service provide additional guidance on its use of these terms that (1) indicates more

precisely how often it expects passive acoustic monitoring to be used and two observers to be on duty and (2) clarifies under what conditions these exceptions are expected to occur.

Monitoring prior to initial start-up and resumption of airgun activity

The Service's *Federal Register* notice states that the applicant will monitor the area for at least 30 minutes prior to the planned initiation of airgun operations. The notice also states that when airguns have been powered down because a marine mammal was detected near or within the proposed safety zone, airgun activity will not be allowed to resume until the marine mammal is outside the safety zone. Several species of cetaceans for which the applicant is seeking incidental take authority can and do remain submerged for periods exceeding 30 minutes. Sperm whale dives, for example, can last more than an hour. As the applicant indicated, sperm whales in the Galapagos Islands typically dove for ~40 minutes and then spent 10 minutes at the surface (Papastavrou et al. 1989). The applicant also recognized that Cuvier's beaked whales and Blainville's beaked whales can stay submerged for up to 85 minutes and 57 minutes (Tyack et al. 2006), respectively. In addition, observers are not likely to detect each time that a marine mammal surfaces in a safety zone, and such animals therefore may surface and dive several times before being detected. Accordingly, the Commission does not believe that monitoring for 30 minutes prior to the planned start or resumption of airgun operations is sufficient to allow detection of these species. With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service extend the required monitoring period at start-up to at least one hour before the initiation of seismic activities and one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone.

Mitigation

The Commission recognizes that ramp-up procedures are likely to be helpful as a mitigation measure in many circumstances or perhaps for many species. However, absent empirical verification, the Commission continues to question the Service's reliance on the assumption that ramp-up constitutes an effective mitigation measure in all instances, particularly when the means to test this assumption are relatively straightforward and simple, but the Service has simply declined to do so. Scientists have differing views of the effectiveness of ramp-up, some assuming that it works and others convinced otherwise. However, the point of a science-based approach to monitoring is to avoid reliance on assumptions, particularly when designing, collecting, and analyzing the necessary data are reasonably straightforward. Refusal to collect such information not only undermines the scientific basis for monitoring, setting a bad precedent, but it also adds unnecessarily to the risks to marine mammals in areas where seismic operations (and other noise-generating activities) are initiated. For that reason, the Marine Mammal Commission recommends that the National Marine Fisheries Service require that observers collect and analyze data on the effectiveness of ramp-up as a mitigation measure during all such procedures. As we have noted in past correspondence, the Commission would be pleased to discuss with the Service the collection of such data and the design of experiments to promote a better understanding of the utility and shortcomings of ramp-up as a mitigation measure.

In previous correspondence (e.g., the enclosed letter of 22 January 2009 regarding a similar request from this applicant), the Commission expressed concern that the issues being raised in this letter have been raised before, yet the Service has done little to try to resolve them. The Commission continues to believe that existing data are not sufficient to describe the potential effects of seismic activities on many cetacean species and that additional research is needed to reduce the uncertainties. The Commission still believes that it would be useful for the Commission, the National Marine Fisheries Service, the National Science Foundation, and the Lamont-Doherty Earth Observatory to meet to discuss existing research plans and needs regarding monitoring and mitigation measures and mechanisms to ensure that the essential research is conducted. Such a meeting also could include a discussion of possible procedural improvements (e.g., outreach) to ensure that potentially valuable comments from experts outside the United States are considered when research supported by the United States is conducted in foreign waters.

Please contact me if you or your staff has questions about the Commission's recommendations and comments.

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

Enclosure

Literature Cited

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