MARINE MAMMAL COMMISSION
4340 East-West Highway, Room 700
Bethesda, MD 20814-4447

22 January 2009

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 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 conducting a marine seismic survey in the South and East China Seas and the Philippines from late March to mid-July 2009. The Commission also has reviewed the National Marine Fisheries Service's 22 December 2008 *Federal Register* notice announcing receipt of the application and proposing to issue the authorization, subject to certain conditions (73 Fed. Reg. 78294).

The National Science Foundation is funding the planned survey as part of the Taiwan Integrated Geodynamics Research program. The survey would consist of four legs and would be conducted in the Exclusive Economic Zones of Taiwan, China, Japan, and the Philippines (between 17°30' to 26°30'N and 113°30' to 126°E). 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 1µPa-m (peak-to-peak). In addition, the applicant would operate an 11.25–12.6 kHz multibeam echo sounder during airgun operations and a sub-bottom profiler continuously throughout the cruise. The applicant also would tow a passive acoustic monitoring hydrophone array up to 8 km in length and deploy 100 ocean-bottom seismometers.

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. At a minimum, such justification should (1) identify those species that it believes can be detected with a high degree of confidence using visual monitoring only, (2) describe detection probability as a function of distance from the observer, (3) describe changes in detection probability at night, and (4) explain how close to the vessel marine mammals must be for observers to achieve the anticipated high nighttime detection rate;

- clarify the qualifiers "when practical" and "when feasible" with respect to (1) using two marine mammal observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns, and (2) using marine mammal observers during daytime periods to compare sighting rates and animal behavior when the seismic airguns are operating and when they are not;
- consult with the applicant to clarify and describe the potential conditions that would render the use of passive acoustic monitoring impracticable for complementing the visual monitoring program;
- extend the monitoring period to at least one hour before initiation of seismic activities and at least one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone;
- require that observations be made during all ramp-up procedures to gather the data needed to analyze and provide a report on their effectiveness as a mitigation measure;
- require the applicant to take all measures necessary to ensure that the proposed activities are not conducted near the Ryukyu Islands and Babuyan Islands during peak occurrence of the humpback whales in those areas (i.e., February through April);
- describe the reasons why and the conditions under which the applicant would need to conduct surveys closer than 8 to 10 km off the coast of Taiwan where threatened Indo-Pacific humpback dolphins are more likely to be exposed to sound pressure levels greater than 160 dB re 1 μPa (rms);

RATIONALE

The Service has preliminarily determined that the proposed activities would result at most in a temporary modification in the behavior of small numbers of up to 34 species of marine mammals 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 death or serious injury is anticipated and that the potential for temporary or permanent hearing impairment will be avoided through the incorporation of the proposed mitigation measures. The Service believes that these determinations are reasonable because, among other things, (1) marine mammals are expected to move away from a noise source that is annoying before it becomes potentially injurious; (2) temporary threshold shift is unlikely to occur, especially in odontocetes, at levels below 180 dB re 1μPa (rms); (3) injurious levels of sound are likely to occur only very close to the vessel; and (4) the monitoring program (visual detection and passive acoustic monitoring) developed to avoid injury would be sufficient to detect with reasonable certainty all marine mammals within or entering the identified safety zones.

Monitoring

The Marine Mammal Commission recommends that, prior to granting 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. At a minimum, such justification should (1) identify those species that it believes can be detected with a

high degree of confidence using visual monitoring only, (2) describe detection probability as a function of distance from the observer, (3) describe changes in detection probability at night, and (4) explain how close to the vessel marine mammals must be for observers to achieve the anticipated high nighttime detection rate. If such information is not available, the Service should undertake the studies needed to verify that the proposed monitoring program is likely to detect most marine mammals in or near those zones and/or to encourage development of alternative means of detecting marine mammals within the specified safety zones. Specifically, we note the following concerns.

Vessel-based visual monitoring. As discussed in the Commission's previous letters commenting on similar activities by this and other applicants, visual monitoring alone is not adequate to detect all marine mammals within the safety area. As recognized by the Service in its previous *Federal Register* notices on similar requests, visual monitoring typically is not effective during periods of 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. This conclusion is supported by a study by one of the Service's own scientists (Barlow 1999), which 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 at least three marine mammal observers will be onboard the *Langseth*, and at least one observer and, "when practical," two, will monitor the exclusion zone for marine mammals during ongoing daytime operations and nighttime start-ups of the airguns. The term "when practical" is not clear in this instance. Similarly, the notice states that "when feasible" marine mammal observers will also make observations during daytime periods when the seismic system is not operating "for comparison of sighting rates and animal behavior with vs. without airgun operations." Here again, the term "when feasible" is not clear. The Marine Mammal Commission recommends that before issuing the requested authorization, the Service clarify the qualifiers "when practical" and "when feasible" with respect to (1) using two marine mammal observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns, and (2) using marine mammal observers during daytime periods to compare sighting rates and animal behavior during times when seismic airguns are and are not operating.

Passive acoustic monitoring. 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. 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 ability of the acoustic system and its operators to locate vocalizing cetaceans and determine whether an acoustically 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 hard to detect but are of relatively greater concern because of their location. Further, the notice states that passive acoustic monitoring will take place to complement the visual monitoring program "if practicable." The notice does not

describe the potential conditions that would render the use of passive acoustic monitoring impracticable. Therefore, the Marine Mammal Commission recommends that the Service consult with the applicant to clarify and describe the potential conditions that would render the use of passive acoustic monitoring impracticable for complementing the visual monitoring program.

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 has been detected near or within the proposed safety zone, airgun activity will not resume until the marine mammal is outside the safety zone (i.e., the animal is visually observed to have left the safety zone or has not been seen or otherwise detected within the safety zone for 15 minutes in the case of small odontocetes and 30 minutes in the case of mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, and beaked whales). Several species of cetaceans for which the applicant is seeking incidental take authority remain submerged on most dives for more than 30 minutes. Sperm whales and beaked whales, for example, can stay submerged for more than one hour. The application states that Blainville's beaked whales dive to considerable depths (> 1,400 m) and stay submerged for nearly an hour (Tyack et al. 2006, Baird et al. 2006). Accordingly, monitoring for 30 minutes prior to the planned start or resumption of airgun operations is not sufficient to allow detection of those species. Furthermore, the applicant states that the proposed survey area may be a "hotspot" for *Mesoplodon* beaked whales. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service extend the monitoring period to at least one hour before initiation of seismic activities and at least one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone.

Mitigation

Ramp-up procedures. These procedures frequently are presumed to be effective, but their effectiveness has yet to be verified empirically. In the Commission's opinion, the Service cannot continue to assume that ramp-up constitutes effective mitigation without empirical verification. Such verification is not a trivial task. It may require not only collecting opportunistic data but also designing and conducting studies directed at specific hypotheses regarding the utility of ramp-up procedures. In addition, the results may reveal variable responses depending on the species involved or other factors. For those reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require that observations be made during all ramp-up procedures to gather the data needed to analyze and report their effectiveness as a mitigation measure. The Marine Mammal Commission would be pleased to discuss with the Service the collection of such data and the design of such experiments to promote a better understanding of the utility and shortcomings of ramp-up as a mitigation measure.

Temporal/spatial avoidance. The *Federal Register* notice states that, according to Perry et al. (1999), Acebes et al. (2007), and Calambokidis et al. (2008), North Pacific humpback whales winter and calve around the Ogasawara (formerly Bonin) and Ryukyu Islands in southern Japan and the Babuyan Islands in Luzon Strait in the northern Philippines, arriving in the area as early as

November and leaving in May or June, with peak occurrence during February through March or April. The notice states that the applicant "will attempt" to avoid these wintering areas at the time of peak occurrence, by surveying the lines near the Ryukyu Islands and Babuyan Islands as late as possible during each leg of the cruise. The application further notes that, according to Perrin et al. (2005), the waters off the Babuyan Islands, which may be the southernmost breeding area of this species, are being recommended as a humpback whale sanctuary. Therefore, the Marine Mammal Commission recommends that the Service require the applicant to take all measures necessary to ensure that the proposed activities are not conducted near the Ryukyu Islands and Babuyan Islands during peak occurrence of humpback whales in those areas (i.e., February through April).

The *Federal Register* notice also states that "when possible," the applicant will conduct the survey at least 8 to 10 km (5 to 6.2 mi) from the Taiwanese coast to minimize the potential of exposing threatened Indo-Pacific humpback dolphins to sound pressure levels greater than 160 dB re 1 μPa (rms). The notice does not describe the reasons why or the conditions under which it would be impossible to avoid conducting surveys closer than 8 to 10 km off Taiwan. The Marine Mammal Commission recommends that the Service require the applicant to explain the reasons why or the conditions under which the applicant would need to conduct surveys closer than 8 to 10 km off the coast of Taiwan where threatened Indo-Pacific humpback dolphins are more likely to be exposed to sound pressure levels greater than 160 dB re 1 μPa (rms). We also note that it makes more sense to use a single distance, rather than a range, to prevent the survey from approaching the Taiwan coast too closely.

Finally, the handling of this application raises two additional concerns that the Commission believes can best be addressed jointly by the action agency (the National Science Foundation), the contractor (the Lamont-Doherty Earth Observatory), the authorizing agency (National Marine Fisheries Service), and the oversight agency (the Commission). The first concern is that most of the issues raised in this letter have been raised before and, to our knowledge, little is being done to resolve them. Seismic studies introduce a tremendous amount of acoustic energy into the marine environment. Although some efforts have been made to assess the potential effects on one species of odontocetes (e.g., the Minerals Management Service's Sperm Whale Seismic Study), existing data are not sufficient for describing potential effects on other species of cetaceans, and all involved parties remain relatively ignorant on this topic. Although we should expect such uncertainty initially, we should not perpetuate that ignorance if we are capable of reducing it through well-directed research. The Commission believes that the action agency and contractor should bear primary responsibility for carrying out the studies needed to reduce the existing uncertainty and that the authorizing and oversight agencies have a degree of responsibility as well.

The second concern involves the opportunity for scientists, conservationists, and other interested parties from other countries to comment on research activities to be conducted by U.S. organizations in foreign waters. The study under consideration in this letter has generated a considerable amount of legitimate concern regarding potential effects on marine mammal species in the South China Sea. Such concern is heightened for endangered or threatened species (e.g., the Indo-Pacific humpback dolphin, *Sousa chinensis*) and species that are poorly known but potentially vulnerable (e.g., the ginkgo-toothed beaked whale, *Mesoplodon ginkgodens*). Those scientists,

conservationists, and others generally are unfamiliar with the procedures for permit review and authorization in the United States but may have a good understanding of the natural history and vulnerability of potentially affected species. The Commission believes that they should be provided with opportunities to contribute to the evaluation of the potential effects of seismic studies in the context of all other factors that may be affecting these species. If U.S. scientists and institutions are to engage in research activities in the waters of other countries, it stands to reason that our system of review should include sufficient opportunities for foreign parties to comment on potential effects. This might be accomplished in a number of ways, such as extending the comment period to give them additional time to comment and promoting interaction between the research organization and concerned parties from other countries. We recognize that such accommodations may complicate research efforts and that various mechanisms might have to be explored before suitable ones are found. Nonetheless, we believe such participation is appropriate and, in the long run, will facilitate international cooperation on conservation issues, more informed comments, and more risk-averse research methods and mitigation procedures.

With these concerns in mind, the Commission will send a separate letter of invitation to the National Marine Fisheries Service, the National Science Foundation, and the Lamont-Doherty Earth Observatory to discuss (1) existing research plans and needs regarding monitoring and mitigation measures and mechanisms to ensure that the essential research is conducted, and (2) possible procedural improvements (e.g., outreach) to ensure that potentially valuable comments from expertise outside the United States are considered when research supported by the United States is conducted in foreign waters.

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

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

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