UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

JUN 13 2012

Meagan J. Cummings
Marine Environmental & Safety Coordinator
Department of Marine Operations
Lamont-Doherty Earth Observatory
P.O. Box 1000
Palisades, New York, 10964-8000

Dear Ms. Cummings:

Enclosed is an Incidental Harassment Authorization (IHA) issued to the Lamont-Doherty Earth Observatory, under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*), to harass small numbers of marine mammals, by Level B harassment, incidental to the R/V *Marcus G. Langseth*'s marine geophysical survey in the northeastern Pacific Ocean during June to July, 2012.

You are required to comply with the conditions contained in the IHA which have also been included as Terms and Conditions for incidental take of endangered species in the Biological Opinion. In addition, you must submit a report to the National Marine Fisheries Service's (NMFS) Office of Protected Resources within 90 days of the completion of the cruise. The IHA requires monitoring of marine mammals by qualified individuals before, during, and after seismic activities and reporting of marine mammal observations, including species, numbers, and behavioral modifications potentially resulting from this activity.

If you have any questions concerning the IHA or its requirements, please contact Howard Goldstein, Jeannine Cody, or Jolie Harrison, Office of Protected Resources, NMFS, at 301-427-8401.

Sincerely,

Helen M. Golde
Acting Director
Office of Protected Resources

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

Incidental Harassment Authorization

We hereby authorize Lamont-Doherty Earth Observatory (L-DEO), P.O. Box 1000, Palisades, New York 10964-8000, under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1371(a)(5)(D)), to harass small numbers of marine mammals incidental to a marine geophysical (seismic) survey conducted by the R/V *Marcus G. Langseth* (*Langseth*) in the northeastern Pacific Ocean, June to July, 2012:

1. This Authorization is valid from June 13 through July 25, 2012.

2. This Authorization is valid only for the *Langseth*'s specified activities associated with seismic survey operations as specified in the Observatory's Incidental Harassment Authorization application and the National Science Foundation's (NSF) associated Environmental Assessment in the following specified geographic areas:

   (i) An area bounded by approximately 43 to 48 degrees (°) North by approximately 124 to 130° West.

3. Species Authorized and Level of Takes

   (a) This authorization limits the incidental taking of marine mammals, by Level B harassment only, to the following species in the waters of the northeastern Pacific Ocean:

      (i) Mysticetes – see Table 1 (attached) for authorized species and take numbers.

      (ii) Odontocetes – see Table 1 (attached) for authorized species and take numbers.

      (iii) Pinnipeds – see Table 1 (attached) for authorized species and take numbers.

      (iii) During the seismic activities, if the Holder of this Authorization encounters any marine mammal species under NMFS jurisdiction during seismic activities that are not listed in Table 1 (attached) for authorized taking and are likely to be exposed to sound pressure levels (SPLs) greater than or equal to 160 dB re 1 µPa (rms), then the Holder of this Authorization must alter speed or course, power-down, or shut-down the airguns to avoid take.

   (b) This Authorization prohibits the taking by injury (Level A harassment), serious injury, or death of any of the species listed in Condition 3(a) above or the taking of any kind of any other species of marine mammal thus, it may result in the modification, suspension or revocation of this Authorization.

4. This Authorization limits the methods authorized for taking by Level B harassment to the following acoustic sources without an amendment to this Authorization:

(i) A 36 Bolt airgun array with a total capacity of 6,600 in^3 (or smaller);

(ii) A multi-beam echosounder;

(iii) A sub-bottom profiler; and

(iv) An acoustic release transponder used to communicate with ocean bottom seismometers (OBS).

5. The taking of any marine mammal in a manner prohibited under this Authorization must be reported immediately to the Office of Protected Resources, National Marine Fisheries Service (NMFS), at 301-427-8401.

6. Mitigation and Monitoring Requirements

The Holder of this Authorization is required to implement the following mitigation and monitoring requirements when conducting the specified activities to achieve the least practicable impact on affected marine mammal species or stocks:

(a) Utilize two, NMFS-qualified, vessel-based Protected Species Visual Observers (PSVOs) (except during meal times and restroom breaks, when at least one PSVO shall be on watch) to visually watch for and monitor marine mammals near the seismic source vessel during daytime airgun operations (from nautical twilight-dawn to nautical twilight-dusk) and before and during start-ups of airguns day or night. The *Langseth*'s vessel crew shall also assist in detecting marine mammals, when practicable. PSVOs shall have access to reticle binoculars (7 x 50 Fujinon), big-eye binoculars (25 x 150), laser range-finding binoculars, and thermal imaging cameras. PSVO shifts shall last no longer than 4 hours at a time. PSVOs shall also make observations during daytime periods when the seismic system is not operating for comparison of animal abundance and behavior, when feasible.

(b) PSVOs shall conduct monitoring while the airgun array and streamer(s) are being deployed or recovered from the water.

(c) Record the following information when a marine mammal is sighted:

(i) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(ii) Time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), Beaufort sea state and wind force, visibility, and sun glare; and

(iii) The data listed under Condition 6(c)(ii) shall also be recorded at the start and end of each observation watch and during a watch whenever there is a change in one or more of the variables.

(d) Utilize the passive acoustic monitoring (PAM) system, to the maximum extent practicable, to detect and allow some localization of marine mammals around the *Langseth* during all airgun operations and during most periods when airguns are not operating. One NMFS-qualified Protected Species Observer (PSO) and/or expert bioacoustician (i.e., Protected Species Acoustic Observer [PSAO]) shall monitor the PAM at all times in shifts no longer than 6 hours. An expert bioacoustician shall design and set up the PAM system and be present to operate or oversee PAM, and available when technical issues occur during the survey.

(e) Do and record the following when an animal is detected by the PAM:

(i) Notify the on-duty PSVO(s) immediately of the presence of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required;

(ii) Enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information. The acoustic detection can also be recorded for further analysis.

(f) Visually observe the entire extent of the exclusion zone (EZ) (180 dB re 1 µPa [rms] for cetaceans and 190 dB re 1 µPa [rms] for pinnipeds; see Table 2 [attached] for distances) using NMFS-qualified PSVOs, for at least 30 minutes prior to starting the airgun array (day or night). If the PSVO finds a marine mammal within the EZ, L-DEO must delay the seismic survey until the marine mammal(s) has left the area. If the PSVO sees a marine mammal that surfaces, then dives below the surface, the PSVO shall wait 30 minutes. If the PSVO sees no marine mammals during that time, they should assume that the animal has moved beyond the EZ. If for any reason the entire radius cannot be seen for the entire 30 minutes (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the EZ, the airguns may not be ramped-up. If one airgun is already running at a source level of at least 180 dB re 1 µPa (rms), L-DEO may start the second airgun without observing the entire EZ for 30 minutes prior, provided no marine mammals are known to be near the EZ (in accordance with Condition 6[h] below).

(g) Establish a 180 dB re 1 μPa (rms) and 190 dB re 1 μPa (rms) EZ for marine mammals before the 4-string airgun array (6,600 in^3) is in operation; and a 180 dB re 1 μPa (rms) and 190 dB re 1 μPa (rms) EZ before a single airgun (40 in^3) is in operation, respectively. See Table 2 (attached) for distances and EZs.

(h) Ramp-up procedures at the start of seismic operations or after a shut-down - Implement a "ramp-up" procedure when starting up at the beginning of seismic operations or anytime after the entire array has been shut-down for more than 8 minutes, which means start the smallest gun first and add airguns in a sequence such that the source level of the array shall increase in steps not exceeding approximately 6 dB per 5-minute period. During ramp-up, the PSVOs shall monitor the 180 dB EZ for cetaceans or the 190 dB EZ for pinnipeds, and if marine mammals are sighted within or about to enter the relevant EZ, a power-down, or shut-down shall be implemented as though the full array were operational. Therefore, initiation of ramp-up procedures from a shut-down or at the beginning of seismic operations requires that the PSVOs be able to view the full EZ as described in Condition 6(f).

(i) Alter speed or course during seismic operations if a marine mammal, based on its position and relative motion, appears likely to enter the relevant EZ. If speed or course alteration is not safe or practicable, or if after alteration the marine mammal still appears likely to enter the EZ, further mitigation measures, such as a power-down or shut-down, shall be taken.

(j) Power-down or shut-down the airgun(s) if a marine mammal is detected within, approaches, or enters the relevant EZ (as defined in Table 1, attached). A shut-down means all operating airguns are shut-down (i.e., turned off). A power-down means reducing the number of operating airguns to a single operating 40 in^3 airgun, which reduces the EZ to the degree that the animal(s) is no longer in or about to enter it.

(k) Following a power-down, if the marine mammal approaches the smaller designated EZ, the airguns must then be completely shut-down. Airgun activity shall not resume until the PSVO has visually observed the marine mammal(s) exiting the EZ and is not likely to return, or has not been seen within the EZ for 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales). Following a shut-down, the *Langseth* may resume airgun operations following ramp-up procedures described in Condition(h).
(l) Procedures after an extended power-down – Monitor the full 180 dB EZ for cetaceans and the full 190 dB EZ for pinnipeds. The *Langseth* may resume full power operations anytime after the entire array has been powered-down for more than 8 minutes. Resuming operations at full power after an extended power-down of more than 8 minutes requires that the PSVOs be able to view the full EZ as described in Condition 6(f). If the PSVO sees a marine mammal within or about to enter the relevant EZs, then the *Langseth* will implement a course/speed alteration or power-down.

(m) Marine seismic surveys may continue into night and low-light hours if such segment(s) of the survey is initiated when the entire relevant EZs are visible and can be effectively monitored.

(n) No initiation of airgun array operations is permitted from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the entire relevant EZ cannot be effectively monitored by the PSVO(s) on duty.

(o) If a North Pacific right whale (*Eubalaena japonica*) is visually sighted, the airgun array shall be shut-down regardless of the distance of the animal(s) to the sound source. The array shall not resume firing until 30 minutes after the last documented whale visual sighting.

(p) If killer whales (*Orcinus orca*) are visually sighted or detected acoustically, the airguns array shall be shut-down regardless of the distance of the animal(s) to the sound source. The array shall not resume firing until 30 minutes after the last documented whale visual sighting or acoustic detection.

(q) To the maximum extent practicable, communicate with NMFS Northwest Regional Office and/or Orca Network for near real-time reporting of the whereabouts of killer whales.

(r) To the maximum extent practicable, schedule seismic operations (i.e., shooting airguns) during daylight hours and OBS operations (i.e., deploy/retrieve) to nighttime hours.

(s) To the maximum extent practicable, plan to conduct seismic surveys (especially when near land) from the coast (inshore) and proceed towards the sea (offshore) in order to avoid trapping marine mammals in shallow water.

7. Reporting Requirements

The Holder of this Authorization is required to:

(a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, NMFS, within 90 days of the completion of the *Langseth*'s three cruises. This report must contain and summarize the following information:

(i) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all seismic operations and marine mammal sightings;

(ii) Species, number, location, distance from the vessel, and behavior of any marine mammals, as well as associated seismic activity (number of power-downs and shut-downs), observed throughout all monitoring activities.

(iii) An estimate of the number (by species) of marine mammals that: (A) are known to have been exposed to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re 1 μPa (rms) and/or 180 dB re 1 μPa (rms) for cetaceans and 190 dB re 1 μPa (rms) for pinnipeds with a discussion of any specific behaviors those individuals exhibited; and (B) may have been exposed (based on reported and corrected empirical values for the 36 airgun array and modeling measurements for the single airgun) to the seismic activity at received levels greater than or equal to 160 dB re 1 μPa (rms) and/or 180 dB re 1 μPa (rms) for cetaceans and 190 dB re 1 μPa (rms) for pinnipeds with a discussion of the nature of the probable consequences of that exposure on the individuals that have been exposed.

(iv) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement (ITS) (attached); and (B) mitigation measures of the Incidental Harassment Authorization. For the Biological Opinion, the report shall confirm the implementation of each Term and Condition, as well as any conservation recommendations, and describe their effectiveness, for minimizing the adverse effects of the action on Endangered Species Act-listed marine mammals.

(b) Submit a final report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft report. If NMFS decides that the draft report needs no comments, the draft report shall be considered to be the final report.

(c) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this Authorization, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), L-DEO shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov and the Northwest Regional Stranding Coordinator at 206-526-6550 (Brent.Norberg@noaa.gov). The report must include the following information:

(i) Time, date, and location (latitude/longitude) of the incident; the name and type of vessel involved; the vessel's speed during and leading up to the incident; description of the incident; status of all sound source use in the 24 hours preceding the incident; water depth; environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility); description of marine mammal observations in the 24 hours preceding the incident; species identification or description of the animal(s) involved; the fate of the animal(s); and photographs or video footage of the animal (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with L-DEO to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. L-DEO may not resume their activities until notified by NMFS via letter, email, or telephone.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), L-DEO will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov, and the NMFS Northwest Regional Office (206-526-6550) and/or by email to the Northwest Regional Stranding Coordinator (Brent.Norberg@noaa.gov). The report must include the same information identified in Condition 7(c)(i) above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with L-DEO to determine whether modifications in the activities are appropriate.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in Condition 2 of this Authorization (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), L-DEO shall report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov, and the NMFS Northwest Regional Office (206-526-6550) and/or by email to the Northwest Regional Stranding Coordinator (Brent.Norberg@noaa.gov) within 24 hours of the discovery. L-DEO shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

9. L-DEO is required to comply with the Terms and Conditions of the ITS corresponding to NMFS's Biological Opinion issued to both NSF and NMFS's Office of Protected Resources (attached).

10. A copy of this Authorization and the ITS must be in the possession of all contractors and PSOs operating under the authority of this Incidental Harassment Authorization.

JUN 13 2012

Helen M. Golde
Acting Director
Office of Protected Resources
National Marine Fisheries Service

Date

Attachments

Attachment

Table 1. Authorized Take Numbers for Each Marine Mammal Species during the Juan de Fuca Plate Seismic Survey in the northeastern Pacific Ocean.

Species	Authorized Take in the Juan de Fuca Plate Study Area
Mysticetes	
North Pacific right whale (*Eubalaena japonica*)	0
Gray whale (*Eschrichtius robustus*)	10
Humpback whale (*Megaptera novaeangliae*)	19
Minke whale (*Balaenoptera acutorostrata*)	11
Sei whale (*Balaenoptera physalus*)	4
Fin whale (*Balaenoptera borealis*)	30
Blue whale (*Balaenoptera musculus*)	4
Odontocetes	
Sperm whale (*Physeter macrocephalus*)	24
Unidentified *Kogia* spp. Pygmy sperm whale (*Kogia breviceps*) and/or Dwarf sperm whale (*Kogia sima*)	16
Cuvier's beaked whale (*Ziphius cavirostris*)	10
Baird's beaked whale (*Berardius bairdii*)	27
Unidentified *Mesoplodon* beaked whale (*Mesoplodon* spp.)	40
Striped dolphin (*Stenella coeruleoalba*)	2
Short-beaked common dolphin (*Delphinus delphis*)	238
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	806
Northern right whale dolphin	297

(*Lissodelphis borealis*)	
Risso's dolphin (*Grampus griseus*)	258
Killer whale (*Orcinus orca*)	0
Harbor porpoise (*Phocoena phocoena*)	2,153
Dall's porpoise (*Phocoenoides dalli*)	1,935
Pinnipeds	
Northern fur seal (*Callorhinus ursinus*)	1,931
California sea lion (*Zalophus californianus*)	0
Steller sea lion (*Eumetopias jubatus*)	303
Pacific harbor seal (*Phoca vitulina richardii*)	995
Northern elephant seal (*Mirounga angustirostris*)	1,058

Table 2. Exclusion Zone Radii for Triggering Mitigation.

Source and Volume	Tow Depth (m)	Water Depth (m)	Predicted RMS Distances (m)		
			Shut-down EZ for Pinnipeds 190 dB	Shut-down EZ for Cetaceans 180 dB	Level-B Harassment Zone 160 dB
Single Bolt airgun 40 in^3	6 to 15	Shallow (<100)	150	296	1,050
		Intermediate (100 to 1,000)	18	60	578
		Deep (>1,000)	12	40	385

4 strings 36 airguns 6,600 in^3	9	Shallow (<100)	680	2,140	20,550
		Intermediate (100 to 1,000)	550	1,540	12,200
		Deep (>1,000)	400	940	3,850
4 strings 36 airguns 6,600 in^3	12	Shallow (<100)	770	2,250	23,470
		Intermediate (100 to 1,000)	615	1,810	13,935
		Deep (>1,000)	460	1,100	4,400
4 strings 36 airguns 6,600 in^3	15	Shallow (<100)	865	2,750	4,490
		Intermediate (100 to 1,000)	690	1,975	15,650
		Deep (>1,000)	520	1,200	26,350