

incidental harassment of marine mammals. Within 45 days of the close of the comment period, NMFS must either issue or deny issuance of the authorization.

Summary of Request

On October 8, 2003, NMFS received an application from LDEO for the taking, by harassment, of several species of marine mammals incidental to conducting a seismic survey program. As presently scheduled, a seismic survey will be conducted in the Gulf of Mexico off the northern Yucatan Peninsula. The Gulf of Mexico research cruise will be off the coast of the northern Yucatan Peninsula in an area extending between 21° to 22.5° N and 88° to 91° W from March 7, 2004 to April 4, 2004. The operations will partly take place in the Exclusive Economic Zone (EEZ) of Mexico.

The purpose of the project is to study the Chicxulub Crater. The Chicxulub Crater was formed 65 million years ago when a massive meteor crashed into the Yucatan Peninsula of Mexico leaving behind the crater with a diameter of about 150 km (93 mi). The well-known massive extinction event at the Cretaceous-Tertiary (K-T) boundary appears to have been caused, at least in part, by this impact. It is also the only large terrestrial impact crater with a well preserved topographic peak ring. The Chicxulub Crater is uniquely suited for a seismic investigation into the deformation mechanisms of large diameter impacts in general and the physical parameters of the K-T impact in particular. The goals are to: (1) Determine the direction of approach and angle of the Chicxulub impact through the collaborative seismic and modeling effort, (2) map the deformation recorded in the upper crust near the crater center that may yield important information about the kinematics of large bolide impacts, (3) image the peak ring and other morphologic features in the northwest quadrant of the crater to further understand the physical parameters of the Chicxulub impact structure, and (4) model the 3-D collapse of an asymmetric transient crater to help better understand the mechanics of large impact craters and to quantify the environmental effects of the K-T impact.

Description of the Activity

The seismic survey will involve one vessel, the *R/V Maurice Ewing*. It will deploy an array of 20 airguns as an energy source, plus a 3 to 6-km (1.6 to 3.2 n.mi.) towed hydrophone streamer. As the airgun array is towed along the survey line, the towed hydrophone

streamer or Ocean Bottom Seismometers (OBSs) will receive the returning acoustic signals and transfer the data to the on-board processing system. Water depths within the study area range are less than 100 m (328 ft) and almost all of the survey will be conducted in water depths less than 50 m (164 ft).

The procedures to be used for the seismic study will be similar to those used during previous seismic surveys by LDEO in the equatorial Pacific Ocean (Carbotte et al., 1998, 2000). The proposed seismic surveys will use conventional seismic methodology, with a towed airgun array as the energy source and a towed hydrophone streamer and/or OBSs as the receiver system. The energy to the airgun array is compressed air supplied by compressors on board the source vessel.

During the airgun operations, the vessel will travel at 7.4–9.3 km/hr (4–5 knots), and seismic pulses will be emitted at intervals of 60–90 sec (OBS lines) and approximately 20 sec Multi-Channel Seismic profiles (MCS lines). The 20-sec spacing corresponds to a shot interval of about 50 m (164 ft). The 60–90 sec spacing along OBS lines is to minimize reverberation from previous shot noise during OBS data acquisition, and the exact spacing will depend on water depth. The 20-airgun array will include airguns ranging in chamber volume from 80 to 850 in³. These airguns will be spaced in an approximate rectangle of dimensions of 35 m (115 ft) across track by 9 m (30 ft) along track.

Along the selected lines, the OBSs will be positioned on the ocean bottom by the *Maurice Ewing*. After each line is shot, the *Maurice Ewing* will retrieve the OBSs, download the data, and refurbish the units before redeploying the OBSs along the next line that will be shot. During the Yucatan cruise, there will be three deployments of OBSs.

In addition to the operations of the airgun array, the ocean floor will be mapped continuously throughout the entire cruise with an Atlas Hydrosweep DS-2 multibeam 15.5-kHz bathymetric sonar, and a 3.5-kHz sub-bottom profiler. Both of these sound sources will be operated simultaneously with the airgun array.

The Atlas Hydrosweep is mounted on the hull of the *Maurice Ewing*, and it operates in three modes, depending on the water depth. There is one shallow water mode and there are two deep-water modes: an Omni mode and a Rotational Directional Transmission mode (RDT).

The sub-bottom profiler is normally operated to provide information about the sedimentary features and the bottom

topography that is simultaneously being mapped by the Hydrosweep. The energy from the sub-bottom profiler is directed downward by a 3.5 kHz transducer mounted in the hull of the *Maurice Ewing*. The output varies with water depth from 50 watts in shallow water to 800 watts in deep water. Pulse interval is 1 second (s) but a common mode of operation is to broadcast five pulses at 1-s intervals followed by a 5-s pause. The beamwidth is approximately 30° and is directed downward. Maximum source output is 204 dB re 1 μPa, 800 watts, while nominal source output is 200 dB re 1 μPa, 500 watts. Pulse duration will be 4, 2, or 1 ms, and the bandwidth of pulses will be 1.0 kHz, 0.5 kHz, or 0.25 kHz, respectively.

Additional information on the airgun arrays, bathymetric sonars, and sub-bottom profiler specifications is also contained in the application (see ADDRESSES) and in previous **Federal Register** notices (April 14, 2003, 68 FR 17909, and September 17, 2003, 68 FR 54421).

Description of Habitat and Marine Mammals Affected by the Activity

A detailed description of the Gulf of Mexico near the northern Yucatan Peninsula and its associated marine mammals can be found in the LDEO application and a number of documents referenced in the LDEO application, and is not repeated here. In the Gulf of Mexico near the Yucatan Peninsula, 29 marine mammal species are known to occur within the proposed study area. The species included in this application are the sperm whale (*Physeter macrocephalus*), pygmy sperm whale (*Kogia breviceps*), dwarf sperm whale (*Kogia sima*), Cuvier's beaked whale (*Ziphius cavirostris*), Sowerby's beaked whale (*Mesoplodon densirostris*), Gervais' beaked whale (*Mesoplodon europaeus*), Blainville's beaked whale (*Mesoplodon densirostris*), rough-toothed dolphin (*Steno bredanensis*), bottlenose dolphin (*Tursiops truncatus*), pantropical spotted dolphin (*Stenella attenuata*), Atlantic spotted dolphin (*Stenella frontalis*), spinner dolphin (*Stenella longirostris*), clymene dolphin (*Stenella clymene*), striped dolphin (*Stenella coeruleoalba*), short-beaked common dolphin (*Delphinus delphis*), long-beaked common dolphin (*Delphinus capensis*), Fraser's dolphin (*Lagenodelphis hosei*), Risso's dolphin (*Grampus griseus*), melon-headed whale (*Peponocephala electra*), pygmy killer whale (*Feresa attenuata*), false killer whale (*Pseudorca crassidens*), killer whale (*Orcinus orca*), short-finned pilot whale (*Globicephala macrorhynchus*), long-finned pilot whale (*Globicephala*