



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

MAY 3 2003

David Hogg  
U.S. Geological Survey  
Coastal and Marine Geology Program  
599 Seaport Blvd.  
Redwood City, California 94063

Dear Mr. Hogg:

This is in response to your letter informing the National Marine Fisheries Service (NOAA Fisheries) of your proposed marine high-resolution seismic-reflection studies offshore in the Gulf of Mexico. The objectives of your surveys are to support ongoing studies of gas-hydrates (methane-ice substances found at the sea floor and in shallow sub-bottom sediments on continental margins in water depths greater than about 500 m) in the Gulf of Mexico, looking specifically at the occurrence and distribution of naturally occurring marine gas hydrates in order to understand the hazard they pose to deep-water drilling and the potential they offer as an energy resource. As a part of this research, you wish to acquire high-resolution seismic reflection data to better image and, therefore, understand the geologic structure and stratigraphy in areas where gas hydrate has been recovered through sea floor coring programs, and where an industry-funded research well will be drilled early next year. In the past, high intensity acoustic survey work has been demonstrated to result in the incidental harassment of marine mammals and, under the Marine Mammal Protection Act (MMPA), the taking of marine mammals, including harassment, is prohibited unless the activity is exempted by law or permitted under the MMPA.

The U.S. Geological Survey (USGS) has requested that NOAA Fisheries review this project and the proposed mitigation measures in order to concur with its determination that the low power acoustic sources planned for use in this activity would not result in the taking, including Level B harassment, of marine mammals. However, because the USGS has not applied for an Incidental Harassment Authorization under section 101(a)(5)(D) of the MMPA, the USGS will be taking certain measures to avoid taking, including harassment of, those marine mammals inhabiting the coastal and offshore waters of the Gulf of Mexico.

During data collection surveys, the USGS will operate five seismic sound sources: a Hunttec boomer system, an Edgetech 512I Chirp high resolution system, a Benthos SIS-1000 chirp side scan sonar and sub-bottom profiler, a 35-in<sup>3</sup> generator-injector (GI) air gun, and a multi-channel Type S15 T Water Gun system. The boomer system has a sound pressure level (SPL) of about 205 dB re 1 uPa-1 m (root-mean square (rms)), which is triggered at 0.5 to 1.25 second intervals and has an output sound bandwidth of 0.5 kHz to 8 kHz, with a main peak frequency of 4.5 kHz. The Edgetech 512I Chirp high resolution bottom profiler has a SPL of 198 dB re 1 uPa-1 m rms, operates within a frequency range of 500 Hz to 12 kHz with a peak frequency of 5.75 kHz, and pulse widths from 5 ms to 50 ms. The SIS-1000 is a side scan sonar and sub-bottom profiler.



The side scanner operates as a focused beam and has a SPL of 225 dB re 1 uPa-1 m rms that radiates at .5 degree horizontal at a 70 degrees vertical angle, and has a frequency of 100-kHz band-swept FM. The sub-bottom profiler component has a SPL of 207 dB re 1 uPa-1 m rms that operates as a 45 degree conical beam at a swept frequency of 2 kHz to 5 kHz. Fired every 10 seconds, the 35-in<sup>3</sup> GI gun is a dual-chamber gun that will have inserts installed to reduce it from a 35-in<sup>3</sup> to a 24-in<sup>3</sup> gun, and has a SPL of about 208 dB re 1 uPa-1 m rms. Compressed air delivered to the gun will have a pressure between 2000 and 3000 psi, and the gun's output sound pulse has a duration of about 10 ms. Most of the sound energy is at peak frequencies below 500 Hz. The Type S15 T Water Gun multi-channel system is operated with 3000 psi high pressure air, has a 15 cubic inch chamber, has a peak frequency of less than 500 Hz (100 - 300 Hz) and will be fired at approximately 5 second intervals. The 15-in<sup>3</sup> water gun has a SPL of about 204 dB re 1 uPa-1 m rms. Each of these systems is significantly less powerful than standard seismic airgun arrays.

Along with your project description you provided estimated zones of marine mammal impact. These zones were calculated using peak or center frequencies for each sound source for two different isopleth levels incorporating absorption calculations (Richardson et al., p 73). The following table is a summary of your calculated safety zones for each sound source and the frequencies used to calculate them:

Sound Source	Peak Frequency	160 dB	180 dB
Huntec boomer system	4.5 kHz	175 meters	17 meters
Edgetech 512I	5.75 kHz	75 meters	8 meters
Benthos SIS-1000 side scan sonar sub-bottom profiler	4.5 kHz	375 meters 250 meters	105 meters 25 meters
35-in <sup>3</sup> GI Air Gun	500 Hz	250 meters	25 meters
Type S15T Water Gun	200 Hz	170 meters	15 meters

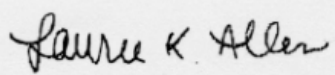
In order to ensure that taking, including Level B harassment, does not occur incidental to conducting your activities, appropriate safety ranges and shut-down criteria need to be established. You proposed to establish safety zones for the 180 dB isopleth. However, because an Incidental Harassment Authorization is not being requested, it is more appropriate to establish correct ranges for the 160 dB isopleth to avoid marine mammal takes. Additionally, observers will instruct researchers to shut down all active seismic sources whenever marine mammals approach or enter into these established safety zones at any time, even at night. Observers must monitor work areas for 30 minutes prior to the start up of seismic surveys to ensure that no marine mammals are in the area. If this observation cannot be conducted, such as at night or in poor visibility, new surveys will not be started until this observation can happen.

The following measures will be followed by the USGS in order to ensure that no taking, including harassment, will occur. These include: (1) The surveys will use acoustic systems with

modest power sources, (2) trained observers will be onboard at all times and in an adjacent boat, watching for marine mammals and collecting data, (3) operations will cease whenever marine mammals approach the calibrated marine mammal safety zones of impact of 160 dB 1 uPa-1 m rms, (4) safety zones of impact will be monitored 30 minutes prior to the startup of seismic systems to ensure that no marine mammals are in the area, (5) no new surveys will begin when the 30 minute observation cannot be conducted, such as in poor visibility conditions or at night, and (6) the ship's speed will be 4 to 5 knots during seismic-reflection survey operations so marine mammals will have gradual warning of the ship's approach and can move away.

Therefore, based on the relatively low power of each of the acoustic sources, the fact that no new survey work will be started without a pre-observation period and that a protocol has been developed to shut down acoustic sources whenever marine mammals enter the 160 dB isopleth zone, NOAA Fisheries has concluded that your activity is unlikely to result in the harassment of marine mammals. If you have any questions concerning this letter, please contact Kenneth Hollingshead, Office of Protected Resources, NOAA Fisheries at (301) 713-2322, ext. 128.

Sincerely,



Laurie K. Allen  
Acting Director  
Office of Protected Resources