U.S. Geological Survey
Coastal and Marine Geology Program
Natural Hazards Mission Area
Reston, Virginia

ENVIRONMENTAL ASSESSMENT

AND FINDING OF NO SIGNIFICANT IMPACT

PURSUANT TO THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA),

42 U.S.C. 4321, *et seq.*

Low-Energy Marine Seismic Survey by the U.S. Geological Survey

in the northwestern Gulf of Mexico, April-May 2013

This constitutes an environmental analysis prepared by the U.S. Geological Survey (USGS) for a low-energy marine seismic survey to be conducted ~April 16 to May 5, 2013 aboard the *R/V Pelican* in the deepwater northwestern Gulf of Mexico. This analysis is based, in part, on an Environmental Assessment report prepared by LGL Limited Environmental Research Associates (LGL) on behalf of U.S. Geological Survey, entitled, "Request by U.S. Geological Survey for an Incidental Harassment Authorization to Allow the Incidental Take of Marine Mammals during a Low-Energy Marine Seismic Survey in the Gulf of Mexico, April–May 2013" (Report 1263-1). National Marine Fisheries Service (NMFS) posted the draft Environmental Assessment on its website for public comment from February 20, 2013 through March 22, 2103. The USGS adopted the NMFS public comment period to fulfill the USGS responsibility to seek public input on the proposed action. Public comments were filed by the Center for Biological Diversity (CBD), the International Association of Geophysical Contractors (IAGC) and the American Petroleum Institute (API), and private citizens in the US and foreign countries. Government agency comments were received from the Marine Mammal Commission (MMC). These comments are available at the Woods Hole Coastal and Marine Science Center environmental compliance website:
http://woodshole.er.usgs.gov/project-pages/environmental_compliance/index.html

The USGS assisted NMFS in formulating responses to the public comments and those from MMC. Changes were also made to the Environmental Assessment. These changes are summarized here:

- Explicitly incorporated by reference federal agency NEPA documents produced by the National Science Foundation, the USGS, the Department of the Navy, and the Bureau of Ocean Energy Management (BOEM).

- Clarified that the USGS is a scientific agency whose mandate includes research on energy topics, but that the USGS has no authority to exploit resources.
- Clarified that the purpose of the seismic surveys is related to determining the extent and saturation of known gas hydrate deposits and imaging the geologic structures in the sediments above the gas hydrates.
- Clarified the need for the seismic surveys in light of the inadequacy of pre-existing data.
- Expanded the description of the no action alternative.
- Added appropriate information about the affected environment, including air quality/greenhouse gas emissions.
- Included information about bluefin tuna.
- Updated information about fish habitat.
- Updated the status of NMFS activity on establishment of new noise exposure criteria.
- Included a discussion of dose-response in the section on delphinids in Attachment 1 §4 *Environmental Consequences.*
- Clarified that the USGS has provided courtesy notification to BOEM about the upcoming surveys.
- Updated references.

The revisions made to the LGL report did not alter the conclusions of the report. These conclusions were used to inform USGS management of potential environmental impacts of the cruise. The USGS has reviewed and concurs with the report's findings. Accordingly, the LGL report is incorporated into this analysis by reference as if fully set forth herein.

The Environmental Assessment also serves to support NMFS in its NEPA compliance process associated with its proposed issuance of an Incidental Harassment Authorization (IHA).

Project Objectives and Context

The purpose of the proposed study is to conduct a multicomponent and high-resolution marine seismic survey in two areas of the northern Gulf of Mexico where gas hydrates have previously been identified and studied by the US government and private sector partners. Multicomponent seismic surveys would constrain the areal distribution, saturation, and thickness of hydrate-bearing coarse-grained sediments beneath the seafloor. High resolution surveys would image the sedimentary section between the seafloor and the hydrate-bearing strata and provide information about faults, structural traps, sedimentation patterns, and related features that could affect the distribution of gas hydrate or the migration of gas.

Summary of Proposed Action and Alternatives

The procedures to be used for this survey are similar to those used for low energy seismic surveys carried about by academic and other government researchers and would involve conventional seismic methodology. The proposed survey would take place during April to May 2013 within the deepwater Gulf of Mexico, entirely within the Exclusive Economic Zone (EEZ) of the U.S. (See Attachment 1, Figure 1). The seismic survey would consist of a maximum of 1400 km of transect lines (including turns) in water depths ranging from ~1500 to 2000 meters. During the survey, a two airgun array would be deployed as an energy source; it would be operated as a single array consisting of two 10 in^3 GI airguns, with a maximum discharge

volume of 210 in^3. Up to 25 ocean bottom seismometers would passively record the seismic energy. Energy would also be recorded by a towed 470-m-long 72-channel digital streamer.

Seismic operations would be carried out for up to 8 days during the ~15 day cruise. Some minor deviation from proposed cruise dates may be required, depending on logistics, weather conditions, and the need to repeat some lines if data quality were substandard.

One alternative to the proposed action would be to issue an IHA at an alternative time and conduct the survey at that alternative time. Constraints on the availability of the vessel, of USGS operational personnel, and of USGS seismic equipment would need to be considered for alternative cruise times. Limitations on scheduling the vessel include additional research studies planned by other federal agencies for 2013 and the availability of the ocean bottom seismometers which are, at times, oversubscribed in the shared academic/research institution pool to which the USGS contributes instruments and annual fees.

Another alternative to conducting the proposed activities would be the "No Action" alternative (i.e., do not issue an IHA and do not conduct the operations). If the planned research were not conducted, the "No Action" alternative would result in no disturbance to marine mammals attributable to the proposed activities. If new seismic data designed to address deficiencies in the presently available seismic data are not acquired, then researchers would be unable to constrain whether faults intersect the hydrate-bearing sediments and how extensive the hydrate-bearing sediments may be. Without the acquisition of new seismic data to expand scientific expertise in using shipborne (instead of drilling) data to estimate hydrate saturations within sediment formations, scientists would be more reliant on drilling. The "No Action" alternative would therefore represent a lost opportunity to obtain data and knowledge important to science and to society in general.

Summary of Environmental Consequences

The proposed activity would have negligible impact on transportation in the survey area, air quality/greenhouse gas emissions, geological and water resources, terrestrial biological resources, and visual and cultural resources, nor implications for safety and hazardous materials or socioeconomic and environmental justice.

The potential effects of sounds from airguns on marine species, including mammals and turtles of particular concern, are described in detail in Attachment 1 (pages 23-33) and might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and at least in theory, temporary or permanent hearing impairment, or non-auditory physical or physiological effects. It is unlikely that the project would result in any cases of temporary or especially permanent hearing impairment, or any significant nonauditory physical impacts during seismic operations. Any such impacts would likely be localized, short-term, and involving a limited numbers of animals.

The surveys do not overlap with essential fish habitat (EFH) or habitats of particular concern (HAPC) as designated by the Gulf Coast Fishery Management Council for managed species. The survey areas do overlap with EFH of one or more life stages of 16 migratory species identified by NMFS and with a proposed HAPC for spawning bluefin tuna, listed as a species of

concern under the Endangered Species Act. For individuals farther than a few meters from a high-energy seismic source, the typical effects of seismic surveys on fish include behavioral changes and other non-lethal, short-term, temporary impacts. The *Final Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey (hereafter "PEIS")*, which is incorporated here by reference, concluded that there would be no significant impacts of NSF-funded or USGS marine seismic research on populations, fisheries, and associated EFH. Furthermore, the proposed source is not a high-energy source, but rather a low-energy source, as defined in § 2.4.2.1 of the PEIS.

The proposed activity would include a mitigation program to further minimize potential impacts on marine mammals that may be present during the conduct of the research to a level of insignificance. As detailed in Attachment 1 (pages 7-11; and 28) monitoring and mitigation measures would include: ramp ups; a dedicated observer maintaining a visual watch during all daytime airgun operations; observations 30 min before and during ramp ups during the day and at night; no start ups during poor visibility or at night unless at least one airgun has been operating; and shut downs when marine mammals or sea turtles are detected in or about to enter designated exclusion zones. The fact that the airguns, as a result of their design, direct the majority of the energy downward, and less energy laterally, would also be an inherent mitigation measure.

With the planned monitoring and mitigation measures, unavoidable impacts to each species of marine mammal that could be encountered would be expected to be limited to short-term, localized changes in behavior and distribution near the seismic vessel. At most, effects on marine mammals may be interpreted as falling within the U.S. Marine Mammal Protection Act (MMPA) definition of "Level B Harassment". No long-term or significant effects would be expected on individual marine mammals, the populations to which they belong, or their habitats.

A survey at an alternative time would result in few net benefits. As described in Attachment 1, a number of marine mammal and sea turtle species are expected to occur in the area year-round, so altering the timing of the proposed project likely would result in no net benefits for those species. Postponing or changing the cruise period would delay this scientific research and disrupt other programs scheduled for the R/V *Pelican* in 2013. In addition, the proposed cruise dates are the only period when the ship and all of the personnel and equipment essential to meet the overall project objectives are available.

The "no action" alternative would remove the potential for disturbance to marine mammals or sea turtles attributable to the proposed activities as described. It would, however, preclude important scientific research that has the potential to address geological processes of concern.

Conclusions

The USGS has reviewed and concurs with the conclusions of the LGL report (Attachment 1) that implementation of the proposed activity would not have no significant impact on the quality of the human environment. Consequently, implementation of the proposed activity does not have a significant impact on the environment within the context of the National Environmental Policy Act (NEPA) and an environmental impact statement will not be prepared. On behalf of USGS, I

authorize the issuance of a Finding of No Significant Impact for the marine seismic survey proposed to be conducted on board the research Pelican in the Gulf of Mexico in April and May 2013.

David Applegate
Associate Director, Natural Hazards

April 12, 2013
Date