

gun and 12-gun array at the planned levels.

Response: The definition quoted in the comment was modified by Public Law 99-659 when Congress expanded the small take authorization to include marine mammal species listed under the ESA. NMFS interprets negligible impact to mean that the impact resulting from the specified activity cannot reasonably be expected to, and is not reasonably likely to, adversely affect the species or stock through effects on reproduction or survival. NMFS believes that this definition of negligible impact captures Congressional intent since it adopted, substantially without change, the definition set out in the Senate's "Section-by-Section Analysis" (132 Cong. Rec. S16305 (October 15, 1986)).

Discussion regarding the potential for taking by Level B harassment of up to 8,901 marine mammals is provided in the previous response. As required by the MMPA, L-DEO has provided significant documentation in its application that the harassment of marine mammals incidental to conducting a scientific survey using a seismic array will have a negligible impact on affected species and stocks of marine mammals. NMFS concurs with this finding and believes that the information contained in the L-DEO application and the NSF EA is a compilation of the best scientific information available on this subject. NMFS is unaware of additional scientifically-based information on which to make an alternative decision and the commenter has not provided any information to support the statement. Refer to the proposed authorization notice (68 FR 17909, April 14, 2003) for discussion on potential seismic noise impacts on marine mammals.

Mitigation Concerns

Comment 4: The CBD states that while the proposed IHA notice outlines several mitigation measures the action will include, these measures do not ensure the "least practicable adverse impact" as required by the MMPA. It is unclear from the proposed IHA that the safety radii dB levels are sufficient to protect marine mammals (from injury). It appears that L-DEO determined the safety radii based on exposure to 180 dB (cetaceans) and 190 dB (pinnipeds). These levels are far too high to be deemed "safety" radii and should be modified accordingly.

Response: The safety radii are based on the findings of two public workshops (High-Energy Seismic Survey (HESS) Workshop, June 12-13, 1997; NMFS Acoustic Criteria Workshop, September,

1998). A panel of nine experts in marine biology and acoustics sponsored by Southern California's HESS Team convened to develop marine mammal exposure criteria (Knastner, 1998). The consensus of the experts was that they were

apprehensive about levels above 180 dB re 1 μ Pa (rms) with respect to overt behavioral, physiological, and hearing effects on marine mammals in general. Therefore, the 180-dB radius, as initially defined by transmission loss model and verified on-site, is recommended as the safety zone distance to be used for all seismic surveys within the southern California study area.

The 1998 NMFS workshop clarified that, because pinniped hearing is different from that of cetaceans, 190 dB would be a safe level preventing pinniped injury from exposure to impulse sounds.

While there is limited empirical evidence on injury at levels below 180 dB, the 180- and 190-dB levels make sense, given that Frankel (1994) estimated the source level for singing humpback whales to be between 170 and 175 dB while Au and Andrews (2001) measured humpback whale calls off Hawaii at 189 dB; the average call source level for blue whales was calculated by McDonald et al. (2001) to be 186 dB; Watkins et al. (1987) and Charif et al. (2002) found source levels for fin whales up to 186 dB; and Mhl et al. (2000) recorded source levels for sperm whale clicks up to 223 dB. If marine mammals vocalize at these levels, it is realistic to believe that these species have also evolved mechanisms to protect themselves and conspecifics from high SPLs.

Comment 5: The CBD states that it is far from clear that the vessel-based observers will detect marine mammals in the area in order to trigger the necessary shutdown of operations. For example, Cuvier's beaked whales in the vicinity of the airgun array and sonar are likely to escape observance due to the documented extreme difficulty in detecting this species.

Response: The MMPA requires NMFS to ensure that takings are at the lowest level practicable. The mitigation measures, which include (1) course alteration; (2) power-down procedures; (3) ramp-up procedures; and (4) vessel-based observers, are discussed in detail later in this document (see Mitigation). In combination, they are more likely to be effective mitigation than the use of observers alone. These same measures are included in the Interim Operational Guidelines for High-Energy Seismic Surveys off Southern California (HESS, 1999) and are standard mitigation measures for high-energy seismic sources used in the Beaufort Sea and

other areas. NMFS reviewed the practicality of adding other mitigation measures, and has added an additional measure discussed later in this document (see Monitoring Concerns) and clarified timing for events such as ramp-up and observation periods (see Mitigation). Other mitigation measures, such as aircraft overflights and limiting operations to daylight hours, are not practicable. Overflights, for example, in addition to the prohibitive cost, would be unable to spend much time in the area for observation after flying 600 nm (1111.2 km) from the Galapagos Islands. Therefore, NMFS determined that the takings, by Level B harassment, are at the lowest level practicable without compromising the ability of L-DEO to obtain the scientific information on movements of the earth's plates and on formations associated with those movements at the Hess Deep.

Monitoring Concerns

Comment 6: The Commission believes that NMFS' preliminary determinations are reasonable, provided NMFS is satisfied that the proposed mitigation and monitoring activities are adequate to detect marine mammals in the vicinity of the proposed operations and ensure that marine mammals are not being taken in unanticipated ways or numbers. In this regard, NMFS' **Federal Register** notice and the application state that "[v]essel-based observers will monitor marine mammals near the seismic source vessel during all daylight airgun operations and during any nighttime startups of the airguns;" and that bridge personnel will watch for marine mammals during nighttime activities but that "[o]bservers will not be on duty during ongoing seismic operations at night." The **Federal Register** notice states that an image-intensifier night-vision devices (NFDs) will be available for use at night, although past experience has shown that NFDs are of limited value for this purpose." Thus it is unclear that, for nighttime activities, the monitoring effort will be sufficient to determine that no marine mammals are within the safety zones at start-up or will be an effective means of detecting when marine mammals enter the safety zones during operations such that activities are suspended before received levels of 180 and 190 dB (rms) are reached.

Response: As part of the IHA, NMFS is requiring that if the airguns are started up at night, two marine mammal observers will monitor for marine mammals within the safety radii for 30 minutes prior to start up using night vision devices as described later (see Monitoring and Reporting). If the entire