

Power-down and Shut-down Procedures

Airgun operations will be powered-down (or shut-down) immediately when cetaceans or pinnipeds are seen within or about to enter the appropriate safety radius. If a marine mammal is detected outside the safety radius but is likely to enter the safety radius, and if the vessel's course and/or speed cannot be changed to avoid having the marine mammal enter the safety radius, the airguns will be powered-down before the mammal is within the safety radius. Likewise, if a mammal is already within the safety zone when first detected, the airguns will be powered-down immediately. If a marine mammal is seen within the appropriate safety radius of the array while the guns are powered-down, airgun operations will be shut-down. For the power-down procedure for the 20-gun array, one 80 in³ airgun will continue to be operated during the interruption of seismic survey. Airgun activity (after both power-down and shut-down procedures) will not resume until any marine mammal has cleared the safety radius. The mammal has cleared the safety radius if it is visually observed to have left the safety radius, or if it has not been seen within the zone for 15 min (small odontocetes and pinnipeds) or 30 min (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, beaked and bottlenose whales).

Ramp-up Procedure

When airgun operations with the 20-gun array commence after a certain period without airgun operations, the number of guns firing will be increased gradually, or "ramped up" (also described as a "soft start"). Operations will begin with the smallest gun in the array (80 in³). Guns will be added in sequence such that the source level of the array will increase in steps not exceeding 6 dB per 5-min period over a total duration of approximately 25 minutes. Throughout the ramp-up procedure, the safety zone for the full 20-gun array will be maintained. Given the presence of the streamer and airgun array behind the vessel, the turning rate of the vessel with trailing streamer and array is no more than five degrees per minute, limiting the maneuverability of the vessel during operations.

The "ramp-up" procedure will be required under the following circumstances. Under normal operational conditions (vessel speed 4 knots, or 7.4 km/hr), a ramp-up would be required after a power-down or shut-down period lasting about 8 minutes or longer if the *Ewing* was towing the 20-

gun array. At 4 knots, the source vessel would travel 900 m (2953 ft) during an 8-minute period. If the towing speed is reduced to 3 knots or less, as sometimes required when maneuvering in shallow water, it is proposed that a ramp-up would be required after a "no shooting" period lasting 10 minutes or longer. At towing speeds not exceeding 3 knots, the source vessel would travel no more than 900 m (3117 ft) in 10 minutes. Based on the same calculation, a ramp-up procedure would be required after a 6 minute period if the speed of the source vessel was 5 knots.

Ramp-up will not occur if the safety radius has not been visible for at least 30 min prior to the start of operations in either daylight or nighttime. If the safety radius has not been visible for that 30 minute period (e.g., during darkness or fog), ramp-up will not commence unless at least one airgun has been firing continuously during the interruption of seismic activity.

Comments on past proposed IHAs raised the issue of prohibiting nighttime operations as mitigation. However, this is not practicable due to cost considerations. The daily cost to the federal government to operate vessels such as *Ewing* is approximately \$33,000 to \$35,000/day (Ljunngren, pers. comm. May 28, 2003). If the vessels were prohibited from operating during nighttime, it is possible that each trip would require an additional three to five days, or up to \$175,000 more, depending on average daylight at the time of work.

Taking into consideration the additional costs of prohibiting nighttime operations and the likely impact of the activity (including all mitigation and monitoring), NMFS has determined that the proposed mitigation ensures that the activity will have the least practicable impact on the affected species or stocks. Marine mammals will have sufficient notice of a vessel approaching with operating seismic airguns (at least one hour in advance), thereby giving them an opportunity to avoid the approaching array; if ramp-up is required after an extended power-down, two marine mammal observers will be required to monitor the safety radii using night vision devices for 30 minutes before ramp-up begins and verify that no marine mammals are in or approaching the safety radii; ramp-up may not begin unless the entire safety radii are visible; and ramp-up may occur at night only if one airgun with a sound pressure level of at least 180 dB has been maintained during interruption of seismic activity. Therefore it is likely that the 20-gun array will not be ramped-up from a shut-down at night.

Marine Mammal Monitoring

LDEO must have at least two observers on board the vessel, and at least one must be an experienced marine mammal observer that NMFS approves. These observers will monitor marine mammals near the seismic source vessel during all daytime airgun operations and during any nighttime start-ups of the airguns. During daylight, vessel-based observers will watch for marine mammals near the seismic vessel during periods with shooting (including ramp-ups), and for 30 minutes prior to the planned start of airgun operations after an extended shut-down.

The observers will be on duty in shifts of no longer than 4 hours. The second observer must also be on watch part of the time, including the 30-minute periods preceding startup of the airguns and during ramp-ups. Use of two simultaneous observers will increase the likelihood that marine mammals near the source vessel are detected. LDEO bridge personnel will also assist in detecting marine mammals and implementing mitigation requirements whenever possible (they will be given instruction on how to do so), especially during ongoing operations at night when the designated observers are not on duty.

The observer(s) will watch for marine mammals from the highest practical vantage point on the vessel, which is either the bridge or the flying bridge. On the bridge of the *Maurice Ewing*, the observer's eye level will be 11 m (36 ft) above sea level, allowing for good visibility within a 210° arc. If observers are stationed on the flying bridge, the eye level will be 14.4 m (47.2 ft) above sea level. The observer(s) will systematically scan the area around the vessel with reticle binoculars (e.g., 7 X 50 Fujinon) and with the naked eye during the daytime. Laser rangefinding binoculars (Leica LRF 1200 laser rangefinder or equivalent) will be available to assist with distance estimation. The observers will be used to determine when a marine mammal is in or near the safety radii so that the required mitigation measures, such as course alternation and power-down or shut-down, can be implemented. If the airguns are powered or shut down, observers will maintain watch to determine when the animal is outside the safety radius.

Observers will not be on duty during ongoing seismic operations at night; bridge personnel will watch for marine mammals during this time and will call for the airguns to be powered-down if marine mammals are observed in or