

further mitigative actions will be taken, *i.e.*, either further course alterations or shutdown of the airguns.

Power-down and Shut-down Procedures

Received sound levels have been modeled for the 2-GI and 20-gun arrays. Based on the modeling, estimates of the 190- and 180-dB re 1 μ Pa (rms) distances (safety radii) for these arrays have been provided previously in this document.

Airgun operations will be powered- or shut-down immediately when cetaceans or pinnipeds are seen within or about to enter the appropriate 180-dB (rms) or 190-dB (rms) radius, respectively. These 180- and 190-dB criteria are consistent with guidelines listed for cetaceans and pinnipeds by NMFS (2000) and other guidance by NMFS. 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. If a mammal is already within the safety radius 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 be operated during the interruption of seismic survey. When the 2 GI-guns are in use, a shut-down rather than a power-down will likely be necessary. Airgun activity (after both power-down and shut-down procedures) will not resume until the marine mammal has cleared the safety radius. The animal 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

A "ramp-up" procedure will be followed when the airgun arrays begin operating after a specified duration without airgun operations. 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, 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. During the ramp-up procedures, the safety radii for the full gun array will be maintained.

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 one airgun with a sound pressure level (SPL) of at least 180 dB has been maintained during the interruption of seismic activity. Therefore, it is likely that the 20-gun array will not be ramped up from a shut-down at night or in thick fog, since the safety radii for this array will not be visible during those conditions.

Monitoring and Reporting

LDEO will conduct marine mammal monitoring of its Mid-Atlantic seismic programs in order to verify that the taking of marine mammals, by harassment, incidental to conducting the seismic survey will have a negligible impact on marine mammal stocks and to ensure that these harassment takings are at the lowest level practicable.

Vessel-based Visual Monitoring

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. At night, NVDs will be available (ITT F500 Series Generation 3 binocular image intensifier or equivalent). Laser rangefinding binoculars (Leica LRF 1200 laser rangefinder or equivalent) will be available to assist with distance estimation.

At least two observers will be based aboard the vessel, and at least one will be an experienced marine mammal observer. Observers will be appointed by LDEO with NMFS concurrence. Observers will be on duty in shifts of duration no longer than 4 hours. Use of two simultaneous observers will increase the proportion of the marine mammals present near the source vessel that 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 designated observers will not be on duty. If ramp-up procedures must be performed at night, two observers will be on duty 30 minutes prior to the start of airgun operations and during the subsequent ramp-up procedures. Ramp-up is not required for the 2 GI gun array, but observers must watch for 30 minutes prior to operation of the 2 GI-guns and the safety radii must be visible.

Reporting

When a mammal sighting is made, the following information about the sighting will be recorded: (1) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to seismic vessel (*e.g.*, none, avoidance, approach, paralleling, *etc.*), and behavioral pace; and (2) time, location, heading, speed, activity of the vessel (shooting or not), sea state, visibility, cloud cover, and sun glare. The data listed under (2) will also be recorded at the start and end of each observation watch and during a watch, whenever there is a change in one or more of the variables.

All mammal observations and airgun power- and shut-downs will be recorded in a standardized format. Data will be entered into a custom database using a laptop computer when observers are off-duty. The accuracy of the data entry will be verified by computerized validity data checks as the data are entered and by subsequent manual checking of the database. These procedures will allow initial summaries of data to be prepared during and shortly after the field program, and will facilitate transfer of the data to statistical, graphical or other programs for further processing and archiving.

A report will be submitted to NMFS within 90 days after the end of each cruise in the Mid-Atlantic Ocean. The end of the TAG cruise is predicted to occur on or about November 7, 2003. The end of the ADWBC cruise is predicted to occur during August 2004. The report will describe the operations that were conducted and the marine mammals that were detected. The report will be submitted to NMFS, providing full documentation of methods, results, and interpretation pertaining to all monitoring tasks. The 90-day report will summarize the dates and locations of seismic operations, marine mammal sightings (dates, times, locations, activities, associated seismic survey