

while NMFS agrees that the term "barrier systems" was incorrect, in accordance with the Biological Opinion, some method to decrease the SPLs would be necessary to protect listed fish species. In addition, this would serve as a practical marine mammal mitigation measure. Therefore, the information provided in that paragraph of the proposed **Federal Register** notice has been expanded in this document to include NMFS determination on effective mitigation.

Comment 8: CALTRANS requests the following clarifications be made if NMFS intends to require the pile-driving attenuator in the IHA: (1) although the attenuator planned for use is similar in concept to the one that was used in the PIDP, it will have a substantially enhanced performance; (2) use of the attenuator is only for driving the large in-Bay piles, not for the smaller, temporary in-Bay piles nor for any land-based piles; and (3) NMFS should clarify its intent (for requiring the attenuator to protect marine mammals).

Response: NMFS agrees. In reviewing the Administrative Record on this IHA application, NMFS has determined that deployment of an improved air bubble curtain would effectively reduce impacts to marine mammals at the SF-OB to the lowest level practicable. For example, at the Benicia-Martinez Bridge in California an unconfined air bubble curtain system was developed that used vertically-stacked air bubble rings and large volumes of air to reduce sound pressures. Findings indicate that this system resulted in sound pressure reductions of 19 to 33 dB re 1 microPascal and 17 to 29 dB on an rms basis. At most measurement positions, peak sound pressures were reduced by over 22 dB and RMS SPLs were reduced by over 25 dB. The measurement results and discussion can be found in the report (Reyff, 2003) which is available upon request.

Therefore, as a result of the findings made during the PIDP restrike and the investigation at the Benicia-Martinez Bridge, NMFS has determined that CALTRANS must install an air bubble curtain for pile driving for the in-Bay piles located at the SF-OB. Based on CALTRANS redesign, this air bubble curtain system will consist of concentric layers of perforated aeration pipes stacked vertically and spaced no more than five vertical meters apart in all tide conditions. To address, in part, the issue of currents, CALTRANS has determined that the number of layers of pipe must be in accordance with water depth at the subject pile: 0-<5 m = 2 layers (1263 cfm); 5-<10 m = 4 layers (2526 cfm), 10-

<15 m = 7 layers (4420 cfm); 15-<20 m = 10 layers (6314 cfm); 20-<25 m = 13 layers (8208 cfm). The lowest layer of perforated aeration pipes must be designed to ensure contact at all times and tidal conditions with the mudline without sinking into the bay mud. Pipes in any layer must be arranged in a geometric pattern, which will allow for the pile driving operation to be completely enclosed by bubbles for the full depth of the water column and for a radial dimension of at least 2 m (6.6 ft) as measured from the outside surface of the pile.

To provide a uniform bubble flux, each aeration pipe must have four adjacent rows of air holes along the pipe. Air holes must be 1.6-mm diameter air holes spaced approximately 20 mm apart. The bubble curtain system will provide a bubble flux of at least three cubic meters per minute, per linear meter of pipeline in each layer. Air holes must be placed in 4 adjacent rows. The air bubble curtain system must be in a frame to facilitate transport and placement of the system, keeping the aeration pipes stable, and providing ballast to counteract the buoyancy of the aeration pipes in operation.

Comment 9: On April 23, 2002, CALTRANS informed NMFS that, with some modifications, the description of "barrier systems" should remain in the final IHA **Federal Register** notice as it provides information about the sound attenuating device to be used during the project. CALTRANS suggested the following language: "The bubble curtain system will be used only when driving the permanent in-Bay piles. While the bubble curtain is required specifically as a method to reduce impacts to endangered and threatened fish species in SFB, it may also provide some benefit for marine mammals. The NMFS' Biological Opinion and the California Department of Fish and Game's (CDFG) 2001 Incidental Take Permit also allow for the use of other equally effective methods, such as cofferdams, as an alternative to the air bubble curtain system to attenuate the effects of sound pressure waves on fish during driving of permanent in-Bay piles (NMFS 2001; CDFG, 2001). Piers E-16 through E-7 for both the eastbound and westbound structures of the Skyway will be surrounded by sheet-pile cofferdams, which will be dewatered before the start of pile-driving. De-watered cofferdams are effective sound attenuation devices. For Piers E3 through E6 of the Skyway and Piers 1 and E2 of the Self-Anchored Suspension span, it is anticipated that cofferdams will not be used; therefore, a bubble curtain will surround the piles."

Response: NMFS agrees and has inserted the recommended text as it clarifies where CALTRANS is required to install the air bubble curtain (see Mitigation). It should be noted that NMFS has determined that installation of the redesigned bubble curtain (described in response to comment 8) along with additional mitigation measures described later in this document (see Mitigation) will reduce marine mammal impacts to the lowest level practicable. Therefore, NMFS has determined that the piles for Piers E3, E4, E5, and E6 of the Skyway, as well as for Piers 1 and E2 of the Self-Anchored Suspension span, which will not be surrounded by cofferdams, must have an air bubble curtain system surrounding each pile driven to attenuate peak underwater sound pressure levels.

Comment 10: GC&S states that "it appears that CALTRANS has not considered the potential for marine mammals to wander into the project area during nocturnal periods of no activity. If this happens (and there is not a physical barrier to prevent this), the individuals that remain in the area during initial startup of the pile-driving activity could experience death or serious bodily injury. The use of the confined air bubble system (with fabric curtain) would not only reduce energy levels, but also serve as a physical barrier to exclude entry into the project area."

Response: NMFS has determined that the marine mammal monitoring program will effectively locate all pinnipeds in the vicinity of the pile-driving activity prior to beginning the driving of each pile. The IHA requires trained observers to conduct observations at least 30 minutes prior to the start of all in-water, permanent pile-driving. If any marine mammals are observed, pile-driving cannot begin until the animals leave the 190-dB safety zone or until 15 minutes after the animal was last seen. In addition to monitoring, requirements for the installation of an improved air bubble curtain and to incorporate "soft-start" of the hammer will ensure that no pinnipeds (or cetaceans) will be injured or killed incidental to placement of piles at SF-OB.

Comment 11: The CG&S and others believe that the MMPA provides NMFS with the authority to require CALTRANS ensure the least practicable impact to marine mammals by the project.

Response: NMFS agrees and believes that requiring CALTRANS to install and use the air-bubble curtain, as redesigned after the re-strike and described in