include more explanation to inform applicants about the potential costs, benefits, and consequences of each of these two methodologies.

10. In addition, if the incidental take estimate in a five-year ITR is based on non-weighted PTS and TTS thresholds, then the estimate will be unrealistically high. Alternatively, if an ITR is based on a weighted approach using contemporary modeling, LOA applicants who use the unweighted approach may complicate the agency's ability to reasonably manage and implement the ITR. We recommend that NMFS explain how it plans to implement future ITR/LOA processes, or multiple IHAs, in a context in which two approaches to estimating potential takes are stated in the agency's guidance.

We provide the above suggestions and examples to highlight the need for more information regarding the implementation of the proposed criteria and to identify specific opportunities for improvement. We respectfully request that NMFS revise and reissue the Draft Guidance, and a draft implementation guide, in a manner that comprehensively addresses the concerns described above and below.[4]

B. The Draft Guidance Presents a Number of Scientific and Technical Concerns That Must Be Addressed Before NMFS Issues Final Guidance

In general, the Associations support the development of new acoustic criteria based upon the best scientific information available, such as the findings and principles stated in Southall et al. (2007) and Finneran and Jenkins (2012). However, we have several scientific, technical, and operational concerns about the Draft Guidance. The following comments address these concerns.

1. TTS Thresholds

The Draft Guidance concludes that TTS is not an "injury" for MMPA purposes and should, at most, be considered Level B harassment. The Associations concur with this finding. The best available science indicates that hearing for marine mammals that have experienced TTS returns to normal within hours or days and that post-exposure behavior returns to normal. *See, e.g.*, Mooney et al. (2009a, 2009b); Popov et al. (2011); Finneran and Schlundt (2013). Moreover, behavioral studies indicate that marine mammals tend to move away from a sound

[4] It is not clear whether NMFS reviewed the Draft Guidance pursuant to the National Environmental Policy Act ("NEPA") or, alternatively, determined that NEPA does not apply. The second version of the Draft Guidance should clarify NMFS's determination regarding the applicability of NEPA and provide NEPA review documentation, if any, for public review.

source if it is disruptive, which significantly diminishes the potential for any TTS-related effects. *See* Nowacek et al. (2007). The data collected in experiments in which animals are exposed to sounds in a controlled setting likely result in overestimates of exposure because the subjects are exposed to much longer and louder sounds than they would be in the natural environment.

In addition, the Draft Guidance does not incorporate significant recent research regarding the auditory effects on bottlenose dolphins from multiple impulses of a seismic source (Finneran et al. (2011); Finneran et al. (2012); Schlundt et al. (2013)). These studies exposed three different bottlenose dolphins to multiple (10) impulses of a seismic airgun, SEL_{cum} 195 dB re 1 μPa^2-s, without any measurable TTS. The Draft Guidance proposes a TTS onset for impulsive sounds for mid-frequency cetaceans at SEL_{cum} 172 dB re 1 μPa^2-s. This is an extraordinarily low and unrealistic threshold given that the Finneran research could not induce TTS at 195 dB re 1 μPa^2-s. The draft TTS onset criteria should be revisited to consider Finneran and Schlundt's recent and more directly applicable work. As stated in Finneran et al. (2012), "[t]hese data suggest that the potential for seismic surveys using air guns to cause auditory effects on dolphins and similar delphinids may be lower than previously predicted."

Finally, the Draft Guidance describes criteria applicable to animals likely to experience TTS during marine operations that produce underwater sounds.[5] In most cases, the authors of the available relevant studies have not used the highest levels required to induce TTS, and NMFS has excluded studies in which TTS was not induced by sound levels equivalent to those in the proposed criteria. *See* SEAMARCO (2011); Kastelein et al. (2013). As a result, animals exposed at levels associated with TTS as currently proposed will not necessarily experience TTS and, therefore, the methods described in the Draft Guidance can only be used to estimate the number of animals that could potentially experience TTS.[6] Accordingly, the highest exposure that did not induce TTS in recent studies must be included in the data set used to develop the TTS thresholds, as referenced above. The Draft Guidance should also identify and describe each

[5] The data for establishing TTS for representative species come from a small number of animals. The lack of available data underlying the proposed acoustic criteria is not clearly addressed or explained by NMFS. Although NMFS is required to consider the best available science, it also has an obligation to explain the limitations of the information being used as a basis to develop important agency policy and guidance.

[6] The Draft Guidance references recent studies by Kujawa and Liberman (2009) and Lin et al. (2011) that indicate that even if a full recovery is observed after TTS in small mammals, some neurological damage was permanent. However, these results cannot be extrapolated to other species because the data are very limited and the implications for actual negative effects on the animal's ecology, behavior, or fitness have yet to be measured. Additionally, these two studies investigated extreme TTS, and, therefore, it is not known whether similar effects would occur in marine mammals at lower TTS levels.