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To: Chet Myers
Apex Companies, LLC
125 Broad Street, 5th Floor
Boston, MA 02110

Date: 12 July 2013

RE: **Underwater Acoustic Modeling of Explosive Rock Removal Operations for the Marine Commerce South Terminal in New Bedford, MA.**

Mr. Myers,

From a physical standpoint, the distances to impulse levels for injury criteria (18.4 psi·s) stated in our report can be validly considered as distances for charge weight per delay for delays of 25 ms or greater. This statement is based on the fact that the integration period for the impulse metric is defined as the time elapsed from the onset of the primary pressure wave to its return to ambient, i.e. the duration of the first positive pressure wave; this will be applicable individually to the events in a delayed sequence of detonations as long as the onset of an event does not overlap the positive phase of the previous one. While the positive pressure phase of an event may last just a few milliseconds, in practice some standard delay guidelines are generally applied to ensure a clear separation under realistic conditions. Not having found official directives from NMFS regarding minimum acceptable delays, and in the absence of details about the charge layout geometry for the construction activities for the New Bedford terminal, we recommend a minimum time delay of 25 ms between detonations based on Canadian guidelines for the use of explosives in or near fisheries waters (Wright and Hopky 1998) and experimental results presented by the National Marine Fisheries Services (NMFS; Bullard, J. K. 2012).

JASCO's analysis was limited to the physical estimate of acoustic parameters, and does not attempt to provide an interpretation of the biological impact on fish.

Regards,

Marie-Noël R. Matthews

Project Scientist

SDMS Doc ID 547274

Literature Cited

Bullard, J. K. 2012. RE: Route 52 Causeway Replacement & Somers Point Circle Elimination Contract B. Letter to Kostas Svarnas, U.S. Department of Transportation, New Jersey Division. 13 p.

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p. http://www.dfo-mpo.gc.ca/Library/232046.pdf