



U. S. Department of the Interior  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region

## Technical Announcement

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Contact: Caryl Fagot  
(504) 736-2590

### *Pressure Wave and Acoustic Properties Generated by the Explosive Removal of Offshore Structures in the Gulf of Mexico*

#### [OCS Study BOEM 2016-019](#)

Under the OCS Lands Act (OCSLA), the Bureau of Ocean Energy Management (BOEM) establishes decommissioning obligations to which an operator must commit when they sign an offshore lease, which includes the requirement to apply for and obtain a permit for subsequent removal of wells and facilities. The Bureau of Safety and Environmental Enforcement (BSEE) is responsible for regulating the decommissioning of OCS facilities in accordance with 30 CFR 250 Subpart Q. Decommissioning these structures may be accomplished using mechanical or explosive severance techniques. Explosive severance relies on the use of specially designed charges to produce enough energy to completely sever the structure's bottom-founded components.

Explosive severance and, particularly, below-mud-line (BML) detonations are likely to produce lower pressure levels at the same propagation distances than open-water shock trial configurations due to absorption, attenuation of energy by sediments, and the confinement of the explosion within well casings and platform piles. Conservative take estimates and large exclusion zones have been used for explosive severance due to a wide range of probabilistic error associated with insufficient in situ measurements from which to calculate the most plausible impact zone. By collecting acoustic data under various settings (e.g., varying cut depth, charge size), more accurate estimates of Pressure Wave and Acoustic Propagation (PWAP) can be calculated to apply appropriate mitigations to protect marine mammals and sea turtles, while also optimizing operations (safety and efficiency) during detonations.

Platform targets were selected based on consultation with BSEE and platform owner or operators to identify platforms that would be the best to use for model verification while still conforming to their decommissioning schedule. The goal was to choose targets that would allow numerous detonations and charge configurations such that the data collected would maximize charge types and BML configurations identified as high priority data gaps for refining the Underwater Calculator version 2 (UWCv2). Targets were prioritized to increase the number and type of detonation (shot) measurements as inputs to the UWCv2, strengthening the UWC's value for

potential use in estimating peak pressure and protected species safety zones during decommissioning activities that use explosive severance.

The Underwater Calculator version 1 (UWCv1) returned accurate predictions of the results from this study but overestimated the measurements from Connor and Technology Assessment and Research (TAR) 570 projects. UWCv2 predicted a faster decay rate than was shown in the in-situ measurements. However, both the UWCv1 and UWCv2 predictions will produce safety ranges that are smaller than those for an open-water explosion. The observed data from the current experiment were accurately predicted by UWCv1. As with the Connor and TAR 570 data, the UWCv1 generally over-predicted the actual measured PWAP levels.

This report is available on CD from the Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, for \$15.00, and free of charge as a pdf file downloaded from the BOEM Website. Copies can also be viewed at selected Federal Depository Libraries. The addresses are listed below.

To order a CD, use the Gulf of Mexico OCS Region contact information below and reference OCS Study BOEM 2016-019. To download a pdf copy, use the [Environmental Studies Program Information System](#) (ESPIS) and search on the study report number. In the near future, you will also be able to get this report also from the National Technical Information Service.

U.S. Department of the Interior  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region  
Public Information Office (MS 5034)  
1201 Elmwood Park Blvd.  
New Orleans, Louisiana 70123-2394  
Phone: (504) 736-2519, 1-800-200-GULF  
Fax: (504) 736-2620

U.S. Department of Commerce  
National Technical Information Service  
5301 Shawnee Rd.  
Springfield, Virginia 22312  
Phone: (703) 605-6000, 1-800-553-6847  
Fax: (703) 605-6900  
Website: <http://www.ntis.gov/>

**BOEM Main Website:** <http://www.boem.gov/>