

# REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words)  The goal of this program was to build a deep-towed explosive source that would allow high resolution seismic experiments to be carried out on the ocean floor with a precision and resolving power that is not attainable in any other way. This source, which we call NOBEL (Near Ocean Bottom Explosives Launcher), has an operational depth of 6000 m and can carry, launch and detonate 47 10 lb. charges of explosive while being towed a few tens of meters above the ocean floor on a research vessel's conventional 0.68" coaxial cable. Following a completely successful cruise to the East Pacific Rise in early 1991, NOBEL was unfortunately lost in mid-1992 while carrying out a set of experiments over gas hydrate deposits off the East Coast of the U.S. The single objective of this program was to rebuild this unique seismo-acoustic source. Construction of the system is complete. NOBEL was used extensively on an NSF-funded cruise to the Mid-Atlantic Ridge in June of 1997. It was deployed on ten separate occasions and worked superbly each time.  DTIC QUALITY INSPECTED 2				
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**Final Report of ONR Grant N00014-94-1-0293**  
**High Resolution Measurements of the Shallow Structure Of The Oceanic Crust: The**  
**Rebuild of NOBEL**

John A. Collins

Dept. of Geology and Geophysics, Woods Hole Oceanographic Institution,  
Woods Hole, MA 02543

e-mail: jcollins@whoi.edu, tel. 508-289-2733, FAX 508-457-2150

**Objectives**

The objective of this program was to build a deep-towed explosive source that would allow high resolution seismic experiments to be carried out on the ocean floor with a precision and resolving power that is not attainable in any other way. We call this source NOBEL (Near Ocean Bottom Explosives Launcher). Following a completely successful cruise to the East Pacific Rise in early 1991, during which more than 360 individual explosive charges were detonated within a few meters of the ocean floor in water depths of 2500-2600 m, NOBEL was unfortunately lost in mid-1992 while carrying out a set of experiments over gas hydrate deposits off the East Coast of the U.S. The single objective of this program was to rebuild this unique seismo-acoustic source. NOBEL provides us with the unique capability of generating in a controlled manner substantial low frequency seismic signals within a few meters of the deep ocean floor. Its operational depth is 6000m and it can carry, launch and detonate 47 5-10 lb. charges of pentolite explosive while being towed a few tens of meters above the ocean floor on a research vessel's conventional 0.68" coaxial cable. All aspects of the NOBEL design are dominated by safety considerations. Multiple levels of precautions prevent accidental detonations on deck.

**Accomplishments and Results**

Construction of the system is complete. In a joint experiment with the Naval Surface Warfare Center in April of 1995, we used components of NOBEL to detonate a series of deep (2500-4500 m) charges of both conventional pentolite and new chemical formulations. The high-fidelity source-signature measurements that we recorded (collins et al., 1997) are invaluable in NOBEL science programs. NOBEL was used extensively on an NSF-funded cruise to the Mid-Atlantic Ridge in June of 1997. It was deployed on ten separate occasions and worked superbly each time.

**Publications**

Collins, J.A., J. E. Broda, G.M. Purdy, J. Gaspin, T. Griffin, C. Peletski, L. Lipton, and B. Baudler, 1997. Source signature measurements of underwater explosives at very high ambient pressures, *accepted for publication, J. Acoust. Soc. Am.*

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