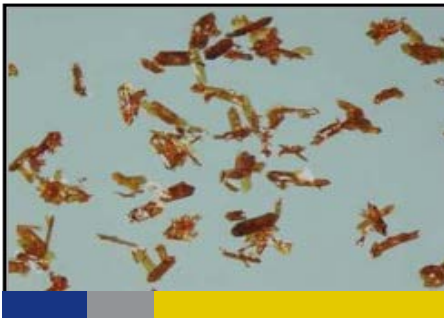


# Optimization and Scale-Up of the Manufacturing Process for DBX-1



## PERIOD OF PERFORMANCE:

November 2010 to December 2012

## PLATFORM:

Energetics

## AFFORDABILITY FOCUS AREA:

Not Applicable

## CENTER OF EXCELLENCE:

EMTC

## POINT OF CONTACT:

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## STAKEHOLDER:

PMA 201  
PEO (U&W)

## TOTAL MANTECH INVESTMENT:

\$1,396,000



## A2375 — Manufacturing Evaluation and Scale-Up of DBX-1

### Objective

Lead azide (LA) is utilized in most chemical detonators as the initial shock wave generating compound for detonation of subsequent main explosive charges. Despite being an effective energetic material, LA has a number of drawbacks associated with its use: (1) LA contains 71% lead, a toxic heavy metal that is released to the environment during production and use, (2) LA is unstable in non-hermetic munitions applications (forming copper azide) and, due to this, has been limited in use by NAVSEA 8020.3A, and (3) there is currently no qualified domestic production of LA with DOD relying on an aging and dwindling stockpile to support its needs.

DBX-1 is an environmentally benign copper-based LA replacement which has recently completed a NAVSEA 8020.5C qualification project. The objective of this project is to optimize synthesis techniques, scale-up to a 100 gram batch-size level, and generate a final product specification for DBX-1.

### Payoff

This project will establish both a remote manufacturing process and specification for DBX-1 at Pacific Scientific Energetic Materials Company in Chandler, AZ. These optimized process procedures will be transitioned to enable domestic production of DBX-1 for use in items of military interest. The project will provide a method for preparation of an environmentally friendly drop-in replacement for LA without the potential for copper azide formation. More importantly, a “green” replacement for LA would establish a U.S. manufacturing capability and eliminate this single point failure source in the fuze/detonator supply chain.

### Implementation

The Cartridge Actuated Devices (CAD) / Propellant Actuated Devices (PAD) group at the Naval Surface Warfare Center-Indian Head EOD Technology Division (NSWC-IHEODTD) has supported development of DBX-1 and started qualification of end-item applications in 2012. There are over 200 distinct CAD/PAD applications which can use DBX-1 as a replacement for LA, including the 25mm Mk210, M792, PGU-25; 30mm Mk266 and 40mm M430, M433, and M918 detonators. DBX-1 can also be used in aircraft pyrotechnic transfer lines and fire extinguisher cartridges for CAD/PAD devices on various airframes (i.e., F-18, V-22, and other airframes used by all DOD components). In addition, ARDEC has proposed and initiated testing DBX-1 in M55 and M100 detonators as well as in NOL-130 primer mixes.

Initial qualification testing of DBX-1 in the JL42 Firex cartridge and the ZY56 Drogue Cutter Detonator are currently underway and will be followed by gap tests between TLX cord and DBX-1 loaded high energy tips to ensure reliable initiation transfer in both directions.

Please visit the EMTC Web site: <http://www.navsea.navy.mil/nswc/indianhead/codeCA/EMTC/main.aspx>

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