Applying Experience: CBARR Supports Destruction of Chemical Weapons Stockpile at Pueblo Chemical Depot, CO

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CBARR Takes Steps to Maintain Operational Readiness for EDS Mission

When an organization envisions a world free of weapons of mass destruction (WMD), it's easy to become farsighted–blind to the realities of today–in the pursuit of a better tomorrow. The details make the difference,
and those are what ECBC pays particular attention to when preparing to destroy chemical weapons at locations like the U.S. Army Pueblo Chemical Depot (PCD) in Colorado.

There are several unique aspects associated with this project since it's a surety operation, which means operators are handling munitions that are stored at a U.S. Army Chemical Depot instead of recovered munitions found in the ground. Second, CBARR is operating a new Explosive Destruction System (EDS), called the P2R, and third it's an extended project that may last 12-15 months requiring extended logistical support. All of these things require a great deal of planning, organizing, preparation and training.

Details like worker and public safety, environmental protection, and regulatory compliance at local, state, federal and Department of Army levels, are necessary components, carefully crafted to meet the needs of all stakeholders. Collectively, these details are the lens through which the mission is focused: in this case, safely and securely destroying a portion of the final 10 percent of the U.S. chemical weapons stockpile stored at Pueblo Chemical Depot (PCD).

The destruction of these munitions support a larger effort spearheaded by the Program Executive Office, Assembled Chemical Weapons Alternatives (PEO ACWA) to meet the U.S. commitment to achieve 100 percent destruction of its chemical weapons as outlined by the Chemical Weapons Convention (CWC). PEO ACWA ensures the operation adheres to the CWC's imperatives of public safety, environmental protection, and international transparency and oversight

The EDS is placed under engineering controls within environmental enclosures at the Pueblo Chemical Agent Depot. Photo courtesy of PEO-ACWA

Chemical Stockpile Destruction Schedule

Currently 22 ECBC personnel work at PCD to operate and support the P2R EDS unit, which began operations on March 18, 2015. This includes chemical engineering technicians, chemical plant operators, chemists, safety and environmental specialists, an EDS crew chief and project manager. The EDS typically operates 12 hours a day, five days a week, to safely destroy an estimated 1,300 munitions—including 560 over packed munitions and Department of Transportation (DOT) bottles that have either been drilled and sampled, or suspected of leaking; and 740 anticipated reject munitions that cannot be processed easily in the main plant.

Hot Operations

"Hot" operations require a lengthy deployment of 12-15 months leading to efforts to develop a logistics management plan. CBARR's ability to sustain this kind of operation is heavily dependent on how the project lead manages the logistics of supplies, spare parts, consumables and personnel.

Deployment

CBARR personnel will be on approximately 28-day rotations, while operational supplies like personnel protective equipment (PPE), reagents and replacement parts for the EDS will be maintained in a warehouse on a 45-day, long-term storage schedule. Day-to-day operational supplies will be kept in a secondary warehouse on a five-day storage schedule, and will be restocked every week from the long-term storage warehouse. Working on a military installation also makes some aspects of the operation a little easier. Security and medical support measures are in place, as well as resident resources that are available to support the staff.

The Explosive Destruction System (EDS) is a transportable system designed to safely destroy explosively-configured and chemical-filled munitions. ECBC operates and maintains the EDS on behalf of the U.S. Army CMA Recovered Chemical Materiel Directorate (RCMD) Program and has been deployed in the continental U.S. successfully completing missions at APG, MD, Spring Valley, D.C., Dover Air Force Base, DE, Former Camp Sibert, AL, Pine Bluff Arsenal, AR, Rocky Mountain Arsenal, CO, and Red Stone Arsenal, AL.

Always Looking For Ways to Improve the Process

The first priority is safety. As operators get ready for operations, the team lead makes sure the workforce is prepared and proficient in the job they are about to do and is always looking at ways to improve upon the process so that efficiencies can be realized during operations. One way to do that is by capturing lessons learned from previous EDS operations. CBARR has operated the technology since it was first developed by the U.S. Chemical Materials Activity (CMA) Non-Stockpile Chemical Materiel Project, now known as the Recovered Chemical Materiel Directorate, in 2001. Each After-Action Review (AAR) is a reflection of what worked well during the operation and is a forum for feedback directly from CBARR operators and technicians. The results reflect the improvements: an upgraded EDS model with a higher throughput and safety protocols that reduce time spent during the most laborious steps in the operation.

Pre-Operational Survey

Conducting a pre-operational survey that looks at different aspects of the process, from safety and surety to security and basic operations, is another way to ensure proficiency. This continuous improvement mentality not only better prepares a multitude of organizations for achieving a long-term common mission, it emphasizes the technical value details have in sustaining the necessary short-term operations along the way.

THE EDS Process

The EDS consists of five transportable EDS units; two Phase 1 and three Phase 2. The Phase 1 unit weighs 32,000 lbs with an explosive rating of 1.5 lbs (TNT equivalent) and processes three items at once including: 4.2-inch mortars, 75 mm artillery shells, livens projectiles and bomblets. The Phase 2 retrofit currently being used in Pueblo, CO weighs 68,000 lbs with an explosive rating of 9 lbs (TNT equivalent) ASME rated and utilizes steam systems and an upgraded door-closing system to allow for 1 day processing. The Phase 2 retrofit processes six items at once including: 4.2-inch mortars, 75 mm artillery shells, 105 mm projectiles, 155 mm projectiles and 8-inch projectiles. Both EDS vessels treat mustard, phosgene, G-series agents, VX, Lewisite, cyanogen, chloride, hydrogen cyanide, and chloropicrin.

PCAPP was built onsite at the depot to safely destroy the chemical weapons stockpile that has been stored there since the 1950s and contains more than 2,600 tons of mustard agent. Processes such as neutralization followed by biotreatment, and destruction technologies like the EDS, have been chosen as safe and effective methods used to eliminate the stockpile. Unlike open detonation, which uses explosives to destroy chemical agent, the EDS seals munitions inside a steel vessel, then uses explosives to access the contents of the munition, expose the chemical agent and destroy the burster. Chemicals are then added to the chamber to neutralize the munition's fill of chemical agent. The blast, vapor and fragments are all contained inside the stainless steel vessel. Destruction of chemical agent is confirmed by CBARR operators who provide on-site sampling and analysis of the residual liquid and air inside.

ECBC operators place a Department of Transportation bottle containing mustard agent inside the Munitions Holder for destruction. Start of agent operations began March 18 in Colorado. Photo courtesy of PEO-ACWA