CBARR NEWS

A RECOGNIZED LEADER IN CB SOLUTIONS

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Innovation

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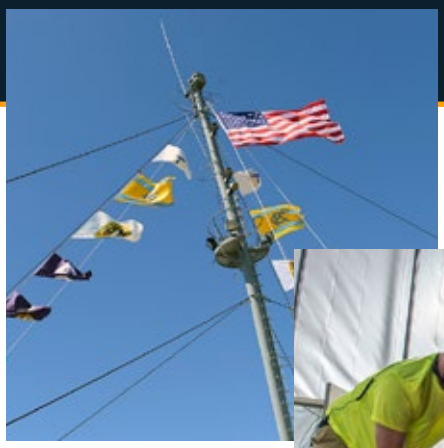
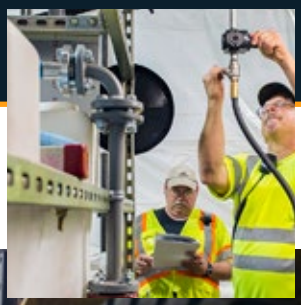
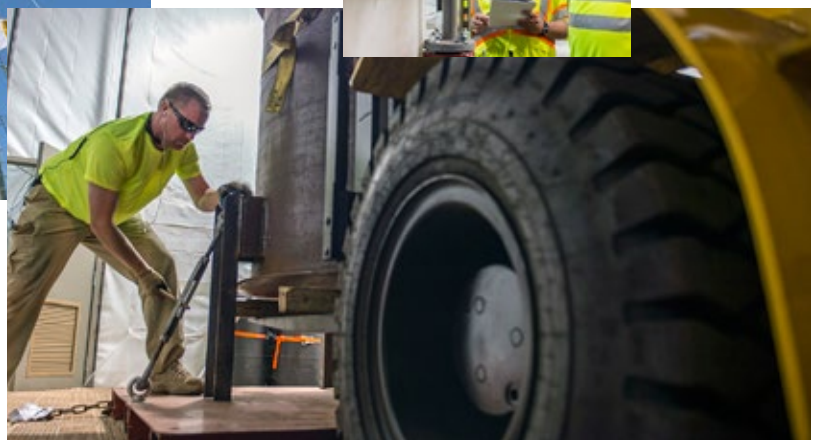
DIRECTOR'S COLUMN

INTEGRATING INNOVATION INTO GLOBAL OPERATIONS







Photos courtesy U.S. Navy photo by Mass Communication Specialist Seaman Desmond Park/Released.

There's been a lot of talk about innovation these days, but no place do I see it more than right here at the U.S. Army Edgewood Chemical Biological Center (ECBC). It's more than what we do as the nation's premier resource for countering weapons of mass destruction (WMD) threats; it's how we do it. ECBC's Chemical Biological Application and Risk Reduction (CBARR) Business Unit has a simple formula for what we consider to be truly innovative solutions: novel ideas with practical application.

In this issue of CBARR News, we take a closer look at the way we work. We celebrate our world-class workforce for the safe and successful destruction of Syria's declared chemical agent stockpile at sea, as well as other significant milestones we are reaching as an organization. Our Environmental Monitoring Laboratory recently received accreditation for the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP), and our scientists are pursuing new quality assurance standards for new agent compounds. Our technical operators continue to be an integral part of the design process for emerging destruction technologies, and as a result, will be using the Explosive Destruction System (EDS) to destroy U.S. stockpile munitions at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) in 2015.

As the year draws to a close, it's important to reflect on where we've been. I could not be more proud of the ECBC volunteers who continue to push themselves to the edge of unknown territory. Our achievements in recent months may seem to be an overnight success in the headlines, but it has been years in the making—built on decades of experience performing chemical demilitarization missions all around the world. No doubt, the insights we've gained during our tenure have led to new opportunities. We look forward to 2015 with renewed energy that will sustain current operations, as well as explore new integrated services with our network of trusted partners.

TIM BLADES, CBARR DIRECTOR OF OPERATIONS

SIMPLIFYING THE COMPLEX:

ECBC Pursues New CASARM Standards for Agent Compounds

New concentration methodology saves time, money for customers

How many times have you heard the phrase, "You don't know what you don't know"? Well, it's never been a statement that has settled well with ECBC scientists who are trained to experiment and discover. It is their job to find out. ECBC is one of the few places where scientists work with some of the most dangerous materials known to man.

Live agent handling is a unique capability at the Center, and developing standards for agent compounds requires a depth of knowledge, specialized skill set and unparalleled safety when calibrating equipment for experiments.

Nancy Pusey, a physical scientist for CBARR, has worked at ECBC since 2003. She is cross-trained in chemical and biological agent handling, and has an expertise for designing intricate experiments that verify agent concentrations. She works at ECBC's Chemical Transfer Facility (CTF), the nation's only single small-scale facility designated under the Chemical Weapons Convention (CWC) that serves as a single repository for the Army's defensive research and development stock of toxic chemical agents.

ECBC supplies other DoD agencies and supporting contractors with dilute agent reference materials at stock concentrations that are validated and certified by the U.S. Army Research, Development and Engineering Command's (RDECOM) Chemical Agent Standard Analytical Reference Material (CASARM) Quality Assurance Team (CQAT). These dilute agents are prepared by CBARR scientists like Pusey, who create a test methodology in order for the agent standards to meet a stringent set of quality assurance requirements.

"The hard work has been done for the customer," said Pusey. "They now have standards that are certified for a certain concentration. When you're testing equipment or materials with agent, you want something that's certified, has real value and a determined shelf life. ECBC provides customers with that kind of quality assurance."

According to Pusey, traditional dilute agents usually ship to government agencies for chemical demilitarization activities at locations like Pueblo Chemical Agent-Destruction Pilot Plant in Colorado and Blue Grass Chemical Agent Destruction Pilot Plant in Kentucky. The CTF also has the capability to analyze agent for purity and identifying purities by using analytical instrumentation such as Gas Chromatography (GC) and Nuclear Magnetic Resonance. This enables customers to compare their testing and monitoring data to a universal standard that has been CASARM certified.

Developing standards for new agents is a high-pressure job, however. While the methodology is built on a strong foundation used to standardize traditional agent, scientists must be able to adapt their processes to accommodate new properties and reactions, and consider new applications for existing equipment.

"For this new work, I'm using a 7890A GC 5975C inert XL EI/CI mass selective detector (MSD) with dual column processing in order to meet CASARM's rigorous requirements for two independent forms of detection," Pusey said. "So I designed the analytical methods using two different polarity columns in the GC. The sample is injected and split with half of the initial volume placed on each column. The columns merge again at the GC/MSD interface the agent sample. Ionization or fragmentation of the compounds occurs in the MSD in a consistent, reproducible and predictable pattern. The data results in two different chromatograms with peaks at different retention times, and comparable, accurate data for instantaneous confirmation."

This new application of instruments is what makes the process so innovative.

"I think this project is very innovative. I don't know of anyone other than ECBC's CASARM Dilutes Analysis Laboratory that is using the two column approach into an MSD for analytical work," Pusey said. "Generating two sets of confirmatory data in the time of one analytical run cuts the total amount of analytical time in half. Running all of the samples through one column first, and then having to change out to a second column or use a second instrument entirely would be incredibly time consuming and extremely expensive."

The dual-column approach ECBC has developed is the next evolution in live agent concentration verification. In addition to preparing the CASARM standards, ECBC also will conduct stability studies to determine how long the agent concentration will last before it starts to break down and lose its effectiveness. Current CASARM dilute agents have shelf-life of 15 months, which has cut down shipping from twice a year to once a year, and significantly reduced the cost and time required for shipping. According to Pusey, this can make a big difference when customers design a study, and it's exactly why they rely on ECBC's ability to provide CASARM-certified standards: they know exactly what's in the bottle when they get it, and how long it will last.

ECBC operator checks the EDS equipment at Pueblo Chemical Agent-Destruction Pilot Plant.
Image courtesy of PEO ACWA.

The Ultimate End-User

ECBC Operators Chosen for EDS Mission in Colorado

Equipment upgrades reduce time, improves operator safety

One way to measure a product's performance is to evaluate how easy it is for the end-user to operate. Consider the Explosive Destruction System (EDS) for example, a neutralization system that uses explosives to access chemical agent inside munitions. Researchers and developers from the U.S. Army Chemical Materials Activity (CMA) have engaged ECBC technical operators throughout the design process of the WMD neutralization technology to gain the critical insights necessary for innovation.

"We're constantly working with the crews because we're always looking for ways to make their jobs easier," said Allan Caplan, lead research and development specialist for the Joint Project Manager for Elimination (JPM-E). ECBC's CBARR operators work with some of the world's most advanced chemical demilitarization technologies, and in early 2015 they will use the EDS to destroy a portion of the final 10 percent of the U.S. chemical weapons stockpile at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) in Colorado.

"Instead of waiting until the end to bring in ECBC operators, we invited them in early on in design meetings," Caplan said. "They've tested out prototypes and provided direct feedback that has influenced the modifications we've made to the EDS. There's a good exchange of ideas and a lot of compromise, but in the end we have a faster design process and a safer product that is more intuitive to use. "

Unlike open detonation, which uses explosives to destroy chemical agent, the EDS instead 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 then are added to neutralize the chemical agent. The blast, vapor and fragments all are contained inside the stainless steel vessel, where destruction of the chemical agent is confirmed by ECBC operators who provide onsite sampling and analysis of the residual liquid and air inside.

It sounds relatively simple, but destroying chemical weapons is a complex process that requires continual review of practices. Caplan said the EDS evolved from a small unit capable of destroying a single round every two days, to a larger unit capable of destroying up to six rounds in one day, up to 155mm munitions and Department of Transportation (DOT) bottles. The improved throughput, along with reduced time during the most laborious steps in the operations, is one reason the EDS was chosen to support PCAPP.

One of the most time-consuming steps was opening and closing the steel vessel using a traditional two-piece clamp. Continuous monitoring of operators vitals showed this labor-intensive activity put the most stress on the operators, who are dressed in full personal protective equipment (PPE) working in hot or cold environments, depending on the location.

"We took the most physical aspect of the operation and automated it," Caplan said. "We came up with a new closing mechanism that cuts down on the stress of the crew, allowing them to have more energy throughout the day. It also takes a process that originally took 30 minutes, and cuts it in half."

Developers also looked at the system's heating and cooling process. Once the munitions were placed inside the steel vessel, the original process involved heating the vessel with external heating bands and took nearly two hours to reach 100 degrees Celsius. Now, the process uses steam injection to heat the chamber from the inside out, and takes a total of 30 minutes.

The EDS Phase 2 Retrofit (P2R) also uses larger pumps for faster addition of liquid and uses pressurization for faster draining once the chemical agent has been neutralized, and injection of chilled water for faster cooling. What used to take 12 hours overnight now takes about 30 minutes, returning the chamber to cooler temperatures so operators can safely prepare the system for the next round of munitions.

PCAPP EDS is expected to operate five days a week, 12 hours per day, plus an additional day for maintenance. It will destroy an estimated 1,300 munitions, which includes all 560 overpacked munitions that have been drilled and sampled, or suspected of leaking, and 740 anticipated reject munitions that are corroded or in poor physical condition. PCAPP EDS also will destroy 11 DOT bottles containing chemical agent.

About 20 ECBC personnel will be onsite for PCAPP EDS operation, including technicians, and safety and environmental specialists. According to Ed Parshley, ECBC project manager, three technicians will operate the EDS equipment and five will be stationed at the personnel decontamination station (PDS) for safety and emergency response should an incident occur. Four teams of three EDS operators will rotate throughout the day to complete different phases:

- Team 1: Receive the munitions and load into the EDS. Seal the vessel and detonate the munitions using linear shape charges to explosively access the agent fill.
- Team 2: Treat the chemical fill inside the EDS via neutralization. Take a liquid sample.
- Team 3: Conduct two water rinses of the contents inside the EDS vessel. Collect vapor samples within sealed chamber and once cleared of hazards, open the door.
- Team 4: Remove the metal fragments from the EDS vessel. Prepare for next day operations.

"Normally, the EDS is transported to various locations to destroy recovered munitions wherever they are found," Parshley said. "This will be the first time the system will be used to destroy stockpile munitions at a fixed site location. We'll monitor the munitions in their containers before we actually pull them out of storage and in the case of leaker munitions, we'll upgrade our personal protective equipment."

Parshley said ECBC offers a unique perspective as operators and provides end-user value anytime personnel are a part of an equipment improvement process. The collaboration across organizations isn't new, he said, but has made a difference in decision-making, system design, operator safety and mission execution.

The PCAPP EDS agent destruction operation is part of 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). ACWA ensures the operation adheres to the CWC's imperatives of public safety, environmental protection, and international transparency and oversight. Pueblo's main plant is scheduled to start agent destruction operations in 2015 and finish in 2019.

For addional information and to stay up to date with this project check out:

http://www.peoacwa.army.mil/pcapp/

https://www.flickr.com/photos/acwa/

The transportable Explosive Destruction System received technological upgrades to allow for one-day operations.
Photo courtesy of PEO ACWA.

Testing the Original Prototype

Nearly 14 years ago, the first EDS prototype was in operational testing in the United Kingdom when the call came to deploy the equipment to the former Rocky Mountain Arsenal, Colorado. There, on Jan. 28, 2001, the EDS conducted its first mission safely destroying recovered GB bomblets that were considered unsafe for transport. Since then, the partnership between CMA and ECBC has resulted in the safe destruction of nearly 1,800 munitions at sites across the country, including: Washington, D.C.; Delaware; Arkansas; Alabama; Utah; Maryland; and once again, Colorado.

"One of the advantages of working with ECBC is some of the crew members who are going out to PCAPP were part of the original testing of the first EDS years ago. We have a lot of inherent knowledge that we haven't lost," Caplan said. "A civilian crew like CBARR that has been doing this for so long takes pride and ownership in what they do. There are plenty of times where knowledge is transferred from the veterans to the new crew members, and it makes for valuable teaching experiences that ultimately make the team more efficient."

Many U.S. DoD organizations supported the international mission aboard the MV Cape Ray.

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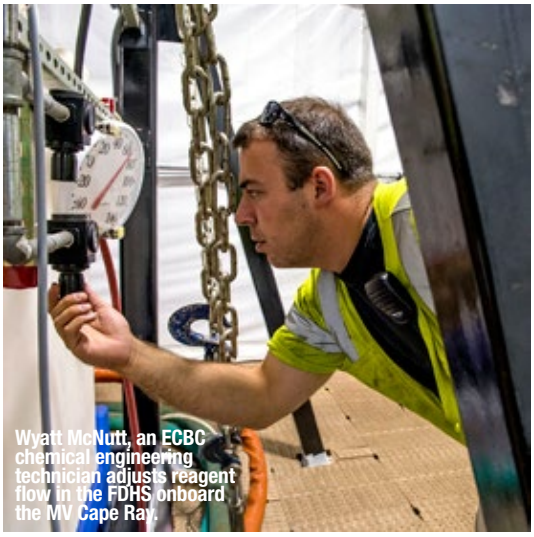
ECBC Volunteers Honored
for WMD-Elimination Mission At Sea


Wyatt McNutt, an ECBC chemical engineering technician adjusts reagent flow in the FDHS onboard the MV Cape Ray.

Eric Copeland, an ECBC chemical operator repairs a crank that will help move drums containing chemical agent to feed into the FDHS for neutralization on the ship.

Photo Credits - U.S. Navy photo by Mass Communication Specialist Seaman Desmond Park/Released.

Tim Blades got up from his seat and walked across the black stage without looking at the handful of Department of Defense (DoD) stakeholders sitting to his left. He didn't look out to the nearly 500 friends, families and colleagues sitting offstage to his right either. When he reached the podium, he focused only on the 45 U.S. Army civilian employees sitting in the front rows; the ones who voluntarily deployed to the Mediterranean Sea to destroy Syria's declared chemical weapons stockpile.

"I think I'd rather be out at sea," he said with a laugh. It wasn't like Blades, ECBC mission commander of the operation, to feel comfortable in the spotlight, even during an Oct. 8 ceremony held at the Edgewood Area of Aberdeen Proving Ground, Md. Instead, he directed the attention to the crew of which he said he was simply a part of.

"I have done hazardous operations for all of my adult life and could not be more proud," Blades paused. A man who typically exhibits an all-business presence suddenly showed an uncharacteristic moment of emotion before continuing, "of the volunteers who actually executed the destruction of Syria's most toxic stockpile onboard the Cape Ray. I cannot imagine any other group of people in the world who could have done this."

During the ceremony, the Honorable Alan Estevez, Principal Deputy Under Secretary of Defense for Acquisition, Technology and Logistics, presented 12 Meritorious Civilian Service Awards and 33 Superior Civilian Service Awards to members of the multi-agency team that completed the historic mission on Aug. 18. They safely and securely destroyed 600 metric tons of Syria's highly toxic chemicals in 42 days, without any reportable accidents or releases to the environment.

"Beyond your expertise and skill set, it was your willingness to extend beyond your comfort zone, to take on new roles and responsibilities, and keep safety at the forefront of your thoughts and actions that made the difference," Blades addressed his team. "You looked out for one another. You collaborated and problem solved, and established a rhythm to get the job done.

"As any operator of this group can tell you, it was not easy," Blades said. "Everyone went above and beyond and worked outside the box. Apollo 13 had nothing on you," he said as he looked at his team.

A majority of ECBC personnel arrived home at Washington Dulles International Airport on Sept. 5, after more than six months away from family, friends and loved ones.

Life Onboard the Cape Ray

Crews worked in 12-hour shifts to maintain 24/7 operations. During an off-shift, people tried to connect with family back home via email or Skype, as well as tried to catch up on sleep. Living quarters in a 40-foot by 8-foot Connex freight container held 12 people. According to Chuck Kyle, while these living conditions were not typical, he was proud to see how well the group adjusted to the tight space.

"That was pretty impressive to me," he said. Kyle was one of the FDHS technical operators who spent his shift inside the engineering control structures that housed the FDHS units. He incorporated feedback from onsite laboratory personnel and was primarily responsible for managing the hydrolysis skid. He adjusted valves that controlled the flow, pressure and temperature gauges, added reagents to the neutralization process, and monitored agent chemistries during high volume throughput. To keep safe, Kyle wore personnel protective equipment (PPE) including skin, respiratory and eye protection, which added to the heat he endured while in the 100-degree enclosure.

Safety was the number one priority during the mission. Specialists from ECBC drew on their vast experiences running operations on land to deal with the added uncertainties and nuances of safely neutralizing chemical agents on a moving vessel at sea. The unprecedented nature of using a maritime environment increased the risk and safety elements of an already dangerous job. As a result, the operations safety team consolidated maritime, Army and Occupational Safety and Health Administration (OSHA) protocols into common pre-mission communication documents such as the Standing Operating Procedure (SOP) and Safety, Health, Emergency Response Plan (SHERP). The preparation of those vital documents involved coordinating with other organizations involved in the mission and communicating possible changes and augmentations as often as necessary.

"Since this was the first time that such a mission was conducted on a ship at sea, there was some degree of hesitation at the beginning," said Brandon Dusick, chemist. "We had to make sure that we could really do something like this. And now that we have proven it can be done at sea, there won't be any more hesitation in the future."

Dusick often reminded himself of the historic magnitude of the mission, but once it got started, he said it was all business working the midnight to noon shift. When he wasn't working, he was catching up on television shows and sleep, and repeated the pattern for a few months straight.

"It feels good that we were involved in a mission that was the first of its kind. Being a part of it was a great experience," he said. "I personally got to do things I don't typically get to do, such as run batches in addition to the sample analysis. I had an opportunity to process agent with the team and it allowed me to see a whole different side of the operation. It expanded my level of knowledge and made me more valuable to the team."

MV Cape Ray at port in Spain.
Photo courtesy U.S. Navy photo by Mass Communication Specialist Seaman Desmond Park/Released.

“This is an example of how science and technology, combined with a world-class workforce and great teamwork, can deliver unique capabilities to our nation.”

Major General John F. Wharton
U.S. Army RDECOM Commanding General

Will Rowell, an ECBC chemical engineering technician, adjusts a filter connected to a hose filling tank during FDHS training aboard the MV Cape Ray.
Photo courtesy U.S. Navy photo by Mass Communication Specialist Seaman Desmond Park/ Released.

ECBC crew honored during an FDHS awards ceremony on Oct. 8, 2014.

What Leaders Are Saying

The degree of difficulty for this mission was incredibly high and yet the expectation was to make it look easy. After all, this was what ECBC's CBARR Business Unit does. Missions like this are what helped the Center build a reputation as the nation's premier resource for chemical demilitarization operations. Now, in the wake of a safe and successful mission that was as every bit unknown as it was historic, ECBC has proven that the future of WMD elimination is already here.

"At the time, no one envisioned a shipboard operation, but when that became the option of choice, you didn't blink," said Rebecca Hersman, Deputy Assistance Secretary of Defense for Countering Weapons of Mass Destruction. "You just got it done and we couldn't be more proud.

"Throughout the effort, you have demonstrated what has always made the U.S. Army special. You were asked to step up and you did so as quiet professionals who never sought the spotlight but only focused on the mission. As a result of your efforts, these chemicals will never be used to kill or injure a human being."

This mission has received attention at the highest levels of the United States government, in addition to the international community. President Barack Obama, Secretary of State John Kerry, United Nations Secretary-General Ban Ki-moon and many others recognized the completion of the mission and congratulated the crew on a job well done.

On Nov. 12, Secretary of Defense Chuck Hagel presented ECBC volunteers with the Office of the Secretary of Defense (OSD) Group Achievement Award for their exceptional service during the period of Feb. 1, 2013 through Aug. 31, 2014. These members were part of the Syrian Chemical Weapons Elimination Team that was also awarded the Navy Meritorious Unit Commendation during the Pentagon ceremony.

"To the DoD personnel that we are honoring today: Thank you. Your accomplishment is a model for the entire Department of Defense," Hagel said. According to OSD, the collaboration among DoD agencies saved billions of dollars, as comparable chemical weapons destruction efforts often take years to execute.

Carmen Spencer, the Joint Program Officer for Chemical and Biological Defense (JPEO-CBD) noted during a September welcome-home ceremony for the Cape Ray Maritime crew that the amount of chemical agent destroyed during the FDHS mission was three times more than the stockpile destroyed at APG years ago, and that took 34 months to eliminate. Indeed, the future of WMD elimination has arrived, and with it, a new way of working: interagency collaboration and fast track acquisition.

"This is an example of how science and technology, combined with a world-class workforce and great teamwork, can deliver unique capabilities to our nation," said Maj. Gen. John F. Wharton, commanding general of the U.S. Army Research, Development and Engineering Command (RDECOM). "It's another great example of rapid acquisition to meet the operational needs of our nation."

ECBC's operational expertise ensured an appropriate environment under engineering controls was recreated on the MV Cape Ray, safety protocols were implemented, the FDHS was technologically sound, the neutralization process was chemically proven, and communications among leaders was paramount. Each of those pieces was necessary to achieve mission success. Destroying Syria's chemical weapons on behalf of the international community has not only made the world a safer place, but has shown that the United States can lead unprecedented efforts to eliminate threats as they emerge.

"It's a very dangerous world out there," said U.S. Representative C.A. Dutch Ruppersberger (D-MD). "The things that are happening throughout the world are scary. We were called on because of our expertise to do something very important, not only for the United States of America, but for the world."

A Lesson in Emergent Leadership: How to Give and Take Under Pressure

MV Cape Ray Captain Rick Jordan aboard the ship.
Photo courtesy U.S. Navy photo by Mass Communication Specialist Seaman Desmond Park/Released.

Turns out, the MV Cape Ray was big enough for the both of them: ECBC mission commander Tim Blades and Captain Rick Jordan. You might wonder how two dominant personalities with demonstrative leadership styles could learn how to work well together so quickly, but according to both Blades and Jordan, it was their commitment to the mission that allowed them to compromise when needed and take charge where appropriate.

This kind of collective give and take is illustrative of emergent leadership, a style that demands logical decision making as it does gut instinct. The unusual circumstances of neutralizing Syria's declared chemical agent stockpile at sea proved to be uncertain, complex, and at times ambiguous. It was critical for the two leaders to know when to step back and relinquish power, and when to trust their respective experiences to offer a new way forward.

Tim Blades speaking at the FDHS awards ceremony.

"I've been very fortunate to cross over a lot of different missions, including Albania, Iraq, Romania, and others," Blades said. "I've been able to keep a foot in most of the lessons learned and best practices, and it's all dependent on personalities and relationships you form with the people you work with."

The desire to safely and securely execute the mission was a driving factor for both Blades and Jordan. For Blades, it was simply a continuation of what he has spent four decades doing in chemical demilitarization. For Jordan, it was a little more personal.

"The biggest takeaway for me is we got rid of these chemical weapons," Jordan said. "This is nasty stuff. My family is from Syria and my grandmother was born not very far from where those people were killed [outside Damascus]. So yeah, we made a difference here."

The two also worked closely with a Navy captain responsible for the military aspect of providing outside security as well as communications with the Pentagon. The three met daily to discuss new developments, trouble-shoot unanticipated challenges and debate alternative solutions. The diversity of thought led to inspired discussions that proved to have the insights needed for all parties to capitalize on their respective skill sets and area of expertise.

"We were very fortunate," Jordan said. "It was pure luck the three of us got chosen but I think all three of us have similar leadership styles. We know we're in charge and had no qualms about taking the lead, but we were also humble and recognized that if we didn't listen to each other, we were never going to get anywhere. The old days of 'my way or the highway' doesn't work on ships or anywhere else. We were lucky we had the kind of leader like Tim Blades and the ECBC crew who followed suit."

This emergent leadership style trickled down to the FDHS crew, including ECBC operators and Maritime Administration crew members. According to Seth Pinto, second mate on the Cape Ray, the entire crew completed a variety of training together prior to the mission and while at port in Rota, Spain in order to prepare for emergency situations should they arise.

"This was the first time we had to teach anyone outside our normal crew anything about inspections," Pinto said. "The only other ships I've been on where we did joint training were for security purposes on military ships, but nothing nearly as complex or involved as this."

The MV Cape Ray is part of a fleet of Ready Reserve Force ships that the Maritime Administration manages. They can be rapidly activated and placed in service to support DoD or national emergencies. In this case, emerging international threats.

"This was a great team effort between AMSAA and ECBC to provide a timely solution to a complex problem of international significance."

Clarke Fox
AMSAA's Logistics Analysis Division Chief

ECBC operator donned in personnel protective equipment during FDHS operations.

Design on the Fly

2014 Dr. Wilbur B. Payne Award recognizes exceptional design for operational excellence

A mark of good design is how intuitive it is for the end-user to operate a product or experience a service. It starts with an open approach to the people, a dogged pursuit to understand the problem and the perseverance to explore innovative solutions. It's an iterative process that requires a blend of creativity and analysis to visualize, prototype and test ideas until they become reality.

Ever wonder whose job it is to get it right? ECBC engineers.

Engineers use systems thinking to match people's needs with what is technologically feasible. In this case, developing the Field Deployable Hydrolysis System (FDHS) for an end-user that had yet-to-be-determined. During concept development, it was undecided if the FDHS was going to be operated by the Warfighter at an undisclosed location in theater or by technical operators on a ship in the middle of the Mediterranean Sea.

So how did the engineers design in the face of the unknown? Exhaustive research. A team of analysts comprised of personnel from ECBC and the Army Materials Systems Analysis Activity (AMSAA) produced the FDHS Risk Reduction and System Enhancement Study, which was used to inform the design, manufacturing and testing of the system. As a result of their exceptional efforts, they were awarded the 2014 Department of the Army Dr. Wilbur B. Payne Award for Excellence in Systems Analysis, Large Group Category. The award recognizes the best large- and small-group operations research analyses conducted in the previous year by Army analysis organizations.

The award nomination endorsement letter states, "This was an incredible opportunity for analysis to shape decisions, systems, procedures and deployments. The FDHS crew successfully destroyed Syria's chemical warfare agents. The mission was unprecedented and a first of its kind in the history of chemical and biological defense."

"This was a great team effort between AMSAA and ECBC to provide a timely solution to a complex problem of international significance," said Clarke Fox, chief of AMSAA's Logistics Analysis Division.

The ECBC and AMSAA team provided analysis that shaped leadership decisions regarding system installments, operating procedures and equipment deployments. Because the FDHS was originally designed as a land-based system, each of these areas came with its own set of design challenges, forcing the team to constantly assess the environment and iterate new solutions dependent on the at-sea situation. For example, engineers had to consider how the vibrations of the ship's engines would impact the neutralization process or how the roll of the waves would affect the laboratory equipment. Not to mention the extremely limited space ECBC's operators had to actually conduct the operations.

"Everyone that fights in wars will tell you that the plan goes out the window the second the operation starts because then you're dealing with reality. And that reality has a lot of 'what ifs' you can't necessary plan for but still have to be able to adapt to," said Tim Blades, CBARR director of operations and mission commander for the at-sea operation.

"That's the way this was. As something as mundane as moving a container out of the Connex and moving it up the deck and in a position to be handled under engineering controls sounds simple, but because you're on a ship, you can't assume you're going to stay on the same axis while transporting the container."

ECBC's Jason Adamek, lead engineer from the Advanced Design and Manufacturing (ADM) division, was part of the crew deployed on the Cape Ray. To address challenge in real time, he designed an elegant yet simple solution, according to Blades, that utilized a system of pulleys to safely secure the agent containers during transport.

"Something that simple took two weeks of design, trial and error, and final fabrication while we were portside in Spain," Blades said.

Not bad, considering significant improvements like these usually take several months of technical testing to complete under normal circumstances. Throughout the mission, ECBC and AMSAA captured the methodologies and processes used to make adjustments to clearly communicate key analytical findings to Army and DoD leadership. This critical component was needed to execute the hazardous mission while reducing the risk to operators, and resulted in a concentrated effort to keep safety as the most important priority when considering what system changes needed to be made.

ECBC was also part of the DoD team that was recognized by CBRN-UK, a British chemical, biological, radiological and nuclear industry special-interest group that presented the group with the Tim Otter CBRN Innovator of the Year award on Dec. 11. According to a DoD News article, this marks the first time CBRN-UK has given the award to a company or organization outside of the United Kingdom.

Syrian chemical agent stockpile was transloaded onto the MV Cape Ray inside shipping containers.

Environmental Monitoring Laboratory Earns DoD ELAP Recognition

ECBC's Environmental Monitoring Laboratory (EML) recently became the first laboratory in the United States to meet requirements set forth by the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) for testing chemical warfare material and degradation products.

The DoD Environmental Data Quality Workgroup (EDQW) provides management and oversight of the program, which allows laboratories like ECBC to demonstrate competency and document conformance to international standard ISO/IEC 1702:2005, General Requirements for the Competence of Testing and Calibration Laboratories as implemented by the DoD Quality Systems Manual for Environmental Laboratories.

As a result, ECBC is part of a network where interoperability among DoD labs is promoted, along with fair and open competition among commercial laboratories. The accreditation also makes it easier for customers to identity and procure providers like ECBC for certified environmental laboratory services, including access to their data collection for known and documented quality.

The infographic below illustrates the EML's unique high-volume screening process, which is capable of providing rapid-turnaround analysis for known and unknown chemical warfare material and related toxic industrial compounds.

The EML is also accredited by the American Association for Laboratory Accreditation (A2LA) and participates in internal and external quality system audits.

Sample EML Screening Process

1 Sample is collected from the site location.

2 Vapor screening of the environmental sample is conducted in the field to determine if it is safe for transport.

3a If headspace is known and the sample is cleared of chemical agent, it is commercially shipped to the EML.

3b If the sample is unknown, it is transported by the 20th CBRNE Command to ECBC's Chemical Transfer Facility (CTF).

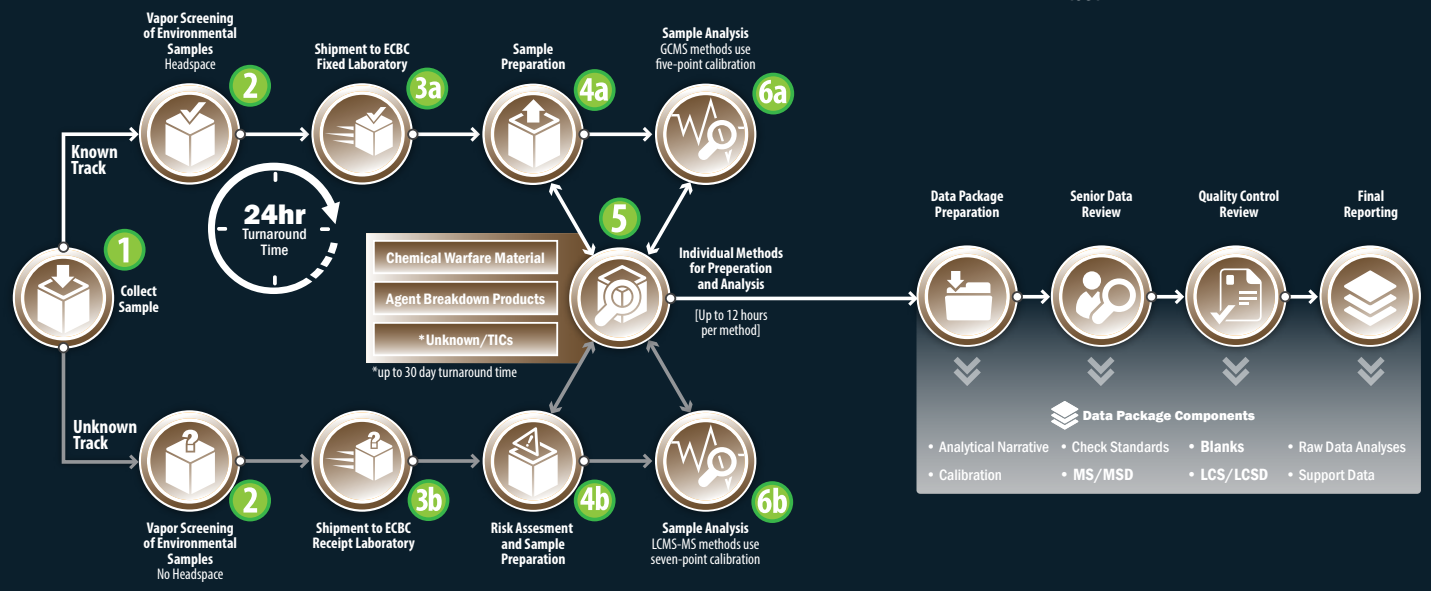
4a All samples are prepared in batch sizes containing up to 20 samples per matrix type. Depending on the determined compounds of interest, between one and five methods are used to analyze each sample.

4b A risk assessment of an unknown sample containing liquids and solids is conducted prior to sample preparation.

5 Individual methods test for chemical warfare material, agent breakdown, toxic industrial compounds and unknowns. Each method can take up to 12 hours to prepare and analyze and test.

6a Gas Chromatography Mass Spectrometry (GC/MS) analyses use five-point calibration to confirm detections by near real-time instruments and provide historical area monitoring documentation of known samples.

6b Liquid Chromatography Mass Spectrometry (LCMS-MS) analyses use seven-point calibration for unknown samples.



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Employee Spotlight
Laura Graham

What is your current job at CBARR? How long have you been with ECBC?
Chemical Engineer working in Project Management. I have been with ECBC since 2005.

What is your background? How have these experiences shaped your perspective on the work you do?
I have a BS in Chemical Engineering. After college, I began my professional career working for a pharmaceutical manufacturing company in the Environmental Monitoring department. That experience introduced me to personnel protection equipment (PPE) and clean room practices where PPE was worn to protect the product. That experience easily helped me transition to the PPE practices we use to protect ourselves.

What best practices and lessons learned from other locations have been incorporated into the upcoming Pueblo operation?
I started with ECBC as an operator at Pine Bluff, Ark. and worked my way to project management. That opportunity has given me an excellent perspective of the entire EDS process from both the operations piece and the command and control management. I was able to gain hands-on knowledge of the EDS and bring that to the decisions I make in the management of a project.

What has your experience been like at CBARR? How would you describe the culture?
Because I had not worked in the chemical field before this job I had very little expectations of what it would really be like. From the very beginning the training and encouragement I received made me feel instantly comfortable. I was able to gain knowledge from seasoned operators and ask questions to fully understand the material we work with. And as it turns out I loved it! We have a unique job, and it has provided me the chance to learn skills I may not have had as a desk engineer.

How would you describe a typical field operation? What is your role?
It's hard to describe a typical operation because each job we begin is different in a number of ways from the last. The overall plan stays the same, but we must be able to adapt to different customer expectations, different field locations and incorporate lessons learned from the last operation. Sometimes we set up in a field of grass and sometimes it's in an established neighborhood. My role may be titled project manager but I still work with an operations mind. When we mobilize and set up occurs, I have no problem putting on a pair of gloves to help prepare the site.

How does it feel to be working toward a world free of WMD?
I am proud to say I contribute to this goal. We come to work every day and in our eyes this is just a day at the office; but our office is very different than many people. I make sure to take a step back every so often and recognize the unique aspects of the work we do.

What's your favorite part about working at ECBC?
The big tools and equipment! I never thought I would have a reason to use a wrench the size of my arm or use a forklift regularly. I also feel very fortunate that this job has given me the opportunity to travel the world. I have seen some pretty cool places.

What are your hobbies outside of work?
I have a large collection of music. I read often and LOVE to cook.

What's the Word? Contact Us!

Have a story for the CBARR News? Send article suggestions, questions or comments to CBARR Communications Officer Kristen Dalton at kristen.a.dalton.ctr@mail.mil.

Beyond the Newsletter

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