



CBARR NEWS

Edgewood Chemical Biological Center

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A MESSAGE FROM LEADERSHIP

The U.S. Army Edgewood Chemical Biological Center (ECBC) has continued to demonstrate resolute endurance during months of fiscal challenges. Navigating uncertainty has not been easy, but we have done it together, and will continue to forge ahead with purpose. For years, the Chemical Biological Application and Risk Reduction (CBARR) Business Unit has helped defined Department of Defense (DoD) chemical demilitarization operations both at home and abroad. Recent news cycles have placed our work in a new global context, where chemical weapons have become commonplace and the efforts to destroy them have become an international effort. ECBC has long-supported the Organisation for the Prohibition of Chemical Weapons (OPCW) chemical demilitarization mission, whether it is the development of a new WMD elimination technology, adhering to regulations of the Chemical Weapons Convention, or the Chemical Transfer Facility (CTF) serving as the only U.S. declared Single Small Scale Facility. When the OPCW is awarded the Nobel Peace Prize on Dec. 10, let it also be a reflection of ECBC's purpose in keeping the world safe from chemical warfare.

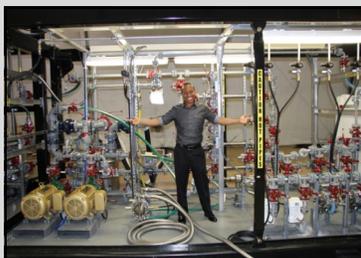


-Tim Blades, CBARR Director of Operations

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ECBC Partners with JPM-E for Personnel Decontamination Training

What do you do when a spill of hazardous material occurs? Call in the experts. Trained equipment technicians and operators from CBARR often work at onsite locations where chemical and biological (CB) agents are present, typically loaded inside recovered warfare material. They are trained to remain calm and focused during high-pressure emergencies, and know how to perform decontamination safety measures under the threat of serious harm and injury.

During a new training course developed in conjunction with the Joint Project Manager-Elimination (JPM-E), ECBC personnel wearing Level C personnel protective equipment (PPE) simulated gross decontamination of a mass casualty incident. A designated line of tape on the floor indicates the hot and warm zones of the simulated incident. After crossing into the warm zone, a participant enters the first of three stations – the shuffle pit – where the trainee is scrubbed with sodium hypochloride or bleach, depending on which chemical solution was deemed necessary for the decontamination training exercise.

“The second station is called ‘complete decontamination,’ where they take soapy water and scrub the person from head to toe, and front to back in order to get chemical contamination from the creases in the suits. The hands and feet are the main points of focus and after that, they are hosed down with fresh water at the rinse station,” said Jerry Hogue, personnel decontamination trainer.

From there, low-level quadrant monitoring is conducted. Miniature Continuous Air Monitors (MINCAMS) are used to run a full quadrant monitoring set, which includes: 1) head to mid-body monitoring in the front; 2) head to mid-body monitoring of the back; 3) mid-body to feet monitoring of the front; and 4) mid-body to feet monitoring of the back. MINICAMS are an analytical instrument used to accurately monitor vapors from potential exposure. Once cleared, the trainee is stripped of the now-decontaminated PPE and completes the Personnel Decontamination Station (PDS) with a final rinse station.

“The training program is very comprehensive and uses the

standard operating procedures (SOPs) from CBARR and the 20th Support Command’s subordinate element, the CBRNE (Chemical Biological, Radiological, Nuclear and Explosives) Analytical and Remediation Activity (CARA),” said Chris Wilson, an industrial equipment mechanic for CBARR. Wilson is a veteran of the U.S. Air Force and served as an aircraft maintenance mechanic for 15 years. His experience wearing PPE and his background in explosives is what attracted him to

the job at CBARR seven years ago. It also allowed him to trust the safety procedures and protocols, something that gives him a sense of peace while handling some of the most dangerous hazardous materials, he said.

“Wearing gear like the mask and equipment is something that you get used to over time. There are many people who have trouble getting acclimated to the weight of the suit. Some have trouble standing on one foot due to the oversized boots and you’re wearing clothing that you normally wouldn’t wear. It’s restrictive and there’s limited range of motion, which can cause dehydration and fatigue,” Wilson said. “The new training program is great, especially for newcomers because the hands-on exercises require you to don the full PPE

gear. It gives you the actual feeling of being in the suit and mask as you simulate the entire 45-minute decon process.”

ECBC’s CBARR Business unit is a highly trained and experienced workforce that supports numerous government agencies and whose personnel is certified for a variety of field operations, including the demolition of former chemical and biological process facilities, the remediation of formerly used defense sites, non-proliferation activities and environmental investigations. All of these missions have an element of risk and danger associated with them, making safety not only the number one priority for all personnel, but a necessary component that ensures the project mission is successful. For 96 years, ECBC’s core competency has been working safely with chemical and biological agents in research, engineering and operations for the Department of Defense across the nation and around the globe.

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According to Wilson, there is no question how paramount the appropriate training is for personnel deployed on field operations, whether they are a new employee understanding the process for the first time or a veteran who has completed countless operations in their career.

In 2012, JPM-E identified a number of courses that chemical workers are required to take on an annual basis to retain their qualifications. According to the Occupational Safety and Health Administration (OSHA) standards, operators must learn new techniques and methodologies for reacting to hazards. The PDS training course got a recent upgrade after a partnership with JPM-E turned the annual required training into a robust three-day program of classroom instruction and hands-on exercises.

“Some of the things we’re trying to inject into these course developments are the use of videos, live hands-on training and realistic scenario-based activities,” said Karen Price, training development coordinator for JPM-E. “Training can prepare you to think quickly when something out of the ordinary happens at a site location. We need to be flexible and adapt to the new technologies that are being developed in order to determine what will work best for a given environment.”

According to Price, soap and water is not the only quick emergency cleanup. A new biological skin decontamination lotion approved by the FDA can be used for decontamination purposes and is one of the many new products JPM-E tries to incorporate into its 20-30 training development programs. The Chemical Demilitarization Training Facility (CDTF) located on the Edgewood area of APG, Md., provide an easy-access, controlled environment conducive for personnel required to complete training.

“Having the ability to set up full scale equipment in the high bay area for scenario-based training is incredibly beneficial,” Price said. “All of our courses are developed in conjunction with our partners—ECBC and CARA—whose subject matter experts help shape the guidelines and requirements of a given course. Once it is developed, we’ll conduct an internal pilot to run through all of the different module and components before finally offering the class to students, the public or other agencies at APG.”

But the challenge for Price is keeping the training content fresh for folks who have numerous years of experience on field operations. Leroy Wainwright has been a CBARR industrial maintenance mechanic for the past 12 years, whose primary responsibility is to pick up hazardous waste at sites across the country. He also has international experience and has worked side-by-side with colleague Wilson for years. The more important thing, he said, is the relationships built among team members on various site projects.

“Take Australia, for instance. That mission and site location requires a multi-talented, diverse group of personnel,” said Wainwright, who had previous experience working with personnel protective equipment (PPE) during his 23-year tenure in the U.S. Navy as an aircrew survival equipment specialist. For the past few years, CBARR has supported the Australia Department of Defence (ADoD) in the chemical warfare investigation and assessment of buildings, laboratories and surrounding environment of former Australian chemical warfare facilities.

“When doing this kind of work, we have to trust each other. There’s a bond that must be developed. Being together and working with your coworkers on a daily basis overtime eliminates the unknown of responding to a man-down situation. I have to have complete trust in my coworkers if they are going to decon me and help me until emergency personnel arrive. A lot of times, it is your crew onsite that serve as your first responders, so that’s when all of the training kicks into gear,” Wainwright said.

JPM-E and ECBC’s commitment to new training measures furthers each organization’s dedication to safety of their more important resource: the personnel.

ECBC equipment operators and technicians participate in a pilot program for personnel decontamination. The mandatory training was developed in conjunction with CMA.



Field Operations and Laboratory Analysis Support OPCW Mission

2013 Nobel Peace Prize winner serves as standard for chemical demilitarization efforts

ECBC has long supported the non-proliferation of chemical weapons and the demilitarization of their stockpiles and destruction facilities. These two areas reflect the mission of the Organisation for the Prohibition of Chemical Weapons (OPCW), which will be awarded the 2013 Nobel Peace Prize Dec. 10 “for its extensive efforts to eliminate chemical weapons.”

Sixteen years after the independent, autonomous international organization based in The Hague, The Netherlands, administered the Chemical Weapons Convention (CWC) in 1997, 190 member states have ratified the treaty, including the newly joined Syrian Arab Republic on Oct. 14, 2013. The CWC is an arms control agreement that outlaws the production, stockpiling and use of chemical weapons. The OPCW also has a working relationship with the United Nations to promote peace, disarmament and international cooperation; and ECBC has supported these efforts in significant ways.

New Field Deployable Hydrolysis System (FDHS) advances WMD elimination technology

The OPCW Executive Council announced in a Nov. 15 [press release](#) that Syria’s stockpile of chemical weapons will be transported for destruction outside its territory no later than June 30, 2014. The plan includes sequenced destruction of declared chemical weapons facilities from mid-December to March 15, 2014, as well as the destruction of priority chemi-

icals to be completed by March 31, 2014. All other chemical materials must be destroyed by June 30, 2014. As of yet, the OPCW has not decided on a WMD elimination technology to destroy Syria’s stockpile of chemical weapons.

One of ECBC’s core competencies is chemical demilitarization field operations. Nearly a year ago, the U.S. Department of Defense (DoD) identified a capability gap in chemical agent disposal operations and sought a solution that would meet mission critical needs by the following summer. ECBC had only six months to produce an operational model of a new transportable elimination technology that could neutralize chemical warfare materiel: the FDHS. Through unprecedented collaborative efforts across multiple government organizations, ECBC led the FDHS effort through full lifecycle development, from design and fabrication to engineering and test evaluation of the system. As a result, the FDHS can neutralize bulk amounts of known chemical warfare agents and their precursors at a 99.9 percent destruction efficiency rate, converting chemical warfare materiel into compounds not usable as weapons.

“The most difficult aspect of designing a system in such a short time period was the need to concurrently perform tasks that would normally be performed sequentially,” said Adam Baker, CBARR chemical engineer. “Equipment was already being procured while reaction chemistry and skid design were still being finalized. To overcome this challenge, ECBC and the Joint Program Executive Office for Chemical and Biological Defense’s Joint Project Manager for Elimination (JPM-E) incorporated proven technology to the greatest extent possible, which helped keep late design changes to a minimum.”

According to Baker, the design team included personnel from ECBC and the JPM-E, formerly known as the Chemical Materials Activity (CMA), which greatly enhanced the in-house capabilities required to complete such a difficult task. In February 2013, the Defense Threat Reduction Agency (DTRA) provided \$1.6 million in initial funding that enabled the integrated design team to capitalize on the interagency partnership’s shared personnel, resources and expertise. ECBC had two primary roles throughout the design process: manage project execution with DTRA and implement the design from the standpoint of the system’s operator.

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The CBARR unit, comprised of operators, maintenance and safety experts, were utilized from the start of the project to ensure the FDHS product could be safely transported and functionally perform in the expected operational environments. As a result of the 20-week collaborative design phase, the FDHS is a self-sufficient system that includes power generators and a laboratory that is fully capable onsite, needing only consumable materials such as water, reagents and fuel to operate. The system can be set up within 10 days and is equipped with redundant and critical systems that ensure maximum system availability. Should the FDHS be deployed, a crew of 15 trained personnel, including SME support from CBARR, would be needed each shift for 24/7 operational capability.

“The process was a rare opportunity for CBARR to work collaboratively with a large number of organizations within and outside of ECBC. One lesson learned from this project is that ECBC can greatly enhance its capabilities by working collaboratively with other organizations that have complementary skill sets,” said Baker.

On June 27, 2013, ECBC and DTRA signed a technology transfer agreement with the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD). The transition signified advanced development and future integration into the Chemical Biological Defense Program Portfolio.

CBARR remains CWC-compliant with treaty regulations

In 1997, the OPCW began conducting international chemical weapons inspections as part of CWC compliance and verification. The Organisation has a “verification regime” designed to collect relevant facts and discover any violations among State Parties, requiring declaration of chemical weapons or related facilities acquired since 1946. According to ECBC’s Treaty Compliance Officer, the CWC specifies threshold amounts that are required for particular types of chemicals and verifies these declaration through routine inspections of designated facilities.

ECBC’s Chemical Transfer Facility (CTF) is one such facility, and serves as the single repository for the Army’s research and development stock of toxic chemical agents. The CTF was designated as the only U.S. declared Single Small Scale Facility (SSSF) under the CWC, and is the only U.S. declared Chemical Weapons Storage Facility and Chemical Weapons Destruction Facility.



Chemical agents stored at the CTF are used to conduct defensive research and development for the DOD, whose research is imperative to maintaining an effective defense posture against the new world chemical threat. In support of this mission, CBARR personnel are responsible for the receipt, triage and screening of “unknowns.” Agent preparation occurs through synthesis or purification, as well as the packaging and shipment of neat and dilute agent throughout the DoD.

In addition to the FDHS elimination technology, the CTF also supports the U.S. chemical agent disposal program, including “drill and drain” operations completed downrange at the Munitions Assessment and Processing System (MAPS) facility. All chemical agents used in studies are prepared and shipped from the CTF, where bench scale and large volume neutralization experiments can be conducted by CBARR personnel. The CTF team is extensively trained in areas such as safety and health, proper use and application of PPE, hazardous materials packaging and transportation, storage and handling.

The ECBC Treaty Compliance Officer said the most important regulation under the CWC is remaining under the designated agent quantities for permitted purposes. ECBC also adheres to Army regulations and inventory is monitored through rigorously data management processes and best practices. According to the OPCW website, results from routine inspections are reported to the Director-General. If the report contains any uncertainties, a challenge inspection may occur. ECBC has remained CWC-compliant since 1997.



Top: The CTF is the only U.S. declared Single Small Scale Facility under the CWC.

ECBC CONNECTION



NOV. 9 — DEC. 9, 2013

The 26th Annual Food, Toy and Gift Drive will benefit civilian and military families in the community!

Participating organizations include:

ECBC

Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD)

Program Executive Office, Assembled Chemical Weapons Alternative (PEO ACWA)

U.S. Army Chemical Materials Activity (CMA)

Department of Emergency Services (DES)

Extreme Family Outreach, the Edgewood Sharing Table and families of the 20th Support Command and 22nd Chemical Battalion thank you!

What's the Word?

Contact us!

Send us your feedback. For article suggestions, questions or comments please contact CBARR Communications Officer Kristen Dalton at kristen.a.dalton.ctr@mail.mil

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NOVEMBER forecasts

WEATHER AROUND THE WORLD



CBARR LOCATIONS	AVG. HIGH (F)	AVG. LOW (F)	AVG. PRECIP. (in)
Aberdeen Proving Ground, Md.	56	38	3.24
Pine Bluff Arsenal, Ark.	64	43	4.79
Washington, D.C.	58	41	3.17
Deseret Chemical Depot, Utah	51	24	0.66
Umatilla, Ore.	50	36	1.10
Redstone Arsenal, Ala.	64	42	4.94
Melbourne, Australia	72	61	0.06



We Heard You!

2013 READERSHIP SURVEY RESULTS

Great news! Thanks to your participation in the 2013 CBARR News Readership Survey, we've been able to identify several focus areas for 2014:

- **Employee Spotlights and Contributions** | Get to know CBARR employees better through in-depth employee interviews and guest columns. With a specialized workforce of 200 strong, the newsletter is a great place to share their personal stories and professional expertise.
- **Reading Habits** | Nearly 74% of readers enjoy the CBARR News in digital format. Hard copies are also available for visitors at locations throughout the Center.
- **Concentration on CBARR divisions** | Nearly 96% of readers believed the newsletter successfully shares the CBARR story. In 2014, we'll focus on how each division contributes to the mission.
- **Lessons Learned** | CBARR is known for its project successes and collaborative partnerships; But the most impactful stories acknowledge the lessons learned from adversity. We'll take a look at some of the most pivotal turning points in CBARR history.

Military/Civilian Collaboration at Forefront of Summer Internship

West Point Cadet shadows CBARR chemical engineer on FDHS project

ABERDEEN PROVING GROUND, Md. – When Sean Crain, a Cadet from the United States Military Academy at West Point, began his summer internship at ECBC, he had no idea he would be on the cutting edge of elimination technology for weapons of mass destruction.

“It’s pretty impressive to neutralize a really dangerous chemical and get it to a point where it is not harmful. It’s also a neat capability to be able to deploy the technology,” said Crain, who spent several weeks at ECBC assisting CBARR develop the Field Deployable Hydrolysis System (FDHS).

Crain had a unique opportunity to assist on the project. He was one of 10 cadets selected to receive training at ECBC, giving up their summer vacation to receive additional laboratory academic credit toward their education. Working alongside chemical and biological experts at the Center as part of the Academy’s Advanced Individual Academic Development (AIAD) program, the cadets were integrated into various ECBC teams, observed scientific processes and implemented concepts from their course work throughout the program. For Crain, he was immersed in the fast track acquisition of the FDHS, whose design-to-fabrication process has since been applauded by government partners and generated the interest of numerous stakeholders.

Crain had been assigned to shadow CBARR Chemical Engineer Adam Baker, who said the cadet’s most direct impact had been conducting calculations regarding the effluent of the system after the water has been evaporated from it. Dealing with mass and material balances in and out of a system is exactly where Crain had left off his learning at West Point prior to his summer internship. He was now putting it into practice.

“For some of our acidic effluent, that involves first neutralizing with sodium hydroxide, which leaves a salt and water byproduct. Sean’s been doing some calculations that determine how much sodium hydroxide you need to neutralize the hydrogen fluoride or hydrogen chloride. After evaporating the water, you can then determine the volume of the remaining salts,” Baker explained.

“You start with a huge amount of effluent, oftentimes thousands of liquid gallons, and once you evaporate the water, you’re left with a relatively small amount of solid remainder. So Sean’s been working on calculating what those amounts would be.”

Baker said Crain’s chemical engineering background has been just as helpful as his military experience, knowing that the FDHS was designed with the Warfighter in mind. Given the circumstance, the technology could transition from civilian-operated to soldier-operated. Because the system is transportable, it is self-sufficient with power generators and a mobile laboratory that needs only consumable materials such as water, reagents and fuel to operate. It can be set up within 10 days of arriving at an onsite location and is equipped with redundant critical systems that ensure maximum system availability. Should the FDHS be deployed, it is possible that CBARR personnel would serve as subject matter experts supporting an onsite crew of 15 trained personnel, who would be needed each shift to operate the system 24 hours a day, seven days a week.

“It’s neat to get a fresh set of eyes from someone in the military with a chemical engineering background. Being able to introduce him to the project and see what his thoughts were was a huge help, especially knowing that this system, in the long view, is expected to at first be soldier-assisted and eventually soldier-operated,” Baker said.

According to Crain, this civilian-military interaction is critical when earning higher leadership roles and moving up within a command. He got to witness the dynamic first-hand during his time at ECBC, something he does not often have the chance to do as a junior officer.

“For example, with the FDHS demonstrations, there were a lot of colonels and commanders of the chemical school in attendance. They interact a lot with the chemistry labs, and it’s very important because while the civilian side is designing it, the military side will eventually be the ones operating it. That’s why it’s important to understand that this system is capable of being run by both civilians and the military,” Crain said.

As for his biggest takeaway? “I think I’ll definitely be able to bring back the first-hand knowledge of the new technologies in the Army and how chemical engineering is truly operable to what we need. I’m also going to bring back the relationships and understanding the collaboration between Army personnel and civilians,” he said.

Crain is expected to graduate West Point in two years as a 2nd Lieutenant Officer. In five years he hopes to be serving in the Chemical Corps.



Top: West Point Cadet Sean Crain, left, and Adam Baker onsite with the FDHS. **Bottom:** Crain assesses the hydrolysis component of the WMD-elimination technology.





Mobile Labs & Kits lead joins CBARR as program manager

ABERDEEN PROVING GROUND, Md. – In the years following 9/11, new services and capabilities were meeting the needs of an evolving defense market where mobile, on-the-go applications were replacing fixed, permanent solutions. ECBC's CBRNE Mobile Laboratories & Kits Team partnered with federal agencies to design, fabricate, integrate and validate modular, mobile and semi-permanent analytical capabilities for customers with national and international missions that include the verification of the CWC and WMD countermeasures.

The Mobile Labs & Kits team has since integrated into various Center teams as shrinking budgets forced the unit to disband, but the capability remains an active service offering for customers like the Department of Homeland Security, the Food and Drug Administration, and the Federal Bureau of Investigation, who desire upgraded equipment for their mobile laboratories. Now, a former team lead of the group, George Noya, has joined CBARR as a program manager responsible for a mobile ground sensor project, an interagency agreement with the Environmental Protection Agency, and the design and fabrication of custom glove boxes to be used for new emerging threats.

Noya's experience adds value to CBARR's deployable laboratory services, which include near real time monitoring for the detection airborne contaminants to ensure worker safety, as well as on-site lab analysis of chemical warfare agents and their breakdown products.



"My approach has always been: let the science drive the engineering, not the engineering drive the science. There are a lot of factors that impact the customization of a mobile lab, including the infrastructure space, air flow and weight of

equipment," Noya explained. These transportable CBRNE analytical platforms require state-of-the-art, novel technologies designed to accurately perform under austere conditions. Robust engineering controls and technical risk assessments specially designed for chemical and biological threat materials significantly reduces the logistical burden while providing data that withstands the most intensive and critical review.

"The biggest challenge is making sure the equipment is ruggedized enough to be deployed where the customer needs it. Mobile labs are designed to provide incident commanders with a level of accurate information to make quick decisions. Depending on the situation and location, there isn't time to prepare samples for shipment to a fixed laboratory that can provide a thorough analysis of results. The equipment in the mobile labs can save time and cost while still providing an accurate assessment of the samples," Noya said.

According to Noya, having the correct engineering controls reduce or eliminate personnel exposure to chemical or physical hazards, as well as ensure the equipment is performing accurately. For example, Heating, Ventilation and Air-Conditioning (HVAC) systems and diffusers are designed to mix the air so it remains turbulent, but this can create a disturbance in chemical fume hoods and BSCs. Additionally, some pieces of equipment use a lot of power or are sensitive to vibration and movement, such as electron microscopes.



"I've done a lot of work with glove boxes, fume hoods and customized equipment for scientists and research teams in order to work safely with new emerging threats. One of those projects is the new glove box that is going into the McNamara Building. Enrique Faure and I are in the process of fabricating the temperature and humidity control system that will be utilized for the inside chamber," Noya said.

The McNamara Glove Box Facility recently won ECBC's 2013 Excellence in Safety Award, which recognized David McCaskey and John Carpin, two scientists in the Research & Technology Directorate. Their design of the facility made significant contributions to existing safety management system initiatives for the "Little Mac" and "Big Mac" glove boxes. This equipment is used for the safe handling of non-traditional agent (NTA) materials at ECBC.

Noya's experience and contributions across the Center will bolster CBARR's mobile laboratory capabilities. Unlike the former Mobile Labs and Kits team that was limited to the design and distribution of the platforms, CBARR has the trained and specialized personnel to maintain, repair and sustain the offering for customers carrying out their mission in homeland defense.

For more information about CBARR's mission, visit:

<http://www.ecbc.army.mil/cbarr>



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