CBRNIAC Newsletter

Chemical, Biological, Radiological & Nuclear Defense Information Analysis Center

Volume 8 Number 2
2007

Since 1917 -
A Tradition of Solutions.

EDGEWOOD CHEMICAL BIOLOGICAL CENTER
90 Years
1917-2007
APG

Edgewood Chemical Biological Center Celebrates 90th Anniversary

Renovated High-Containment Lab Offers More, Effective Research Space

U.S. Army Completes All Activities Required to Close Aberdeen Chemical Agent Disposal Facility

A U.S. Department of Defense Information Analysis Center sponsored by the ***Defense Technical Information Center***

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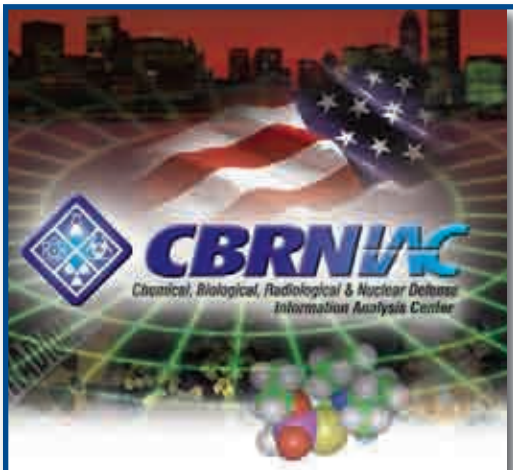

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The CBRNIAC is located in building E3330, Room 150, Aberdeen Proving Ground-Edgewood Area, Maryland 21010. For further information or assistance, visit or contact the CBRNIAC.

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On the Cover: *Graphics Courtesy of ECBC*

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- Third Quarter (Number 3) – April 15th
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Edgewood Chemical Biological Center Celebrates 90th Anniversary

By Mary Doak, ECBC Community and Educational Outreach Program Manager

This year marks Edgewood's 90th Anniversary. Since 1917, Edgewood Chemical Biological Center (ECBC), located at the Edgewood Area of Aberdeen Proving Ground, has served as the Nation's lead science and technology center for the development of chemical and biological defense products and services. Although ECBC's primary focus has been support to the warfighter, ECBC's growth and development has been closely tied to events on the national and international stages.

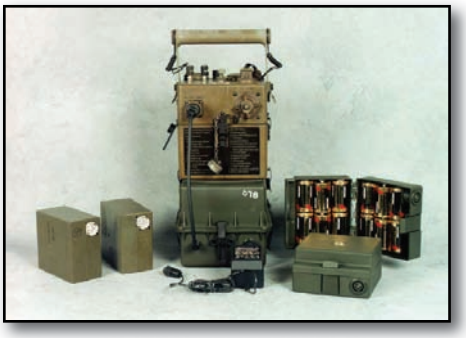
ECBC's long and distinguished history of providing the best chemical and biological defense technologies dates back to the trenches of World War I where chemical agent was first used as a battlefield weapon and gas masks were consequently needed for U.S. Army soldiers. In April of 1917, when the United States joined the war, U.S. soldiers did not have the proper equipment or training to fight in a war where chemicals were used. The Bureau of Mines, an ECBC predecessor, produced the first 25,000 gas masks for Army Soldiers during World War I. In 1918, all chemical warfare functions were centralized at the Edgewood Area, including the Chemical Warfare Service chemical school, research division, and gas mask production. Over 3 million gas masks were produced during the war.

Chemical Lab

Chemical School

Later, at the onset of World War II, Edgewood's incendiary bombs were used by aviator LTC Jimmy Doolittle for his famous raid on Tokyo. During the late 1940's (post World War II), upon discovery of German nerve agent weapons, Edgewood began addressing defense against this new class of threat agents. This new class of lethal agents required the development of a new generation of munitions, protective masks, protective clothing, and detection systems. Edgewood standardized the Army's first nerve agent detector and alarm, known as the M5 Automatic G-Agent Fixed Installation Alarm, in 1958. In 1959, we developed the M17 Mask which included several improvements over the previous mask. One of the improvements was the elimination of the need for a separate canister by placing filter material in the cheek pockets of the mask. Another improvement was a longer wear capability in a nerve agent contaminated environment.

As the challenges evolved during the Vietnam War, ECBC provided riot control equipment, flame, and incendiary weapons to assist in the war effort. The riot control agent CS was standardized by Edgewood and used extensively by both military and civilian police forces. In addition, Edgewood developed the M8 Portable Automatic Chemical Agent Alarm, the first mass-produced field detector for nerve agents. This was a significant accomplishment in chemical defense and this new fielded technology corrected a major deficiency that had made U.S. soldiers vulnerable to a surprise nerve agent attack. In 1960, DS2 Decontaminating Agent was developed by Edgewood. DS2 is effective against known toxic chemical agents and biological agents.



M8A1

M40 Mask

In 1990 in support of Operation Desert Shield, we accelerated the delivery and limited fielding of the M40 mask to soldiers in the Persian Gulf. We also supported the deployment of the first XM93 series Nuclear, Biological, Chemical (NBC) Reconnaissance System (Fox) and activated an Emergency Operations Center as the focal point for operational and logistical inquiries pertaining to chemical defense equipment.

XM93 Fox

Continued pg. 4

ECBC 90th Anniversary *cont.*

DP Program

In 1996 at the direction of Congress, ECBC became the lead agency charged with implementing the Domestic Preparedness (DP) Program to enhance the capability of federal, state, and local emergency responders in incidents involving Weapons of Mass Destruction (WMD). This program provided training, exercises, equipment and a variety of technical assistance which enhanced domestic WMD response capabilities. The DP program put lifesaving knowledge and skills into the hands of our nation's emergency responders and was used as the blueprint for WMD response efforts across the country. It also served as a springboard into the new business area of homeland defense and opened the doors of many new start national defense preparedness programs at ECBC.

Ton Containers

In 1997, the United States ratified its support for the Chemical Weapons Convention, an international treaty that prohibits the development, production, stockpile, transfer and use of chemical weapons. The treaty also called for the destruction of all chemical weapons stockpiles around the world. The Chemical Materials Agency (CMA) is the organization responsible for carrying out the demilitarization mission in the U.S. ECBC has provided engineering support and trained operational personnel for the chemical demilitarization program since its inception in the late 1960s. Edgewood developed alternative neutralization-based technologies for the disposal of the U.S. chemical weapons stockpile. These technologies are currently being used to destroy bulk mustard and nerve agents. For obsolete or recovered non-stockpile chemical munitions, ECBC collaborated with Sandia National Laboratories and the CMA to develop two generations of the Explosive Destruction System (EDS) for safe on-site chemical agent containment during detonation. Detonation and then chemical neutralization take place in a sealed, stainless steel chamber that contains all of the blast, vapor, and fragments from the munitions. Since 1999, the system has been used in successful chemical munitions destruction at sites such as in the Edgewood Area of Aberdeen Proving Ground, Maryland and Spring Valley in Washington, D.C. In 2005, ECBC personnel deployed the system to Dover Air Force Base twice to neutralize two mustard-filled chemical munitions that had been discovered while dredging there for a clam digging operation. Also in 2005, ECBC performed testing on the second version of the EDS, which allows it to neutralize six munitions at one time instead of a single munition.

EDS Phase 2

Our expertise in aerosol sciences was recently applied to support studies for the U.S. Postal Service. These studies led the redesign and delivery of new post office mail sorting equipment to post offices nationwide. Additionally, the Department of Homeland Security has sought our expertise to execute numerous research and development projects including the design and build of two prototype All Hazard Receipt Facilities and associated protocols, which allow public health and law enforcement personnel to safely prescreen unknown or potential threat materials. In a collaborative effort with the National Institute for Standards and Technology and the National Institute of Occupational Safety and Health, ECBC developed chemical and biological (CB) standards for Air Purifying Respirators and Escape Masks for civilian application. ECBC also tested numerous civilian protective masks and clothing ensembles for efficacy against chemical and biological agent exposure. In support of the Global War on Terrorism, ECBC rapidly developed and produced Buffalo Mine Protected Clearance Vehicle (MPCV) training surrogates to aid in training combat units for Improvised Explosive Device (IED) defeat missions. These surrogates, M923A2 5-ton cargo trucks, were modified to simulate a Buffalo MPCV. They have been integrated into pre-combat training programs at Fort Irwin, California; Fort Polk, Louisiana; and Camp Beuhring, Kuwait.

Buffalo Surrogate

This year we are commemorating a 90-year tradition of solutions. Over the past nine decades, we have provided numerous battlefield enhancements to include smoke screening capabilities, collective protection systems, chemical and biological detection and warning devices, as well as new respiratory protection and decontamination equipment. Most recently, our defense efforts expanded to include domestic preparedness, homeland security, and the current Global War on Terrorism. Now ECBC has partnerships with nearly every federal agency and has truly grown into a unique national resource for chemical and biological defense. We are looking forward to future success as we begin the last decade into a century of supporting the warfighter and other U.S. interests with the best chemical and biological defense products and services possible.

For further information, please visit ECBC online at http://www.ecbc.army.mil

Since 1917 - A Tradition of Solutions.

Sample Receipt Facility Under Construction

By Mary Doak, ECBC Community and Educational Outreach Program Manager

Edgewood Chemical Biological Center (ECBC) along with our federal partners, the Federal Bureau of Investigation (FBI) and the Department of Homeland Security (DHS), are collaborating on the construction of the new Sample Receipt Facility (SRF) at the Edgewood Area of Aberdeen Proving Ground (APG), Maryland. The SRF is the first multi-agency funded project at APG with construction funds provided by the Army, the FBI, and DHS. This facility will be the central location for the receipt, triage, screening and analysis of potentially contaminated samples and devices from military theaters of operation, intelligence organizations, and law enforcement agencies around the world. A sample is a portion of an unknown substance suspected to contain hazardous material. A sample may consist of air, soil, water, or surface swipes. It may also be an object such as an envelope or suitcase or an improvised explosive device (IED).

For decades, ECBC has played a critical role for our nation and the international community in receiving and analyzing samples where the contents are not known. Currently, this work is being conducted in several different buildings across the Edgewood Area of APG. However, increased demand for receipt and screening of unknowns stemming from the Global War on Terrorism has created a need for a consolidated and modernized facility to serve the warfighter and the nation. ECBC chemical and biological defense experts routinely take receipt of the sample. Scientists conduct a "triage" to determine where and how it should be handled and conduct all documentary processes as required by law. This triage process also can include characterizing samples, determining contents of unknown samples, removing of explosive configurations, and documenting a legal chain of evidence for the sample. All work with hazardous materials is performed within engineering controls such as chemical fume hoods and sealed glove boxes.

The new facility will upgrade and expand ECBC's existing capability while consolidating several functions under one roof. Remote intrusive sample processing of explosive munitions or devices containing lethal chemicals, biologicals, and radionuclides will be included in the SRF. It will also feature Biosafety Level III containment laboratories for biologicals and toxins as well as an explosive containment chamber. The SRF will be capable of gamma irradiation for suspect biologicals and sample storage and archive capability. The SRF will provide the FBI with a safe, secure laboratory space to perform forensic examinations on items of evidence which are contaminated. DHS's Chemical Security Analysis Center, which provides technical reachback support for analysis and scientific assessment of the chemical threat to address homeland security needs, will also be housed within the SRF.

The SRF will include 50,000 square feet of laboratory, storage, and administrative space. The John C. Grimberg Company, Incorporated was named the general contractor for the SRF. The Army Corps of Engineers will serve as the contract monitoring agency. Site preparation began in December 2006 and planned completion is within approximately 18 months.

By combining the broad spectrum of expertise from the ECBC, the FBI, and DHS in one location, our Nation's capability to deal efficiently and effectively with potential weapons of mass destruction will be significantly increased.

For further information, please visit ECBC online at http://www.ecbc.army.mil

An Interagency Success!

Contract Awards

Upgrades on the Fox M93 and Fox M938A1 Nuclear, Biological and Chemical Reconnaissance System Vehicles
General Dynamics Land Systems Incorporated
Sterling Heights, MI
$9,200,000 April 5, 2007
By U.S. Navy, Washington, DC

Procurement Order for RSDL™ Personal Skin Decontamination Product
E-Z-EM, Incorporated
Lake Success, NY
$5,070,000 April 2, 2007
By U.S. Army Space & Missile Defense Command, Arlington, VA

Equipment and Training Programs- FY 2006 Commercial Equipment Direct Assistance Program (CEDAP)
First Responders
Nationwide
$34,600,000 March 27, 2007
By Department of Homeland Security, Washington, DC

Exploratory Research in Advanced Nuclear Detection Technology
Alliant Techsystems Incorporated
Plymouth, MN
Canberra
Meriden, CT
EIC Laboratories, Incorporated
Norwood, MA
General Electric Global Research Center (two awards)
Niskayuna, NY
Physical Optics Corporation
Torrance, CA
Radiation Monitoring Devices, Incorporated
Watertown, MA
Rapiscan Systems Corporation
Hawthorne, CA
Science Applications International Corporation (SAIC)
La Jolla, CA
Westinghouse Electric Company
Monroeville, PA
$8,800,000 March 26, 2007
By Department of Homeland Security, Washington, DC

Active Detection and Imaging of Special Nuclear Material and All Nuclear Isotopes Via Nuclear Resonance Fluorescence Imaging
Passport Systems, Incorporated
Acton, MA
$9,883,410 March 26, 2007
By Space and Naval Warfare Systems Center, San Diego, CA

Nerve Agent Antidote
Meridian Medical Technologies
Columbia, MD
$3,004,143 March 12, 2007
By U.S. Army Medical Research Acquisition Activity, Frederick, MD

Large Area Depositon & Plasma Diagnostics
Innovative Scientific Solution
Dayton, OH
$1,270,992 March 10, 2007
By Department of the Air Force, Air Force Materiel Command, AFRL - Wright-Patterson AFB, OH

Development of a DNA Vaccine for Equine Encephalitis
Ichor Medical Systems, Incorporated
San Diego, CA
$900,000 March 8, 2007
By U.S. Department of Defense, Washington, DC

Improved Methods Development for Determining Thermophysical and Thermochemical Properties
Phoenix Chemical Laboratory Incorporated
Chicago, IL
$967,000 March 7, 2007
By Department of the Air Force, Air Force Materiel Command, AFRL - Wright-Patterson AFB, OH

Rapid, Multiplexed Enzymatic Analysis of Botulinum Neurotoxin Serotype Activity and Toxicity
Radix BioSolutions LTD
Georgetown, TX
$441,795 February 14, 2007
By DOI - NBC, Ft. Huachuca, AZ

CBRNIAC
Chemical, Biological, Radiological & Nuclear Defense Information Analysis Center

Serving the CBRN Defense and Homeland Security communities

Renovated High-Containment Lab Offers More, Effective Research Space

By Karen Fleming-Michael, U.S. Army Medical Research and Materiel Command

Very few people ever get a chance to see the inside of the high-containment suites at the U.S. Army Medical Research Institute of Infectious Diseases.

However, members of local media outlets as well as a few Fort Detrick commanders got a chance January 22, 2007 to step into a newly renovated biosafety-level four suite - the highest level of containment- before it is put into use in the coming weeks.

"Most of the time you have to look through windows to see the suite," said Caree Vander Linden, the public affairs officer for the institute. "This is a rare opportunity to see it before we button it up and it goes hot."

When it goes hot, no one will enter the air-locked suite without changing into colored surgical scrubs and zipping into electric blue "spacesuits" in a prep area just outside the level-four part of the suite. Intricate precautions are taken because the agents that are worked on in the suites, like Ebola, Marburg and Lassa fever viruses, have no cure or treatments, said Dr. Tom Geisbert, chief of the Department of Viral Pathology and Ultrastructure within the Virology Division.

"We don't know enough about them," he said. "These are emerging infections so you want to be at the highest level of protection you can get, and the pressure suits are the best you can get."

Animal assessment-4, called AA-4, is one of two main BSL-4 suites at the institute. Renovations took seven months and $3 million and have resulted in upgraded equipment and more efficient use of space. For example, before the renovation, researchers had nowhere to store expensive equipment.

"We had to cover it and put it in the large animal area. You can imagine, here's this sensitive equipment that you have and last place you want it is an animal room," said Lisa Hensley, a microbiologist who has worked for eight years at the institute in high-containment labs.

Inside the freshly painted suite, the number of rooms for culturing cells has now doubled from one to two. Having just one limited the number of people who could work on experiments. And the number of double-decked incubators has quadrupled as well, going from two to eight.

"When I'm conducting experiments, I can easily fill one of these by myself in one week," said Joan Geisbert, a biological laboratory science technician whose specialty is working in and training others to work in BSL-4 conditions. "So when you run out of incubator space, you're out of business. You can't do anything else."

Having the capacity to conduct more cell culture experiments also cuts down on the number of animal tests, Hensley said.

Dr. Tom Geisbert demonstrates how the air lines attach to high containment suits during a January 22 tour of a biosafety level 4 lab at the U.S. Army Medical Research Institute of Infectious Disease. The lab, which will go "hot" soon, was recently renovated to make it more efficient and state of the art for studying infectious agents that have no treatments or cures. (Photo by Karen Fleming Michael)

Safety is at the heart of many of the renovations. Emergency flashlights automatically turn on when there's a power failure so researchers, dressed in their pressurized containment suits, can find their way to the steel exit doors that lead to a chemical shower. The air that continuously flows through the suits, coupled with the hearing protection the researchers wear, make hearing in the suite a challenge.

Flashing lights alert the researchers if a problem is occurring with their air supply, if there's a message from security, or if there's a phone call.

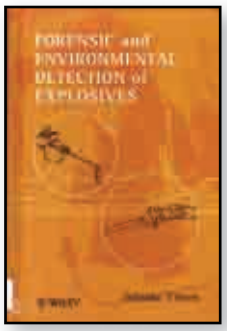
"It's noisy in the suit," Hensley said, adding that in her time at the institute, the amber light indicating she had five minutes of air remaining turned on just once, when there was a lightning strike to the building.

The suite also doubled the space for animal cages, going from two to four rooms, some of which are equipped to monitor the animals continuously by telemetry. An automatic watering system, hands-free sinks and cameras to monitor the animals are all available in the animal rooms.

Continued pg. 19

New CBRNIAC Information Resources

Books



Yinon, Jehuda. **Forensic and Environmental Detection of Explosives**. New York: John Wiley & Sons, 1999.

"Acts of terrorism, such as the destruction of Pan Am flight 103 over Scotland in 1988, the bombing of New York City's World Trade Center in 1993, and the Oklahoma City bombing in 1995, have brought terrorism to the awareness of the public in a tragic way. With the increasing use of explosives by terrorist groups and by individuals, law enforcement forces throughout the world are faced with the problem of detecting hidden explosives in luggage, mail, vehicles, aircraft, on suspects, etc., in order to prevent such acts of terrorism and crime." *(Preface)*

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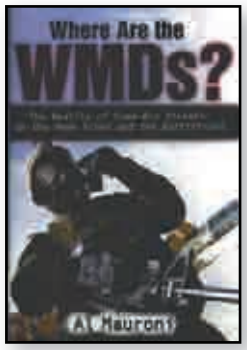
Phone: 732.469.4400



Mauroni, Al. **Where Are the WMDs?**. Annapolis, MD: Naval Institute Press, 2006.

Al Mauroni draws on more than twenty years of experience in CBRN defense policy to provide both an historical overview of CB defense issues from 1995 to 2005 and a comprehensive analysis of the CB defense decision-making process within the DoD.
"This book is first and foremost a history of some fairly significant events in the DoD CB defense community, and includes [the author's] opinions of what must be done to develop a much-needed capability for the armed forces." *(Preface)*

Includes two appendices, tables, figures, photographs, a list of acronyms, notes for each chapter, a selected bibliography, and an index.

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ISBN 1-59114-486-8
Naval Institute Press
291 Wood Road
Annapolis, MD 21402-5034
Phone: 1.800.233.8764 Fax: 410.571.1703
http://www.usni.org

Shemer, Joshua and Yehuda Shoenfeld, eds. **Terror and Medicine: Medical Aspects of Biological, Chemical and Radiological Terrorism**. Lengerich, Germany: Pabst Science Publishers, 2003.

Terror and Medicine was created in response to worldwide requests for additional information on the topic originally published in the July

2002 issue of ***The Israel Medical Association Journal* (IMAJ)**, and world events that have brought focus to the threat of terror. **Terror and Medicine** is a compilation of articles organized in five sections: "Introduction;" "Policies and Doctrines of Non-Conventional Warfare;" "Chemical, Biological and Radiological Terror;" "Trauma;" and "Psychological Aspects."

"Our [the editors'] mission …was to enlighten individuals and institutions on the basis of our Israeli experience in medically preparing for and handling the aftermath of terror.
The book aims to provide useful guidance, pragmatic knowledge and practical experience not to be found in a textbook to date." *(Preface)*

Includes photographs, illustrations, tables, and graphs.

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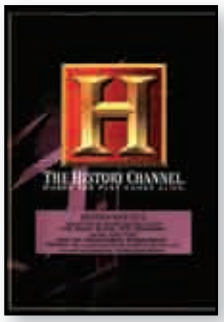
DVDs



The History Channel. **Modern Marvels®: Weapons of Mass Destruction**. A&E Television Networks, 2007.

Modern Marvels®: Weapons of Mass Destruction is a survey of the history, science and technology of Weapons of Mass Destruction (WMDs). The development of nuclear, biological, chemical, and radiological threats is chronicled. This 50-minute documentary covers the range of technologies that have been used to create WMDs, from historically uncomplicated, crude strategies to the latest technologies that unleash daunting levels of destruction. Historical footage includes the countries that have developed WMDs, the experimentation that was done to verify the effects and dangers of each of these weapons, and the changes in policy that accompanied the awareness of the magnitude of destruction possible. The potential threat of terrorists using WMDs is discussed. Programs and technologies that scientists and governments are currently developing and implementing for the safety and protection of all are showcased.

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U.S. Army Completes All Activities Required to Close Aberdeen Chemical Agent Disposal Facility

CMA Public Affairs

On March 12, 2007, the U.S. Army announced the completion of all activities required to close the Aberdeen Chemical Agent Disposal Facility (ABCDF) located at the Edgewood Area of Aberdeen Proving Ground (APG). ABCDF safely neutralized 1,623 tons of mustard agent, decontaminated and disposed of the steel containers that once held the agent and demolished buildings used during the disposal process.

"Today [March 12] marks a significant achievement in the global chemical weapons disarmament effort. ABCDF is the first chemical weapons disposal facility in the continental U.S. to destroy its stockpile and decontaminate and demolish its plant. It is a model for all the other facilities that will follow suit," said CMA Director (Acting), Dale Ormond. "I am extremely proud of the ABCDF team of Army civilians and Bechtel National, the systems contractor, in reaching this goal."

Dale Ormond, Acting CMA Director, speaking at the ABCDF Closure Open House.

The site has fewer buildings since the Ton Container Cleanout Facility and Process Neutralization Building, the two structures dedicated to agent destruction activities, have been demolished. Auxiliary buildings such as the medical infirmary and administrative trailers have also been removed. In addition, all waste generated from closure has been decontaminated and disposed.

Cake donated by site employee commemorates closure of the ABCDF.

Brian O'Donnell, ABCDF Site Project Manager, welcomes COL Jesse Barber, Chemical Stockpile Elimination Project Manager, to the podium.

The project was accelerated after the terrorist attacks on September 11, 2001. Construction of the facility was completed in September 2002 and the mustard was neutralized from April 2003 until March 2005. The following year, February 2006, marked the end of the destruction of the 1,817 ton containers that held the agent.

"The workforce should be commended for its dedication and team effort. It was a major challenge to eliminate the mustard while working within the confines of strict Army and EPA regulations," said Bechtel Aberdeen Project Manager Jimmie Willman.

"Safety has always been the cornerstone of our project. We began, operated and now closed this facility with safety as the first priority. The fact that our safety record during closure is on par with banking institutions is testament to this," ABCDF Site Project Manager Brian O'Donnell added.

Closing the Resource Conservation and Recovery Act (RCRA) permit issued by the state will take an additional few months to achieve. RCRA governs the construction, operation and closure of hazardous waste storage, treatment and disposal facilities. Since ABCDF is located on APG, its property and structures will remain under Army control after closure. Some of the equipment at ABCDF may be used at another CMA or U.S. government facility. The site will be re-used by APG.

The remaining disposal facilities are located in Anniston, Alabama; Pine Bluff, Arkansas; Pueblo, Colorado; Newport, Indiana; Richmond, Kentucky; Umatilla, Oregon; and Tooele, Utah. ABDCF is the second chemical demilitarization facility to close; Johnston Atoll Chemical Agent Disposal System completed operations in November 2000.

For more information contact:
CMA Public Affairs (410) 436-1093

In the News

Robotic Fleas Spring into Action
Duncan Graham-Rowe
Technology Review
April 3, 2007
"Tiny rubber bands can power microrobots that could serve as ultrasmall sensors."
http://www.technologyreview.com/Infotech/18477/

DHS Releases Comprehensive Regulations for Securing High Risk Chemical Facilities
U.S. Department of Homeland Security News Release
April 2, 2007
"The U.S. Department of Homeland Security today released an interim final rule that imposes for the first time comprehensive federal security regulations for high risk chemical facilities."
http://www.dhs.gov/xnews/releases/pr_1175527925540.shtm

Aethlon Medical Responds to U.S. Government Initiative to Develop and Acquire Broad-Spectrum Biodefense Countermeasures
Business Wire
March 28, 2007
"Aethlon Medical, Inc., announced today that the U.S. Government has disclosed plans to support research, development, acquisition, storage/maintenance, deployment, and utilization of broad-spectrum treatment countermeasures…Aethlon Medical believes its Hemopurifier® treatment technology is a leading broad-spectrum countermeasure candidate…designed to assist in the treatment of multiple bioterror threats, including Smallpox, Ebola, Marburg, Lassa fever, and potentially genetically engineered viruses purposely developed to defeat traditional drug and vaccine therapy."
http://biz.yahoo.com/bw/070328/20070328005319.html?.v=1

BYU Scientists Create Portable Spectrometer
David Fellingham
BYU News Net
March 23, 2007
"BYU researchers have created a portable version of large, heavy lab equipment that the military, city governments, and civilian companies want to buy…creat(ing) a portable version of a mass spectrometer and gas chromatographer."
http://newsnet.byu.edu/story.cfm/63705

New Options for CBRN Protection – Part 1
Jeffrey O. Stull
Globe
March 12, 2007
"Firefighters and other first responders are seeing their missions expanded to deal with potential terrorism involving chemical, biological, or radiological agents…An important part of their readiness is in having appropriate personal protective equipment. To this end, a series of standards have been created to establish requirements for first responder clothing and equipment."
http://www.firerescue1.com/Columnists/PPEupdate/articles/280746/

Little Rafts Battle Anthrax
PhysOrg News
March 2, 2007
"Whether as a bioweapon or as a 'mere' animal epidemic, anthrax is a serious threat. A team of Canadian and American researchers has now developed a method to increase the effectiveness of an anthrax toxin inhibitor."
http://www.physorg.com/news92053816.html

LLNL Researchers Review Biodetection Technologies
Lawrence Livermore National Laboratory News Release
February 27, 2007
"In an effort to detect biological threats quickly and accurately, a number of detection technologies have been developed. Researchers from Lawrence Livermore National Laboratory review several of the latest technologies in the most recent issue (Issue 3, 2007), of the British journal 'The Analyst.'"
http://www.llnl.gov/pao/news/news_releases/2007/NR-07-02-04.html

AlphaSniffer Prepares to Launch New Biosensor
Dr. Matt Wilkinson
DrugResearcher
February 23, 2007
"A new biosensor developed by AlphaSniffer can detect viruses, bacteria, proteins, nucleic acids and aptamers in minutes leading to faster and more efficient analyses, according to the US company."
http://www.drugresearcher.com/news/ng.asp?n=74460-alphasniffer-biosensor-spr-cpi-surface-plasmon-resonance-common-path-interferometry

Continued pg. 11

Vol. 4 No. 2 of the Chem-Bio Defense Quarterly Magazine is Now Available!

Vol. 4 No. 2 Chem-Bio Defense Quarterly Magazine

For the most part, the most effective means to decontaminate vehicles, equipment and personnel has been to use hot soapy water, a method that remains a simple, low-tech decontamination procedure still in use that doesn't require a lot of training. Hot soapy water, though, has its share of problems. While it removes most of the agent, some agent will remain on the decontaminated item and water cannot be used on sensitive equipment (such as a laptop computer or aircraft interiors). Any amount of contamination, large or small, reduces the Warfighter's ability to perform the critical missions necessary to prosecute the mission at hand. Sensitive equipment, a recent phenomenon that didn't even exist a century ago, has attained such importance that rendering it useless with water-based decontaminants threatens the mission, the warrior and the fight. You can read about some of today's choices in this issue of Chem-Bio Defense Magazine.

To view the electronic version, visit: http://www.jpeocbd.osd.mil/page_manager.asp?pg=4&sub=0

Would you like to receive the link to upcoming issues or have a hard copy version for your office or organization?
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USAMRICD Scientists Receive Army Research and Development Achievement Award

A team of scientists from the U.S. Army Medical Research Institute of Chemical Defense (MRICD) received a 2006 Research and Development Achievement Award for Technical Excellence. Drs. John McDonough and Tsung-Ming Shih, of MRICD's Research Division, Pharmacology Branch, and Dr. Benedict Capacio, of the Analytical Toxicology Division, Medical Diagnostics and Chemical Branch, distinguished themselves in the design and execution of a collaborative research effort towards the advancement of the anticonvulsant drug midazolam for the treatment of seizures induced by chemical warfare nerve agents. The team identified midazolam as a more potent and rapidly acting anticonvulsant than the currently fielded diazepam against seizures produced by nerve agents.

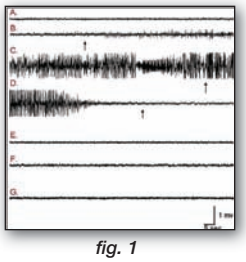

fig. 1

In addition, they successfully demonstrated that prompt and effective anticonvulsant treatment was essential to protect against nerve agent-induced permanent brain damage. Their research efforts provided a significant body of scientific evidence for the Army to seek from the Food and Drug Administration approval of midazolam as an improved anticonvulsant for the treatment of nerve agent-induced seizures.

McDonough, Shih, and Capacio were presented their awards at MRICD on February 1, 2007 by Mr. Jean Reed, special assistant for chemical and biological defense and chemical demilitarization in the Office of the Assistant Secretary of Defense (Nuclear and CB Defense Programs).

Reed also presented the Order of Military Medical Merit to Col. James Madsen of MRICD's Chemical Casualty Care Division. The medal, said MRICD's commander, Col Brian Lukey, acknowledges the excellence with which Madsen does his job as well as his contribution to the Army Medical Department.

"Thank you very much for giving me the honor [of presenting the awards]," said Reed, who along with his scientific advisor, Ms. Fay Peng, was visiting the institute that afternoon.

Reed expressed pleasure at being back at the MRICD and thanked the scientists for the effort and time they devote to what they do, acknowledging that the cutting edge research performed at MRICD and other Army labs could not be done in the private sector. After the award presentations, Reed and Peng had the opportunity to see some of that cutting edge technology with tours of MRICD's Affymetrix gene chip facility and the Electron Microscopy Laboratory, with its JEOL 7401F Field Emission Scanning Electron Microscope.

For further information, contact Cindy Kronman at 410-436-1866 or cindy.kronman@us.army.mil, or visit USAMRICD online at http://chemdef.apgea.army.mil/

fig. 1: EEG before, during, and after treatment with midazolam.

In the News *cont.*

Iraq Chlorine Attacks Raise New Concerns
Katarina Kratovac
USA Today
February 22, 2007
When Iraqi insurgents this week blew up trucks carrying chlorine, the attacks conjured up frightening images of chemical warfare and soldiers choking to death on the battlefields of Belgium in World War I.
http://www.usatoday.com/news/world/iraq/2007-02-22-chlorine-iraq_x.htm

Toward a Three-in-One Airport Passenger and Baggage Security Scanner
Science Daily
February 13, 2007
"Scientists in California and Michigan report development toward a 'universal point detection system,' a long sought three-in-one machine that screens airline passengers and baggage for explosive, chemical and biological threats at the same time."
http://www.sciencedaily.com/releases/2007/02/070212101742.htm

U.S. and Panama to Combat Nuclear Smuggling
National Nuclear Security Administration News
February 9, 2007
"The United States signed a Declaration of Principles today with the government of Panama to help prevent smuggling of nuclear and other radioactive material."
http://www.nnsa.doe.gov/docs/newsreleases/2007/PR_2007-2-09_NA-07-04.htm

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Calendar of Events

Do you have a Chemical and/or Biological Defense or Homeland Security course or event to add to our Calendar? Submit the pertinent information via email to **cbrniac@battelle.org** *or online at* **http://www.cbrniac.apgea.army.mil/info/posting_request.php**. *The CBRNIAC reserves the right to reject submissions. For a more extensive list of events, view our online calendar at* **http://www.cbrniac.apgea.army.mil/info/calendar_06.php.**

July 8-11	**17th World Conference on Disaster Management (WCDM)** Toronto, Ontario, Canada http://www.wcdm.org/
July 8-12	**52nd Annual Meeting of the Health Physics Society** Portland, OR http://hpschapters.org/cascade/2007hps/index.html
July 9-11	**Heartland Security Conference & Exhibition** Minneapolis, MN http://www.ndia.org/Template.cfm?Section=7790&Template=/ContentManagement/ContentDisplay.cfm&ContentID=16593
July 9-27	**COURSE: Public Policy and Nuclear Threats** La Jolla, CA http://igcc.ucsd.edu/PPNT.php
July 10-11	**Collecting and Processing Intelligence Information** Arlington, VA http://www.homelanddefensejournal.com/hdl/Intelligence-Information.htm
July 11-13	**NACCHO Annual Conference 2007** Columbus, OH http://www.naccho.org/conferences/nacchoannual07/
July 17-19	**Illinois Bioterrorism Summit 2007** Oak Brook, IL http://www.ipha.com/IPHA3/bioT.php
July 22 - August 24	**TRAINING: Public Policy and Biological Threats: Training the Next Generation** La Jolla, CA http://igcc.ucsd.edu/cprograms/PPBT/PPBT.php
July 23-25	**Fifth Annual TICs and TIMs Symposium** Richmond, VA http://www.ticsandtims.com/
July 23-25	**Combating Bioterrorism / Pandemics: Implementing Policies for Biosecurity [17.60s]** Cambridge, MA http://web.mit.edu/mitpep/pi/courses/combating_bioterrorism.html
July 24-25	**Physical Security for Government Facilities** Millington, TN http://www.homelanddefensejournal.com/hdl/Physical-Security-Facilities-july.htm
July 27-29	**Joint Senior Leader's Course (JSLC)** Fort Leonard Wood, MO http://www.wood.army.mil/usacmls/usacmlsflash/flashindex.aspx
July 29 - August 3	**Chemical Sensors & Interfacial Design** Newport, RI http://www.grc.org/programs.aspx?year=2007&program=chemsens
July 30 - August 2	**2007 Naval S&T Industry Partnership Conference** Washington, D.C. http://www.ndia.org/Template.cfm?Section=7200&Template=/ContentManagement/ContentDisplay.cfm&ContentID=16387

MRICD Welcomes Vedder Family

By Cindy Kronman, U.S. Army MRICD Public Affairs

On January 26, 2007, MRICD welcomed a very special group of people, the relatives of Col. Edward B. Vedder, a career military physician, noted researcher, and medical educator.

Vedder can be considered the first commander of what eventually developed into MRICD as well as the father of MRICD's training program in the medical management of chemical casualties, according to Dr. Gary Hurst, chief of MRICD's Chemical Casualty Care Division (CCCD). Vedder's importance to MRICD is underscored by the institute's having named its training building after Vedder and then, as the CCCD buildings increased, naming all of the division's training and office facilities the Vedder Complex. In addition, Vedder's photograph was incorporated into the design of MRICD's logo, developed a few years ago.

Col. Brian Lukey, commander of MRICD, called Vedder "one of my heroes," as he welcomed the family. "It is an absolute honor to host you today," said Lukey.

The Vedder family was led by Mrs. Martha Vedder Cullinane, widow of Vedder's only son, Henry Clay Vedder II, who folllowed in his father's footsteps, serving as a physician in the Army for 30 years. He died in 1989. She was joined by their three children and members of their families as well as by several of the descendents of Vedder's daughter, Sibyl. These included one of Sibyl's sons-in-law, his three children and members of their families, and two of his nieces, children of Sibyl's other two daughters. While many of the Vedder family live in Virginia, others came from California, Tennessee, New York City, and even Nova Scotia, Canada.

"My mother talked about her grandfather and had many stories about his accomplishments," said Pamela Lowen Osti. "She was very proud of him."

"It is an honor to be part of this family, "added her sister, Catherine Lowen Erno. "I have two sons. I wanted them to learn about their family and their great great grandfather."

The same was true for the daughters of Vedder's son. While Martha Vedder Poulin and Melissa Vedder Murray never knew their grandfather, they were often told stories about him and his accomplishments by their father.

Plans for the family to visit MRICD and the Vedder Complex began four years ago when members of the Chemical Casualty Care Division located a Henry Clay Vedder III on the Internet, contacted him, and asked whether he was any relation to MRICD's Col. Vedder. He turned out to be Vedder's grandson and put the CCCD officers in contact with his mother.

Meanwhile, Lt. Col. Nathan Johnson, U.S. Air Force, currently with the Defense Threat Reduction Agency, was developing an interest in medical chemical defense as he pursued his graduate degree in biochemistry and found himself continually coming across Vedder's name. Through research, he learned more about Vedder's many accomplishments in the fields of science and medicine and discovered Vedder's papers, which had been donated by Cullinane to the University of Rochester Medical School. Johnson contacted Cullinane and a dialogue about Vedder and a family visit to MRICD began.

During the visit, both Johnson and Hurst gave presentations highlighting Vedder's contributions to modern medicine, which were extensive and not merely related to the medical treatment of chemical warfare casualties.

Born in New York City in 1878, Vedder attended the University of Rochester and then went on to the University of Pennsylvania Medical School, which, as Hurst pointed out, was unusual at the end of the nineteenth century when one could attend medical school without a college degree. After graduating, Vedder stayed on for a year to do research on dysentery and tropical medicine with the early microbiologist Dr. Simon Flexner.

He was commissioned a lieutenant in the Army in 1903, attracted to service by a sense of duty as well as by a recognition that the Army provided a unique opportunity to do research. Many of his research efforts, however, had to be accomplished in his spare time, outside of his official responsibilities. As a result, Vedder was often beaten to the punch, his significant research findings laying the groundwork for discoveries that would be attributed to others.

Twice in his career, first in 1904 and again in 1909, Vedder was assigned to the Philippines, where he became interested in research to determine the cause of the disease beriberi. In this research he partnered with chemist Robert Williams, and out of their work came important developments into what Vedder called a substance "necessary to life" but would be later dubbed vitamins by another researcher. It also led to Williams's isolation and synthesis of thiamine. Vedder determined that beriberi was caused by a deficiency in diet and was not of germ origin as was commonly believed. In 1913, he authored his first textbook "Beriberi."

Among the other medical diseases and topics that Vedder advanced through his research are syphilis, plague, pellagra, cholera, and medical hygiene. He was a leading physician in testing one of the first drugs for syphilis, during his tour at the Army Medical Center, now the Walter Reed Army Medical Center, from 1913 to 1919.

In 1922, Vedder was handpicked by the Army Surgeon General, and approved by the chief of the Chemical Corps, to serve at Edgewood Arsenal as the first chief of medical research. Toward the end of his tour, in 1925, he studied information about the chemical injuries of WWI, which led to his groundbreaking book "Medical Aspects of Chemical Warfare." While at Edgewood, Vedder also began a training program for doctors and nurses that included a course on the clinical aspects of gas poisoning and the treatment of gas casualties.

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Building Protection and Weapons of Mass Destruction

By William K. Blewett, CBRNIAC Subject Matter Expert

In the 1979 anthrax release from a biological warfare institute in Sverdlovsk, Russia, 18 of the people who died of inhalation anthrax became exposed to the deadly spores while working inside a building 1.5 miles from the point of release.

Their deaths provide a tragic demonstration of protection theory— that buildings in their normal operating state provide little or no protection against airborne hazards.

Buildings are designed to protect people from the weather, but because they must be ventilated, they do not protect against airborne hazards. A building reduces the concentration of airborne contaminants relative to the outdoors, but it also retains the contaminants, sustaining a concentration indoors for a longer period than outdoors. Theoretically, a person indoors is exposed to the same dose of agent as a person outdoors.

Dose reduction can be achieved only with filtration, removing or rendering harmless the toxic aerosols or gases. For the anthrax victims in the factory building in Sverdlovsk, there apparently was no significant filtration for the tiny spores.

Most buildings do not have substantial filtration for biological aerosols or gases. Their filters typically have low removal efficiency for small aerosols and no capability at all for removing gaseous contaminants. The filters in building ventilation systems are designed to protect equipment, not people.

A building can be made temporarily protective by well-timed changes to its indoor-outdoor air exchange rate, but this protective action, commonly known as sheltering in place, requires knowledge that a hazard is present or imminent. Protection against an undetectable hazard such as a biological-agent aerosol is practical only by improving a building's filtration system.

With the threat of a large-scale, terrorist release of biological agents, the challenge of protecting the population is daunting. Improving building filtration systems is a practical approach. A building has the basic elements of a protective system— barriers and filters. The barrier system is incomplete, with both intentional and unintentional openings, and the filters of a building are inefficient. The challenge of making a building protective is to reconfigure the filter-barrier system to yield substantial protection.

This reconfiguration to achieve protection against an outdoor release of toxic agents requires two changes: 1) improving the removal efficiency of the filters, and 2) directing through the filters 100 percent of the air entering the building. The latter involves eliminating bypasses at the filter frames and between the fans and filters and preventing infiltration through all intentional and unintentional openings of the building shell.

Pleated Filter Unit: A novel building-protection filter unit that incorporates HEPA filtration with a pleated, carbon-loaded non-woven material for chemical protection at reduced operating costs.

MCRF 8400: A novel multi-cell, radial-flow filter unit that incorporates commercial HEPA filters with military adsorbers for chemical protection.

There are two general approaches for applying air filters to a building— external filtration and internal filtration. External filtration involves filtering makeup air, drawing air from outside the building and discharging purified air inside it. Internal filtration involves recirculated air, filtering and discharging air into the same space from which it is drawn.

With either, there must be a tight building envelope to achieve substantial protection. But only with external filtration is it possible to filter 100-percent of the air entering the building. This is achieved by pressurizing the protected envelope.

Internal filtration does not affect the indoor-outdoor air exchange that results from wind and buoyancy pressures, and therefore yields far lower levels of protection. Most air-handling units combine internal and external filtration, filtering fresh air and recirculated air with the same set of filters.

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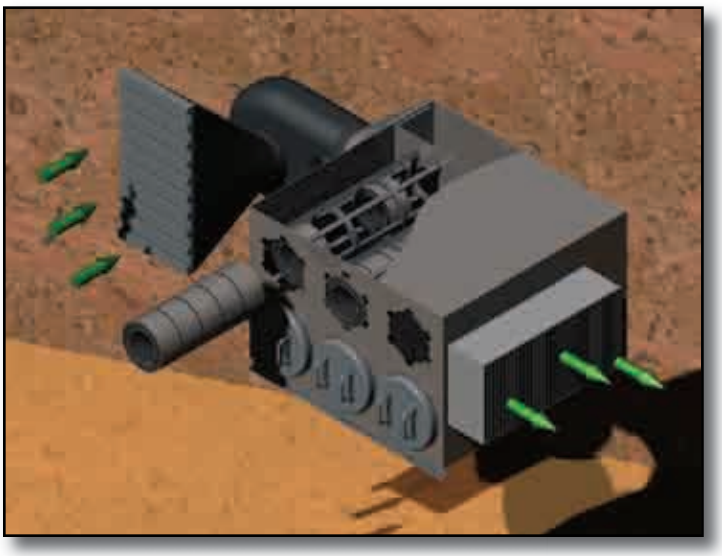
High-Level Protection, High Cost

There are very few buildings with high-efficiency external filtration, mainly special military or government facilities. Some commercial facilities, such as clean rooms and archives buildings, employ high-efficiency external filtration to protect materials. Some military facilities use makeup-air (ventilation) units with high-efficiency particulate air (HEPA) filters to remove aerosols and high-efficiency gas adsorbers (HEGA) to remove chemical agents.

The performance of protective systems is commonly measured in terms of protection factor, the dose (concentration integrated over time) outside the protected space divided by dose inside it. These military facilities yield protection factors of at least 10,000, which is considered a minimum for protection against highly toxic agents.



A filter unit that employs radial-flow HEPA and HEGA filters.

These systems are expensive. The protective systems installed in three dormitories in 2002 added $32 per square foot for new construction and $42 to $53 per square foot for retrofit.

Medium-Level Protection, Moderate Cost

Protection can be attained at lower cost, but the maximum possible protection factor with conventional mechanical ventilation systems is substantially lower, generally no higher than about 100.

Take for example a building with filters upgraded to just below HEPA efficiency, i.e. MERV-16 (Minimum Efficiency Reporting Value 16) filters. A new MERV-16 filter removes 99 percent of 1-micron particles in a single pass; that is, there is about 1 percent penetration of particles in the size range of biological warfare agents. If gaskets and seals on the filter holding frames are improved to reduce bypass to about 1 percent, the maximum protection factor attainable is approximately 50— the inverse of the sum of filter penetration (0.01) and bypass (0.01).

This conventional system includes only particulate filters, so it protects only against biological agents, radiological agents, and other solid or liquid aerosols— not chemical agents. Because this conventional air-handling unit takes in outside air, it can probably be adjusted for pressurization to limit the unfiltered air exchange through the building shell. Such air exchange varies with weather conditions and is driven by wind pressures and buoyancy pressures.

Low-Level Protection, Low Cost

Internal filtration is the simplest way to incorporate filtration. Because internal filtration does not control indoor-outdoor air exchange, the protection it yields against an outdoor hazard is determined by the rate of indoor-outdoor air exchange as well as the efficiency and flow rate of the recirculating filter units.

The simplest application of recirculating filters involves the use of free-standing filter units referred to as indoor air purifiers or indoor air quality units. There are many different models of these on the market that contain filters for both aerosols and gases.

Internal filtration can also be applied by simply installing filters of higher efficiency in place of standard dust filters in air handling units. Air handling units are not designed, however, to accommodate a large increase in airflow resistance a HEPA filter or carbon filter would add. In typical air handling units, dust filter slots allow relatively high bypass.

As an illustration of the protection afforded by free-standing units, a dwelling having an air exchange rate of 0.67 air changes per hour with four indoor air purifiers, each operating at 300 cubic feet per minute flow rate, would yield a protection factor of about 23.

The Objective: High-Level Protection at Low Cost

The challenge is to achieve high levels of protection at low cost. There is a simple approach, one that does not rely upon new technology. For biological agent protection, it involves the use of HEPA filters, which were developed in the 1940s. It is most practical for new construction. It consists of the following.

- A tight building shell. Simple measures to reduce leakage rates are practical and economical when incorporated in new construction. Ideally, a mechanically ventilated building should be made tight enough to pressurize with the minimum volume of outside air needed for health and comfort.

- Pressurization. Pressurization ensures that high-level protection can be achieved with high-efficiency filtration. A level of internal pressure in the range of 25 to 50 Pascals is adequate to prevent unfiltered air exchange in low-rise buildings at the wind conditions most favorable for a toxic agent attack.

- Makeup-air units. The most economical means of providing high-efficiency external filtration is to use a separate makeup-air unit; that is, a ventilation unit that incorporates HEPA filtration, leak-tight filter frames, heating and cooling coils for supplying neutral air, and pre-filters to maximize the service life of the HEPA filters. With this approach, the larger volume of recirculated air is filtered separately, at a lower efficiency but with smaller operating and maintenance costs.

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Airmen, Soldiers Jointly Hone Chemical Response Skills

by Tech. Sgt. Bret Reinhardt, Air Force Print News

In today's Air Force, Airmen are warfighters focused on helping win the war on terrorism. Part of that focus involves working interdependently with other services in what is definitely a joint fight. As the Air Force continues to increase its footprint in the joint environment more and more Air Force career fields are working with their sister-service counterparts.

An Airman and a Soldier jump into a tub of cleaning solution during training, after entering a bunker housing a simulated chemical weapons lab April 12, 2007 at Ramstein Air Base, Germany. (U.S. Air Force photo)

For the first time, Airmen and Soldiers in the chemical, biological, radiological and nuclear response experts are working together to share ideas during a recent chemical response exercise that included a simulated deployment.

Two Soldiers from the 18th Engineer Brigades' Emergency Management Assessment Team (EMAT) out of Heidelberg, Germany and one Air Force Chemical, Biological, Radiological, and Nuclear Technician, or CBRN for short, worked their way through a chemical response exercise at Ramstein Air Base, Germany. However, for the purposes of the exercise, they have simulated a deployment to Djibouti, Africa where host nation officials have asked for assistance with a suspected chemical weapons lab.

EMAT member Army Sergeant David Cox said, "The African General of their military stated they found some type of munitions handling area or some kind of chemical lab setup and called us up and asked us to come down and check it out."

During training, Airmen and Soldiers enter a bunker housing a simulated chemical weapons lab April 12 at Ramstein Air Base, Germany. Responders from the Army and Air Force are training together at a chemical response exercise so they can respond as a single unit if needed. (U.S. Air Force photo)

Staff Sgt. Denise Hodge checks her gear April 12, 2007 before donning a protective chemical suit at Ramstein Air Base, Germany. Airmen and Soldiers are training together at a chemical response exercise so they can respond as a single unit if needed.This training familiarizes the Army and Air Force response teams with each others equipment and tactics. (U.S. Air Force photo)

What makes this training unique is that it's the first time the Air Force CBRN technicians and Army EMAT units have worked together in a joint exercise, and a great opportunity to share tactics, techniques, and procedures with one another.

"We can't do it by ourselves, this is a joint team, where we have the people and a little bit of equipment, and they have the equipment but only twelve people," said Tech. Sgt. Greg Brannan, the Full Spectrum Threat Response Strike Team coordinator.

As the Air Force continues to be highly capable and efficient, exercises like this will continue to help hone the skills today's Airmen bring to the fight.

For more information, please visit the Air Force Link Web site at http://www.af.mil/news/story.asp?id=123048821.

Vedder Family *cont.*

Vedder 's other publications include a book on medicine from a historical perspective, "Medicine: Its Contribution to Civilization," published in 1929.

Among the Vedder papers donated to the University of Rochester, and since read by many of the medical staff in MRICD's Chemical Casualty Care Division, was a memoir of the history of medicine up to 1950. Partly autobiographical, Vedder's memoirs, said Hurst, provide "tremendous insight about Dr. Vedder."

"He was humble," said Hurst. "He downplays his contributions and mentions [those of] others, but he was not a shrinking violet."

"Vedder is part of the reason modern medicine now exits," said Hurst.

Among the recognitions Vedder received during his lifetime were the Cartwright Award from Columbia University College of Physicians and Surgeons, the Welcome Essay Prize, three times, awarded by the Association of Military Surgeons, and the honor in 1924 of laying the cornerstone for the School of Medicine and Dentistry at the University of Rochester, where is he considered the university's most distinguished graduate.

"Time" featured Vedder in two issues, May 12, 1923, and December 8, 1924, for his work on developing a cure for influenza. The Army made a film about Vedder and Williams's accomplishments, called "The Modest Miracle," and in 1942 True Comics ran a strip, "The Modest Miracle," on Williams's research to isolate and synthesize thiamine in which Vedder is represented as "the Army doctor."

In addition to MRICD's Vedder Complex, there is a Vedder Hall at Ft. Sam Houston and a display dedicated to Vedder at the Walter Reed Army Medical Center.

When he retired from the military Vedder taught medical students at George Washington University and residents at Alameda County Hospital in California. He died in 1952.

After presentations by Johnson and Hurst, Cullinane was presented with a copy of the modern "Textbook of Military Medicine: Medical Aspects of Chemical and Biological Warfare" and a framed photograph of the Vedder Complex at MRICD. Lukey also gave her a commander's coin.

For Cullinane, who had been wanting to visit since hearing of the dedication of the Vedder Complex, the reception was much more than she had expected.

"This is truly an honor for us," said Cullinane, "and we want to thank you."

She particularly appreciated the presentations by Johnson and Hurst. Family members were given literature on MRICD and on its training in the medical management of chemical casualties, and a tour of the training exhibits displayed in the Vedder building as well as a look at the reception area and main hallway of MRICD's primary building, where Vedder's photograph hangs in the Commanders Gallery.

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USAMRICD online: http://chemdef.apgea.army.mil/

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The focal point for DoD Chemical, Biological, Radiological and Nuclear (CBRN) Defense scientific and technical information

HHS Launches New Online Toolkit for Medical Responses to Radiation Emergencies

HHS Secretary Mike Leavitt today announced the Department of Health and Human Services (HHS) has developed a new downloadable online diagnostic and treatment toolkit designed for health care providers, primarily physicians, who may have to provide medical care during a radiation incident.

The new information package includes easy-to-follow procedures for diagnosis and management of radiation contamination and exposure, guidance for the use of radiation medical countermeasures, and a variety of other features to facilitate medical responses. All of this is now available on the Radiation Event Medical Management (REMM) Web site (http://remm.nlm.gov).

"The REMM toolkit is part of our effort to improve public health emergency preparedness and response," Secretary Leavitt said. "It reflects the department's commitment to help instill a spirit of preparedness throughout our nation."

Guidance on diagnosis and treatment will help health care providers by describing:

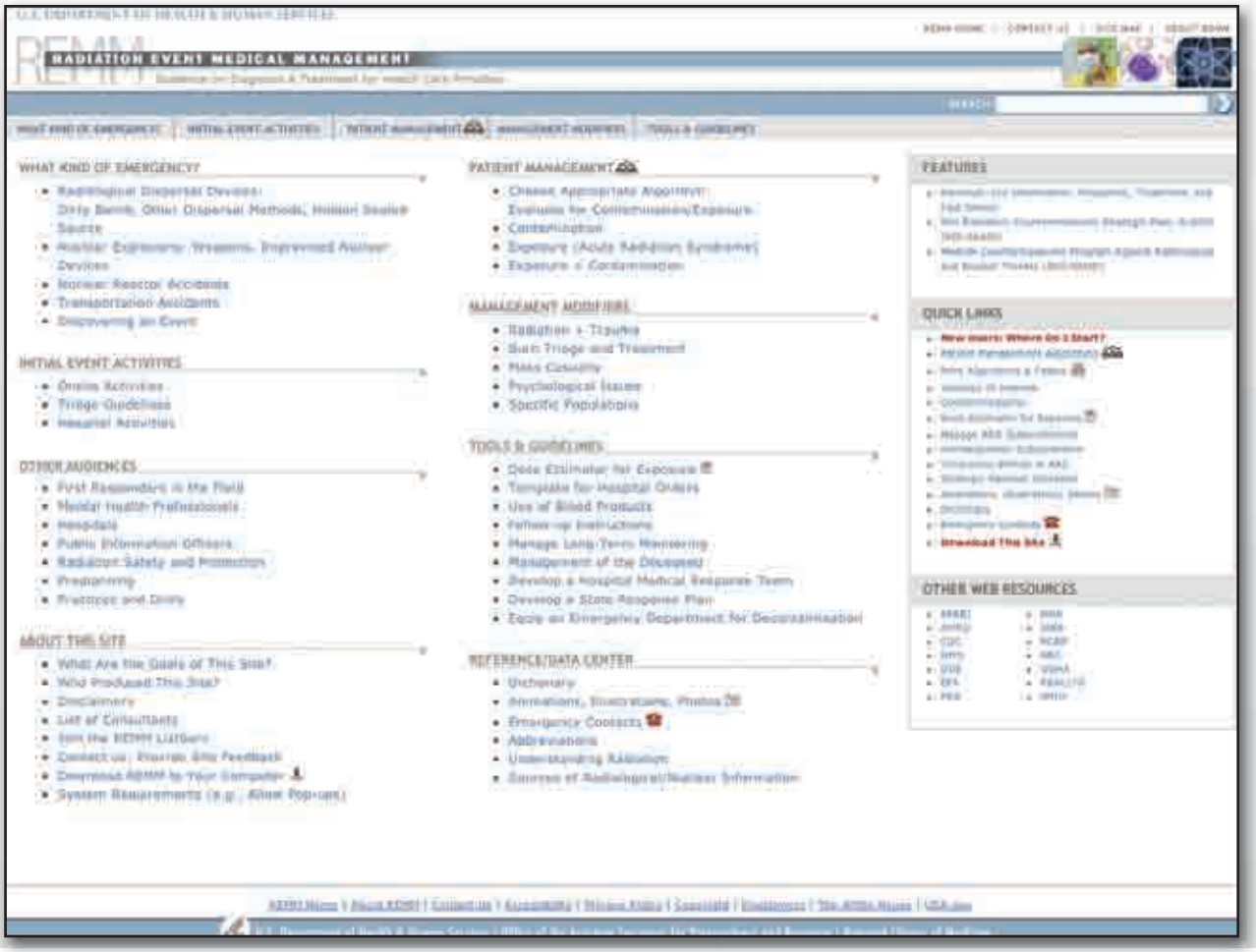
- types of radiation emergencies they may face
- initial medical actions at the incident site and/or medical facility
- key steps in patient care

Critical information is presented in a format that will quickly and efficiently orient and guide health care providers during a mass casualty radiation event. In addition to online access, federal, state and local medical response teams will be able to download REMM information on laptop computers for quick access when they are deployed to a radiation incident or for training sessions. Users can also register for automatic e-mail updates whenever information is changed or added to the REMM Web site.

Future plans include formatting the REMM material for use on Personal Digital Assistant (PDA) devices, additional multimedia graphics, and more topic areas, such as follow-up patient care of radiation's chronic effects.

A team of subject matter experts from the HHS' Office of the Assistant Secretary for Preparedness and Response, the National Institutes of Health's National Cancer Institute and National Library of Medicine and the Centers for Disease Control and Prevention collaborated on the development and design of the REMM tool.

U.S. Department of Health & Human Services News Release:
http://www.hhs.gov/news/press/2007pres/20070308.html



MRIID *cont.*

"Our veterinary staff ensures the animals are well cared for," Hensley said.

Other improvements include new air handling equipment, new biosafety cabinets and new or refurbished autoclaves for sterilizing equipment.

The renovations, according to a background paper, ensure that the U.S. Army Medical Research Institute of Infectious Diseases remains a state-of-the-art facility and can continue its reliable and safe operations.

Before the suite can go from cold to hot, it has undergone several inspections, said Dr. Cathy Wilhelmsen, the institute's biosafety officer. Representatives have visited from the Centers for Disease Control and Prevention's Select Agent Program, the U.S. Department of Agriculture, the Army Safety Office, and the Association for Assessment and Accreditation of Laboratory Animal Care International.

For further information, visit U.S. Army MRIID online at http://www.usamriid.army.mil

Building Protection *cont.*

- Vestibules or revolving doors. These minimize air exchange through open doorways at main entrances.

This approach emphasizes protection against outdoor releases of biological aerosols, the most toxic of the threat agents and ones for which accurate, real-time detection is currently not practical. Protection against chemical agents can be added with the use of carbon adsorbers, but at substantially higher costs.

This approach can provide a simple, economical but high level of protection for any mechanically ventilated building. It can also provide benefits by keeping out particulate air pollutants, pollen, and dust to create a better indoor environment. The use of high-efficiency filtration provides a practical means of ensuring that the release of biological agents into the environment would not have tragic consequences.

About the author: William K. Blewett is a CBRNIAC Subject Matter Expert (SME) and a senior research scientist at Battelle Eastern Science and Technology Center, Aberdeen, Maryland. He can be contacted for further information at blewettw@battelle.org

This is an updated version of an article by William K. Blewett that originally appeared in the September-October 2003 issue of **The Military Engineer.**

CBRNIAC
Chemical, Biological, Radiological & Nuclear Defense Information Analysis Center

Bringing the CBRN Defense and Homeland Security communities together

New Technique Can Detect Biological, Chemical and Explosive Agents

By Steve Wampler, Lawrence Livermore National Laboratory

Airplane passengers and baggage might be screened one day by a machine under development at Lawrence Livermore National Laboratory (LLNL) that can detect explosive, chemical and biological agents all at the same time.

George Farquar and Audrey Martin are two members of the team that have developed the use of the Single-Particle Aerosol Mass Spectrometry (SPAMS) system for detecting the presence of minuscule particles of explosives. They are shown operating the SPAMS system, which can also detect biological and chemical agents. Photo by Jacqueline McBride/LLNL

A team of LLNL researchers has conceptually proven that a three-in-one machine, or "universal point detection system," can be achieved, said George Farquar, a postdoctoral fellow and physical chemist at the Lab's Glenn T. Seaborg Institute.

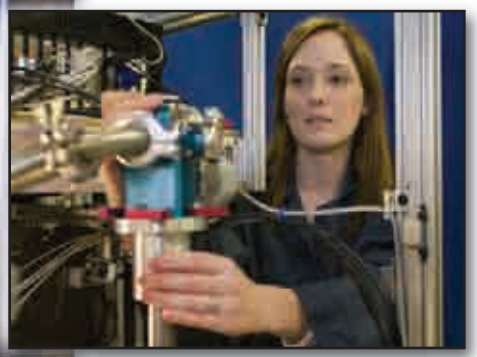
The team's latest advance, using its mass spectrometry system to detect the presence of minuscule particles of explosives, is described in the March 1 edition of Analytical Chemistry, a semi-monthly journal published by the American Chemical Society.

"We have found we can potentially detect an incredibly small quantity of material, as small as one dust-speck-sized particle weighing one trillionth of a gram, on an individual's clothing or baggage," Farquar said. "This is important because if a person handles explosives they are likely to have some remaining residue."

Using a system they call Single-Particle Aerosol Mass Spectrometry, or SPAMS, the Livermore scientists already have developed and tested the technology for detecting chemical and biological agents.

The new research expands SPAMS' capabilities to include several types of explosives that have been used worldwide in improvised explosive devices and other terrorist attacks.

"SPAMS is a sensitive, specific, potential option for airport and baggage screening," Farquar said. "The ability of the SPAMS technology to determine the identity of a single particle could be a valuable asset when the target analyte is dangerous in small quantities or has no legal reason for being present in an environment."



Audrey Martin adjusts the lens stack of SPAMS. Martin, who worked at LLNL for 15 weeks last summer as a Department of Homeland Security (DHS) Fellow, is the first DHS intern hired into the Laboratory as a full-time student employee. Photo by Jacqueline McBride/LLNL

The team conducted its explosives tests under laboratory conditions at LLNL last summer.

"The tests went well. They show the potential to identify explosives in a field setting," Farquar said.

Besides Farquar, other LLNL researchers on the explosives detection team included the paper's lead author, Audrey Martin, an LLNL chemist and Michigan State University Ph.D. student, chemists Eric Gard and David Fergenson, and physicist Matthias Frank.

The early history of the three-in-one detection system started at LLNL in 1999 with the development of what is called the Bioaerosol Mass Spectrometry (BAMS) system. This system can detect airborne biological pathogens and sound a warning in less than one minute.

In late 2005, Livermore researchers started work to expand the capabilities of BAMS to include chemicals and explosives, setting the stage for the new machine now called SPAMS.

Continued pg. 21

New Technique *cont.*

"While this instrument started as a biological detector, we saw that it had the potential to do much more by detecting other threat agents, such as chemicals and explosives," Farquar said.

The biological detection system underwent field testing for background studies at San Francisco International Airport in late 2005. Farquar describes the biological detection technology as "very solid."

In late 2005, the biological system underwent testing for several biological "surrogates" at the Applied Physics Laboratory at Johns Hopkins University. A second round of tests – with smaller releases and seven days of autonomous sampling – is planned for later this month.

Initial studies to test the performance of SPAMS with four chemical "simulants" were undertaken in 2006.

Future plans for SPAMS include a field test at a large public facility in the United States later this year, upgrading the technology for removing particles from luggage and clothing, and adding the capability of detecting narcotics, Farquar said.

Research funds to add the capabilities of detecting explosives and chemicals have been provided by the Defense Advanced Research Projects Agency, the U.S. Department of Homeland Security and LLNL's Glenn T. Seaborg Institute, which is part of the Chemistry, Materials and Life Sciences directorate.

Founded in 1952, Lawrence Livermore National Laboratory has a mission to ensure national security and to apply science and technology to the important issues of our time. Lawrence Livermore National Laboratory is managed by the University of California for the U.S. Department of Energy's National Nuclear Security Administration.

More Information:

LLNL's Public Affairs Office (www.llnl.gov/pao/)

"Identification of High Explosives Using Single-Particle Aerosol Mass Spectrometry" (abstract)
Analytical Chemistry, March 1, 2007 (http://pubs.acs.org/cgi-bin/abstract.cgi/ancham/2007/79/i05/abs/ac061581z.html)

Glenn T. Seaborg Institute (www-cmls.llnl.gov/?url=jobs_and_education-glenn_t_seaborg_institute)

"Identifying Airborne Pathogens in Time to Respond"
Science & Technology Review, October 2005 (www.llnl.gov/str/October05/Riot.html)

March 15, 2007 News Release
http://www.llnl.gov/pao/news/news_releases/2007/NR-07-03-07p.html

New and Improved DoD CBRN Defense Education & Training Integration Website

The CBRN Defense Education and Training Integration Directorate recently launched a comprehensive website aimed at networking DoD CBRN Defense educational and training resources. They announced the new website on April 26, 2007, at their annual Education and Training Integration Conference (ETIC) held at Analytic Services, Inc.

The 2007 ETIC Theme was "A Roadmap to Combating WMD Education and Training Integration." The site will play a key role in the roadmap development by providing a center of gravity for DoD civilians and military personnel seeking information about CBRN defense education and training needs. The Education & Training Directorate plans for the site to foster DoD partnerships, while supporting DoD Training Transformation. Eventually the portal will provide a collaborative venue to incorporate the Interagency and International Organizations.

A detailed course catalog will be available once participating organizations have submitted information on offered courses. Other website resources include an event calendar, a library of briefings and reports (e.g. annual reports to Congress), featured links to other important and valuable training-related sites, and organization highlights. To learn how you can contribute to the course catalog and events calendar, please visit the site or contact a site administrator.

The CBRN Defense Education & Training Integration Directorate seeks to provide a comprehensively educated and trained Force unified to effectively manage CBRN threats and events. In August 2005, Mr. Jean Reed, the Special Assistant to the Secretary of Defense for Chemical and Biological Defense and Chemical Demilitarization Programs, appointed COL Sandra B. Wood to lead the initiative.

For more information about the Education & Training Integration Directorate or the 2007 ETIC "A Roadmap to Combating WMD Education and Training Integration," visit the new website at https://etic.jscbis.apgea.army.mil/ or contact:

Heather Williams
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More Than a Library

Through CBRNIAC's Inquiry and Referral Services, our Inquiry Analysts can search, identity, retrieve, analyze and synthesize CBRN Defense and Homeland Security (HLS) scientific and technical information from multiple sources. The collective expertise of our Inquiry Team covers scientific and engineering disciplines in all aspects of CBRN Defense and Homeland Security. Our reach-back capability provides immediate access to subject matter experts (SMEs) in government, industry and academia. For over 20 years, CBRNIAC staff members have been a part of the CBRN Defense history, committed to finding the most complete and authoritative CBRN Defense and HLS information.

More Than One Database

CBRNIAC Inquiry Analysts have access to over 90 U.S. DoD and other Federal CBRN and HLS related electronic information repositories. Examples of the databases and resources available to our analysts include:

- **CBRN START** – **C**hemical, **B**iological, **R**adiological and **N**uclear **S**cientific and **T**echnical **A**nalysis **R**esearch **T**ool, CBRNIAC's premier database, is an on-line, menu-driven database containing a completely digitized, unclassified collection of over 126,000 citations to documents across all CBRN Defense and Homeland Security subject areas. Of these citations, over 70,000 correspond to documents at the CBRNIAC, while the rest are available through other collections, such as the Defense Technical Information Center (DTIC), the U.S. Army Dugway Proving Ground Technical Information Center, and the Edgewood Chemical Biological Center (ECBC) Technical Library.

- **TEMS** – **T**otal **E**lectronic **M**igration **S**ystem is a DTIC-sponsored database that allows qualified users access to search online text libraries from all DoD IACs.

- **Public STINET** – DTIC-sponsored **S**cientific and **T**echnical **I**nformation **Net**work database accessing DoD scientific and technical information at the public release level.

- **Private STINET** – DTIC-sponsored **S**cientific and **T**echnical **I**nformation **Net**work database accessing DoD scientific and technical information; it contains limited distribution data; and is not publicly accessible.

- **CDMD** – **C**hemical **D**efense **M**aterials **D**atabase contains data from technical reports on over 1,100 materials that have been exposed to Chemical Warfare agents, simulants and decontaminants.

- **BACWORTH** – **B**iological **a**nd **C**hemical **W**arfare **O**nline **R**epository and **T**echnical **H**oldings contains data on CB agents, toxins and riot control agents (limited to U.S. Government Agencies only; Export Controlled).

- **P²NBC²** – The **P**hysiological and **P**sychological Effects of **N**uclear, **B**iological, and **C**hemical Environment and Sustained Operations on Systems in **C**ombat database contains data collected from 1985-1993 on 20 field tests with soldiers performing 463 tasks in MOPP4.

- **ASK** – The chemical and biological (CB) **A**gent/**S**imulant **K**nowledge database developed by the U.S. Army Edgewood Chemical Biological Center (ECBC) is an information repository of physical and chemical properties, toxicological data, applications, and environmental fate and effects information along with a chemical agent/simulant comparison search based on properties of interest.

Inquiry Categories

- **Technical Inquiries:** A review and analysis of technical information obtained through standard search efforts. Technical information resources are analyzed, subject area experts are consulted when appropriate, and a summary of the results with references and search information are provided.

- **Referral Inquiries:** If the CBRNIAC does not have direct access to the requested information, we will provide a point of contact, address, and/or phone number and fax number of an alternative

Continued pg. 23

Inquiry Services *cont.*

information source. The CBRNIAC maintains a database that contains listings of agencies, subject area experts, other IAC resources, and pertinent referral information.

- **Bibliographic Inquiries:** Clients requesting literature searches and summaries receive a list of bibliographic citations to documents, including abstracts (if available), a summary of the search results and identification of the most relevant information. Comments and excerpts from pertinent documents may also be included.

- **General Information Inquiries:** Users needing information about the various products and services offered by the CBRNIAC may contact us for one of our free information packages.

Examples of CBRN Defense and HLS Inquiry Responses

Situation: Anthrax-contaminated letters

Request: What types of Weapons of Mass Destruction (WMD) might be transportable through the U.S. mail or any common mail carrier?

Response: Requestors were provided annotated bibliographies from searches performed on our CBRNSTART database, the BACWORTH encyclopedia and reliable scientific documentation on Internet sites.

Situation: Potential Drinking Water Contamination

Request: What are the surety requirements for drinking water - level concentrations of chemical warfare agents?

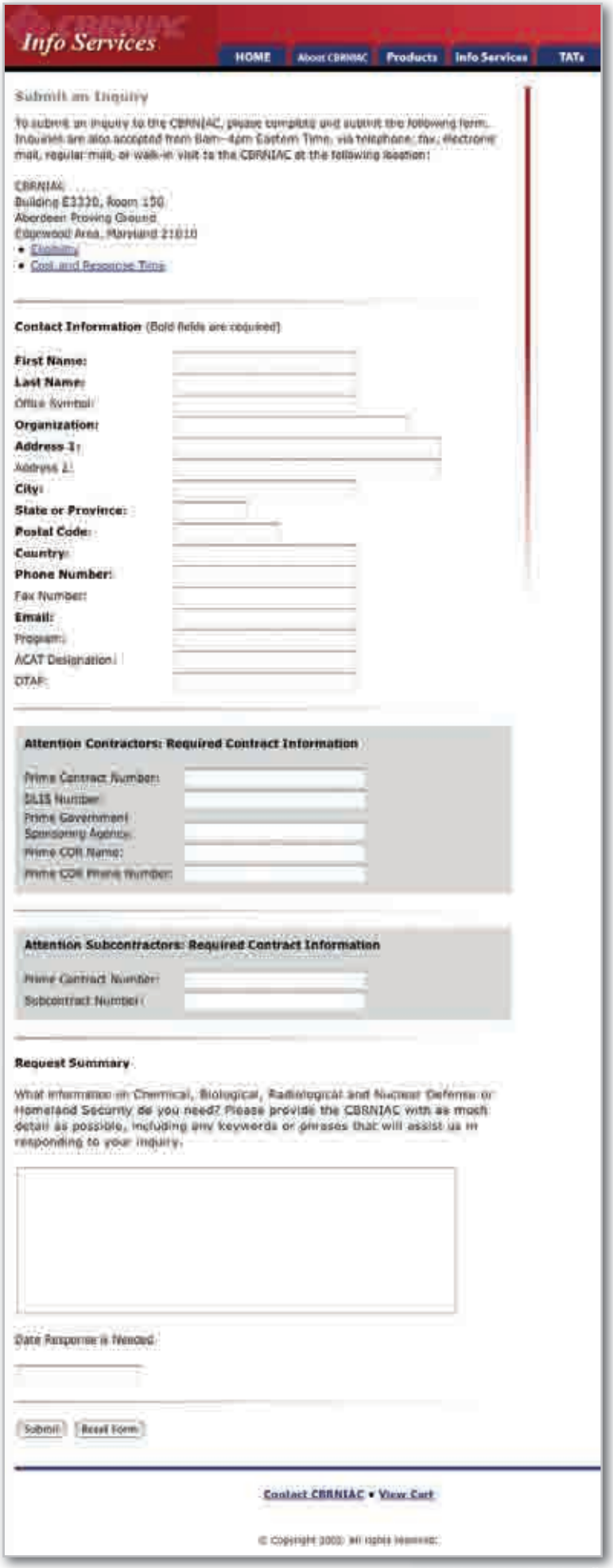
Response: Subject Matter Experts (SMEs) were contacted to determine a reliable documentation of standards for drinking water. Inquiry Analysts were guided to Technical Bulletin (TB) Med 577, the standard to follow at the time of the request. TB Med 577 is in the process of being updated by TB Med 577 Interim Guidance (July 2005).

When You Need Assistance

It's part of the CBRNIAC mission to support the CBRN Defense and Homeland Security communities. Responses are provided in electronic format if possible, or hardcopy if necessary. Requestors are asked to allow up to 10 business days for a response package, but shorter turnaround times are more usual. Same-day responses are provided when required.

CBRNIAC Inquiry services are available to DoD agencies, military services, other Federal Government agencies, DoD and Federal Contractors, and state and local governments and emergency response organizations.

Questions in any area of our mission and scope can be posed by phone, email or by using the interactive form on our Web site at http://www.cbrniac.apgea.army.mil/info/inquiry.php.



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On 17 April 2007, the Chemical and Biological Defense Information Analysis Center (CBIAC) was officially re-designated the **Chemical, Biological, Radiological and Nuclear Defense Information Analysis Center (CBRNIAC).** This new designation more accurately reflects the technical scope of the IAC and the products and services we provide to the CBRN Defense and Homeland Security communities.

Visit our updated website at http://www.cbrniac.apgea.army.mil.

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