ARMY CHEMICAL REVIEW

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Summer 2008

From Gas Attacks to CBRN Response:

90 Years of the Dragon Soldier

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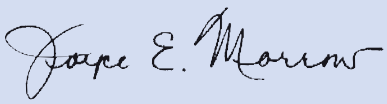

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ARMY CHEMICAL REVIEW

THE PROFESSIONAL BULLETIN OF THE CHEMICAL CORPS
Headquarters, Department of the Army

PB 3-08-1
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Chief of Chemical

Brigadier General Thomas Spoehr

Dragon Soldiers, another great edition of *Army Chemical Review*! I am proud to report that our Corps is advancing on all fronts.

On 28 June 1918, President Woodrow Wilson ordered the establishment of the Chemical Warfare Service as a separate branch of the National Army. Therefore, 2008 marks the 90th anniversary of the founding of our branch, and this edition of *Army Chemical Review* commemorates that fact. We will celebrate this milestone 22–28 June 2008 here at Fort Leonard Wood, Missouri—the home of the Chemical Corps. *(See page 4 for a schedule of events.)* If you can't be here with us—and I truly hope you'll be able to join us—then I ask you to reflect during that week about the service of our Corps to the Nation and how it has always been the Dragon Soldiers who make our Corps the greatest in the Army.

The theme for this year's Regimental Week is "From Gas Attacks to CBRN Response: 90 Years of the Dragon Soldier." I didn't dream up this theme, but I wish I had. Because, to me, it perfectly captures the idea that our Corps was founded by Soldiers. Despite all odds and despite skepticism and outright hostility at times, Dragon Soldiers strived and succeeded in training, equipping, and protecting their comrades from the dangers of chemical, biological, radiological, and nuclear (CBRN) weapons.

Major Charles Heller, in his seminal paper, "Chemical Warfare in World War I: The American Experience, 1917–1918," speaks eloquently of the difficulties faced by Dragon Soldiers in 1918 while training other Soldiers to use the uncomfortable equipment that protected them from mustard and other agents.[1] Although much has changed

We must continue training Army forces to survive and win in CBRN environments, despite the discomforts and challenges of operations in those environments.

in ninety years, some things stay the same. We must continue training Army forces to survive and win in CBRN environments, despite the discomforts and challenges of operations in those environments. Ninety years later, Dragon Soldiers still employ persuasion, innovation, and persistence to overcome all obstacles. Chemical units and staffs (Active Army and Reserve Component) continue to perform magnificently in all areas: continental United States (CONUS), outside the continental United States (OCONUS), combat zones, and civil support operations. I like to tell folks that the Chemical Corps is the most versatile and experienced Corps in the Army—and I defy anyone to make a valid argument otherwise!

It's hard for me to believe, but it has come time for me to move on to another assignment. In June, I will be reassigned to the Department of the Army G-8. Frankly, I hate to leave this position—and I could not have survived without the help of Regimental Command Sergeant Major Patrick Z. Alston—but the Army will assign another great officer to this command. Our Corps will not lose a beat with the help of our outstanding Assistant Commandant, Colonel Greg Olson; the Chief of Staff, Lieutenant Colonel Doug Straka; and the superb teams at the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) and 3d Chemical Brigade.

I will continue to serve as a staunch advocate for the Chemical Corps and for the capabilities needed for this Nation to counter the threats posed by weapons of mass destruction. I want to thank you for your service to the Chemical Corps and for your support to the USACBRNS and me. I am in awe of your sacrifices and dedication.

ELEMENTIS, REGAMUS, PROELIUM!

Endnote:

[1]Charles E. Heller, "Chemical Warfare in World War I: The American Experience, 1917–1918," Leavenworth Papers No. 10, September 1984, <*http://www-cgsc.army.mil/carl/resources/csi/Heller/HELLER.asp*>, accessed on 8 April 2008.

10th RCSM Signing Out!

Command Sergeant Major Patrick Z. Alston

For the past four years, I have had the distinct honor and privilege of serving Dragon Soldiers as the 10th Regimental Command Sergeant Major. Time has a way of continuing to move forward in our everyday lives. And as much as I (and maybe others) would love to freeze time in place and enjoy precious moments forever, it is impossible. The time has come for me to pass the banner of leadership, mentorship, and guidance—and the management of our Corps—to the next senior NCO who will lead and guide the Corps to the next level.

I have willingly and with humble gratitude served and supported two chiefs of the U.S. Army Chemical Corps: Brigadier General Thomas W. Spoehr and Brigadier General Stanley H. Lillie (Retired). Since 16 April 2004, time has seemingly transpired quickly and speedily. I have enjoyed every moment, every day, and every second spent at the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS). It has been a pleasure—and it has certainly been a real joy—for me to provide leadership and constant support while serving the Army in this capacity. I have served as the Regimental Command Sergeant Major for more than 21,000 Dragon Soldiers who are spread evenly among the three components of the Army. And as the USACBRNS Command Sergeant Major, I have served more than 800 talented professionals engaged in training through resident and distributed learning programs.

During my time as the Regimental Command Sergeant Major, I have been blessed because so many positive and upward-mobility changes in the Corps have transpired. Our Corps has seen growth through many programs designed to promote the readiness of the enlisted force; the chemical, biological, radiological, and nuclear (CBRN) NCO development guide has been published; and the five-year shortage issue of sergeants in the Chemical Corps has been resolved. Additionally, for the first time in the history of this Corps, the Warrant Officer Program was established. It has been approved at the Department of the Army level, and implementation will soon follow. The Dragon's Peak competition, which names the Chemical Corps Soldier and NCO of the year, injected pride through the competitive edge—because passion in what one believes in will always be a driving force that compels people to show others how deep the blood flows in their veins.

I unequivocally believe that people and Soldiers are the centerpieces of our formations, that readiness is our mission, and that transformation is an imperative.

I am proud to note that during the last four years, the interest of others outside the Chemical Corps has grown significantly. The number of command sergeants major in brigade positions increased from one to seven, and the nominative command sergeants major positions increased from one to three. The 3d Chemical Brigade transformed from three battalions to seven, which has considerably increased our footprint on Fort Leonard Wood.

In my initial article as the 10th Regimental Command Sergeant Major, my desire was to foster effective communication with the units in the field, the Soldiers, and the civilians throughout the CBRN community; support the heritage of the Corps; be a role model to all Soldiers; share the great work we do as CBRN Soldiers and; where possible, improve weaknesses. In short, I unequivocally believe that people and Soldiers are the centerpieces of our formations, that readiness is our mission, and that transformation is an imperative.

I will be remiss if I do not thank everyone who supported me during my tenure as the Regimental Command Sergeant Major—so, THANK YOU! I am tremendously blessed and honored to be selected as the first Chemical Command Sergeant Major to serve at the three-star level (Defense Threat Reduction Agency). I do not take this selection lightly. And I promise to continue representing the Corps with honor, dignity, and pride.

RCSM 10 out!

90th Anniversary Regimental Week Agenda

The 2008 U.S. Army Chemical Corps 90th Anniversary Regimental Week will be conducted at Fort Leonard Wood, Missouri, in June. The following schedule is provided for planning purposes, but is subject to change due to ongoing operational commitments. For additional information and last-minute changes, please visit the U. S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) public Web site at <*http://www.wood.army.mil/cbrns/*>.

Time	Event	Location
Sunday, 22 June		
0700–2300	Dragon's Peak Noncommissioned Officer of the Year and Soldier of the Year Competition	Various
Monday, 23 June		
0700–1800	Regimental Golf Tournament/Barbecue	Piney Valley Golf Course
1200–1700	20th Support Command (CBRNE) Commanders' Conference	Battle Lab
Tuesday, 24 June		
0900–1600	Sergeants' Major Conference	Pershing Community Club
0900–1130	Colonels' Conference	Pershing Community Club
1130–1300	General Officers', Colonels', and Sergeants' Major Combined Luncheon	Pershing Community Club
1300–1600	General Officers' Conference	Pershing Community Club
1500–1900	National Defense Industrial Association (NDIA) Joint CBRN Conference Registration (Exhibits Open)	Exhibit Pavilion
1900–2200	General Officer/VIP Dinner (by invitation only)	Essayons 2
Wednesday, 25 June		
0600–0700	Regimental Run	Gammon Field
0600–1700	48th Chemical Brigade Capabilities Exercise (CAPEX)	LT Terry Facility/CDTF
0730–0900	Registration and Continental Breakfast	Exhibit Pavilion
0800–1830	Exhibits Open	Exhibit Pavilion
0915–0930	Opening Ceremonies/Welcome	Baker Theater
0930–1130	NDIA Joint CBRN Conference	Baker Theater
1130–1230	International Luncheon	LT Terry Facility
1130–1330	Lunch	Exhibit Pavilion
1330–1530	NDIA Joint CBRN Conference	Baker Theater
1530	Closing Comments, Day 1	Baker Theater
1530–1700	Demonstrations	Baker Theater
1700–1830	NDIA Reception	Exhibit Pavilion
1830–1930	Hall of Fame Reception	Pershing Community Club
Thursday, 26 June		
0600–0645	"Honor to Our Fallen" Sunrise Service	Memorial Grove
0600–1700	48th Chemical Brigade CAPEX	LT Terry Facility/CDTF

Time	Event	Location
Thursday, 26 June (continued)		
0700–0830	Chemical Corps Regimental Association (CCRA) Corporate Members' Breakfast	Pershing Community Club
0730–0900	Registration and Continental Breakfast	Exhibit Pavilion
0800–1600	Exhibits Open	Exhibit Pavilion
0830–1130	NDIA Joint CBRN Conference	Baker Theater
1130–1330	Lunch	Exhibit Pavilion
1330–1500	NDIA Joint CBRN Conference	Baker Theater
1500	Closing Comments	Baker Theater
1500–1800	Joint Program Manager Warfighter Meeting	Lincoln Hall Auditorium
1600–1700	Hall of Fame Induction Ceremony	Baker Theater
1900–2200	CCRA Members' Barbecue Social	St Robert American Legion
Friday, 27 June		
0645–1600	Warfighters' Seminar	Lincoln Hall Auditorium
1800–2300	Green Dragon Ball	Nutter Field House
Saturday, 28 June		
0930–1030	Regimental Review/Change of Commandant Ceremony	Gammon Field

Honoring Our Fallen Dragon Soldiers

Specialist Aaron R. Clark

Hometown:
Chico, California

Unit:
440th Signal Battalion,
22d Signal Brigade,
V Corps
Darmstadt, Germany

Killed:
5 December 2003

Specialist James Gudridge

Hometown:
Carthage, New York

Unit:
4th Battalion, 64th Armor Regiment,
4th Brigade Combat Team,
3d Infantry Division
Fort Stewart, Georgia

Killed:
6 January 2008

Specialist Arturo Huerta-Cruz

Hometown:
Clearwater, Florida

Unit:
10th Brigade Support Battalion,
1st Brigade Combat Team,
10th Mountain Division
Fort Drum, New York

Killed:
14 April 2008

This casualty list from the ongoing War on Terrorism was current as of the publication date.

Combined Microbiology Training in Support of New and Emerging Biowarfighting Capabilities

By Captain Dana Perkins, Ph.D., and Major Shane Wilde

Biological warfare—coined "public health in reverse" because it involves the deliberate use of living microorganisms or their toxins to incapacitate or kill people[1]—has never been used on a large scale. In fact, it is currently banned under the Biological and Toxin Weapons Convention (BTWC), which was entered into force 26 March 1975. However, some countries are still believed to be pursuing biological and toxin weapons (BTW) capabilities.[2] Moreover, history indicates that even the inadvertent spread of infectious diseases during wartime may erode fighting capability and result in more casualties than actual combat.[3] The threat to our Forces is, therefore, clear and imminent.

Asymmetric Biological and Toxin Threat

One of the founding sponsors of the BTWC, the former Soviet Union (FSU), continued to secretly develop an offensive BTW capability throughout the 1970s and 1980s. The project involved tens of thousands of scientists who were mainly employed by one of about forty civilian research and development facilities in the Biopreparat complex (established in 1973), but also by military institutions. It wasn't until 1992, after the collapse of the Soviet Union, that former Russian President Boris Yeltsin officially acknowledged violations of the BTWC and banned further offensive biological weapons (BW) work in Russia.

Hands-on bacteriology training at MAMC

According to a 2004 testimony before Congress,[4] the U.S. government continues to be concerned about Russian compliance with the BWTC and about the solvency of certain Russian laboratories funded via the Department of Defense (DOD) Cooperative Threat Reduction Program. This is because the infrastructure of the FSU BTW program is largely intact and may be capable of supporting future mobilization for the production and delivery of weaponized biological agents. Moreover, results of "sensitive" research on the genetic engineering of BW agents have been published as recently as 1992.[5,6] The use of these agents against humans could lead to unusual symptoms, thereby obscuring diagnoses and delaying therapy.

While terrorists continue to favor proven conventional tactics such as bombings and shootings, the possibility of chemical, biological, radiological, and nuclear (CBRN) attacks cannot be disregarded. Worldwide terrorist organizations and nonstate actors have expressed an interest in CBRN agents. In 2005, at the first International Criminal Police Organization (INTERPOL) global conference on preventing bioterrorism, French Interior Minister Dominique de Villepin stated that "Several al-Qaida cells have been trained in Afghanistan, where they have learned to use biological agents including anthrax, ricin, and botulinum toxins. Later, after the fall of the Taliban regime, those groups continued their experiments in the Pankisi Gorge, on [*sic*] the territory of Georgia, bordering Chechnya."[7] Moreover, on 31 March 2005, the Commission on Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction concluded that "Al-Qa'ida's [*sic*] biological program was further along, particularly with regard to Agent X than pre-war [*sic*] intelligence indicated. The program was extensive, well-organized, and operated for two years before 9/11, but intelligence insights into the program were limited."[8]

An 11 August 2005 posting to an al-Qaida message board indicated that "the use of nuclear, dirty bombs, chemical and biological weapons by martyrs is justified as part of holy war strategy [*sic*]." On 28 September 2006, the leader of al-Qaida in Iraq, Abu Ayyub Al-Masri, released the following call to scientists: "We are in dire need of you. The field of jihad can satisfy your scientific ambitions [*sic*] and the large American bases [in Iraq] are good places to test your unconventional weapons, whether biological or dirty, as they call them." Recent insurgent attacks in Iraq, including those involving exploding trucks filled with chlorine canisters, may illustrate responses to this call. They may also reflect the escalation and further development of classic suicide bombing techniques.[9]

Counterproliferation

The main goal of the Cooperative Threat Reduction Biological Weapon Proliferation Prevention Program (BWPP) is to facilitate a partnership between FSU states working toward the successful global elimination of BW and the prevention of bioterrorism. The Cooperative Biological Research (CBR) Program of the BWPP specifically aims to engage FSU BW scientists, preempt the "brain drain" of these scientists to rogue states and terrorist groups, gain U.S. access to scientific expertise to enhance preparedness against biological threats, and reduce the threat through direct U.S./FSU cooperation on biological research. Memoranda of understanding were signed between the agency implementing the CBR program (Defense Threat Reduction Agency [DTRA]) and the Department of the Army so that military experts from organizations such as the U.S. Army Medical Research Institute of Infectious Diseases could provide support for CBR efforts. Some of the experiences and lessons learned from this partnership are available to Chemical and medical Soldiers and may enhance BW awareness and overall preparedness.

110th Chemical Battalion

The 110th Chemical Battalion (Technical Escort [TE]) is one of five subordinate chemical battalions within the 48th Chemical Brigade, which is assigned to the 20th Support Command (Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives [CBRNE]).

The mission of the 110th Chemical Battalion is to conduct weapons of mass destruction–elimination operations in support of the combatant commander and to support local, state, and federal agencies at CBRNE incidents within the Homeland. The Soldiers of the battalion mitigate the effects of chemical and biological weapons through detection, monitoring, presumptive analysis, render-safe operations, packing and transportation, and limited decontamination operations.

Soldiers conducting decontamination

An emerging unconventional biological threat and the requirement for a full CBRNE spectrum response pose new challenges for individual and unit training. As U.S. Forces face a potential CBRNE threat across the full spectrum of combat operations, a broad range of military operations from homeland security support to war and stability operations may be necessary. Combined TE unit/Army Medical Department training, if expanded and standardized, could enhance the capabilities of Chemical and medical Soldiers to fight and win in a CBRNE environment. The 110th Chemical Battalion and the Madigan Army Medical Center (MAMC) recently participated in such joint cooperative training.

Clinical Microbiology and Molecular Diagnostics Training

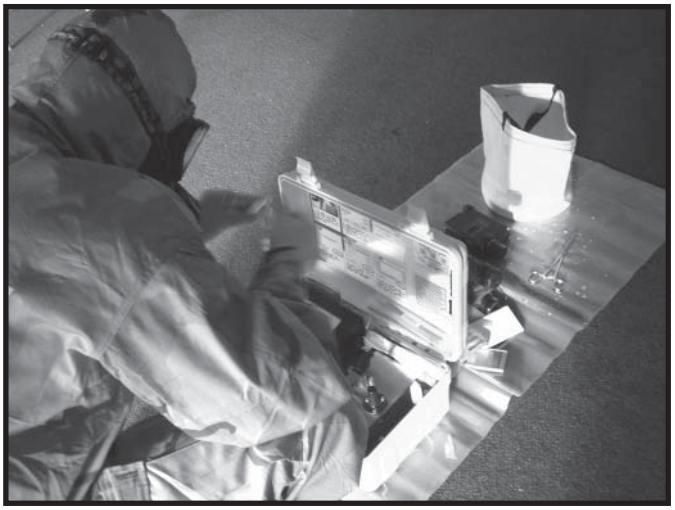
From December 2006 to April 2007, twenty-four 110th Chemical Battalion Soldiers with military occupational specialties of 74A and 74D were trained on basic clinical microbiology at MAMC, Fort Lewis, Washington. The training objectives included understanding the principles of pathogen isolation, understanding processes involved in identifying a pathogen in a clinical specimen, learning good laboratory practices, and observing and discussing laboratory procedures with medical laboratory technicians (MLTs). Opportunities for hands-on practice of agar-streaking techniques and antibiotic susceptibility testing were also provided.

In addition to basic clinical microbiology training, Soldiers were trained in basic concepts of molecular diagnostics, with an emphasis on biological-agent detection and an overview of detection technologies, including capabilities and program development of the Ruggedized Advanced Pathogen Identification Device (RAPID) and

the Joint Biological Agent Identification and Diagnostic System. The training objectives included understanding the quality control requirements of polymerase chain reaction data, learning good molecular diagnostics laboratory practices, and assessing and mitigating the risk of cross contamination. Trainees also had the opportunity for hands-on practice of parallel deoxyribonucleic acid (DNA) extraction of *Legionella pneumophila* on Dacron swabs (to simulate environmental sampling) with a Roche MagNa Pure instrument (currently in use at MAMC and in the RAPID system used by TE units in the field) and parallel polymerase chain reaction testing using a Roche LightCycler instrument and RAPID.

Following the clinical microbiology and molecular diagnostics training, Soldiers were asked to complete an evaluation which included the following questions:

1. Was the training provided relevant to your current duties and/or mission? Was the time allotted to training appropriate in length? All respondents except one noted that the training was useful and relevant. The comments indicated that the training would help Soldiers improve prioritization, gain a better scientific background, understand basic laboratory instrumentation, understand the difference between clinical and weapons laboratories, and apply the fundamental aspects of MLT work to daily tasks. One of the participants felt that more time at the setup bench would have been useful.
2. Were the briefings provided useful and informative in content? All Soldiers answered affirmatively. Comments indicated that additional information about obtaining clinical samples from deceased individuals who were suspected to have died as a result of chemical and biological weapons would have been useful.
3. Were the laboratory trainers knowledgeable and helpful? All Soldiers answered affirmatively.
4. Would you like to attend more training sessions at MAMC? All Soldiers answered affirmatively. Comments indicated that MAMC microbiology training could contribute to integrated contingency response training (through joint bioterrorism preparedness drills); customized training on specific techniques or equipment used by clandestine and government-sponsored biowarfare and terrorist laboratories; instruction on the weaponization of certain parasites, viruses, and bacteria; field testing of clinical samples; and training in chemistry and hematology laboratories.



TE Soldier conducting presumptive identification of an unknown liquid

BW Threat Awareness Training

Captain Dana Perkins, Ph.D. (a MAMC-assigned officer with Military Occupational Specialty 71A), assisted with the presentation of a week-long training program to contractors and Soldiers of the 110th Chemical Battalion on the production and use of biological agents. The training was conducted by ImmunoSolutions, Incorporated—a company specializing in biological incident training for first responder units. The program involved a series of briefings on several topics: the history of biowarfare, microbiology of biological agents, aerobic and anaerobic bioprocesses, detection overview, bioprocessing and optimization, bioprocess equipment and uses, specific systems for specific agents, dissemination, bioterrorism and biocrimes, agroterrorism, bioterrorism case studies, and lessons learned from Iraq. It also addressed laboratory techniques and procedures; featured hands-on activities (including work with nonpathogenic bacterial simulants) to teach the essentials of retrieval, culture, fermentation, and downstream processing of microorganisms; and included a multiday team project that involved using off-the-shelf items to build a complete bacterial fermentation system in a makeshift laboratory.

In addition, Captain Perkins briefed 110th Chemical Battalion Soldiers on the use of viruses as biowarfare/bioterrorism agents. Topics covered included the definitions of biowarfare/bioterrorism, historical examples of biowarfare/bioterrorism attempts and incidents involving viruses, sensitive research, terrorist types and potential bioterrorism attacks, al-Qaida interest in biological agents, "fingerprints" of potential BW programs, threat assessments and criteria for prioritizing

preparedness efforts, public health consequences of a biowarfare/bioterrorism threat or event, and infection control measures.

As a former DTRA contractor/desk officer in the BWPP/CBR program, Captain Perkins attended a series of officer professional development lectures at the 110th Chemical Battalion and presented a briefing on U.S. government nonproliferation programs that focused on the redirection of former bioweaponeers in Russia, Libya, and Iraq toward public health-oriented research programs. Dr. Alexander Chepurnov (a scientist at the Michigan Nanotechnology Institute for Medicine and Biological Sciences, Ann Arbor, Michigan)[10] presented a lecture on Ebola and Marburg diseases, epidemiology, vaccine development, work at the State Research Center of Virology and Biotechnology "Vector" (with a pictorial demonstration of personal protective equipment use), and the Ebola laboratory accident case[11] clinical course and management.

Sharing of Chemical Expertise

Major Shane Wilde, 110th Chemical Battalion operations and training officer (S3), was a guest speaker for chemical warfare and terrorism briefings conducted for medical residents, laboratory personnel, MLT students, and other MAMC staff. Major Wilde discussed chemical detection and decontamination, while Captain Perkins provided an overview of clinical symptoms of and medical countermeasures for chemical agents and a history and assessment of the current threat of chemical terrorism (with an emphasis on al-Qaida and scientific communities in Islamic countries).

Captian Perkins attended the 110th Chemical Battalion exercise on site assessment and exploitation of a "clandestine" chemical production facility and has received training on TE procedures for personal protective equipment use, the operation of field detection devices, sample collection, and decontamination.

Conclusions

Executing CBRN defense requires the overall integration of multiservice doctrine and intraservice coordination of activities as outlined in Field Manual (FM) 3-11. It is the authors' opinion that further integration and combined TE unit/Army Medical Department training will enhance the ability of the Army to defend against and mitigate the effects of CBRN incidents.

As Lieutenant Colonel Mark Lee, commander of the 110th Chemical Battalion, stated, "The unique set of microbiology skills and biowarfare threat assessment provided to our Soldiers as a result of MAMC involvement are [*sic*] an illustrative example of Army transformation toward a responsive, deployable, agile, and versatile force able to adapt its training and future operations to an everchanging threat climate in order to remain relevant."

Endnotes:

[1]*Technologies Underlying Weapons of Mass Destruction*, U.S. Congress, Office of Technology Assessment, Government Printing Office, Washington, D.C., December 1993.

[2]"Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 2003," Central Intelligence Agency.

[3]J.P. Heggers, "Microbial Invasion—The Major Ally of War (Natural Biological Warfare)," *Military Medicine,* Volume 143, Number 6, June 1978, pp. 390–394.

[4]Testimony of Lisa Bronson, Deputy Under Secretary of Defense for Technology Security Policy and Counterproliferation, before the Senate Committee on Armed Services, Subcommittee on Emerging Threats and Capabilities, 10 March 2004.

[5]V.M. Borzenkov et al., "The Additive Synthesis of a Regulatory Peptide in Vivo: The Administration of a Vaccinal *Francisella tularensis* Strain That Produces Beta-Endorphin," *Biull Eksp Biol Med*, August 1993.

[6]V.M. Borzenkov et al., "Study of Nonpathogenic Strains of *Francisella*, *Brucella,* and *Yersinia* as Producers of Recombinant Beta-Endorphin," *Biull Eksp Biol Med,* June 1994.

[7]"Preventing Bioterrorism: The 1st INTERPOL Global Conference," Lyon, France, 28 February–1 March 2005.

[8]"The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction," Report to the President of the United States, 31 March 2005.

[9]Audrey Kurth Cronin, "Terrorists and Suicide Attacks," Congressional Research Service Report for Congress, 28 August 2003.

[10]Dr. Chepurnov was formerly the chief of Biosafety Level 4 Highly Dangerous Viruses at the State Research Center of Virology and Biotechnology "Vector," Novosibirsk, Russia.

[11]In May 2004, Antonina Presnyakova, a scientist working with the Ebola virus, accidentally injected herself with the deadly virus and died two weeks later.

References:

FM 3-11, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations*, 10 March 2003.

ImmunoSolutions, Incorporated, Web site <*http://www.immunosolutions.com*>, accessed on 10 April 2008.

Captain Perkins served in Operation Enduring Freedom 20 April 2006–5 September 2007. She was appointed chief of the Clinical Immunology and Molecular Diagnostics Laboratory at MAMC and also served as a CBRN instructor with I Corps.

Major Wilde, formerly the 110th Chemical Battalion S3, is currently attending Command and General Staff College. He holds a bachelor's degree in political science from the University of Oregon.

Decontamination Operations in a Mass Casualty Scenario:

Observations From Ardent Sentry 2007

By Michael L. Snyder and Thomas J. Sobieski

At 10 a.m. on 10 May 2007, a terrorist group smuggled in and detonated a nuclear device, resulting in a 10-kiloton surface blast near Lawrence, Indiana (just northeast of Indianapolis). Local, state, and federal government officials were presented with many complex challenges as a result of this catastrophic event. Among the most challenging tasks was the need to quickly and completely decontaminate much of the population. This was the scenario for the week-long Ardent Sentry 2007 (AS07) exercise.

The Department of Defense (DOD) is capable of providing decontamination in support of civil authorities. However, the effective employment of DOD decontamination capabilities requires a full understanding of the special circumstances surrounding a homeland event and the doctrinal differences between defense support of civil authorities (DSCA) and battlefield decontamination operations.

This article (sponsored by the Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense [JRO CBRND]) focuses on two aspects of the DOD decontamination mission:

- Differences in conducting decontamination operations in a DSCA environment versus a traditional wartime environment.
- Additional considerations for mass decontamination in a DSCA environment.

Background

Since 2004, the JRO CBRND has been providing chemical, biological, radiological, and nuclear (CBRN) and consequence management subject matter experts to support combatant commands and subordinate training and exercise programs. The JRO CBRND has also partnered with several non-DOD government agencies to enhance the knowledge of DSCA procedures.

The AS07 exercise was designated by the Chairman of the Joint Chiefs of Staff, sponsored by the U.S. Northern Command (NORTHCOM), and supported by the U.S. Joint Forces Command (JFCOM). In the months leading up to AS07, the JRO CBRND provided technical assistance to the NORTHCOM Operational Plans and Joint Force Development Directorate (J-7) and JFCOM J-7 in observing battle staff operating procedures at selected command and control locations and developing the effects of the nuclear detonation. Exercise development included collaborating with exercise planners from the Indiana Department of Homeland Security and the Indianapolis Department of Public Safety to build the documents and determine the scenario participants needed to drive DOD responses to federal requests for assistance.

Based on National Planning Scenario 1,[1] AS07 primarily focused on the ability of NORTHCOM to execute DOD chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) response plans at the operational level. For the first time, the Ardent Sentry exercise also included a separate but simultaneous field training exercise designed to allow selected DOD units to train with their civilian counterparts.

CCMRF Soldiers perform decontamination operations during AS07.

The nuclear detonation that occurred at the outset of the AS07 exercise was designed to simulate a "no-notice" terrorist event. Scripted weather, census data from 2000, and computer modeling were used for the scenario. Casualties were estimated at 15,000 dead and 21,000 injured. The injured included those affected by the blast itself and by thermal radiation, prompt radiation, and radioactive fallout.

The nuclear detonation and subsequent effects resulted in the appointment of a principal federal official by the Department of Homeland Security (DHS) followed by a presidential disaster declaration. DHS and the Federal Emergency Management Agency (FEMA) (Region V) established a joint field office (JFO) at Camp Atterbury, which is located about forty-three miles south of Indianapolis. The defense coordinating officer and element from FEMA Region V joined the JFO coordination staff. NORTHCOM Joint Task Force–Civil Support was also deployed to Camp Atterbury to provide command and control of DOD forces deployed to support the local, state, and federal response.

The JRO CBRND is the single office within DOD responsible for the planning, coordination, and oversight of joint CBRN defense operational requirements. The JRO CBRND serves as the Chairman of the Joint Chiefs of Staff single source of expertise to address all issues involving CBRN defense within passive defense, consequence management, force protection, and homeland security.

In addition, elements of the DOD CBRNE Consequence Management Response Force (CCMRF) were deployed to conduct consequence management operations in concert with first responders from Marion County, Indiana; the Indiana Department of Homeland Security; the Indiana National Guard CBRNE Enhanced Response Force Package; and civil support teams. This field training exercise was conducted at the Muscatatuck Urban Training Center, located about twenty-five miles southeast of Camp Atterbury.

It became apparent during the planning process and exercise execution that further discussion of the two aforementioned aspects of the DOD decontamination mission would benefit the CBRN response community in general and emergency responders in particular.

DSCA

In a scenario such as that presented in AS07, DOD is ready to assist with local, state, and federal response efforts. Upon receipt of a request for federal assistance, DOD provides support according to the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* and *The Economy Act*. The *National Response Plan* (which was in effect at the time of the exercise but has since been replaced by the *National Response Framework*) provides the coordinating framework for the support. DOD provides support for all fifteen emergency support functions of the *National Response Plan* and is a cooperating agency for most of the *National Response Plan* support and incident annexes. When requested, DOD (in concert with other federal agencies and possibly federalized National Guard units) supports the primary agency (DHS) by providing the manpower and equipment necessary to quickly mitigate the effects of the disaster and meet the needs of responding local and state officials. The manner in which DOD provides this support is described in NORTHCOM Contingency Plan 2501. The JFO is responsible for coordinating DOD and other existing capabilities.

Decontamination in a DSCA Environment

In the AS07 scenario, DOD was called upon to augment or provide relief in place for decontamination operations that had been initiated by local first responders and National Guard units in state active duty or Title 32 status.[2] Thus, it is important for DOD decontamination units to know and understand the manner in which civilian first responders approach expedient mass decontamination operations.

Before 11 September 2001, a very thorough and capable decontamination process was used when responding to and remediating hazardous materials spills. The procedures and systems used were equipment- and manpower-intensive and had various but limited throughput capacities—usually 50 to 100 people per hour. By comparison, the current decontamination throughput capacities of DOD units such as the Marine Corps Chemical/Biological Incident Response Force and Army Chemical decontamination units vary from 250 to 400 Soldiers per hour.[3]

Recognizing the need to more rapidly perform mass decontamination, civilian first responders developed methods of increasing their decontamination capabilities. Two of the more common approaches include the Emergency Decontamination Corridor System and the

Ladder Pipe Decontamination System (LDS). Both have been documented in publications by the U.S. Army Soldier and Biological Chemical Command (SBCCOM)[4] and the Chemical, Biological, Radiological, and Nuclear Defense Information Analysis Center (CBRNIAC).

In January 2000, SBCCOM published *Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident*.[5] Section 4.4 of the guidelines contains excellent schematics; photographs; and descriptions of the Emergency Decontamination Corridor System, LDS, and first-responder equipment commonly used for mass decontamination. Although the mass decontamination capabilities were reviewed with respect to a chemical event, several conclusions also apply to a nuclear detonation scenario, such as—

- Expect an unaffected-to-affected casualty ratio of five to one.
- Perform decontamination as soon as possible.
- Disrobe from top to bottom.
- Flush with water, since it is generally the best method for mass decontamination.
- Self-decontaminate as soon as possible to avoid serious effects after known exposure to a liquid agent.

Similarly, CBRNIAC cites CR-04-12 and SOAR-03-10. As with the SBCCOM guidelines, the focus of SOAR-03-10 is on responding to and decontaminating victims of chemical or biological incidents; however, the sections on general decontamination principles and the setup and management of incident sites are useful for nuclear scenarios as well.

DOD forces are trained and equipped much like their civilian fire department counterparts, and the two entities routinely collaborate through mutual assistance and aid compacts. To adequately fulfill the DSCA role, it is imperative that the DOD response community become familiar with civilian expedient mass decontamination equipment and procedures.

Impact of DSCA on Decontamination Tasks

During development of the exercise scenario, participants discovered that special considerations were required for decontamination efforts in a DSCA environment. Military CBRNE planners must take into account—

- Personnel to be decontaminated.
- Multisite operations.
- Integration of decontamination operations with other plans.
- Disposition of runoff.
- Disposition of personal effects.
- Accountability.
- Crowd control operations.

The CBRNE planner must be keenly aware of the full extent to which DOD decontamination capabilities will be employed in a DSCA environment. Incorporating the special considerations into staff preplanning and command guidelines will strengthen the execution of mass decontamination operations.

An additional source of information that can be used to amplify and support these special considerations is the DHS lessons-learned, information-sharing Web site at *<http://www.LLIS.gov>*. It contains an archive of best practices for subjects of interest to the response community at large. One of the citations, "Radiological Dispersal Device Incident Response Planning: Decontamination," provides insight into the topical discussions presented here.

Personnel to be Decontaminated

In the AS07 scenario, computer modeling indicated that about 21,000 citizens were within the area defined as the "evacuation zone." Some of these citizens would need to be evacuated immediately, while it might be possible for others who were further downwind to find shelter and be evacuated later.

It is reasonable to assume that not all personnel within the evacuation zone were contaminated. Identifying those who were "clean" (not contaminated) would greatly reduce the decontamination resources required and expended. In a no-notice event, such as that of AS07, the prescreening process is complicated by several factors. For example, many actual or potential victims may have self-evacuated, which creates problems such as locating and treating them, communicating with them, and dealing with any cross contamination that may have occurred as a result of their evacuation. Additionally, first responders—some of whom may be victims themselves or become victims through exposure—may arrive late and be uninformed due to degraded communications.

Multisite Operations

Most likely, several decontamination sites will need to be established around the plume perimeter to effectively respond to the magnitude of need at a mass casualty incident. While DOD is not the primary agency responsible for coordinating the operation of multiple decontamination sites, the efficiency and success of the process can be maintained and even improved with the help of military leaders who are prepared to provide

support or relief to any operation or take over the full operation of a particular site.

Integration of Decontamination Operations With Other Plans

Decontamination operations must be integrated into the entire mitigation and recovery process. Successful decontamination operations include planning the initial medical triage; completing follow-on medical care; and providing subsequent transportation, food, clothing, and shelter for all prescreened individuals.

Ambulatory and nonambulatory decontamination lines must be established. The distance from the decontamination area to triage facilities and transportation staging areas should be established in such a manner that wind shifts do not threaten operations. Other provisions that must be planned include food and water for those awaiting transportation, trash collection, and the proper consolidation and disposal of contaminated clothing and personal effects. To prevent overcrowding at the decontamination site, it is recommended that pickup and transportation be conducted according to *National Response Plan* Emergency Support Function #8 (Health and Medical Annex) and in coordination with the American Red Cross.

Disposition of Runoff

During conventional hazardous-materials decontamination operations, runoff is contained to prevent environmental contamination. A hard surface with the proper grade for reducing cross contamination is essential for containing the runoff. There are numerous federal and state laws that govern runoff, and runoff issues must be addressed and coordinated with the proper environmental agencies.

The need to quickly process large numbers of people through the decontamination line makes runoff containment in the DSCA environment particularly challenging. And the ECDS and LDS operate as high-volume/low-pressure systems, generating significant amounts of runoff. Therefore, the selection of a proper location and configuration for the runoff containment system is crucial for enabling continuous decontamination operations and reducing the amount of postdecontamination remediation necessary. When planning and executing decontamination operations in a DSCA environment, CBRNE staff officers must consider laws, policies, and environmental impacts regarding runoff. Environmental Protection Agency (EPA) 550-F-00-009 contains an excellent synopsis of this issue.

Disposition of Personal Effects

The need to quickly and efficiently decontaminate a large number of people also creates the need to handle their personal effects. Jurisdictional decisions regarding the disposition of personal effects must be addressed during the planning stages. Decisions regarding the disposition of identification items such as licenses and credit cards must be consistent with local protocols. In addition, protocols for the screening and disposition of vehicles must also be in place.

Accountability

The magnitude of the event presented in the AS07 exercise most certainly represents a worst-case scenario. But, in every event, ascertaining the disposition of everyone who is affected, displaced, injured, or killed is a major concern. Complicating the need to track a large number of displaced residents through evacuation, decontamination, transportation, and follow-up medical care is the fact that they may have also been stripped of any identification. In the initial chaos of a no-notice event, other priorities may have precluded the establishment of accountability protocols. In any case, although this task is not addressed in typical DOD decontamination procedures, DOD may be expected to provide such support in a DSCA environment.

Crowd Control Operations

Crowd control is essential for effective mass decontamination operations. Local law enforcement personnel direct victims to various mass decontamination sites that have been established upwind of the blast and outside the projected plume path. Victims are informed of the necessity to move through the decontamination process in an orderly and efficient manner. While the *Posse Comitatus Act* prevents Title 10 forces[6] from performing law enforcement duties, the planning and operation of a mass decontamination station must address the need for crowd control and coordination of civilian law enforcement support.

Summary

The capabilities and procedures used to conduct expedient mass decontamination have undergone dramatic changes in recent years. Although DOD is not the lead agency for coordinating the overall decontamination effort in a catastrophic scenario such as a nuclear detonation, DOD forces will likely be called upon to augment existing local or state first-responder operations or establish their own mass decontamination sites.

(continued on page 15)

A "People Sniffer" Operation That Went Terribly Wrong

By Sergeant Major Mike R. Vining (Retired)

The date 13 February 1971 started out as a typical day for the First Team. But that was about to change; a field experiment was to be conducted. The 1st Cavalry Division had been conducting "people sniffer" missions, which involved searching out the enemy by deploying a riot control agent, such as tear gas, causing enemy soldiers to reveal themselves from their concealed positions. Once exposed, gunships could then engage the enemy.

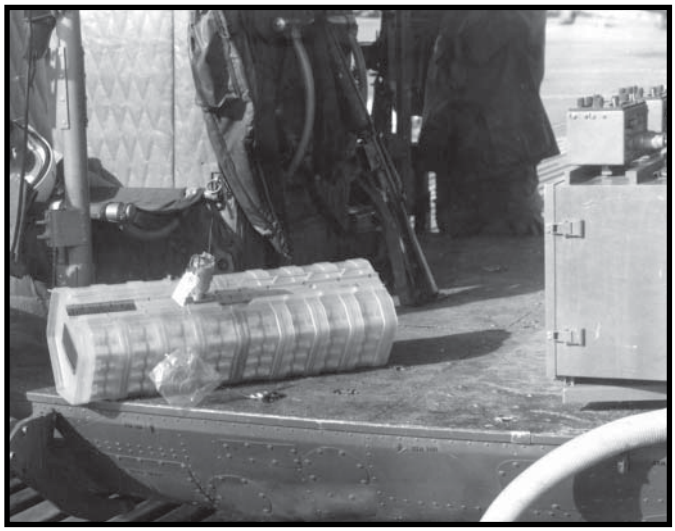
Leading the experiment that day was Captain Frederick "Fred" Phillip Smith, the assistant division Chemical officer assigned to Headquarters, Headquarters Company, 1st Cavalry Division (Airmobile). Support was provided by Headquarters, Headquarters Battery, 2d Battalion, 20th Artillery (Aerial Rocket) and a UH-1H Huey helicopter. Soldiers from the 184th Chemical Platoon (Direct Support) also assisted. The team flew over Binh Thuy Providence, Republic of South Vietnam.

The experiment involved the use of an Air Force E158 2-chlorobenzalmalononitrile (CS) cluster bomb, which was considered to be the best CS delivery system during the Vietnam War. The bomb consisted of 264 canisters (each about the size of a D-cell battery) of CS held in place by a 1- by 3-foot plastic unit. A timing fuze was to detonate a bursting/igniting charge that, in turn, would send the smaller munitions over an area 50 meters in diameter, spraying CS as they went.

Somehow, in the process of deploying the munition, the arming wires were loosened and the E158s began detonating inside the helicopter. Captain Smith's clothing caught fire, and he was badly burned. Although blinded by the fire and resulting smoke, Captain Smith was able to push the cluster munitions out of the helicopter. However, in the confusion, Captain Smith went out with the munitions and fell 1,500 feet to his death. Others onboard the helicopter received burns, and some required extensive hospitalization. Captain Smith's quick thinking and actions saved the helicopter and the lives of seven people. His body was not recovered until three days later.

Captain Smith's heroism is recalled in a book entitled *Hunter-Killer Squadron: Aero-Weapons, Aero-Scouts, Aero-Rifles, Vietnam 1965–1972*.[1] Chapter 26, "Chemicals and People Sniffers," was written by Captain Bob Parker, commanding officer of the 184th Chemical Platoon.

In a personal letter to me, Captain Parker stated, "The sad part was that [Captain Smith] and I had discussed the dangers in how we carried the E158's and he hoped to prove that it would be safe to deploy them en mass, which as it turned out it didn't work. I was on another bird returning from Long Binh when we saw the fire break out in another bird off to our right. Our bird immediately rallied to their bird and landed next to it. There was another bird that was with them and it took the Sergeant Major and some of the others on board in for treatment for their burns.



E158 cluster bomb

Captain Fred Smith

Luckily the injuries were not life threatening and one of my troops ended up in Japan for a month or so for a large burn. He was the one who told us about what had happened as it went up in front of him. [*sic*]"

Captain Smith's decorations and awards included a Silver Star, Bronze Star Medal with oak leaf cluster, Air Medal with three oak leaf clusters, Army Commendation Medal, Good Conduct Medal, National Defense Service Medal, Vietnam Service Medal, Republic of Vietnam Campaign Medal, Parachutist Badge, and Senior Explosive Ordnance Disposal Badge.

Captain Smith was born on 6 March 1946; his hometown was Oklahoma City, Oklahoma. He arrived in Vietnam on 23 March 1970. At the time of his death, Captain Smith was stationed at Phuoc Vinh, Republic of South Vietnam. He served as the Chemical officer and assistant operations and training officer (S3) for 2d Brigade, First Cavalry Division.

While Captain Smith was serving in Vietnam, his wife gave birth to a son who, unfortunately, never had a chance to meet his father.

I am searching for any witnesses to this tragic event. Please contact me at (719) 873-1065 or *mvining@amigo.net* if you have any information.

Endnote:

[1]Matthew Brennan, editor, *Hunter-Killer Squadron: Aero-Weapons, Aero-Scouts, Aero-Rifles, Vietnam 1965–1972*, Presidio Press, Notavo, California, 1990.

Sergeant Major Vining (Retired) is a 30-year Army veteran. From 26 February 1970 through 29 January 1971, he was assigned to the 99th Ordnance Detachment, Explosive Ordnance Disposal Unit, Phuoc Vinh, Republic of South Vietnam.

("Observations From Ardent Sentry 2007," continued from page 13)

This creates the need for DOD to understand the operational employment concepts and equipment that may be employed by civilian first responders. The AS07 exercise provided DOD with that opportunity.

We do not train just for the sake of training. We train because we may actually need to execute the scenario someday.

Endnotes:

[1]The Homeland Security Council, "Scenario 1: Nuclear Detonation—10-Kiloton Improvised Nuclear Device," *National Planning Scenarios*, March 2006.

[2]United States Code (USC), Title 32, *National Guard.*

[3]From a Chemical/Biological Incident Response Force organizational brief and statements made by CCMRF task force response personnel at the CCMRF Commanders' Conference hosted by Joint Task Force–Civil Support, Fort Monroe, Virginia, 28–30 August 2007.

[4] In 2003, SBCCOM was renamed the Natick Soldier Research, Development, and Engineering Center under the U.S. Army Research and Development Command.

[5]SBCCOM, *Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident*, January 2000, available at *<http://www.esd.uga.edu/hart/Web%20Page/Publications/Mass%20Cas.%20Decon..pdf>*, accessed on 15 April 2008.

[6] USC, Title 10, *Armed Forces*.

References:

CBRNIAC Number CR-04-12, *Emergency Decontamination Corridor and Ladder Pipe Decontamination Systems*, May 2004.

DHS *Lessons Learned, Information Sharing* Web site, *<http://www.LLIS.gov>*, accessed on 16 April 2008.

DHS, *National Response Framework*, 22 March 2008.

DHS, *National Response Plan,* December 2004.

EPA 550-F-00-009, *First Responders' Environmental Liability Due to Mass Decontamination Runoff*, July 2000.

NORTHCOM Contingency Plan 2501, *Defense Support to Civil Authorities (DSCA)*, 11 March 2006.

Public Law (PL) 93-288, *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (as codified at *42 USC 68*), 22 May 1974.

SOAR-03-10, *Best Practices and Guidelines for Mass Personnel Decontamination*, June 2003.

USC, Title 18, Section 1385, *Posse Comitatus Act*, 16 June 1878.

USC, Title 31, Section 1535, *The Economy Act*, 25 June 2003.

Mr. Snyder is a homeland security advisor with Battelle Memorial Institute. He is a retired infantry lieutenant colonel and holds a bachelor's degree in history from the University of Colorado.

Mr. Sobieski works for Battelle Memorial Institute. He is an Air Force Reserve lieutenant colonel and holds a bachelor's degree in electrical engineering from Lehigh University, Bethlehem, Pennsylvania, and a master's degree in engineering management from the University of Alaska.

Joint Task Force Elimination Integration and Combined Elimination Team Training in the Republic of Korea

By Lieutenant Colonel John C. Barber

During exercise Ulchi Focus Lens (UFL) 2007 (conducted in August 2007), the Army's 20th Support Command (SUPCOM) Headquarters and the U.S. Strategic Command Joint Elimination Coordination Element (JECE) strategically deployed to the Republic of Korea (ROK), where together they formed a joint task force for weapons of mass destruction–elimination (JTF-E) operations in support of the Combined Forces Command (CFC). During this same time period, two weapons of mass destruction (WMD) joint response teams from the 110th Technical Escort (TE) battalion deployed to the ROK and led two weeks of combined sensitive-site exploitation (SSE) training with teams from the Chemical Special Forces Battalion, ROK Nuclear, Biological, and Chemical (NBC) Defense Command.

The "National Military Strategy to Combat Weapons of Mass Destruction" defines elimination as "military operations to systematically locate, characterize, secure, disable, and/or destroy a state or non-state [*sic*] actor's WMD programs and related capabilities in hostile or uncertain environments."[1] More specifically, elimination operations—

- Prevent the looting or capture of WMD and related materials.
- Render harmless or destroy weapons, material, agents, and delivery systems that pose an immediate or direct threat.
- Control documents and other media to prevent further WMD proliferation or regeneration.

CFC ground components lack the specialized teams, equipment, and expertise necessary to exploit the potentially large number of WMD sites in North Korea. Beginning in 2005, CFC and U.S. Forces Korea (USFK) addressed the need to train with a WMD elimination task force in support of combined and joint mission-essential tasks. To fully achieve standards, CFC needed to successfully integrate a JTF-E during an annual exercise, develop a concept of operations, and incorporate JTF-E operations into its plans.

The February 2006 "Quadrennial Defense Review Report" (QDR) directed the following: "Expand the Army's 20th Support Command (CBRNE) [Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives] capabilities to enable it to serve as a Joint Task Force [*sic*] capable of rapid deployment to command and control WMD Elimination [*sic*] and site exploitation missions by September 2007."[2] Upon receipt of a combatant command request for forces at the U.S. Joint Forces Command, elements of the 20th SUPCOM, the JECE, and other agencies come together to form the JTF-E headquarters. Although the subordinate units of the JTF-E operation are predominantly Army, some are specialized interagency assets. The JTF-E is not a standing joint task force.

During the February 2006 plenary session of the Counterproliferation Working Group (CPWG), the ROK Ministry of National Defense (MND) and U.S. Office of the Secretary of Defense for Counter-proliferation Policy began discussing the need to integrate a JTF-E into CFC, develop ROK capabilities for internal command and control of elimination operations, and establish specialized teams to conduct SSE. As a result of the CPWG, CFC initiated plans to begin two major partnership-building activities between the United States and ROK. The first initiative involved annual combined WMD SSE team training, and the second involved the integration of the JTF-E headquarters into CFC during UFL 2007.

Combined WMD SSE Team Training

For the first iteration of WMD SSE team training, the Defense Threat Reduction Agency provided funding to send 15 soldiers from the ROK NBC Defense Command Chemical Special Forces Battalion to Aberdeen Proving Ground, Maryland, to train with the 22d Chemical Battalion (TE). In September 2006, ROK soldiers, accompanied by the CFC C35[3] Combating Weapons of Mass Destruction (CWMD) Plans Branch, traveled to Aberdeen Proving Ground and trained with the 22d

U.S. and ROK soldiers conduct decontamination following exploitation of a chemical storage facility.

Chemical Battalion for two weeks. This training marked the beginning of an ongoing effort between the United States and ROK to build ROK capabilities for conducting highly technical SSE missions.

The second iteration of combined SSE training occurred in August 2007 in conjunction with UFL 2007. Two U.S. joint response teams from the 110th Chemical Battalion (TE) deployed from Fort Lewis, Washington, to the ROK for two weeks of training with the ROK Chemical Special Forces Battalion. The ROK NBC Defense Command, in coordination with the 50th ROK Infantry Division, hosted the training at an urban warfare training site that replicated a small North Korean village. After a week of classes and hands-on training, U.S. Soldiers joined ROK soldiers to form combined SSE teams. During the second week, the combined SSE teams encountered scenarios that involved entry into a sensitive-site facility, the use of a Portable Isotopic Neutron Spectroscopy System to conduct nonintrusive chemical-ordnance assessment for characterization of unexploded chemical munitions, and detailed personnel decontamination following each mission.

The United States and ROK plan to continue this annual training, alternating the location between the two countries. The goal is to build 12 ROK joint response teams with SSE capabilities similar to those of U.S. TE battalions.

JTF-E Integration into CFC

Immediately following the QDR in February 2006, planners from CFC and the 20th SUPCOM began discussing the possibility of using UFL 2007 to conduct the JTF-E initial operational capability validation exercise. In December 2006, planners from the 20th SUPCOM attended the initial CFC planning conference for UFL 2007 and confirmed that this exercise would be the perfect venue for their upcoming validation exercise.

During the UFL 2007 midplanning conference in February 2007, the CFC CWMD Plans Branch and six planners from the 20th SUPCOM hosted a JTF-E workshop to begin detailed planning and coordination across the CFC staff. The primary objectives were to develop a concept of operations, command and control architecture, command relationships, scenario event lists, and intelligence summaries for North Korean WMD sites. In addition, the group began planning all logistical support (including strategic lift, transportation, work space and appropriate communications for the operational command post, and operational work spaces within the CFC command post) for 20th SUPCOM coordination elements.

Action officer level planning and coordination continued throughout the spring. The plenary session of the U.S./ROK CPWG met in Washington, D.C., in May 2007. During the session, senior policy officials on both sides agreed to support JTF-E participation in UFL 2007. They also agreed to continue the combined SSE training and pursuit of the ROK capability to command and control elimination operations. With the assurance that CFC was not in conflict with U.S. Office of the Secretary of Defense or ROK MND policy, the United Nations Command/CFC commander approved JTF-E participation in UFL 2007 based partly on the progress achieved through the CPWG.

In final preparation for participation in UFL 2007, Lieutenant General Raymond P. Ayres, Jr. (Retired) (UFL senior observer) and Brigadier General Kevin R. Wendel (Commander, 20th SUPCOM) visited Korea in June and facilitated a week-long workshop with the CFC staff, U.S. Joint Forces Command, 20th SUPCOM, and JECE. The primary objectives of the seminar were to inform the CFC staff of the JTF-E capabilities, agree on the command relationship, develop a concept for integrating the coordination elements into the CFC staff and subordinate components, and develop a concept of operations for supporting ground components in SSE operations.

In August 2007, more than 130 personnel from the 20th SUPCOM and JECE deployed to the ROK and established a JTF-E under the operational control of CFC for exercise UFL 2007. Coordination elements (CEs) from the JTF-E were located with the CFC C35 Future Operations Division, C35 CWMD Plans Branch,

A Soldier breaches the entrance to a suspected chemical weapons storage facility.

Intelligence (C2), and Combined Unconventional Warfare Task Force. The JTF-E headquarters communicated with CFC and CEs using the Combined Enterprise Regional Information Exchange System–Korea network and monitored updates to the CFC commander via the click-to-meet feature of the network. The click-to-meet capability allowed the JTF-E to collaboratively conduct deliberate planning for several chemical/biological WMD sites in North Korea with the CFC staff and CEs throughout the exercise. In addition, the JTF-E worked with the C35 CWMD planners to develop a draft "Elimination Operations" tab for inclusion in the CWMD appendix to the CFC operations plan.

With respect to security cooperation and partnership building, the JTF-E headquarters hosted representatives from the ROK MND, ROK Joint Chiefs of Staff, ROK NBC Defense Command, and Korean Arms Verification Agency to assist the ROK in developing an internal capability for command and control of elimination operations. The effort culminated in an invitation from Brigadier General Wendel to Brigadier General Kwon-Hon Lee (Commander, ROK NBC Defense Command) and his staff to attend the JTF-E final draft presentation on the concept of operations for JTF-E support to the CFC Ground Component Command.

Conclusion

Conclusions can be drawn from three separate perspectives—CFC/USFK, ROK, and 20th SUPCOM/JECE. From the CFC/USFK perspective, UFL 2007 provided the opportunity to train to standard according to the combined and joint mission-essential task lists, thus integrating a capability to command and control elimination operations and provide highly skilled SSE teams to the ground components for the exploitation of North Korean WMD sites. For all future theater level exercises, the JTF-E will be integrated into CFC as a "combined" JTF-E. From the ROK perspective, UFL 2007 and the combined team training greatly enhanced efforts to develop internal capabilities for elimination operations. Finally, from the JTF-E perspective, UFL 2007 provided the 20th SUPCOM with the opportunity to complete initial operational capability validation by September 2007 as directed by the QDR. With respect to JTF-E integration into CFC during UFL 2007, General B.B. Bell (Commander, United Nations Command, CFC, and USFK) concluded, "We all learned enormously together, and I can clearly endorse an initial operational capability of this outfit." Lieutenant General Ayres (Retired) stated, "I consider their participation in UFL to have been a complete success. JTF-E has developed an operational focus that is suitable for a command that is OPCON [operational control] to a COCOM [combatant command]."

Endnotes:

[1]"National Military Strategy to Combat Weapons of Mass Destruction," Chairman of the Joint Chiefs of Staff, Washington, D.C., 13 February 2006.

[2]"Quadrennial Defense Review Report," U.S. Department of Defense, 6 February 2006.

[3]The "C" refers to combined U.S./ROK staff, whereas a "J" would refer to joint U.S. staff only. "C35" refers to the future operations section of the C3 (as opposed to the current operations section, which is referred to as "C33").

Lieutenant Colonel Barber is currently the Chief, CWMD Plans Branch, CFC/USFK, Yongsan, Seoul, Korea. He holds a bachelor's degree in environmental resources from Eastern Kentucky University, master's degrees in public administration and environmental science from Jacksonville State University, and a master's degree in national security and strategic studies from the Naval War College.

Improvised Explosive Device Defeat

By Mr. John Moore

Capability Integration Team

The Army has established a Capability Integration Team (CIT) to specifically assist active and reserve deploying units with improvised explosive device defeat (IEDD) training and materiel capabilities integration. The CIT was established as a result of gaps identified in the Army IEDD training strategy published in March 2007. The CIT serves all units as a point of contact for IEDD questions and issues. In June 2007, the Army Assistant Chief of Staff, Operations and Plans, approved and funded six CIT locations: Fort Lewis, Washington; Fort Bliss, Texas; Fort Hood, Texas; Camp Shelby, Mississippi; Fort Bragg, North Carolina; and Fort Leonard Wood, Missouri. Teams at each location are capable of traveling to other nearby Army unit locations or other service bases to assist units with their IEDD requirements. Work priorities are driven by the Army Force Generation process and the deployment and training priorities established by the U.S. Central Command and the U.S. Army Forces Command. For further information regarding the CIT, contact <*leon.cdidieddicdt@conus.army.mil*>.

Training Web Site

The U.S. Army Training and Doctrine Command IEDD Integrated Capabilities Development Team has established an IEDD training Web site as a result of an initiative contained in the Fiscal Year 2007 IEDD Training Strategy. The site was established in close coordination with personnel responsible for operating the Center for Army Lessons Learned, the Battle Command Knowledge System, and the U.S. Joint Forces Command Knowledge and Information Fusion Exchange (KnIFE) sites. The IEDD training Web site encompasses the self-development, operational, and institutional training domains. Additionally, it provides training support products to remote locations to assist individuals with their current jobs and prepare them for future assignments with increased responsibility. The site further serves as a portal for access to other Army IEDD training resources that have been developed by various Army proponents. The IEDD training Web site is located at <*https://www.us.army.mil/suite/page/477426*>. An Army Knowledge Online (AKO) account is required to access the site.

2008 Writing Contest

Each year, the Chemical Corps Regimental Association sponsors a writing contest to stimulate thinking and writing on issues of interest to the Chemical Corps. The contest is open to military personnel in all branches and services, including allied nations, and civilians of any nationality. The topics for the 2008 writing contest are—

- **The Chemical Corps Vision.** Visions, if they are successful, give us a positive, achievable view of our future. We have such a Vision. Now, how should we go about achieving it? What should come first?

- **Chemical, biological, radiological, and nuclear (CBRN) reconnaissance functions in the contemporary operational environment.** Describe how CBRN reconnaissance functions promote success in support of protection warfighting functions during full-spectrum operations. Present the key and essential staff functions (from battalion through Army echelon levels) using a modular model. Illustrate the similarities and differences at each echelon, and determine how staffs at each level support the Army operations process (plan, prepare, execute, and continually assess). Present CBRN unit capabilities from team to brigade levels. Describe the CBRN unit commanders' roles for CBRN reconnaissance, and address the unit commanders' integration with supported commanders' staffs and joint force command operations. Finally, compare and contrast CBRN reconnaissance capabilities and responsibilities among various full-spectrum operational themes (major combat operations [offense and defense], stability operations, and civil support operations).

- **Transformation from CBRN to chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE).** Describe the entire range of chemical, biological, and radiological hazards and how they relate to terms such as *nuclear, biological, and chemical (NBC)* and *CBRN.* Present arguments for changing our fundamental focus from NBC to CBRN. Propose a definition and descriptive discussion on CBRN hazards. Using this foundation, describe what is necessary to expand the scope of hazards from CBRN to CBRNE. What is the impact on Army organizations at various echelons? Are there existing organizational models that may serve as a baseline for future Army capabilities? Present arguments to compare and contrast a CBRN hazard focus against an expanded CBRNE focus.

- **Capabilities and manpower requirements in the infantry brigade combat team (IBCT) organic CBRN reconnaissance platoon.** Using lessons learned from Operations Iraqi Freedom and Enduring Freedom, the Chemical Corps recognized a capability gap in the ability of general-purpose CBRN units to assess the full range of hazards (particularly the ability to assess sensitive-site areas). The organic CBRN reconnaissance platoons in the IBCTs are extremely limited in their ability to provide adequate dismounted CBRN reconnaissance support to the BCT. The platoon transport platform also offers inadequate survivability protection. A 2006 limited-objective experiment resulted in the determination that IBCT reconnaissance platoons could better provide commanders with CBRN hazard assessment analyses if they were equipped with a Joint CBRN Dismounted Reconnaissance System (JCDRS). The information gained from the JCDRS would determine if a hazard warrants further exploitation, can be mitigated using organic assets or with help from force-pooled CBRN units, or should be abandoned. An analysis is still needed to determine if the IBCT CBRN reconnaissance platoon is properly organized with eight personnel, two wheeled vehicles, and a dismounted commercial, off-the-shelf (COTS) CBRN reconnaissance system with a Level B protective ensemble for detection, identification, and limited sampling. Do platoons need a Level A capability? Can a small, eight-man platoon maintain training proficiency for Level A requirements? Can an IBCT fund sustainment training and equipment maintenance? Will eight personnel be enough to adequately provide site assessment, command and control, search, and support functions (including emergency extraction and limited decontamination operations)?

- **Open category.** Write about another CBRN-related topic with a training, current mission, or historical focus.

All articles should be submitted as a double-spaced paper manuscript accompanied by a compact disk containing the file in Microsoft Word format. All articles should contain 500 to 2,500 words and include the appropriate footnotes, bibliography, and graphic support. Hard copy photographs are preferred; however, if digital photographs are submitted, they should be saved at a resolution of no less than 200 dots per inch and at 100 percent of the actual size. All submissions should include a cover sheet with the author's name, title, organization, mailing address, and short biography. To ensure anonymity in a selection process, the author's name should not appear in the manuscript itself. The selection panel will rank submissions on a 100-point scale, with up to 40 points assigned for writing clarity, 30 points for relevance to Chemical Soldiers, 20 points for general accuracy, and 10 points for originality. The deadline for submissions is **5 January 2009**. Please forward your submissions to—

Mr. David C. Chuber, Chemical School Historian
401 MANSCEN Loop, Suite 1041
Fort Leonard Wood, Missouri 65473-8926

The authors of the winning articles will be awarded the following:
First place, $500
Second place, $300
Third place, $150

For additional information, contact Mr. Chuber at—
Telephone: DSN 676-7339; commercial (573) 563-7339; e-mail: <*david.chuber@conus.army.mil*>

The Chemical Corps Vision

A Corps and Army capable immediately of countering the entire range of CBRN threats and effects to protect our Nation, operating seamlessly with military and civilian partners, while conducting simultaneous operations from civil support to war.

Partnership

Develop an understanding of the key and enabling experts…and an ability to collaborate effectively with them…to include joint, interagency, intergovernmental, and multinational (JIIM)…and civil authorities, either domestically or within host nations abroad.

Capability

A professional U.S. Army Chemical Corps, expertly manned, equipped, and trained…preparing all U.S. Army organizations at all echelons through technical expertise…at the peak of readiness to perform immediately when called upon.

Operational Environment

Execute simultaneous full-spectrum operations (offense, defense, and stability or civil support)…within the homeland and in an operational theater…across the spectrum of conflict, from permissive to hostile environments.

Effect

Proactively execute our role in combating weapons of mass destruction (WMD)…where chemical, biological, radiological, and nuclear (CBRN) are inclusive of traditional weapons and toxic industrial materials… and contribute to the protection warfighting function as it applies to people, equipment, and information.

CBRN HAZARD MITIGATION AND GEOSPATIAL DATA:

A SYNERGISTIC APPROACH

By Major Jared (Jay) Ware

In regions where increasing numbers of people occupy a finite and densely crowded area, urbanization, migration, public health, and refugees are factors of growing strategic importance.

—Field Manual (FM) 3-100.4

Due to recent military operations in Afghanistan and Iraq, the Chemical Corps has taken on an increased role in protecting forces and civilians from industrial and environmental threats. One mission in particular—hazard mitigation—has increased in scope due to the presence of industrial infrastructure within the urban battlespace. Not only do adversaries pose chemical, biological, radiological, and nuclear (CBRN) hazards through a variety of weapon systems, but the industrial infrastructure also creates new and additional threats. Coalition forces must protect the infrastructure from terrorist activities and monitor operations to ensure that environmental hazards do not occur. CBRN personnel can use geospatial information and engineering systems (available at various staff echelons) to better predict, track, assess, and mitigate hazards. The use of these systems allows for a synergistic and effective approach to CBRN hazard mitigation and force protection.

Hazard Mitigation

CBRN hazard mitigation requires an understanding of the threats within the area of operations (AO) and defined areas of interest. Environmental threats to stability and security might result from acts of war or terrorism that destroy the infrastructure (petrochemical facilities, power plants, nuclear sites). Moreover, environmental threats such as polluted air or water may result from routine activities of an industrial society.[1] These threats should be identified, defined, and prioritized by Chemical, engineer, and medical planners of the environmental protection cell (EPC) during mission analysis. Members of the cell can use geographic information systems (GISs) and geospatial engineering to plot and track the threats, perform predictive analysis, and collect geospatial intelligence.

Geospatial Advantage

Geospatial intelligence (GEOINT) refers to the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities such as CBRN incidents.[2] Information about incidents can be entered into the GIS database, appropriately labeled, referenced by geolocation, and displayed on digital imagery and three-dimensional digital elevation models. This allows the EPC to maintain a credible data set with robust layers of information that can be easily updated for current or predictive analysis. Geospatial engineering hardware systems such as the Digital Topographic Support System contain special suites of software (ArcGIS, ERDAS IMAGINE) used by geospatial analysts to visualize the battlespace and analyze the terrain. The systems are capable of accepting various forms of data (imagery, Global Positioning System points) that enhance CBRN analysis and support hazard mitigation.

Synergy Achievement

The overall goal of hazard mitigation is to prevent CBRN threats from becoming incidents that could harm personnel or equipment. In the current operational environment, insurgents can obtain relatively cheap, easy-to-make CBRN weapons. These weapons can be used directly against personnel or critical infrastructure to produce a CBRN industrial or environmental incident.

EPC staff expertise and the ability to predict, visualize, and assess potential threats are required to mitigate those threats and protect the force and critical infrastructure.

The EPC staff can use geospatial information, engineering systems, and intelligence analysis to war-game potential courses of action. Maps and imagery can be used to identify critical facilities within an AO. The descriptions and locations of the facilities can then be entered into a GIS database. The EPC staff can use this information to develop a protection plan. Figure 1 shows a sample analytical product that can be generated in this manner. It illustrates the results of a line-of-sight analysis conducted for a prominent intersection within the industrial area of a city. The 360° analysis indicates, within a radius of 10 kilometers, which facilities can and cannot be observed from the intersection. A line-of-sight analysis such as this allows the EPC staff to determine optimal locations for critical infrastructure observation posts within the AO.

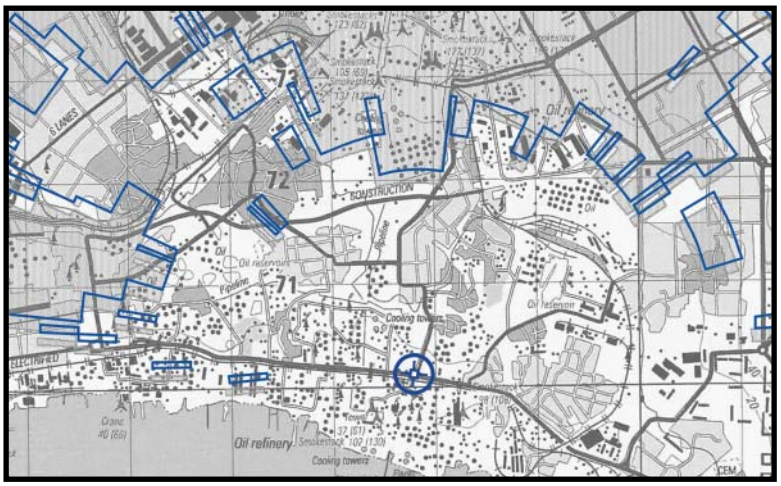


Figure 1. Sample line-of-sight analysis for critical infrastructure observation posts. The areas outlined in blue are those that cannot be observed from the intersection (within circle).

The EPC staff can also develop predictive analyses to ensure that proper actions are taken for CBRN incidents and that proper resources are devoted to incident responses. Figure 2 represents a downwind plot for a hypothetical CBRN incident in a populated area. In this case, the question is whether the Lake Ridge Executive Park needs to be evacuated. The GIS analysis indicates that the incident poses no threat to the park.

A number of scenarios can be analyzed for various locations, infrastructure designs, and chemical agents. Using this information, the EPC staff can determine the probable and most likely scenarios and can develop plans to mitigate potential hazards.

Conclusion

In the current operating environment, Chemical Corps Soldiers work with engineer and medical personnel to mitigate industrial and environmental hazards. Geospatial information allows for more effective mitigation of CBRN hazards and, consequently, improved force protection. Geospatial engineering and intelligence allow the EPC staff to better understand adversaries and the threats that they pose to military operations within an AO. Incorporating geospatial data into the planning process facilitates a synergistic approach to CBRN hazard mitigation.

Endnotes:

[1]FM 3-100.4, *Environmental Considerations in Military Operations*, 15 June 2000.

[2]GEOINT Publication 1-0, *Geospatial Intelligence (GEOINT) Basic Doctrine*, National Geospatial Intelligence Agency, Office of Geospatial-Intelligence Management, September 2006.

Reference:

FM 3-100.4, *Environmental Considerations in Military Operations*, 15 June 2000.

Major Ware is the executive officer of the 65th Engineer Battalion (Combat Effects), Schofield Barracks, Hawaii—the higher headquarters for the 71st Chemical Company. He has served as a combat, systems, electrical, and geospatial engineer. He holds an undergraduate degree in geography and graduate degrees in engineering and geospatial science.

Figure 2. Downwind plot for predictive analysis within a populated area.

CBRN Soldier Personifies Personal Courage, Places Mission First

By Sergeant Mary E. Ferguson

Integrity check: Have you ever thought, or maybe even said, "This is not my job, I didn't sign up for this, I'm not supposed to be here, doing this?" Even the most dedicated, selfless Soldier must admit to having had these types of thoughts. After all, Soldiers are human too. They are not set apart because they refuse to wonder, "What about me?" They are set apart because, despite being human, they somehow find within themselves the personal courage to place the mission first.

Sergeant Charles A. Claude, Jr., found the personal courage; and then throughout his seven years in uniform, has lived that personal courage. During his time in the Army, Sergeant Claude has had many opportunities to think, "This is not my job," though perhaps none more compelling than what he experienced during his recent tour in Iraq. In December 2007, Sergeant Claude completed a 15-month tour in Mosul with E Company, 2d Battalion, 7th Cavalry Regiment, 4th Brigade Combat Team, where he earned the Bronze Star with "V" device (denoting valor) and a Purple Heart for doing what he's always done—placing the mission first.

Sergeant Claude explained, "We're a combat engineering company, and we were in charge of clearing all of Mosul [of improvised explosive devices], which is the second largest city in Iraq. And we only had one battalion and one route-clearing company, so we did two to three missions a day. We were about three months from coming home. It was September second. I'd been the first sergeant's gunner since the second month of the deployment, and we were the element that would pursue people that fired RPGs [rocket-propelled grenades] and small-arms fire at us after an IED [improvised explosive device]. That's what we were doing that day—moving to contact on some guys that fired an RPG at [us], and it was a big firefight. All hell broke loose. We were coming down this back road, and I was shooting this car. And around the corner there was an insurgent, and he tried to go head to head with our ASV [armored security vehicle]. He actually did some damage—took my driver's window completely out and blew my sight out."

Sergeant Charles A. Claude, Jr.

During the firefight, one of the insurgent's rounds came through the broken ASV window, flipped around inside the vehicle, and shattered apart—wounding Claude's arm and his first sergeant's leg. "I didn't even know I was hit at that time," Claude recalled. "It all happened so fast. We got a call from the vehicle behind us saying that the [insurgent] was hanging on our vehicle, so I popped out of the hatch and shot him. That day was just as crazy as the rest of the days, but that day we got hurt. I'd say it was only about two weeks later, and we were back out on the road again."

By the way, unlike most Soldiers in his company, Sergeant Claude isn't a combat engineer (21B). He's a chemical, biological, radiological, and nuclear (CBRN) specialist (74D). But on that September day, like the hundreds of combat days before it, Sergeant Claude didn't act like a 21B or a 74D. "I just acted like a Soldier," he said, "It's something I've always tried to do, so that moment was no different."

And it's true—Sergeant Claude's actions before 2 September 2007 reflected the same attitude. For example, after assuming the position as the first sergeant's gunner earlier in the deployment, Sergeant Claude continued to serve as the unit nuclear, biological, and chemical (NBC) and ammunition noncommissioned officer (NCO). "Originally, other engineers where supposed to be the first sergeant's gunner . . . people were stepping up and filling spots, and that may have included going on a five-hour mission, coming back, and being in charge of the [tactical operations center] . . . and completing my ammunition duties. And we were firing off rounds every day," Claude said, "But, I'm not the type of guy that wants to sit in the office listening to all the action on the radio. Of course, with my background, I wanted to be out there with my unit."

The background Sergeant Claude refers to includes his three years as an infantryman (11B) and an earlier (April 2003) tour in Iraq with the 10th Mountain Division. "I reclassed after my first deployment because I wanted more time to go to school. I wanted to challenge my brain, and I just thought the Chemical Corps was interesting," he explained. "I didn't expect to do what I did during this last deployment. I'd already done that as an 11B. I wasn't thinking I'd be out there fighting every day." Sergeant Claude recalls sitting in the combat support hospital while having his arm cleaned after the 2 September firefight and thinking, "I've seen more action as an NBC guy than I ever did as an 11B."

In fact, this most recent combat tour wasn't the first time since he reclassified that Sergeant Claude had tackled missions outside the CBRN field—missions that some might say aren't part of his job description. "My personal experience since I've reclassed is that units see the [Combat Infantry Badge] and know I used to be infantry, and they think, 'We can have him do anything,'" Sergeant Claude said. "Even when I was at a Chemical company, I was training people on how to do room clearing. Not that I mind. I have the experience, so if I can help, if it's the mission, I will complete it."

Colonel Michael Bolluyt, Claude's former Chemical battalion commander at Fort Polk, Louisiana (and now the chief of the Requirements Determination Division, Capability Development and Integration Directorate, U.S. Army Maneuver Support Center), said, "Sergeant Claude came to the battalion during a crucial period, and he stood out with basic combat skills as we began training on the brigade-sponsored, live-fire ranges. He became a teacher and mentor to his peers in all the skills we were introducing to CBRN Soldiers." Bolluyt added, "In the blistering heat of Fort Polk, he never complained, never quit, and put the mission first because he knew how important the training was—despite one's MOS [military occupational specialty]."

While his infantry experience has led to unusual missions, Claude said that all Chemical Corps Soldiers should be prepared for the experiences he has faced as an NBC/CBRN NCO. "It's important for some of the younger [Soldiers] to read this and think, 'That could be me in a year or two,'" Claude said. "With any MOS like this, where you are probably the only one in a company, you have to really show that you are supposed to be there to earn respect. You have to have pride in the Chemical Corps, represent it, and think, 'I'm going to do this job as well as anyone.'"

Colonel Bolluyt said this message is incredibly relevant for CBRN Soldiers because the Chemical Corps is one of the few Army branches that have Soldiers at the corps, division, brigade, battalion, and company levels. "The Chemical Corps is making enormous contributions. We are the fifth most-deployed branch," Bolluyt explained. "All formations across the battlefield are vulnerable. By hearing Sergeant Claude's experiences, I hope senior leaders see the importance of exposing their Soldiers to a mixture of combat skills."

Claude agreed and said that today, all warriors must be infantry Soldiers at heart and that they need to know how to do the jobs around them because—even though they may have a specialty—they may need to cover for others to accomplish the mission, as he has throughout his career. He also said that his experiences have made him a better-rounded NCO, with the ability to adapt and change to lead all types of Soldiers. "During this last deployment, I had a squad of six Soldiers, and none of them were my MOS," he said. "But again, if you do what you're supposed to do as a Soldier and an NCO, it will take care of itself. Over time, they will not even look at you as 'just the NBC guy' anymore."

As a Soldier, an NCO, and a member of the Chemical Corps, "Sergeant Claude has made a mark for future CBRN Soldiers to recognize and emulate," Bolluyt said. "He is a warrior of the highest caliber."

Yet, even Claude admits, "Sure, there have been plenty of times when I've felt like 'Why am I doing this?'" But that never stopped him from climbing into the gunner's turret of his first sergeant's vehicle. He said, "You've got to always think, no matter what, 'I'm a Soldier. Putting the mission first is always my job—regardless of what that mission is.'"

Sergeant Ferguson is a journalist with The NCO Journal. She has a bachelor's degree in journalism from the University of North Carolina at Chapel Hill.

Print Commemorates 90th Anr

Staff Sergeant John M. Flores created this drawing to represent U.S. Army Chemical Corps Soldiers and their ninety years of stalwart service to our Nation. Various missions and equipment of the Chemical Warfare Service are represented by the World War I illustration on the right, which is mildly obscured in the distant past. With the progression of clarity to the left, you see the current Chemical Corps.

The Chemical Corps Regimental Association (CCRA) is reproducing this print to celebrate the 90th anniversary of the Chemical Corps, which was originally established as the Chemical Warfare Service on 28 June 1918. The theme for this year's anniversary celebration is "From Gas Attacks to CBRN Response: 90 Years of the Dragon Soldier."

The original print is on display in the foyer of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Building 3203 (Thurman Hall), Fort Leonard Wood, Missouri. Reproductions are available at the Chemical Corps Regimental Gift Shop

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niversary of the Chemical Corps

in Building 1607, Fort Leonard Wood. The first 200 prints are artist proofs that have been signed, dated, and numbered by Staff Sergeant Flores. For more information, contact Ms. Shannon Hazlett at (573) 329-0600 or <*ccramanager@embarqmail.com*> or Mr. Donnie Killgore at (573) 329-8562 or <*killgord@ctc.com*>.

Staff Sergeant Flores is a preventive medicine (radiological protection) Soldier assigned to the Health Physics Section, USACBRNS. Born in the Philippines, Flores is an "Army brat" who calls Tacoma, Washington, home. He was naturalized at a young age and joined the U.S. Army in 1997.

Preferring to work in pencil, Staff Sergeant Flores considers portraits particularly challenging and is especially proud of his ability to produce them. He is a very talented, self-taught artist who has little more than high school art classes as formal training. Another of his prints, an illustration of combat medics, is on display at Walter Reed Army Medical Center in Washington, D.C.

The Netherlands? What's Over There?

By Captain Shannon W. Shackelford

When I look back on my 18 years of Active Army service, I am reminded that I have had the opportunity to be a Dragon Soldier in a myriad of interesting and exciting places throughout the world. As an enlisted Soldier, I served overseas in Germany and Korea and had the pleasure and honor of being a member of the prestigious 1st Cavalry Division, Fort Hood, Texas. Upon receiving a commission, I was assigned to the celebrated 1st Armored Division, 3d Brigade, Fort Riley, Kansas, and served in Baghdad, Iraq. I am **PROUD** to be a Chemical Soldier and have always been amazed at where and in what capacity Dragon Soldiers perform their duties.

In July of 2006, I began the Chemical Captains Career Course (CMC3) at Fort Leonard Wood, Missouri. A major topic of discussion among students outside of class was where we would like to be assigned upon completion of the course. As I thought about it, I realized that I was interested in returning to Europe but I was not sure what options were available. However, one day, the branch manager visited and showed us the list of open slots. There was one position in Europe that needed to be filled—a position at the North Atlantic Treaty Organization (NATO) Joint Forces Command (JFC) Brunssum, the Netherlands. As I looked at the list, I thought to myself, "The Netherlands? What's over there?" Soon, I found that I was not the only student interested in that position; two of my classmates were also interested. I made my wishes known to the branch manager and, fortunately, was selected for the slot. After completing CMC3, I elected to stay at Fort Leonard Wood to obtain a master's degree in environmental management before heading to my new assignment.

Upon my arrival at JFC Brunssum, I was hit with questions about what I had learned at CMC3 and about topics covered in the master's program. I was asked how to contain and dispose of various chemicals and how to manage and remediate small hazardous-materials (HAZMAT) spills. This job was going to be a challenge!

My official job is to serve as the chemical, biological, radiological, and nuclear (CBRN)/force protection officer for a NATO JFC Headquarters Support Group (HSG) with a worldwide deployment contingency mission. I am responsible for all aspects of CBRN operations and force protection for JFC Brunssum and outlying areas. Every member of the 26-nation NATO alliance is represented on the JFC Brunssum installation. It is sometimes difficult to keep up with the multitude of diverse uniforms encountered on any given day! As the CBRN officer, I work with three lieutenant colonels of three different nationalities (American, Belgian, and German) in the Operations and Training (S3) Section of the HSG. I handle CBRN plans, training, equipment maintenance, and evaluations for the JFC and Static War Headquarters (located in Germany). As the force protection officer (and the HSG intelligence officer [S2]), I work with international military police and fire and rescue teams to ensure that proper procedures are followed and to alleviate procedural conflicts in the event of a terrorist attack or natural disaster.

Working in an international NATO headquarters organization is challenging. At times, achieving expectations can be difficult. One significant obstacle is the language barrier. Although English is the primary language spoken in NATO facilities, it is sometimes difficult for host nation employees and authorities to understand precise explanations about how a task is to be executed. A second obstacle is the false sense of security experienced by many citizens and personnel. Inhabitants of the Netherlands simply do not view the country as a target for terrorist activity. When I inquired about the lack of an installation standing operating procedure (SOP) or

(continued on page 43)

CBRN Transformation in the IBCT: Too Little Too Late?

By Major Jason G. Anderson

BCTs [brigade combat teams] are the Army's basic tactical maneuver units, [sic] and the smallest combined arms units that can be committed independently. BCTs are designed to conduct offensive, defensive, and SO [special operations]. Their core mission is to close with the enemy by means of fire and maneuver to destroy or capture enemy forces, [sic] or to repel their attacks by fire, close combat, and counterattack.

—Field Manual (FM) 3-90.6

The infantry brigade combat team (IBCT) was meant to be an independent fighting team with all the assets necessary to support victory. FM 3-11 states that "Current US [*sic*] policy is to deter enemy NBC [nuclear, biological, and chemical] use through a strong nuclear force and conventional capabilities that include counterforce, active and passive defense, and consequence management to enable US [*sic*] forces to survive, fight, and win in an NBC environment." However, as the Chemical Corps combines assets to become a truly joint corps, we are directly opposing the intent of the IBCT. During the transformation process, IBCTs have been denied necessary force protection and chemical, biological, radiological, and nuclear (CBRN) assets. Light IBCTs were allotted eight-Soldier "platoons" with conventional CBRN equipment and two lightweight, unarmored, high-mobility, multipurpose, wheeled vehicles (HMMWVs) for transportation. To enable IBCTs to win the current fight—and the next one—improvements need to be made in the CBRN reconnaissance section of the brigade special troops battalion (BSTB) and other CBRN assets must be fielded immediately.

Reconnaissance—whether conventional or CBRN in nature—is one of the fundamental tools of a commander. Prior to Army transformation, divisional Chemical company support to a brigade was determined by an assessment conducted by the commander in conjunction with the division Chemical staff. Light divisions included a company with three dual-purpose (smoke and decontamination) platoons that obtained reconnaissance support from corps Chemical companies. Heavy divisions contained a reconnaissance platoon (usually with six nuclear, biological, and chemical reconnaissance vehicles [NBCRVs]), a mechanized smoke platoon, and three decontamination platoons. The reconnaissance platoon was designed to be easily broken into squad configurations (generally consisting of six to eight Soldiers and two vehicles), as Fox platoons normally operate in squad arrangements.

Although the current IBCT reconnaissance "platoon" manning is confusing, placing one of these reconnaissance squads in each IBCT was the logical way to proceed—even if the appropriate equipment was not available. However, considering the current improvised explosive device (IED) threat, small, eight-Soldier, dismounted, CBRN reconnaissance teams with HMMWV variants provide little value to an IBCT commander. According to the Joint Program Executive Office Chemical and Biological Defense Web site,[1] the Joint NBC Reconnaissance System Increment 2 (JNBCRS 2) continues to be negotiated and procured. Although this system may include the Marine light armored vehicle variant, the Army (specifically, the Chemical Corps) should push for a mine-resistant, ambush-protected (MRAP) variant. This would improve force protection and allow the CBRN platoon to access priority targets without additional security support from already overtasked maneuver elements. An MRAP vehicle, or even a Stryker, could easily solve the problem of force protection and vehicle capability. But what about other equipment, training, and the personnel capability of the CBRN reconnaissance platoon?

If commercial, off-the-shelf (COTS) equipment is available, it should become a permanent part of the platoon equipment package. Unfortunately, the current CBRN reconnaissance platoon vehicles (HMMWVs) do not provide enough storage or space for COTS equipment or occupants of the vehicle. Furthermore, training on COTS equipment is not always readily available. Consequently, COTS equipment may remain in container express, causing the platoon to lack the basic knowledge or understanding of potential new capabilities.

The CBRN reconnaissance platoon should also maintain a Level A personal protective equipment (PPE)

capability (including fully encapsulated suits with self-contained breathing apparatuses), which would allow the IBCT to immediately perform an initial assessment and more accurately describe the situation to higher headquarters. Our current enemies are not using weapon grade CBRN agents but, rather, toxic industrial chemicals and toxic industrial materials (TIMs), which are equally deadly. For example, nitric acid is one of the ingredients used in homemade explosives. According to the National Institute of Safety and Health (NIOSH), nitric acid has an immediate danger to life and health level of 25 parts per million (ppm), based on the development of pulmonary edema at exposures of 100–150 ppm for ½ hour to 1 hour. In 2007, it became apparent that extremists in Iraq were willing to use large, vehicle-borne IEDs laden with chlorine to assert their commitment to unsophisticated weapons of mass destruction. For these reasons, Level A PPE capability is appropriate for CBRN reconnaissance platoons.

The Army funds specialized CBRN training for Soldiers at all levels. The U.S. Army CBRN School increasingly recognizes training issues and constantly improves programs of instruction (POIs). Now, IBCT commanders must allow all members of the CBRN reconnaissance platoon to become qualified technical escorts (TEs) (with the additional skill identifier J5). The additional schooling, which must be approved at the unit level, provides intense training on high-level CBRN problems and solutions. Such training would allow the CBRN reconnaissance platoon to share common knowledge and understanding in the event of an overextended TE team.

While improvements in the type of platoon vehicles used will enhance force protection and additional equipment and training will increase the capability of the CBRN reconnaissance platoon, a crew of only eight Soldiers is inadequate. According to FM 3-20.96, "In the IBCT, CBRN reconnaissance assets are organic to the HHC [headquarters and headquarters company] of the BSTB. Equipped with two HMMWVs and composed of eight Soldiers, this CBRN reconnaissance platoon has the primary responsibility of establishing a CRBN cell that can track all the CBRN action on the battlefield. The platoon is not used to conduct CBRN reconnaissance."

Did I read that right? Why in the world would we fail to use the CBRN reconnaissance assets for the intended purpose—reconnaissance? And why would we have the CBRN reconnaissance platoon track battlefield assets—the job of the brigade CBRN team? FM 3-20.96 indicates that heavy brigade combat teams (HBCTs) and Stryker brigade combat teams (SBCTs) have more Soldiers and assets with which to conduct full CBRN reconnaissance. The assumption is that, as the NBCRV replaces the Fox, HBCTs will gain two additional Soldiers, bringing the total to twelve—which is also the SBCT manning requirement. A twelve-Soldier, specialized "platoon" allows for increased opportunity for rotation during long missions. Furthermore, the additional four Soldiers (above the eight IBCT CBRN reconnaissance platoon Soldiers), along with equipment support from the HHC BSTB, may allow for internal platoon decontamination.

As we transform our Army and our Corps, every CBRN reconnaissance platoon should be transformed into a viable asset for the commander—especially the IBCT commander.

The IBCT CBRN reconnaissance platoon has a long way to go to become a truly effective asset. The platoon is certainly needed on the modern battlefield, but additional equipment, training, and Soldiers are required. Training can be locally increased by working with base fire departments and using chain teaching methods (transferring knowledge from one Soldier/noncommissioned officer to another). However, equipment and additional Soldiers can only be procured through changes to the modified table of organization and equipment, which can take time. As we transform our Army and our Corps, every CBRN reconnaissance platoon should be transformed into a viable asset for the commander—especially the IBCT commander.

Endnote:

[1]"Joint Program Executive Office for Chemical and Biological Defense," <*http://www.jpeocbd.osd.mil*>, accessed on 26 March 2008.

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"Operation Iraqi Freedom," 3d Infantry Division (Mechanized) after-action report, Fort Stewart, Georgia, June–July 2003.

FM 3-11, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations*, 10 March 2003.

FM 3-20.96, *Reconnaissance Squadron*, 20 September 2006.

FM 3-90.6, *The Brigade Combat Team*, 4 August 2006.

FM 3-90.61, *The Brigade Special Troops Battalion*, 22 December 2006.

"NIOSH Pocket Guide to Chemical Hazards," Department of Health and Human Services, Centers for Disease Control and Prevention, NIOSH Publication Number 2005-149, September 2005.

Major Anderson, a 17-year veteran of the Chemical Corps, is a member of the Joint Staff Integrated Vulnerability Assessments Team at the Defense Threat Reduction Agency. He has a bachelor's degree in sociology from Eastern Illinois University.

Editor's note: *"The doctrinal mission statement for the IBCT CBRN Reconnaissance Platoon (Light) is to provide dismounted CBRN reconnaissance to the infantry brigade combat team in order to protect the force across full spectrum operations. Organizational mission sets include 1) Dismounted CBRN Reconnaissance, 2) CBRN Site Assessment Operations, 3) Hazardous Materials Mitigation Support, and 4) CBRN Consequence Management Support." (FM 3-11.6, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Aspects of Command and Control, DRAFT).*

The JNBCRS 2 (HMMWV) variant is not under development for use in the U.S. Army. In 2004, the program was restructured using a dismounted concept to address three areas: sensitive-site assessment, hazardous-site assessment, and enhanced dismounted CBRN reconnaissance. Studies are underway to address future tactical vehicle requirements. The tactical vehicle that is selected to replace the HMMWV is the vehicle that will provide this light capability. The heavy requirement is being addressed by a CBRN variant to the Stryker family (NBCRV).

The JNBCRS 2 program is partitioned into three phases. In Phase I, COTS and government off-the-shelf detection and protection equipment will be fielded in a package that addresses the joint urgent needs requirement to detect and protect against TIM such as nitric acid. Phase I will include new equipment training to support fielding and changes in institutional training to address the new capabilities. The POI for the training is under development. In the meantime, the CBRN School has been providing mobile training team support to the units receiving the Phase I equipment. In Phase II, capabilities will be formalized with a full-featured training and logistics package that will replace Phase I equipment. The equipment will be packaged in modular containers. Improved technologies and added capabilities unique to each service will be introduced in Phase III. They will be configured in a modular package organized as a set, kit, or outfit. This approach is intended to provide a flexible, tailorable package that can be upgraded as more capable equipment options become available.

German Liaison Team Honored

By Colonel Robert Walk

On 26 March 2008, Brigadier General Thomas W. Spoehr, Commandant of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) and Chief of the Chemical Corps, presented the German liaison team of Lieutenant Colonel Fabian Bosse and Sergeant Major Uwe Leiner with Orders of the Dragon for their efforts while assigned to the U.S. Army Maneuver Support Center (MANSCEN) and Fort Leonard Wood (Missouri). Lieutenant Colonel Bosse and Sergeant Major Leiner are members of the Atomare, Biologische, und Chemische (ABC)–Abwehrtruppe—the German equivalent of the Chemical Corps. This was the first time that the MANSCEN German liaison team had been composed solely of ABC-Abwehrtruppe Soldiers.

Lieutenant Colonel Bosse, who was assigned to this position in 2005, worked on high-level issues between the schools. He departed on 31 March 2008, returning to Germany for his next assignment with the German equivalent of the U.S. Army Training and Doctrine Command.

Sergeant Major Leiner has worked extensively with trainees at the Chemical Defense Training Facility, Basic Officer Leadership Course, Chemical Captains Career Course, Basic Noncommissioned Officers Course, and Advanced Noncommissioned Officers Course—introducing them to the German Army and, most importantly, the German Army proficiency badge. Sergeant Major Leiner will depart this spring to attend the U.S. Army Sergeants Major Academy at Fort Bliss, Texas.

Brigadier General Spoehr presents the Order of the Dragon to Sergeant Major Leiner (left) and Lieutenant Colonel Bosse (right).

Colonel Walk is the deputy assistant commandant for the U.S. Army Reserve, USACBRNS, Fort Leonard Wood, Missouri.

Homemade Explosives and Hazardous Materials

By Major Jim Hartman

Recent experience in supporting explosive ordnance disposal (EOD) operations in Iraq has highlighted the urgent need for predeployment training on hazardous materials (HAZMAT). An increase in the number of homemade explosives (HMEs) in Iraq has resulted in an increase in the amount of HME ingredients that Soldiers encounter in cache clearance. These ingredients include substances such as nitric acid, sodium cyanide, and sodium arsenate. Caches generally contain significant amounts of HAZMAT. For example, a recent find contained more than 1,000 gallons of nitric acid in partially buried, 5-gallon containers; nearly half of these containers were leaking. It is often necessary to move leaking containers to destroy HMEs and ordnance stored in the cache. In many instances, containers are stored in confined spaces where fumes can collect in dangerous concentrations.

The approved technique for disposing of HAZMAT associated with HMEs is to secure the site and commit the Multinational Corps–Iraq (MNC-I) HAZMAT platoon. The platoon consists of Chemical Soldiers who are specially trained and equipped to deal with HAZMAT. They do a fantastic job of removing undamaged containers and preparing damaged containers for transport and disposal. The HAZMAT platoon has recovered and overpacked more than 6,000 gallons of nitric acid and numerous other HME precursor chemicals throughout its tour. The platoon is generally capable of completely mitigating a hazard in 48 hours or less.

Although securing the site and using specially trained Chemical Soldiers is the safest way to reduce a hazard, alternate methods are required when there is an unstable HME in close proximity to the HAZMAT. This is very common in HME production facilities in Baghdad. The presence of an unstable HME requires that an EOD operator enter the area, assess the situation, and mitigate the explosive hazard. There are a number of techniques that can be used to accomplish the task; however, they all require that the EOD operator be exposed to potentially hazardous fumes. EOD operators currently receive very little training on the identification of hazards and associated risks. The Soldiers in the field are doing a great job of locating HME factories, and the HAZMAT platoon is getting the site mitigation job done. We just need to better educate and equip personnel to decrease hazards.

The Army is making great strides in solving this problem, but we can still do more. Oxygen monitors that enable Soldiers to assess the risk of entering a room are being procured, and predeployment HME training is being integrated into Bureau of Alcohol, Tobacco, and Firearms post-blast schools. Hopefully, an M40 protective mask filter that protects against nitric acid fumes will be fielded in the near future. I believe that additional training could be accomplished during the biological-chemical phase of EOD School or at predeployment Global Antiterrorism Operational Readiness training. EOD Soldiers need to be aware of the inhalation, contact, and long-term

(continued on page 34)

Five-gallon containers of nitric acid from a recent cache

Spartans Make Their Home in Texas

By Mrs. Cathy Kropp

They call themselves "Spartans." "As the Spartans of the past, we too are trained and ready to respond when our Nation calls," said Colonel Vance P. Visser, commander of the 48th Chemical Brigade.

The 48th Chemical Brigade was activated in September 2007, marking the first time since World War I that a brigade level headquarters has been available to command and control Chemical forces in support of a war. Headquartered at Fort Hood, Texas, these modern-day Spartans consist of nearly 2,800 chemical, biological, radiological, and nuclear (CBRN) Soldiers in 5 battalions, with 27 operational companies spread out across 9 military installations.

While fully supporting operations in Iraq and Afghanistan, the brigade is simultaneously preparing to demonstrate its initial operational capability during a September 2008 exercise. And the brigade may experience additional growth and reorganization in the future, as it supports the overall modularization of the Army and the revolutionary transformation of chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) assets.

As part of the overall modularization of the Army, the 20th Support Command (CBRNE) (the higher headquarters for the 48th Chemical Brigade) is initiating a comprehensive review of its subordinate Chemical and explosive ordnance disposal (EOD) organizations and evaluating strategies that combine CBRN and EOD capabilities within standardized, multicapable, expeditionary CBRNE brigades and battalions. This valuable mix has already proven effective in the 48th Chemical Brigade technical escort (TE) battalions.

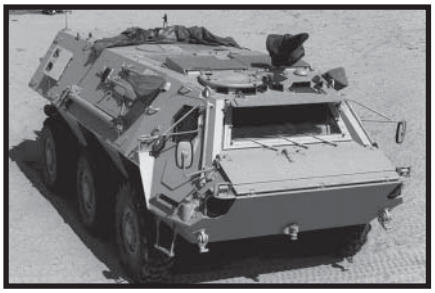
Of the five battalions in the brigade, two are TE battalions. These battalions are designed to quickly mitigate or eliminate CBRNE hazards at home and overseas. TE battalion assets are strategically responsive and rapidly deployable. They can also be tailored to a specific mission. Each specially trained and equipped CBRNE response team can detect, sample, and monitor CBRN hazards. The teams can mitigate initial hazards, package hazardous materials for transport, decontaminate themselves and their equipment, and escort transported packages. They can also render unexploded ordnance safe and, when necessary, disable or eliminate CBRNE hazards or production facilities. The analysis, munitions assessment, and CBRNE advice provided by the TE battalions are invaluable to the supported decision makers.

The remaining three conventional Chemical battalions are outfitted with various arrays of specialized reconnaissance, smoke, Biological Integrated Detection System (BIDS), or decontamination companies to support the operational force. The primary mission of these conventional units is to improve the survivability and mobility of ground forces.

Using CBRNE vehicles and equipment (such as Fox and Stryker CBRN reconnaissance vehicles), reconnaissance units are able to detect, identify, and mark areas of chemical and radiological contamination. Reconnaissance units also collect and transport air, water, and ground samples to identify nuclear, biological, and chemical contamination and convey real-time, detailed hazard information to supported commanders.

Smoke units are employed to protect assembly areas and other high-priority targets and to increase the maneuver time for friendly

BIDS



Fox CBRN reconnaissance vehicle

forces. With equipment such as M56 and M58 Smoke Generation Systems, smoke units can generate vast amounts of obscurants to create camouflage or decoys or to counter new-generation smart weapons.

The BIDS consists of biological detection, identification, and sampling equipment. BIDS units are capable of detecting biological attacks, providing presumptive identification of biological agents, and producing samples for detailed laboratory analysis.

The work of decontamination units allows for the return of units to the field for combat operations. With decontamination equipment such as the M12A1 and M17, vehicles can be decontaminated rapidly and returned to the fight. Decontamination units are undergoing a significant modernization, which will enable them to conduct hazard response operations.

Impressive equipment and technology are not the sole indicators of success. As Colonel Visser points out, "Humans are more important than hardware, quality is better than quantity, CBRNE forces cannot be mass-produced, and competent CBRNE forces cannot be created after emergencies occur."

With a full-time focus on countering CBRNE threats at home and abroad, the Spartans of the 48th Chemical Brigade are using lessons learned in today's operations to combat the weapons of mass destruction and CBRNE threats of tomorrow.

"We stand ready with sharp swords and polished shields to deploy on short notice anywhere in the world to provide CBRNE support to protect the Nation," said Visser. "Spartans, leading to victory!"

Stryker CBRN reconnaissance vehicle

Mrs. Kropp is a public affairs specialist with the 20th Support Command (CBRNE), Aberdeen Proving Ground, Maryland.

("Homemade Explosives and Hazardous Materials" continued from page 32)

environmental hazards presented by the emergency disposal of HMEs. Increased training and awareness will ensure the continued safe mitigation of explosive hazards and proper site turnover to HAZMAT personnel for final clearance.

Most likely, the number and complexity of HMEs will grow as we win the war against the supply of conventional ordnance used in improvised explosive device construction. The education, training, and protection of all personnel involved in the search and reduction process can only enhance combat readiness in the field. Efforts to coordinate the mitigation of the HME precursor hazard with the Chemical Corps will continue to pay big dividends.

Major Hartman recently served as the Assistant Operations Officer, 79th Ordnance Battalion (EOD), Baghdad, Iraq. He is a graduate of the Naval School, EOD, Eglin Air Force Base, Florida.

Editor's Note: *The U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) recognized this gap in capabilities and collaborated with the Edgewood Chemical Biological Center to develop training material that will allow Soldiers to recognize situations where they should notify EOD. The training material will be validated this summer in the Chemical Captains Career Course, and the training will be integrated into other courses during Fiscal Year 2009.*

The USACBRNS and the Maneuver Support Center are currently working on a chemical, biological, radiological, and nuclear dismounted reconnaissance and surveillance capability (Joint Nuclear, Biological, and Chemical Reconnaissance and Surveillance [JNBCRS] Increment II) that includes HAZMAT sensors capable of detecting HME compounds. The JNBCRS Increment II will enable units to enter unknown environments using protection and detection technologies similar to those found in many HAZMAT response teams.

U.S. Army Flamethrower Vehicles

(Part Three of a Three-Part Series)

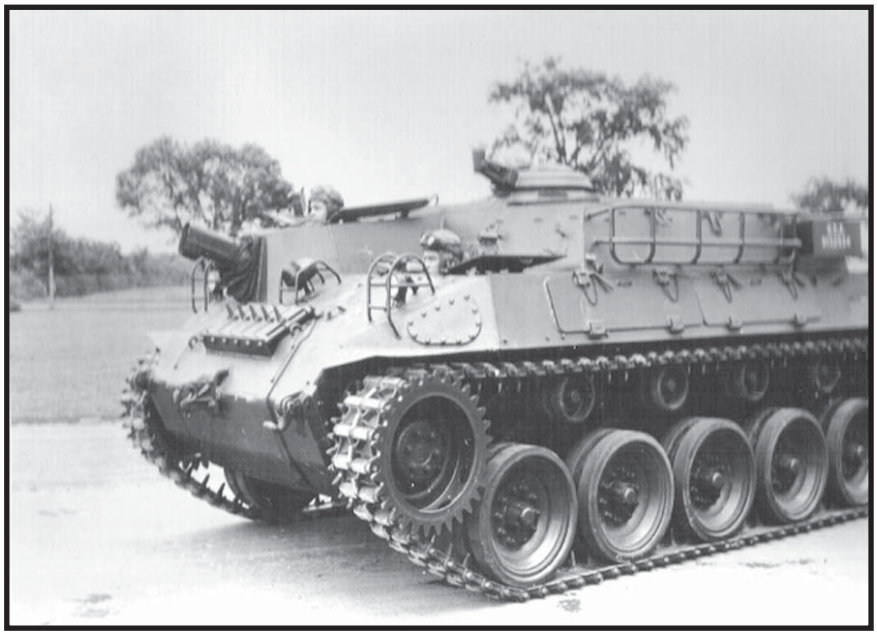
By Captain John Ringquist

Army Flamethrower Vehicle Research and Development (1945–1953)

Following World War II, Army research involving flamethrower tanks initially focused on two variants of the M26 medium tank. The T-35 was a joint Chemical Warfare Service/Ordnance Board project involving the modification of an M26 tank so that a coaxial flame gun and a 90-millimeter cannon were housed in the same turret.[1] In July 1948, the Army concluded that there was no longer a requirement for a main armament flamethrower and the T-35 experiment was cancelled. Next, the Army pursued further development of a kit that was designed to transform the M26 into a flamethrower tank without the need for a complete vehicle conversion, thus minimizing the time required for the transformation. The approved unit (designed by Chemical and Radiological Laboratories [CARL], Edgewood Arsenal, Maryland, and built by the M.W. Kellogg Company) consisted of a nonintegral flame gun and trailer. An E-29 flame gun could be mounted on the glacis plate of the M26 which, in turn, could tow a motorized, 500-gallon E-24 fuel trailer.[2] The E-24 trailer could be remotely operated from within the tank and was equipped with a quick-disconnect linkage. The unit, which was delivered to the U.S. Army Chemical School on 10 January 1953, tested well, as it demonstrated a 190-yard range.[3] However, despite its performance, it was not further developed. Other research and development had indicated that low-cost operational flamethrower tanks could be created with minimal effort and no need for a trailer.

In 1953, CARL and the Ground Munitions Branch, Munitions Division, Edgewood Arsenal, developed a flamethrower vehicle that used an improvised ⅝-inch armor plate miniturret and a Canadian "Iroquois" flame gun. The tank was modified in three days "to show how quickly an obsolete tank could be converted to a flame tank. The experiment used the same tank that had been used for the T-35 tests and employed the same model of flamethrower used on the T-65 AUV [action utility vehicle]/APC [armored personnel carrier]."[4] While this experiment proved that obsolete vehicles could be restored to utility using attachable flamethrowers, other vehicles were under consideration for use as flamethrower platforms.

The vehicle selected for further development was an M39 AUV modified by Detroit Arsenal, Warren, Michigan, under the direction of CARL.[5] Authorization was granted on 24 April 1952. Two trial installations were



T-65 AUV/APC with a flame gun

sent to Fort Knox, Kentucky, for testing and establishing doctrine. A Canadian "Iroquois" flame gun was operated from a commander's cupola. The range of a flame gun equipped with a 0.89-inch nozzle was 180 yards at a pressure of 2,000 pounds per square inch (psi). While this vehicle appeared promising, it was not further developed and the project was discontinued in favor of the M67 flamethrower tank.

M67 Flamethrower Tank

The Marine Corps did not concur with the Army's decision to halt development of main armament flamethrower tanks in 1948. Therefore, the Marines submitted a requirement for a medium tank armed with an integral flamethrower to support amphibious operations.[6] This was not surprising since main armament flamethrower tanks played a key role in Pacific operations during World War II—especially in Okinawa and Iwo Jima.

The prototype T66 tank was completed in May 1952—too late for participation in the Korean War, where Marine Corps M4A1 POA-CWS-H5 tanks fit the bill. The test results were promising; the new flamethrower delivered flame up to 250 yards at a firing angle of 30° through a dummy 90-millimeter gun tube. The design, however, was quickly superseded when the M48 became available for development as a flamethrower tank.

The M48A2 medium tank was modified with an M7A1-6 flamethrower tank turret, resulting in the M67 flamethrower tank, which was finalized in 1953. The flamethrower could be installed as the main armament of the M48 tank or as T-89 kits manufactured by the Chrysler Corporation.[7] The T-89 was a complete kit that, in 8 hours, could be used to convert an M48 main gun turret to an M67 configuration, with 365 gallons of fuel storage where 90-millimeter shells had been stored in turret racks in the M48. Refueling for the M67 was supported by a dedicated, 2½-ton, truck-mounted service unit.[8] The fuel storage limitations of the M67 could, therefore, be overcome with the aid of a refueling truck deployed to the area of operations.

The flame gun was installed in a dummy 90-millimeter gun tube equipped with vent holes to allow air to enter the combustion chamber and a removable top cover to allow access to ignition components. Several modifications to the outer tank fixtures were required. For example, headlight covers were flattened and—since the loader's hatch was taken up by flamethrower controls—top entry to the tank was restricted to the commander's hatch. The flame gun featured a firing range of +45° to –12°. With a ⅞-inch nozzle and a pressure of 300 psi, the gun fired thickened fuel up to 280 yards. The use of interchangeable ⅞-inch and ¾-inch nozzles resulted in firing times of 55 and 61 seconds, respectively.[9] The M67 was operated by a three-man crew. The gunner fired the flame gun and the coaxial machine gun.

The Marine Corps developed the M67 to its highest level by using the M48A3 to update and upgrade M67 tanks to M67A2 standards. The M67A2 was used extensively in Vietnam; however, it was not the only flamethrower vehicle employed in Vietnam. In 1963, the flamethrower APC concept was revived. The M113 APC was coupled with a flame gun, resulting in the M132 self-propelled flamethrower carrier.

M67 flamethrower tank

Flamethrowing Armored Personnel Carriers

The M113 APC, which was developed by FMC Corporation, quickly lent itself to a number of roles that took advantage of its small size, low weight, amphibious abilities, and ability to operate on nearly all types of terrain. The development of the M113A1 into the M132A1 in March 1963 was a U.S. Army Chemical Corps concept. A number of changes were necessary for the M113 to be used as a flamethrower vehicle.

The M10-8 flamethrower was added to a specially designed cupola on the M113A1 hull. The M10-8 gun was capable of a full 360° rotation and could fire at angles of +55° to –15° from the

vehicle turret. With 200 gallons of fuel, the gun could fire up to 200 meters (approximately 650 feet) for 32 seconds.[10] In some cases, the flame gun fired an initial "wet burst" of unignited fuel that stuck to a target and then fired a second "flaming burst" that achieved a more damaging effect.

The rear compartment of the APC was stripped, and a removable rack system was installed in place of the troop seats. Inside the APC, the 200 gallons of fuel were stored in four 50-gallon spherical fuel tanks. This was enough fuel for 32 seconds of continual flame or 200 one-second bursts. With the 200-meter range and a 7.62-millimeter machine gun in a coaxial mount as a secondary armament, the M132A1 could effectively suppress and then engage an enemy in fortifications in urban areas or jungles stripped by Rome plows. The M132A1 could also keep pace with M113A1 APCs and M48 tanks. A two-man crew operated the M132—one person drove the APC, and the other operated the flamethrower.

Weapon performance in the field was impressive, and the demand for the M132 as a support weapon was high. Several tactics were employed to adapt the M132 for use with supported Army, Marine, and Navy units. For example, the Navy backed M132 APCs onto two armored troop carrier (ATC) vessels on the Mekong River and fired the flamethrowers over the sides. The flamethrowers were nicknamed "Zippos" due to the lighter used to ignite the napalm fuel when the electrical igniters failed.[11] A 2½-ton fuel truck was placed onboard a third ATC vessel. In other engagements, the M132 participated in convoys in which the devastating effect of the flamethrower was used against ambushers operating from within thick vegetation along roadsides. One story of the Battle of Ap Tau O in 1966 recounts how an M132 destroyed a Vietcong 57-millimeter recoilless rifle team with a 3-second flame burst.[12]

The aluminum armor of the M132 was incapable of withstanding artillery fragments, large-caliber weapons, mines, or rocket-propelled grenades. Because the APC was vulnerable to enemy attacks, it was completely relegated to a support role, operating in conjunction with infantry and armor support. In addition, the M132 had a high fuel consumption rate and required significant time to return to a safe area for refueling.[13] These limitations required the selective use of the gun and targets engaged. However, the M132 was somewhat successful given that headquarters companies of U.S. armor and cavalry units were assigned at least one M132 and Republic of Vietnam units were assigned four M132s per armored regiment. Many individual vehicles were also assigned to other units for temporary duty due to their effectiveness against bunkers and other fortifications.[14]

The M132 was a valuable contribution to the American war effort in Vietnam. Modifications based on the M10 turret later came to be major components of riverine strategy as Navy vessels were mounted with flamethrowers. However, the M132 flamethrower design was not retained in the U.S. military. And in the 1980s, flame weapons were gradually phased out of U.S. Army and Navy inventories. The last flame weapon in Army service is the M202, which is armed with four triethylaluminum-filled rockets. Flamethrower vehicles and man-packed flamethrowers are no longer being used in combat.

Endnotes:

[1]U.S. Army Chemical Museum Notes: T-35 tank photo and T-35 development.

[2]Ibid., E-24-29 and photo 18169, M26 and E-24-29.

[3]Ibid.

[4]Ibid., Deturreted M26 Flame Thrower [*sic*] and photo. (The T65 mechanized flamethrower vehicle was an experimental vehicle derived from the AUV/APC vehicle class that was recommended for a variety of roles by the Ordnance Branch in the early 1950s.)

[5]Ibid., T-65 Flame Thrower [*sic*] AUV/APC and photo.

[6]Ibid., T-66.

[7]Ibid., T-67.

[8]Ibid., AGO 2661A, p. 4.

[9]R.P. Hunnicutt, *Patton: A History of the American Main Battle Tank*, Volume 1, Presidio Press, Novato, California, 1984, p. 250.

[10]Fred W. Crismon, *U.S. Military Tracked Vehicles*, Motorbooks International, Osceola, Wisconsin, 1992.

[11]"9th Infantry Division Flame Throwers APC's In Vietnam Served Many Units—Affectionately called 'Zippos,' 1967," *River Currents*, Mobile Riverine Force Association, Vietnam, Volume 13, Number 1, Spring 2004, p. 6 (mistakenly labeled "Volume 12, Number 4, Winter 2003" on the front page of the publication), <*http://www.mrfa2.org/PDF/spring04.pdf*>, accessed on 19 March 2008.

[12]"The FReeper Foxhole Remembers Battle of Ap Tau O (6/8/1966)—June 8th, 2003," <*http://www.freerepublic.com/focus/f-vetscor/925211/posts*>, accessed on 13 March 2008.

[13]After-Action Report (AAR) 56, Headquarters, 25th Infantry Division, 22 October 1968.

[14]*River Currents*, p. 6.

Captain Ringquist is currently an advanced civil schooling student at the University of Kansas in Lawrence, where he is pursuing his doctorate's degree in African history.

DOCTRINE UPDATE

U.S. Army Maneuver Support Center Directorate of Training Doctrine Development Division			
Publication Number	**Title**	**Date**	**Description**
Current Publications			
FM 3-11 MCWP 3-37.1 NWP 3-11 AFTTP(I) 3-2.42	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations	10 Mar 03	A multiservice tactics, techniques, and procedures (MTTP) manual which provides commanders and staffs a key reference for the planning and execution of service chemical, biological, radiological, and nuclear (CBRN) defense operations, with focus on the passive-defense component of counterproliferation. **Status**: Under revision Fiscal Year (FY) 2008.
FM 3-11.3 MCRP 3-37.2A NTTP 3-11.25 AFTTP(I) 3-2.56	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance	2 Feb 06	An MTTP manual for conducting CBRN contamination avoidance. This revision combines Field Manual (FM) 3-3 and FM 3-3-1 into one publication. **Status**: Current.
FM 3-11.4 MCWP 3-37.2 NTTP 3-11.27 AFTTP(I) 3-2.46	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection	2 Jun 03	An MTTP manual which establishes principles for CBRN protection and addresses individual and collective protection (COLPRO) considerations for the protection of the force and civilian personnel. **Status**: Current.
FM 3-11.5 MCWP 3-37.3 NTTP 3-1.26 AFTTP(I) 3-2.60	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination	4 Apr 06	An MTTP manual which addresses the principles and levels of CBRN decontamination operations in a tactical environment. **Status**: Current.
FM 3-6 (FM 3-11.6) AFM 105-7 FMFM 7-11-H	Field Behavior of NBC Agents (Including Smoke and Incendiaries)	3 Nov 86	An MTTP manual which addresses the battlefield influences of weather and terrain and the use of smoke and obscurants on CBRN operations. **Status**: Under revision FY08 (will be renumbered FM 3-11.6).
FM 3-11.9 MCRP 3-37.1B NTRP 3-11.32 AFTTP(I) 3-2.55	Potential Military Chemical/ Biological Agents and Compounds	10 Jan 05	An MTTP manual which provides commanders and staffs with general information and technical data concerning chemical-biological (CB) agents and other compounds of military interest, such as toxic industrial chemicals (TICs). **Status**: Current.
FM 3-11.11 MCRP 3-3.7.2	Flame, Riot Control Agent, and Herbicide Operations	19 Aug 96 C1 10 Mar 03	An MTTP manual which describes the tactics, techniques, and procedures (TTP) for employing flame weapons, riot control agents (RCAs), and herbicides during peacetime and combat. **Status**: Current.
FM 3-11.14 MCRP 3-37.1A NTTP 3-11.28 AFTTP(I) 3-2.54	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Vulnerability Assessment	28 Dec 04	An MTTP manual for conducting CBRN vulnerability assessments; analyzing, managing, and assessing risks; and measuring, mitigating, and reducing vulnerabilities. **Status**: Current.
FM 3-11.19 MCWP 3-37.4 NTTP 3-11.29 AFTTP(I) 3-2.44	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance	30 Jul 04	An MTTP manual for planning and conducting CBRN reconnaissance operations to detect, define, limit, mark, sample, and identify CBRN and toxic industrial material (TIM) contamination. **Status**: Change 1 under development FY08.
FM 3-11.20	Technical Escort Battalion Operations	29 Aug 07	An Army-only manual which provides the TTP for the employment of technical escort battalions. **Status**: Current.
NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil/*>, the Chemical Knowledge Network (CKN) Web site at <*https://www.us.army.mil/suite/portal.do?$p=409522*>, or the Maneuver Support Knowledge Network (MSKN) Web site at <*https://www.us.army.mil/suite/page/275589*>.			

DOCTRINE UPDATE

U.S. Army Maneuver Support Center Directorate of Training Doctrine Development Division			
Publication Number	**Title**	**Date**	**Description**
Current Publications (Continued)			
FM 3-11.21 MCRP 3-37.2C NTTP 3-11.24 AFTTP(I) 3-2.37	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations	1 Apr 08	An MTTP manual which provides commanders and staffs a key reference for mitigating the CBRN aspects of consequence management. **Status**: Current.
FM 3-11.22	Weapons of Mass Destruction–Civil Support Team Operations	10 Dec 07	An Army-only manual which provides the suggested doctrinal TTP for use by weapons of mass destruction–civil support teams (WMD–CSTs), which are designed to provide support to local, state, and federal response systems. **Status**: Current.
FM 3-11.34 MCWP 3-37.5 NTTP 3-11.23 AFTTP(I) 3-2.33	Multiservice Tactics, Techniques, and Procedures for Installation CBRN Defense	6 Nov 07	An MTTP manual which provides a reference for planning, resourcing, and executing CBRN defense of theater fixed sites, ports, and airfields. **Status**: Current.
FM 3-50 (FM 3-11.50)	Smoke Operations	4 Dec 90 C1 11 Sep 96	An Army-only manual which provides the TTP for using smoke and obscurants to attack and defeat specific enemy targets, sensors, target acquisition systems, weapon guidance systems, and other enemy electro-optical devices. **Status**: Under revision FY08 (will be renumbered FM 3-11.50).
FM 3-11.86 MCWP 3.37.1C NTTP 3-11.31 AFTTP(I) 3-2.52	Multiservice Tactics, Techniques, and Procedures for Biological Surveillance	4 Oct 04	An MTTP manual for planning and conducting biological surveillance operations to monitor, detect, sample, identify, report, package, and evacuate samples of biological warfare agents. **Status**: Current.
FM 3-101	Chemical Staffs and Units	19 Nov 93	An Army-only manual which provides fundamental principles for chemical staff functions, command and control of Chemical units, and Chemical unit employment. **Status**: Under revision FY08 to consolidate with FM 3-11.6.
FMI 3-90.10	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Operational Headquarters	24 Jan 08	An Army-only tactics manual which provides the basic doctrine for the employment of a chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) operational headquarters to conduct tactical level weapons of mass destruction elimination (WMD-E) operations or transition to a joint task force-capable headquarters for WMD-E operations in support of campaigns and to support civil authorities. **Status**: Current.
NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil/*>, the CKN Web site at <*https://www.us.army.mil/suite/portal.do?$p=409522*>, or the MSKN Web site at <*https://www.us.army.mil/suite/page/275589*>.			
Emerging Publications			
FM 3-11.2	Multiservice Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination (WMD-E) Operations	To be determined	An MTTP manual that provides the tactical doctrine and associated TTP that each Service provides in support of the joint WMD-E mission area in an effort to operate systematically to locate, secure, disable, and/or destroy a state or nonstate actor's WMD programs and related capabilities. **Status**: Under development FY08.
ST 3-11.24	Hazard Mitigation During Contingency Operations	To be determined	An Army-only ST which provides the TTP for conducting hazardous mitigation during contingency operations. **Status**: Under development FY08.
NOTE: CBRN draft publications can be accessed and downloaded in electronic format from the CKN Web site at <*https://www.us.army.mil/suite/portal.do?$p=409522*> or the MSKN Web site at <*https://www.us.army.mil/suite/page/275589*>.			

Army Reserve Units

The 460th Chemical Brigade (Camp Pike, North Little Rock, Arkansas) held an inactivation ceremony on 10 February 2008. Colonel Wornest Lambert (brigade commander) and Command Sergeant Major David Hayes (brigade command sergeant major) cased the colors, with Brigadier General Philip Hanrahan, commanding general of the 90th Regional Readiness Command (RRC), presiding. Officially, the unit will stand down in September 2008, but the ceremony was held in February to ensure maximum participation from unit Soldiers.

The 464th Chemical Brigade (Johnstown, Pennsylvania) held an inactivation ceremony on 30 March 2008. Colonel Gregory Ritch (brigade commander) and Command Sergeant Major Donald Riggs (brigade command sergeant major) cased the colors, with Colonel Mark Smith, deputy commander (readiness) of the 99th RRC, presiding. All former Johnstown era brigade commanders and many former Soldiers were present at the ceremony, which was followed by an inactivation/ reunion party. This unit will also officially stand down in September 2008.

The 7th Army Reserve Command, Germany, has been authorized to stand up four foreign consequence management civil support teams. Athough details are not final, one of the teams will be staffed by Active Guard Reserve (AGR) Soldiers and the remaining three teams will be staffed with traditional Army Reserve Soldiers.

Training

All Total Army School System (TASS) training is now on one page in the Army Training Requirements and Resources System (ATRRS). The 74D TASS training is listed on the former "Region B" screen. This should make it easier for Soldiers to schedule military occupational specialty (MOS)-specific training.

Total Army School System Training Center (TTC) 74D instructors are now located at Fort Leonard Wood, Missouri. As previously noted, due to Chemical Defense Training Facility (CDTF) requirements, this is the only 74D TTC. Training XM50 masks are on-hand at the facility; the final variation should be available shortly. We are working to build an equipment set to alleviate equipment availability issues and ensure that our Soldiers receive premium training.

The 74D10 MOS training (formerly the "reclassification course") is a four-phase course. Phase I is provided through distributed learning (dL). Connectivity issues with the module continue to persist. Phase I cannot be completed in one weekend, so don't plan on that. Instead, get started early and finish early. Phases II and IV consist of resident training conducted at Fort Leonard Wood. Phase III consists of nonresident instruction provided in each TASS region. This year, in response to requests from the field, Soldiers will be able to complete Phases II, III, and IV on one set of orders to Fort Leonard Wood.

The 74D Basic Noncommissioned Officer Course (BNCOC) is also a four-phase course. Phase I is common to all MOSs. Work is underway to provide it via dL; look for that this year. Phases II and IV consist of 74D-specific resident training at Fort Leonard Wood. Phase III consists of 74D-specific nonresident instruction provided in each TASS region.

The 74D Advanced Noncommissioned Officer Course (ANCOC) is a three-phase course. There is no dL portion. The entire course is provided through classroom instruction. Phases I and III consist of resident training at FLW. Phase II consists of nonresident instruction provided in each TASS region.

Officer Education

The Reserve Component Chemical Captains Career Course (RC-CMC3) is a five-phase course. Phase I, common core, is ready and will be required shortly. Phase II is the chemical technical dL phase. Final validation is complete, and this phase will replace the correspondence course shortly. Those students currently enrolled in the correspondence course may complete it; however, all future students must take the new dL phase. Phase III consists of a two-week resident phase conducted at the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood. Before beginning Phase III, Soldiers must complete the awareness level training available through the U.S. Army Maneuver Support Center (MANSCEN) Blackboard Web portal. To enroll in the training, contact Major Joan Lenahan-Bernard at <*joan.m.lenahanbernard@us.army.mil*>. An Army Knowledge Online (AKO) e-mail address is required. As additional or alternate study material, a compact disc–read-only memory (CD-ROM) can be provided to the student. On the first day of

resident training, students are tested on the precourse awareness level material as part of the hazardous materials (HAZMAT) training and certification conducted during the course. Phase IV, which does not yet exist, will consist of the dL portion of the combined arms exercise (CAX). Phase V, the CAX phase, is conducted at Fort Leonard Wood. This phase includes Joint Warning and Reporting Network and Maneuver Control System training. It culminates in a military decision-making process exercise using state-of-the-art battle simulation equipment. Previously, Phases III and V were taught only in the summer; but in Fiscal Year 2009, these phases will be offered in the early spring and summer.

Officers that transfer into the Chemical Branch after attending another branch officer basic course must attend the CBRN Defense Course to obtain basic CBRN defense training. Efforts are underway to place that course online; however, officers may attend the training in resident status wherever it is available. Good courses are available at Fort Dix, New Jersey, and in the TASS battalions. Other required training depends on the officer's previous education. Contact RC personnel at USACBRNS for specific details.

Army Reserve- and National Guard-Specific Training

Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Enhanced Response Force Package (CERFP). USACBRNS offers a mass casualty decontamination class, which is appropriate for members of the CERFP medical and decontamination teams. In addition, any member of the CERFP may complete the class to obtain awareness or operations level HAZMAT training. Anyone requiring HAZMAT technician level training may complete the CBRN Responder Course. These courses are available on ATRRS.

Chemical, Biological, Radiological, and Nuclear Consequence Management Response Force (CCMRF). The mass casualty decontamination class is appropriate for CCMRF Soldiers providing mass casualty decontamination. In addition, any member of the CCMRF may complete the class to obtain awareness or operations level HAZMAT training. CCMRF personnel who need HAZMAT technician certification may complete the CBRN Responder Course. These courses are available on ATRRS.

USACBRNS Personnel Issues

Authorized AGR positions. There are six authorized AGR positions at USACBRNS: the Deputy Assistant Commandant–Reserve Component (DAC-RC) (a U.S. Army Reserve [USAR] colonel), the Deputy Assistant Commandant–National Guard (DAC-NG) (an Army National Guard lieutenant colonel), two training developers (a USAR major and a USAR master sergeant), a combat developer (a USAR lieutenant colonel), and another total force integrator (a USAR lieutenant colonel) who is now serving as the director of the Incident Response Training Detachment. Five of these positions are currently filled.

Drilling Individual Mobilization Augmentee (DIMA) positions. There are 20 authorized DIMA positions throughout USACBRNS, with 12 officer slots (captain through lieutenant colonel) and 8 noncommissioned officer (NCO) slots (sergeant first class through sergeant major). The mission is to prepare to expand during mobilization. Our goal is 100 percent-qualified instructors. The RC-CMC3 training mission is currently supported. We strive to improve the RC-CMC3 and Active Army Chemical Career Captains Course through our work. Captains and sergeants first class are always needed, so contact us if you are interested!

Contact Information

Colonel Robert Walk (outgoing DAC-RC), telephone: 573-563-8050, e-mail: <*robert.d.walk@us.army.mil*>.

Colonel Larry Meder (incoming DAC-RC), information to be published soon.

Lieutenant Colonel Chris Van Alstyne (DAC-NG), telephone: 573-563-7676, e-mail: <*christian.vanalstine@us.army.mil*>.

Master Sergeant Mark Vasquez (USAR-NCO), telephone: 573-563-7096, e-mail: <*margarito.vasquez@us.army.mil*>.

Master Sergeant Robert Wheat (ARNG-NCO), telephone: 573-563-7667, e-mail: <*robert.a.wheat@us.army.mil*>.

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Inactivation of the 455th Chemical Brigade

By Colonel Robert Walk

The 455th Chemical Brigade, the only Chemical brigade in the history of the Chemical Corps to deploy from the United States to a theater of operations, was inactivated on 15 September 2007. In a fitting ceremony, the brigade colors were ceremonially sheathed and retired by Lieutenant Colonel George C. Frank (brigade commander), Command Sergeant Major Honora Rhatigan (brigade command sergeant major), and Brigadier General William Terpeluk (commander of the 77th Regional Support Command). An exception to policy was granted to allow the colors to remain at Fort Dix, New Jersey.

The lineage of the 455th Chemical Brigade starts with the constitution of the 100th Chemical Battalion (Motorized) on 7 June 1944, followed by its activation in La Fagianeria, Italy, on 5 August 1944. The 100th Chemical Battalion was reorganized and redesignated as the 100th Chemical Mortar Battalion on 15 November 1944. The 100th Chemical Mortar Battalion received battle streamers for the Rome-Arno, Po Valley, and North Apennines campaigns. Five soldiers were killed in action. The battalion was inactivated at Camp Miles Standish, Massachusetts, on 13 October 1945. Over the next several years, the battalion was allotted to the Organized Reserve Corps and was activated and inactivated in Boston, Massachusetts. In 1952, the unit was redesignated as the Headquarters, Headquarters Company, 100th Chemical Group (Communications Zone [COMMZ]) and allotted to the Regular Army. From 17 July 1952 to 24 June 1967, the unit (which was redesignated as the Headquarters and Headquarters Detachment, 100th Chemical Group [COMMZ] on 25 November 1953) was located at Fort McClellan, Alabama.

The most recent term of service for the 455th Chemical Brigade began on 4 June 2000 at Fort Dix under the command of Colonel Joseph Leonelli. There were two subordinate battalions—the 462d Transportation Battalion, Trenton, New Jersey, and the 479th Chemical Battalion, Fort Tilden, New York. The brigade motto was, "Protecting the Force." Over the next three years, the brigade and subordinate units conducted traditional inactive-duty training and prepared for possible mobilization following the terrorist attacks of 11 September 2001. One company—the 320th Chemical Company in Jamaica, Queens, New York—alerted all available personnel in case they were needed for decontamination operations after the fall of the twin towers in Manhattan.

455th Chemical Brigade colors being sheathed

The 455th Chemical Brigade was mobilized as a major subordinate command of the Combined Forces Land Component Command in support of the War on Terrorism and Operation Enduring Freedom on 10 February 2003 under Colonel Robin Byrom. The brigade was first assigned to perform joint task force elimination and disablement functions and tasked to support Defense Threat Reduction Agency operations designed to eliminate Iraqi weapons of mass destruction (WMD).

Brigadier General William Terpeluk speaking at the inactivation ceremony

After the cessation of major combat operations on 1 June 2003, the brigade was reassigned as part of the Iraq Survey Group (ISG), a Presidentially directed, joint, multinational, interagency organization charged with unveiling the truth about Iraqi WMD programs and the fate of Navy Captain Michael Speicher, who had been missing in action since Operation Desert Storm. Other functions performed by the brigade included taking garrison command of Camp Slayer, Iraq; providing convoy escort security and decontamination support for various WMD teams operating in Iraq; and manning positions in the ISG Survey Operations Center, Sector Control Point–Baghdad, and Central Media Processing Center. The 455th Chemical Brigade operated in conjunction with the 450th Chemical Battalion (which was mobilized from Houston, Texas) to carry out much of this work.

Elements of the Pennsylvania Army National Guard and Kansas Army National Guard assumed responsibility of Camp Slayer and the ISG in April 2004, and the 455th Chemical Brigade returned from deployment on 28 April 2004. Despite involvement in combat operations, the unit suffered no casualties. The brigade was released from active duty and returned to reserve status on 1 July 2004.

After returning from Iraq, the brigade continued to train—focusing on the Army Reserve homeland defense mission and the mobilization of other brigade Soldiers and units for deployment overseas. One brigade Soldier killed in action, Sergeant Jose Velez, was fatally wounded on 8 June 2006 during the deployment of the 773d Transportation Company. As part of the ongoing Army modernization initiative and transition to a modular force, the 455th Chemical Brigade was selected for inactivation no later than 2011. However, due to Army Reserve restructuring initiatives, the unit was inactivated in 2007.

Colonel Walk is the deputy assistant commandant for the U.S. Army Reserve, U.S. Army Chemical, Biological, Radiological, and Nuclear School, Fort Leonard Wood, Missouri.

("The Netherlands? What's Over There?" continued from page 28)

CBRN training program, the initial response was, "You're in the Netherlands—that won't happen here." After much discussion, negotiation, and persuasion, I am finally developing an SOP and CBRN plan for JFC Brunssum. I have also begun building an early-response team to respond to any incident that occurs at JFC Brunssum. The team will be comprised of American, Belgian, British, and German soldiers who will work alongside host nation authorities in the event of an attack or chemical spill. Although it has been quite an undertaking, this approach will result in a unified team that follows a plan which incorporates contributions from each nation represented.

The position of CBRN/force protection officer for a NATO JFC HSG is very demanding, but the experience and opportunities that the job affords (including the opportunity to visit other European countries during downtime) more than outweigh the occasional aggravations. In this position, I work hard but I also get to play hard. In the end, I consider myself extremely lucky to have secured this assignment.

Captain Shackelford is the CBRN/force protection officer for JFC Brunssum, the Netherlands. He holds a bachelor's degree in psychology from Texas A&M University and a master's degree in environmental management from Webster University.

Toward a Comprehensive National Incident Management System: "What Is" Versus "What Could Be"

By Mr. Norm Mueller and Ms. Mary Bergeron

The progress associated with using technology to collect and store data has far outpaced the ability to process or convert that data into useful or, more precisely, actionable information. Closing this dangerous knowledge gap (the proverbial example of "what is" versus "what could be") was at the heart of a recent award-winning project conducted at the Coalition Warrior Interoperability Demonstration (CWID) 2007. The project demonstrated how the gap, precipitated by the breakdown in communication between those who hold useful information and those who are in a position to act on that information, could be successfully closed during an emergency pursuit to save lives, preserve property and infrastructure, and protect the environment.

On an annual basis, CWID provides a globally networked environment where military commanders investigate command, control, communications, computers, intelligence, surveillance, and reconnaissance solutions that can be used by military and civilian organizations. At CWID 2007, key military and emergency management decision makers witnessed, for the first time, the Integrated Information Management System (IIMS)—a truly interoperable system and a watershed in domestic security. A broad spectrum of public and private-sector organizations participated in the demonstration. The coordinated technologies of IIMS offered military and civilian leaders an improved common operational picture (COP) for use in critical decision making.

The Challenge

The key to creating and sharing actionable information in support of domestic defense and security missions lies in the ability of the defense domain to shepherd accurate data into and out of the civilian emergency management arena in a timely manner. This is of particular interest to the Chemical community, which is responsible for preparing for and monitoring potentially hazardous chemical, biological, radiological, and nuclear events. By leveraging science and technology, the defense Chemical community collects and evaluates critical data using sophisticated tools such as field sensors and predictive dispersion modeling. But then what? Is there more that could be done?

The technical structure of computer messages within the Department of Defense (DOD) is governed by the U.S. message text format (USMTF). Until recently, however, there was no overarching agency to create and mandate standards for data formats and messaging within the civilian emergency management community. Non-DOD data formats and messages were independently determined by a variety of vendors who were trying to support the civilian emergency management community.

These independent development efforts resulted in dissimilar emergency message formats and a variety of human interfaces, creating confusion among military and civilian emergency personnel during potentially life-threatening situations and undermining efforts to create common standards and interoperability.

Civilian Background

In October 2002—with the interoperability problems that surfaced during the tragic events of 11 September 2001 in mind—the Emergency Interoperability Consortium (EIC) was formed to focus on issues related to interoperability standards for emergency and incident management. The EIC provided a means for public agencies, private companies, and nonprofit organizations to unite in a public forum, address the absence of interoperability standards, offer solutions, and create standards that would represent best practices and consensus.

From its early days, EIC worked closely with the Emergency Management Technical Committee of the Organization for the Advancement of Structured Information Standards (OASIS). Their combined goal was to begin creating requirements for standards. In January 2005, EIC formed a partnership with the Department of Homeland Security (DHS) Disaster Management Program

to encourage and provide guidance for the development of standards.

As a result of wide industry input, the first OASIS message format—Common Alerting Protocol (CAP) Version 1.1—was created. By developing a message translator that maps applicable civilian CAP information fields to similar USMTF fields and vice versa, nonmilitary and military groups could "talk" to each other to develop a COP in the midst of an emergency situation.

Military Background

In October 2006, the Nuclear, Biological, and Chemical Battlefield Management Team at Edgewood Chemical and Biological Center (ECBC) and the Air Force Research Laboratory Information Technology Division joined forces to address the need for accurately passing military messages to civilian emergency managers. Their goal was to develop an interoperability tool and demonstrate it at CWID 2007.

For eight months, participants planned the configuration and established objectives to be met. These objectives included demonstrating interoperability among various military and civilian hardware and software systems and sharing CAP 1.1 messages and polygons across civilian, DHS, and DOD domains. Polygons, which are shapes (rather than text) that represent important places or conditions on a map, are particularly important but challenging to communicate. Examples of typical polygons include roadblocks, staging areas, and hazard outlines.

In addition to fulfilling the stated objectives, the group had bigger ambitions. They sought to uncover additional areas for improvement so that they could make recommendations for the future. Two significant issues surfaced.

First, because CAP 1.1 is the only approved message standard and not all systems support this standard, stakeholders were forced to find work-arounds. This encouraged collaborative problem solving among a variety of organizations and likely influenced the direction of future development efforts, prompting organizations to develop technical specifications that would accommodate future standards.

Secondly, arriving at commonality on even simple matters, such as units of time and organizational labels, proved challenging. In IIMS, which was tailored to address the needs of local response teams, minutes and hours are used to measure process milestones. However, it may take seventy-two hours for a federal response to commence; so in those cases, time must be measured in larger units. Also, a single point on a postdisaster timeline may simultaneously represent a federal response and a local recovery.

Preparation for the CWID 2007 demonstration helped uncover these issues, which in turn, encouraged the spiral development process used in defense transformation efforts. Vendors also benefited from the process. They received feedback and suggestions regarding their products and processes. As a result, many systems were reprogrammed, incorporating new capabilities and more user-friendly screens and processes.

Preparation and Demonstration

In March 2007, ECBC conducted a laboratory trial to test message translators and message-passing capabilities. One of the key findings of the project was made during the laboratory trial.

Each of the CAP-compliant software platforms used in the trial had been developed independently using different business models and delivering different interpretations and implementations of the CAP standard. The potential existed for these independently developed graphic user interfaces to display CAP messages differently—and they did. So, even though the message data followed a standard format, the presentation of the data was not standard.

This discovery, which was considered critical by the emergency management community, was presented at a special briefing to the EIC. As a result of the briefing and pressure from the emergency management community, numerous commercial software platforms were modified to address the problem.

As technical development and testing progressed, steps were taken to more closely replicate the CWID environment. A simulated emergency operations center (EOC) was mobilized aboard a large motor home. It provided a nonmapped workflow platform representing multiple local and state jurisdictions using a variety of emergency management software applications. The EOC contained ten laptop workstations and multiple briefing/status areas.

The mobile unit was able to take advantage of local power and internet infrastructure or operate autonomously via onboard diesel generators and its own satellite dish. The information technology architecture of the EOC was also adaptable. It operated on thin client user interfaces with a central processing server, but was also set up to support internet connectivity for standard thick client laptops and thin client applications.

In addition to technical testing, scenario testing was also conducted. ECBC directed that the scenarios be as credible as possible to ensure that each message made operational sense to the players and simultaneously

proved technical success. Software manuals and player guidebooks were put through the paces, and the group's ability to maintain "controlled confusion" in the pursuit of effective problem solving was tested. ECBC wanted to observe how the players in an unscripted environment would use the military and civilian software platforms to communicate and share actionable data. The hope was that in such a near real-world scenario, user needs would be revealed. Such scenario testing is indicative of the type of forward thinking that continues to support ongoing Homeland Security Exercise and Evaluation Program-compliant tabletop exercises.

CWID itself held a number of planning and coordination meetings, some of which involved adjustments to the proposed configuration for the demonstration. Final CWID preparations included the shipment and delivery of hardware to the Naval Surface Warfare Center, Dahlgren, Virginia.

During the actual CWID exercise, IIMS demonstrated dynamic data sharing, enabled on-the-fly collaboration between military and civilian sectors, and demonstrated increased efficiency and effectiveness of responses to simulated events ranging from earthquakes, wildfires, and other natural events to acts of chemical, biological, and radiological terrorism. The demonstration paved the way for a practical, affordable approach to the data-sharing aspect of the National Incident Management System (NIMS).

Key Players

The success of IIMS can be attributed to the joint cooperative effort among the military, state and local emergency responders, and the private sector. Approximately sixty people from a variety of organizations contributed to the success of this project.

Movement Toward a Best Practices Solution

IIMS is a software tool that assists the installation commander in the efficient deployment of the observe, orient, decide, and act (OODA) loop during an emergency.[1] IIMS addresses the *observe* role of the OODA loop by providing the near real-time operational status of the installation and surrounding area. With IIMS, seemingly unconnected incidental data and events can prove to be critical information as the commander properly orients to the threat.

IIMS can display disparate observations in its COP—a potential clue that an adversary might be trying to disrupt the ongoing mission. In the event that a continuum of these types of asymmetric threats is encountered, multiple observations can be made and input into IIMS, further strengthening the *observe* element of OODA. If managed manually, the input of data could be labor-intensive. And without warning, an additional follow-on disaster such as a new attack or infrastructure failure could occur. This would increase the amount of data to be analyzed, rendering manual information processing completely ineffective.

In addition to assisting with the deployment of the OODA loop, IIMS provides operational recordkeeping in support of postevent analysis. Not only does the electronic record contribute to the creation of a valuable resource for studying lessons learned, but it also provides an official government record that could be used in a court of law.

The IIMS also helps support the installation commander's decision-making process for determining the appropriate mission-oriented protective posture (MOPP). IIMS contains specific elements designed to quickly assimilate chemical warfare agent contamination data and orient the commander to the threat. Continuously updated information provides a current COP, orients the commander to the near real-time threat, and assists in decisions to reduce MOPP levels in uncontaminated and unthreatened areas of the installation.

From a purely technical perspective, IIMS serves as a research and development software platform, aiding in the development and testing of new concepts at operational installations. The system provides a reliable test bed configuration for evaluating components and transitioning successful elements into programs of record.

Conclusion

The success of the IIMS project at CWID 2007 positively affects our Nation's domestic security and emergency management efforts by—

- Bridging the data exchange between critical and historically untethered organizations (such as DOD and civilian security agencies) with affordable, available technologies.
- Considering communications and interoperability standards as more than action items for the long term—proving them to be doable, affordable options for today.
- Encouraging emergency management software vendors to consider modifying software to reflect standards and guidelines.
- Encouraging emergency planners to promote interoperability immediately by using informally approved data formats to create temporary, voluntary standards in lieu of formal standards.

- Showcasing best practices for vendors cooperatively working to improve offerings to defense and emergency management sectors.
- Raising emergency managers' expectations of CAP messages, thereby increasing the demand for clear, understandable headers and content.
- Promoting CWID and its offerings, including ambitious objectives such as determining relevant technologies; quickly and affordably demonstrating and fielding effective solutions; and identifying gaps in service, cooperation, and coordination.
- Creating a catalyst for change. Presenting IIMS at CWID 2007 encouraged industry leaders to begin taking cooperative steps in support of a comprehensive NIMS.

Endnote:

[1]The OODA loop, developed by John Boyd, is a well-tested, well-accepted combat assessment process that exercises the following tasks in a cyclical fashion: observe, orient, decide, and act. The cycle continually repeats until victory or defeat is declared. It has been demonstrated that engagements are typically won by those employing the fastest assessment and decision cycle. Due to its deployment record in exercises and combat, the OODA loop has been embraced within DOD.

Mr. Mueller, a former Army Chemical officer, is the associate manager of chemical, biological, radiological, nuclear, and high-yield explosives at IEM, Incorporated. He holds a bachelor's degree in mechanical engineering from Michigan Technical University and a master's degree in public administration of emergency management from Jacksonville State Univeristy, Alabama.

Ms. Bergeron is a marketing specialist with IEM, Incorporated. She holds a bachelor's degree in arts and sciences from Louisiana State University.

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The AN/PSS-14 Mine Detector Requires a License:

Mine Detection Moves Into the Future

By Mr. David Holbrook

Why is there an article about mine detectors in *Army Chemical Review?* Isn't the mine detector an engineer thing? I'm sure that these questions will be on the minds of many Chemical Soldiers as they read through this issue of *Army Chemical Review*.

The Army is always changing. If you are required to conduct quartering-party operations, then your unit will be required to operate the AN/PSS-14 mine detector. With that in mind, the Chemical Corps is updating modified tables of organization and equipment (MTOEs) and authorizing the AN/PSS-14 for some Chemical units. Technical escort teams, smoke units, and Chemical companies (combat support and heavy) will need the AN/PSS-14 for site exploitation; consequently, it will be added to their MTOEs. So read on, Soldier, read on!

The AN/PSS-14 Mine Detection System is more advanced than any detector used to accomplish mine detection. But the AN/PSS-14 is only one part of this remarkable system; the other and more essential part is the operator. The complexity of the system requires operators to be licensed to ensure safe and effective operation. For that reason and for the safety of personnel involved in route and area clearance operations, commanders must emphasize that each operator be properly licensed before using the system in a real-world situation. Licensing on the AN/PSS-14 will ensure that the operator is properly trained and that the equipment is adequately sustained to perform as designed.

Basic Operational Theory

The AN/PSS-14 mine detector applies two technologies: metal detection (MD) and ground-penetrating radar (GPR). The AN/PSS-14 employs aided target recognition algorithms that alert the operator to the presence of targets of interest. A trained operator learns to mute the MD or GPR to identify an object buried in the ground, pinpoint its location, determine if it is a mine, and

Soldiers being graded on sweeping techniques while attending the UMT course

investigate it. The GPR can be used to distinguish mines from battlefield clutter and other metal debris.

Fielding

The first step in fielding the AN/PSS-14 is educating units on the system requirements. The program manager (PM) for countermine and explosive ordnance disposal (EOD) sends a team to the unit location to conduct a new material introductory briefing. During the briefing, the PM representative explains the capabilities, sustainment requirements, licensing requirements, and training devices. The number one goal of the briefing is to ensure that commanders schedule time to conduct new equipment training (NET) and unit master training (UMT). (UMT is conducted by master trainers from the U.S. Army Engineer School [USAES].) Both courses are forty hours long and are conducted at the units' home stations or at Fort Leonard Wood, Missouri—whichever is more convenient for the unit. After the training is scheduled, the NET team travels to the training location, sets up the training site, begins training, and issues equipment (following successful NET completion). The operators who attend the training are considered certified.

Training

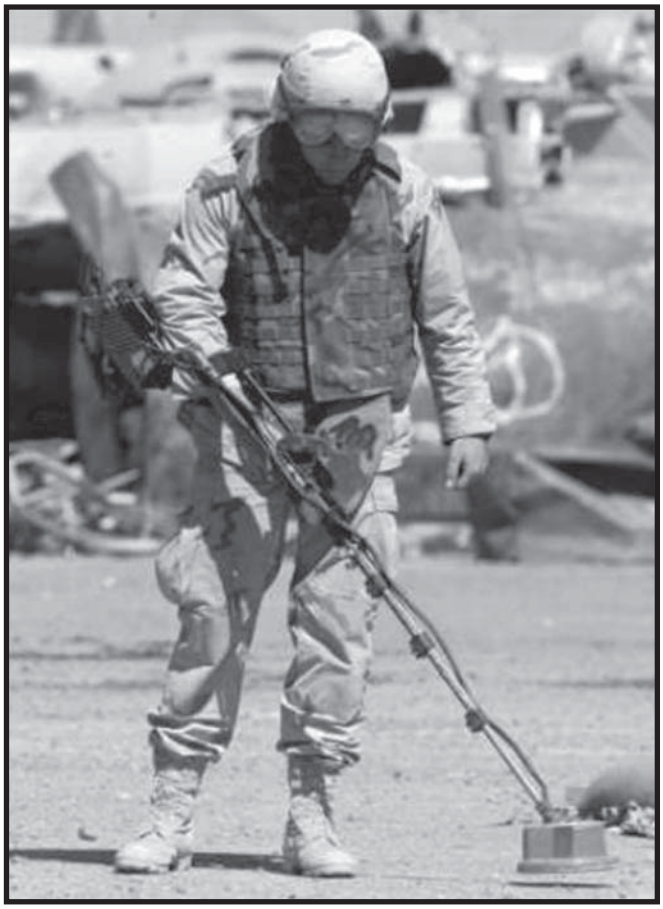
The PM provides proper training on every unit authorized the AN/PSS-14. This means that before a unit is fielded its authorized quantity of mine detectors, it must have an equal or greater number of licensed operators.

Every unit must send operators to NET before the AN/PSS-14 is fielded. Only **sergeants (E5s) or above** may attend the training. Selected attendees will then be qualified to take additional training and become unit master trainers.

UMT is conducted to provide a sustainment capability to each unit issued the AN/PSS-14. Units are encouraged to send as many attendees **(E5 and above)** as possible to this training.[1] These individuals develop unit standing operating procedures (SOPs) and conduct new operator and refresher training when the fielding process is complete. Additionally, instructors are required to be operator-certified before participating in UMT. With this requirement in mind, units must capitalize on sending personnel to NET so that they are eligible for UMT later.

Licensing

The leadership at USAES feels that equipment designed to detect explosives, mines, or other hazards must have a licensing requirement associated with it. The proper use of these types of equipment will prevent



Soldier using an AN/PSS-14

injuries and the loss of lives. The licensing requirement ensures the proficiency of personnel using the equipment. Army Regulation (AR) 600-55, Chapter 7, states that all military personnel and Department of the Army (DA) civilians must have a completed Optional Form (OF) 346 *(U.S. Government Motor Vehicle Operator's Identification Card)* and be able to demonstrate their proficiency before operating miscellaneous equipment determined by local commanders or higher authorities to warrant licensing (such as powered lawn mowers; agricultural machinery; food preparation equipment; field ranges; immersion heaters; laundry equipment; snowmobiles; and detecting sets, mine-portable, AN/PRS-7 and AN/PSS-11).

The USAES has recommended the following changes to AR 600-55 to clarify the licensing requirement for the AN/PSS-14: All military personnel and DA civilians must have a certified DA Form 5984-E *(Operator's Permit Record)* and demonstrate their proficiency to operate mine-detecting or other explosive-detecting equipment, to include all portable, handheld, and truck-mounted models (including, but not limited to, AN/PSS-12 and AN/PSS-14). The first draft of revised AR 600-55 is

currently under review. The final version is scheduled for completion in early 2008.

Summary

It is imperative that commanders become familiar with the capabilities of the AN/PSS-14. This system is essential to safe route clearance operations. The USAES has provided all the tools required to establish a successful training and licensing program, to include providing units with a draft SOP for adoption and immediate implementation. The PM has an aggressive fielding schedule for the AN/PSS-14. If NET and UMT are not on your unit training calendars, please contact the following personnel:

NET
Mr. Rob Sellmer
AN/PSS-14 Field Manager
(703) 704-3397 or DSN 654-3397
E-mail: <*robert.sellmerii@us.army.mil*>

UMT
Mr. John Sullivan
Site Manager
(573) 563-7646 or (573) 528-9081 (cell)
E-mail: <*john.b.sullivan@us.army.mil*>

Soldier using the Sweep Monitoring System to calibrate an AN/PSS-14

Endnote:

[1]Because of the licensing requirement for this system, all personnel in the UMT course must be E5 or above. **Specialists are not authorized UMT.**

References:

AR 600-55, *The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)*, 18 June 2007.

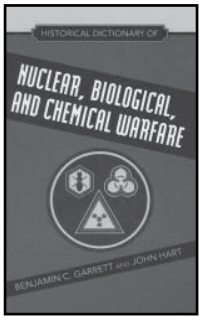
DA Form 5984-E, *Operator's Permit Record*, 1 March 1991.

OF 346, *U.S. Government Motor Vehicle Operator's Identification Card*, November 1985.

Mr. Holbrook is a retired engineer lieutenant colonel and a former battalion commander. He currently works as a senior analyst for BRTRC Technology Research Corporation, Fort Leonard Wood office.

By Mr. Reid Kirby

Book Reviews



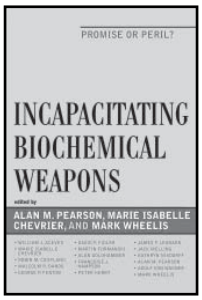
Historical Dictionary of Nuclear, Biological, and Chemical Warfare, Benjamin C. Garrett and John Hart, The Scarecrow Press, Inc., Lanham, Maryland, August 2007.

Benjamin Garrett is a former Chemical Soldier who is now working for the Federal Bureau of Investigation, and John Hart is a Stockholm International Peace Research Institute scholar who is well experienced in disarmament efforts. Having previously read the works of both authors, I was expecting this book to contain a wealth of obscure information. I was initially disappointed. The sources are mainly secondary, and the information presented is largely commonplace for those well versed on authoritative public works regarding nuclear, biological, and chemical (NBC) warfare.

Dictionaries necessarily define terms without the benefit of the context; therefore, it is often difficult for a novice reader to absorb information from a dictionary. However, the *Historical Dictionary of Nuclear, Biological, and Chemical Warfare* does contain a wealth of authoritative information that could be of assistance to those writing about NBC warfare. Many readers may be reminded of what they have forgotten after years spent on the topic.

The content of the dictionary has been limited, apparently to avoid sensitive but unclassified details. The authors admit that some readers will believe the dictionary reveals too much; however, to those who are familiar with the scholarly information available to the public, it is obvious that the path of least sensitivity was chosen.

Due to its diverse definitions, accuracy, and clear presentation, the *Historical Dictionary of Nuclear, Biological, and Chemical Warfare* is a recommended reference that deserves to be perused on a regular basis.



Incapacitating Biochemical Weapons: Promise or Peril? Alan M. Pearson, Marie Isabelle Chevrier, and Mark Wheelis, editors, Lexington Books, Lanham, Maryland, November 2007.

This book originated from a June 2005 symposium on incapacitating biochemical weapons conducted by well-known authorities and scholars in the arms control arena. The first half of the book is comprised of chapters that provide insight into the development of biochemical nonlethal weapon technologies. This is followed by a series of chapters that discuss the legal implications of using such weapons in law enforcement and the military. The use of an incapacitant by Russian special forces to resolve a 26 October 2002 hostage situation at the Dubrovka Theatre in Moscow takes center stage throughout the book.

In the first half of the book, biological and chemical weapons are overtly confused, as are riot control agents (tear and vomiting) and incapacitants (psycho agents). This is followed by the presentation of unsupported links between biomedical and pharmaceutical technologies and undefined biochemical weapon efforts. There are numerous valid points made in the first half of the book, and much of the information is interesting. However, against a troubled backdrop, these efforts fail to impress.

The latter half of the book is well worth reading. There are many vocal proponents for nonlethal weapons, which have the greatest potential to challenge the current international norm against chemical-biological weapons. The legal interpretations contained in the second half of the book effectively disprove the notion of nonlethal loopholes, making it clear that the perception of loopholes is derived from pulling the language out of context coupled with the difficulty in structuring a treaty through committee deliberations. *Incapacitating Biochemical Weapons* reveals important conflicts between military and police use of emerging nonlethal weapon technologies and demonstrates how such technologies may threaten the current international norms set forth by the Chemical Weapons Convention.

Mr. Kirby is a project manager for Bradford and Galt. He holds a bachelor's degree in valuation science from Lindenwood College, with a minor in biology and special studies in behavioral toxicology and biotechnology.

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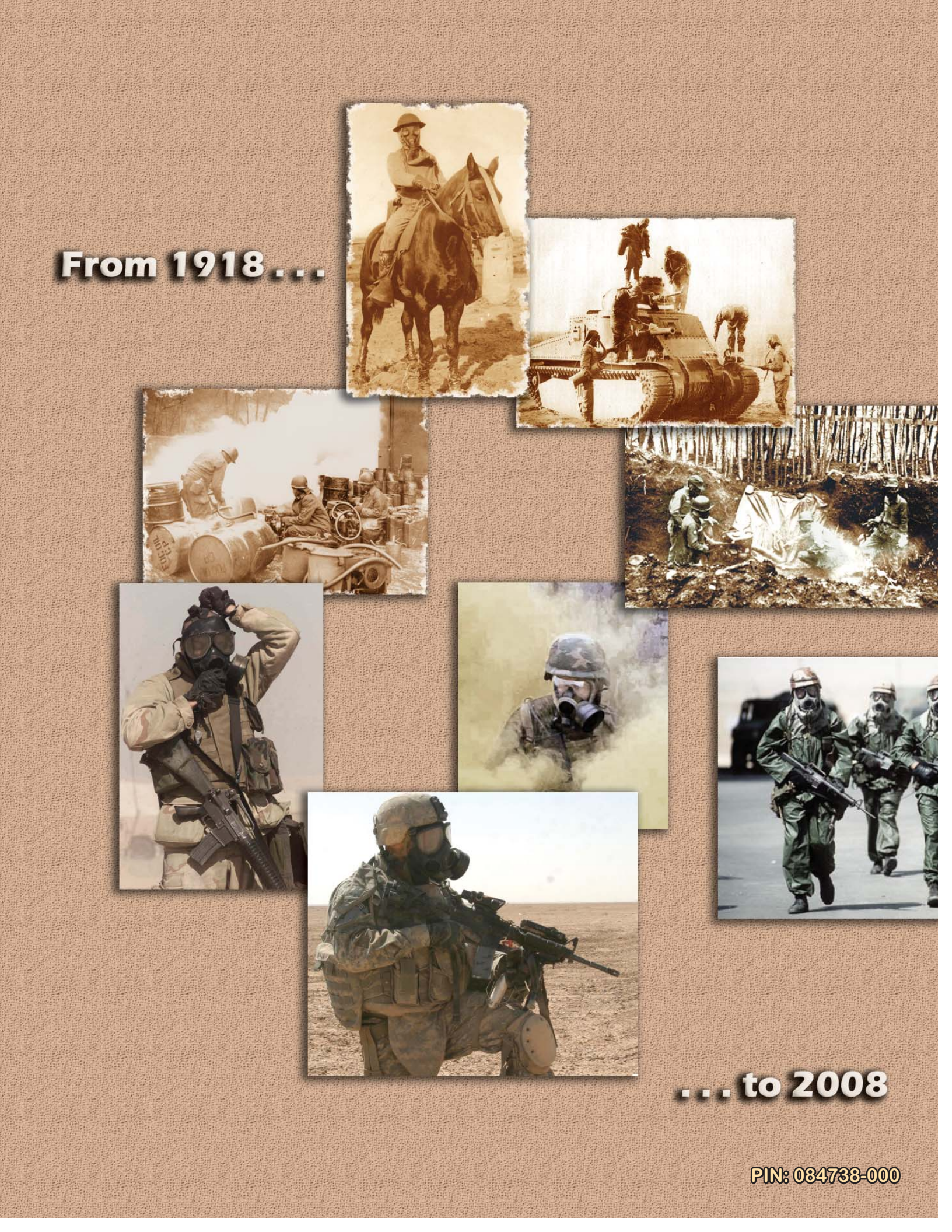

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