CML ARMY CHEMICAL REVIEW

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Articles

Departments

Front cover: A photographic collage of the 2000 Worldwide Chemical Conference. Individual photos by SFC Victor Alas. Clockwise from the upper left: Regimental Review—color guard members from the 3d Chemical Brigade; Regimental Review—COL Allan Hardy, 3d Chemical Brigade Commander, reports to COL(P) Patricia L. Nilo, Chief of Chemical, and MG Ralph G. Wooten; COL(P) Patricia Nilo dedicates the decon barn; an instructor explains the BIDS mock-up trainer unit; Chavis Barracks Dedication—CSM James E. VanPatten, Regimental Command Sergeant Major, and CSM Jesus Gomez, NCO Academy Commandant, unveil plaque. Center photo: Regimental Review—MG Ralph G. Wooten gives his farewell speech.
Back cover: Russian soldiers in gas gear, see page 20.


COL(P) Patricia L. Nilo

My vision for 2020 is a vital U.S. Army Chemical Corps leading an NBC-trained-and-ready, capabilities-based Joint Force. We will leverage technology and fully integrate doctrine, training, leader development, materiel, and soldiers for the Army and Joint Force.

We are about to embark on the most significant transformation of our Army since World War II. In moving forward to support our nation and our Army, we must remember that the role of the Chemical Corps is to protect the force and maximize combat power. We do this in two ways: one, by training and equipping the battle staff to support commanders and two, by training and equipping chemical units to conduct NBC reconnaissance, decontamination, obscuration, and thermobaric (intense heat and pressure) operations. Officers and noncommissioned officers, enlisted soldiers, and civilians all play key and critical roles in defense against asymmetric threats and weapons of mass destruction (WMD).

Furthermore, we must protect the force during all phases of operations, deployment, and early entry through redeployment. This includes both permissive and nonpermissive environments and specifically covers the passive defense aspects of theater missile defense for which the Chemical Corps is the proponent. We must broaden our horizon to ensure that we include the vital aspects of protecting our homeland from WMD as well. We must also ensure that our strategic national interests are protected against any enemy, foreign or domestic, attempting to employ chemical, biological, or radiological weapons, regardless of the level of the NBC threat.

The proliferation of WMD is a constant and ever-increasing threat. Even in the high end of the Smaller Scale Contingency and even more so at the low end of the Major Theater of War, the threat and expectation of WMD use are always present. Our Army Chief of Staff and leadership at the DoD level consistently emphasize the evolving nature of the threat into one in which adversaries seek to challenge us asymmetrically. The prospect of asymmetry in the context of chemical and biological warfare clearly applies to the Army Transformation. The Army Chief of Staff has stated that transformed forces "must be survivable when faced with an adversary employing asymmetric threats." The asymmetric threat most often cited is the use of WMD against our forces. Clearly an adversary's use of WMD early in a developing conflict potentially reduces his risk for U.S. commitment. The design of our future warfighting organizations must be more responsive, not less, to these perceived changes in the future environment.

Army Transformation presents great opportunities and potential in support of our nation and our Army. We are ready and moving forward to meet these requirements as fast as we can.

ELEMENTIS REGAMUS PROELIUM!

Dragon Soldiers...Rule the Battle!

BNCOC Splits

TRADOC mandated that beginning 1 October 2000, BNCOC would be split into two phases—Phase I, Common Leader Training, and Phase II, Technical or Proponent Training. Each phase is scheduled separately on the Army Training Requirements and Resource System (ATRRS).

This split was brought to the attention of the NCO Academy with the release of the most recent ATRRS reflecting The Army Training System (TATS) BNCOC Common Core (Phase I) and Chemical BNCOC (Phase II). The future intent is for the soldiers to attend Phase I training at the nearest NCO academy in their region. Upon completion of Phase I, they will be scheduled or will proceed to Phase II training at the appropriate NCO academy that supports the branch service school.

Current guidance is that a soldier **must** complete Phase I before attending Phase II. Listed below are class dates, which are currently reflected on the ATRRS as TATS BNCOC Common Core (Phase I) and Chemical BNCOC (Phase II). There are some problems with the dates that are being worked on (i.e. BNCOC Class 01-01 and Class BNCOC [R] 01-01 will operate under the old POI 15/16 weeks, while waiting for the approval from TRADOC for the TATS POI of 9 weeks and 3 days for BNCOC and 10 weeks and 3 days for BNCOC-R). These dates will be corrected once the issues have been resolved with the appropriate agencies.

Current scheduled classes for Chemical BNCOC, FY 01 are as follows:

PHASE I

TATS BNCOC Common Core

Course Number 600-BNCOC (F)

CL#	Start Date	End Date
006	29 JAN 01	13 FEB 01
007	26 FEB 01	13 MAR 01
010	02 APR 01	17 APR 01
014	04 JUN 01	19 JUN 01
016	09 JUL 01	24 JUL 01

BNCOC (R), FY01

CL#	Start Date	End Date
001	07 FEB 01	29 MAY 01
501	31 MAY 01	19 SEP 01

PHASE II

Chemical Operations Specialist BNCOC

Course Number 494-54B20

CL#	Start Date	End Date
001	14 FEB 01	29 MAY 01
002	14 MAR 01	25 JUN 01
003	18 APR 01	31 JUL 01
004	20 JUN 01	02 OCT 01
005	25 JUL 01	06 NOV 01

Until the Common-Core scheduling can be worked out, units should actively be involved to ensure that sergeants projected to attend Phase II Chemical BNCOC are scheduled to attend the Phase I Common-Core portion before adding Phase II. The target date for implementing the TATS POI is 14 March 2001 for Class 02-01. If you are attending Classes 02-01, 03-01, 501, 04-01, and 05-01, continue to check ATRRS for changes in graduation dates (in January or February 2001).

Soldiers who are scheduled to attend BNCOC should read the information on the Web site before arriving at Fort Leonard Wood. The Web site can be accessed at the following address: http://www.wood.army.mil/. Click the NCO Academy link located on the MANSCEN Web page, click on the chemical symbol, and then click BNCOC. The Chemical BNCOC Web page will provide you with assistance and the needed requirements for attendance. The most recent requirement for students attending TRADOC Common Core and BNCOC are that they **must have a completed Unit Pre-Execution Checklist signed by the commander or designated representative.** The checklist is found in TRADOC Regulation 350-18, *The Army School System*, Appendix H, or on ATRRS. Soldiers reporting for training without the checklist signed by the soldier and unit commander will be given 72 hours from the report date to provide the checklist with appropriate attachments. Those who fail to obtain these attachments will be returned to their units.

If you have any questions, contact the BNCOC course chief—1SG Lorenzo Hamilton—at DSN 676-7416, commercial (576) 596-0131 ext. 3-7416, or e-mail Hamiltol@wood.army.mil.

A New Approach to an Old Problem

By Mike Donohue

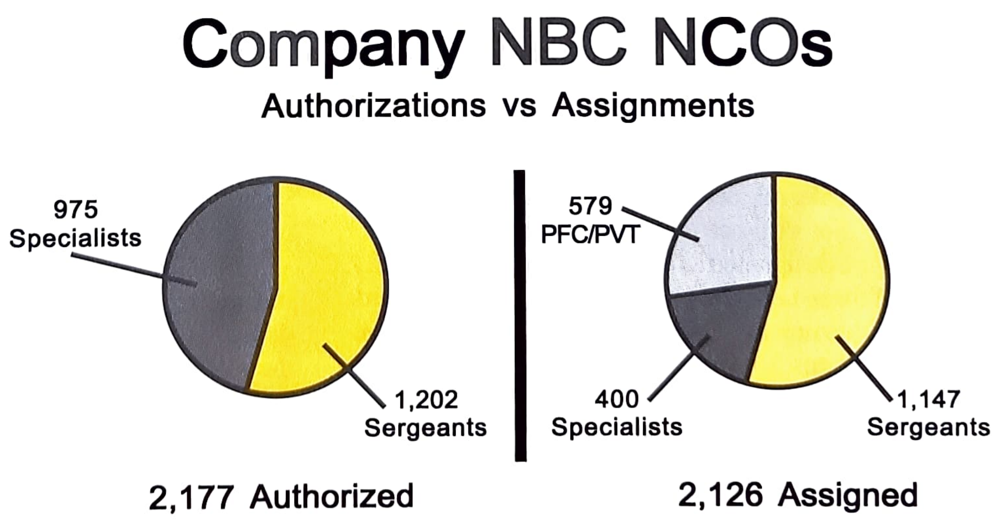
In November 1999, the Joint Service Integration Group at Fort Leonard Wood, Missouri, released its mask-surveillance process-action team's final report. Detailing the results of a 2-year study on the readiness of the M40-series protective mask, this report identified systemic shortcomings relating to the care and maintenance of the protective masks at the individual and organizational levels.

More than 10,000 of the 19,000 masks inspected were found to have at least one critical defect. A critical defect is defined as having "the potential to result in mask leakage and may impact on protection of the wearer." It was noted that most of these deficiencies were the result of normal wear and tear, a lack of NBC training, and poor maintenance practices. A review of the deficiencies by the Soldier and Biological Chemical Command (SBCCOM) revealed that five defects accounted for 95 percent of the critical defects found during the study, all of which are issues of operator-level preventive-maintenance checks and services.

On 21 June 2000, Major General John Sylvester, Deputy Chief of Staff for Training at TRADOC, and Colonel Thomas Klewin, Assistant Commandant of the United States Army Chemical School, appeared before the House Subcomittee on National Security, Veterans Affairs, and International Relations to respond to congressional concerns raised by the integration group's report. In his testimony, Major General Sylvester committed to increased command emphasis; reviewed current training efforts; and described, in detail, a new training strategy designed to eliminate the existing training deficiency at the company NBC NCO level.

The keystone of a successful company-level NBC program is the company NBC NCO. Normally the only school-trained chemical soldier in the unit, this soldier is part advisor, part administrator, part maintainer, part logistician, and part trainer in addition to whatever other duties the unit assigns him—driver, assistant supply, assistant armorer, training NCO, or shadow clerk. If you can think of a nonauthorized manpower need at the company level, the NBC NCO has filled it.

Traditionally, table of organization and equipment company-level NBC NCO positions have been authorized to be filled by a sergeant. The Chemical Corps's enlisted structure has not been able to provide enough sergeants to fill its authorizations. As a result, specialists and privates have been assigned to fill the positions. Therein lies the problem. Specialists and privates are not authorized to attend



Traditionally, the Chemical Corps has had difficulty filling company-level NBC NCO positions with sergeants, so specialists were commonly assigned to fill the positions. During the mid-1990s, CINCOS I and CINCOS II restructured 54B NCO authorizations and most NBC NCO positions in combat-service-support units were downgraded to specialist positions. While this alleviated a personnel-assignment problem, it exacerbated the NBC NCO training problem by placing more soldiers in positions for which they were untrained. Of the 2,126 Dragon Soldiers assigned as NBC NCOs, 400 (19%) are specialists and 579 (27%) are PFCs or privates.

BNCOC, where NBC NCO skills are taught, so they are placed in a position without the benefit of receiving the formal training in the skills necessary for them to be successful. During the mid-1990s, the change in the NCO structure intensified the problem. During these structural changes, NCO positions were reviewed and many authorizations for company-level NBC NCO positions were reduced from sergeant E5 to specialist E4. As a result, specialists and privates now fill 46 percent of all company-level NBC NCO positions.

The genesis of the training strategy, Major General Sylvester stated to the House Subcommittee, can be traced to Regimental Command Sergeant Major James E. Van-Patten and his efforts to address the needs of Dragon Soldiers. Ideally, when a soldier is selected to serve as an NBC NCO, he would be sent to the Chemical School for training. The reality of today's Army is that training budgets are shrinking and the cost of sending a new NBC NCO to the Chemical School for resident training would be prohibitive.

Additionally, TRADOC has a "no-growth" policy that requires service schools to reduce training hours in one course to compensate for new hours in another. These factors removed the resident-training option from consideration. Initially, a job aid that would serve as a guide for NBC NCOs was planned, but analysis data indicated that more than a job aid was needed. In late November 1999, a task-selection board identified 83 tasks and 9 procedures, knowledges, and skills that needed to be trained. Next, a review of current training products was undertaken in an effort to identify courseware that could be modified and used to meet the training need. Eventually, a comprehensive training strategy evolved that rested on four pillars: self-study, unit training, formal courseware, and job aid.

When training budgets shrink, units and individuals must assume a greater role in training individual soldiers, which is the case in this instance. Of the 87 tasks selected for training, 14 were designated as a unit-training responsibility. All but two of these tasks are trained to qualifying standards during one-station unit training, so the unit's primary responsibility will focus on providing refresher training. An additional 11 tasks will be offered via the Army correspondence-course program. These tasks focus on supervisory and planning responsibilities and will be taught again during BNCOC.

The majority of the tasks (61) will be trained during two courses—the NBC Defense Officer/NCO Course and the NBC Room Operations Course. The NBC Defense Course—80 hours—is designed to train non-54B officers and NCOs who have been assigned the additional duty of unit NBC officer or NCO. The course focuses on the tactical aspects of company-level NBC operations and includes instruction on the use and maintenance of NBC equipment found at the company level, NBC reports, tactical operations, and conducting NBC training. The course is scheduled for revision in October 2000, and its scope will be expanded to require 54B NBC NCOs who have not already attended BNCOC to attend.

The NBC Room Operations Course is a new training product scheduled for completion during FY01. It will be taught as a 1-week add-on to the NBC Defense Course and will focus on the administration, maintenance, logistics, and training responsibilities of company-level NBC NCOs. The course content will be based on the 10th Mountain Division's "Unit NBC Room Operations Course" and on input from the field. Since units have different tactical and logistical requirements, the course will be designed to allow installation NBC schools to modify or replace lessons (with proponent approval) to meet their command's unique requirements.

Graduates of the NBC Room Operations Course will be given a two-CD set to take back to their unit. The first will be an interactive media-instruction version of the NBC defense course. This CD includes all 80 hours of instruction and is intended as refresher training for infrequently used tasks. The second CD will be a job aid/toolbox for NBC NCOs. It uses the NBC NCO's 35 responsibilities (FM 3-100, *Chemical Operations Principles and Fundamentals, Appendix A*) as the framework and will be designed to provide Dragon Soldiers with the "who, what, when, and where" of accomplishing their duties.

Discussions of each responsibility will be hyperlinked to individual task summaries associated with the responsibility. When the form is required, users will be linked to interactive forms that tell them what information goes in the blocks and where to find it. Users will also be able to access task summaries and forms from master lists, which will be available at the click of a button. Chemical-related graphic training aids, national stock numbers of NBC equipment, chemical-related mini-lesson plans, and links to chemical references will be available on the CD.

Advisor to the commander, planner, trainer, logistician, maintenance expert—few career-management fields demand as much from their soldiers at such an early stage in their development as is expected of Dragon Soldiers serving as NBC NCOs. It is past time that we, as a Corps, provide our soldiers with the training and tools necessary for them to be successful.

At the time this article was written, Mike Donohue was serving as the chief of Functional Courses Branch, Chemical Warrior Division, Warrior Department, DOTD, MANSCEN. He retired from active duty in October 1992 after serving 20 years as an infantryman and is now a career civil servant. Mr. Donohue is a graduate of the U.S. Army Sergeants Major Academy and holds a master's in education from Auburn University, Auburn, Alabama.

Company Chemical NCO Responsibilities

(FM 3-100, Appendix A)

This NCO works in company operations where he is immediately available to the company commander as the primary advisor for all NBC matters. The NCO supports combat readiness by training first-line supervisors so they can train individual soldiers in NBC-related tasks. NBC NCOs also advise on, conduct, monitor, and evaluate NBC training within the company. This NCO demonstrates proper techniques for operation and maintenance of NBC equipment and analyzes unit training needs. His responsibilities fall under seven broad areas: intelligence, training, evaluation, readiness, logistics, administration, and field operations.

Intelligence:

- Receives, prepares, correlates, and disseminates information on enemy NBC attacks.
- Ensures that key personnel have received an appropriate, specific NBC threat briefing pertaining to their mission. Also, makes sure that all newly assigned personnel receive an unclassified NBC threat briefing.

Training:

- Advises on methods to integrate NBC defense into all aspects of training.
- Assists in establishing and reviewing unit-level mission-essential tasks. Provides recommendations to ensure that battle tasks can be performed under NBC conditions.
- Trains first-line supervisors to provide proper, informed training to individual soldiers.
- Trains and ensures continued proficiency of unit NBC-defense equipment operators.
- Forecasts NBC-training ammunition requirements.

Evaluation:

- Conducts periodic evaluations of unit NBC preparedness through individual and unit NBC-defense tests.
- Ensures that appropriate sections, squads, or platoons have personnel trained to operate and maintain assigned NBC-defense equipment.
- Uses the results of platoon drills, common-task tests (CTTs), Army Training and Evaluation Programs (ARTEPs), and other evaluations to improve NBC readiness.

Readiness:

- Reports NBC-readiness status, as required by higher headquarters.
- Helps the company supply sergeant determine authorizations and forecasts NBC equipment to support training.
- Helps the company supply sergeant maintain status of shelf-life items and rotates them as required.
- Ensures that all contingency NBC equipment is included in unit load plans.

Logistics:

- Supervises operator/crew maintenance of NBC equipment.
- Ensures that supply sergeant and prescribed load list (PLL) clerk requisition NBC-related items. Maintains document numbers for all requisitioned items.
- Inventories and reports status of NBC equipment, as required by higher headquarters.
- Helps unit leaders fit, package, and issue individual NBC-defense equipment.
- Recommends the use of funds to replace shortages, expendables, and items consumed in training based upon authorizations contained in appropriate publications.
- Coordinates turn-in of unserviceable NBC equipment.
- Ensures that radiacmeter calibration and/or certification is current.

Administration:

- Maintains and updates the NBC annex to the unit SOP.
- Maintains close coordination with the battalion officer/NCO. Keeps them abreast of NBC-related activities.
- Maintains and updates NBC-related publications.
- Maintains mask-status chart.
- Ensures that all soldiers are screened for optical inserts.
- Maintains list of personnel exempt from CS (chemical riot-control agent) exposure.

Field Operations:

- Supervises use of NBC equipment, including protective gear.
- Provides commander with unit operational exposure guidance (OEG).
- Makes recommendations to the commander on decon and smoke support.
- Maintains basic loads of NBC items in coordination with the supply sergeant.
- Supervises the use of unit NBC personnel.
- Advises on the use of flame.

BIDS MUT Dedication Ceremony

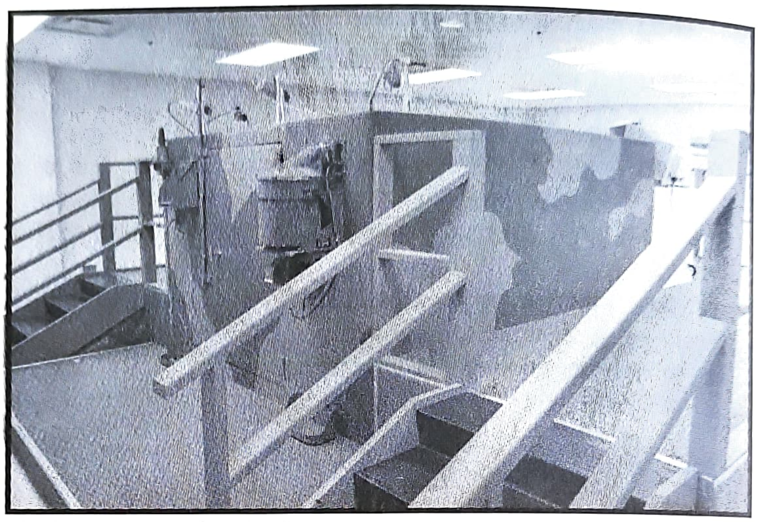
Article and Photographs by Sergeant First Class Victor M. Alas

Past training of a biological, integrated detection system (BIDS) operator required the use of the M43 BIDS Detection Suite, which uses expensive consumables in the BIDS biodetection sensors. The implementation of the mock-up trainer (MUT) that simulates the functions of the BIDS increased training capabilities.

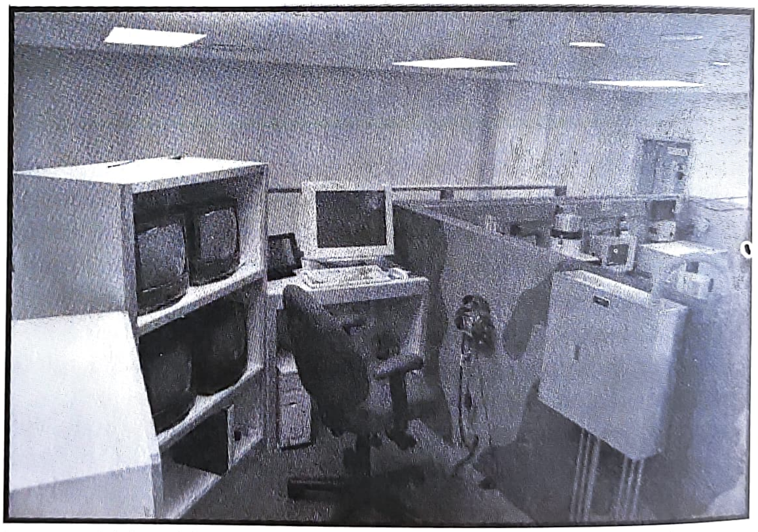
Fort Leonard Wood's BIDS MUT is not the first one of its class; this is a similar iteration of the one at Fort McClellan, Alabama. The current version consists of two MUT classrooms that replicate monitoring, sampling, detection, and presumptive identification of biological agents. The MUT looks like the actual system with a cutaway roof that enables instructors to evaluate training better. The real and simulated components enable realism in training with standard and alternate protocol procedures, as well as start-up and shutdown procedures. Each MUT has an observer controller/instructor workstation that is capable of generating scenarios and data and duplicating actual components responses. With the use of computers, the simulator is a safe and cost-effective way to train biological detection. The operator/trainee performance is captured with multiple video cameras and shown by the instructors for a comprehensive after-action review.

The MUT BIDS dedication ceremony on 23 June 2000 marked the result of a partnership effort between the program director for biological defense and the United States Army Chemical School. During the ceremony, Mr. Bruce Jezek (program director for biological defense) and Mr. Mike Smith and Ms. Elaine Neary (two members of his team) were awarded the Chemical School Commandant's coin of excellence by the guest speaker, Colonel Thomas W. Klewin (Assistant Commandant of the Chemical School). Several participants of the Worldwide Chemical Conference attended the ceremony and stated that they enjoyed the demonstrations and tour of the installation.

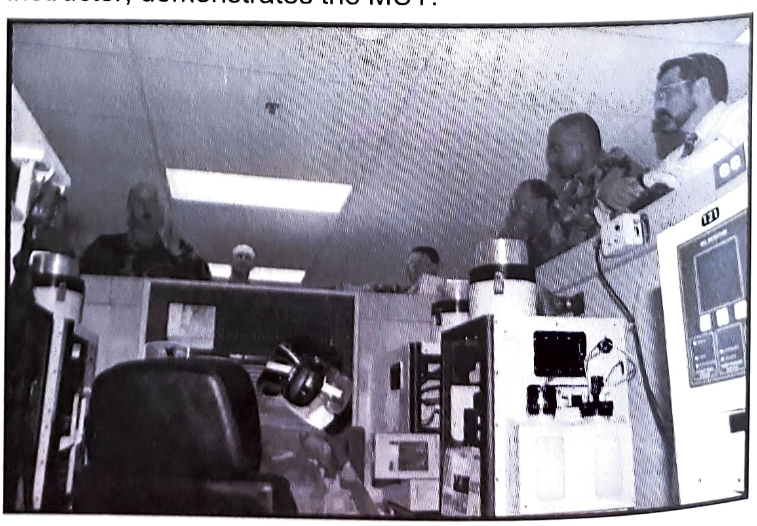
SFC Alas is currently the experimentation senior training management NCO of the WARMOD Chemical Section, Directorate of Training Development, Maneuver Support Center, Fort Leonard Wood, Missouri. His previous assignments include ANCOC branch chief, NCO Academy, Fort McClellan, Alabama; brigade NBC NCO, DIVARTY, 2d Infantry Division, Korea; and team leader, CDTF, Fort McClellan, Alabama.



Platform view of the MUT



(Above) MUT instructor station (Below) SFC Clay Young, instructor, demonstrates the MUT.



The Army National Guard and Reserve—Past and Present

By Sergeant Major Charles Barber

The Army National Guard predates the founding of the nation and a standing military by almost a century and a half—making it the oldest component of the United States armed forces. In 1636, the Massachusetts Bay Colony organized America's first permanent militia regiments, among the oldest continuing units in history. Since that time, the Guard has participated in every U.S. conflict from the Pequot War of 1637 to our current deployments.

The Army Reserve traces its origins to the creation of the Medical Reserve Corps in 1908. In 1916, Congress passed the National Defense Act which created the Officers' Reserve Corps, Enlisted Reserve Corps, and Reserve Officers Training Corps (ROTC). In April 1917, after the United States entered World War I, 89,500 officers from the Officers' Reserve Corps participated in the war. About one-third were medical doctors. More than 80,000 soldiers of the Enlisted Reserve Corps served, with 15,000 assigned to medical units.

After the war, the Officers and Enlisted Reserve Corps were combined into the Organized Reserve Corps, a name that lasted into the 1950s. The years between the world wars were austere, with few opportunities for training. An opportunity for service, however, was created during the Great Depression. One of Roosevelt's New Deal programs, the Civilian Conservation Corps (CCC), placed young men in barracks and military-styled organizations to work in national forests and other outdoor projects. Between 1933 and 1939, more than 30,000 officers from the Organized Reserve Corps served as commanders or staff officers at the 2,700 CCC camps.

In these times of ever-diminishing resources for the Active Component, the dependence on the Army Reserve is at an all-time high. Today, 70-plus percent of the chemical assets for the total force are comprised of Reserve-Component personnel. The Reserve Component also is capable of deploying in much shorter times than the old 6 to 8 months required for WWII; it is now "come as you are."

Technology has brought about a faster, smaller world that has become susceptible to threats by terrorists and fanatics who would use almost any means to achieve their goals. This is evident by the use of chemical weapons in Japan and Iraq. Saddam Hussein used them against his own people. These are the most dangerous times in history for the use of weapons of mass destruction against the United States.

The best offense is a strong defense; however, maintaining a strong and ready defense requires a trained and ready force. The Reserve-Component soldiers are training hard to master the skills needed to be ready at a moment's notice, but many positions go unfilled.

The Chemical Corps is a prime factor in the defense of our homeland, but there are not enough assets to fill the need. The loss of any chemical soldier is a serious loss to our nation. As you know, not every soldier can be a chemical soldier; we are specialized, highly intelligent, and highly motivated. Dragon Soldiers are at the forefront of our nation's foreign and domestic defense.

The Reserve Component of the Army needs you to sustain your skills and America's defense by continuing to serve after active service. It only requires one weekend a month and two weeks during the summer of your time. If you have decided to leave active service and would like to find out what is available, go to the Internet and look for http://www.1800goguard.com/ or http://www.goarmyreserve.com to find all the benefits, programs, and opportunities available.

As a member of the Army Reserve Component, you can further your education with the College Level Examination Program (CLEP), Defense Activity for Non-traditional Education Support (DANTES), and distance learning. There are also bonuses for reenlistment, affiliation, and staying in service.

Special thanks to SGM Thomas VanDevender, senior National Guard liaison, for his input to this article.

SGM Charles E. Barber is the senior chemical Reserve Component liaison NCO at Fort Leonard Wood, Missouri. He has 28 years combined service—10 years with the Texas Army National Guard, 2 years as a drilling reservist, and 16 years active National Guard/Reserve. SGM Barber has served in numerous fields including field artillery, area support groups, engineer (combat heavy), and chemical battalions/brigade and recruiting/retentions.

83d Chemical Battalion Activates

By Major Darryl J. Briggs

On 15 September 2000, the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, and Warrior Brigade welcomed one of the most unique tables of organization and equipment (TOE) chemical battalions in the Chemical Corps—the 83d Chemical Battalion. Considering that there are only three TOE chemical battalion headquarters in the active Army makes it more interesting to note that this battalion headquarters now serves as the direct higher headquarters for TWO "one-of-a-kind" active duty chemical units—the 7th Chemical Biological Integration Detection System (BIDS) Company and the 51st Chemical (Recon) Company.

Unit History

The 83d Chemical Battalion originally was organized as the 83d Chemical Mortar Battalion and activated at Camp Gordon, Georgia, on 10 June 1942. The battalion served 508 days of combat in the Mediterranean theater and mainland Europe during World War II. It successfully performed five amphibious operations and one airborne operation and fought in eight campaigns. The battalion's mission was to provide close mortar support to ground-combat forces. The battalion distinguished itself by supporting units such as Darby's Rangers, the 82d Airborne Division, the 101st Airborne Division, the 509th Parachute Infantry Battalion, and the 2d and 41st British Commandos. The 83d Chemical Mortar Battalion was inactivated on 26 November 1945.

Because of the lessons learned about chemical force sturcture during *Operation Desert Storm*, the United States Army Forces Command (FORSCOM) reactivated the 83d Chemical Battalion on 1 October 1993 and attached the battalion to the XVIII Airborne Corps at Fort Bragg, North Carolina. Since that time, the 83d Chemical Battalion has supported the XVIII Airborne Corps and FORSCOM units in a variety of contingency deployments and exercises.

Why the Move

By 1998, Headquarters, JRTC, and Fort Polk became the home of the 7th Chemical (Biological Detection) and 51st Chemical (NBC Reconnaissance) Companies. To provide a chemical battalion headquarters to command and control these unique assets, FORSCOM directed that the 83d Chemical Battalion move to Fort Polk. Effective

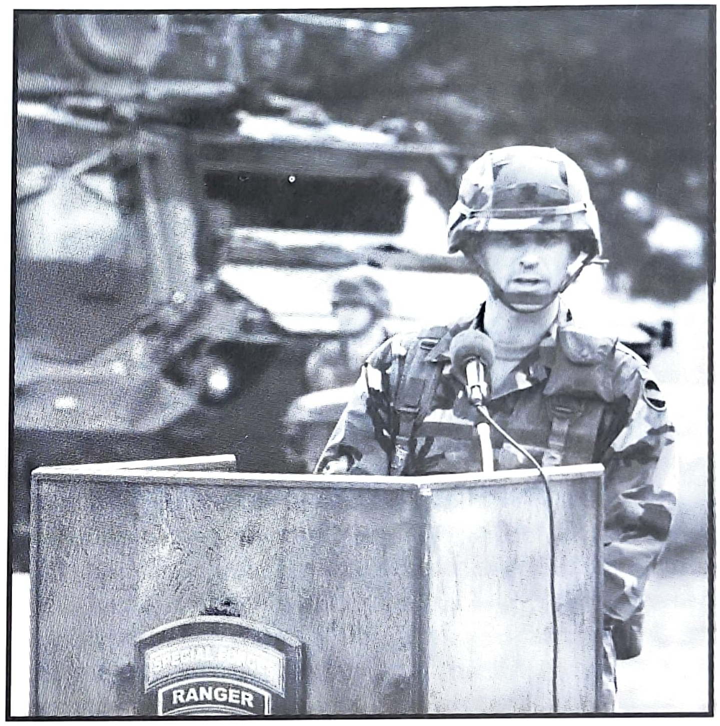
SPC Jason Alexander, the 83d Chemical Battalion Soldier of the Year, explains the M21 RSCAAL with CSM James VanPatten, Chemical Corps Regimental CSM (left); COL(P) Patricia Nilo, Commandant and Chief of Chemical; and COL Jesse E. Daniels, XVIII Airborne Corps Chemical officer (both right), at the activation ceremonies.

16 September 2000, the 7th and 51st Chemical Companies were attached to the 83d Chemical Battalion. The 83d Chemical Battalion is attached to the Warrior Brigade and retains a war-traced and training alignment with the 59th and 101st Chemical Companies and the XVIII Airborne Corps.

The 7th Chemical Company (BIDS) is the only active-duty biological-detection company. It has 35 BIDSs to conduct biological surveillance. The 51st Chemical Company (Recon) is the only active-duty chemical recon company. This company has 22 Foxes to conduct NBC reconnaissance. Almost one-fourth of the Army Foxes are located in this company. The 59th and 101st Chemical Companies are dual-purpose companies, which provide both smoke and decon support.

Conclusion

During the activation ceremony, the Battalion Commander, LTC Raymond VanPelt, stated, "As we stand here today, soldiers of the 7th, 51st, and 59th Chemical Companies are supporting the 10th Mountain Division during their Advanced Warfighting Experiment JRTC rotation at Fort Polk. The Dragon Soldiers on the field today have proven themselves time and time again under some of our toughest training conditions, and they stand ready to answer our nation's call to duty." The Brigade Commander, COL Lynch, added during his comments, "Because of their unique organization and mission, they are on the cutting edge of the Army's evolving doctrine. Their assignment to the JRTC and Fort Polk allows us to task-organize within the battalion and build teams that can service the complete array of NBC threats."



LTC VanPelt delivers welcoming remarks.


83d Chemical Battalion Headquarters, Fort Polk, Louisiana

This battalion is ready to confront any mission! It is the cutting edge of the Chemical Corps with its technology and combat-ready soldiers. The battalion has not slowed down because of this move. The 83d Chemical Battalion's training events for the upcoming year include the 10th Mountain Division and XVIII Airborne Corps warfighter exercises, JRTC and National Training Center support to FORSCOM units, and participation in joint and coalition exercises in Southwest Asia.

Major Darryl J. Briggs is the XO for the 83d Chemical Battalion, Fort Polk, Louisiana. His previous assignments were deputy SGS and FORSCOM chemical organizational integrator, Fort McPherson, Georgia; S2/3, 84th Chemical Battalion, and recon course manager, Fort McClellan, Alabama; commander, 51st Chemical Company (Recon), and brigade chemical officer, 1st Brigade, 5th Infantry Division (M), Fort Polk, Louisiana. Major Briggs is a graduate of the Chemical Officer Basic and Advanced Courses; the Recon, the BIDS, and the Tech Escort Courses; Combined Arms and Services Staff School; and the Command and General Staff College. He holds a B.S. in biology from Southeastern Louisiana, Hammond, Louisiana, and an M.A. in general studies from Jacksonville State University, Jacksonville, Alabama.

Helping the Civilian Community . . .

The Improved Response Program

By Dr. Mohamed Athher Mughal and Dr. Paul David Fedele

INTRODUCTION

In March 1995, members of the Aum Shinrikyo Japanese cult attacked the Tokyo, Japan, subway system with sarin nerve agent. The incident captured international attention and sensitized world leaders to the threat of terrorist use of weapons of mass destruction (WMD). The threat of chemical and biological terrorism is increasing. The knowledge needed to produce deadly chemical and biological (CB) agents is more readily available than ever before. The death and disruption that can be caused by such agents is the professed goal of terrorists.

Recognizing this increasing threat and not waiting until a chemical or biological terrorism disaster had already occurred, the 104th Congress of the United States passed Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997. This Act contained Title XIV—*Defense Against Weapons of Mass Destruction*—which provided for preparedness training against WMD for our nation's first responders. Because the Department of Defense (DoD) is experienced in defending against chemical and biological agents, Section 1415 of Title XIV stated, "The Secretary of Defense shall develop and carry out a program for testing and improving the responses of federal, state, and local agencies to emergencies involving biological weapons and related materials and emergencies involving chemical weapons and related materials." As a result of this legislation and in support of DoD, the U.S. Army Soldier and Biological Chemical Command (SBCCOM) developed an improved response program (IRP).

The IRP is a multiyear analytical program designed to identify and demonstrate the best practical approaches to improve the overall preparedness of the United States to respond to domestic acts of terrorism involving CB or CB-related materials. This article describes the IRP's mission, major products, and future.

IRP MISSION

The U.S. military has unique national resources in CB defense technologies and concepts. The IRP is designed to leverage these resources to enhance the overall preparedness of civilian emergency responders and managers to respond to and mitigate the consequences of a domestic CB terrorist event. As such, the IRP maintains a partnership between military CB experts and civilian responders and emergency managers at the federal, state, and local levels. Civilian participants represent functional specialties including emergency management, law enforcement, fire fighting, emergency medical services, hazardous-materials management, and public health.

Using this diverse cross section of participants, the IRP has identified, prioritized, and developed solutions to the most pressing response issues associated with domestic CB terrorism. By engaging a nationally representative group of civilian emergency managers and responders from the program's inception, the IRP has retained an analytical focus bounded by the real-world needs of these civilian response professionals.

BIOLOGICAL AND CHEMICAL AGENTS, FUNCTIONAL DICHOTOMIES

According to the Centers for Disease Control and Prevention, one of the most significant differences between CB events is the way medical consequences will unfold over time. For instance, the medical casualties of chemical terrorism would usually be "immediate and obvious."[1] Alternatively, biological terrorism "will not have an immediate impact because of the delay between exposure and onset of illness."[2]

Because of these time differences in effects, chemical terrorism will usually have an identifiable incident scene while biological terrorism will not. The casualties of chemical terrorism will be readily observable, whereas the casualties of biological terrorism may not know that they are infected until days after initial exposure.

Because of these significant differences between the consequences of CB terrorism, different disciplines of first responders will be engaged in managing the consequences of each kind of incident. Chemical terrorism will likely engage firefighters, law-enforcement personnel, and emergency medical services that converge at an incident scene. Biological terrorism will likely engage nurses, physicians, and other medical providers who treat patients at hospitals and clinics days after the initial event. Because of the different nature of consequences between biological and chemical agents, IRP analyses are focused separately in these two areas.

Biological Terrorism

The overriding consequence of a large-scale, unannounced bioterrorist attack will be the anomalous occurrence of a large number of medical casualties.[3] Response systems must be capable of providing the appropriate types and amounts of medical treatments and services. However, the full spectrum of potential consequences is much broader than medical casualties.

A well-conducted bioterrorist attack will strain our nation's public-health medical-surveillance systems. It will also require responders to make quick, accurate medical diagnoses and disease identifications. By definition, a bioterrorist event is a criminal act that requires a complex criminal investigation. Depending on the agent used in an attack, such an incident could also result in residual environmental hazards that would require mitigation. Considering the potential magnitude of casualties, a significant portion of a metropolitan area's population may have to be medically managed and physically controlled. The aforementioned medical-treatment, criminal-investigation, environmental-hazard-mitigation, and population-control activities will require a coordinated and integrated command-and-control effort extending across federal, state, and local jurisdictions. In short, the full spectrum of consequences that will have to be managed encompasses multiple professional disciplines and functional areas of responsibility spanning three levels of government.

The Biological Weapons (BW) IRP Team

The above considerations influenced the makeup of the BW IRP team in fundamental ways. Because the problems inherent in a bioterrorist attack are multifaceted, the SBCCOM needed a multidisciplined team that included participants from federal, state, and local emergency-response organizations. Recognizing the technical complexities surrounding biological weapons and terrorism, the SBCCOM also included experts in the offensive and defensive aspects of BW. The final team consisted of more than 60 federal, state, and local responders, as well as technical experts from nine states. At the federal level, 8 federal agencies, 6 Department of Energy national laboratories, and 11 DoD organizations were represented.

Having assembled a strong team, the SBCCOM began to define broad parameters of the overall process for the BW IRP. The process first had to provide a forum to educate and inform the entire interdisciplinary and multiagency team on the offensive and defensive aspects of BW and bioterrorism. Second, the process had to yield an initial set of integrated response activities designed to manage and mitigate the full spectrum of consequences that would emerge from a large-scale, domestic bioterrorist event.

The BW IRP Process

The BW IRP process was designed around five 3-day technical workshops. Each day of the five workshops was similar in structure, but different in content.

Day one of each workshop consisted of a series of 1-hour tutorials on preselected topics such as the physics of aerosol dispersion, pathogenic microbiology of BW agents, biodetection, medical prevention and intervention, and decontamination of and physical protection against BW agents. Although the topics remained the same, the depth and complexity of the tutorials increased as the team progressed through each of the five workshops.

Day two of each workshop began with the presentation of a selected BW terrorist-attack scenario. From Workshop 1 through Workshop 5, the respective terrorist-attack scenarios increased in scale from an attack on a single building to an attack on an entire metropolitan area. After reviewing each scenario, workshop participants identified a series of specific response activities designed to mitigate the emerging consequences of the given bioterrorist-attack scenario.

On day three of each workshop, the team reviewed and integrated the complete set of response activities. The team also analyzed the integrated activities to identify response shortfalls and possible response improvements. Throughout the reviews, the team took a "bottom-up" approach and *let the problem drive the solution.*

The BW IRP Products

The BW IRP team identified a myriad of response activities spanning multiple functional areas. To be useful and understandable, these activities needed to be organized into a logical and integrated response system. Thus, the team formulated a generic bioresponse template (see chart, page 14) that embodied the concepts and work breakdown structure a city needed to respond to effectively in a bioterrorist event. This template serves

BW IRP Response Template Outline and Work Breakdown Structure

2.1 Public Health Surveillance
2.2 Medical Diagnosis
2.3 Epidemiological Investigation
2.4 Mass Prophylaxis
2.5 Criminal Investigation
2.6 Residual Hazard Assessment and Mitigation
2.7 Control Affected Area/Population
2.8 Care of Presented Casualties and Worried Well
2.9 Fatality Management
2.10 Command and Control
2.11 Resource and Logistical Support
2.12 Continuity of Infrastructure
2.13 Family Support Services

as a useful starting point for cities and states in preparing their own local plans to respond to a bioterrorist attack.[4]

Chemical Terrorism

The SBCCOM possesses world-class technical experts who are knowledgeable in how to defend against and deal with the use of chemical-warfare agents on military battlefields, but not necessarily in civilian environments. It recognized that it would have to work closely with civilian emergency responders to identify and solve many of the unique difficulties in civilian response to chemical terrorism. Direct involvement of civilian emergency responders in the chemical weapons (CW) IRP was essential. This involvement contributed to the ready acceptance of response guidance developed by the CW IRP and made the program a success across the national emergency-response community.

The CW IRP Team

Early in the program, Baltimore, Maryland, aggressively pursued a partnership with the CW IRP. Surrounding jurisdictions—including Baltimore, Harford, Howard, and Montgomery Counties—also were anxious to participate and joined the program early. The CW IRP also works closely with the U.S. Army Medical Research Institute of Chemical Defense. The medical expertise and extensive experience of the institute's personnel have been invaluable in all CW IRP efforts. They teach military physicians, nurses, medics, and combat lifesavers how to manage and treat chemical-agent victims. With added participation by several state and federal agencies and with individual participation from representatives of emergency-response organizations from across the nation, the CW IRP has grown into a team with diverse expertise that includes specialists in chemical weapons environmental and medical effects, fire-fighting response, law enforcement, hazardous-materials mitigation, and overall emergency management.

The CW IRP is organized into four groups that address distinct functional areas in an emergency response. These groups address law enforcement, public health and safety, emergency management, and emergency response. Each group conducts tabletop and functional exercises that help identify the difficulties encountered in civilian response to chemical terrorism. Once identified, these difficulties are addressed using a think-tank approach involving the overall CW IRP.

In developing solutions to these difficulties, the CW IRP relies on technical studies conducted by its chemical-defense experts. Solutions often involve novel applications of equipment and techniques that emergency responders already employ in other emergency situations. The CW IRP's unique combination of chemical-warfare-agent expertise and operational know-how in civilian emergency response enables it to develop improved response guidance and methods that are scientifically accurate and operationally practicable. Improved response guidance and methods often use equipment and skills that civilian responders may possess already.

To ensure that new response concepts are workable, they are operationally tested in functional exercises, demonstrating and validating their suitability. When the CW IRP's improved response guidance and methods have been fully validated and demonstrated, civilian-response jurisdictions have found that they can readily incorporate the CW IRP's information into their own local-response plans.

The CW IRP Accomplishments

Improving how civilian responders can deal with chemical terrorism requires addressing personal protection of responders, decontamination, and medical treatment of chemical-agent victims. The CW IRP team has performed technical initiatives in each of these areas and has used the results of these initiatives to develop improved guidance and methods of dealing with chemical terrorism. The SBCCOM cannot, and does not, dictate emergency-response requirements and procedures. However, with the participation of its civilian emergency-response partners, the

CW IRP team provides improved response guidance and methods to the emergency-response community as a whole. Each separate jurisdiction of the emergency-response community holds the authority to adopt or reject the CW IRP's improved response guidance and methods. To date, the guidance and methods have helped many jurisdictions develop emergency-response procedures that can maintain the safety of the emergency responders while minimizing the impact of chemical terrorism and maximizing the effectiveness of emergency-response assets.

For decontamination of chemical-agent victims, the CW IRP team has examined previous research reports and studies on the removal of chemical agents from the skin and found that rinsing with large amounts of plain water is the best way that firefighters can most rapidly decontaminate chemical-agent victims. The CW IRP team has developed guidance on how firefighters can use their fire-fighting equipment to decontaminate large numbers of chemical-agent victims quickly.[5] Fire rescue personnel were recognized as likely to encounter chemical-agent vapors during early response to a chemical terrorism event, and it was initially not known whether or not brief vapor exposures would be highly lethal to firefighters using normal personal protective equipment (PPE), including a self-contained breathing apparatus. This uncertainty threatened a fundamental firefighter mission—saving lives by rapid reaction.

The CW IRP tested firefighter's PPE and determined how much protection the equipment offers when it is used. Using this information, the CW IRP team demonstrated that firefighters could arrive on scene and proceed with recognizance and rescue, with known and minimal risk of any significant chemical-agent effects.[6] The CW IRP team showed how firefighters can use positive-pressure ventilation fans to further reduce the risk associated with rescue in an enclosed space containing chemical-agent vapors.[7] Firefighters often use positive-pressure ventilation fans to remove dangerous gases from buildings. The CW IRP team demonstrated that these techniques and procedures apply equally well to chemical-agent contamination.

ON-GOING INITIATIVES

The CW IRP team is currently working with the Maryland State Police special weapons and tactics teams to perform, for law-enforcement personnel, PPE assessments similar to those that have helped fire departments. This work will show the levels of protection that law-enforcement personnel will receive from various PPE systems. More importantly, these analyses will assess the risk of receiving chemical-agent symptoms from various law-enforcement missions with chemical PPE in chemically contaminated environments. This information will allow law-enforcement personnel to match their PPE configurations and their mission activities so they can effectively manage the risks of potential chemical threats.

With outstanding support from Baltimore, the CW IRP team is developing the operational plans for an off-site triage treatment and transportation center (OST3C) to provide medical care to chemical victims. The OST3C plan is designed to keep contamination out of existing medical facilities. The CW IRP team and Baltimore are developing structural and operational plans for an OST3C and will be exercising those plans soon. An OST3C will help the community deal with large numbers of chemical victims without dangerously contaminating and having to close its valuable medical facilities. Once decontaminated and given initial medical care at the OST3C, more severe chemical victims can be safely moved to existing medical facilities.

The CW IRP team is also continuing to develop guidance on handling fatalities that might be caused by chemical terrorism and what follow-on medical care and handling would be needed for victims who suffered acute exposure to chemical agents. These efforts will help medical examiners deal with chemical fatalities safely and effectively and will better help the medical profession deal with people who may have been exposed to chemical agents.

For biological events, the BW IRP team plans to continue to validate and improve selected components of the BW response template through tests and exercises. The team planned and executed a functional test of the template's casualty-care function in November 1999. In addition to demonstrating the concept's applied validity, the test helped determine more definitive staffing and facility requirements for casualty care during a BW incident.

The BW IRP team analyzed the overall structure of the BW response template to identify the key decisions that public officials will have to make to respond effectively to a biological threat.[8] The response template was evaluated as a total, integrated response system in three national regions. The regions were of varying populations and geographically dispersed, including Kansas, Florida, and Delaware. These evaluations provided feedback on the general applicability of the template and indicated how it could be adapted to various localities in different regions and with different population bases.

In addition, the team helped identify useful "triggers" or "flags" that could guide decision makers in determining if a covert biological attack has occurred. The BW IRP team also conducted a follow-on workshop with the Federal Bureau of Investigation, local law-enforcement representatives, and members of the public-health community to assess the nuances associated with criminal investigation for a bioterrorist incident. A full workshop report is forthcoming and will be placed on the SBCCOM Web site at http://dp.sbccom.army.mil/.

Finally, the BW IRP team continues to assess response-improvement concepts. Specifically, the team is working to develop chemical and biological building-protection measures, biodecontamination techniques and protocols, subway biosurveillance technologies, emergency-response-management software, and biocasualty projection methods to assist civilian emergency managers in assessing the consequences of a bioterrorist attack.

Reports referenced in this article and all other technical reports of both the CW IRP's and the BW IRP's analyses can be found at SBCCOM's Internet Web site.

CONCLUSIONS

In a relatively short period of time, the IRP has begun to provide civilian emergency managers and first responders a logical conceptual framework that they can use as a starting point to improve their overall preparedness for responding to a domestic CB terrorist incident. Using the IRP, first responders have been able to identify actual response problems and design solutions that work in the real world. Solutions emphasized in the IRP are based on equipment and know-how already possessed by the first responders. Through follow-on activities of the IRP, these initial-response concepts will be both validated and improved.

The IRP response concepts will also be extrapolated and applied to the requirements of military installation responders and response units. From experience, the military has learned that being prepared to defend against CB warfare is the most effective deterrent to such warfare itself. The efforts of the IRP will never eliminate all CB terrorist threats. Hopefully, preparedness to defend ourselves against this kind of terrorism will lead terrorists to realize that their desired ends will not be achieved because our emergency responders are prepared and capable of effectively dealing with such incidents.

In addition to providing these tangible benefits to our nation's civilian- and military-based communities, the IRP highlights another important fact: the Army's research and development centers are a valuable national resource that can provide broad-based benefits beyond the military community. The successes of the IRP specifically underscore how Army scientists and engineers can effectively partner with federal agencies as diverse as the Federal Bureau of Investigation, the Federal Emergency Management Agency, the Department of Health and Human Services, the Environmental Protection Agency, and the U.S. Department of Agriculture. Indeed, through the IRP, SBCCOM engineers and scientists have worked side by side with state and local representatives in functional specialties spanning law enforcement, hazardous-spill management, fire fighting, and emergency medical services. Considering the organizational and practical benefits of such partnerships, the SBCCOM feels privileged to continue working on this critical national effort.

Endnotes

[1] Centers for Disease Control and Prevention, "Biological and Chemical Terrorism: Strategic Plan for Preparedness and Response," 21 April 2000/ Vol.49/No. RR-4, 3.

[2] Ibid.

[3] SBCCOM, "Biological Weapons Improved Response Program (BW IRP) Executive Summary," March 1999. Available: http://dp.sbccom.army.mil/.

[4] SBCCOM, "Improving Local and State Agency Response to Terrorist Incidents Involving Biological Weapons – Interim Planning Guide," August 1999 (contains a more detailed description of the BW response template and its response components). Available: http://dp.sbccom.army.mil/.

[5] SBCCOM, "Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident," January 2000. Available: http://dp.sbccom.army.mil/.

[6] SBCCOM, "Guidelines for Incident Commander's Use of Firefighter Protective Ensemble (FFPE) with Self-Contained Breathing Apparatus (SCBA) for Rescue Operations During a Terrorist Chemical Agent Incident," August 1999. Available: http: //dp.sbccom.army.mil/.

[7] SBCCOM, "Use of Positive Pressure Ventilation (PPV) Fans to Reduce the Hazards of Entering Chemically Contaminated Buildings," July 1999. Available: http://dp.sbccom.army.mil/.

[8] SBCCOM, "Biological Weapons Improved Response Program (BW IRP) Response Decision Tree Workshop," August 1999. Available: http://dp.sbccom.army.mil/.

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Dr. Paul D. Fedele is a senior scientist with the SBCCOM. Currently, he is a senior scientific advisor with the Domestic Preparedness Chemical Weapons IRP. Dr. Fedele has a B.S. in physics from the University of Rochester, Rochester, New York, and an M.S. and a Ph.D. in physics from Lehigh University, Bethlehem, Pennsylvania. His previous positions include working at the U.S. Army Chemical Systems Laboratory, Maryland; manager of research and operational studies in fluid dynamics and the motion of aerosols and vapors; and an international exchange scientist for the United Kingdom (UK) Ministry of Defence, where he worked with the UK Defence Research and Evaluation Agency at the Chemical Biological Defence Establishment, Porton Down, England.

German Toxic 10th Year Training—

NBC Training at the Chemical Defense Training Facility

By Major Andrae E. Brooks and Sergeant Major Alexander Hammer

German toxic NBC training has truly undergone an "evolution" at the Chemical Defense Training Facility (CDTF), both at Fort McClellan, Alabama, and at the new facility at Fort Leonard Wood, Missouri. Since moving from Fort McClellan, the new CDTF has trained more than 4,200 students, including five German NBC classes, during its first year of operation. As we celebrate this 10th training anniversary with the German NBC School in Sonthofen, Germany, it is very important to look back, reflect, and assess the numerous improvements made over the years to increase the overall quality of training.

The Birth of a Partnership

In the fall of 1988, the German decontamination facility (Wehrwissenschaftliches Institut der Bundeswehr) in Munster, Germany, closed because of environmental constraints as communities found traces of perchloroethylene contamination in the local water table. In just a few months, all toxic NBC training ceased (training was conducted using blister agent(s) in an outdoor environment). Training at Munster consisted of five classes per year, each with a 1-week training cycle. Student populations included two officer classes (those NBC Defense Corps officers selected to remain on active duty), two senior noncommissioned officer classes (those NCOs selected to be decontamination platoon leaders and platoon sergeants), and one Joint service (officer/NCO) class from the German air force.[1]

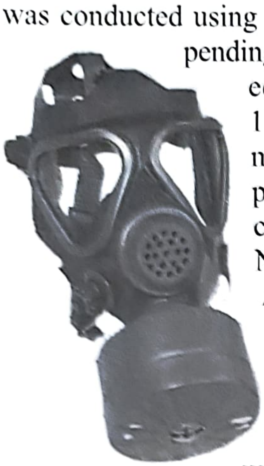
In 1989, the German government estimated that designing, approving, constructing, and testing a new environmentally controlled toxic-agent-training facility in Munster would require 5 to 8 years. Additionally, the German armed forces would not be able to fully train their corps; divisions; and wartime host-nation-support decontamination company commanders, platoon leaders, and platoon sergeants during this interim period. Following this assessment, the German NBC Defense and Self-Protection School and the German General Army Office (TRADOC equivalent) decided that actual toxic chemical-decontamination training was so important that it must be done.[2] The chemical-decontamination facility (currently the CDTF) quickly became the most feasible and viable alternative training solution. The rest, as they say, is history!

Fort McClellan, Alabama

During the approval process, the U.S. Army Chemical School (USACMLS) determined that it could, and would, in fact, actively support the addition of German training at the CDTF. Key individuals included COL Joseph Goss, Assistant Commandant, USACMLS; COL Trannie Sanderson, Director of Training and Doctrine, USACMLS; COL Jan Roberts, Director of Training, USACMLS; LTC Gerhard Dotzauer, German liaison officer (LNO) to the USACMLS; CPT Keith Zurlo, CDTF; MAJ Walter Polley, Sonthofen LNO; and Mr. Steven Cook, CDTF.

Initial coordination and staffing determined that training at Fort McClellan would mirror the Munster program but with additional requirements. Day 1 would include a pre- and post-blood draw to establish cholinesterase levels followed by a complete medical screening and an introduction to safety/surety requirements. Day 2 would focus strictly on the conduct of "hot" toxic-agent training.[3]

The USACMLS signed and approved a final program of instruction on 22 March 1990, and actual training followed on 18 June 1990. The first year of training was conducted using only U.S. NBC equipment, pending the approval of the German equipment. On 31 October 1990, the official request was made to use the German M65 protective mask (left), filter canister, boots, gloves, and NBC overgarment (right). Approval was granted in February 1991. However, the German gloves did not meet safety requirements because they were too short and reacted with DS2.[4] In March 1999, German training at the Fort McClellan facility ended with a total of 1,772 students trained over 9 years.



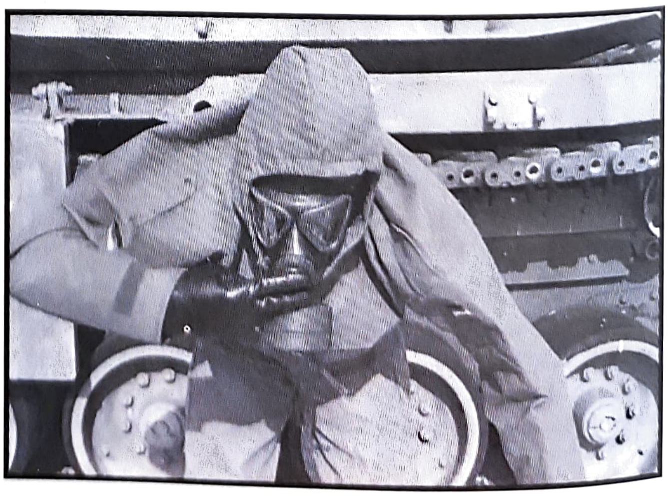
Fort Leonard Wood, Missouri

In January 1999, COL Hans Juergen Kalder (Director of NBC Defense and Commandant, NBC Defense and Self-Protection School) visited the USACMLS and COL Stephen Chapman (Director of Training). COL Kalder stressed the importance of continuing a training/partner relationship with the future CDTF at Fort Leonard Wood and requested the addition of German NBC equipment into the training program. When the new facility opened in September of 1999, I arranged a meeting with SGM Alexander Hammer (the German LNO) to discuss the future of the German training program.[5] The goal was simple—create a "Joint" training environment in which German soldiers could train using their equipment (German Draeger tubes, vehicle-decontamination kits, backpack-decontamination sprayers, detection paper, and individual decontamination kits), according to current German NBC doctrine.

The first and most important changes centered on the German doff procedures that were used at Fort McClellan. In the past, German students were cutting off their NBC protective overgarments because the jacket had no zipper (smock type). This procedure proved to be very dangerous because students were prone to breaking the seal of their protective mask and, as a result, they did not follow the actual German doctrine. To change this procedure, we conducted a series of actual demonstrations for Fort Leonard Wood's Maneuver Support Center (MANSCEN) Safety Office (MSO). Mr. Fred Fanning, the MSO director, visited the CDTF and evaluated several demonstrations. A final recommendation included alternately holding the protective mask with two fingers while removing the NBC jacket. This new technique was quickly implemented at the CDTF in the April 2000 German class and proved to work extremely well. In fact, SGM Hammer is now working on a proposal to implement this modification into the German NBC doctrine (Zentrale Dienstvorschrift –ZDv 5/400).

Upon staffing and subsequent approval with the MSO, the CDTF introduced German decontamination paper (M8/M9 variants), vehicle-decontamination kits, and Draeger chemical-agent-identification tubes in May 2000. Additionally, the CDTF added the newly fielded German backpack-decontamination sprayer in June 2000. Currently, we are using our high-test hypochlorite (HTH) in lieu of the German C8 (pending future approval) in these pieces of equipment and finding that the HTH works quite well. However, normal HTH is somewhat more granular than C8, so students must be very cautious of mixing/solution wait times to prevent clogging.

(Above) From left to right: detection paper, Draeger tube set, carrying pouch (in back), individual-decontamination kit, vehicle-decontamination kit, and backpack sprayer (Below) A student secures his mask before removing his jacket.



In October 2000, the CDTF introduced the individual decontamination kits. Each German soldier is assigned an individual decontamination kit, which consists of decontamination powder (65% chloride of lime and 35% magnesium oxide), felt decontamination wipes, soap, bandages, and earplugs. At the CDTF, two sets of individual decontamination kits are used for training. The first set is used for practice and rehearsal "cold" training, and the second set is prepositioned inside of the training building for toxic-agent training. Most importantly, now two-man German buddy teams complete various NBC exercises using both German and U.S. equipment.

Future Training Goals

Currently, the future of continued German training at the CDTF is uncertain. Approved funding is projected out for 2 more years, but the decontamination training facility at Munster is scheduled to reopen next summer. At this time, training may shift or divert NBC soldiers once again to Munster. At any rate, the CDTF has more improvements planned for upcoming German training and continuing our partnership with the German NBC School at Sonthofen. Future planning includes using the German C8, adding the German canteen for drinking water during normal training rotations (U.S. soldiers perform these tasks using the M40 mask), and conducting a MOPP-gear exchange.

As a final note, it is clear that the CDTF is a flexible training facility that can adapt to many countries around the world. The facility can also create and accommodate a myriad of training scenarios and safely train NBC skills to all ranks and military specialties. In June 2000, the Office of the Surgeon General approved the Dutch M82 NBC protective suit to complete the FM12 protective mask approved in 1997. Soldiers from the Royal Netherlands air force train at the CDTF twice a year and now are actively pursuing the approval of their NBC-defense equipment for use in the CDTF. The Italian government also has recently contacted the CDTF about possibly creating a training partnership with its NBC military forces.

The 10th anniversary of toxic NBC training with the German NBC School and the CDTF is a historic milestone and a great achievement. I sincerely hope that this relationship will continue to grow and develop for many years to come. Most of all, I am thankful for the opportunity to experience a small piece of history.

Endnotes

[1] Memorandum For Commandant, USACMLS, Subject: Request for German Training Assistance, dated 04 August 1989.

[2] Ibid.

[3] Memorandum For Assistant Commandant, USACMLS, Subject: Approval of the Federal Republic of Germany (FGR) Decontamination Procedures Course Program of Instruction (POI), dated 22 March 1990.

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[5] Heeresverbindungstab 6, Memorandum For Director of Training (DOT), Subject: Use of German NBC Equipment for Future Training at the CDTF, dated 14 May 1999.

MAJ Andrae E. Brooks is a distinguished military graduate from the University of Kentucky's ROTC with a B.S. in geology. His previous assignments include technical support officer, CDTF, Fort McClellan, Alabama; advanced civil schooling at the Colorado School of Mines, Golden, Colorado; brigade chemical officer, Aviation Brigade, 25th ID (L), Schofield Barracks, Hawaii; assistant division chemical officer, 25th ID (L), Schofield Barracks, Hawaii; decontamination platoon leader, reconnaissance platoon leader and executive officer, 92d Chemical Company, 3ID, Kitzingen, Germany; battalion chemical officer, 3-64th Armor Battalion, 3ID, Schweinfurt, Germany. His military education includes Airborne, Air Assault, Battalion Maintenance Officer, and Chemical Basic and Advanced Courses.

SGM Alexander Hammer of Marktoberdorf, Germany, is assigned to the German Army Liaison Staff USA 8, Fort Leonard Wood, Missouri. He joined the German armed forces in October 1982. He completed basic combat training and chemical advanced training at Dragoner-kaserne, Bruchsal, Germany. From May 1998 until June 1999, he served as SGM in the German Army Liaison Staff USA 6, Fort McClellan, Alabama. Other assignments include reconnaissance platoon leader and operation sergeant, 2d NBC Defense Company, and instructor of officer cadets at the NBC Defense and Self-Protection School, Sonthofen, Germany.

CDTF Wins DA Safety Award

The Chemical Defense Training Facility at Fort Leonard Wood, Missouri, trained 4,000 soldiers this year without any accidents and received the ***Prevention Award of Accomplishment in Safety.***

Major General Anders Aadland, post commander, and Colonel (P) Patricia Nilo, Chemical School commandant, presented the award to the CDTF officials in a brief ceremony on 22 November 2000.

Russian/American NBC Exchange Visits

By Major Shirley DeGroot

Peacekeeping duty in Bosnia-Herzegovina is not a branch-specific job for a chemical soldier. The Multinational Division North (MND)(N) headquarters does not have a chemical section, so chemical soldiers assigned to the headquarters are performing branch-immaterial jobs. On the other hand, assignment to a multinational headquarters affords opportunities for training with other nations. Such an opportunity presented itself to the chemical soldiers of Task Force Eagle during the spring of 2000.

Since 1996, when the Implementation Force determined there were no chemical hazards and only traces of industrial chemical pollution in the MND(N) area of responsibility, the U.S. contingent of the Stabilization Force has shrunk its chemical-force structure to zero assets. However, the 1st Peacekeeping Russian Separate Airborne Brigade (1PRSAB) maintained an NBC platoon at the brigade headquarters at Ugljevic. Upon the transfer of authority to the Stabilization Force 7 (comprising the 49th Armored Division and 3d Armored Cavalry Regiment [ACR]), the 1PRSAB extended the MND(N) headquarters an invitation to do an NBC-exchange visit. The MND(N) G3 training, along with the chemical personnel assigned in the Joint Military Commission, organized a visit of 25 members of the quick-reaction force from Mad Dog Troop, 3/3 ACR to Ugljevik for an NBC demonstration.

The demonstration started with an introduction to Russian detection equipment. Major Gennady Tarchov, the 1PRSAB chemical officer, displayed the current models of the radiacmeter and chemical-detection kit that is used by the 1PRSAB. These items were one or two generations older than comparable U.S. detectors and were not digitized or computerized, but as Major Tarchov demonstrated, both detectors functioned properly. In terms of technology, the radiac equipment brought back memories of the AN/PDR-27 that I trained on as a lieutenant at the basic course in the mid-80s, and the chemical-detection kit was a composite of old M8 detector technology contained in a portable kit. Although the equipment was old, it appeared well maintained.

Following familiarization with the detection gear, the quick-reaction force was instructed on the operation and employment of Russian-made smoke pots, smoke projectors, and smoke grenades. The AKS-74 automatic rifle, which arms the Russian chemical soldier, and the RPG-7 rocket-propelled grenade launcher were also demonstrated.

Major Tarchov demonstrates the chemical-detection kit to the 3/3 ACR quick-reaction force.

Next, the current protective-mask model used by the 1PRSAB was demonstrated. Each member of the quick-reaction force was issued a Russian protective mask for the training. The group walked through basic instructions on the maintenance and wearing of the mask. The mask has many of the same features as the M40-series mask; in fact, the drinking tube even works with the U.S. canteen-cap adapter. However, the construction of the mask is not comparable to the M40-series mask. It is obviously designed to be used as a training device or used only once in a contaminated environment and then replaced. Compared to the M40-series, the Russian mask is cheap, disposable, and mission-capable.

Next, the quick-reaction force received familiarization training on the precombat checks required to put the BTR-80 RhM-4 chemical-reconnaissance vehicle into action. The BTR-80 RhM-4 is an improvement of the BTR-70 Kh. The BTR-80 has an all-new power train, and new placement of doors and hatches make it easier for the crew to enter and exit. The vehicle is equipped with an NBC-filtration system; however, because the vehicle crew must exit the vehicle during a mission, the crew must be in full NBC gear while in the vehicle during a mission.

In addition to the usual vehicle maintenance and communication checks, the crew demonstrated how to load the detection-marker-flag carrier at the vehicle's rear and how to load the detection flare launchers and the smoke projectors on the vehicle. The vehicle crew then suited up in its protective posture. NBC specialists in the Russian army wear a two-piece rubber suit. The jacket has a hood, and the trousers are the step-in variety with overboots attached. The suit is easy to put on, and aside from being rubberized fabric, it is comparable to the U.S. suit.

Loading signal flares into the BTR-80 RhM-4, part of precombat checks on the vehicle

At this time, the BTR-80 RhM-4 moved out to the training area, and while the crew was preparing to conduct its detection drills, the quick-reaction force observed two demonstrations by the 1PRSAB Artillery Battery. First, the gunners demonstrated the "mask-only" drill. The Russian standard is to don the protective mask in 7 seconds. Once they had donned their masks, the lieutenant in charge of the section inspected them. Of the 12 soldiers inspected, 10 passed. Two soldiers had installed their mask filters improperly, and the officer was able to pull the filters out of the masks. The ensuing display of discipline really drove home to me that this certainly was not U.S. Army training that I was observing. The gunners practiced the task over and over until all 12 soldiers got it right.

Following the mask-only drill, the gunners performed their reaction drill to a full protective posture. The standard suit issued to Russian combat troops is a rubberized gas cape with rubberized overboots that secure to the bottom of the cape. The entire outfit seemed complicated to put on, with ties, buckles, and multiple closures to deal with. The soldiers finished their suiting-up drill within 10 minutes, and after inspection, they were given the all-clear signal. As with the NBC troops' suit, the cape is made of rubberized fabric, and the heat stress of fighting while wearing an impermeable garment had to be intense.

The quick-reaction force moved out to the local training area to observe the final demonstration with the BTR-80 RhM-4. Major Tarchov explained the procedure for the drill. First, the BTR would move down range until it detected an agent. Upon detection, the BTR crew would fire a signal flare, and one crewmember would exit the vehicle to sample the agent and determine its identity. Once the sample was collected, the BTR backed off from the contamination. The distance that the vehicle backed off depended on climatic conditions, but essentially the vehicle moved a safe distance out of the contamination and fired one of the marker flags, by remote control, into the ground. Then the vehicle continued to scout and performed the same drill, eventually cordoning off the contaminated area.

Gunners of Russian airborne artillery go through the gas-reaction drill.

This explanation sounded a bit dubious, in that I could not understand why a crewmember was required to leave the protection of the BTR. I resolved to wait and see what the demonstration showed. However, for the actual demonstration, "Murphy" proved to be alive and well. The BTR began the drill, fired the initial signal flare, took a sample, and backed up. Upon firing the first marker flag into the ground, the entire marker-flag carrier caught fire. This was obviously not a planned demonstration event, and the Russian NBC officers supervising the exercise reacted quickly to the fire. However, eventually all 25 marker flags burned, and the quick-reaction force suppressed their smiles to refrain from offending their hosts.

A flare goes up from the BTR-80 RhM-4 to signal contamination.

The final event of the demonstration was sort of a let-down after watching the marker flags burn. Major Tarchov demonstrated the different types of smoke pots and grenades. After this, the quick-reaction force retired to the main base for lunch.

Three weeks later, it was time to arrange a reciprocal visit. The MND(N) G3 Training Section hosted the 1PRSAB NBC platoon at Eagle Base. The Russians were given demonstrations on—

- Emplacing the M8A1 chemical-agent alarm.
- Exchanging mission-oriented protection posture (MOPP) gear.
- Wearing the M40-series protective mask.
- Performing self-decontamination.
- Using M8 and M9 detector paper.
- Using a chemical-agent monitor.
- Using the AN/VDR-2 radiacmeter.
- Identifying chemical agents using the M256 kit.

Upon completion of the training, members of the NBC platoon were guests of honor at a Texas barbeque, followed by some free time.

Overall, the NBC-exchange training was an unqualified success. It was part of an overall program in the MND(N) that strives to build trust and confidence in the abilities of our multinational force. I remember serving in Europe in the 1980s when the Soviet Union was the enemy, particularly to any Chemical Corps soldier. I would have never guessed that by the year 2000, I would be training alongside some of the same people I once guarded against at the German border. I saw more similarities than differences between U.S. and Russian chemical-detection methods, use of protective equipment, and response to NBC hazards. Certainly, our two doctrines contain differences, but it is most important to know that we can work out those differences with one another in Bosnia or elsewhere.

Russian NBC soldiers learn how to emplace the M8A1 chemical-agent alarm.

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Supporting material provided by CW4 Badder, 3d ACR PAO and SGT Decarou, TFE combat camera crew.

Correction

In our July issue, the article "Combined-Arms Training-Strategies Aid—short- and long-range training plans," stated, "Starting June 2000, with the fielding of the Standard Army Training System (SATS) 4.2, unit commanders and staffs will be able to download these CATSs from the Reimer Digital Library (General Dennis J. Reimer Training and Doctrine Digital Library Web site) in database format." February 2001 is now the projected date for fielding the SATS 4.2. **This delay was necessary to expand the utility of the CATS information as a module in the SATS and to user-field test the program before extended Armywide fielding.**

Mask History—
Infantry or General-Purpose Mask

By Major Robert D. Walk

The perfect infantry mask is nonrestrictive, easy to breathe through, comfortable, and fully compatible with all military equipment, from sophisticated optical-sighting systems to common-soldier equipment such as helmets and canteens. Over the years, millions of dollars have been spent on research in various attempts to find the prefect mask. In the process, the United States has produced a myriad of masks—from the uncomfortable but effective masks of the First World War to the easy-to-wear masks of today. Each mask produced exemplified the technology of its day.

World War I

When the United States entered the First World War, the French M2 mask and the British small-box respirator (SBR) were the only two masks readily available. Not knowing which was better, the American Expeditionary Force (AEF) bought both and issued them to our doughboys.

The SBR had a facepiece with mouthpiece and noseclip, hose, canister, and carrier (with accessories). When the threat level was high, the soldiers wore the mask carrier on the chest for immediate access. To put the mask on, the soldier put the mouthpiece in his mouth, attached a noseclip to his nose, and pulled the facepiece over his head. The noseclip and mouthpiece were required because the facepiece did not fully seal around the face. Army regulations of 1918 allowed the soldier 9 seconds to don the mask from the ready position. All masks used since that date have the same donning requirement. If the mask was damaged, the soldier had an accessory kit to repair the mask or could use his French M2.

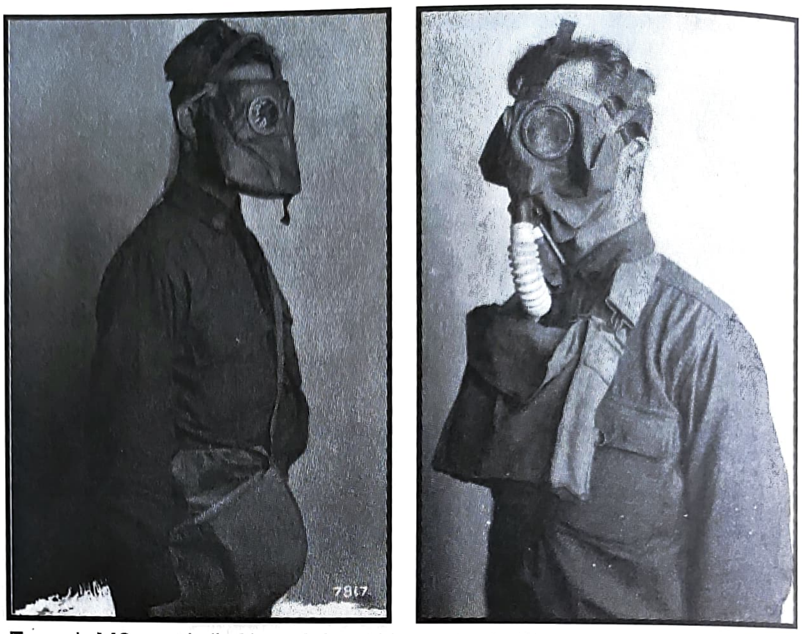

British small-box respirator mask

The French M2 mask used multi-layered, impregnated cheesecloth to filter out the chemical agents. It had no outlet valve and was difficult to fit properly. It did not provide adequate protection against chloropicrin, so it was not the primary mask for the soldier. It, however, was readily available since the French manufactured more than 50 million during the war. While it was more comfortable to wear, it was not as effective as the SBR. During gas attacks, soldiers would initially wear the SBR but then would change to the M2 for its comfort and get gassed during the changeover. This was not acceptable, so the M2 was removed from service as a secondary mask. Not satisfied with Europe's available masks, MAJ Karl Connell of the AEF Gas Service developed the Connell mask for the infantry in Europe.

The Connell mask was a stamped-brass mask with small eye lenses and a sponge rubber seal for the face. Official histories called this a single-line-of-defense mask; the single line of defense was the face seal. As the soldier inhaled, the air was drawn over the eye lenses to keep them clear. Unlike all other American masks in World War I, the filter canister was suspended behind the head. Up to 1,000 copies of the mask were possibly produced in Great Britain and sent to the United States for evaluation. This mask was not as comfortable as the later American Tissot masks, so in July 1918, production was discontinued. Some of the design features, however, influenced some future mask designs. (Look at the Navy masks of World War II and you can see the lineage!) In addition, the six-point head harness was used on later mask designs.

The U.S. Bureau of Mines initiated work for a good protective mask. Copies of the SBR and the French M2 were examined, but the first mask manufactured was a sight-unseen imitation of the SBR. This SBR, while a tremendous effort, was not good enough to use in war. Unfortunately, 25,000 were manufactured before the flaw was discovered. These masks were used for training and could be identified by the large black-filter canister. While not bad for a first effort, an actual SBR was brought from Britain for the United States to examine and copy.

After receiving an SBR, the design was examined and improvements added. This resulted in the corrected English (CE) mask. One of the features of this mask was its use of "safety glass." Improvements to the basic SBR included outlet-valve protection, noseclip redesign (to lessen discomfort), and facepiece-frame redesign. About 2 million masks were produced between June 1917 and March 1918. The CE mask was better, but improvements to the basic SBR could still be made and they were.


French M2 mask (left) and the CE mask (right)

The next version was the Richardson, Flory, and Kops (RFK) mask (named after its designers—Ralph Richardson, E.L. Flory, and Waldemar Kops), of which more than 3 million were produced before the war ended. On 11 November 1918, about 40,000 masks were being produced daily. This mask provided a DOUBLE line of defense—mouth tube and noseclip and face seal. It included improvements in the head harness, angle tube (inlet and outlet for the mask), and facepiece construction of the CE. Unfortunately, it still retained the SBR's weak points—the mouth tube and noseclip, which added the second layer of protection and also added discomfort. This discomfort caused the soldiers to try and adjust or change the mask, causing casualties. Checking around, we found an answer from the French—the Tissot mask.

The Tissot mask used the facepiece to form the seal which prevented chemical agents from getting into the lungs. Incoming air was also deflected over the eye lenses to prevent fogging. The mask system was large and bulky, which prevented it from being issued to the infantry; so creative American designers adapted the Tissot system with the infantry canister. Kops, talented designer of corsets, adapted the Tissot system with a better canister and outlet valve to come up with the Kops-Tissot (KT) mask, of which 197,000 were produced before the armistice. Air flowed into the facepiece at the nose area (and was deflected over the eye lenses before reaching the mouth) and exhausted through a separate outlet valve in the chin area. The KT used the same carrier as the SBR/CE/RFK and was thus usable by the infantry. Without the mouthpiece and noseclip, speech transmission was improved, although all communications was difficult. Difficulties in production and limited durability restricted this mask's effectiveness. The Akron-Tissot (AT) mask was another design built on the Tissot system.

The AT mask, developed in parallel with the KT, integrated the deflector of the Tissot with the angle-tube arrangement—the inlet and outlet for the mask was in one—of the RFK. As with the KT, speech transmission was not impossible but it was difficult. This mask, while good, did not fully protect soldiers with high cheekbones or hollow cheeks. However, it was still an improvement and was produced in quantity (297,000 manufactured before the armistice). Using the best features of


The Kops-Tissot (KT) (left) and the Akron-Tissot (AT) (right) masks

The KTM mask

all masks, the Kops-Tissot-Monroe (KTM) mask was adopted.

The KTM mask was the best American mask of the First World War. This mask (relatively speaking) was comfortable, effective, and durable. The facepiece and hose were made of rubber covered with elastic stockinette and was manufactured using the fastest hand-working methods. In this mask, the incoming air was deflected over the eye lenses by two separate tubes from the angle-tube assembly; 2,500 were bought before the armistice. An improvement, but the engineers knew that to really improve the mask, a molded mask would have to be made.

A molded mask, developed in parallel to the KTM, was in advanced development as the war ended but was never completed and put into production. This was the "Victory Mask" developed at the Long Island Laboratory of the Gas Defense Service. This mask was designed as a one-piece mold and then assembled, eliminating the vulnerable seams present in the previous masks. Unfortunately, work on the Victory Mask was abandoned after Armistice Day (11 November 1918), and the KTM was adopted as the standard Army mask after the war and soldiered on. The next molded mask did not appear for 20 years.

Between the Wars

Initially called the KTM, it was also known as the Model 1919 and later the MI mask. The mask was produced in five sizes to fit the majority of soldiers' foreheads (masks were marked number 1—the largest, to 5—the smallest). The carrier went from the chest (M1919 carrier) to the side (MI carrier). This mask solved the comfort and breathing problems as best it could, but communications, while better, were not solved.

During this time period, the filters effectiveness continued to improve. With filter changes, carriers changed. Since there was little money to replace all filters and carriers to one standard design, the Chemical Warfare Service (CWS) developed a nomenclature to identify the masks. Each mask was identified by the facepiece model, filter model, and carrier model separated by dashes. Thus, an MI facepiece with an MIV filter canister and an MIII carrier was an MI-IV-III service mask.

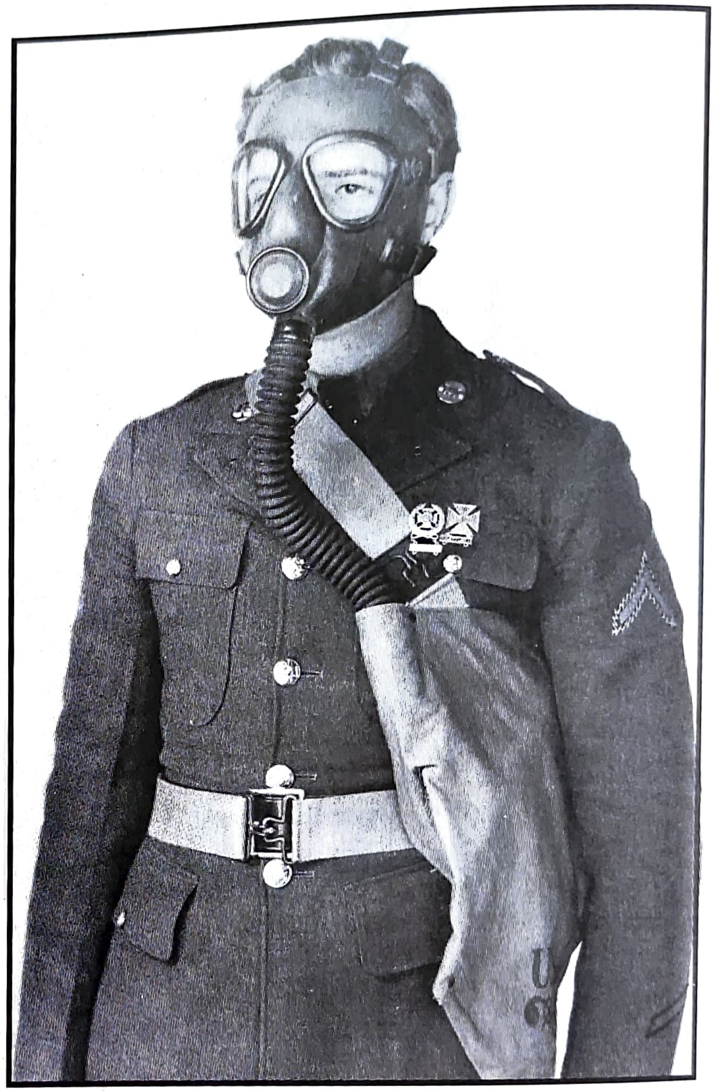
In 1934, improvements to the mask were adopted as the MIAI. The mask was now repairable because of the screwed-in eye lenses, and it fitted better. When researchers developed a mask that fitted 90 percent of the soldiers, sizes 2, 3, and 4 were replaced by the universal size (facepieces marked with a U), and the MIA2 was adopted in 1935. The MIAI soldiered on in sizes 1 and 5. Upon mobilization of American industry in 1940, the MIA2-IXA1-IVA1 was the first mask produced in quantity for World War II. In 1944, when sufficient newer masks were on hand, the MI-series mask was declared obsolete.

Continuing the search for the perfect mask, various experiments were tried between the wars. The filter was constantly improved and issued with the masks, resulting in improvements in the carrier design to accommodate the new filters. Officers had to communicate, which was difficult in the MI service mask, and so the diaphragm mask was developed and procured. (The diaphragm mask, not in general infantry use, will be the subject of another article.) Manufacturing technology at the time (1930s) did not allow the procurement of diaphragm masks for all soldiers at a reasonable cost. In an attempt to improve the mask, various attempts were made to make a fully molded mask.

Budgets were constrained in the interwar years. To reduce the cost of chemical training, the chemical branch developed a training mask. This mask was molded rubber and took less effort to manufacture than the service mask. It also was more comfortable. The MI (1940) was produced with an MIV outlet valve, and the MIAI (1941) was produced with an MV outlet valve. It used the MI training filter and was carried in the MI training gas-mask carrier. The original was thus the MI-I-I training gas mask. Because of the obvious improvements over the MI-series service gas mask, the MI training facepiece was assembled with service gas-mask components and adopted as the M2-IXA1-IVA1 service gas mask. The MI training mask, renamed the M2 training mask to reduce confusion (yet causing some), was used by soldiers in combat zones because of its small size and easy storability. This mask was used by the Airborne forces and by the jungle fighters in the Pacific. Because of the harsh conditions of the Pacific, the CWS created a waterproofing system for the mask.

World War II

The M2 service gas mask was more easily manufactured than the MI service mask because the injection-molded facepiece could be produced using modern manufacturing methods unlike the MI-series facepiece. Improvements in plastic technology and outlet-valve design led to the M2A1 (MV outlet valve), the



(Above) A soldier wearing an M1 mask
(Right) A soldier in an M2-IXA1-IV

M2A2 (M8 outlet valve), and the M2A3 (C15 outlet valve). The original M2 facepiece used the MIV outlet valve. The M2 mask was more comfortable to wear than the MI, but it still suffered from the MI masks' bulkiness and weight (about 5 pounds). Research for the perfect mask continued.

The M3 lightweight-service mask was the next attempt at a perfect mask. This mask resulted from experiments on various filter designs and carry locations. It used a shorter hose (18 inches) and smaller filter canister (M10) than previous masks. The M10-filter canister was smaller and lighter than the MIXA1, provided almost the same protection, and used the M8 outlet valve. The M6 carrier held the mask, three protective covers, and one tube of protective ointment. Adopted in 1942, it was known as the M3-10-6 and weighed about 3 1/2 pounds. The M3 was the first American mask to use a nose cup. The M8s, along with other early outlet valves, were fouled easily with mud, so a new outlet valve was designed—the C15. The basic C15 design was so good that it is still used today. The C15 outlet valve used the M3A1 facepiece. No original M3A1s were produced; all were converted from M3s. In World War II, 4,069,556 M3 masks were procured. Improvements to the M10 canister resulted in the M10A1 canister, still in use in the year 2000. In 1949, all masks using the M10 canister were declared obsolete. The M3-10A1-6, using the improved M10A1 canister, was not declared obsolete until 1961. Initially, production of the mask was slow because of tooling difficulties and the learning curve on using neoprene for the facepiece instead of rubber.

When the demand for M3s exceeded its production capabilities, a stopgap solution was found. The M2-service gas masks could be modified and rebuilt to the same standard, creating the M4-series lightweight gas mask. This was adopted in 1942 but not produced in quantity until 1944. The hose for the M2-series mask was 27 inches long, and the hose for the M3-series mask was 18 inches long. By cutting off 9 inches of the M2 hose and vulcanizing it to another 9-inch hose piece, three M3 hoses could be produced for every two M2 hoses. As with the M3, the M4 used an M8 outlet valve and the M4A1 used the C15 outlet valve. In World War II, 3,672,069 M4 masks were procured. As with the M3A1, all M4A1s were produced by retrofitting M4s with the C15 outlet valve. The masks were declared obsolete at the same time as their related M3 masks. The soldiers now had a lighter mask but still did not have adequate speech transmission and light enough weight. The Army ground forces wanted something better. This led to continuing research in mask design.

During World War II, research on producing the perfect mask continued at a record pace. New concepts were tried and discarded or adopted. With a critical shortage of rubber in the United States because of the loss of the major rubber-producing countries in Asia (Malaysia and the Dutch East Indies [later Indonesia]), a substitute rubber had to be found. Research resulted in the use of neoprene, which was used in mask components during the war. In the search for a better mask design, the British lightweight-mask concept of a filter mounted on the cheek was used on the E6 mask designed by the Massachusetts Institute of Technology.

The E6 assault gas mask had a redesigned M3 facepiece with a filter attachment on the left cheek. This modification still allowed the soldier to fire his rifle but deleted the hose and used a lighter filter—the E3. After field tests, the E6 assault mask was adopted as the M5 combat-service gas mask and the E3 filter as the M11 filter. The mask was carried in the M7 carrier. The nomenclature for the mask was the M5-11-7 assault (later combat-service) gas mask. The M7 carrier was constructed of rubberized-cotton-duck fabric and was waterproofed for fording and assault-landing operations. The soldiers in the Normandy invasion carried this mask. In fact, the M7 carrier is credited with saving lives during the war; when soldiers carrying the mask on their chest were dunked into deep water, the mask kept them afloat. More than 500,000 were produced. The M5 masks were in great demand and issued as quickly as they were made, but production was unable to keep up with the demand. In fact, production was curtailed in 1944 after the failure rate for masks became too high to be practical. The mask was never completely available, so another assault-type mask was needed to supplement it.

Assault gas mask

The Massachusetts Institute of Technology engineers looked into quick modifications of existing masks to fill the void. Modifications to the M2A2 service and training facepiece examined included attaching an M11 filter to the mask horizontally, vertically, and at a 45-degree angle. A shortened M10A1 filter directly attached to the M3 service facepiece (similar to the M2 training gas mask) was also examined. After field tests with troops, which included checking the mask for ease of storage; water leakage in the rain; and comfort in the standing, kneeling, and prone positions, the 45-degree-angled filter attachment was deemed best and adopted as the M8 snout-type gas mask. The standard M2A2 facepiece could be modified quickly with a new head strap and filter-attachment insert and issued. It was carried in the M10 carrier, a modified MI training gas-mask carrier. During the war, 1 million masks were authorized and more than 300,000 modified. The use of the natural rubber M2A2 facepiece (which became the M8 snout-type facepiece with the inclusion of the head strap and filter mount) kept this mask in use for more than 10 years. By mounting the filter under the chin, this mask could use the early steel-cased M11 canisters (later M11s were aluminum). The steel canisters were not usable on most other masks (M5 and M9) because of the weight imbalance caused by the filter. The entire nomenclature of this mask was the M8-11-10 mask. In 1958 it was declared obsolete.

After the initially successful introduction of the M5 mask, work continued on improving the design of the mask for better air distribution. The combat experience in Europe during the winter of 1944 disclosed a major problem (cold set) in the mask with neoprene, which was used in the construction of the M5 facepiece. Cold set caused the mask to get rigid in cold weather, rendering it incapable of forming a good seal on soldiers' faces. The result was the E48. Instead of passing the air under the chin as in the M5 mask (causing most of the air to come in on the left side), the air flowed across and in front of the nose, providing better air distribution (and giving it a big-nosed look). This protrusion led to it being a "mustache-type" mask in some publications. The E48 also was made of butyl rubber, a rubber that did not get cold set. This mask was deemed fit for use and adopted as the M9 service gas mask in 1947.

The E48 and M9 masks, 1947

Production masks were made of natural rubber. The carrier, C15R1, was similar to the carrier used with the M5-11-7 mask and was rubber-coated duck. At this time, the prewar nomenclature was also discarded for new masks, and the M5 was declared obsolete because of the neoprene used. In 1951, the M9A1 field protective mask was adopted. The only difference was that the M11 carrier replaced the C15R1 carrier. This mask became known as a "protective" mask because the mask protected against dusts and organisms as well as gases.

The 1950s

In the 1950s, with a plethora of masks still standard (M2-series, M3-series, M4-series, M8, and M9), the Chemical Corps initiated research on a replacement mask. The program's goal was to develop a lightweight, comfortable mask for the soldier that occupied less space and weighed less than its predecessors.

In the search for a better mask, several variants were tried. One was a modified M9 mask, another was an entirely new mask without a conventional filter, another was to be attached to the helmet so that it could be donned rapidly, and another was a hood-type that sealed at the neck. There was even thought of developing an inexpensive, disposable mask to issue to soldiers until the need for the full-sized mask was realized. The unconventional filter mask showed promise and was further developed into two models—the E12 for rapid donning and the E13 with detachable filters. These masks were developed further; the E13 being seen as the most acceptable model. In 1959, with minor changes, the tenth revision (E13R10) was adopted as the M17.

The 1960s

The M17 was made of natural rubber, had twin pork-chop-shaped cheek-mounted filters (M13-series), an integral nose cup, a voicemitter, and twin triangular eye lenses. This was the first time a voicemitter was included on a general-issue U.S. mask. Once the M17 was adopted, other masks were quickly deleted from the inventory (M3, M4 in 1961 and the M9 was removed from frontline service). The M9 was kept as the "Mask, Special-Purpose, M9" until the 1990s because of its use in chemical surety units. After further research, in 1967, the M17 was modified to include drinking and resuscitation capabilities—the M17A1. This allowed the soldier to drink fluids in a chemical environment—a real advantage to those who sweated profusely. Again, a further move along the line towards the perfect mask, but this mask, while giving all soldiers improved voice transmission capabilities, made firing the rifle difficult. Experience in Vietnam showed that the M17-series mask, while effective, provided more protection than necessary and was too heavy in the light-soldier environment there.

The M17A1 design allowed soldiers to drink while wearing the mask.

What to do? Soldiers in the field needed protection against the riot-control agents in use and desired a lightweight, easily carried protective mask (or none at all). This requirement led to the development of the XM27- and the XM28-series masks. Each used a high-efficiency-particulate air filter to remove the riot-control agents but provided no protection at all against military-standard chemical agents. The XM27 mask was effectively a green silicone M17, while the XM28 was a totally new design. Experience in field use in Vietnam showed the XM28 to be superior in design, comfort, and storage; so, after four revisions, the XM28E4 was adopted as the mask, riot-control agent M28 in 1968. Many people refer to this mask as the "grasshopper" mask. The M28 was widely procured (up to a million examples) and surplused to many police departments after the war. In 1976, the M28 was declared obsolete.

The 1970s

The 1970s focused on the logisticians and money concerns. After Vietnam, the Army had four standard masks—M17 (and A1), M25 (and A1), M24, and the M9A1. Two (M25-series and M24) were very similar and only had a few dissimilar parts. The others were unique with few interchangeable parts; therefore, maintaining spares and parts for these masks was expensive. The XM29 program was developed to make a common-mask system, simplify logistics, and save money. This one mask would use a common facepiece for all variations and would be of one-piece, injection-molded, transparent, silicone rubber. Silicone, the wonder material of the aviation industry in the 1970s, doesn't suffer from cold set, is nonallergenic, and seals to the face in a wide range of temperatures. To improve sealing, the facepiece used an in-turned periphery. The mask used a screw-mounted NATO-standard filter canister that mounted on either cheek (right or left side). The screw mount not used by the filter had an insert that functioned as a voicemitter. In the front, the mask had a front voicemitter and drinking tube. Unlike the M17 mask, filter changes were rapid, and the mask could be used with two filters mounted to reduce breathing resistance. Unfortunately, the XM29 eye lens had a tendency to "frost," but this could be corrected by scrubbing it with a mild cleanser. However, the silicone required special coatings to provide the necessary protection against CB agents or decontamination chemicals. The technology did not exist yet to coat the silicone and allow it to remain transparent. Lens-coating problems caused the Army to develop the XM30 series, which was effectively an XM29 with a separate glued-on lens.

The 1980s

The XM30-series masks continued the developmental work of the XM29 series. The XM30 was a hybrid approach that retained the silicone face-blank materiel but used a glued-in, transparent, urethane-material lens. In this program, there were initially some problems with securing the lens face-blank seal. In 1981, after the Army's investment of more than $60 million in the program, Senator William Proxmire gave it a "Golden Fleece Award" for a perceived waste of the taxpayers' money. The Army dropped the XM30 program shortly afterwards. The problem of bonding the urethane lens to the silicone face blank was eventually solved, and the U.S. Air Force and U.S. Navy adopted the XM30, now redesignated the MCU-2/P, as their standard mask.

With M17-series masks generally more than 10 years old and used hard, the Army reopened the M17 production line in 1983. The M17 produced an M17A1 without the resuscitation-tube capability and was designated the M17A2. This mask also was produced in a size XS—the first in a U.S. mask. The XS mask facepiece used the in-turned periphery to improve the fit on hard-to-fit soldiers (and to cause untold grief to these soldiers when they tried to change the filters!). After years of service, the resuscitation tube was deemed useless and discarded. The M17A2 still only had one voicemitter and, in the 1990s, a separate loudspeaker by Audiopack was authorized to improve communications with a large group. While producing the M17A2, the Army initiated a minimum-change, minimum-risk program for the M40 series.

The M40 program was then initiated to modernize the Army mask as quickly as possible. The M40 program was to combine the best elements of the mechanically attached rigid lenses of the M17 and the silicone face blank and replaceable filter canister of the XM30 program into a new

Soldiers wear the XM30 mask.

mask for the military. In 1984, Scott Aviation, ILC Dover, and Avon submitted masks for testing. The Scott Aviation version won the competition, and the mask was adopted in 1987. The M40A1 (1992) had user-requested mask improvements, including a better nose cup and quick-doff hood. This mask did not solve all communications problems, so the M7 voicemitter amplifier was adopted. The M7 amplifier was a screw-in design that mounted on the front voicemitter. Because of the number of laser systems on the battlefield, the M1 laser ballistic outsert was developed to protect soldiers' eyes while wearing the mask. The M40 was produced in small, medium, and large sizes.

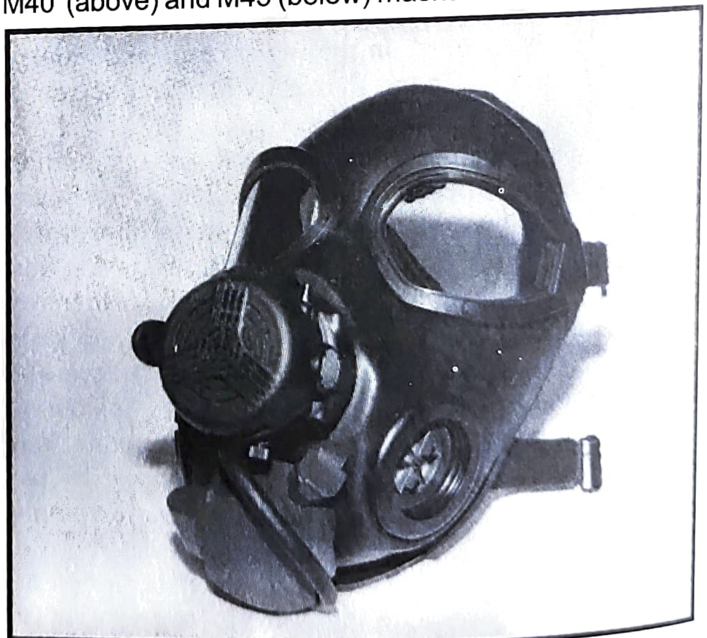
The 1990s

In 1996, the M45 aircrew protective mask was adopted. The follow-on mask for infantry use was to be the XM47. While not originally procured as a general-purpose mask, the M45 is currently used in the "Land Warrior" program. Because of this adaptability, the "Aircrew" was dropped from the designation in 1997 and the follow-on XM47 deleted. This mask took lessons learned from the M40 mask and also was designed using modern plastics technology. This mask is virtually an all-injection-molded composite and silicone-rubber assembled using modern production methods and ultrasonic welding. The M45 is designed to use night-vision equipment. Like the M40, the filter can be attached to the mask on either cheek. With front and side voicemitters, the mask can be used for face-to-face and phone communications. To improve communications, Audiopack is in the process of producing a new voicemitter amplifier (smaller and lighter than the original M7). To eliminate lens fogging, the design forces the air from the filter over the eye lenses before entering the mouth area and being inhaled. To ensure a good seal, the mask uses an in-turned periphery. The mask is available in extra small, small, medium, and large sizes with six replaceable nose cups for a better fit. Those few soldiers who cannot be fitted to an M40 are fitted with M45s.

While the M40 and M45 are excellent masks, the Army needed to do better. The perfect mask still did not exist. The RESPO-21 project was begun as a technological leap forward in mask-protection technology and, in 1996, evolved into the Joint-Service General-Purpose Mask (JSGPM) program. The JSGPM is known as the XM50. As initially demonstrated, a technology demonstrator proved to be lightweight and compact. Protection from a variety of chemical agents and toxic-industrial materials is planned. Comfortable to wear with minimal peripheral vision loss and low breathing resistance, this will be a Cadillac (maybe even a Rolls Royce, considering the maker) among masks. As all services have signed on to the program, this mask will replace all M40-series, M42-series, M45 (nonaviation applications) and

Photos courtesy of Audiopack Sound Systems.

M40 (above) and M45 (below) masks with voice amp



MCU-2/P masks. This will drop the cost of masks and spare parts by an economy of scale. This will meet the program's goal of lower total cost through low initial investment and low operating cost.

Sustainment is being considered throughout the design and testing phases of the program. Through the use of new, revolutionary manufacturing methods and techniques, the military hopes to procure a proper mask that meets the requirements but will have a low enough initial unit-issue cost to consider alternative sustainment concepts. When grossly contaminated, or at the end of its service life, the mask would be thrown away properly. The soldier, marine, or airman would then be issued a replacement mask. The idea is to consider and simplify logistics.

The NBC-defense project manager is also working closely with other program managers who are developing other components of the NBC ensemble (such as overgarment, helmet, and gloves) to ensure that they meet the new joint-service sustainment initiatives like "Vision 2010" to create the best cost-effective, low-logistic-footprint protective mask for the twenty-first century. This would help ease logistics in the future battlefield. (Remember, a good theater commander is always concerned about logistics.) Reduction in overall weight and bulk is also critical, and the JSGPM must occupy less space than a replacement M40 facepiece. The mask will also be usable with a wide range of soldier systems to minimize soldier degradation on the future battlefied.


JSGPM mask

The XM50 is a technological leap forward, but it still has a long way to go. As of September 2000, the first prototypes were received from the government's prime contractor—Avon—which won the benchmark "cradle-to-grave" developmental, production, and sustainment contract. The XM50 program can only succeed with the continued dedication of an extensive joint-service, integrated-product team. You can contact the system manager for the JSGPM at his Web site (SBCCOMs). He wants to develop the best mask for the soldiers, so he will review all ideas submitted.

Conclusion

The search for the best protection for our soldiers continues. Choosing the mask that performs best while logistically supportable is difficult. During the years, the Army has examined and procured masks to protect soldiers while continuing the search for the best mask. The current standard mask, the M40A1, has an excellent protection factor. Meanwhile, there is an ongoing search for a better mask in the JSGPM program.

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Making Chemical Weapons History at the U.S. Army Johnston Atoll Chemical Agent Disposal System

By Gary McCloskey

Ten years ago, the U.S. Army took a giant step forward in ridding our nation of its chemical-weapons stockpile. On 30 June 1990, disposal operations began at the Johnston Atoll Chemical Agent Disposal System (JACADS) with the processing of M55 rockets filled with the nerve agent GB (sarin). JACADS, located on a remote Pacific atoll, 825 miles southwest of Hawaii, is the Army's first fully integrated chemical-weapons-disposal facility.

Since then, the Program Manager for Chemical Demilitarization—the Army organization charged with destroying the nation's chemical-weapons stockpile—has processed over 399,000 rockets, projectiles, bombs, mortars, and ton containers and has eliminated over 1,961 tons of chemical agent at JACADS. This amounts to more than 96.7 percent of the chemical-weapons stockpile stored on Johnston Island and nearly 6 percent of the nation's total chemical-weapons stockpile (processing data as of 20 September 2000).

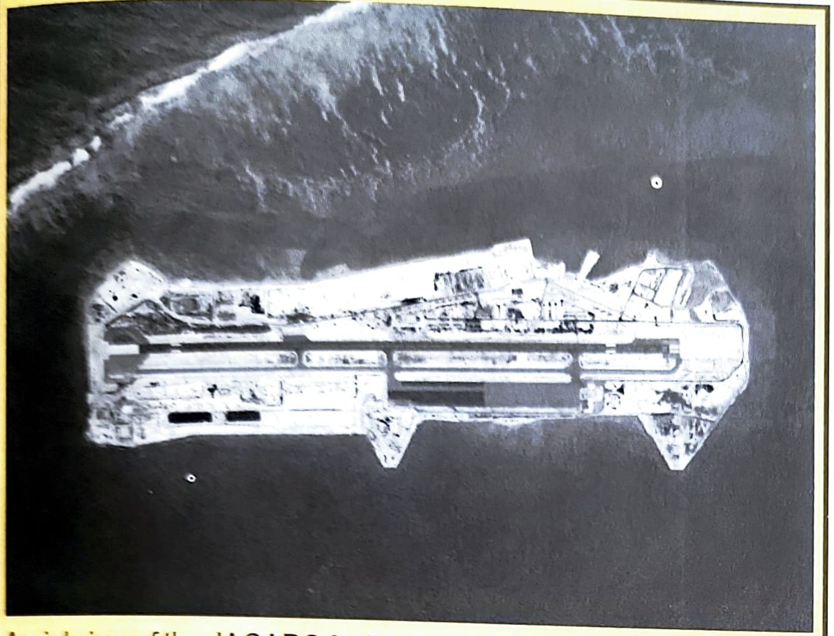
This effort took time, perseverance, and ingenuity. The facility's design incorporated state-of-the-art technology and safety systems, but chemical-weapons processing had never been attempted on such a grand scale. The JACADS team has had to overcome many hurdles to achieve success. The lessons learned and the accomplishments achieved at JACADS have enabled it to set an example for future facilities.

For example, at the Army's chemical-agent-disposal facility in Tooele, Utah, the M55-rocket operation was upgraded to incorporate a series of changes, originally made at JACADS, that significantly increased processing efficiency. The freezing of mustard-agent projectiles to facilitate processing is the foundation of a modified technology being proposed for the chemical-weapons-disposal system at Pueblo, Colorado. In addition, a very successful safety program that has significantly decreased the accident rate at JACADS stands as an example across the chemical-weapons-disposal program.

M55-Rocket Processing Rates

M55 rockets were among the first munitions to be processed through JACADS. The rocket-disposing process included draining the rockets of their chemical agent, removing the fuse located in the nose of the rockets, and then shearing the rockets into pieces. The chemical agent was drained into a tank that fed the liquid incinerator, and a system of conveyors associated with the rocket-processing equipment carried the pieces to the deactivation furnace where they were decontaminated at high temperatures. Typical with this type of processor, it was laden with difficulties that required the JACADS team to take extra time to ensure that operations met the environmental and safety measures set for the program. Some of these difficulties were technically challenging.

Difficulty arose from the unanticipated cooling of molten aluminum in certain stages of rocket processing. The M55-rocket operation was conducted within the sealed environment of the facility's explosion containment room because of the volatile nature of the munition. As an added precaution, the integrity of the room was maintained even after the munitions were deactivated and ready to be stored as waste. This safeguard depended on a system of two gates that opened, one at a time, to receive the waste as it passed out of the explosion containment room to the storage bin beyond it. However, the gates often jammed when molten aluminum from the deactivation furnace cooled on them, forming a wedge as the gates opened and closed. Unjamming the gates was a time-consuming, manual process that caused delays. Furthermore, the conveyor that carried the decontaminated



Aerial view of the JACADS facility

rocket parts from the deactivation furnace to the alternating gates was made of metal mesh that could withstand the temperature of the waste from the deactivation furnace. Problems arose, however, when molten aluminum from the rocket fins, end caps, and chemical-agent tank melted during processing, formed metal icicles on the belt that caught on the floor or overweighed the conveyor, and caused numerous breakdowns. As a solution, the metal-mesh conveyor was replaced by a bucket-type conveyor system that solved many problems, including the jamming waste-bin gates and the conveyor breakdowns.

Some of the problems were simple to diagnose and solve. When the rockets were punctured to drain the chemical agent inside, fragments of fiberglass from the rocket-storage tube got into the agent and had to be filtered out. When the filters were full, they had to be changed manually and processing had to be halted. In the beginning of rocket processing, filters were changed approximately every 6 hours, requiring 2 hours per change. With the facility running 24-hours per day during processing, operations were stopped three or four times every day to clean the chemical-agent strainers, resulting in a processing time loss of 30 percent per day. Engineers found that enlarging the strainers so that they only had to be cleaned once instead of four times daily solved the problem.

Gradually, processing rates improved at JACADS, but the benefit of all the changes made to the M55-rocket disposal process was fully realized at the Tooele Chemical Agent Disposal Facility—the sister facility to JACADS. Because of the lessons learned at JACADS, the initial processing rates for M55 rockets have doubled at the Tooele facility.

Processing Mustard-Agent Rejects

Mustard-agent munitions are among the oldest in the U.S. chemical-weapons stockpile. Thus, their condition has deteriorated over the years, and the liquid agent inside the munitions has turned very thick, almost solid. Normally, the liquid agent would be drained and destroyed in the liquid incinerator, the projectile fuze and explosives would be destroyed in the deactivation furnace, and the munition body would be decontaminated in the metal-parts furnace. However, during the processing of mustard-agent projectiles at JACADS, the condition of the munitions presented a problem when about half of the chemical agent had deteriorated and could not be drained adequately from the munitions. The processing rates were cut by as much as 90 percent to meet the stringent operating standards established by the Resource Conservation and Recovery Act. The Army was able to work with the U.S. Environmental Protection Agency (EPA)—the agency that issues JACADS operating permit—to take advantage of the thermal capability of the metal-parts furnace and treat full trays of sludge-laden projectiles in the furnace.

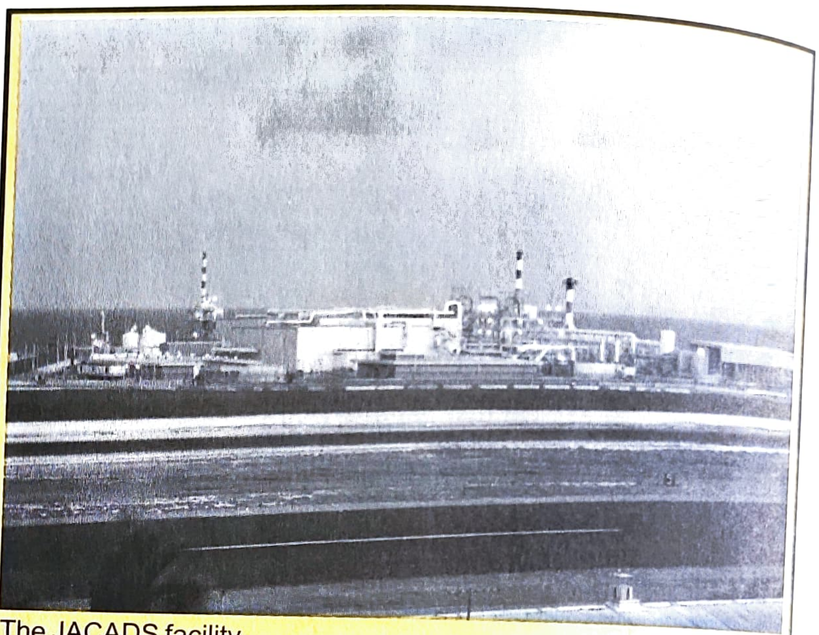
The Army asked for and received permission from the EPA to conduct a trial burn to prove its theory. The results of the trial burn were exactly as anticipated: the agent inside the projectiles was destroyed within environmental standards, and the munition bodies were appropriately decontaminated. Disposing of mustard-agent projectiles in this manner increased processing rates by seven times; however, a small percentage of projectiles could not be processed by the disassembly equipment. These projectiles were considered rejects.

Processing rejects is very costly to the disposal program and presents a potential safety hazard when the chemical agent is exposed during the cutting operation. The Army's operations team at JACADS found that mustard agent freezes at an unusually high temperature (approximately 58 degrees). Using this knowledge, the team solved the problem of mustard projectiles. The hypothesis was that rather than remove the mustard, freeze it and process it inside the munition in the metal-parts furnace. Again this change was tested and worked flawlessly.

These methods of processing mustard-agent munitions are being proposed as a viable modification to the incineration technology for processing mustard-agent munitions stored at the Pueblo Chemical Depot.

JACADS Safety Culture

Within its first several years of operation, the safety program instituted at JACADS by the Army and its facility-operating contractor, Raytheon Demilitarization Corporation, averaged an Occupational Safety and Health Administration record incident rate of five incidents per 200,000 man-hours worked. This rate was better than most industrial-/hazardous-waste operations facilities and average for the chemical industry. In 1995, however, the facility's safety-process improvement team accepted the challenge of the National Research Council to shift the safety program focus from a management-imposed approach to an employee-based "safety-culture" program. Its second mission was to upgrade JACADS safety process to cause continuous improvement in safety performance and reduce injuries to plant and plant-support personnel.



The JACADS facility

The first major change in the safety program at JACADS was the safety-process improvement team itself. The team is made up of members from every discipline at JACADS. These members are nominated by their peers to serve a 1-year term, but the culture of being a "safety leader" remains, even after the term has expired. Approximately one out of every five employees at JACADS has served as a safety leader.

Program management provides the safety-process improvement team with its foundation. The element that drives the safety program is buy-in from managers and supervisors who fully support safety initiatives and rewards programs for workers who first identify and then resolve safety issues. Employee empowerment is what gives the team its inspiration and provides its great success. Employees are empowered to set safety standards and develop safety-awareness initiatives to avert accidents. The "near-miss" program is one initiative that provides a mechanism for employees to identify, submit, and correct situations that could cause damage to equipment or injury to personnel.

Changing the safety program at JACADS resulted in an immediate and steady drop in the record-incident rate from October 1995 to October 1996, when the record-incident rate went from just above five to below two incidents per 200,000 man-hours worked. Recently, the record-incident rate dropped even further. "Our recordable incident rate at JACADS is below one," said James Bacon, the program manager for chemical demilitarization. "That is comparable to a regular business office as opposed to a major industrial hazardous-waste operation."

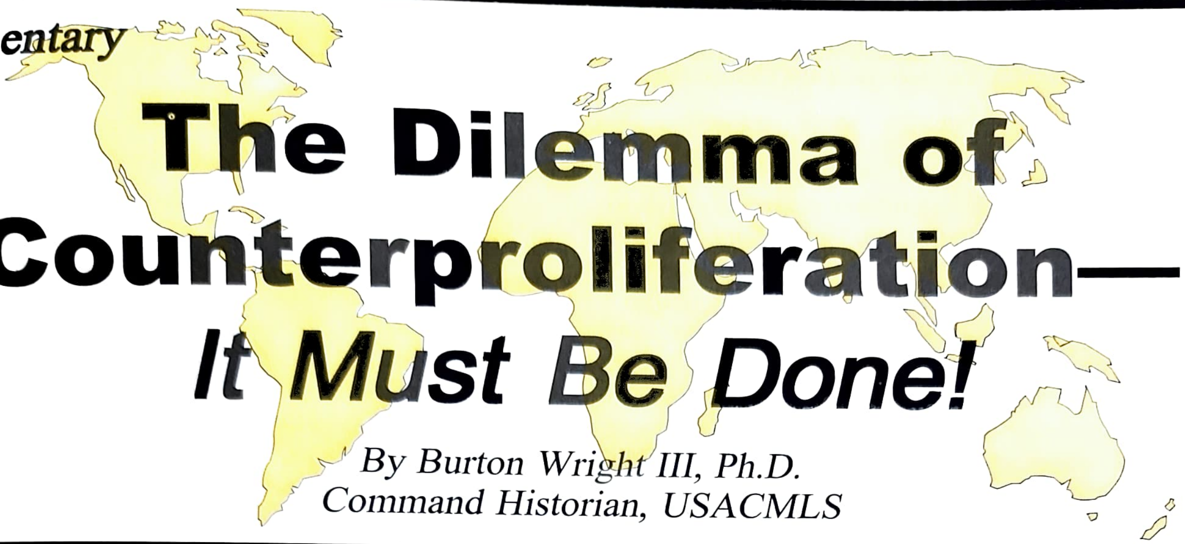
The accomplishments of JACADS's safety-process improvement team stand as a testimony to the dedication of the professional men and women who work at JACADS. The accomplishments also provide a model for safety initiatives at JACADS, the Tooele Chemical Agent Disposal Facility, and at seven other facilities that will be constructed to dispose of the chemical-weapons stockpile.

Doubling the M55-rocket processing rates, increasing the mustard-agent-projectile processing rates by seven times, and significantly decreasing on-the-job accident rates are just a few of the benefits the Army's chemical-weapons-disposal program has realized through 10 years of diligent, innovative operations at JACADS. The Army's first fully integrated facility to begin chemical-weapons-disposal operations has paved the way for other chemical-weapons-disposal facilities in the continental United States as the Army continues to make chemical-weapons history at JACADS.

Currently, chemical-weapons-disposal operations are in the final stages, and the Army is looking ahead to another major accomplishment at JACADS: completing its mission and closing the facility. Plans to decommission JACADS have already begun, and full-scale dismantling of the facility will begin in early 2001.

Mr. Gary McCloskey is the site project manager for JACADS. Having served in this capacity for the past 10 years, Mr. McCloskey has overseen the destruction of over 380,000 munitions processed in the U.S. prototype chemical-weapons-stockpile disposal facility. Mr. McCloskey's previous employment includes the U.S. Army Chemical Activity—Pacific (USACAP), where he served as an executive assistant and a chief engineer. While with USACAP, Mr. McCloskey managed the upgrade and renovation of various demilitarization buildings and served as the contracting officer's representative for the facility's contract. Mr. McCloskey received a bachelor of science degree in electrical engineering from the Rensselaer Polytechnic Institute in Troy, New York, and a master of science degree in industrial engineering from Texas A&M.

Commentary



The Dilemma of Counterproliferation— *It Must Be Done!*

By Burton Wright III, Ph.D.
Command Historian, USACMLS

Have you ever had to make a decision or take some action that you knew had a slim chance of success? Well, that is the dilemma those individuals entrusted with the counterproliferation effort to stop the spread of weapons of mass destruction (WMD) face. They are embarked on a vital crusade, but the chances of success are not good. Why?

There has been more success in the area of nuclear weapons than in biological or chemical weapons. There are several contributing factors for the success in this area of counterproliferation:

- Atomic weapons are very expensive to design and build. Hence only rich countries can afford them.
- Atomic weapons require delivery vehicles such as aircraft or missiles, which adds to the cost.
- Atomic weapons are normally produced in special buildings, which have a structure and outside equipment that can be seen and identified from the air.
- Certain parts of an atomic bomb cannot be used for anything else. There is no dual use, and parts can be more easily controlled, such as atomic triggers.
- Much of the technology for developing atomic bombs and reprocessing facilities to make weapons-grade plutonium are difficult to acquire, and the countries that have the capability have strict export controls that generally work.
- Atomic weapons draw more interest and concern from the most powerful countries than do chemical and biological weapons proliferation.
- Most nuclear countries, with the exception of China, have not been prolific in sharing nuclear technology.

As for biological and chemical weapons, the chances of stopping their proliferation lessen with each passing week. Chemical weapons are not likely to be used. While the necessary chemicals to make nerve agents are easier to obtain, there are certain important chemical parts that ONLY have one use—nerve agent. The government strictly controls the export of these chemicals.

Also, chemical weapons are bulky to use and require large tanks to have the potency to be fully operational. While chemical weapons have some uses in small areas, they are less likely to cause widespread damage than biological agents. Given these factors, chemical agents can be controlled to some degree, but it is more difficult than with atomic weapons.

Biological weapons present the greatest danger and are the hardest to control. Their development is the hardest to retard because of the dual nature of biological research. Within the United States and other highly technical nations, certain biotech companies track and use some of the lethal biotechnology to develop defenses against such a weapon. Some cultures of dangerous agents such as smallpox must be retained to help develop a cure and/or a vaccine. Since the late 1960s, the United States has developed only defensive biological agents.

A few years ago, a white supremacist obtained a vial of anthrax through a biological supply house. (Many of these lethal-stock agents exist to assist in developing new forms of treatment.) If such agents can be sold, especially over the counter, this in itself thwarts counterproliferation.

Before its demise, the Soviet Union had the world's largest and probably most proficient bioweapons organization in the world. The civilian side of the biowarfare program (BIOPREPARAT) has been stopped, but the military side has not. To date, there is no hard evidence that the Russians are selling their considerable capability in this area.

Iraq has a capable WMD program, but there is no evidence that Saddam is sharing his expertise. China, however, seems to be the "fly in the ointment." There is hard evidence that China has sold and shared its atomic technology with other nations, and probably for profit. If this is correct, an intellectual assumption is that biological and chemical agents are being sold as well.

There are many nations pursuing atomic capabilities, and many more pursuing chemical and biological capabilities. The nations possessing nuclear capabilities are usually well-to-do and are largely in the Middle East. The amount of money a country can put into the development of such weapons is not always relevant. North Korea, by all accounts, has a very poor economy yet there is evidence that it possesses both the expertise and the facilities to produce WMD in masses. Lately, the North Koreans have been showing a willingness to halt nuclear development, if the price is right, but no such actions are forthcoming for biological and chemical WMD.

Iran has been suspected of working on nuclear as well as biological and chemical WMD capabilities. During the war with Iraq, the Iranians were the first soldiers since WWI to face massive use of chemical weapons. Clearly, this indicates that they do not intend to be caught unprepared in any future conflict.

Although it would seem that these problems of proliferation are not increasing, they are, and for the following reasons:

- Nations rarely develop WMD for offensive purposes, although they have the capability. WMD are acquired to ensure that the nation in question has the ability to reply, in kind, if threatened by a nation with similar capabilities. This allows a smaller nation to make, what in business would be called, a "poisoned-pill defense." In other words, attacking them would not be pleasant for any nation.
- The money to be made is too tempting. Even if the United States were to pass severe laws to stop such proliferation, there still would be those willing to take the risk.
- Counterproliferation treaties currently in force are good efforts, but they lack two important provisions—punishments for breaking the terms of the treaty and, in most instances, the nation's agreement to adhere to the treaty. Currently, there is no punishment to withdraw from the treaty.
- There are several important nations that are not part of any treaty or are part of only a few nonbonding, nonproliferation treaties. Some of these nations are well financed and have been linked to the development of WMD. Unless they sign the treaty, they are not bound to follow the guidelines of nonproliferation. Therefore, any nation wanting to acquire WMD now has a source to contact that can provide it what it wants.

Efforts have to be made to counter proliferation, but they may be doomed to failure over time. There is too much money and influence to be made and to have with the development of WMD. As citizens, we can only hope that counterproliferation succeeds in halting the spread of WMD technology. If not, the world may face another Armageddon.

Army Reserve Personnel Command (AR-PERSCOM)

Let me introduce myself. I am **Major Paul M. Gonthier**, the Chemical Career Management Officer for the United States Army Reserve. I am stationed at the AR-PERSCOM in St. Louis, Missouri.

My mission at AR-PERSCOM is to provide the highest quality personnel life-cycle management and services for Army Reserve officers in the Chemical Corps. This results in a trained and ready force in support of the national military strategy.

My phone number is **1-800-325-4987**, menu option #1. If you are a Chemical Corps Reserve officer, and we have not spoken yet, call me. If you are an Active Component or National Guard officer pondering a career in the Army Reserve, call now and get answers to your questions before you switch service. You also may contact me through my e-mail: PAUL.GONTHIER@ARPSTL.ARMY.MIL.

Let's keep the Chemical Corps strong and ready!

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BREAKING THE PARADIGM: Restructuring the U.S. Army Chemical Corps for the 21st Century

By Major Gerald O. (Neal) Dorroh, Jr.

INTRODUCTION

Since the end of the Cold War, the U.S. Army has been in a state of continuous change. With the dissolution of the Soviet Union and the Warsaw Pact, the Army has downsized from 18 to 10 active divisions. To balance the nation's budget, many military bases in the continental United States and abroad have closed or realigned. But arguably, the most significant changes are the result of Army Transformation—the transition from a threat-based army, the Army of Excellence (AOE), to a strategically responsive army, the Objective Force.

Not only is Army Transformation revolutionizing the way the military thinks about war, but it is also having a significant effect on the way the U.S. Army is organized for combat. Some of these changes have already occurred in the 4th Infantry Division (Mechanized) (ID[M]), the Army's experimental force, at Fort Hood, Texas. They included reducing the number of armored and mechanized infantry companies assigned to a maneuver battalion, an organic engineer battalion in each maneuver brigade, and reducing logistics personnel and equipment in the maneuver and engineer battalions.[1]

Army Transformation also has had an impact on the force structure of the Chemical Corps. For instance, the 4th ID (M) no longer has an organic chemical company. As part of the effort to limit the number of soldiers in a division to 15,000 or less, the chemical company was eliminated and most of its soldiers were "passed back" to the corps.[2] The only chemical personnel, capabilities, and equipment remaining in the digitized division are a 21-man NBC-reconnaissance detachment, staff expertise at each level of command, and the capability to conduct operational decontamination operations. The personnel and equipment passed back to the corps have been used to create a new organization—a dual-purpose reconnaissance/decontamination company—and to modify the mechanized smoke company.[3]

The three key documents that drive the Chemical Corps's transformation are *Joint Vision 2010*, *Army Vision 2010*, and *Chemical Vision 2010*. In *Joint Vision 2010*, the Joint Chiefs of Staff under General John M. Shalikashvili, introduced four operational concepts for future conflicts. They are dominant maneuver, precision engagement, full-dimensional protection, and focused logistics.[4] Based on these concepts, the U.S. Army published its direction for the 21st century—*Army Vision 2010*. In it, the Army Chief of Staff describes six patterns of operations: decisive operations, project the force, protect the force, information dominance, shape the battle space, and sustain the force.[5]

In February 1999, the Chief of Chemical, Major General Ralph G. Wooten, delivered his guidance to the Chemical Corps for future operations. In *Chemical Vision 2010*, he presents four principles that directly support two of the Army's patterns of operation, protect the force and information dominance, and two of the Joint Chiefs' principles, full-dimensional protection and information superiority. Those four principles are sense NBC hazards, shield the force, sustain operational capability, and shape the battle space.[6]

Sense is the ability to detect and identify NBC hazards in the air, in the water, and on the ground with reconnaissance units and with airborne and space-based remote-sensing assets. In addition to contamination avoidance, shield is the capability to screen the force from enemy-target-acquisition systems through smoke and obscuration operations. Sustain equates to decontamination, which the Army does with specialized platoons. And finally, shape is achieved by orchestrating these activities in the most efficient and effective manner. These four principles contribute to two main goals: minimizing casualties and preserving combat power.[7]

When the principles laid out in *Chemical Vision 2010* are compared to the force structure, capabilities, and doctrine of the current force, several significant shortfalls become apparent. Historically, the Chemical Corps has tried to solve its capability shortfalls by fielding new types of NBC-defense units. But despite fielding new units, the Corps cannot effectively and efficiently implement the Chief of Chemical's vision without some revolutionary changes, especially in terms of command and control. Therefore, the purpose of this article is to illustrate the shortfalls of the current system and propose a new force structure for the U.S. Army Chemical Corps at the corps level and below.

CURRENT DOCTRINE

During a major regional conflict, a chemical brigade headquarters activates and deploys in support of a corps. Within the chemical brigade, there are two or more chemical battalions. Each battalion commands and controls two to five companies. Unlike the chemical brigade, the ratio of chemical battalions to divisions is not one-to-one. But rather, the number of battalions is a function of the number of chemical companies in theater. Chemical companies are not permanently assigned to battalions in peacetime.[8]

The chemical brigade headquarters plans the employment of the chemical companies based on six factors: mission, enemy, troops, terrain, time available, and civilians (METT-TC). Subsequently, the chemical battalions execute the brigade's plan. Since the number of chemical units is relatively small, the chemical brigade commander tries to weight the corps main effort with a disproportional number of units. Other chemical units are employed in an economy-of-force role throughout the rest of the corps area.[9] According to the Total Army Analysis (TAA) 07 allocation rules, chemical units typically would be employed in a corps area of operations (AO) as depicted in Figure 1. In this scenario, the digitized division receives four corps-level companies (one dual-purpose smoke/decontamination, one mechanized smoke, one dual-purpose reconnaissance/decontamination, one biodetection) and one chemical battalion headquarters.

Although not doctrine, chemical battalions routinely are placed in direct support of divisions. In turn, each chemical battalion reorganizes its companies into chemical-company teams and places them in direct support of a maneuver brigade. Such was the case during the 1st Cavalry Division Warfighter exercise at Fort Hood from 29 February to 5 March 2000. As the corps supporting effort, the 1st Cavalry Division received the 2d Chemical Battalion in direct support. For this exercise, the 2d Chemical Battalion consisted of one dual-purpose reconnaissance/decontamination company, one mechanized smoke company, and three dual-purpose smoke/decontamination companies.[10] With the division's organic chemical company attached to it, the 2d Chemical Battalion task-organized its subordinate units into company teams. After cross leveling was complete, each company team consisted of elements from as many as three different parent companies. Each company team was then placed in direct support of a brigade combat team.

Advantage

There is an advantage to the current doctrine. The allocation rules afford Chemical Corps planners the maximum

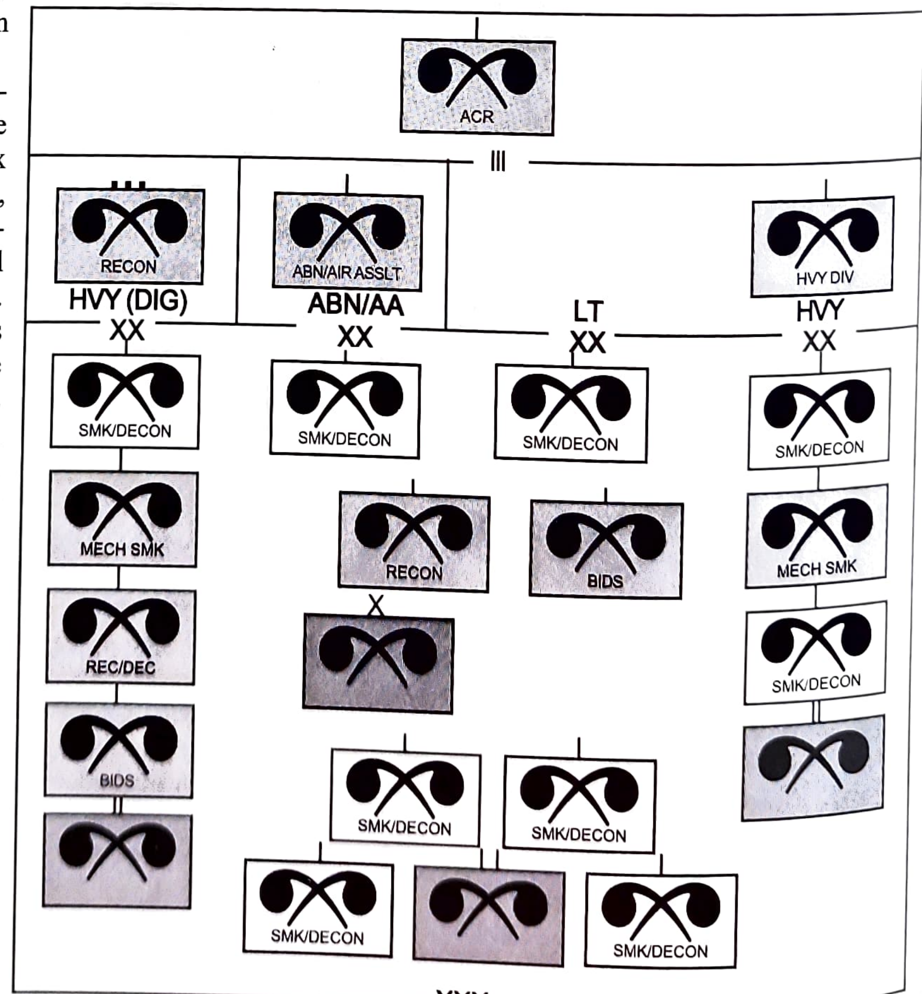

Figure 1. A chemical brigade deployed throughout a corps area of operation

amount of flexibility with regard to force employment. Chemical battalions are not fixed organizations; therefore, planners can task-organize NBC defense and obscuration units, based on METT-TC, to meet the specific needs of the force commander. As a result, inefficiencies and redundancies are avoided. As one of the smallest proponents/branches in the U.S. Army, the Chemical Corps must be efficient to be effective.

Shortfalls

The first shortfall concerns unity of command and unity of effort.[11] Although the chemical brigade commander owns the majority of the NBC-defense assets within the corps, a significant capability, specifically NBC reconnaissance and surveillance, still belongs to the regiment and division commanders. According to the TAA 07 allocation rules, in a major theater of war, 82 M93A1 Foxes and 140 M31 Biological Integrated Detection Systems (BIDs) would be assigned to III Corps (Digitized) and its subordinate units. However, 41 percent of the M93A1s and 50 percent of the M31s would be under regimental and divisional control. Consequently, the 460th Chemical Brigade commander, the senior chemical commander in the corps, could not directly assign chemical or biological named areas of interest (NAIs) to those crews.

In addition to equipment, only a small percentage of chemical officers within a corps actually is assigned to the chemical brigade. The majority of chemical officers are working on maneuver staffs from the battalion to the corps level. As a result, they are often entrusted with responsibilities unrelated to NBC defense. For example, many chemical officers are battle captains, force-modernization officers, and unit-status-report officers. Consequently, chemical officers acquire excellent staff skills but do not cultivate the technical and tactical expertise needed to plan NBC-defense operations. Captain Brant D. Hoskins highlighted this point in his award-winning essay, *Sustaining Critical Skills*.[12]

Second, the Chemical Corps is a staff-oriented branch. Ideally, every chemical lieutenant would be a reconnaissance and/or a decontamination platoon leader before becoming a captain. In reality, however, a lieutenant is fortunate to serve in any leadership position because the ratio of platoon-leader positions to staff positions is very low. Most brigade chemical officers are junior captains who have just finished their Chemical Captains Career Course. To compete for a company command, they must serve at least 12 months on a brigade or division staff. Although they have received the best training possible, their experience at the brigade level is minimal. Despite this, they are expected to be experts in the employment of NBC-defense units.

The third shortfall is a structural problem common to all chemical units. Although chemical companies are task-organized to provide the full spectrum of NBC support to maneuver brigades, they are not designed to do so. Chemical companies are specialty units with a singular or dual function—reconnaissance, reconnaissance/decontamination, biodetection, mechanized smoke, or smoke/decontamination. Consequently, company commanders become subject-matter experts on one or two pieces of equipment.

Once task organization is complete, company commanders are often responsible for executing as many as three different missions simultaneously. For example, a chemical company team in direct support of a maneuver brigade could have an NBC-reconnaissance squad, a mechanized smoke platoon, and a decontamination platoon. Having not employed all these types of NBC-defense units in training, chemical company commanders are not fully qualified to perform their combat function. Can the Chemical Corps realistically expect the commander, 59th Chemical Company—a dual-purpose smoke/decontamination company at Fort Drum, New York—to employ an NBC-reconnaissance squad in an AO effectively and efficiently? Possibly, but at what cost?

What complicates this particular problem is the lack of command, control, and communication assets within chemical companies, which is the fourth shortfall. When chemical-company teams are formed, the headquarters element does not have the proper equipment to command and control its subordinate units across a large AO. Because of the size of the brigade's AO, a commander cannot communicate with his subordinates with SINCGARS alone. Furthermore, platoon-sized elements are not authorized mobile subscriber equipment.

And finally, and probably most importantly, task organizing has a significant impact on the logistical operations of a chemical company. Maintenance sections are normally small and are only authorized mechanics for the equipment that is assigned to them. Because chemical companies are specialty units, task organizing requires maintenance sections to split in terms of personnel, spare parts, and special tools. For example, a logistics "tail" must accompany a reconnaissance squad that is task-organized with a smoke/decontamination company. The alternative is long evacuation routes to centralized maintenance points in the division or corps rear area, effectively preventing the reconnaissance vehicle from returning to fight in a timely manner.

PROPOSED FORCE STRUCTURE

Although not doctrine, chemical battalions and chemical-company teams are placed in direct support of divisions and maneuver brigades, respectively, during major training exercises. The proposed force structure acknowledges this relationship and establishes the NBC-defense platoon as the basic building block of the Chemical Corps. The platoon consists of the platoon headquarters section and three NBC-reconnaissance/surveillance teams. One NBC-defense platoon is normally in direct support of one maneuver battalion or squadron.

The platoon headquarters, consisting of the platoon leader, platoon sergeant, and two NBC operations specialists, integrates itself into the maneuver battalion's tactical operations center (TOC). Equipped with one shelter-mounted and one cargo high mobility, multipurpose wheeled vehicle (HMMWV), the platoon headquarters has the necessary personnel and equipment to plan, execute, and support, logistically, the maneuver battalion's NBC-defense plan as well as communicate with its subordinate units and higher headquarters—the NBC-defense company.

Each NBC-reconnaissance/surveillance team is authorized one NBC-reconnaissance vehicle, either the M93A1 Fox or its eventual replacement. The platoon leader can employ the NBC-reconnaissance/surveillance teams in a variety of ways: with the battalion scouts, with the maneuver companies or troops, or in general support of the maneuver battalion or squadron. In every instance, the teams are assigned chemical NAIs in the AO.

The NBC-defense company consists of a company headquarters, three NBC-defense platoons, one decontamination platoon, and a maintenance section. When the company is in direct support of a maneuver brigade or armored cavalry regiment, the company headquarters integrates itself into the maneuver brigade or regimental TOC just as the other slice elements do. If all three maneuver battalions or squadrons are employed (that is no reserve), the three NBC-defense platoons are placed in direct support of those units. If the brigade keeps one battalion in reserve, two NBC-defense platoons are in direct support while the third remains in general support of the brigade or regiment. In either case, the decontamination platoon remains in general support.

The company can command and control additional NBC-defense units. Based on METT-TC, the company could receive one or more NBC-defense platoons, BIDS teams, NBC-reconnaissance/surveillance teams, or decontamination platoons. Additional units can be either attached or under the operational control of the company.

The NBC-defense battalion consists of a headquarters and headquarters company and three organic NBC-defense companies. Once it is task-organized with a division, the battalion headquarters integrates itself into the division TOCs. The three NBC-defense companies are organized for combat based on the mission of the brigades. Like the companies, the battalion is capable of commanding and controlling additional NBC-defense units. Furthermore, mechanized smoke companies and dual-purpose smoke/decontamination companies can be added to the battalion, if required.

Assigned to the headquarters and headquarters company are three organizations not found in the NBC-defense companies—a BIDS platoon, an unmanned-aerial-vehicle (UAV) platoon, and an NBC element. The BIDS platoon, consisting of seven or more teams, is deployed throughout the division AO. The UAV platoon enables the NBC-defense battalion commander to conduct NBC reconnaissance over large areas, complex terrain, and/or urban areas. The NBC element is responsible for NBC battle management, which includes the integration of all NBC sensors in the division AO and the NBC Warning and Reporting System.

At the corps level, there is one NBC-defense brigade consisting of two or more active battalions. The brigade also has reserve-component battalions assigned. In a major theater of war, the reserve battalions activate and deploy with the chemical brigade headquarters. Some reserve battalions are identical to the active battalions to support Active- and Reserve-Component divisions and armored cavalry regiments. The other reserve battalions—consisting of singular- or dual-purpose companies—augment active battalions, provide support in the corps rear area, deploy throughout the communications zone, or remain in the intermediate staging base based on METT-TC.

Figure 2 depicts how an NBC-defense brigade would deploy in a corps AO. Each brigade combat team or armored cavalry regiment would receive an NBC-defense company. A division (digitized, airborne, light, or heavy) would receive an NBC-defense battalion.

Tradeoffs

To adopt the proposed force structure, we must recognize that Army Transformation is often a zero-sum gain. For every increase in personnel and equipment in one field, there must be a decrease in another. The size of the Army is determined by public law and simply cannot be expanded or contracted at will. Therefore, some organizations, capabilities, and doctrine must be eliminated, modified, or realigned to maintain a balance.

To support this restructure, there must be three significant pass backs. First, every armored cavalry regiment and division—that is mechanized infantry, armored, airborne, air assault—must pass back most, if not all, of their remaining NBC equipment. This equipment would be redistributed to outfit the NBC-defense battalions, companies, and platoons. Second, most, if not all, Chemical Corps positions at the division level and below must be passed back to an NBC-defense brigade. Those positions would be used to man the battalions, companies, and platoons. And finally, most smoke-generating units

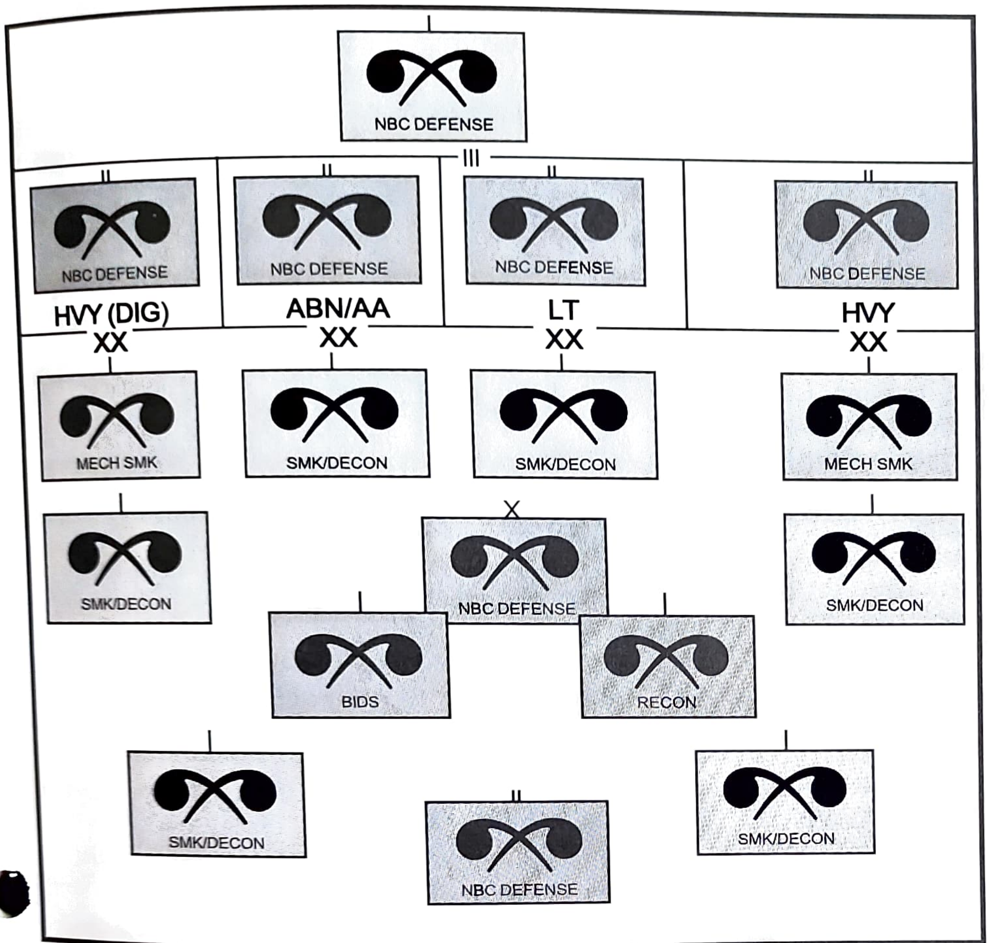

Figure 2. A proposed chemical brigade deployed throughout a corps area of operation

would be passed back to the Reserve Component. This would enable active-duty smoke positions and equipment to be exchanged for Reserve-Component NBC-reconnaissance and -decontamination positions and equipment.

These pass backs would have a significant impact on current doctrine. Without organic NBC-defense equipment, the armored cavalry regiments and divisions would be completely dependent on echelons above division for NBC-reconnaissance, -decontamination, and -smoke support. Without Chemical Corps personnel permanently assigned to their staffs, NBC-defense unit commanders would be dual-hatted. In other words, NBC-defense unit leaders would also be advisors to the commander they are supporting. For instance, an NBC-defense platoon leader would also be a battalion chemical officer. The NBC-defense company commander would also fulfill the responsibilities of a brigade chemical officer. This relationship would be identical to that of the air-defense-artillery battery commander or the engineer-battalion commander and the maneuver-brigade commander.[13] Both the air-defense-officer and engineer-officer positions have been eliminated from the brigade staff.

Advantages

There are several advantages to this force design. First and foremost is unity of command and unity of effort. With all the NBC-defense assets and personnel under his command, the NBC-defense brigade commander would be able to task-organize his forces to effectively and efficiently support the corps main effort. All other units would receive an appropriate level of assets. This basically equates to what the air-defense-artillery or engineer commander does. There are not enough air-defense or engineer assets for every unit in the battle space. Therefore, units are apportioned based on METT-TC.

With all NBC-defense personnel under his command, the senior NBC-defense commander also would become a personnel manager. He no longer would have to coordinate with maneuver commanders to reassign personnel. He now would be able to assign the right person to the right job at the right time. Not only is this beneficial to the Chemical Corps, but the maneuver commander also would benefit as well. His NBC-defense advisor would be a commander—someone who knows how to employ NBC-defense assets properly because of education, training, and most importantly experience. This relationship is the Chief of Chemical's vision for the future.[14]

Next, NBC-defense units would be modular, agile, and versatile. For any contingency, whether a major theater of war or a support and stability operation, an NBC-defense package could be designed and deployed which meets the maneuver commander's requirements but is also sustainable. As opposed to current doctrine, the NBC-defense brigade, battalions, companies, and platoons would have the assets to provide Classes I, III, and V supplies to their subordinate elements. Currently, NBC-defense units must rely almost exclusively on maneuver units to support them logistically. Ironically, there is no support relationship (direct support, general support) or command relationship (operational control) that requires a maneuver unit to provide logistical support to a slice element except assigned and attached.

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Finally, this force design would incorporate every NBC-reconnaissance and -surveillance asset in the corps and would facilitate cooperative detection[15] throughout the AO. Not only does the number of NBC-reconnaissance vehicles increase, but the entire fleet is also under the command and control of the chemical brigade commander.

Disadvantages

There are disadvantages to this concept. First, this proposal has significant implications on doctrine, training, leader development, organization, materiel, and soldiers (DTLOMS). Not only would doctrine have to be rewritten, but the U.S. Army Chemical School also would have to modify programs of instruction and tables of organization and equipment as well. Second, this concept takes away a degree of flexibility currently afforded to planners. Because the battalions are fixed organizations, the force commander's requirements may not be met as efficiently and effectively as they are today.

CONCLUSION

Not only is Army Transformation changing the way the military thinks about war, but it's also changing the way the Army organizes for combat. Now, armor and mechanized infantry have only three maneuver companies, brigade combat teams have an organic engineer battalion, and forward-support companies have assumed most maneuver-battalion logistical functions.

At the same time, Army Transformation is having an impact on the Chemical Corps. Divisions are passing back NBC-defense personnel, capabilities, and units to reduce the number of soldiers in a division. To compensate, the Chemical Corps is fielding new types of units and modifying others at the corps level. In the twenty-first century, however, creating new types of units is not enough. To meet the Chief of Chemical's vision, the Chemical Corps must revolutionize its *modus operandi*. The corps cannot afford to be a patchwork of NBC-defense units deployed throughout the battle space that cannot produce a common operating picture for the force commander.

It does not appear that the Chemical Corps will increase in size in the near future, even though the threat has not only expanded but also changed. Therefore, the optimal solution is to reorganize the existing personnel and equipment into NBC-defense units. Each unit will have the capability of integrating itself into the TOC of the supported unit. It will also be able to command, control, and communicate with its subordinate elements and higher headquarters as well as logistically support itself. But most importantly, every maneuver commander will have an NBC-defense advisor who is also an NBC-defense commander.

Endnotes

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Chemical Lane-Training Exercises: *Essential Planning Considerations*

By Sergeant First Class Russell E. Gehrlein

I have an awesome job! Like many active-duty senior chemical NCOs, I have been assigned to work with the Reserve Component (RC). Over the past year, I've had the privilege of wearing the 91st Division patch, serving as an observer controller/trainer (OC/T) with the 3-360th Training Support Battalion at Fort Douglas in Salt Lake City, Utah. This battalion is a unique multicomponent, active-reserve unit which has 20 active-duty personnel and about 120 RC officers and NCOs. Our mission is to provide mobilization and training assistance to selected National Guard and Army Reserve combat support and combat service support units in a four-state area. We spend most of our time planning, preparing, and executing lane-training exercises (LTXs) for our customer unit's annual training (AT) or weekend drills.

Over the past few months, our team of four reserve officers and NCOs, my active-duty chemical officer CPT Jeffrey Nelson, and I have conducted numerous LTXs with a brigade headquarters (to include its chemical platoon) and three subordinate battalion headquarters from the Idaho Army National Guard. We also have worked with an Army Reserve quartermaster unit from Montana and a mobile-public affairs detachment from Salt Lake City. Most of our lanes have been some version of "React to Chemical Attack," taken from various ARTEP manuals. We've executed this lane seven times, with and without decon, and have had a surprising amount of success because of a number of factors.

> *...the techniques and procedures outlined here can be used for any type of unit that wants to train on specific NBC-related ARTEP collective tasks or on any other task under NBC conditions. This is not "the way" but "a way" to help chemical leaders conduct lane-training exercises successfully.*

This article explains what we did, how we did it, and what we learned so that it might help those who have a similar mission. Perhaps there is a newly assigned brigade, battalion, or company NBC NCO or chemical officer who would like to conduct lane training but needs a few good ideas to get started. Hopefully, they can use these ideas and won't have to start from scratch like CPT Nelson and I did. Although the bulk of our experience with lanes have been with RC units, the techniques and procedures outlined here can be used for any type of unit that wants to train on specific NBC-related ARTEP collective tasks or on any other task under NBC conditions. This is not "the way" but "a way" to help chemical leaders conduct lane-training exercises successfully.

General Planning Guidelines

Lane training, according to FM 25-101, *Battle Focused Training*, is simply a technique for training a company or smaller unit on a series of selected soldier, leader, and collective tasks that support the unit's mission-essential task list (METL) on a limited area of terrain. Reacting to a chemical attack (to include planning and preparing for it) is an excellent example of this kind of multiechelon training because it involves performing many soldier and leader tasks simultaneously. These situational-training exercises are resource-intensive and require much OC/T support. OC/Ts can either be internal or external to your unit. Externally supported lane training is more difficult to coordinate, but it can be more effective.

Our success in execution definitely was because of thorough planning and diligent preparation. Planning for lane-training events must be done well in advance. The actual dates and location were locked in about 9 months prior. We attended an initial planning conference (IPC) with the key leaders from our supported unit 6 months before. At the beginning of the IPC, we determined the specific ARTEP tasks to be included in the LTX. We also discussed training-area requirements, personnel and logistics issues, opposing forces, and timelines. Both the OC/T team and the unit were committed to following up and completing

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certain projects before the next planning conference. As a result of this initial meeting, we drafted a memorandum of agreement, which outlined all the details necessary for this training event to be successful, and got the needed signatures 2 months before the training began. Follow-up meetings, or NBC exercise-planning conferences (EPCs), were scheduled every 2 months after the IPC. Of course, occasional contact by e-mail and telephone between meetings was critical.

Once the initial plan was established, further planning and preparation continued. It was not that difficult to put together a scenario to tie in all the collective tasks that the unit wanted to train (more on this later). We also formulated workable timelines to leave space between events, to include an OC/T-led after-action review (AAR) and an opportunity for retraining if necessary. We built an OC/T coverage plan and began to train internally on all those tasks that we were going to evaluate.

About 4 months before the lane training, we gave a complete training-support package to the supported unit's company commander and first sergeant. This proved to be an invaluable product. It immediately won us their respect because it was professional and well organized and provided what the unit needed for success before and during the lane. The binder contained the following documents:

- The memorandum of agreement.
- The OC/T team's task organization.
- The concept of the operation.
- The proposed timelines.
- A crosswalk between METL and collective tasks.
- A matrix between collective and individual tasks.
- A safety/risk-management worksheet.
- A medical-evacuation plan.

We also included copies of each of the collective-task training and evaluation outlines (T&EOs) found in the appropriate ARTEP manual, along with their supporting individual tasks from the common-task-test (CTT) manual. The General Reimer Training Digital Library, located on the Internet, was the best source for finding up-to-date versions of all these tasks. It is important to note that for most of the NBC individual tasks, the latest versions **must** be obtained from the FY00 and FY01 CTT manuals and not from STP 21-1-SMCT, *Soldiers Manual of Common Tasks*, because most of the tasks, conditions, and standards have changed. If the tasks are printed off the Web site, they look much better than photocopies from an old, beat-up manual. In addition, we put all these documents on floppy disks for the unit trainers to use.

In keeping with our customer-service approach, we scheduled a few assistance visits in conjunction with the EPCs, where we would "train the trainer" on a few individual tasks. This may or may not be necessary, depending on the chemical personnel strength and experience in the unit you are supporting. With the brigade chemical platoon, for example, the classes CPT Nelson and I gave and a mini-field-training exercise we did with them 2 months prior were critical to the successful execution of the smoke missions during AT. We found they were short on technical manuals, and with some help from the Chemical Doctrine Net and the Soldier, Biological, and Chemical Command (SBCCOM), we were able to locate some before the next drill. On two occasions, I also taught some classes at the public-affairs detachment since they are not authorized a 54B and did not have any 2-week NBC-school-trained soldiers.

Planning a Chemical Lane

Now let's look at chemical lanes specifically. As we began planning our first chemical lane-training event, our goal was to make it *doctrinal, realistic, and challenging.* Building a solid exercise scenario was the first step. The document used to describe the scenario is the operations order (OPORD). Sometimes the units put the OPORD together, and other times, we wrote one for them. If there is going to be any NBC play, ensure that some mention of the enemy's chemical capability is in the OPORD's Intelligence Annex. For example, "Possible chemical munition shipment has arrived at (location). Chemical use in support of the attack is likely. During the attack, persistent and nonpersistent nerve agents may be used. Persistent agents will be placed on the flank to seal it, while nonpersistent agents will be placed on the brigade maneuver units to stop repositioning."

There also needs to be something else in the OPORD. In paragraph 3 (Execution), subparagraph d (Coordinating Instructions), the MOPP level must be addressed. I recommend starting the unit at MOPP Zero, emphasizing that soldiers must either carry their MOPP gear with them or keep it at arm's length. Many confuse this with the "MOPP Ready" posture, which means MOPP gear can be left in your truck or somewhere else as long as you can get to it quickly (within a couple of hours if stored in a central location).

For every chemical lane, units must decide before beginning whether or not decon will be included. Performing decon operations is probably a separate collective task from react to chemical attack. You could go either way, depending on what the unit needs. The quartermaster unit from Montana wanted to train on decon operations, which worked well. However, during the Idaho National Guard units' AT last summer, we decided, for a number of reasons, that we would only go with a nonpersistent chemical-agent attack this time around and not worry about decon at all. In the harsh desert environment found in Orchard Training Area during the month of July, a nonpersistent chemical agent would probably dissipate quickly, eliminating the need for operational decon.

Secondly, performing an operational decon is somewhat of a logistical nightmare that most units cannot do without the support of a chemical company, which in our case was not available. In addition, because of a real concern for heat injuries to soldiers, we decided that we would only keep the units in MOPP4 for about 1 1/2 to 2 hours at a maximum. Since it was apparent that they had not conducted NBC-collective tasks recently, we wanted to follow the "keep it simple, Sir," (KISS) principle. By executing the task from "Gas, Gas, Gas," to "All Clear," without decon, we met the unit commander's intent of conducting NBC training to standard, while minimizing risks to the soldiers.

Another key ingredient in planning a chemical lane is a good timeline. We designed two separate standard timelines, one for a dawn attack and one for a dusk attack, depending on what was agreed to. Backwards planning was used to construct this tool to allow time to execute all necessary tasks in a logical sequence. The timelines must start the day before the scheduled attack to include a realistic buildup phase and time for the unit to conduct a Rock Drill, rehearsing in detail all soldier and leader actions when the chemical attack occurs. We planned to issue a chemical-downwind message every 6 hours. We also factored in the time it gets dark in the evening for dusk attacks and the scheduled time chow was to be served for dawn attacks. It was suggested, for convenience, to have the attack occur either mid morning or in the afternoon. We explained that for training to be effective, it must be realistic—that is, performed at the time when the enemy would most likely use chemical agents. One unit that understood the concept requested one chemical attack at dusk for a dry run and then had the actual "for-record" lane bright and early the next morning.

I also scheduled inputting several NBC intelligence spot reports leading up to the attack. When I worked at III Corps Chemical at Fort Hood, Texas, my corps chemical officer had much success using these kinds of reports during Battle Command Training Program Warfighter exercises. These reports add realism to the exercise by giving the unit some indication that the enemy may use chemical weapons in the near future. It also exercises the NBC channels of communication from higher headquarters to lower, between the intelligence (G2/S2) and operations (G3/S3), and forces the unit commanders to conduct a MOPP analysis. These spot reports are given in a preprinted standard size, activity, location, unit, time, and equipment (SALUTE) report format. All we had to do was plug in the date-time group and location. The reports we used covered a number of situations:

- Enemy personnel seen wearing masks and complete chemical protective clothing.
- The enemy prime minister delegating approval authority to release chemical weapons down to brigade-commander level.
- A wheeled-vehicle convoy carrying chemical rounds headed in the vicinity of known artillery units.
- Dismounted patrol finding dead birds and animals in a wooded area next to a cache of damaged mortar rounds.
- A captured enemy soldier becoming extremely agitated when he thought his protective mask would be taken away.

Along with developing a thorough, standardized plan to train and evaluate our supported unit on these chemical tasks, we also looked at ways to standardize our own team's actions during the lane. We developed an OC/T-coverage plan that specified which individual tasks each of us would be watching once things got started. The team would be spread out to observe as many soldiers as possible. All of us would check how long it took soldiers to mask and would inspect MOPP gear to ensure that it was worn properly. Selected OC/Ts would test soldiers on skin decon or administering nerve-agent antidote kits to self or a buddy, as needed, using chemical-casualty cards. I planned to stay around the company NBC NCO and evaluate tasks such as using the M256 chemical-detector kit (no shortcuts were allowed; they had to use real time), submit NBC-1 Reports, and conduct unmasking procedures. I also acted as the higher headquarters if theirs was not participating in the exercise. Once the unit sent the NBC-1 Report up, I sent down an NBC-3 Report (part of which told the unit that the agent would only be in the area for a short time). When unmasking procedures were completed properly, we gave permission, as their higher headquarters, to give the "All Clear."

How did we plan to initiate the simulated chemical attack? We wanted to use artillery simulators (with or without smoke grenades), but we were never allowed to use them because of possible fire hazards. Most of the time we simulated chemical artillery rounds with an audible whistle at the dismount point and then told the gate guard that he was experiencing nerve-agent symptoms. A couple of times we set off the M8A1 chemical-agent alarm. The element of surprise was key. We always wondered if we would show up with all soldiers in MOPP4 just waiting for us, but that never happened. Because of the NBC intelligence, they were usually at MOPP2, which made it quicker to get to MOPP4.

Execution Phase Lessons Learned

A few key lessons were learned from the execution phase that are worth mentioning. I could have done a little more follow-up with our customers before AT. Although we had plenty of coordination with the brigade HHC, we only got to meet one of the two maneuver battalion's HHC commanders ahead of time. With the engineer battalion's headquarters company, we didn't get to do a face-to-face with the commander until day one. I gave the training-support

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packages to each of these units, through the active-duty captains who were assigned to work with them. However, they all did not ensure that the packages were sent down to the company NBC NCO. One company did not have an NBC NCO, another e-mailed the package to the HHC commander who didn't want to print it all, and another left the package with the battalion NBC NCO.

Another lesson we learned was to communicate the purpose of the AAR ahead of time and let the unit commanders know what we expected. One HHC commander thought an AAR was a back brief for us to tell him what he did wrong, rather than a discussion facilitated by the OC/T involving self-discovery and maximum participation from his soldiers. I also think we may have failed to provide a complete schedule of the AARs because the commander seemed surprised when we asked to conduct one after each lane. He would have rather had a final AAR with key leaders, but that would have violated the purpose of an AAR, according to Training Circular 25-20, *A Leader's Guide to After-Action Reviews.*

One other valuable lesson learned was striking a balance between good customer service and effectively taking charge of the lane as an OC/T. There is always room for flexibility with the unit concerning some details prior to execution. Times, places, and even the sequence of events can be modified, based on the unit's needs; it is its LTX. However, it must be made clear that the OC/T runs the lane, and flexibility ends when it violates safety, conditions in the ARTEP manual, or Army doctrine.

At the end of the lane, it is also very important to provide a well-run AAR and to get off-line afterwards with the unit leaders to give them some feedback from the T&EO checklists. If you are able to be a training asset to the commander, end on a positive note and do not burn any bridges; you will be able to support the unit next time around. Our team got a major vote of confidence from our public-affairs unit after our LTX was completed. The commander told our team chief that he wanted us to go with him to do his training assessment model during its AT overseas next May.

Conclusion

Looking back over the chemical lanes that we planned, prepared, and executed, I'm totally convinced that lane training is a great idea that really works. I believe that the best way to conduct chemical lane-training exercises effectively is to put together a thorough plan that is doctrinal, realistic, and challenging and to prepare both the supporting unit and your OC/Ts with all the tools they need to succeed.

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National Training Center Opposing Forces Smoke Doctrine

By Captain Donald R. Twiss

The opposing forces (OPFOR) at the National Training Center (NTC), Fort Irwin, California, developed several new tactics, techniques, and procedures (TTP) for smoke operations. Over time and multiple NTC rotations, these TTP were refined and adjusted into an OPFOR smoke doctrine. This doctrine has proven to be extremely effective at the NTC and has both offensive and defensive smoke elements that regular Army (BLUFOR) units could use effectively.

While serving as the chemical officer of 1st Squadron, 11th Armored Cavalry Regiment (ACR); leader of the OPFOR smoke platoon; and executive officer of Headquarters and Headquarters Troop Regimental Support Squadron, 11th ACR, I saw first hand the effectiveness of the OPFOR smoke doctrine. This article begins with a detailed account of the OPFOR smoke doctrine focusing on the hard-learned lessons of the NTC. Next, it discusses problems associated with transferring this doctrine to Army standards and ends with a brief summary of each point.

OPFOR Smoke Doctrine

Providing maneuver smoke to the OPFOR at NTC presents several unique problems:

- The OPFOR do not have a set plan for line of departure. Instead, the OPFOR have several courses of action to follow, or they may make up one while on the move, depending on the enemy-force deployments.
- The OPFOR stop for no one. Once the OPFOR have started their movement, units must move out smartly with them or be left behind.
- The OPFOR are outranged by the BLUFOR weapon systems. This makes the OPFOR vulnerable in flat terrain and when crossing linear danger areas. To overcome these problems, the OPFOR developed several unique smoke TTP.

The smoke-platoon leader must know the OPFOR plan better than anyone else. To do so, he/she must attend all war games, rehearsals, and coordination meetings for the regiment and for the motorized rifle battalion he/she will work with. The leader needs not only to plan out-placement of the smoke elements but also to plot preplanned artillery-delivered smoke lines. The requirement for the smoke-platoon leader to coordinate artillery-delivered smoke cannot be understated. There are two important reasons for this: artillery-delivered smoke is the best method to cover your smoke systems until they can conceal themselves, and the effectiveness of your own smoke is doubled with a well-placed artillery smoke line. The placement of artillery-delivered smoke is best coordinated by the smoke-platoon leader who has more experience than the squadron chemical officer and is more concerned with its proper use than the squadron fire-support officer.

Coordinating artillery-delivered smoke becomes more critical when we discuss the task organization of the smoke platoon for offensive operations. However, to understand the smoke platoon's task organization, we first must have a working knowledge of how the OPFOR fight. During an offensive penetration, the regiment will have a forward detachment consisting of the forward security element (FSE) and the advanced-guard main body (AGMB). Task organization for these elements depends on the situation. The mission of the FSE and the AGMB is opening a point of penetration and a maneuver corridor for the regiment. The rest of the regiment consists of the main-body supporting element, the main body, the second echelon, and the fifth maneuver element.

The mission of the main-body supporting element is to exploit the success of the FSE and the AGMB or create an additional point of penetration and create follow-on points of penetration. The mission of the main body is to secure the objective and prepare for follow-on forces. The second echelon mission is to secure the objective or secure a flank. The fifth maneuver element is the last element and can be assigned a variety of missions.

For any of the regimental elements to accomplish their assigned tasks, they have to close with the enemy without taking heavy causalities from the BLUFOR's direct-fire systems. This is not an easy accomplishment considering the BLUFOR units have an advantage in standoff range of their direct-fire systems. The regiment primarily tries to use terrain to cover its movement. However, without smoke to fill in the gaps in terrain coverage, the regiment would suffer heavy causalities before it could return fire. Therefore, every element in the regiment needs smoke support to accomplishment its mission, which only one platoon provides.

This is the problem we faced when developing a smoke-platoon task organization for offensive operations.

An OPFOR surrogate vehicle (OSV) pulls security as another advances over the hill.

To solve this problem, the first thing we did was to move the entire platoon to the line of departure an hour before start-point time and emplace a smoke haze. This would tie into artillery-delivered smoke lines, if available. The effect of the smoke haze is to conceal the regimental start point. As the regimental elements hit the start point, the smoke platoon splits into teams of two smoke-generator vehicles (TDA-Ms) and moves out with select elements in the regiment. Generally, two TDA-Ms go with the FSE, two with the AGMB, and two with the main-body supporting effort. This gives the supported unit maximum smoke on target at the required time. The linkup with the supported unit is done on the move without a change in the rate of movement.

Once the linkup is complete, the TDA-M team (in coordination with preplanned artillery smoke lines) will smoke supported elements until they are safely in broken ground or across linear danger areas. To screen the supported unit effectively across a linear danger area, smoke should not be placed directly on the maneuver unit. The preferred method is to place a curtain of smoke between the supported unit and the suspected BLUFOR locations. Artillery-delivered smoke is used to cover the TDA-Ms on the flank of the supported element.

After the unit has made contact, the primary mission of the two TDA-Ms with the AGMB and FSE is to obscure the point of penetration. The smoke TTP developed by the OPFOR for opening a point of penetration or breaching operations are extremely effective and a key component of the OPFOR smoke doctrine. Artillery-delivered smoke mission is called in on the far side of the obstacle. Once the smoke builds on the far side of the obstacle, two TDA-Ms move toward the intended breach site and start generating smoke. With the obstacle obscured, the breach tank moves up and creates a breach. The breach tank is followed by one TDA-M to smoke the far side. The second TDA-M follows the next tank across the obstacle and proceeds with the breaching unit toward the objective. The important thing to remember about breaching operations is that a tank never leaves a TDA-M unsupported. The coordination between the supporting tank and TDA-M must be worked out during the planning process and should be rehearsed.

The two TDA-Ms attached to the main-body supporting element have a different mission from those assigned to the AGMB and the FSE. The main-body supporting element is moving through a corridor cleared by the AGMB or the FSE and should be free of enemy contact. So, the need to cover linear danger areas is not as great, and the main-body TDA-Ms should save smoke for their primary mission. The primary mission of the two

TDA-Ms with the main-body supporting-effort element is to open a second point of penetration and to act as the platoon reserve in case the TDA-Ms with the AGMB and the FSE are destroyed.

Once a course-of-action decision is made, the main-body supporting element will do one of three things. It will—

- Attack through the point of penetration made by the FSE.
- Attack through the point of penetration of the AGMB.
- Open a new point of penetration.

Generally, the smoke platoon follows the same basic plan of maneuver despite the course of action the main-body supporting effort picks. For example, if the main-body supporting effort moves through the point of penetration created by the FSE, the two TDA-Ms with the FSE will join the main-body supporting effort. As a result, four TDA-Ms are attached to the main-body supporting effort as they make a second point of penetration. The two TDA-Ms with AGMB split—one stays with the AGMB to try to deceive the BLUFOR while the other joins the main body. (Note: If the main-body supporting effort opens a new point of penetration, one TDA-M from the FSE and the AGMB will stay with those elements while the other two will join the main body.) After the main-body supporting effort has created the second point of penetration and any additional points of penetration that are necessary, they pass the battle off to the main body securing the objective. With battle handoff of these two elements, the four TDA-Ms with the main-body supporting effort join the one TDA-M in the main body. The end state provides five TDA-Ms supporting the OPFOR at the objective.

The basis of offensive OPFOR smoke doctrine is the ability to mass, disperse, and mass again at the decisive point on the battlefield. Every soldier in the smoke platoon has to know the plan, know how to track the battle, and be very proficient at orienting himself to his terrain and stages of the mission.

The OPFOR defensive smoke operations face many of the same problems and require the same skills as the OPFOR offensive smoke operations. However, defensive smoke operations have some additional challenges. Combat battle instructions (CBI) are the rule book for all the NTC engagements and only allow four TDA-Ms in a defensive battle. In addition, the CBI place restrictions on the placement of the four TDA-Ms.

To understand how the CBI limit defensive smoke operations, a working knowledge of how the OPFOR fight in the defense and its task organization is required. The OPFOR fight defensive operations with a reinforced motorized rifle battalion under the command of a captain, while a counterattack reserve usually fights using a motorized rifle company under the command of the division commander. The task organization of these two elements changes from battle to battle.

Security-zone defense is a layered defense. In security-zone defense, each element, with the exception of the final defense line, has the mission of engaging the BLUFOR, causing attrition, breaking forward momentum, and withdrawing before it becomes decisively engaged. To do so, the motorized rifle battalion has ambush positions with two tanks and an armored personnel carrier placed in three different positions toward the forward edge of the battle area. Behind the ambush positions is the security zone that consists of one or two motorized rifle companies spaced out in ambush positions across the width of the battlefield. After the security zone is the main defensive line, which defends the OPFOR's no-penetration line and does not withdraw. The motorized rifle battalion commander will hold a small local reserve to stop any penetration of the main defensive belt or to use as he sees fit. The counterattack reserve is not under the control of the motorized rifle battalion commander and will not be released unless the BLUFOR's no-penetration line is in danger of collapsing or the BLUFOR has been fixed or destroyed and a counterattack is possible.

For the security-zone defense to be effective, the ambush positions and the security zone have to break contact with the BLUFOR units and move into a hide position. This is not an easy task because it requires vehicles to come out of hiding places and expose themselves to enemy fire. The best way to withdraw from contact is to use smoke coverage. This places the smoke platoon in high demand, and the CBI say that only two TDA-Ms are allowed in the security zone. The other two TDA-Ms have to be assigned to the counterattack reserve.

To overcome the restrictions placed on the smoke platoon by the CBI, the same basic principles that were effective during offensive operations are placed in use again. The platoon depends heavily on artillery-delivered smoke and remains flexible. The first thing to do on preparation day during first light or last light is to emplace a smoke haze somewhere on the battlefield. This deceives the BLUFOR scouts or allows them to emplace fighting positions or obstacles without being detected. Smoke is most effective at times of limited visibility. There are only two TDA-Ms to emplace the haze; this is why first or last light is picked. After completion of the smoke haze, the two TDA-Ms resupply and split up, with each one going to an ambush position occupied by a tank. The TDA-Ms stay with the ambush position until first contact the next day.

Once first contact is made, the mission for each TDA-M becomes very difficult. The first mission for the TDA-M is to assist the ambush position in breaking contact. Generally, ambush positions are in broken terrain, which provides great hiding positions to blow smoke to cover the TDA-M's withdrawal. If the ambush position is unable to break contact, the TDA-M will leave the position to save itself. However, if the ambush position is decisively engaged and is unable to break contact, the TDA-M stays with the unit in ambush until the unit is safe behind friendly lines; then, it withdraws back to a set point and links up with the second TDA-M. It is important that the TDA-M does not take any unnecessary risks when withdrawing from the forward ambush position because it will be needed later. The link-up point for the two TDA-Ms is a center location within the security zone, usually near the security-zone commander's location.

A motorized rifle battalion advances across a dry lake bed under a smoke screen provided by the smoke platoon.

After the security-zone commander makes contact with the BLUFOR and the decision to withdraw from the security zone is made, the next step is to determine where smoke is needed most to aid in the withdrawal. Contact generally occurs on the left or right side of the security zone, and smoke can be massed where the security zone is in contact. If contact is made on both flanks, split up the TDA-Ms and send each one to the largest concentration of vehicles on the battlefield to extract them. Once the decision is made to withdraw the security zone, an artillery-delivered smoke line is fired in front of the BLUFOR unit. If the BLUFOR assault is canalized into the left or right flank, the mission for artillery smoke does not change. However, the TDA-Ms will stay together and place a smoke curtain between the OPFOR and the BLUFOR. As a result, the withdrawal of the security zone from direct-fire contact is a high-risk operation and losses can be expected.

After the security zone has withdrawn from contact, it attempts to move into a hide position on the flank of the BLUFOR. If possible, the two TDA-Ms join the security zone. Once there, the two TDA-Ms support the counterattack of the security zone into the flank of the BLUFOR. If the two security-zone TDA-Ms are unable to link up with the security zone, they will either move back to the motorized rifle battalion reserve or find a location where they can link up with the counterattack reserve TDA-Ms.

The two TDA-Ms with the counterattack reserve have an easier mission. They wait with the counterattack reserve until the division commander releases them. After the division commander releases the counterattack reserve, the TDA-Ms attached to that unit assume the flank-obscuring role discussed during offensive operations.

The OPFOR defensive smoke operations are more difficult than offensive operations. The TDA-Ms on the defense are placed in vulnerable positions, and their loss has an immediate impact on the battle. To survive defensive smoke operations, the TDA-M operators need all the skills necessary for offensive operations and good situational awareness. They also need to develop a feel for the battle. In other words, they must be able to sense the battle's outcome and future enemy locations from battle tracking.

Problems with the OPFOR Smoke Doctrine

The OPFOR smoke doctrine has several key elements that were not discussed in the above examples. One thing not mentioned is a smoke-control point. Another problem the unit faced was how to resupply the TDA-Ms in this fast-paced environment. Both of these issues warrant further discussion.

First, a smoke-control point is not used in the OPFOR smoke doctrine mainly because it is ineffective. The command vehicle of the smoke platoon is a TDA-M with dual net ability. The TDA-Ms are on the radio frequency of the element they support. Several reasons for not using a smoke-control point are as follows:

- The OPFOR move so fast that there is no time to relay information from a separate net. Instead, platoon command and control use hand and arm signals and, only if necessary, the support-unit net.
- The distance is too great between platoon elements on the battlefield. A smoke-control point could follow only one section of the platoon, and by the time it was in position to observe smoke, the regiment had

moved on. Therefore, the speed of the regiment makes a smoke-control point difficult to manage.

- The supported unit can act as its own smoke-control point because it knows what is needed better than the smoke-platoon leader. Hence, the smoke-platoon leader's job is to find a way to execute what the supported unit wants and to give advice when necessary.

Second, one of the most difficult aspects of the OPFOR smoke doctrine is how to resupply the TDA-Ms and keep up the rate of movement. The OPFOR move quickly and do not wait for the smoke platoon to resupply. In addition, a tank-and-pump unit assigned to the platoon cannot be brought into the fight because it is not fast enough to keep up with the battle. The solution then is to load 5-gallon cans with fog oil and MOGAS and place them in the TDA-Ms. This is sufficient to resupply the platoon during normal battles. However, during heavy smoke-use battles, the smoke platoon uses a HMMWV, visually modified to look like a BRDM (an armored car used for reconnaissance and command control), loaded with 5-gallon cans of fog oil and MOGAS. The BRDM is able to keep up with the platoon and is more durable than the tank-and-pump unit on the battlefield.

Conclusion

The OPFOR smoke doctrine is created to support the unique way the OPFOR fight at the NTC. This does not mean that elements of this doctrine would be ineffective if used by the BLUFOR units. The same concepts the OPFOR use are the basis for Army doctrine. Army units are supposed to move rapidly, seize the initiative, concentrate combat power at points of penetration, deceive the enemy, and attack into an unexpected point.

Some aspects of this doctrine would be easy for a BLUFOR unit to implement. The close coordination of artillery and generated smoke could be done with little trouble. The new smoke-generating systems with graphite can create a smoke curtain more effectively than the M157 jet-pulse system that the OPFOR use.

However, the basis of the OPFOR doctrine—the ability to mass smoke, disperse with the supported unit, and mass again at the decisive point on the battlefield—would take additional training time and money to implement. For the BLUFOR units to implement this concept, a close relationship must be created between the smoke platoon and the supported unit. The supported unit has to know and trust the smoke platoon, and its soldiers, in turn, must know the strengths and weakness of the supported unit. A sense of mutual trust and respect must be built between the supported unit and the smoke-platoon leader. The only way to build this trust is through months of training together under realistic conditions. The platoon must be well trained down to the last soldier. The supported unit also must be well trained and understand the importance of smoke operations.

On the surface, the OPFOR smoke doctrine may appear different than the BLUFOR doctrine in FM 3-50, *Smoke Operations*. However, the doctrine is nothing more than our present Army doctrine modified to fit rapid and decisive maneuver, which is the key to winning on the modern battlefield and is what all Army units train to do. The OPFOR smoke doctrine applied to the BLUFOR units would greatly increase their ability to maneuver and win on the modern battlefield.

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Book Review

By Dr. Burton Wright,
USACMLS Command Historian

America's Struggle With Chemical-Biological Warfare, Albert J. Mauroni. Westerfield, Connecticut:Praeger, 2000.

The first chapter of this book really captures the reader's attention. The author lays out a dispassionate defense for the necessity of this country to prepare for the use of WMD by people who wish to cause harm to the United States. Even though you may not like the thought of this, and find the use of such weapons repugnant, the mounting evidence indicates that many countries, even small developing ones, are working overtime to develop WMD capability, especially chemical and biological weapons.

Mr. Mauroni lays out some cogent arguments for the consideration of WMD and for increasing our capability in that area. Beneath the surface, you can detect the rumblings that the author believes this country should get back into the offensive WMD business—that is weapons other than nuclear. We, however, are not likely to do that because of various treaties to which this nation is a signatory that forbid the development of chemical and biological offensive weapons. Unfortunately, there are a number of countries that have not signed these treaties.

Given the revelations of BIOHAZARD by Dr. Ken Alibek, it seems clear that the Russians had offensive weapons well after the United States renounced the use of offensive chemical and biological weapons during the Nixon administration. The United States remains steadfast to that promise, but how do we retaliate if attacked with chemical or biological weapons?

The second chapter discusses the famous Skull Valley sheep kill. The author takes a somewhat different view than members of the 4th Estate, who were quick to blame the Chemical Corps when the blame may have been elsewhere. This chapter is interesting in that it is reasonable and well researched. It clearly shows that the rush to blame the government, that is the Chemical Corps, for the incident was premature, but it sure made good headlines.

The author's next chapter deals with other incidents and a bad press that begin to erode the nation and politicians', which in this case didn't take much, use of nonlethal incapacitating agents and herbicides in South Vietnam. In 1969, the antiwar lobby was in full cry. Anything the Army did, especially operations involving chemicals, the media seized the opportunity and published headlines that could be called "loud and biased." Those in political and leadership positions were not slow to read the "tea leaves." Ever quick to bow to public pressure, thoughts of doing away with chemical-biological warfare altogether were given serious attention.

The author gives detail experience on the near death of the Chemical Corps in the late 1960s because of the press' lack of knowledge concerning chemical warfare and its less-than-charitable attitude toward the matter. To understand how and why this happened, the author takes the case that was used by the press and public then, and compares it to what we know now—hindsight is always better.

The time between 1968 and 1990 was one of the most important and critical periods in the Chemical Corps's history. Although the author had to abridge much of the history of research and development of defensive equipment, he tried to divide the book equally into a discussion of policy and the research and development world to show better the total picture of this important decade leading up to the Gulf War.

Although some may not agree with his conclusions or his layout of the tone at the time, the book wasn't written to bring consensus but to present information that would cause the reader to stop and give serious thought to the situation. If clear thought replaces gut reactions, we are all better off.