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The Chemical Corps: Developing CBRN Leaders



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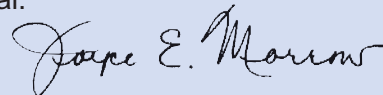
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ARMY CHEMICAL REVIEW



THE PROFESSIONAL BULLETIN OF THE CHEMICAL CORPS
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**Brigadier General
Thomas Spoehr**

Greetings Dragon Soldiers! Welcome to another edition of Army Chemical Review, our professional journal! Our theme for this issue is the development of chemical, biological, radiological, and nuclear (CBRN) leaders—I cannot think of a more important topic. Oftentimes, we tend to focus on the newest gadget or piece of equipment as representing a step forward in capability. But without the training and skills necessary to operate and understand the equipment, new equipment is a liability rather than an asset. I'd rather have well-trained CBRN Soldiers with M8 paper on the ends of sticks than poorly trained Soldiers trying to operate gas chromatograph/mass spectrometers.

Chemical Soldiers and units continue to assist our Army in the prosecution of the War on Terrorism. Their collective efforts should make us all proud! Numerous Chemical companies will be rotating in support of Operations Iraqi Freedom and Enduring Freedom in the next few months. Many units will perform “nontraditional” missions such as security, convoy escort, and other key tasks. These are missions that our Army needs done, and the Soldiers of the U.S. Army

Chemical Corps are proud to play a part. Every day, we create new pages in our Corps history—a history hallmarked by adaptability and versatility.

What qualities do we need in the CBRN leaders of the future? . . . The first attribute is an ability to learn and adapt. . . . The second attribute is leaders who are confident and persuasive.

On 18 September 2007, Command Sergeant Major Alston and I attended the activation ceremony for the 48th Chemical Brigade at Fort Hood, Texas. This Active Army brigade will provide a central focus for the training and readiness of Chemical units in the continental United States. This proud day would not have been possible without the contributions of many who have come before us—great individuals who fought for this unit. We visited with many great Dragon Soldiers while we were at Fort Hood!

What qualities do we need in the CBRN leaders of the future? This issue will offer some thoughts on this subject. From my perspective, a few key attributes stand out. The first attribute is an ability to learn and adapt. How quickly can our leaders take the education and training that they have been given and apply them to new and differing situations? Are they able to take what they know, offer advice to their commanders, and get it around 80 percent right? Or will they freeze and wait for the experts in sanctuary to provide a 100 percent solution? The second attribute is leaders who are confident and persuasive. Leaders must project competence! I remember being at the scene of a “white-powder incident” at a nearby hospital. When the local weapons of mass destruction—civil support team arrived on-scene, one of their officers, a Chemical captain, projected such a sense of confidence that the overstressed fire chief and hospital administrator were immediately reassured that the experts were on-site. CBRN leaders must project that same sense of confidence. And confidence comes from a good grounding in technical and tactical skills.

Equipment and doctrine change, but people endure. And investment in CBRN leader development is the most important investment we can make as a Corps. It is a topic that warrants our continued interest. I encourage you to give it some thought and reflection as you read the articles in this issue. Thank you for what you are doing for our Nation and the Chemical Corps.

Elementis, Regamus, Proelium!

Regimental Command Sergeant Major

Leadership—Merriam-Webster defines it as “an act of directing or guiding.” I define it as “influencing others to accomplish a mission.” The concept of leadership is comprised of a team of distinct parts that work together to arrive at a common goal. In the Chemical Corps of today, leadership is the most prominent tool that we possess to advance the Corps beyond the barriers and limitations that we have faced in the past. However, chemical, biological, radiological, and nuclear (CBRN) leadership should not be encapsulated or isolated in the chemical arena. Leadership is about what you do every day—mentoring and guiding those around you to secure a better force for tomorrow.

Leadership is a process where a person or group influences others to operate an organization or accomplish objectives in a more cohesive and consistent manner. The art of leading is obtained by applying what most leaders relate to as the “be, know, and do concept.” Many aspects have changed within the structure of the Army; however, many also remain the same. Leaders must influence others with true leadership attributes—their beliefs, values, ethics, character, knowledge, and skills. The one aspect that remains constant is that an organization is only as strong as its weakest link. But the weakest link is only as strong as his leader empowers him to be.

A great leader is one who works at being the best. Through consistent and constant acts of self-improvement, leaders expand their knowledge base and learn more about themselves. Additionally, a great leader seeks to implement what he learns by providing purpose, motivation, and direction to his peers and subordinates through mentorship, guidance, and tutoring.

There is a level of authority or power that accompanies the title *leader*. A leader can be a positive or negative influence. The power that a leader possesses can be misappropriated if not implemented in a manner that will increase an organization’s effectiveness and productivity. A leader who has a proclivity to lead from an “I’m the boss” mentality and rule like a dictator is less likely to possess the characteristics necessary to empower subordinates to be motivated and dedicated to an organization’s goals.

Leaders are expected to have an arsenal of tools—knowledge, experience, proficiency, honesty, trust, loyalty, respect, dignity, pride, and concern—that impact an organization and its people while consistently and professionally accomplishing a mission. An organization is only as good as its leadership—the people assigned the task of providing direction to every vein that causes the organism to live and prosper. Leaders must be concerned about the total well-being of every Soldier under their charge; this includes ensuring that physical, emotional, material, and spiritual needs are met. The Army’s system of well-being ensures that when these needs are met within an organization, mission preparedness and overall effectiveness increases.

What makes a person want to follow a leader and entrust that leader with his life? I believe that people want to be guided by someone who is proficient in what he does—someone who possesses ethics and a clear sense of direction. Leaders are not born; they are made. A great leader operates ethically to gain respect; possesses a vision and focused tenacity that is honest and sincere; admits mistakes; compliments a subordinate, peer, or another leader; asks questions; says please and thank you; and uses “we” instead of “I.”

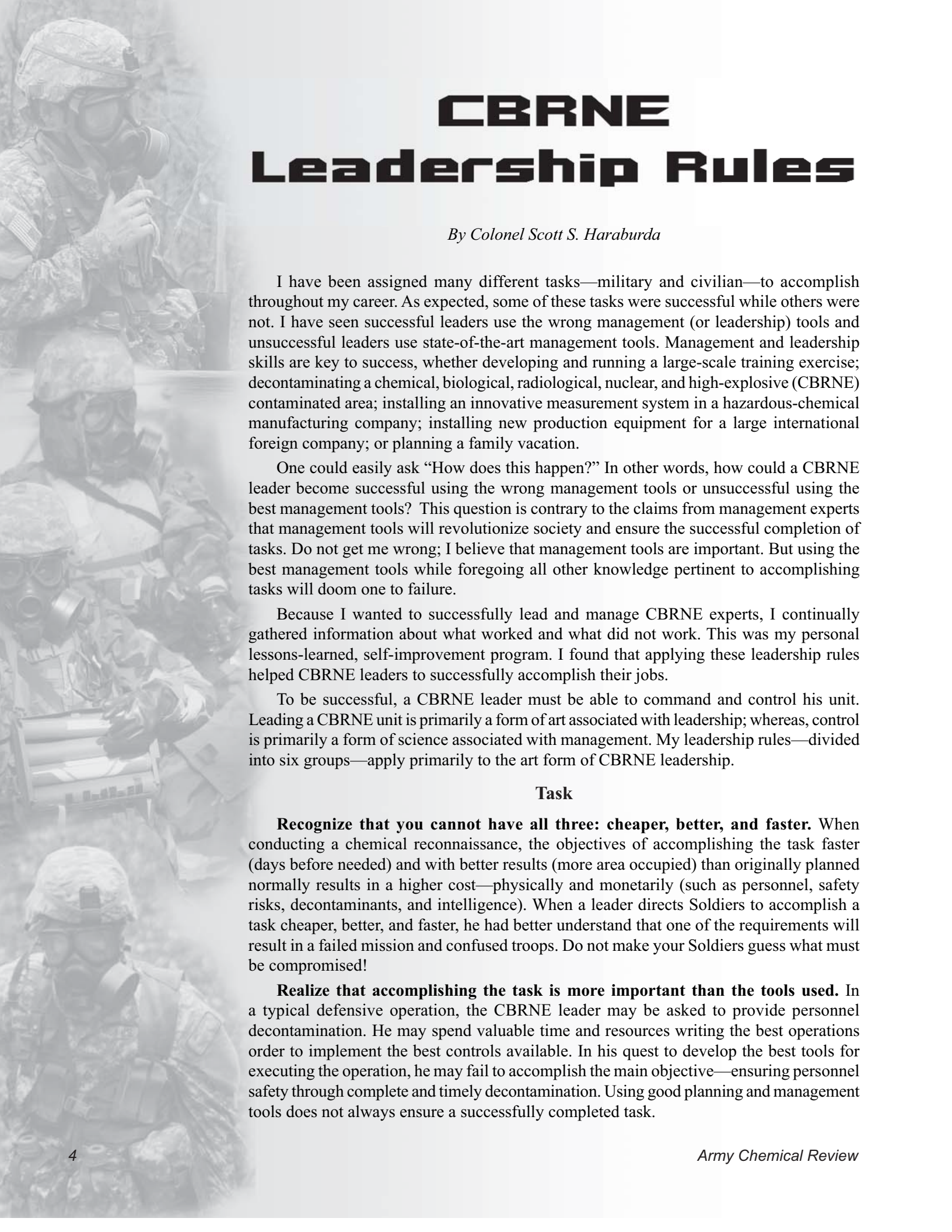
A leader is someone who has followers. If someone is unsure of his leadership capabilities, I urge him to look behind himself to check for eager followers.

Great leadership attributes are important in our everyday lives—on our jobs, in our homes, and in our communities. I deeply and sincerely feel that a true leader looks outside the box and his own life to develop and implement ways to motivate and provide direction. A leader must **be** who he says he is by acting as a role model every second of every day, **know** himself as well as his Soldiers, and **do** everything in his power to ensure a positive investment in the lives of his Soldiers. This will secure and solidify a better force for tomorrow.



**Command Sergeant Major
Patrick Z. Alston**

Leadership is about you! What are you going to do?

The background of the page features a faded, grayscale image of three soldiers in full CBRNE (Chemical, Biological, Radiological, Nuclear, and Explosive) protective gear. They are wearing helmets with goggles and respirators, and carrying equipment. The image is positioned on the left side of the page, with the text overlaying it.

CBRNE Leadership Rules

By Colonel Scott S. Haraburda

I have been assigned many different tasks—military and civilian—to accomplish throughout my career. As expected, some of these tasks were successful while others were not. I have seen successful leaders use the wrong management (or leadership) tools and unsuccessful leaders use state-of-the-art management tools. Management and leadership skills are key to success, whether developing and running a large-scale training exercise; decontaminating a chemical, biological, radiological, nuclear, and high-explosive (CBRNE) contaminated area; installing an innovative measurement system in a hazardous-chemical manufacturing company; installing new production equipment for a large international foreign company; or planning a family vacation.

One could easily ask “How does this happen?” In other words, how could a CBRNE leader become successful using the wrong management tools or unsuccessful using the best management tools? This question is contrary to the claims from management experts that management tools will revolutionize society and ensure the successful completion of tasks. Do not get me wrong; I believe that management tools are important. But using the best management tools while foregoing all other knowledge pertinent to accomplishing tasks will doom one to failure.

Because I wanted to successfully lead and manage CBRNE experts, I continually gathered information about what worked and what did not work. This was my personal lessons-learned, self-improvement program. I found that applying these leadership rules helped CBRNE leaders to successfully accomplish their jobs.

To be successful, a CBRNE leader must be able to command and control his unit. Leading a CBRNE unit is primarily a form of art associated with leadership; whereas, control is primarily a form of science associated with management. My leadership rules—divided into six groups—apply primarily to the art form of CBRNE leadership.

Task

Recognize that you cannot have all three: cheaper, better, and faster. When conducting a chemical reconnaissance, the objectives of accomplishing the task faster (days before needed) and with better results (more area occupied) than originally planned normally results in a higher cost—physically and monetarily (such as personnel, safety risks, decontaminants, and intelligence). When a leader directs Soldiers to accomplish a task cheaper, better, and faster, he had better understand that one of the requirements will result in a failed mission and confused troops. Do not make your Soldiers guess what must be compromised!

Realize that accomplishing the task is more important than the tools used. In a typical defensive operation, the CBRNE leader may be asked to provide personnel decontamination. He may spend valuable time and resources writing the best operations order to implement the best controls available. In his quest to develop the best tools for executing the operation, he may fail to accomplish the main objective—ensuring personnel safety through complete and timely decontamination. Using good planning and management tools does not always ensure a successfully completed task.

Plan and sacrifice now for the sake of the future. Command and other key military leadership positions are typically held for two or three years. It's difficult for leaders to establish programs that will improve the performance of CBRNE units or organizations several years beyond their tenure. It's better for unit leaders to establish priorities of unit readiness in lieu of bureaucratic requirements. For example, don't divert Soldiers from a scheduled weapons qualification exercise to improve unit paperwork in support of an upcoming command inspection.

Implement plans. General George S. Patton, Jr. once said, "A good plan executed today is better than a perfect plan executed at some indefinite point in the future." You may not always have the perfect plan, under the perfect conditions, but you must have decontamination operations in place to save Soldiers now!

Data

Ensure that you only use metrics if they are needed in the decision-making process. For example, don't create a metric to count the number of briefings a subordinate leader makes unless it is being used to improve the leader's communication techniques. Having a metric to measure the number of hours Soldiers in a unit work may be interesting information; however, it should not be used unless you make work-related decisions based on it. On the other hand, using a metric to determine the personnel readiness rate of a unit could be used to improve readiness or recognize cross-level resources available from one unit to another.

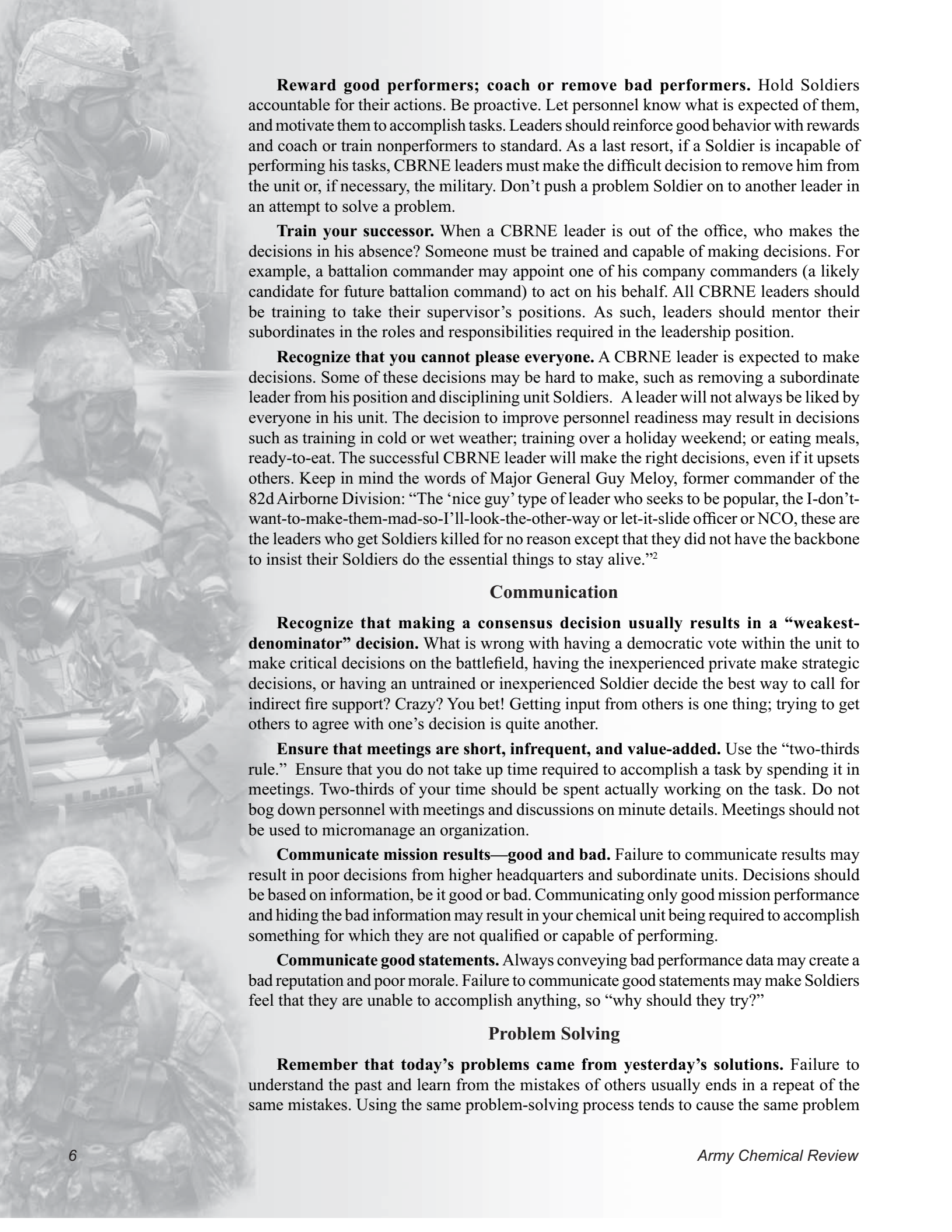
Understand the source of the data. It is unwise to make decisions based on data that is not known to be accurate or timely. Making decisions about unit schooling or training using military occupational specialty qualification data extracted from databases with obsolete or irrelevant information does not make sense. By the same token, a CBRNE leader should not make decisions in combat without understanding the accuracy and timeliness of his sources and the intelligence on the battlefield.

Avoid pursuing information to reach meaningless goals, even if the information can be easily obtained. For example, information on the number of rounds fired by Soldiers in a unit is an easy metric to obtain. However, with the exception of logistical or familiarization purposes, this information does not provide a leader with information that would improve unit readiness or indicate how well the unit is performing. Better data would be the number of targets destroyed rather than the amount of ammunition used.

Challenge your assumptions. A CBRNE leader may assume that subordinate Soldiers are incapable of making good decisions. How does the leader know whether this assumption is accurate? Mentoring Soldiers and providing them with decision-making opportunities allows you a glimpse of their abilities. In combat, a leader receives battlefield intelligence information to help him make informed decisions. To better understand the intelligence data, leaders should challenge whether the assumptions (and facts) are relevant to operations.

Personnel

Recognize that a mission begins and ends (and sinks or swims) with personnel. Noncommissioned officers (NCOs) and enlisted Soldiers mean everything! A unit is nothing without them. They run the equipment, fire the weapons, and make lifesaving decisions. Mentor and develop them. As for trusting them to accomplish tasks, take the advice of General Patton: "Never tell people how to do things. Tell them what to do, and they will surprise you with their ingenuity."¹ Remember, your missions cannot be accomplished without solid Soldier support.

A background image showing three soldiers in full chemical warfare protection suits, including helmets with filters and gas masks. They are in a field setting, with one soldier in the foreground looking down at something in his hands, and two others behind him.

Reward good performers; coach or remove bad performers. Hold Soldiers accountable for their actions. Be proactive. Let personnel know what is expected of them, and motivate them to accomplish tasks. Leaders should reinforce good behavior with rewards and coach or train nonperformers to standard. As a last resort, if a Soldier is incapable of performing his tasks, CBRNE leaders must make the difficult decision to remove him from the unit or, if necessary, the military. Don't push a problem Soldier on to another leader in an attempt to solve a problem.

Train your successor. When a CBRNE leader is out of the office, who makes the decisions in his absence? Someone must be trained and capable of making decisions. For example, a battalion commander may appoint one of his company commanders (a likely candidate for future battalion command) to act on his behalf. All CBRNE leaders should be training to take their supervisor's positions. As such, leaders should mentor their subordinates in the roles and responsibilities required in the leadership position.

Recognize that you cannot please everyone. A CBRNE leader is expected to make decisions. Some of these decisions may be hard to make, such as removing a subordinate leader from his position and disciplining unit Soldiers. A leader will not always be liked by everyone in his unit. The decision to improve personnel readiness may result in decisions such as training in cold or wet weather; training over a holiday weekend; or eating meals, ready-to-eat. The successful CBRNE leader will make the right decisions, even if it upsets others. Keep in mind the words of Major General Guy Meloy, former commander of the 82d Airborne Division: "The 'nice guy' type of leader who seeks to be popular, the I-don't-want-to-make-them-mad-so-I'll-look-the-other-way or let-it-slide officer or NCO, these are the leaders who get Soldiers killed for no reason except that they did not have the backbone to insist their Soldiers do the essential things to stay alive."²

Communication

Recognize that making a consensus decision usually results in a "weakest-denominator" decision. What is wrong with having a democratic vote within the unit to make critical decisions on the battlefield, having the inexperienced private make strategic decisions, or having an untrained or inexperienced Soldier decide the best way to call for indirect fire support? Crazy? You bet! Getting input from others is one thing; trying to get others to agree with one's decision is quite another.

Ensure that meetings are short, infrequent, and value-added. Use the "two-thirds rule." Ensure that you do not take up time required to accomplish a task by spending it in meetings. Two-thirds of your time should be spent actually working on the task. Do not bog down personnel with meetings and discussions on minute details. Meetings should not be used to micromanage an organization.

Communicate mission results—good and bad. Failure to communicate results may result in poor decisions from higher headquarters and subordinate units. Decisions should be based on information, be it good or bad. Communicating only good mission performance and hiding the bad information may result in your chemical unit being required to accomplish something for which they are not qualified or capable of performing.

Communicate good statements. Always conveying bad performance data may create a bad reputation and poor morale. Failure to communicate good statements may make Soldiers feel that they are unable to accomplish anything, so "why should they try?"

Problem Solving

Remember that today's problems came from yesterday's solutions. Failure to understand the past and learn from the mistakes of others usually ends in a repeat of the same mistakes. Using the same problem-solving process tends to cause the same problem

in the future. For example, using the military decision-making process for a given situation without the lessons-learned knowledge from a similar past decision has a high probability of failure. Understand history and how it can be used to solve problems.

Recognize that the cure may be worse than the disease. It is not wise to dedicate valuable resources to ensure that a simple task is accomplished. It does not make sense to take several officers and NCOs away from their jobs to supervise a single Soldier performing a task. When solving a problem, always consider the related expenses. Is it worth not accomplishing another task?

Dominate technology—do not let it dominate you. Do not spend all of your time behind the computer communicating by e-mail or with fancy PowerPoint® presentations. What happens if the computer goes down? Do you stop communicating?

Solve problems, not symptoms. I once had a Chemical company commander who investigated a vehicle accident. He determined that the Soldier driving the vehicle was the cause of the accident. When I asked him why the driver was the cause, he indicated that the driver had failed to maintain the proper distance in the convoy and had overcorrected when the vehicle in front of him slowed down. I asked the investigator why the driver did that, but he did not know. In my personal investigation, I found that the driver was not licensed to drive the vehicle. My next question was, “Why was a nonlicensed Soldier allowed to drive a vehicle in his company?” Never stop asking “why.” You need to discover the real cause contributing to the problem behind the initial story.

Decision Making

Remember that doing the right thing is better than doing things right. In an emergency situation, it may be better to begin decontamination operations at the right time (even though the plans may not be perfect) instead of spending valuable time planning and preparing. Otherwise, we spend time planning and rehearsing until we have a perfect solution with flawless movement—at a time long after Soldiers have died or the battle has been fought and won by the enemy.

Recognize that “better” is the enemy of “good enough.” Let’s wait until we have perfect Soldiers who perform perfectly before we go to war. Not a realistic statement! There is nothing wrong with improving a unit—but not at the expense of the mission.

Remember that resources mean nothing if they are not used. Having the best-trained, -equipped, and -qualified CBRNE Soldiers does nothing for our Army if we cannot get them into the fight.

Remember that if it “ain’t broke,” strive to maintain or improve it. A Soldier in combat needs to know that he can count on his weapon. He spends time maintaining it because failure to do so may cost him his life or the lives of his fellow Soldiers. The same is true with other equipment such as vehicles, protective clothing, and detection devices.

The rules outlined in this article are not all-inclusive, but they provide insight into what is needed to successfully accomplish a mission. CBRNE leaders should consider these rules a guide to success—success for leaders and success for Soldiers! 🎯

Endnotes:

¹George S. Patton, Jr., *War as I Knew It*, Houghton Mifflin Company, 1947.

²Major General Guy S. Meloy, “Reflections of a Former Troop Leader,” *ARMY Magazine*, 1 August 2003.

Colonel Haraburda is a USAR officer and the Commander of the 464th Chemical Brigade. He has a doctorate degree in chemical engineering from Michigan State University and is a graduate of the U.S. Army War College.



Army Leadership: A Personal View

By Lieutenant Colonel Wayne Larry Dandridge (Retired)

Leadership is taking the point position when your unit or flight is expecting contact with the enemy. Leadership is flying a crippled bomber to the ground when a wounded crew member cannot bail out. Leadership is keeping your young Soldiers, Marines, Airmen, Sailors, and Coast Guardsmen alive and never leaving wounded behind. Leadership is writing a dead comrade's family a personal letter immediately following a battle.

Leadership is not glorifying war. Leadership is not doing "anything" just to get promoted. Leadership is not winning the battle at all costs, nor is it losing a war to avoid casualties. Leadership is not found in the security of a well-fortified command bunker, nor is it found in a plush officer field mess.

Leadership allows for no compromise in the integrity of one's word, deed, or signature. Setting high standards and seeing that they are met; applying intelligence, dedication, creativity, and selflessness; and employing stamina, vigor, commitment, and drive for self-improvement—these are key factors in leadership. Spontaneous enthusiasm is contagious.

Leadership is rewarding a Soldier, Sailor, Airman, Marine, Coast Guardsman, or Civilian with the appropriate recognition immediately after exceptional service. Leadership is commanding and managing with professionalism and establishing and meeting, by priority, specific objectives. Leadership is managing by exception, using job enlargement, and seeking job enrichment.

Believing in God, family, and country—in that order—is leadership. Being humanistic is leadership. Trusting the ideas and decisions of well-trained troops is leadership. Knowing where the mission is, when the troops and material are to be there, and how many troops and systems are needed to win is leadership. Blocking out periods of "private time" to accomplish creative work and recharge—that is leadership.

Leadership is treating men and women equally without regard to race, color, creed, religion, age, or custom. Leadership is learning the language, culture, and customs of a host country. Leadership is knowing and living by the Constitution, the Code of Military Conduct, the Geneva Convention, and the basic human rights of all mankind. Practicing assertiveness, not aggressiveness when dealing with peers and subordinates is leadership. Leadership is

neither ruthless nor mindless discipline, but the ability to do the right thing at the right time—putting the whole before the parts. Leadership is not a good efficiency report or paper readiness. Leadership is not a court-martial for every mistake or leniency for serious

violations. A leader must be fair, predictable, and consistent.

Giving sound professional advice to a superior, even when you know he or she does not want to hear it—that's leadership. If you have given your best advice and followed all legal, moral, and ethical orders (even when you do not agree with them), you have accomplished effective leadership. Leading when you can, following when you should, and getting out of the way when you have nothing to offer is leadership.

Leadership is the general who knows the friendly and enemy situations, the immediate action sequence for the M16 rifle, his driver's first name and family information, and the words to the Lord's Prayer. Leadership is the private who knows that he or she is in the chain of command and will have to take over when senior in rank. Leadership is knowing that a water truck in the desert is worth more combat power than an extra armored cavalry regiment.

Remembering that the past is our heritage, the present is our challenge, and the future is our responsibility—that is leadership. Staying in top physical condition—maintaining your weight, not smoking, saying no to

Leadership allows for no compromise in the integrity of one's word, deed, or signature.



drugs, and not drinking alcohol in excess—is leadership. Delegating authority, commanding confidence and respect, and accepting full responsibility for your actions is leadership. Ingenuity, sociability, tact, and tenacity are leadership.

Leadership is not being right all the time, and it is certainly not being wrong most of the time. Leadership does not place blame; it fixes problems. Leadership is adaptability, appearance, cooperation, and decisiveness. Leadership displays knowledge, manages resources efficiently, and plans beyond the immediate requirements of assigned duties. Leadership creates an organization of mutual respect. Leadership is building an organization and environment where it is not necessary to tell troops what to do. Leaders know that combat without conscience is evil.

A leader knows why there are air, land, and sea forces; why there are cavalry, infantry, armor, artillery, aviation, amphibious, special-operations, pre-positioned, reconnaissance, and logistical forces; and knows why combined arms and the concentration of combat power are important. A leader knows about net-centric warfare, defense in depth, civil affairs, urban operations, and the advantages our forces have at night (and how to use them). A wise leader knows that young Soldiers spend most of their time worrying about and planning tactics, while older, more experienced Soldiers spend the majority of their time worrying about planning logistics.

Leadership can be good or bad, centralized or decentralized, warm or cold, offensive or defensive, macro or micro, or expensive or free. Leadership can be Catholic or Protestant, Jewish or Moslem, Hindu or Mormon, or atheist or agnostic. Leadership prevents the overmobility of junior leaders and troops by keeping them in positions long enough to learn job duties, master common and collective tasks, and perform as team members. Establishing and promoting worker and troop certification and team certification programs are leadership.

Leaders hope and pray for the best and plan for the worst. Leaders know about the need to wage “total war” to win and the special advantages the defender has in cities, mountains, and jungles. Leaders know how to “own the night” and take maximum advantage of combat arms teams, snipers, attack helicopter operators, counterartillery personnel, naval gun/missile fire operators, and close air support personnel. Leaders know not to keep troop

weapons locked up and away but, rather, to train troops to live with a clean weapon that they are an expert with.

Leadership was embodied in Dr. Martin Luther King, Jr., Abraham Lincoln, Pope John Paul II, Robert E. Lee, Winston Churchill, Sister Teresa, and many other well-known figures. But leadership is also embodied in thousands of unknowns.

Commitment to a team and a participatory form of leadership that draws on the knowledge and skills of all personnel—at every level—is leadership. Encouraging and rewarding suggestions and complaints is leadership. Having an open door and remaining open-minded is leadership. Empowering troops, civilian personnel, and support contractors with the tools, responsibility, and authority to

get the tough jobs done is leadership. Making troops multiprocess, multiweapon, and multifunctional experts is leadership. Good leaders practice servant leadership.

Leaders know that “the bitterness of low quality remains long after the sweetness of low price.” Leaders allow talented Soldiers “long tethers” for experimenting. Leaders find ways to satisfy the essential dualism of troops and civil servants to be part of a team and be recognized as individuals. Leaders know how to use internal and external benchmarking, observations, and inspections to rate their organization’s readiness, products, services, and processes against the front-runners in their specialty.

Leadership is guiding. Leadership is legendary. Leadership is foresight. Leadership is absorbent, abstinent and, unfortunately, at times—abominable. Leadership is baccalaureate, balance, basic, and, too frequently, backward and barbaric. Leadership has saved lives, caused casualties and fatalities, stopped wars, and started wars. Leadership has walked softly and carried a big stick, but it has also been loud and nonviolent.

Saying what you do (in clear and concise standing operating procedures, plans, and operation orders) and doing what you say is leadership. Breaking down communication barriers between staffs, line units, support organizations, and sister units is leadership. Asking deep, probing questions and finding root causes is leadership. Changing problems into opportunities is leadership. Knowing that you can seldom wait until you have all the answers is leadership. Repeatedly doing simple things that demonstrate sincerity is leadership.

*Remembering that the past
is our heritage, the present is
our challenge, and the future
is our responsibility—that is
leadership.*



Leadership is honesty, enthusiasm, loyalty, courage, and wisdom. Taking care of your Soldier's, Civilians, Sailors, Airmen, Coast Guardsmen, and Marines (and their dependents) is leadership. Leadership is visiting your wounded and sick frequently. Leadership includes being a good boss, comrade, and friend; father or mother; son or daughter; sister or brother; or husband or wife. Knowing that the profession of arms is much more than just a job is leadership.

Being a champion of safety and quality and an unquestionable friend to the environment is leadership. Basing decisions on facts is leadership. Promoting and rewarding continuous improvement is leadership. Being a champion of safety and quality is leadership. Staying focused on internal customers, external customers, and the enemy is leadership. Performing preventive maintenance, knowing what cellular techniques involve, being skilled in setup reduction, understanding mixed-model methods, understanding rocks-in-the river inventory management, knowing how to level and balance a workload, understanding that distance (to supplies, replacements, ammunition, fuel) is usually detrimental, and ensuring that things are "in time," not "just in time"—is leadership.

Leadership is enthusiasm, optimism, helping, training, encouraging, understanding, motivating, disciplining, crying, laughing, standing firm, giving way, counseling, correcting, giving a second chance, and trying again and again. Leaders are tall, short, thin, heavy, male, female, black, brown, white, yellow, old, young, naturalized, and unnaturalized. Leaders are from the city and from the country. Leadership works hard to close the gap between the potential and the performance of a Soldier.

Knowing how to use teams, flow charts, simple (but powerful) statistical methods, simplification, continuous improvement tactics, complaint and suggestion programs, and standardization to get the tough jobs done is leadership. Leadership makes quality easy to see, feel, smell, taste, and hear by finding root causes and permanently fixing the problem. Leadership is clarifying processes, flow-charting complex processes, and making every troop an expert at common tasks (everyone should be an infantryman first in their career!).

Leadership is caring, compassion, understanding, and leading by example. Leaders look you in the eye, kick you

in the butt, cover your flank, and take your place on the most dangerous missions. Knowing that "there is a place for everything and everything in its place" is leadership. Leadership is admitting mistakes and learning from them. Eating last is leadership. Sharing the pains of heat, dirt, sand, cold, wet, insects, and other harsh environmental conditions is leadership. "Packing your own roll and digging your own hole" is leadership.

Leadership comes from experience, but experience comes from making mistakes. A leader changes the odds and knows the risks. Leaders develop teamwork. The tides, the channels, the seasons, the winds, the hazards, the weather, and the best forecasts are all known by leaders. Leadership knows that there is no end to change except failure. Leadership knows that if you treat every customer like your last or first, you will never have to worry about repeat business.

Leaders often make good grades in school and have many years of formal education and numerous important degrees. But they also have been known to fail math, English, and other equally important subjects. Leaders ensure that the enemy gives his life for his cause. Leaders ensure that their troops always have the tactical advantage, the best training and equipment, the highest morale, and plenty of food and water. Leaders work hard to ensure that the workload is distributed equally among all troops.

Leadership comes from family, friends, teachers, coaches, and pastors. Simple, easy-to-understand orders come from leaders. Complex tasks are changed into short and accurate plans through leadership. Leadership can be learned and taught, but it cannot be forgotten or bought. Leadership can be seen, tasted, smelled, felt, and heard; and it can also come from a blind person with no hands who cannot hear, speak, or walk.

Finally, a leader is so in love with life that he or she is willing to die for the lives and freedom of others and our great Nation! 🇺🇸

Leadership works hard to close the gap between the potential and the performance of a Soldier.

Lieutenant Colonel Dandridge is a certified business process reengineering specialist and the East-region manager and a senior engineer with Westar Aerospace and Defense Group, Incorporated, Field Services Division. He holds a bachelor's degree in aeronautical science and a master's degree in transportation management.



The 23d Chemical Battalion Leader Certification Program

By Captain Meredith Noll

A morning fog rolls into the Naktong River Valley in South Korea. Soldiers position heavy packs on their backs, depart the assembly area, and begin a grueling ascent to the top of Hill 303. The atmosphere is somber. The pace is intense. Battle buddies are helping each other climb the hill. At the top, victory awaits!

Although this could be an entry from a Soldier's personal journal from the Korean War, it is in fact, the capstone event of the 23d Chemical Battalion Leader Certification Program. Alongside the Hill 303 Memorial, the Commander of the 23d Chemical Battalion awards officers and senior noncommissioned officers (NCOs) certificates and coins for completing the program—a program unlike no other in the Chemical Corps.

Throughout the history of the U.S. Army, Chemical Soldiers have been a part of various units' symbols of excellence, to include the Parachute, Air Assault, and Pathfinder Badges; Prop Blast celebration; Order of the Spur; and Ranger Tab. Some Chemical Soldiers have earned all of these. But what has been missing is a symbol of excellence that defines Corps personnel. The 23d Chemical Battalion initiated a leader's certification program to indoctrinate Chemical Soldiers into an organization that symbolizes both distinction and an affiliation with a proud history. This article covers the inception, current operations, and future of the 23d Chemical Battalion Leader Certification Program.

Significance of Hill 303: Fallen But Not Forgotten

On 17 August 1950, scouts from G Troop, 5th Cavalry Regiment, came upon wounded Private Roy Manning on Hill 303. He had been shot in the legs and the arm by a North Korean burp gun and had begun to crawl down the hill. After spotting him, the scouts ascended to his location. As the scouts were treating the private's wounds, he told them of the tragedy that had occurred over the past two days. The men of Heavy Mortar Platoon, H Company, were positioned near Hill 303, along the Taegu Front on 15 August when the platoon leader became aware of enemy activity in the area of operations. The lieutenant

received communication from his commander that 60 Republic of Korea (ROK) soldiers would reinforce the mortar platoon. Later that day, Korean soldiers appeared along the slope and a patrol was sent forward to link up with the reinforcements. It was not until the red stars were visible on the Koreans' caps that the Americans realized they were not the reinforcements but, rather, the enemy. The North Koreans easily took the stunned Soldiers' weapons, tied their hands behind their backs, and forced them to walk over rough terrain without boots. One Soldier was even tortured with a can opener in an open wound. On 17 August, the North Koreans began receiving indirect fire from American artillery and air strikes. Unable to hold their position or continue to keep their prisoners, the North Koreans fired into a ditch where they kept the bound Soldiers. This heinous act killed 40 men and wounded 5. When the scouts arrived at the top of Hill 303, they saw the massacre. "The boys lay packed tightly, shoulder to shoulder, lying on their sides, curled like babies sleeping in the sun. Their feet, bloodied and bare, from walking on the rocks, stuck out stiffly. . . . All had hands tied behind their backs, some with cord, others with regular Army issue communication wire. Only a few hands were clenched."¹ The five Soldiers who survived did so by hiding in the ditch under their murdered comrades. One Soldier was even able to remain still as a North Korean shot into the ditch a second time, hitting him in the arm and leg.

The atrocities on Hill 303 caused General Douglas MacArthur to send a broadcast and distribute leaflets to the Commander-in-Chief of the Armed Forces of North Korea. "Inertia on your part and on the part of your senior field commanders in the discharge of this grave and universally recognized command responsibility may only be construed as a condonation and encouragement of such outrage, for which, if not promptly corrected, I shall hold you and your commanders criminally accountable under the rules and precedents of war."²

The Korean War is known to many as the "Forgotten War." And that was true for the men of Heavy Mortar Platoon, H Company, 5th Cavalry Regiment. The Veterans



Leadership of the 23d Chemical Battalion at the Hill 303 Memorial during the first leadership certification program ceremony (in 2001)

of Foreign Wars (VFW) Post 10033 in Taegu, South Korea, built a memorial on Hill 303 to honor the Soldiers involved in the tragedy. The memorial contains five posts (one for each Soldier who survived) encircled by a chain containing 40 links (one for each Soldier massacred). On 20 June 2000, the memorial was commemorated with two of the survivors present, one of which was Private Manring. The Hill 303 Memorial will ensure that fallen Soldiers of the Heavy Mortar Platoon, H Company, are not forgotten.

History of Leader Certification: From Korea to Afghanistan

The history of the Leader Certification Program began in 1999 at Camp Carroll, South Korea (the home base of the 23d Chemical Battalion since 1988). Colonel Michael Bolluyt (Chief of the Requirements Determination Division at the U.S. Army Maneuver Support Center), while serving as Battalion Operations and Training Officer (U.S. Army) (S3) under the command of Colonel Greg Olson (currently the Assistant Commandant of the U.S. Army Chemical School), initiated research into Hill 303 and how it related to the Korean War. The 23d Chemical Battalion wanted to honor the fallen Soldiers by ascending the same hill that the Soldiers of the Heavy Mortar Platoon did in 1950.

In 2001, Colonel Al Swanda (currently the Defense Attaché to Thailand) conceived the Leader Certification Program and was the first battalion commander to execute the program planned and developed by his battalion S3, Lieutenant Colonel James E. Bonner (currently Commander of the 23d), and executive officer, Lieutenant

Colonel Ron Fizer (currently a strategist for the Chief of Staff for the Army Staff Group). The culminating event: a rucksack march up Hill 303 where, at the top, while overlooking the Naktong River Valley, the leaders of the 23d Chemical Battalion were awarded the battalion coin and Chemical Corps Branch Insignia adorned with “23.”

As Colonel Bill Barnett (currently the Commander of Pine Bluff Arsenal) took command of the 23d in 2002, he carried on the tradition. However, this time he included the leaders of the 13th Chemical Company (Biological Integrated Detection System [BIDS]), 2d Chemical Battalion (who were forward-deployed to South Korea with the 23d). When Lieutenant Colonel William E. King IV (currently attending the Industrial College of the Armed Forces) was in command from 2004 to 2006, the 23d Chemical Battalion was restationed in the continental United States and the Leader Certification Program was transformed for the great Pacific Northwest. The rucksack march occurred at Solo Point (a beach in Washington State where the Puget Sound meets Fort Lewis) and included two separate 30 percent grades that demanded great endurance and stamina from participants.

When Lieutenant Colonel Bonner assumed command of the 23d in 2006, he felt that the program should be expanded to include all battalion Soldiers, not just leaders. He visualized the program not as a “rite of passage” for the leaders, but as a qualification consisting of all the skills necessary to perform in a chemical unit (much like the Expert Infantryman Badge [EIB] and Expert Field Medics Badge [EFMB]). Those who completed the program displayed the skills to perform the Soldier and leader tasks necessary to fight and win in wartime. One of the most intense components of the newly developed qualification was Level 1 combative certification (conducted at the battalion’s Lion’s Den Academy, one of two certified academies on Fort Lewis). The five-day, concentrated course honed in on warrior tasks for Soldiers and leaders by building confidence in hand-to-hand combat skills. The latest amendment occurred when the battalion deployed for Operation Enduring Freedom (OEF) 06-08 in support of the 82d Airborne Division. The battalion leadership recognized this deployment as certification, and all Soldiers and leaders who deployed received the 23d Chemical Battalion belt buckle.

Why Leader Certification?

Colonel Swanda (Commander of the 23d from 2000 to 2002) understood that with the limited number of leadership positions for Chemical NCOs and officers, there needed to be a baseline of training to certify these leaders. This was done to ensure that Soldiers were

able to conduct wartime missions proficiently. Colonel Swanda envisioned a standard qualification test to certify that leaders possess the necessary technical and tactical skills. He compared the Leader Certification Program to mechanized infantry and armor Table VIII and Table XII training, keeping in mind that leaders need to be knowledgeable with their equipment and confident in leading in combat. He wanted to make the certification physically and mentally challenging—a test of stamina and mental endurance. The company grade officers were also required to conduct a book review from the battalion commander's reading list (a selection of books ranging from basic military history to the Korean War to nuclear, biological, and chemical warfare [past and present]).

Components of the Program

There are five components that encompass the Leader Certification Program. All components contain skills in which Chemical Soldiers and leaders need to be proficient—skills where leaders are confident in their abilities and Soldiers are confident in their leaders, with the unit functioning as a cohesive team. The certification program consists of—

- Core requirements, including officer and NCO evaluation report counseling sessions (initial and annual) for Soldiers and attendance at the battalion newcomer's briefing.
- Individual training requirements, including an Army Physical Fitness Test event, a 4-mile run to be completed in 36 minutes, weapons qualification, common-task training, combat lifesaving-skills certification, communications equipment use, preventive-maintenance checks and services certification, unit equipment and confidence/obstacle course licensing, and Level I combative certification.
- Field training exercise (FTX) requirements, which include at least one battalion, company, or platoon level exercise; proficiency on weapons employment and organic communication; technical and tactical chemical, biological, radiological, and nuclear (CBRN) tasks; and the employment of navigation equipment.
- Professional development requirements, which include developing a risk assessment based on a tactical scenario; understanding the battalion commander's vision, philosophy, and training guidance; and understanding the battalion and brigade missions/mission-essential task list requirements.



A Soldier receives the 82d Airborne Patch during a ceremony in February 2007.

- Lion Pride participation, including the capstone event of a 10-kilometer road march that incorporates dismounted land navigation, weapons assembly, call-for-fire, communication skills, CBRN skills, and medical tasks. The Lion Pride events are executed over a three-day period and consist of intense and rigorous testing similar to EIB and EFMB qualifications.

The Belt Buckle

With the transformation of Army uniforms from the battle dress uniform (BDU) to the Army combat uniform (ACU), Lieutenant Colonel Bonner transformed the 23d Chemical Battalion insignia concept into a belt buckle. This allowed Soldiers and leaders in the battalion to wear the symbol of excellence—a symbol of Soldier integration and unity—long after their departure from the unit. The belt buckle—designed and developed by Lieutenant Colonel Bonner, Major Daryl Hood



A Soldier demonstrates combative techniques at the Lion's Den Academy.



23d Chemical Battalion belt buckle

(U.S. Army Central Command), and Command Sergeant Major Matthew Barnes (23d Chemical Battalion)—is ornamented with the coat of arms containing symbols of the battalion’s operations during World War II and the Korean War, majestic Mount Rainier (a representation of the battalion’s current location in Washington State), and the battalion translation (from the Korean motto “*moong chi ja*”) of “two joined as one” (a tribute to the battalion’s service in the Korean Peninsula, 1950–1954 and 1988–2005). On the back of the buckle, the battalion’s campaigns are displayed—from the beaches of Normandy to Afghanistan (a total of 15 campaign streamers), two ROK Presidential Unit Citations, and two Meritorious Unit Commendations. Upon the completion of OEF, the belt buckle will be updated to include a third Meritorious Unit Commendation and a 16th campaign streamer. It will also encompass additions to the Distinguished Unit Insignia and Coat of Arms.

Certified Leaders

Many Soldiers who served in the 23d Chemical Battalion in Korea were leader-certified on top of Hill 303 and have carried on a legacy of leadership and commitment. Command Sergeant Major Alston (currently the Regimental Command Sergeant Major) received his certification on Hill 303 in 2001, along with Colonel Swanda, Lieutenant Colonel Fizer, and Lieutenant Colonel Bonner. There are others who were previously certified, returned to the unit to serve, and have since received the belt buckle: Major James Conner (currently the 23d Chemical Battalion S3) earned his certification in 2003; Captain Erick Velasquez (currently Commander of the 62d

Chemical Company) received his certification in 2004.

Under Lieutenant Colonel Bonner, the 23d began an honorary certification in appreciation for the development of Soldiers and leaders of the battalion as well as the outstanding support that leaders have provided the battalion. The first inductee was Colonel Victor Petrenko, Chief of Staff, 82d Airborne Division, for his support of the 23d Chemical Battalion while the unit served at Bagram Airfield, Afghanistan (in support of Combined Joint Task Force [CJTF] 82).

Future of the Leader Certification Program

As the 23d Chemical Battalion returns home to Fort Lewis, the Leader Certification Program will be open to all CBRN Soldiers on the installation. The battalion looks forward to integrating not only the 48th Chemical Brigade and 20th Support Command subordinate units (110th Technical Escort Battalion and 3d Explosive Ordnance Battalion), but also CBRN Soldiers in the Stryker Brigade Combat Teams, 2d Ranger Battalion, 1st Special Forces Group, and all other major subordinate commands at Fort Lewis. As the Leader Certification Program continues, more CBRN Soldiers will earn the coveted belt buckle and be united in history. 🇺🇸

Endnotes:

¹Charles and Eugene Jones, *The Face of War*, pp. 45–49.

²“Massacre at Hill 303,” *Time Magazine*, 28 August 1950.

Captain Noll is the commander of Headquarters and Headquarters Detachment, 23d Chemical Battalion.



The 23d Chemical Battalion belt buckle is awarded to a Soldier during a ceremony in Bagram, Afghanistan.

Chemical Soldier Rises to the Top

By Second Lieutenant James Lee



During the annual Fort Lewis Army Ball on 14 June 2007, the 23d Chemical Battalion proudly watched as one of its own—Specialist Blanca Cedeno—was selected as the 2007 I Corps Soldier of the Year. Specialist Cedeno attended countless boards, perfected her warrior tasks and skill sets, and immersed herself in military academics to emerge as the top Solider.

Selection for Soldier of the Year is a career-altering distinction—an honor that singles out a Soldier not only for mission accomplishment and Class A accoutrements but for sterling exemplification of the Army values, particularly selfless service. Sergeant First Class Carlos Cerritos, Specialist Cedeno's platoon sergeant said that "The highest standards aren't put on them by others . . . The Soldier engenders them from within."

Although Specialist Cedeno's actual time in the Army will be short, her journey has been long. Born and raised in the Dominican Republic, her original ambitions in the tourist industry changed when she relocated to the United States. "Everything happened so quickly—9/11, Army commercials, calling my recruiter," said Specialist Cedeno.

Despite having U.S. residency prior to moving to Massachusetts, Specialist Cedeno's English was rudimentary, at best. At 35, she was also much older than the average enlisted Soldier. "I focused twice as much [and] worked twice as hard to be the same as everyone else, to do something as simple as receiving orders," said Specialist Cedeno. Out of necessity, she became acutely observant and attentive to detail. Her English improved; and coupled with her work ethic, she quickly distinguished herself from her peers. Specialist Cedeno started noticing Soldiers half her age trying half as hard and not meeting the standards, which sparked her confidence and added a competitive edge. She spent her free time running long distances and reading field manuals. "Once she started going to boards," said her squad leader, Staff Sergeant Antonilius Davis, "there was no stopping her."

Despite the publicity and awards for being selected as Soldier of the Year, Specialist Cedeno's achievements remain personal. Her father, Mark Antonio Cedeno, served in World War II with the 101st Airborne Division. Her brief visits to the United States as a teenager were with her father to attend reunions for the 101st. She credits him with her desire to be part of a team, her discipline, and her belief that true character reveals itself on the job. "He (her father) died before I joined (the Army), when I was much younger," Specialist Cedeno said, "I feel close to my father by being a good Soldier."

Specialist Cedeno went on to compete in the U.S. Army Forces Command Soldier of the Year competition at Fort Bragg, North Carolina, where she placed as first runner-up. The competition featured tests on drill and ceremony, battle focus, and weapon assembly. Upon returning to her unit, Specialist Cedeno was awarded the Army Commendation medal, a dress blue uniform, a gold watch, an antique musket, and numerous gifts and monetary prizes. And through it all, Specialist Cedeno did not lose sight of future challenges. "I am not satisfied with what I've learned and accomplished," she stated matter-of-factly, "I am still not even half the Soldier that I want to be." 

Second Lieutenant Lee is the platoon leader for the 62d Chemical Company, 23d Chemical Battalion.

RESERVE UNIT TRAINS ON BIDS

By Sergeant First Class Craig Pickett

The sun set over the Mojave Desert at Fort Irwin, California, as the Army Reserve Soldiers of the 375th Chemical Company set up operations for participation in Operation Sand Castle (OSC).¹ The company ensured that Soldiers at Forward Operating Base Santa Fe were safe by detecting and reporting any biological agents in the night air. The Chemical operations specialists participated in OSC as part of their three-week annual training.

OSC is an exercise designed for Army Reserve engineers to execute construction and support missions in a fully tactical environment, part of a 10-year project to improve the National Training Center (NTC). The

375th was tasked with integrating engineer operations and acting as resident experts on chemical attacks. The mission provided the company with a tactical scenario that trained Soldiers to operate in a desert environment; however, most of the engineer Soldiers didn't see much of the Chemical Soldiers because the agents were deployed at night.

The company's 2006 annual training (conducted in Utah) was more technical and dealt with testing new equipment and working with the other services. Soldiers spent most of their time in mission-oriented protective posture (MOPP) gear. In 2007, the Soldiers from the 375th worked extensively with the Biological Integrated Detection System (BIDS)—a self-contained system mounted on a high-mobility, multipurpose wheeled vehicle (HMMWV) and used to monitor the air and record data.

Soldiers on a BIDS team operate on a twenty-four hour rotation in support of a battalion. "Once [*sic*] something is detected, we call battalion and inform them. At that point, everyone goes to MOPP level four," explained a Soldier from the 375th. At the same time, the BIDS collected and recorded all pertinent data regarding potentially deadly agents. A vial was filled with an air sample, sealed, packaged, and evacuated to a lab where it was analyzed to identify the contents and possible source. "When there is a hit, it is much like a urinalysis sample," said the Soldier from the 375th. The Soldiers took similar steps to ensure that chain-of-custody procedures were documented and never broken.²

The BIDS team in the field continued to monitor the air until it was deemed breathable and then notified the battalion when declaring the all clear. The operations officer and acting commander for the mission felt this was the capstone of all battle assemblies for the 375th Chemical Company. "It's more of a tactical operation that is incorporating everything."

The Soldiers of the 375th were living and working in a field environment, learning much about each other as they spent time together. From eating chow served from a mobile kitchen trailer to pulling guard duty through the night, no training opportunity was missed. For some,



Soldiers from the 375th Chemical Company set up camouflage netting on the BIDS.

this was their first experience in the desert; for others, it was their first field training. One of these Soldiers, a private from St. Louis, summed up the exercise very simply: "I love the 375th; we're like a family. . . . I like doing BIDS, the work is exciting." 🎧🎧

Endnotes:

¹Each month throughout the year, Reserve Soldiers train on one or two tasks.

²It is crucial that personnel follow chain-of-custody procedures when processing a sample, as legality issues may be a factor if prosecution is deemed necessary.

Sergeant First Class Pickett is a member of the 350th Mobile Public Affairs Detachment, a Reserve unit from Indianapolis, Indiana.



Two Soldiers set up the communications system while others prepare the inside of the BIDS for night operations.



2008 Nominations for the Hall of Fame and Distinguished Member of the Corps Honors



Nominations are being accepted for the Chemical Corps Regimental Association (CCRA) Hall of Fame and Distinguished Member of the Corps honors.

- ⚔ **Hall of Fame.** This award is extended to Chemical personnel (living or deceased) who have spent their professional careers serving the Chemical Corps. Their service to the Corps must be extraordinary.
- ⚔ **Distinguished Member of the Corps.** This award is extended to living members who served the Corps in their professional lives and continue to serve it in their personal lives. Active Army military and current federal civilian personnel are not eligible for the program. The nominations are

limited to personnel who have been retired for at least two years.

For nomination criteria and submission requirements see <<http://www.chemical-corps.org/honors>>. Nomination packets should be sent to:

Commandant
U.S. Army Chemical School
Regimental Historian
ATTN: ATSN-CM-CS-H
Fort Leonard Wood, MO 65473-8926

All packets must arrive before 5 May 2008. For more information, call (573) 563-7339 or e-mail <david.chuber@us.army.mil> or <christy.lindberg@us.army.mil>.



Army to Get More Stryker NBC Recon Vehicles

By Mr. C. Todd Lopez

Army News Service, 20 December 2007—The Army now has authorization to purchase 95 more Stryker nuclear, biological, and chemical reconnaissance vehicles, in addition to 10 already in Iraq and several others used for testing and training.



A Soldier from the 84th Chemical Battalion, Fort Leonard Wood, Missouri, discusses the capabilities of the Stryker NBCRV at the Pentagon on 19 December 2007.

During a press conference 19 December at the Pentagon, Brigadier General Thomas W. Spoehr, Chief, U.S. Army Chemical Corps, said existing NBCRVs have proven important for Army commanders in the field and that the Army requested and received approval to purchase more of them.

“The Stryker NBCRV represents a powerful tool for commanders to protect U.S. interests from weapons of mass destruction,” Brigadier General Spoehr said. “And this month, after careful consideration, the Department of Defense gave the authorization for 95 more Stryker NBCRVs.”

For now, the NBCRV is in low-rate initial production, but the Army eventually hopes to have as many as 355 NBCRVs.

The Stryker NBCRV is an NBC testing lab on wheels. It is intended as a replacement for the Fox NBC Reconnaissance System and demonstrates improvement in several key areas over the Fox. It also provides improved communication to ground commanders, said Brigadier General Spoehr.



The Stryker NBCRV (displayed recently at the Pentagon) is an NBC testing lab on wheels.

“The Stryker NBCRV represents a vast increase in capability over its predecessor, the Fox, in terms of biological sensing, accuracy, speed, lethality, survivability and digital communications—it is a true leap ahead,” he said. “The Stryker NBCRV gives combatant commanders an unmatched capability to sense, mark, and warn U.S. forces about weapons of mass destruction threats in near real time.”

The NBCRV, as a moving NBC sensor, provides to ground commanders information about where it is safe to move their Soldiers. The vehicle could be used, for instance, to determine the safest route for troop movement or for supplies.

Specialist Christopher A. Case, a chemical operations specialist with the 23d Chemical Battalion, Fort Lewis, Washington, was on hand at the Pentagon to discuss the capabilities of the NBCRV and to enlighten civilian press about the features of the vehicle. He says he believes the Army was right to ask for more NBCRVs.

“This is a good vehicle, with a lot of sensors and a lot of capability,” he said. “It can run in multiple situations and purposes. For example, one of the better capabilities it has over the Fox is the weapons system. Instead of being mounted and outside of the vehicle, you have a remote weapon system. You sit inside the vehicle with a joystick and aim a .50-cal machine gun. At the same time, you remain protected inside a pressurized compartment even if there is a chemical environment on the outside.”

The NBCRV features a suite of nuclear, chemical, and biological sensors that enable it to test for a wide range of contaminants that could prove hazardous for ground troops. One such feature is a set of two tiny rubber wheels on robotic arms that roll along the ground behind the vehicle. As the NBCRV moves, the wheels automatically

lift up off the ground and transfer to an external sensor any dust they have accumulated. In turn, the sensor determines if that dust contains any potential contaminants. The effect of such a sensor is that the vehicle doesn’t have to stop moving to do spot checks along a route.

“While we are rolling down the route, the wheels come up to the probe, then it gets vaporized and put into a sensor,” Specialist Case said. “So instead of having to stop each time, we can keep rolling until we get a hit.”

Another feature of the NBCRV is its automated connection to a larger communications grid. That connection makes the vehicle a moving, net-centric warfare enabled sensor that can clear routes for ground troops or alert commanders to places where they shouldn’t send their Soldiers without appropriate protection.

“When this thing runs into a contaminant, it plugs that information into a preformatted message without anybody even touching it,” Brigadier General Spoehr said. “It includes weather data, the time, and the location in that message. The vehicle commander simply needs to press a button and that information is out there on the grid for everybody else to see. All you have to do is push one button and a ground or operation commander’s situational awareness will be populated with knowledge of that hazardous material.”

Being able to put that kind of information on tap for commanders is what makes the NBCRV a key component in ensuring Soldiers remain safe and effective while executing their mission, Brigadier General Spoehr said. 

Mr. Lopez is a staff writer for the Soldier Media Center.



A Soldier from the 23d Chemical Battalion, Fort Lewis, Washington, was on hand at the Pentagon, 19 December 2007, to discuss the capabilities of the Stryker NBCRV.

The Warrior Scientist: Preparing Today for Victory on Tomorrow's Battlefield

By Mr. Gene Weinreis

The chemical personnel—the new chemical, biological, radiological, and nuclear (CBRN) Warrior Scientists—of today are influenced by the Chemical warriors of the past. These Chemical Soldiers, Airmen, Marines, Sailors, and Department of Defense (DOD) civilians and contractors will step forward, as never before, to play a key role in defending our freedom. All will play a part as we fight the War on Terrorism (WOT) against very resourceful and dedicated enemies that use all means at their disposal to hurt the free world. They have attacked many times in the past and will continue to do so until they exhaust their resources or we stop their followers.

The threat changes daily. And Warrior Scientists are constantly changing to counter these threats on the modern battlefield. With the use of chlorine (and even the recent finding of nitric acid) on the battlefield, the free world is faced with new and changing situations. But the desired end result of our enemies remains constant: Kill people and cause destruction and chaos. With changing and emerging tactics, U.S. forces will come to the battlefield well prepared and trained to fight resourcefully. With the use of technology, we possess a fighting edge. But we must keep in mind that our enemies also know how to use technology. We must be prepared for the unexpected, know what to do in each situation, and defeat the enemy (preferably on their home front) before they strike.

Our Warrior Scientists are a self-contained, sustainable, lethal force organized with full-spectrum capabilities to combat a range of missions. The U.S. Army Chemical Corps Vision—"A Corps and Army capable now of countering the entire range of CBRN threats and effects to protect our Nation, operating seamlessly with military and civilian partners, while conducting simultaneous operations from civil support to war"—could not be more fitting. Each Chemical warrior is more adaptive, competent, confident, and technically and tactically proficient. We adapt quickly and may soon see the "E" for "high-yield explosives" added to CBRN because many agents are precursors to weapons of mass destruction

(WMD) or can be transitioned to include explosive properties.

The threat of toxic industrial chemicals (TICs) and toxic industrial material (TIM) on the battlefield or in the CBRN operational environment is a reality. All personnel must be aware of and be able to survive in a potential CBRNE environment. Commanders, as never before, must deal with this growing and menacing threat. Maneuver commanders must know information about areas suspected or confirmed to be contaminated. Some of these potential contaminated areas may include—

- Clandestine, illegal drug-manufacturing sites.
- Lakes with runoff from industrial complexes.
- Bodies of water or land suspected of sabotage.
- Debris from cargo aircraft, truck, car, or railroad accidents.
- Illegal toxic-waste sites found on battlefields.
- Large industrial spills found along avenues of commerce transportation.

TICs and TIM are everywhere. The automotive and cleaning aisles in department and grocery stores have changed forever because of the chemical properties in these products. The list of products includes—

- Antifreeze.
- Brake fluid.
- Chlorine bleach.
- Lawn chemicals.
- Kerosene.
- Old propane tanks.
- Paints.
- Pesticides.
- Prescription drugs.
- Solvents of all types.
- Spot removers.
- Toilet bowl, drain, and oven cleaners.

How many of these items are in your home—perhaps in your garage or under your kitchen or bathroom sink?

The improper use or mixing of common household cleaning products can cause serious injuries. For example, several years ago, a janitor at a grocery store showed how his hands were peeling large amounts of skin daily. He had not worn protective gloves while using an industrial-type cleaner on shelves and floors. The threat from these products is real! When comparing the hazards of TICs and TIM versus chemical-weapon agents, the threats are the same: ingestion, inhalation, and skin contact hazards.

Another area of great concern is the use of chemicals in illegal methamphetamine labs. Methamphetamine is very easy to make; the ingredients used are available in local stores in any neighborhood. The chemical products and substances used to make methamphetamine number in the hundreds, including combinations of volatile organic compounds, acids, bases, metals, salts, and solvents. In addition to the obvious risks associated with methamphetamine, mixing these chemicals can produce chemical fires, explosions, and toxic gases. There is a constant danger to the skin and respiratory tract of everyone who comes in contact with the materials in these clandestine labs. Today's Warrior Scientist dons personal protective equipment and safely enters these sites to conduct sampling, detection, and decontamination operations (to name just a few). Warrior Scientists must know the general characteristics of methamphetamine and the dangers associated with illegally manufacturing the substance. The correct handling and reporting of suspected lab locations and the use of sensitive-site assessment functions are critical to the missions.

In the WOT, the Army is faced with developing policy to establish shorter training periods for our troops. Analyses, planning, and preparations must center on the risks posed by many threats, including—

- Industrial manufacturing complexes (such as those that manufacture fertilizers, herbicides, insecticides, and petrochemicals).
- Nuclear facilities (laboratories, medical research, and power plants).
- Chemical and biological research laboratories.

Many of these facilities are situated near populated urban areas. The overall goal of the Warrior Scientist is to protect and defend the population in all communities. Warrior Scientists are responding to many of these emergencies as members of local first-responder units.

By remaining adaptable, Warrior Scientists are constantly using technology to their advantage. Defense tactics can be changed as quickly as the enemy develops

new tactics. The Internet makes that knowledge readily available, but the Warrior Scientist must be prepared to act immediately to save lives and end the threat. The Chemical Corps provides that joint, interdependent, and well-trained force in the contemporary operational environment of today!

One critical tactic that is developing into a finer art of preparedness in the United States is the emergency response to CBRN incidents. During any form of emergency response that involves a large land or water area, first responders must inform the public of the necessary safety responses. From the start, commanders at CBRN incidents must look at the full range of response possibilities. Proper evaluation by incident commanders and first responders determines the effectiveness of evacuation or in-place protection operations. These incidents could occur because of natural disasters (as we experienced in New Orleans during Hurricane Katrina) or terrorist attacks (such as the events of 11 September 2001). Potential attacks or natural disasters must be viewed from a global, strategic mantle to prepare for future operations; the safety of U.S. citizens rests on well-planned response operations in **all** situations. Incident commanders must isolate identified hazard areas and deny entry to personnel who are not part of emergency response operations. Unprotected personnel should not be allowed to enter the contaminated areas (hot zones). This restriction is vital to gain control over the areas of operation. The initial missions of the first responders require isolation in all directions of the contaminated areas, protection of the areas, and measurement of wind speeds and directions. The graphic on page 22 is just one possible solution for countering terrorist incidents or industrial accidents.

The First Lieutenant Terry CBRN WMD Responder Training Facility was dedicated at Fort Leonard Wood, Missouri, on 26 June 2007. This facility serves as a CBRN individual-response certification and training center for Chemical Soldiers, other service members, and DOD civilians. The facility parallels numerous capabilities found at the Combat Training Centers by using state-of-the-art classrooms, instantaneous feedback from video surveillance systems located in the decontamination bays, realistic urban training areas, a cave complex designed to simulate confined-space operations, and an emergency response area that includes an overturned tanker and railroad cars. The training at the Terry Facility simulates what hazardous material (HAZMAT) technicians, incident commanders, branch and local officers, safety officers, and other response specialists will face in future missions.

It is important that all training (officer and enlisted) at the U.S. Army Chemical School mirrors the contemporary

operational environment of the future. The CBRN training we provide our Soldiers today will affect the future of our Nation. A good example is the Chemical Captain's Career Course, where not only chemical and biological defense is stressed but also nuclear, radiological, and HAZMAT defense. The rules and regulations associated with incident response information are vital to the incident commander. He must know how to address each incident.

All career management field (CMF) 74 personnel are now CBRN Soldiers. CMF training prepares personnel to face CBRN hazards in the contemporary operational environment of tomorrow. Currently, all upper-level courses at the Chemical School end in some form of practical exercise (such as field training exercises or command post exercises). Many of these exercises open the eyes of the participants, in many ways, for years to come by presenting Soldiers with a what-if scenario—a glimpse into possible future threats. More direct multibranch, multiechelon, joint-service training scenarios are in the works to fight the WOT. In fact, a multinational scenario is not out of the question but, rather, may become a part of the solution. Time will tell if these multilevel exercises will extend from the military to local and state civilian organizations.

Former President Calvin Coolidge stated that "The meaning of America is not to be found in a life without



First Lieutenant Terry CBRN WMD Responder Training Facility

toil. Freedom is not without a great price; it is maintained by unrelenting effort."² Freedom has never been free! The Chemical Corps' motto—*Elementis Regamus Proelium*—means "We Rule the Battle by Means of the Elements." This is a fitting definition of the Warrior Scientist—the mission yesterday, the mission today, and the mission in the future! The Chemical Corps' motto is a testament to the character, determination, drive, heart, and will of the Warrior Scientist! 🇺🇸

Endnotes:

¹When a TIC or TIM incident is suspected, the minimum safety requirements must be established by the incident commander.

² President Calvin Coolidge, 22 February 1922.

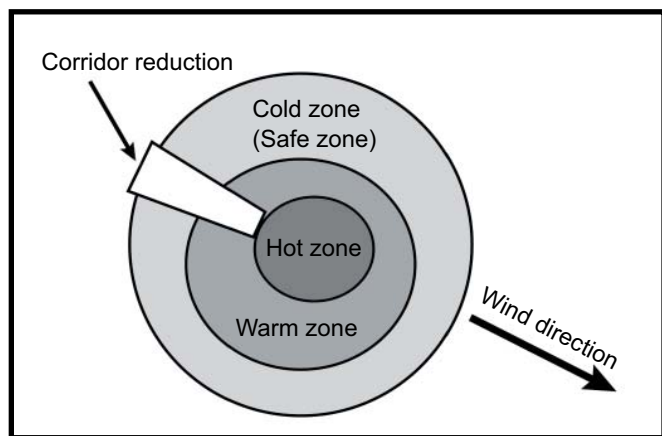
References:

Army Training and Evaluation Program (ARTEP) 3-219-D60-MTP, *CBRN Reconnaissance Platoon (With Digital)*, 11 April 2006.

FM 3-11.19, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance*, 30 July 2004.

FM 3-11.86, *Multiservice Tactics, Techniques, and Procedures for Biological Surveillance*, 4 October 2004.

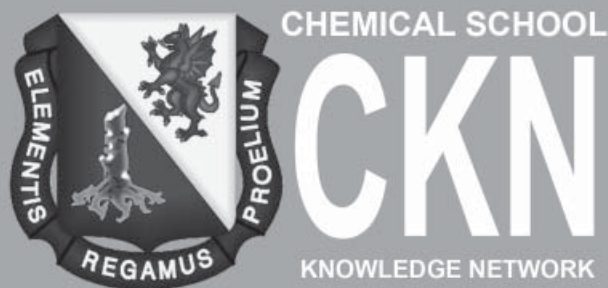
Mr. Weinreis is a training specialist with the Maneuver Support Center, Capability Development and Integration Directorate, Requirements Determination Division, Combating WMD/New Systems Branch, Fort Leonard Wood.



Countering terrorist incidents or industrial accidents¹

ARMY
CHEMICAL
Online
REVIEW

Recent issues of *Army Chemical Review* are now available online at <http://www.wood.army.mil/chmdsd/default.htm>. If you are interested in an article that is not available for download on the Web site, send your request to leon.mdotacr@conus.army.mil. Type "Army Chemical Review" in the subject line, and list the article(s) requested in the body of the message. Include your name, unit, address, and telephone number with your request.



Chemical Knowledge Network Web Site

By Second Lieutenant Eleanor Baldenweck

Did you know that the Chemical Corps has a Web site? I sure did not! But while on temporary duty travel at Fort Leonard Wood, Missouri, I was assigned to a three-person development team and tasked with updating the Chemical Knowledge Network (CKN) Web site. Being a green second lieutenant, I had never heard of CKN; however, I am now certain the Web site will become one of the more important tools in my training arsenal as my Chemical career progresses.

The CKN is an extension of learning aids provided by the U.S. Army Chemical School. The CKN is a strong beginning of what the Chemical School views as an online chemical, biological, radiological, and nuclear (CBRN) resource center available to all members of the Chemical Corps, regardless of duty location or career stage.

Learning for today's enlisted Soldiers and officers does not end with courses at the Schoolhouse (such as Advanced Individual Training or the Chemical Captain's Career Course [CMC3]). The threat of CBRN is only a matter of "when," not "if." Instructors at the Chemical School cover as much material as they can in the time given; an online resource is the perfect accompanying tool for Chemical Soldiers to continue their training development.

Initially, the CKN boasted a healthy array of Chemical resources, including a selection of field manuals (FMs) and standing operating procedures (SOPs). The development team added fresh material to the CKN by the truckload, specifically to the *Staff Tool*, *Community Documents* page. Much of the material is in the form of practical tools (calculators, PowerPoint® presentations, and SOPs). I

worked specifically on the Army publications. Since the CKN had links to all Chemical FMs, I added mostly Army training and evaluation programs (ARTEPs) and technical manuals (TMs) to the already rich cache. For example, ARTEP 3-477-10-MTP, a manual that complements the previously posted FM 3-11.86, fits nicely with the critical task knowledge requirements on biological surveillance—a necessity for captains planning biological detection operations at the brigade level. Another example is Department of the Army Pamphlet (DA PAM) 50-6, a manual used for civil relief operations. I also compiled a list that shows the twenty most toxic industrial materials and where these hazards are most often found. This information dovetails with a new item on the critical task list for officers and enlisted Soldiers: "Provide Technical Advice on Toxic Industrial Chemicals."

Many Chemical leaders, including many who are or were deployed, were asked what sort of information they thought the site should include. Captain Colin Vance, a member of the development team, conducted inquiries with deployed officers and introduced "Leader Material"—a folder full of standard leadership aids good for officers in any branch. These aids included blank forms for leader books, physical training plans, and an eight-step training plan. He also uploaded tools specific to Chemical Corps functions (such as CBRN training and CMC3 information). Materials of special interest include the Soldier/Service Member Radiation Dosimeter presentation; mission-oriented protective posture (MOPP) analysis; and nuclear, biological, and chemical staff book.

Captain Vance drew on his own experience as a Chemical platoon leader to create a point of reference that could make the job of today's Chemical platoon leader easier. As a result, a number of unit CBRN SOPs are now accessible online, creating an alternate avenue of reference for newly arriving Soldiers and, possibly, other units looking for new ideas to incorporate into their own training. With a cross-pollination of ideas, Chemical officers have a solid supply of resources.

Second Lieutenant Travis Cox, fresh from Basic Officer Leadership Course (BOLC) III, was in the perfect position to compile BOLC III information for Soldiers to use as a point of reference. This information included fact sheets and information on smoke operations (including calculators).

The information in the CKN will continue to evolve to best meet the needs of Soldiers. A forum option is available at the site, where members of the Army Chemical community can ask questions, answer questions, and make suggestions for additional improvements to the site. The CKN revision is part of a general update to the curriculum of the Chemical School itself, including a new, more robust critical task list. The tasks taught in BOLC III have been augmented and now number more than 200. The 74D critical task list has also been augmented and now includes more than 100 tasks, mostly focused on hazard response (including equipment familiarity). As already mentioned,

today's CBRN threat is more technologically advanced than ever before. The role of the Army extends beyond protecting troops to defending civilian populations. To marry this combination of missions means more initial training to produce knowledgeable, competent, junior officers equipped with additional skill sets. More robust training means that Chemical Soldiers and leaders will be more technologically proficient. An online resource center is the perfect touchstone for the myriad of tasks necessary to maintain proficiency.

To access the CKN, go to the Fort Leonard Wood Web site <<http://www.wood.army.mil/>> and select *Maneuver Support Knowledge Network (MSKN)* in the lower left-hand corner of the home page. At the Army Knowledge Online (AKO) portal, log in using your user name and password. Under *MANSCEN [Center of Excellence] CoE Links*, select *CBRN*. 

References:

ARTEP 3-477-10-MTP, *Mission Training Plan for the Biological Integrated Detection System (BIDS) Platoon*, 14 April 2006.

DA PAM 50-6, *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*, 26 March 2003.

FM 3-11.86, *Multiservice Tactics, Techniques, and Procedures for Biological Surveillance*, 4 October 2004.

Colonel Robert Eng, "Soldier/Service Member Radiation Dosimeter," presentation, 22 May 2007.

Second Lieutenant Baldenweck is a BOLC student.

Honoring Our Fallen Dragon Soldier



Sergeant Jacob Schmuecker

Hometown:
Norfolk, Nebraska

Unit:
755th Reconnaissance/
Decontamination Company,
Nebraska Army National Guard,
O'Neill, Nebraska

Killed:
21 July 2007



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

Fort Leonard Wood Trains on Emergency Response

By Ms. Allison Choike

Coordination among response elements is a key factor when it comes to emergency response services at Fort Leonard Wood, Missouri. Emergency responders put their coordination skills to the ultimate test during a chemical accident/incident response and assistance exercise on 29 August 2007.

During the exercise (conducted at the former post exchange complex), emergency responders reacted to a simulated hostage and toxic chemical-agent incident. “The exercise involved Soldiers releasing mock chemical agent to a terrorist organization . . . [The agent was] later used on the installation (along with firearms) to take hostages in a public area,” said Master Sergeant Jason Mosher, the observer/controller noncommissioned officer in charge. “Law enforcement [personnel] took control, eliminating the immediate threat and securing the area so that the fire department could decontaminate all those affected. Chemical Defense Training Facility staff then recovered and accounted for the chemical agents that were removed, and medical staff treated simulated casualties . . .”

Soldiers spent months planning and hours preparing for the most important part of the exercise—a realistic scenario. “Realism on the part of all responders in an exercise of this type is very important. Exercises of this nature allow responding organizations to practice working together and pools their abilities to overcome situations they are not equipped to handle on their own,” said Mr. David Schodlatz, a chemical surety specialist. Even the role players—initial-entry Soldiers with little experience in these types of situations—made the exercise more realistic and worthwhile. “I picked the Soldiers for two reasons: First, I needed people that would react like any civilian and not with a regimented response to an emergency. Second, their [the initial-entry Soldiers’] availability. We don’t [sic] want to be training distracters, but there are a number of Soldiers not involved in training on any given day,” said Master Sergeant Mosher.

The exercise, which lasted a few hours, was less challenging than the planning that went into it. “The hardest part for me was keeping it secret while I was trying to coordinate all of the agencies

to participate. In order to have an actual response (instead of a rehearsed one), surprise is necessary,” said Master Sergeant Mosher. But at the end of the day, the time spent on the exercise was rewarding. “The key players stated in the after-action report that they felt the event was the most realistic one that they had participated in . . .,” said Master Sergeant Mosher.

The objective of the exercise, according to Mr. Schodlatz, was to challenge the Directorate of Emergency Services Recapture and Recovery Plan by identifying strengths and weaknesses. “It is only through the challenges of an exercise of this type (where all of the support pieces are present) that everyone in the program can learn from each other and . . . make sure the proper systems are in place.”

Of course, no exercise (regardless of the realistic circumstances) can compare to a real scenario. “Everyone thought the time line was very close to an actual one,” said Master Sergeant Mosher. “Once a real situation develops, it can roll like an out-of-control freight train.”

Ms. Choike is a staff writer for the Fort Leonard Wood *Guidon*.



Soldiers from the 252d Military Police Detachment, Special-Reaction Team remove a suspected terrorist during a simulated hostage situation.

U.S. Army Flamethrower Vehicles

(Part Two of a Three-Part Series)

By Captain John Ringquist

Background

The development of the U.S. flamethrower tank took off during World War II as U.S. Soldiers encountered strong, dug in, defensive positions manned by veteran Japanese and German soldiers. The characteristic that set these tanks apart from others was their armament—fire. Such formidable armament would be relied upon numerous times against flammable and inflammable defenses. The thick fuel of the flamethrower could not only incinerate flammable materials, but could also superheat the air in fortifications, causing defenders to surrender or be incapacitated while seeking protection from the heat. The flame tank could overwhelm embrasures, rendering them liabilities as the flames poured into the enclosed defenders and detonated munitions. While other fortification-reducing weapons required pinpoint accuracy or the firing of numerous rounds to be effective, the effectiveness of the flame tank was immediate. These tanks served the United States well during combat in Asia.

A number of methods were used to produce flamethrower tanks. Flamethrower vehicles were created through custom design or by modifying existing infantry flame weapons. Typically, existing tank chassis were field- or factory-modified.

Medium Flamethrower Tanks

Initially, the M3 Stuart was used as a flame tank in the Pacific. In the Mariana Islands, Marines successfully modified M3A1 light tanks with the Canadian Ronson flame system. However, the small vehicles proved vulnerable. At Peleliu, the 1st Marine Division mounted the improvised Mark 1 system on a thin-skinned LVT-4 vehicle, but again, vulnerability limited the system's effectiveness. The obvious solution seemed to be to mount

the flamethrower on a medium tank.¹ The result was the M4A1 (chosen for the Iwo Jima and Okinawa campaigns). An Army-Navy design team developed the M4A1-POA-CWS-H1 (Marine design M4A3R5), replacing the main gun with a flamethrower that performed much better than the E-3 bow machine gun, station-mounted flamethrower. The flame could be aimed and fired up to 150 yards for 55–80 seconds.² This was a three-fold increase in range and a five-fold increase in efficiency over the U.S.-used, back-pack flamethrowers with 50-yard ranges and 10-second durations.

Improvement in flamethrower accuracy made the weapon more useful and less dangerous to personnel providing support. Still, the risk of flame tanks in the Pacific theater came not from tanks or missile launchers, but from suicide attacks close to tank-infantry support personnel. A brief rundown of H1 variant flamethrower tank losses demonstrates how important infantry support was to the tanks. During the period of 6 April 1945 to



An H1 variant from the 713th Tank Battalion Division burns out a cave in Okinawa on 25 June 1945. (U.S. Army Signal Corps photograph)

25 May 1945, the 713th Tank Battalion sustained damage to 14 flamethrower tanks. Contrary to the sensationalism of Hollywood movies, it was not the fuel in the flamethrower tanks that put the crews at catastrophic risk for explosion; the extremely stable fuel in the flamethrower tanks was napalm. The engine fuel (gasoline) was more flammable than the napalm. Rather, tank losses were attributed to antitank guns (3), land mines (4), satchel charges (2), immobilization (4), and a fall in the ocean (1). Eight of the fourteen tanks were later repaired and returned to action.³

According to Captain Frank C. Caldwell, a company commander with the 26th Marines, “In my view, it was the flame tank more than any other supporting arms that won this battle.” These are heady words for a force consisting of eight modified M4A1 tanks. Bow-mounted flamethrower tanks of the M4A2 series were also used, but it was the M4 H1 variant that instilled great fear due to its accurate fire and range of elevation and depression. The modified M4 H1 models proved ideal against the rugged caves and concrete fortifications of Iwo Jima. The Japanese feared this weapon greatly; time and again, suicide squads of “human bullets” assailed the flame tanks directly, only to be shot down by covering forces or scorched by the main weapon.⁴

Unique among units fighting in the Pacific theater was the 713th Armored Flamethrower Battalion, designed to support ground forces on Okinawa. There were 54 M4A1 H1 variant tanks fabricated in Hawaii by an interservice conversion program. The battalion impacted far more than their numbers. In 75 days of operation, 4,788 Japanese troops were killed; the flamethrower battalion did not lose a single member to enemy fire while fighting inside the tanks.⁵ The 711th Tank Battalion fought with auxiliary flamethrowers mounted in ball machine gun turrets and made a valuable contribution to the battle, but the flexible H1 variant was able to engage targets in a wide range of fire. More utility was provided by the tanks of the 713th when extension hoses and M2-2 flamethrowers were coupled to the tanks so that the tankers could engage caves and fortifications.

There are two M4-series medium flame tanks located at Fort Leonard Wood, Missouri. Their active-service life has been terminated by doctrine, treaty, and tactical obsolescence. One of the tanks is an M4A1 POA-CWS-H1 Sherman flame tank. This version carried an M5-4 main armament flamethrower and was the product of Chemical Warfare Service personnel in Hawaii modifying an M4A1 tank by replacing the 75-millimeter guns with flamethrowers that were housed in main gun barrels. The barrels were cut to install the flamethrower apparatus and then welded

closed—except for the breech, which held the flame gun and the ignition apparatus. Thickened fuel was expelled from the barrel by high pressure, creating a thin stream of highly accurate flame. This design was successfully used in the Pacific theater. This tank is undergoing final restoration efforts and will soon be available for display. The other tank, the M4A1 POA-CWS-H5, was operated by five Soldiers and was armed with both a 75-millimeter cannon and a coaxial M5-4 (E12-7R1) mechanized flamethrower that was developed by the Standard Oil Development Company. The tank could hold 290 gallons of fuel—enough for two minutes of flame or 200 one-second flame bursts—and had a range of 100 yards. For use against infantry, the tank had a secondary armament of a .50-caliber M2 machine gun and two .30-caliber Browning M1919 machine guns. The H5 tank is displayed adjacent to the main gate with several other armored vehicles.

The main armament flamethrower tank looks similar to other M4 tanks on the surface; but when the flamethrower was fired, the concentrated flame stream made it immediately obvious as a flamethrower. When the flame was cut off, the tank returned to the standard M4 tank appearance. The H1, which was a single-barrel tank, suffered from constant Japanese attacks on Okinawa. Personnel from the 713th Tank Battalion noted in an after-action report that the lack of a gun cannon made the H1 more vulnerable to attack and complicated support relationships with other conventionally armed tanks. They recommended a tank with a cannon and a flamethrower.⁶ The result was the M47 flamethrower tank, which was almost immediately replaced by the M48 flamethrower tank (M67). Neither of these tanks was evaluated and put into service in time to be used during the Korean War. The M67 was used in Vietnam by the Marines; but by the early



M4A1 POA-CWS-H5 with E12-7R1 flamethrower and 75-millimeter gun (author's photograph, Fort Leonard Wood)

1980s, flamethrower tanks had become obsolete in the face of guided missiles and long-range tank guns.

The photograph on page 27 shows what appears to be a double-barrel M4A1 POA-CWS-H5 tank. This design, however, is deceptive. While the tank retains its 75-millimeter gun, a close look at the lower left gun barrel reveals perforations. This is the housing for the flamethrower, and it is carefully shaped to resemble a 75-millimeter gun. The nozzles of the flamethrower can be seen by looking into the barrel of the “gun.” The fuel, the mechanical fuel pumping, and the ignition components for the flamethrower are within the tank. This variant was used in the Korean War. While a replacement for the M4 flamethrower tanks was being developed, the M4 H5 variant was used since it had the 75-millimeter cannon and flame gun and it met the needs for a close-support flame weapon and mobile 75-millimeter artillery. The M4A1 H5 version with two gun barrels was, and still is, immediately recognized as unusual.

The veteran H1 and H5 variant tanks are obsolete by today’s standards; their speed is too low, and their armor is too thin. In their time, however, they were fearsome weapons of war and highly effective at their missions. The H1’s finest hour was in the Pacific on Iwo Jima and Okinawa, and it was there that the greatest value of the weapon was realized; the flame tanks were so effective that they saved American lives. If that is the measure of an effective design, then the H1 was outstanding at its mission. The H5 was valuable from 1950 to 1953 during the Korean War, and today it serves as an example of the American ingenuity and determination used to accomplish a mission. The H5 was later replaced by the M67 flamethrower tank.

The Auxiliary Flamethrower

A seemingly obvious modification to the flamethrower was spurred by tactical ingenuity and immediate need. This modification addressed two dilemmas:

- How could an infantry flamethrower be used in a broken or mountainous environment while retaining the storage capacity and armored fuel protection of an armored flamethrower?
- How could bunkers that were too high for tanks to engage with their flame guns and too large for the infantry flamethrower capacity be engaged without infantry or close air support?

The solution was a 400-foot hose extension that was coupled with the M2-2 flame gun. The hose extension

could be adapted to portable or mechanized fuel tanks. In fact, the hose could be linked to flame tanks to extend their ranges while keeping them away from short-range engagements with enemy cave defenders. This development immediately impacted the fighting on Okinawa. The combat on Peleliu had highlighted the need for a flame weapon to engage bunkers and caves. The Navy’s solution was to take 50-foot lengths of 1½-inch fire hose, link them together, and issue them in 400-foot sections to the crews of flame tanks in preparation for fighting on Okinawa.⁷

Members of the 713th Tank Battalion were in continuous action on Okinawa from 7 April 1945 to 30 June 1945. During that time, members of the unit repeatedly used the hose extensions to attack pockets of resistance. In one instance, two Marines, with the aid of covering fire, reached the top of an escarpment and killed several hundred Japanese with a flamethrower.⁸ Casualty figures illustrate the effectiveness of the simple flamethrower hose expedient; there were 4,788 Japanese killed and 49 captured, while there were 8 killed or missing and 111 wounded from the 713th.⁹

The hose extension is one of the many weapons of World War II that reduced allied casualties by exploiting Soldier and Marine ingenuity to overcome challenges, close in, and destroy the enemy. The example of the 713th Tank Battalion highlights how one unit can have a profound effect on the course of a battle. While the 713th inflicted casualties through the offensive actions of the M4A3 medium tanks, the flamethrower extension made it possible to completely exploit the weapon’s capabilities against all enemies, regardless of the terrain. 

Endnotes:

¹Colonel Joseph H. Alexander (U.S. Marine Corps [Retired]), *Closing In: Marines in the Seizure of Iwo Jima*, 1994.

²U.S. Army Chemical Museum research notes.

³“Tank Casualty Report,” U.S. Army Chemical Museum, 6 April–25 May 1945.

⁴Colonel Joseph H. Alexander (U.S. Marine Corps [Retired]), *Closing In: Marines in the Seizure of Iwo Jima*, 1994.

⁵John W. Mountcastle, *Flame On!: U.S. Incendiary Weapons, 1918–1945*, White Mane Books, Shippensburg, Pennsylvania, 1999.

⁶U.S. Army Chemical Museum research notes.

⁷Colonel George F. Unmacht, “Flame Throwing Seabees,” *Armed Forces Chemical Journal*, July 1948.

⁸*Ibid.*

⁹*Ibid.*

Captain Ringquist is the commander of Company E, 3d Battalion, 10th Infantry Regiment, Fort Leonard Wood.



Doctrine, Tactics, and Training for the NBCRV

By Mr. Gene Weinreis

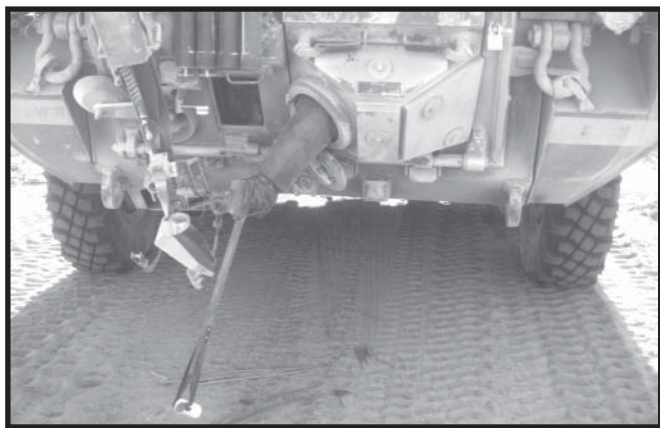
U.S. forces face an ongoing threat from a variety of chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) devices across a broad range of military operations. The number of rogue nations, nonnational terrorists, and criminal organizations capable of developing, possessing, and deploying CBRNE weapons is steadily increasing. In recent years, the range of potential weapons use (from sarin in a Tokyo subway by the Aum Shinrikyo cult in March 1995 to jet aircraft on 11 September 2001) range from blackmail, acts of terrorism, and the operational use of chlorine or nitric acid on the battlefield during military operations.

All unit commanders train their Soldiers in the principles of contamination avoidance, protection, and decontamination to prepare for operations in a chemical, biological, radiological, and nuclear (CBRN) environment. By practicing avoidance, detection, identification, sheltering, and reconnaissance missions, Soldiers can avoid CBRN contamination and, thus, minimize or eliminate casualties and maintain mission performance and logistical-intensive decontamination requirements. U.S. Forces are capable of conducting individual and collective protection to sustain operations in the operational environment. Individual protection includes physical protection devices, immunizations, and pretreatments to help combat growing CBRN threats. With the growing threat of CBRN, it is vital that joint U.S.

Forces use their full capabilities to detect, identify, warn, treat, find, and prosecute the growing list of combatants and terrorists who hate the free world. One such method of defense could include the Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)—the newest, fully capable CBRNE vehicle being fielded in the Army. With the completion of new equipment training on the NBCRV, Soldiers will see the new system significantly change the “how-to-fight” doctrine to accomplish wartime and design missions.

Stryker Brigades will be using NBCRVs for their primary reconnaissance vehicles. Other units are presently using the M93A1 Nuclear, Biological, and Chemical Reconnaissance System (Fox) or the M31A1 Biological Integrated Detection System (BIDS) for CBRN detection and confirmation operations. The NBCRV will complement the older systems. Over time, our CBRN capabilities for the confirmation and denial of CBRNE hazards are continuously improving based on new technology.

Doctrine and tactics training (DTT) assists commanders, leaders, staffs, and crews with employing the unique combat capabilities offered by the NBCRV. The early phases of DTT refresh and mentor all Soldiers on the key elements required for NBCRV reconnaissance missions following operational new equipment training



Collecting a soil sample during reconnaissance

(OPNET) (where Soldiers first learn how specific pieces of equipment work). Phase I of DTT covers the—

- CBRN operational environment.
- CBRN detection and biological and chemical sampling.
- CBRN sample evacuation procedures.
- CBRN employment tactics, techniques, and procedures (TTP).
- Procedures for NBCRV crew drills.
- Defense Advanced Global Positioning System Receiver (DAGR), which replaces the Precision Lightweight Global Positioning System Receiver.
- Force XXI battle command—brigade and below (FBCB2) system.

Soldiers learn to operate the onboard screen and control panel to work the sensors on the NBCRV, but the true test comes when Soldiers learn to deploy and employ their new equipment by operating sensors in a tactical environment of battlefield drills. From tabletop exercises (TTXs) conducted in the classroom to maneuvering exercises in the field, military occupational specialty 74D Soldiers gain a clear and precise understanding of how to conduct unit planning, preparation, and execution of complete, effective, and successful NBCRV missions.

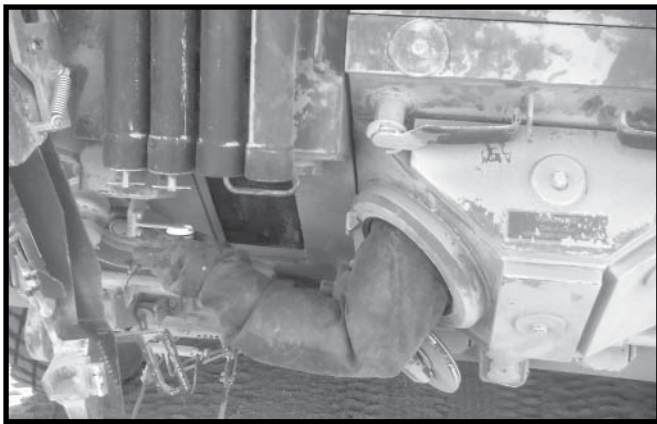
Phase II of DTT is taught concurrently with Phase I and covers leader training. During two days of training, commanders and surveyors plan, prepare, and conduct troop-leading procedures (TLPs) (see table below for sequence) and employ the NBCRV using TTXs. Meanwhile, drivers and assistant surveyors are busy in the field operating the NBCRV. The third day culminates with the entire platoon assembled to conduct TTXs (guided by facilitators).

When applying warning orders and intelligence preparation of the battlefield data, NBCRV crews are constantly using TLPs to ensure success in their missions. The sequence of TLPs varies based on tactical situations.

Crews conduct and execute numerous CBRN search and survey missions during field training exercises (FTXs) to gain greater insight and understanding of the sensors in the NBCRVs. The FTXs also deal with real-world problems (such as flat tires, brake failures, sensor malfunctions, and fuel and oil requirements).

Recently, a successful DTT took place at the Southern California Logistics Airport (SCLA) (the old George Air Force Base, which closed in December 1992) where Soldiers learned to deploy and employ NBCRV system capabilities and to confirm or deny the presence of CBRN

Sequence of Troop-Leading Procedures	
Sequence of Events	Action by NBCRV Platoon Leader
Receive mission.	Issue initial warning order. Perform mission analysis. Provide initial time analysis. Restate mission.
Issue warning order.	Issue warning order.
Make tentative plans.	Prepare estimation of situation and courses of action (COAs). Consider mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC). Compare COAs.
Initiate movement.	Issue a warning, fragmentary, or movement order.
Conduct reconnaissance.	Perform reconnaissance when possible (terrain analyses are vital if the location will significantly affect the use of CBRNE weapon detection).
Complete operation plan.	Prepare operation plan or order.
Issue order.	Issue an operation or fragmentary order.
Supervise personnel.	Conduct rehearsals.
	Update intelligence and weather information.
	Execute mission.



Putting a cap on a sample bottle being prepared for shipment

hazards. Just as all military training must embody how-to-fight doctrine, the DTT provided actual battlefield drills and exercises—the vital “what-to-do” guidance to survive on the battlefield and in the current contemporary operational environment.

The U.S. Army Chemical School at Fort Leonard Wood, Missouri, is currently conducting instructor and key personnel training for NBCRVs to support the L6 institutional training course. Institutional training is scheduled to start in the second quarter of fiscal year 2008.

Traditionally, reconnaissance operations were self-taught tasks, gained by reading field manuals, mission

training plans (MTPs), combined arms training strategies, or distributed learning in virtual reality, scenario-based learning or other media programs. But NBCRV drivers, commanders, surveyors, and assistant surveyors must perform CBRN tasks to standard; or they will never know how to successfully complete a CBRN reconnaissance mission. Numerous real-world problems must be successfully acted upon by crew members to survive in the CBRNE operational environment of today. ●●

References:

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FM 3-11.19, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance*, 30 July 2004.

FM 3-11.86, *Multiservice Tactics, Techniques, and Procedures for Biological Surveillance*, 4 October 2004.

U.S. Army Training and Doctrine Command (TRADOC) Regulation 350-70, *Systems Approach to Training Management, Processes, and Products*, 9 March 1999.

Mr. Bruce Baldwin, “Stryker NBCRV,” *Army Chemical Review*, January–June 2007, pp 4–7.

Mr. Weinreis is a training specialist with the Maneuver Support Center, Capability Development and Integration Directorate, Requirements Determination Division, Combating WMD/New Systems Branch, Fort Leonard Wood.



Stryker NBCRV conducting a route reconnaissance mission at SCLA

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DOCTRINE UPDATE

U.S. Army Maneuver Support Center Directorate of Training Doctrine Development Division			
Publication Number	Title	Date	Description
Current Publications			
FM 3-11 MCWP 3-37.1 NWP 3-11 AFTTP(I) 3-2.42	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations	10 Mar 03	A multiservice tactics, techniques, and procedures (MTTP) manual which provides commanders and staffs a key reference for the planning and execution of service chemical, biological, radiological, and nuclear (CBRN) defense operations, with focus on the passive-defense component of counterproliferation. Status: Under revision FY 08.
FM 3-11.3 MCRP 3-37.2A NTTP 3-11.25 AFTTP(I) 3-2.56	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance	2 Feb 06	An MTTP manual for conducting CBRN contamination avoidance. This revision combines Field Manual (FM) 3-3 and FM 3-3-1 into one publication. Status: Current.
FM 3-11.4 MCWP 3-37.2 NTTP 3-11.27 AFTTP(I) 3-2.46	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection	2 Jun 03	An MTTP manual which establishes principles for CBRN protection and addresses individual and collective protection (COLPRO) considerations for the protection of the force and civilian personnel. Status: Current.
FM 3-11.5 MCWP 3-37.3 NTTP 3-1.26 AFTTP(I) 3-2.60	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination	4 Apr 06	An MTTP manual which addresses the principles and levels of CBRN decontamination operations in a tactical environment. Status: Current.
FM 3-6 (FM 3-11.6) AFM 105-7 FMFM 7-11-H	Field Behavior of NBC Agents (Including Smoke and Incendiaries)	3 Nov 86	An MTTP manual which addresses the battlefield influences of weather and terrain and the use of smoke and obscurants on CBRN operations. Status: Under revision FY 08 (will be renumbered FM 3-11.6).
FM 3-11.9 MCRP 3-37.1B NTRP 3-11.32 AFTTP(I) 3-2.55	Potential Military Chemical/Biological Agents and Compounds	10 Jan 05	An MTTP manual which provides commanders and staffs with general information and technical data concerning chemical-biological (CB) agents and other compounds of military interest, such as toxic industrial chemicals (TICs). Status: Current.
FM 3-11.11 MCRP 3-3.7.2	Flame, Riot Control Agent, and Herbicide Operations	19 Aug 96 C1 10 Mar 03	An MTTP manual which describes the tactics, techniques, and procedures (TTP) for employing flame weapons, riot control agents (RCAs), and herbicides during peacetime and combat. Status: Current.
FM 3-11.14 MCRP 3-37.1A NTTP 3-11.28 AFTTP(I) 3-2.54	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Vulnerability Assessment	28 Dec 04	An MTTP manual for conducting CBRN vulnerability assessments; analyzing, managing, and assessing risks; and measuring, mitigating, and reducing vulnerabilities. Status: Current.
FM 3-11.19 MCWP 3-37.4 NTTP 3-11.29 AFTTP(I) 3-2.44	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance	30 Jul 04	An MTTP manual for planning and conducting CBRN reconnaissance operations to detect, define, limit, mark, sample, and identify CBRN and toxic industrial material (TIM) contamination. Status: Change 1 under development FY 08.
FM 3-11.21 MCRP 3-37.2C NTTP 3-11.24 AFTTP(I) 3-2.37	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Aspects of Consequence Management	12 Dec 01	An MTTP manual which provides commanders and staffs a key reference for mitigating the CBRN aspects of consequence management. Status: Under revision FY 08.
NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at < http://www.adtdl.army.mil/ > or at the Chemical Knowledge Network (CKN) Web site at < https://www.us.army.mil/suite/portal.do?sp=409522 >.			

DOCTRINE UPDATE

U.S. Army Maneuver Support Center Directorate of Training Doctrine Development Division			
Publication Number	Title	Date	Description
Current Publications (Continued)			
FM 3-11.22	Weapons of Mass Destruction—Civil Support Team Tactics, Techniques, and Procedures	10 Dec 07	An Army-only manual which provides the suggested doctrinal TTP for use by weapons of mass destruction—civil support teams (WMD-CSTs), which are designed to provide support to local, state, and federal response systems. Status: Current.
FM 3-11.34 MCWP 3-37.5 NTTP 3-11.23 AFTTP(I) 3-2.33	Multiservice Procedures for Nuclear, Biological, and Chemical (NBC) Defense of Theater Fixed Sites, Ports, and Airfields	29 Sep 00	An MTTP manual which provides a reference for planning, resourcing, and executing CBRN defense of theater fixed sites, ports, and airfields. Status: Under revision FY 08.
FM 3-50 (FM 3-11.50)	Smoke Operations	4 Dec 90 C1 11 Sep 96	An Army-only manual which provides the TTP for using smoke and obscurants to attack and defeat specific enemy targets, sensors, target acquisition systems, weapon guidance systems, and other enemy electro-optical devices. Status: Under revision FY 08 (will be renumbered FM 3-11.50).
FM 3-11.86 MCWP 3.37.1C NTTP 3-11.31 AFTTP(I) 3-2.52	Multiservice Tactics, Techniques, and Procedures for Biological Surveillance	4 Oct 04	An MTTP manual for planning and conducting biological surveillance operations to monitor, detect, sample, identify, report, package, and evacuate samples of biological warfare agents. Status: Current.
FM 3-101	Chemical Staffs and Units	19 Nov 93	An Army-only manual which provides fundamental principles for chemical staff functions, command and control of Chemical units, and Chemical unit employment. Status: Under revision FY 08 to consolidate with FM 3-11.6.
FM 3-11.20	Technical Escort Operations	29 Aug 07	An Army-only manual which provides the TTP for the employment of technical escort battalions. Status: Current.
NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <http://www.adtdl.army.mil/> or at the CKN Web site at <https://www.us.army.mil/suite/portal.do?\$p=409522>.			
Emerging Publications			
FM 3-11.2	Multiservice Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination (WMD-E) Operations	To be determined	An MTTP manual that provides the tactical doctrine and associated TTP that each Service provides in support of the joint WMD-E mission area in an effort to operate systematically to locate, secure, disable, and/or destroy a state or nonstate actor's WMD programs and related capabilities. Status: Under development FY 08.
FM 3-11.24	Chemical, Biological, Radiological, and Nuclear Site Assessment Operations	To be determined	An Army-only manual which provides the TTP for the conduct of sensitive-site and hazardous-site assessments by conventional Army Chemical units. Status: Under development FY 08.
FMI 3-90.10	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Operational Headquarters	Estimated completion date: Jan 08	An Army-only tactics manual which provides the basic doctrine for the employment of a Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) operational headquarters to conduct tactical level WMD elimination operations or transition to a joint task force-capable headquarters for WMD elimination operations in support of campaigns and to support civil authorities.
NOTE: CBRN draft publications can be accessed and downloaded in electronic format from the CKN Web site at <https://www.us.army.mil/suite/portal.do?\$p=409522>.			



RESERVE COMPONENT UPDATE

Update on Army Reserve Units

The 455th Chemical Brigade (Fort Dix, New Jersey) was inactivated 9 September 2007.

The 460th Chemical Brigade (Little Rock, Arkansas) changed command on 9 September 2007, with Colonel Wornest Lambert taking the reins from Colonel Lucas Polakowski. (Colonel Polakowski is now the Deputy Commander, 90th Regional Readiness Command.)

The 464th Chemical Brigade (Johnstown, Pennsylvania) continues operations but is expected to deactivate in March 2008.

The 102d Division (Training Support), 3d Chemical Brigade, stood up on 1 October 2007. The unit provides military occupational skill (MOS) 74D training.

The 404th Chemical Brigade changed command on 22 September 2007. Brigadier General Anthony Stanich relinquished command to Colonel Steven Huber. (Colonel Huber was previously the Commander of the 108th Sustainment Brigade.)

Training

The U.S. Army Chemical School held a critical task selection board in July 2007. The Corps has decided to reduce the requirement for smoke instruction in all phases of chemical, biological, radiological, and nuclear (CBRN) training (beginning in late 2007).

Total Army School System (TASS) training is now in line with the Army Training Requirements Resourcing System (ATRRS). The former Region B screen is now where all 74D TASS training will be listed. This should make it easier for Soldiers to schedule MOS-specific training.

A Total Army School System Training Center (TTC) for 74D will be at Fort Leonard Wood, Missouri. This will be the only 74D TTC due to Chemical Defense Training Facility (CDTF) requirements. The training will also have its own equipment set to alleviate equipment availability issues. The first instructors should be on the ground in late 2007.

There are currently three courses being taught through six TASS battalions:

- **74D10 Military Occupational Specialty Training Course (MOS-T)** (formerly the Reclassification Course) is a four-phase course. Phase I is provided through distributed learning (dL) and cannot be completed in one weekend. Phases II and IV are resident training at Fort Leonard Wood. Phase III is nonresident instruction provided in the TASS battalion regions. This year, in response to requests from the field, Soldiers will only receive one set of orders to finish Phases II, III, and IV at Fort Leonard Wood (albeit in two locations).
- **74D Basic Noncommissioned Officer Course (BNCOC)** is also a four-phase course. Phase I is common to all MOSs. Phases II and IV are 74D-specific resident training at Fort Leonard Wood. Phase III is 74D-specific nonresident instruction provided in the TASS battalion regions.
- **74D Advanced Noncommissioned Officer Course (ANCOC)** is now a three-phase course. Phases I and III are resident training at Fort Leonard Wood. Phase II is nonresident instruction provided in the TASS battalion regions.

Chemical School Knowledge Network

The Chemical School Knowledge Network (CKN) is up and running! Use it as your first source for CBRN information. To access the CKN, go to the Chemical School homepage at <http://www.wood.army.mil/usacmls/> and click on the CKN logo in the upper left-hand corner. You must have an AKO account to access the CKN. The information in the CKN is "For Official Use Only" and includes additional information not available on the World Wide Web. If you have input, go to the feedback link on the page. We can work together to make this a fantastic CBRN resource!



Officer Training

The Reserve Component Chemical Captain's Career Course (RC-CMC3) is a five-phase course. Phase I covers common-core material and is required for all captains, regardless of their component or branch designation. Phase II covers chemical technical material and is offered via dL. The Chemical School has successfully funded the complete revision of Phase II—the completed course should be up and running later this year. This is the first real update in a decade. Phase III is a two-week resident phase at Fort Leonard Wood that focuses on chemical and smoke operations, biological-agent effects and defense concepts, radiological operations, toxic-agent training, and hazardous material (HAZMAT) awareness training. This course now includes the opportunity to certify HAZMAT awareness and operations training. Phase IV, the dL portion of the Combined Arms Exercise (CAX), is still under development. The tasks in this phase will be designed to prepare officers for company command and brigade staff assignments. Phase V is the CAX phase and is conducted at Fort Leonard Wood. JWARN is in this phase, along with Maneuver Control System training. This phase culminates in a military decision-making process exercise using state-of-the-art battle simulation equipment.

Officers transferring to the Chemical Corps after attending another branch's officer basic course must attend the CBRN Defense Course to provide them with basic CBRN defense training. Other required training will depend on the level of the officer's education. Contact Reserve Component (RC) personnel at the Chemical School for specific details.

Senior officers transferring into the Chemical Corps have other requirements. Prominent among the requirements is attendance at the Joint Senior Leader's Course at Fort Leonard Wood to become familiar with upper-level issues among the services. These officers will also get the opportunity to experience decontamination missions at the CDTF. Contact us for additional information.

Army Reserve- and National Guard-Specific Training

Chemical, Biological, Radiological, Nuclear, and Explosive Enhanced-Response Force Package (CERFP). The Chemical School offers the Mass-Casualty Decontamination Course to members of medical or decontamination teams of a CERFP. Of course, as the training provides HAZMAT awareness and operations training, it can be used by anyone on the CERFP. Anyone requiring HAZMAT technician training can attend the course.

Chemical, Biological, Radiological, and Nuclear Consequence Management Response Force (CCMRF). The Chemical School's Chemical, Biological, Radiological, and Nuclear (CBRN) Responder Course is applicable to CCMRF Soldiers who need HAZMAT technician certification. Soldiers providing mass-casualty decontamination can attend the Mass-Casualty Decontamination Course at the Chemical School. And since the training provides HAZMAT awareness and operations training, it can be used by all personnel on the CCMRF.

Chemical School Personnel Issues

Authorized Active Guard and Reserve (AGR) Positions. There are currently six authorized Active Army Reserve positions—the deputy assistant commandant—Reserve Component (DAC-RC) (an Army Reserve colonel position), the deputy assistant commandant—National Guard (DAC-NG) (an Army National Guard lieutenant colonel position), three training developers (Army Reserve major, master sergeant, and lieutenant colonel positions [the lieutenant colonel is currently serving as the Director of the Incident Response Training Detachment in a temporary assignment]), and one combat developer (Army Reserve lieutenant colonel position).

Drilling Individual Mobilization Augmentee (DIMA) Positions. We have 20 authorized DIMA positions throughout the Chemical School, with 12 officer slots (captain through lieutenant colonel) and 8 noncommissioned officer slots (sergeant first class through sergeant major). The mission of the RC is to supplement and expand Chemical School personnel during mobilization missions. The school currently supports the RC-CMC3 training mission. Our goal is to have instructors who are 100 percent qualified—we strive to improve both the active CMC3 and the RC-CMC3 through our work. There are always openings for qualified instructors. Please contact us if you are interested.



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82d Chemical Battalion Cases Colors

By Ms. Allison Choike

The 82d Chemical Battalion rolled up its colors on 6 September 2007 during an inactivation ceremony at Cunningham Gymnasium, Fort Leonard Wood, Missouri.

The battalion has trained initial-entry training (IET) Soldiers for two decades. The ceremony marked a closing for the 82d Battalion and a continuation for the 84th Chemical Battalion. “This is a sad but proud day for our regiment,” said Colonel Peggy Combs, 3d Chemical Brigade Commander. “We are closing one chapter, but reopening another in the proud history of our Corps.” Colonel Combs went on to say that the 82d Chemical Battalion supported the IET mission for 20 years, and with the battalion now being a part of the 84th Chemical Battalion, that mind-set will continue. “I believe that the true spirit and the legacy of the unit is forever set in the hearts, minds, and accomplishments of the Soldiers who have served in that unit—the legacy of excellence will live on.”

With changes taking place in the 3d Chemical Brigade, the 84th Chemical Battalion will continue with its training mission. “They [the 84th Chemical Battalion] will assume the advanced individual training (AIT) mission and become one of the most complex battalions in the Chemical Corps. Ironically, it assumes its mission right where it left off—providing relevant chemical, biological, radiological, and nuclear training,” said Colonel Combs.



The ceremony also included a change-of-command presentation, where Major Thamar Main relinquished command to Lieutenant Colonel Bret Van Camp. Colonel Van Camp said that the ceremony represented many things, including the first steps toward training Chemical Soldiers—a responsibility the 84th Chemical Battalion takes on Army-wide.

“Today marks one of the new efforts in how we train our Soldiers and leaders. We will be responsible for all of the [chemical, biological, radiological, and nuclear] CBRN specialists serving our Nation.”

Major Maria Bochat, the 84th Chemical Battalion Executive Officer said that IET training will finish out as normal until the end of the calendar year. There are still Soldiers in basic training in the battalion, and they will be graduating in December. After that, the 84th Chemical Battalion will only train at the AIT level. “We are only going to be training CBRN, and everyone in the Army will come here to train. It is kind of exciting,” said Major Bochat. 🎖️🎖️

Ms. Choike is a staff writer for the Fort Leonard Wood Guidon.

The 2007 CBRN Critical Task Selection Board: Building the Foundation for CBRN Training

By Mrs. Lisa Merrill

"I truly feel with the ever-changing environment, the Chemical Corps' mission has evolved from a conventional NBC passive-defense role to now encompass full-spectrum CBRN operations, including consequence management, weapons of mass destruction elimination, etc. Therefore, causing us as a Corps to realize that in order for our Dragon Soldiers to be equipped with the right skill sets and to have relevancy, we must refine our lesson plans."

—Command Sergeant Major Patrick Alston
Regimental Command Sergeant Major,
U.S. Army Chemical Corps

Big changes are coming to chemical, biological, radiological, and nuclear (CBRN) training at the U.S. Army Chemical School (USACMLS). The school is currently reworking the curriculum for CBRN initial military training (IMT) (Advanced Individual Training [AIT], Basic Officer Leader Courses, and professional military education [PME]) and Basic and Advanced Noncommissioned Officer and Captains' Career Courses. The effort began in late 2006 and will result in new programs of instruction (POIs) for all IMT and PME courses during Fiscal Year 2008.

The USACMLS commandant, Brigadier General Thomas Spoehr, charged the Directorate of Training and Training Development (DOT&TD) with the mission to gather data from the field and incorporate current trends, future equipment, and organizational and concept plans into institutional training. The goal of this effort was to provide Soldiers and leaders with the skills and knowledge necessary to counter threats and hazards in CBRN operations. To do this, DOT&TD conducted a job analysis (in early 2007) for all skill levels in military occupational specialties (MOSs) 74D and 74A, which culminated in a critical task selection board (CTSB) in July.

CTSBs lay the foundation for training requirements. They are designed to recommend critical individual tasks for each skill level to the commandant, through the use of job surveys, personal experiences, and subject matter experts. This data provides input to evolving doctrine, technology, and force structure to shape the training required for Soldiers in future institutional training courses. With the range of new requirements and continually evolving doctrine, the time is right to reevaluate critical tasks in CBRN training.

CBRN Job Skills Survey

The 2007 CTSB process began with a survey of 74D Soldiers and NCOs and 74A officers. Responses were solicited to a number of questions designed to identify key areas for CTSB members to focus their efforts. While the school maintains an inventory of tasks, the survey helped identify training gaps or tasks to be considered by the board.

Survey respondents provided data that was used to shape the task inventory considered by CTSB members. Respondents, 70 percent of whom were veterans of Operation Iraqi Freedom or Enduring Freedom, offered insight into the demands placed on CBRN Soldiers in current operations. For example, sensitive-site exploitation (SSE) and sensitive-site assessment (SSA) skills were among the most frequently mentioned areas requiring more focus in institutional training. Other skills



Sensitive-site exploitation exercise

frequently cited were hazardous material (HAZMAT) response, toxic industrial chemicals and material training, and CBRN reconnaissance.

In addition to the questions regarding competencies and skills, survey respondents were asked to prioritize general training requirements for CBRN Soldiers, such as ranking major subject areas according to training focus. Areas scoring the highest were CBRN SSA, CBRN decontamination, and chemical-biological threats and hazards. Obscurants were the lowest ranking selection on the list.

CTSB Process

The CTSB panel convened 23–27 July 2007 at the USACMLS. Two separate boards were conducted: one board selected tasks for enlisted skill levels 1 through 4; the other board selected officer tasks for levels O1 through O3. Board members were selected from a diverse set of units that included Active Army, Army Reserve, and Army National Guard components. The enlisted board was chaired by a command sergeant major and included two staff sergeants, three sergeants first class, and two first sergeants. The officer board was chaired by a lieutenant colonel and consisted of two first lieutenants, two captains, two majors, and one lieutenant colonel.

In his opening remarks to the board, Brigadier General Spoehr challenged the members to “be bold, rather than timid” to help achieve the Corps’ vision. He encouraged them to “think holistically about the entire Chemical Corps: Active, Guard, Reserve, [weapons of mass destruction–civil support team] WMD-CST, [special operations force] SOF, battle staff, unit, NCO, officer.”

Regarding the board’s mission, Brigadier General Spoehr said, “This is the Chemical Corps’ opportunity



Rescue exercise in a hazardous environment



Confined-space training

to firmly establish critical training requirements using a process that gathers collective experiences and lessons learned from the field to positively impact training today and prepare it to meet the challenges of tomorrow. While this process will shape the future of the Chemical Corps at its most basic level, the outcome of decisions made during this board will impact the Army’s future force and the Chemical Corps in far-reaching and significant ways.”

After reviewing the results of the job skills survey, the board was given the opportunity to meet with doctrine developers and materiel system developers to get the latest information on emerging technology and doctrinal changes. They worked on evaluating tasks from the total task inventory and voted on the criticality of each task. The board determined the appropriate skill level for training each critical task and the location of the training (at the institution or the unit). As the commandant directed, the board made some innovative decisions regarding not only what should be trained, but also how and where it would be trained. For example, members recommended distributed learning (dL) options for some tasks to augment or replace institutional training.

Curriculum Revision

After recording the recommendations from the board, training developers began evaluating the new critical task list against current training. Laying the POIs against the proposed task lists, developers drafted a list of training gaps and training to be eliminated, and determined where minor modifications to current training would meet the boards’ intent. Meanwhile, the new critical task lists were staffed for approval by the commandant.

Some areas of the curriculum (based on the CTSB recommendations) will be eliminated, shifted to unit

training, or conducted via Web-based dL products. Additionally, some tasks were migrated downward from higher skill levels to lower ones, reflecting the skill level of Soldiers actually performing the tasks in the field. Based on the board's recommendations, all resident courses will see a significant reduction in obscuration training (smoke and flame). Other areas, such as traditional plotting techniques, will be revised to focus on methods that are more technology-driven, using the joint warning and reporting network (JWARN) or other digital systems to accomplish tasks in a more timely and accurate manner. Finally, there will be significant additions to training at all levels, to include HAZMAT training, and some HAZMAT certification opportunities within PME training courses.

Changes based on the CTSB recommendations are beginning now. Students are already receiving training on JWARN at all levels. HAZMAT training in AIT, Advanced Noncommissioned Officer Course, Basic Officer Leader Course, and Captains' Career Course is already receiving positive feedback from students for its relevance in the current fight. Hands-on training in SSE and SSA complements more traditional CBRN training, bringing abstract knowledge and concepts into practical application. By the summer of 2008, virtually all of the board's recommendations will be evident in training.

The curriculum for CBRN courses at the USACMLS will always be flexible and fluid to accommodate emerging tactics, techniques, and procedures; lessons learned; and new doctrine and technology. However, a solid foundation of task training, built on the recommendations



Packaging and sealing contaminated materials

of warfighters with knowledge and experience, is essential to building institutional training that meets the needs of the commanders and Soldiers in an Army at war. The 2007 CBRN CTSB gives training at the USACMLS that foundation—a foundation grounded in the experience of real CBRN Soldiers. 

Mrs. Merrill is an instructional systems specialist and chief of the Professional Courses Training Development Branch, Directorate of Training and Training Development.

Instructor Training Promotion Opportunities

Immediate Opportunities for Chemical Captains, Lieutenants, and Noncommissioned Officers

The U.S. Army Chemical School has openings in its U.S. Army Reserve, Drilling Individual Mobilization Augmentee (DIMA) detachment. The detachment conducts the Chemical Captain's Career Course for the Reserve Component twice a year. If you are interested in becoming an instructor or a member of the support staff, please contact Lieutenant Colonel Barrett Parker by telephone at (573) 563-7105 or e-mail at [<barrett-parker@us.army.mil>](mailto:barrett-parker@us.army.mil).

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Multiple Annual Training Options**



Chemical School Hosts Worldwide Communication Conference

By Ms. Allison Choike

Recently, the U.S. Army Chemical School (USACMLS) hosted a conference for chemical, biological, radiological, and nuclear (CBRN) commandants and commanders. This conference enabled leaders to establish relationships and, most importantly, opened a line of worldwide communication and interaction among personnel from various nations.

More than 15 nations gathered in Panama City, Florida, 15–18 October 2007 to discuss CBRN issues—from learning about each nation's force capabilities to recognizing rank and responsibility equivalents in each country. "[The conference] let everybody come together and gave them the opportunity to talk about whatever they wanted to talk about," said Mr. Dale Chapman, USACMLS International Programs director.

Mr. Chapman said that school commandants from countries such as France, Germany, Poland, Bulgaria, and the Czech Republic spoke about doctrine, organization, training, materiel, leadership, education, personnel, and facilities issues. "The key thing was communication between nations and also for commandants to meet their counterparts from other nations . . . we really achieved that. There was so much talk [and] discussion and [many] great briefings," Mr. Chapman said.

Brigadier General Thomas Spoehr, USACMLS commandant, was thrilled to be a part of the international conference and said that he learned a lot from the other nations. With conference attendees being strictly limited to commandants and commanders, they were able to focus on each other and their jobs. "This conference was commandant- and commander-pure, so we could talk about what it is like to be a commandant in your country

and what it is like to command the chemical forces in your nation," Brigadier General Spoehr said. Many of the nations realized that there are many similarities and differences in training. Some of the learning proved to be humbling. "In the CBRN world, there are some people with some good capabilities, like the Czech Republic. Ever since World War II, they have always taken a lot of pride and had a great ability. And they are ahead of us in some things. The U.S. takes a lot of pride, but we are not the top in everything. Some nations have pushed along further than we have, and we can learn from them."

Mr. Chapman agreed with Brigadier General Spoehr, believing that the USACMLS left the conference with a lot of information that will help shape the future Army and Chemical Corps. "We came out of there with a vast amount of knowledge that we plan on passing on to the students in the Captain's Career Course. The consolidated briefings will be used to help train the captains in the course on the different international capabilities and what they have to offer to the war fight," Mr. Chapman said.

Brigadier General Spoehr and Mr. Chapman want the conferences to continue (and the Czech Republic agreed to host the conference in 2008). "It [the conference] has helped set the stage for everything in the years to come," said Mr. Chapman. "This year was a great start to new relationships and lines of communication with other countries' commandants. . . . I hope that it gets mission-related [topics] on what we are doing in the current fight and what we can do for the current War on Terrorism." 

Ms. Choike is a staff writer for the Fort Leonard Wood Guidon.



Q₅₀: Quantifying Chemical-Biological Threats

By Mr. Reid Kirby

There is a military adage which states that “Amateurs talk tactics; generals talk logistics.” While it is true that chemical-biological (CB) weapons are area weapons, they are also mass-action weapons that require hundreds of tons of chemicals or hundreds of pounds of biological agents to represent a significant threat. Lesser amounts are generally considered more of a destabilizing nuisance than an actual combat power; the minor amounts attributed to potential terrorism merely signify fringe criminality.

In hopes of establishing international agreements and controls that would eliminate CB weapons, the disarmament and counterproliferation communities have concerned themselves with determining the threshold above which CB agents are considered excessive for legitimate research or commercial activities. These threshold levels signify points of concern—not points where developing CB arsenals are considered an appreciable threat. What does it mean when information indicates that Libya has 100 tons of mustard gas (H) or North Korea has 1,000 to 5,000 tons of a variety of chemical agents? A generalized means of assessing such “threats” is necessary.

One means of assessing the threat is to compare the logistics required for various CB weapons. By determining the quantity of CB agent necessary to produce an effect threat and by understanding potential enemy doctrine and battlefield constraints, it may be possible to estimate the area and the number of targets that could be impacted by an emerging CB arsenal. This article presents a workable method for this analysis.¹

Calder’s Legacy

The English physicist Sir Geoffrey Taylor initiated the first systematic treatment of eddy motion in the atmosphere in 1915. Following World War I, the British Chemical Warfare Establishment at Porton Down attempted to improve upon chemical warfare meteorology through controlled experiments with smoke on Salisbury Plain. This work, in turn, led to O.G. Sutton’s theory of eddy diffusion and the birth of atmospheric diffusion modeling as we know it today. Sutton’s understudy at Porton Down was meteorologist Kenneth L. Calder. In the 1950s, the Army Biological Warfare Laboratories (BWL) at Camp Detrick (now Fort Detrick), Maryland, managed to employ Calder to work out biological weapon expenditure problems based on atmospheric diffusion modeling.

It is apparent from Calder’s reports that he was brilliant, but isolated from the rest of the atmospheric diffusion analysis community working on chemical warfare problems. His work in biological warfare led him to use exponential dose-response relationships (i.e., independent action), rather than traditional probit analysis, further alienating his work from mainstream chemical weapon effects modeling.

Calder often reduced the complexity of his calculations by making general comparisons. He also relied on small samples of field trial data to represent typical employment conditions. His vast field experience likely allowed him to make decisions that the insufficiently accurate

models lacked the complexity to make. With a scarcity of computers in the 1950s, Calder produced a series of tables used to estimate biological weapon coverage. The biological warfare community continued to use these tables into the 1990s (Gulf War).

In the 1990s, William Patrick and Richard Spertzel developed a graph which plotted the toxicity of an agent against the quantity of that agent required to produce an effective exposure. This graph (Figure 1), which was based on Calder's tables in BWL Technical Study #3 and widely distributed in *Defense Against Toxin Weapons*, illustrates that by knowing the lethal dose, 50 percent (LD_{50})—the dose required to kill half the members of a tested population—of a potential CB agent, it is possible to theoretically determine the quantity of the agent necessary (Q_{50}), under ideal meteorological conditions, to achieve a 50 percent casualty rate for an open-air exposure in a 100-square-kilometer (km^2) area. The following equation can be derived from the graph:

$$Q_{50}(\text{kilograms [kg]/km}^2) = 32,000 \cdot LD_{50}(\text{milligrams [mg]/kg})$$

At first glance, this appears to be a useful means of identifying the logistics associated with various CB weapons; however, in practice, there are limitations to this methodology that prevent its usefulness beyond the illustrative purposes for which it was originally intended.²

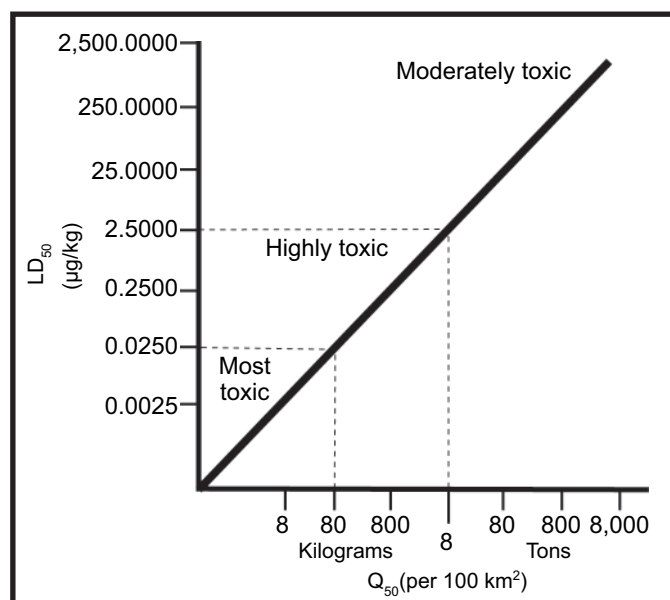


Figure 1. Toxicity (LD_{50}) versus quantity of toxin required (Q_{50}) to provide a theoretically effective open-air exposure under ideal meteorological conditions (after Franz, 1997)

Posological Theorem

CB warfare is, in essence, the delivery of a quantity of agent to a target, subjecting those within the target to a dosage that results in a casualty-causing dose. There is a mathematically transitive relationship among dose, dosage, and quantity; so doubling the dose corresponds to doubling the dosage and the quantity. Further, a dose may have multiple dosages, and these dosages may have multiple quantities, owing to the refinements of added conditions.

The relationship between the dose and the percent of resultant casualties can be described using a probit analysis or an independent-action model. An expected casualty rate can be inferred from the dose received or the dosage of exposure. It is the relationship between the dosage and the quantity that requires a method of calculation.

To calculate quantity, the issue of CB weapon coverage can be simplified by considering a square target area oriented squarely to the release of the CB agent along the upwind side (Figure 2). As a rule, when half the target area is covered with a median dosage, the integrated casualty rate for the entire target area is about equal to the casualty rate associated with that particular dosage. Therefore, the quantity of agent required to achieve a 50 percent casualty rate depends on the amount of agent that must be released on the upwind side to attain a median dosage halfway through the target.

This method is mathematically derived from the reduction of atmospheric diffusion models. The Gaussian model for a point source expands to that for a finite line source, which reduces to that of an infinite line source by extending the source length toward infinity. Assuming that the source height and sampling height are both at the surface ($z = 0$), then it follows that—

$$\frac{D\bar{u}}{\Lambda q} = \frac{\sqrt{2}}{\sqrt{\pi}\delta_z}$$

Where—

D = dosage ($mg \cdot min/m^3$)

$\bar{u}$ = wind speed (m/min)

Λ = conditional adjustment factor

q = quantity released on a line (in $mg/meter [m]$)

δ_z = atmospheric diffusion parameter

With some algebra, some adjustments to convert quantity per meter of line source to total quantity, and

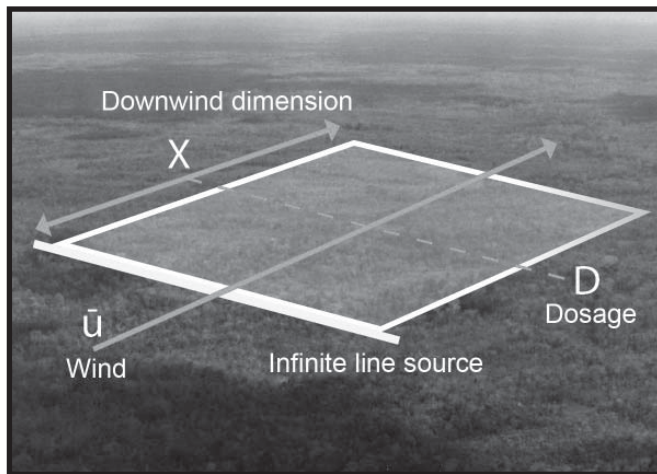


Figure 2. A notional CB target

some adjustments of units, the equation takes on the form—

$$Q = \frac{D\bar{u}}{\Lambda\left(\frac{\sqrt{2}}{\sqrt{\pi}\delta_z}\right)X}$$

Where—

Q = quantity of CB agent needed (kg/km²)

X = windward dimension of a target (m)

This model can be adapted to produce figures for different target sizes (Figure 3), target conditions (Figure 4, page 44), wind speeds, and atmospheric stabilities (Figure 5, page 44).

Evaluation

As a test of the model presented, Field Manual (FM) 3-10 was used to calculate the Q_{50} for sarin (GB), assuming an effects component of 3.22 that corresponds to 0- to 5-knot winds, open terrain, no precipitation, and high temperatures. This method indicated that 40 M121 155-millimeter (mm) projectiles would be needed to produce a 50 percent casualty rate on a 1-km² target area. This translates to a Q_{50} of 118 kg/km².

The method described by Patrick and Spertzel yields a result of 214 kg/km² for the same scenario, assuming a median

incapacitating dose (ID_{50}) for GB of 0.0067 mg/kg. Using the Posological Theorem with a dosage required to incapacitate half the members of an exposed population (ICt_{50}) of 50 mg·min/m³ resulted in a Q_{50} of 119 kg/km². The dose-only methods of determining the Q_{50} , by definition, fail to explain the differences between dose and dosage, and, thence, dosage and quantity.³

Application

In the 1960s, the United States purchased 100,000 pounds of the incapacitating agent BZ—probably one of the most expensive military chemicals ever standardized by the United States; 10,000 pounds went to research and development, leaving about 90,000 pounds for filling chemical weapons. What was the chemical combat power associated with this purchase?

Using the Patrick-Spertzel method, an ID_{50} of 0.0116 mg/kg for BZ, yields a Q_{50} of 371 kg/km². Dividing 90,000 pounds (or 40,823 kg) by this result suggests that the Cold War arsenal of BZ would have been capable of producing 50 percent casualties over a 110-km² area.

From the information in FM 3-10B, BZ weapons were intended to cover half of a 1- to 2-hectare target area with an ICt_{50} of 110 mg·min/m³ under neutral atmospheric stability and 10-knot winds. This indicates a Q_{50} of 1,284 kg/km² in the open and 4,246 kg/km² in an urban terrain complex. Therefore, the BZ arsenal was capable of

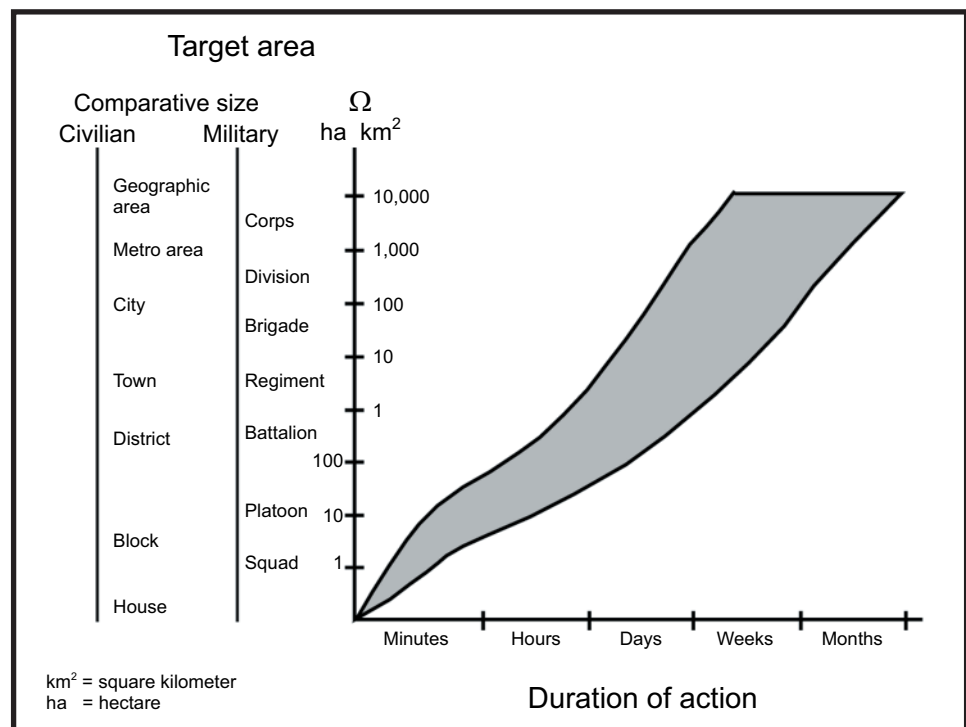


Figure 3. The approximate size of a notional target is proportional to the duration of a CB agent.

Condition	Factor
None	1.0
Wooded	0.8
Hilly	0.5
Indoor	0.5
Rainy	0.4
Jungle	0.2

Figure 4. Effects adjustment factors, Λ^4

neutralizing 32 km² (open) and 10 km² (urban), though expanding the target size to that which is reasonable for the rate and duration of action indicates that the BZ arsenal was actually capable of neutralizing an open area up to 40 km².

The usefulness of this approach is that it indicates the quantities of CB agents needed under different doctrinal assumptions. It applies when determining the amount of

agent that must be successfully disseminated to achieve a casualty effect; therefore, it can also be used to judge the potential threat from a developing CB arsenal. This approach is internally and externally consistent, and its application conforms to the added conditions of extending dose, through dosage, to quantity. ☹☹

Endnotes:

¹This work was the result of a special study on the military potential of prions.

²Patrick and Spertzel were not attempting to create a method for analysts to calculate Q_{50} ; their purpose was merely illustrative.

³Comparisons with other quantity figures verified the reasonable accuracy of these methods. However, similar attempts with infective agents and agents with aerobiological decay rates proved to yield grossly inaccurate results.

⁴These adjustments factors were from University of Pennsylvania, Project SUMMIT, for the U.S. Arms Control and Disarmament Agency (1962).

⁵For puff diffusion, it is customary to take the next highest stability classes' plume diffusion deviation as an approximation.

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Terrain Complex			
Pasquill-Gifford Class	Open	Urban	
	A	$1.35(x/20)^{2.82}$	$0.24(1+0.001x)^{0.5}$
	B	$1.35(x/20)^{1.86}$	$0.24(1+0.001x)^{0.5}$
	C	$1.35(x/20)^{1.18}$	$0.24(1+0.001x)^{0.5}$
	D	$1.35(x/20)^{0.88}$	0.20x
	E	$1.35(x/20)^{0.76}$	$0.14x(1+0.0003x)^{-0.5}$
	F	$1.35(x/20)^{0.66}$	$0.08x(1+0.00015x)^{-0.5}$
	G	$1.35(x/20)^{0.60}$	$0.08x(1+0.00015x)^{-0.5}$

Figure 5. Atmospheric diffusion parameters, δ_z , for open and urban terrain. Pasquill-Gifford stability classes usually used in analysis are B (lapse), D (neutral), and F (inversion). Here $x = 0.5X$. (After Milly, 1957, and Hanna, et. al., 1982.)⁵

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

Chemical Knowledge Network Web Site

Do you need up-to-date information about chemical career management, courses, equipment, doctrine, and training development? All of this information and more is available at the Chemical Knowledge Network Web site. To visit the CKN, go to the Fort Leonard Wood Web site <<http://www.wood.army.mil/>> and select *Maneuver Support Knowledge Network (MSKN)* in the lower left-hand corner of the home page. At the Army Knowledge Online (AKO) portal, log in using your user name and password. Under *MANSCEN [Center of Excellence] CoE Links*, select *CBRN* to check out this great resource.

Adaptive Focus Force Protection Exercise

By Sergeant First Class Pam Voss

The 19th Sustainment Command (Expeditionary) (ESC) and the 501st Sustainment Brigade (SBDE) made history when the 19th Republic of Korea (ROK) Chemical Battalion arrived at the gate of Camp Carroll on 23 May 2007 to participate in an adaptive focus force protection exercise. This event marked the first time that an ROK chemical battalion performed a decontamination exercise on a U.S. Army installation. The exercise was a follow-up event to the agreement signed in November 2003 that transferred decontamination missions from the United States to ROK control.

The idea of a force protection exercise began several months ago when the 19th ESC staff met with the Second ROK Army Chemical, Biological, Radiological, and Nuclear (CBRN) Chief; his staff; and members of the 19th ROK Chemical Battalion. During the meeting, they discussed tactics and doctrine and mutually agreed to execute a combined exercise. An adaptive-focus exercise provided that opportunity. "This is . . . a first step to turning over operational control on [decontamination] decon operations to the ROK Army," said the assistant CBRN officer for the 19th ESC. Nearly 40 ROK soldiers participated in the exercise, which included the decontamination of vehicles, terrain, and Soldiers. "They brought their own equipment and were really eager to get started," said the 501st SBDE CBRN noncommissioned officer in charge (NCOIC).

After the group geared up, they proceeded to the water point to fill up three tank-and-pump units that would be used in the operation. "They were able to fill up To provide an additional water source, the fire department was prepared to support the operation with two fire trucks," said the NCOIC. While ROK Soldiers filled their trucks, a team from the 501st was busy conducting a chemical survey to establish the type and extent of the contamination. After battalion members filled their trucks with the necessary water for decontamination, they headed to their designated site. The 501st SBDE CBRN chief explained, "The 19th Chemical Battalion reconnaissance vehicles led the way by conducting an area recon and secured the . . . decontamination site." At



U.S. and ROK Soldiers discuss doctrinal issues and share notes prior to a decontamination exercise. (Photograph by Major Glenn Roper)

the decontamination site, two lanes were operational to handle the first contaminated Soldiers.

While the decontamination site was readied, a team of Soldiers from the 19th ROK Chemical Battalion prepared for another mission—terrain decontamination. The CBRN NCOIC from the 19th ESC described the decontamination site as ideal. "From my experience as a drill sergeant, we were able to accomplish the operation as close to doctrinally correct as the terrain would allow." The Soldiers did not set up all of the stations found at a thorough decontamination site, but that did not hinder the experience.

According to the 19th ESC CBRN chief, "The ROK soldiers demonstrated their skills to fellow Soldiers and company commanders. Since the 23d Chemical Battalion left the peninsula over two years ago, this is the first opportunity for this training to take place and it was a resounding success. Although this is just the beginning as the two commands work toward future training and building stronger habitual supporting relationships." 

Sergeant First Class Voss is the public affairs NCOIC for the 19th ESC.

Breaking News!

Chemical School Name Change: The Department of the Army has given approval to rename the U.S. Army Chemical School (USACMLS) to the U.S. Army Chemical, Biological, Radiological, and Nuclear (CBRN) School (USACBRNS). The name change, which was effective 8 January 2008, reflects the mission to train with equal emphasis in all these areas.

CBRN Conference: The National Defense Industrial Association (NDIA) will conduct their annual Joint CBRN Conference 23–27 June 2008. The theme will be “Enabling the Force at Home and Abroad.” The 90th Anniversary of the founding of the Chemical Corps will be commemorated.

Army Chemical Review Publishing Schedule: The Army Chemical Review publishing schedule is changing to Summer and Winter. This change goes into effect with the next issue, which will be published in June 2008.

Army Green-to-Gold Program Two-Year, Hip-Pocket Scholarships

The U.S. Army Chemical Corps will award three scholarships in the Army Green-to-Gold Program during the 2008–2009 school year.

Eligibility

All personnel applying for a scholarship must—

- Be a U.S. citizen.
- Be eligible for appointment as a commissioned officer (according to the guidelines in Army Regulation [AR] 35-100).
- Be under 30 years of age upon completion of the program requirements (waivers are authorized).
- Have at least two years of Active Army duty, but less than eight.
- Be recommended by their chain of command.
- Have a reenlistment with at least 48 months remaining upon entering the program.
- Have a general-technical (GT) aptitude score of 100 or higher (no waivers are authorized).
- Have a grade point average of at least 2.5 on all previous college work (no waivers are authorized).
- Have passed the Army Physical Fitness Test (no alternate events are authorized).
- Have two years remaining as a full-time student (4 semesters/6 quarters).
- Obtain an unconditional letter of acceptance from a university.

- Obtain a letter of acceptance from the Professor of Military Science (PMS).
- Have a favorable or have initiated a national agency check (NAC).
- Be medically qualified according to AR 40-501.
- Have no more than three dependents (waivers are authorized).

General Information

All selected recipients—

- Will continue to receive their current pay and allowances.
- May use the Army College Fund or the Montgomery GI Bill.
- Will maintain normal permanent change of station entitlements.
- Must commit to a service obligation of eight years (three years in the Active Army or five years in the Army National Guard or Reserve).

For detailed application information, go to the Reserve Officer Training Corps Web site at http://www.goarmy.com/rotc/enlisted_soldiers.jsp.

For additional information, contact the U.S. Army Chemical School Personnel Proponency Office at commercial phone number (573) 563-7728, DSN 676-7728, or e-mail leon.usacmls@conus.army.mil. 



Poison Arrows: North American Indian Hunting and Warfare, David E. Jones, University of Texas Press, 1 February 2007.

“War is waged with weapons, not with poisons” is the saying the Roman army used in response to the Germanic practice of poisoning wells. This has given some scholars the mistaken notion that poisoned weapons were historically rare. *Poison Arrows* adds to the growing body of knowledge on how unexceptional poisoned weapons were in antiquarian societies.

After a crude introduction to the general history of chemical-biological warfare, the author explains why many scholars may have missed the importance of using poisons in the North American Indian society and how they were employed for nonmilitary purposes such as hunting and fishing. The rest of the book focuses on poisoned arrows, including an extension to poisoned bullets and the conjecture of prehistoric hunting with poisoned arrows.

The disappointment in *Poison Arrows* is the frequent listing of references to various poison concoctions created for use with weapons. This renders the publication to a scholarly text of special interest, with a long list of sources from firsthand observers. There is no attempt to validate the correctness of the concoctions in terms of potency, with the author freely admitting that many may have been more ceremonial in origin.

Nonetheless, it is fascinating to see the similarity of many of the poisons and the specialized design of weapons. For Soldiers who have an interest in early American history, *Poison Arrows* will bridge the gap between profession and hobby; but for others, the book is too short and specialized to hold one’s attention.

A Poisonous Affair: America, Iraq, and the Gassing of Halabja, Joost R. Hiltermann, Cambridge University Press, 18 June 2007.

After World War I and the Abyssinian War, the Iran-Iraq War represented the next major use of chemical weapons. In this book, the author writes a detailed account with emphasis on the attack on Halabja. Using many primary sources and interviews collected over the years, the story has no heroes—the Iraqis used chemical weapons, the Iranians had their own atrocities, the Iraqi Kurds sided with Iran, and the United States turned a blind eye and sent inconsistent diplomatic signals.

The author worked for Human Rights Watch as a consultant and was in Iraq in 1992 to compile a study on Iraq’s Operation Anfal. He later returned to Iran (in 2000), Iraq (in 2002), and elsewhere in the Middle East on a series of grants to complete his research. His detailed research has made one of the most complete accounts of chemical operations during the Iran-Iraq War and the political-diplomatic subterfuge surrounding those events. Many past accounts focus on chemical weapons proliferation. *A Poisonous Affair* brings clarity to the chemical battlefield, describing the motivations and strategies of Iraqi chemical strikes in a series of engagements.

Later in the book, the story changes from Iran-Iraq to the internal conflict between Iraq and Kurdish separatists. A traditional means of counterinsurgency throughout history has been the slaughter of the innocent and the resulting loss of popular support. As a U.S. Civil Defense poster once stated, “civilians—without them there is no reason to fight.” The attack on Halabja made grotesque strategic logic and disintegrated Kurdish resistance. Even with this psychological defeat, Iraq took it a step further with the mass execution of civilians to change the ethnic makeup of the remaining communities.

This book examines the difficult relationship and fickle alliance between the United States and Iraq during the war. The context of this relationship is the U.S. reaction to the Iranian revolution, avoiding the larger U.S.-Soviet context that was still formidable in the minds of policy makers at the time. The persistent claim by the United States that Iran used chemical weapons, which the author finds unfounded, disrupted an international response against Iraqi chemical attacks.

The information reports of chemical casualties in battle are valuable and necessary to understand chemical-weapon effects (and the magnitude of difference between chemical fatalities and casualties). It also demonstrates the political dynamics of chemical allegations and the motivations of Iraq. To Iraq, chemical weapons ultimately kept Saddam Hussein in power by limiting the degree of military defeat from his misguided leadership and, eventually, ended the war with the threat of chemical attacks on Iranian cities.

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

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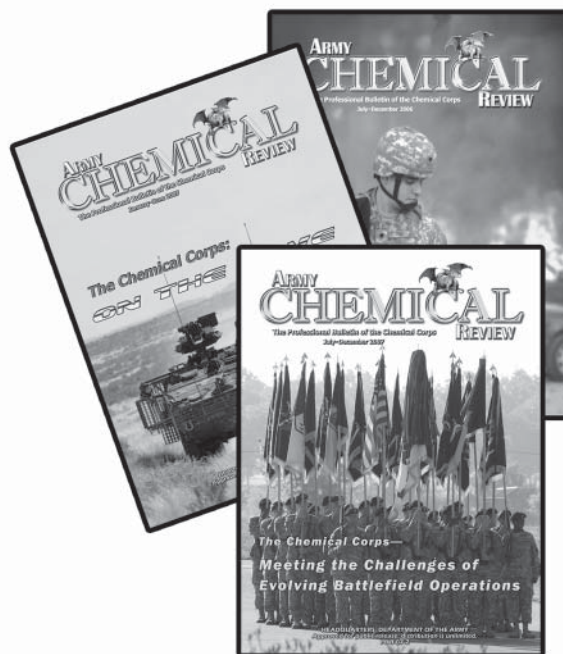
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Lineage and Honors

83d Chemical Battalion

Constituted: 12 March 1942 in the U.S. Army as the 83d Chemical Battalion

Activated: 10 June 1942 at Camp Gordon, Georgia

Campaigns during World War II: Sicily (with arrowhead), Naples-Foggia (with arrowhead), Anzio (with arrowhead), Rome-Arno, Southern France (with arrowhead), Rhineland, Ardennes-Alsace, and Central Europe

Reorganized and redesignated: 27 June 1944 as the 83d Chemical Battalion (Motorized)

Reorganized and redesignated: 7 December 1944 as the 83d Chemical Mortar Battalion

Inactivated: 26 November 1945 at Camp Myles Standish, Massachusetts

Redesignated: Headquarters and Headquarters Company (HHC) on 5 June 1951 as Headquarters and Headquarters Detachment (HHD), 83d Chemical Smoke Generator Battalion, and allotted to the Regular Army (remainder of battalion disbanded)

Activated: 16 July 1951 in Germany

Inactivated: 15 January 1952 in England; concurrently, HHD, 83d Chemical Smoke Generator Battalion redesignated as HHC, 83d Chemical Mortar Battalion

Redesignated: 1 February 1955 as HHD, 83d Chemical Battalion

Activated: 18 March 1955 at Fort McClellan, Alabama

Inactivated: 20 December 1966 at Fort Bragg, North Carolina

Activated: 1 October 1993 at Fort Bragg, North Carolina

Relocated and reorganized: 15 September 2000 at Fort Polk, Louisiana

Campaign during Operation Noble Eagle: Provided biological protection to the Pentagon October–December 2001

Campaign during Operation Enduring Freedom: Provided chemical, biological, radiological, and nuclear (CBRN) reconnaissance and force protection October 2001–September 2002 in Qatar, Uzbekistan, Afghanistan, and Kuwait

Campaign during Operation Iraqi Freedom: Served 118 days in support of the 377th Theater Support Command (V Corps) and the 1st Marine Expeditionary Force in Kuwait and Iraq

“High angle hell” is what they called it. The 4.2-inch diameter, 48-inch-long tube capable of throwing a volley of 80 rounds per hour up to 565 yards (4,400 yards with the improved high-explosive, point-detonating [HEPD] round), proved invaluable to infantry and ranger units during World War II. The men of the 83d Chemical Mortar Battalion carrying this tool of war emulated the bravery and versatility of Dragon Soldiers.

The 83d Chemical Battalion was activated as the United States entered World War II. After arriving in Oran, Algeria, on 11 May 1943, the battalion quickly prepared for amphibious assaults and other combat operations. The battalion was assigned to Darby's Ranger Force X, a special task force of U.S. Army Rangers charged with the invasion of Sicily. On 10 July 1943, the invasion task force landed at Gela, Sicily. Although the force was greeted by sustained artillery batteries, mortars, and machine gun fire, Soldiers hand-carried their 333-pound mortar systems through minefields and rough terrain to successfully suppress enemy attacks.

The 83d conducted four other amphibious and air assaults during World War II, to include landings in Naples-Foggia, Anzio, and southern France. The battalion valiantly served in eight campaigns, for a total of 508 days in combat.

Today, the Dragon Soldiers of the 83d Chemical Battalion continue to serve honorably by performing CBRN reconnaissance, biological surveillance and, during wartime operations, smoke and decontamination operations. The battalion deployed three times in support of the War on Terrorism (WOT). In Operation Noble Eagle, shortly after 11 September 2001, the battalion deployed the 7th Chemical Company from its home station of Fort Polk, Louisiana, to Washington, D.C., to provide identification and early warning operations at the Pentagon. Concurrently, the rest of the battalion began a rigorous training cycle for platoon elements deploying to Operation Enduring Freedom and Operation Iraqi Freedom. The 83d Chemical Battalion, rich with history and valiant service, continues to support the WOT today and sets a strong example for all Dragon Soldiers. 🐉

Archive information for Chemical units is maintained at the U.S. Army Chemical School History Office. Veterans are encouraged to send oral interviews, photographs, and documents to help us preserve the rich history of the Corps. For additional information or to submit information, contact the History Office by telephone at (573) 563-7339; by e-mail at <david.chuber@conus.army.mil>; or by mail at 401 MANSCEN Loop, Suite 44, Fort Leonard Wood, Missouri 65473-8926.

