

Quartermaster

PROFESSIONAL BULLETIN

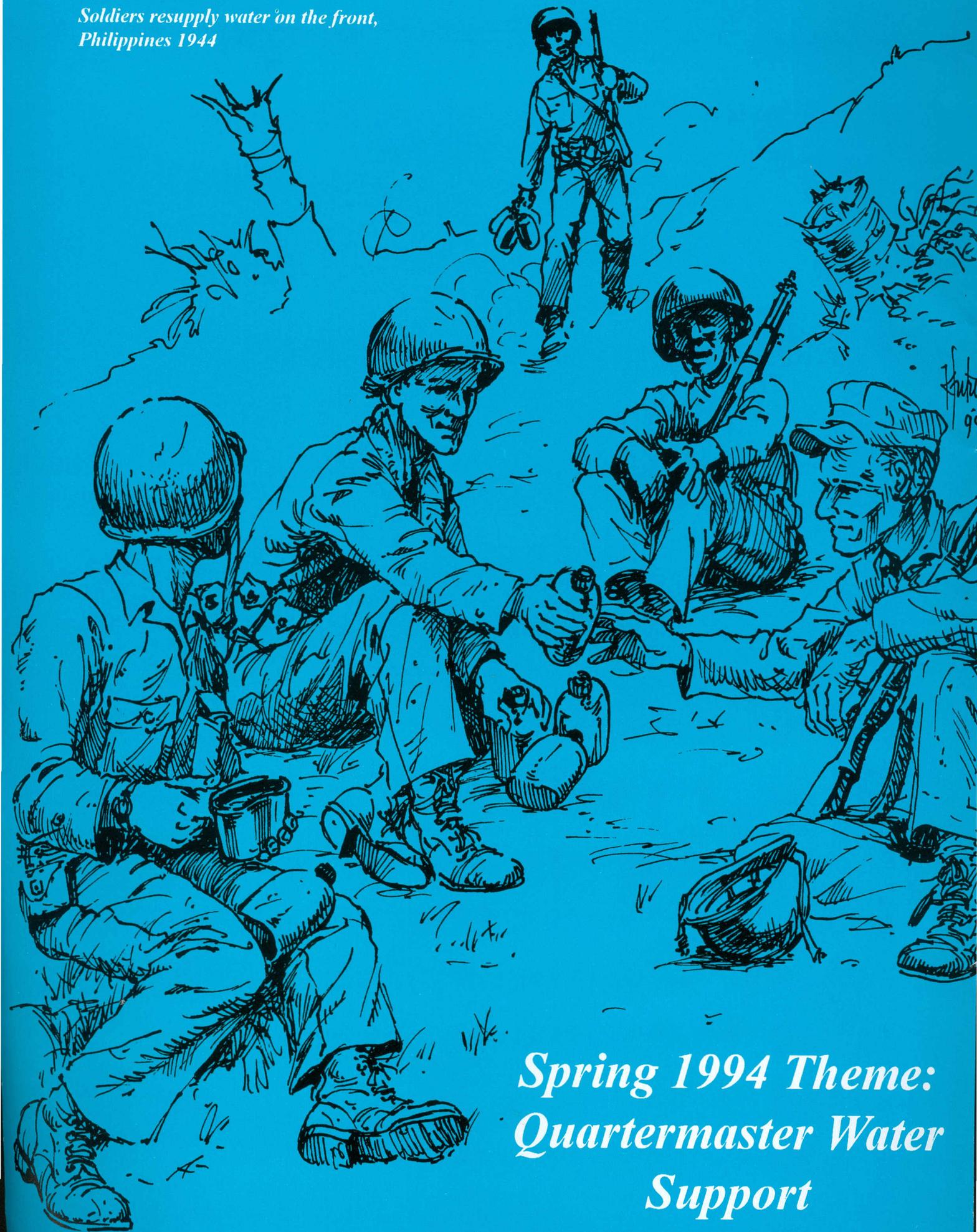
SPRING 1994

PB 10-94-1

SUPPORTING VICTORY



*Soldiers resupply water on the front,
Philippines 1944*



*Spring 1994 Theme:
Quartermaster Water
Support*

Quartermaster

PROFESSIONAL BULLETIN



The Quartermaster General
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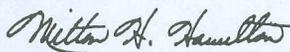
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The *Quartermaster Professional Bulletin* (ISSN 0896-9795) is published quarterly by the U.S. Army Quartermaster Center and School, Fort Lee, VA 23801-5032. The views expressed herein are those of the authors, not the Department of Defense or its elements. The content does not necessarily reflect the official U.S. Army position and does not change or supersede any information in other U.S. Army publications. Use of news items constitutes neither affirmation of their accuracy nor product endorsement. This professional bulletin is approved for official dissemination of material designed to keep Quartermasters knowledgeable of current and emerging developments to enhance their professional development. Use of the masculine pronoun is intended to include both genders where appropriate.

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05756

Distribution: Special

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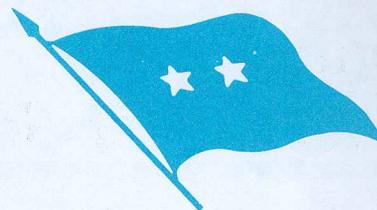
COVER AND ILLUSTRATIONS: LTC Keith K. Fukumitsu, Quartermaster, created all the cover art for this edition, as well as the line drawings accompanying the articles. LTC Fukumitsu was formerly assigned as Chief of the Course Development Division, Directorate of Training and Doctrine, U.S. Army Quartermaster Center and School, Fort Lee, Virginia.

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DISTRIBUTION: Approved for public release. Distribution is unlimited.

POSTMASTER: Application to mail at 2d class postage rates is pending at Petersburg, Virginia 23804-9998, and additional mail offices. Send address changes to Quartermaster Professional Bulletin, ATTN: ATSM-QMG-B, Fort Lee, VA 23801-5032.

From The Quartermaster General



Major General Robert K. Guest

Quartermaster Water Support

The theme for this edition's *Quartermaster Professional Bulletin* is water support. The focus is on the special contributions, training and missions of water support by Quartermasters throughout our Army.

An army without water is an army without the most essential life support commodity. Water support is one of the most critical logistical missions, yet is very often taken for granted. In addition to life support, the water mission is the resource indispensable for personal hygiene and cooking. It is ultimately an essential factor in determining good soldier morale in the field.

New Water Supply Battalion On Line

Take a look at the article on the recently activated **559th Quartermaster Battalion (Water Supply)**. Soldiers are providing outstanding water support all over the world in **Field Laundry and Bath Operations in Somalia** as well as **Water of Life**, basic water support in Somalia. Read about **Water Training** for the Quartermaster soldier, that initially takes place at the Water Training Division of the Petroleum and Water Department, U.S. Army Quartermaster Center and School, Fort Lee, VA. Readers can gain valuable insight on the water mission and water support in a theater of operations from the article, **Water Operations Overview**.

The rest of this issue contains a wide range of interesting topics to include a historical look at **Logistics of Ancient Armies**, **Supporting the Field Artillery at the NTC**, and **Joy and Pain: Change of Com-**

mand Inventory. This edition's Career News section provides valuable information on the professional development of both officers and NCOs. Manage your own career!

Thoughts of reorganization occupy everyone's mind at the Home of the Quartermaster Corps, as some components of the U.S. Army Quartermaster Center and School merge with the U.S. Army Combined Arms Support Command at Fort Lee, VA. Be assured that before and after the dust settles, our Quartermaster soldiers will not experience a negative impact on the quality of training support to the field.

Finally, I am proud to share the words of General Gordon R. Sullivan, U.S. Army Chief of Staff, during his recent visit to Fort Lee, VA: "The Quartermaster School — City Point, represents continuity with our past but at the same time is on the leading edge of information technology, environmental stewardship, and human resource development as we move forward." You are doing a great job. Keep up the good work!



Major General Robert K. Guest, 43d U.S. Army Quartermaster General, has held a wide variety of command and key staff positions. His previous assignments include Deputy Chief of Staff, Logistics, U.S. Army Europe and Seventh Army; Commander, 3d Corps Support Command, Wiesbaden, Germany; Director of Logistics Management, U.S. Army War College, Carlisle Barracks; Commander, Division Support Command, 101st Airborne Division (Air Assault); Chief, Supply and Maintenance Policy Division, Office of the Deputy Chief of Staff for Logistics; Commander, 1st Supply and Transportation Battalion, 1st Infantry Division.

Supporting Victory

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Greetings, Quartermaster Soldiers!



Command Sergeant Major Ricky A. Vernon

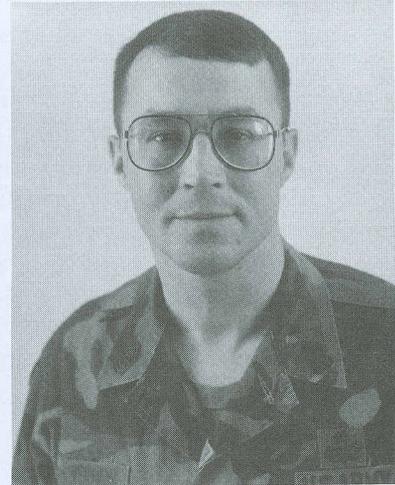
Before I introduce myself, I would like to acknowledge the retirement of Command Sergeant Major Milton B. Hazzard and his many contributions to the Quartermaster Corps and the Army over a period of 34 years.

During his long career, CSM Hazzard tirelessly promoted the image of the Quartermaster soldier and greatly enhanced the prestige of the Corps. He is the proud, professional, noncommissioned officer who enforced high standards while maintaining close ties with the soldiers he so truly loves. He will be missed by the Corps but will still be available during his retirement to talk to soldiers. I expect we will continue to see and hear from him in the future.

I AM QUARTEMASTER! And proud of it. Coming from the CSM of the 3d Corps Support Command in Wiesbaden, Germany, I have seen the many Quartermaster soldiers performing their duties in numerous countries under conditions good and bad. From training at Hohenfelds to the support of the hospital in Zagreb, Yugoslavia, our soldiers are there. We are one of the largest enlisted branches of the service. Every company in the Army has at least one of us. We are Quartermaster, and we sustain the Army.

Your *Quartermaster Professional Bulletin's* theme this quarter is Quartermaster Water Support, so take

this opportunity to read and learn something about your fellow Quartermasters. It never ceases to amaze me that we do all the things we do in our branch. I enjoy learning about what you do in your field. So invite me down and we'll do a little training together!

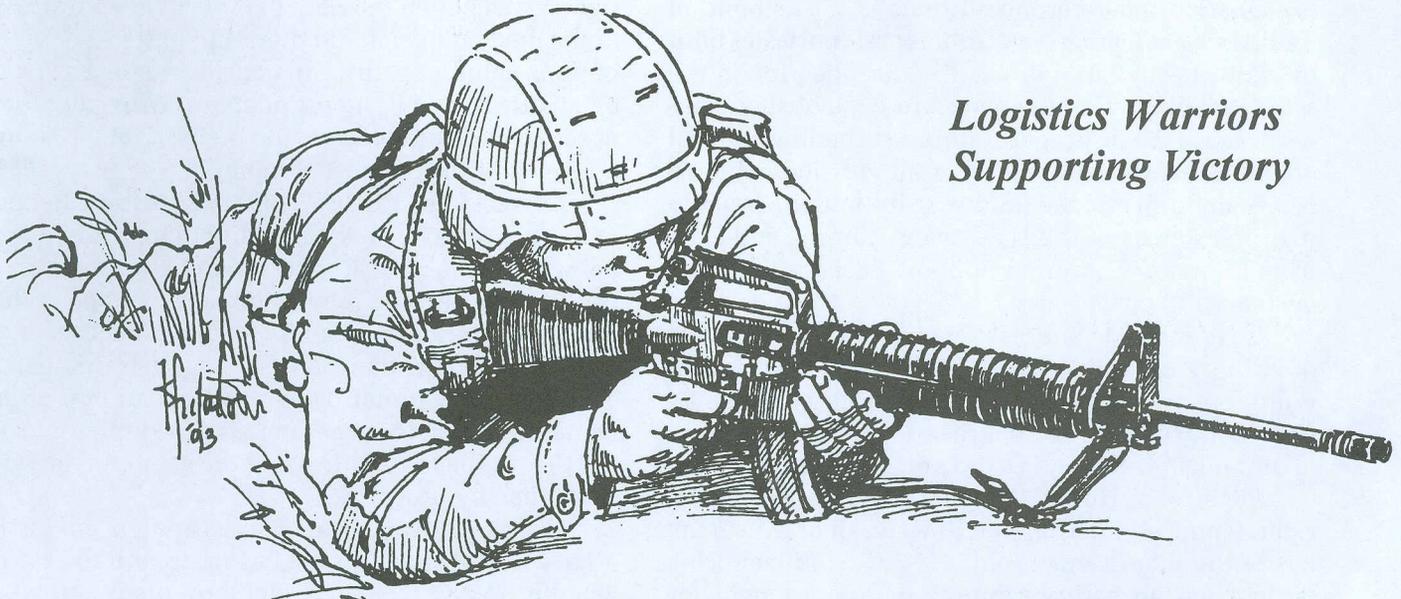


CSM Ricky A. Vernon

I AM QUARTEMASTER AND PROUD OF YOU!!!



Command Sergeant Major Ricky A. Vernon became the fourth Quartermaster Command Sergeant Major on 25 Mar 94. He joined the Army at age 17 in 1970. He is a graduate of Class 28, U.S. Army Sergeants Major Academy.



*Logistics Warriors
Supporting Victory*

Professional Dialogue

Disappointment

LT Lee R. Campe

I left the Army in 1990 after four years of enlisted service to go to college and become an Army officer. In August 1993, I received my commission and returned to active duty only to be disappointed by the loss of respect and tradition I found. As an officer I expected respect and courtesy. I found many junior enlisted and senior noncommissioned officers (NCOs) had no desire to give it. My first salute as an officer came from an E-4 with a cigarette in his right hand. I was shocked to see soldiers running to buildings at the warning bugle for reveille and retreat. When the cannon fired, I saw cars continue driving down the road on their way out the gate. This indicates a lack of pride in today's soldiers. I had expected the downsizing of the Army to leave only those soldiers who most desire to serve. While I have met many motivated leaders and followers, they do not seem to be the majority.

The lack of pride plagues the officer corps, leading me to see the soldiers' behavior as a result of "follow the leader." I have witnessed many officers who pass a soldier needing correction or who lead the way to cover at 1655 hours. Why should a soldier salute when the leader does not require it?

As an enlisted soldier, I held my officers in high esteem. I envied the strong bonds between officers.



Lost Traditions

CPT William R. Stowman

The disappointment that LT Campe has experienced is common among noncommissioned officer (NCO) and officer corps traditionalists. The bond of tradition establishing our customs and courtesies built by centuries of battle is steadily disappearing in the ranks. Mediocrity in adherence to the established standards and lack of proper training at the lowest level are our greatest deterrents. For all enlisted soldiers, NCOs and officers, the following information merely highlights areas of the U.S. Army Training and Doctrine Command Training Support Package (TSP) on customs and courtesies.

Customs and courtesies are essential in all facets of military life because they allow a two-way flow of mutual respect. Understanding appropriate application of our customs and courtesies will assist soldiers of all ranks throughout their careers.

Position of Honor. The place of honor is on the right. If junior in rank, you will walk, sit or ride to the left of the more senior soldier, NCO or officer. This custom has an early beginning. Soldiers fought for

They had generations of tradition and a commission from the president to bring them together. This illusion was shattered by introduction to the officer corps. It has been an introduction to the spirit of individuality and a lack of tradition. The Officer Evaluation Report, for example, says more about individualism than teamwork. The officer club is not the traditional "county club" the Army touts it to be: it is more like a banquet center where few officers can be found. In six months of active duty, I have had only limited mentoring from senior officers. If it were not for my ever-present Training, Assessment and Counseling (TAC) Officer, I would have none.

The solution to these problems rests with the Army's leadership. As junior leaders we are taught the principle of leading by example. The Infantry School has even adopted this principle in its motto, "Follow Me." However, leading by example is not limited to mission-oriented training and combat. It is an ongoing process by which the traditions and heritage of the Army are preserved, leading to increased teamwork and esprit de corps. The army that wins in garrison will win on the battlefield.



LT Lee R. Campe, a recent graduate of the Quartermaster Officer Basic Course, is assigned as a Rigger Platoon Leader, Vincenza, Italy. Previously, he was assigned as an Engineer Sergeant at Fort Campbell, Kentucky.



centuries with sword and shield. Since most men were right-handed, the heaviest fighting occurred on the right. The shield was carried on the left arm, and the left side became defensive. The most trusted and best fighter was put on the right to protect the sword arms of the men on his left. Soldiers and units were proud of their fighting ability and considered the right side of a battle line to be a post of honor. When an officer or senior enlisted soldier walks on the right, he is symbolically filling the post of honor.

Correct Use of Titles. Military rank is a reflection of merit. We have a responsibility to treat all personnel with due respect. Conversation in the presence of troops should always remain formal and proper. When not in the presence of soldiers, you may observe seniors introducing themselves using their first names and addressing junior personnel by their first or last name. However, this does not give the junior personnel the privilege of addressing the senior in any way other than by proper title.

Wearing of Headgear. The uniform is only complete when the appropriate headgear is worn. Too often officers, NCOs and soldiers show disrespect when

they do not remove their headgear when appropriate or when they wear it cocked back on the head. All soldiers need to understand that they are often judged on their appearance. The improper wear of headgear is an easy way for others to evaluate your level of discipline along with your unit.

Responding to a Senior Officer's Presence. The appropriate response varies, depending on whether you are indoors or outdoors. If you are the first person to observe a senior officer enter a room, you are responsible for calling the group to attention. If you are in an outdoor setting and a senior officer approaches your group, call the group to attention, salute and give the greeting of the day. In both situations the senior officer has an obligation to the group to (a) leave them at attention, (b) call, "at ease" or (c) call, "carry on." Always remember, whether you are indoors or outdoors, in a group or as an individual, rise to the position of attention when the senior officer approaches. If you are outdoors, render a proud salute and give the greeting of the day.

Salutes. Understanding how to appropriately salute is important because it tells a lot about the individual soldier and the unit from which that soldier comes. The salute itself should be a smart and proud

response to recognition of an officer. The salute should never be slow and sloppy because that shows lack of confidence and self-discipline. Too often soldiers and officers attempt to avoid recognizing each other so they do not have to render the salute along with the greeting of the day. Sadly, this type of conduct is becoming more and more prevalent throughout the service.

I have only cited a few of the Army's customs and courtesies, but many more exist and should be read by all of us in the military. It is important that our military traditions continue because so many before us have given their blood, allowing us the privilege of wearing the uniform in support of our nation. It is equally important that we who are in the military enforce the highest standards so that military life as we know it can improve for those who choose to follow.



CPT William R. Stowman is currently serving as a Quartermaster Officer Basic Course Training, Assessment and Counseling (TAC) Officer. Previous assignments include Commander, Supply Company, Egypt; Assistant S3, Egypt; Company Executive Officer and Platoon Leader, 13th Corps Support Command, Fort Hood, Texas; and Radio Teletype Specialist, 2d Armored Division, Fort Hood, Texas.

Quartermaster Valor at the Battle of Bull Run

CPT Mark A. Olinger

Volumes have been written about the rout of the Union Army by a smaller and less trained Confederate force at the Battle of Bull Run (vicinity of Manassas, VA) on 21 July 1861. What is often forgotten is the valor displayed by Union soldiers during the day's fighting before the rout toward Washington, D.C. began. A Quartermaster named Charles J. Murphy was one of those soldiers who displayed incredible personal bravery during and after the Battle of Bull Run.

First Lieutenant Charles J. Murphy was the Quartermaster for the 38th New York Infantry Regiment (38th New York). During the Battle of Bull Run, he took a rifle and voluntarily fought with his regiment in the ranks. When the 38th New York was forced back by Confederate infantry soldiers, he volunteered to remain behind to care for his wounded comrades. At the conclusion of the fighting, First Lieutenant Murphy organized a field hospital at Sudley Church. He remained in charge and tended to the wounded until he was captured by the Confederates. Establishing and running a field hospital were not within the normal duty requirements of a Civil War Quartermaster. Within two days, First Lieutenant Murphy was confined at a military prison in Richmond, VA. His later escape to Union lines, after the most-unheard-of suffering was one of the best planned and most successful escapes of the war.

For his distinguished gallantry in action at the Battle of Bull Run and care of wounded soldiers, he was awarded the Congressional Medal of Honor on 6 April 1898. This award gives him the distinction of being the first Quartermaster to *earn* our nation's highest award for valor. (I base this claim on the date that the Congressional Medal of Honor was earned and not the date it was awarded.)



CPT Mark A. Olinger has a bachelor of science degree in business administration from California State Polytechnic University, Pomona. He is a graduate of the Operations Research Systems Analysis Military Applications Course I, Combined Arms and Services Staff Course, Canadian Basic Parachute Course, the Quartermaster Officer Advanced Course, Airborne Course, Air Assault Course and the Infantry Officer Basic Course. His assignments include command and staff positions with special operations forces at Fort Bragg, North Carolina, Panama and Saudi Arabia; and Infantry positions in the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky. He is currently an operations research analyst with the Department of Defense, Fort Meade, Maryland.

Water Support Concept

CPT Marietta Wells

An integral part of the Army's ability to sustain combat operations is its water supply system. If a soldier does not have adequate water, his health, combat effectiveness and, ultimately, the success of the mission are jeopardized.

Although rarely mentioned as such, water is the most important nutrient of all: vital to life itself. It is possible, for instance, to survive for several months without eating any food. Stop drinking water, on the other hand, and life would end in just two to three days. In an arid

environment, death would come even sooner. No wonder that supplying water to soldiers is critical to the success of our Army. Our most advanced weapon systems depend on the efficiency of the soldiers who operate them. When the water supply is inadequate, the combat effectiveness of our soldiers is severely impacted.

FM 10-52 (Water Supply in Theaters of Operations) provides current doctrine for water support. It states that "Water supply is provided on an area basis by QM (Quar-

termaster) units using supply point distribution."

Operation Desert Shield/Storm was a test for current doctrine. As U.S. ships steamed to the region and U.S. aircraft prepared for forward deployments, the first soldiers hit the ground. The buildup began immediately on the heels of the initial deployments. Additional combat elements arrived almost daily, followed by combat support and combat service support units.

As the number of troops in theater increased, the supply of water

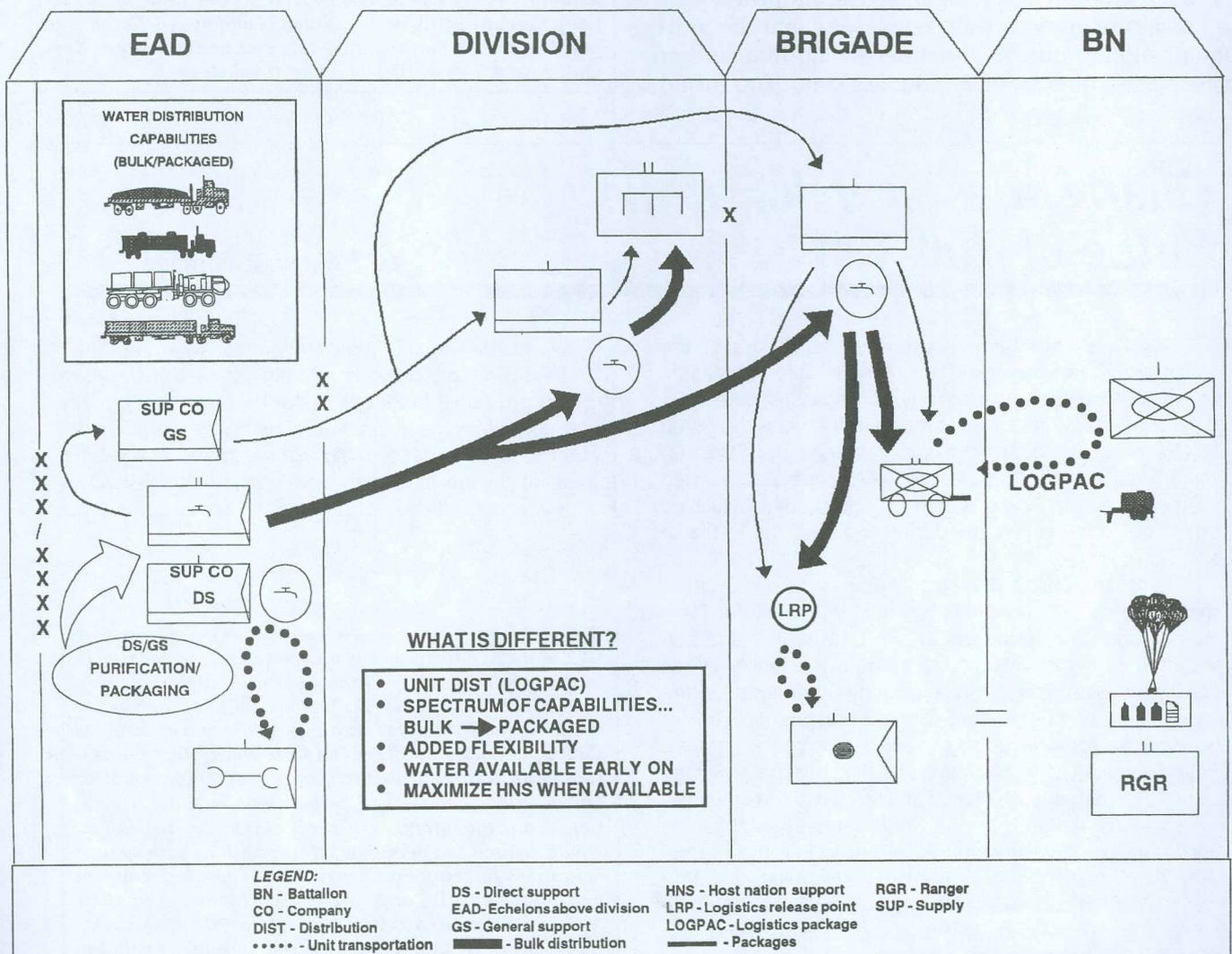


Figure 1. Future Water Distribution and Organic Water Packaging Capabilities

became critical. Daily consumption of water exceeded expectations: running a theater average of 20 gallons per soldier per day. Many units did not have adequate storage and transport equipment to maintain one day's water supply. In addition to other duties, soldiers had to make multiple trips, often over long distances, to the water supply point. This diversion of personnel and transportation assets from their primary mission caused commanders to call for unit distribution of water.

Hardwall Tankers

Our primary means for line-haul of water is the semitrailer mounted fabric tank (SMFT), which is available in two sizes to carry either 3,000 or 5,000 gallons of water. However, the SMFT cannot safely be transported unless completely full or empty. Therefore, hardwall tankers (5,000-gallon) were procured and used in response to the combat commander's request for unit distribution. Bottled water also became the order of the day. Most was supplied by the host country. These bottles were transportable on tactical vehicles organic to the consumer units.

Operation Desert Shield/Storm highlighted the need to improve how water is handled on the battlefield. Specifically, the Persian Gulf war identified significant shortfalls in water distribution, packaging capabilities, and storage.

Therefore, the U.S. Army Quartermaster Center and School (USAQMC&S) is developing a concept to refine current water doctrine based on the desert wartime operations and the increasing mobility and agility of Army units. This article will explore the new concept in the areas of water distribution, packaging, storage, and purification.

In future operations, water will be delivered from water points to battalion field trains (or where logistics packages are being configured), and logistics release points (LRPs) near consuming units. (See Figure 1.) Water will be delivered to all consumers in the division area. Water

will also be delivered to consumers in the corps and theater area, if required, based on mission, enemy, terrain, troops and time available (METT-T). LRPs may support highly mobile units and units passing through an area. Situations may require LRPs forward of the brigade support area (BSA), depending on METT-T and the distance from the forward line of our troops to the BSA. Direct support (DS) water support elements may deliver bulk water in hardwall tankers or deliver packaged water through the standard supply system on cargo trucks or trailers. Once resupply is complete, hardwall tankers, trucks and trailers can move to a new location easily and quickly, as they need not be emptied (a shortfall of the SMFT) before they can depart.

Packaged Water

The Army does not currently have the capability to package water. Packaged water previously used on the battlefield was procured through host nation agreements and contractual arrangements. The new concept calls for an organic capability to package water on the battlefield. That capability will reduce the Army's reliance on contract and host nation sources. It will also reduce the burden on the strategic transportation system when in-theater sources are not available.

Echelon above division (EAD) water sections will have the capability to package water in field locations. The DS supply company and the water supply company are being considered as candidates to perform the packaging mission. The packaging will consist of expendable, lightweight material. A broad spectrum of package sizes will provide added flexibility to consumer units. Package sizes will range from small packages that can interface with canteens to larger packages that can support crew and unit requirements such as sanitation, food preparation, personal hygiene, maintenance and decontamination. Packaged water can be used to perform

a variety of functions. Packages can be used to deliver water to unit trains and LRPs or be used in caches. They can also be used to enhance the consumer unit's storage capability.

Packaged water produced by Quartermaster units will contain a minimum of one gallon of water. The packages are not designed to replace canteens or to be carried on a soldier's load-bearing equipment. The packages will provide a way to perform unit distribution of water. Packaged water can be transported similar to dry cargo on vehicles available throughout the Army. Soldiers can use the packages to refill their canteens with water.

Currently, many units cannot store and transport one day's water supply. The new concept states that all units will have the capability to maintain one day's water supply. This will eliminate the need for units to receive water resupply several times daily. The Army can meet this requirement by using packaged water containers and by increasing organic water storage/transport assets of units with a shortfall in this area. Units can then be resupplied with water daily through delivery to the units' trains or LRPs. Units in the corps and theater areas will make only one trip to the water supply point daily.

Planning Factors

To put the requirement for maintaining one day's water supply in perspective, we are also reexamining the definition for one day's water supply. The current planning factor for an arid environment is 18.4 gallons/soldier/day. A maneuver company within the theater actually only needs 6.2 gallons/soldier/day for drinking, personal hygiene, heat treatment, vehicle maintenance, and company feeding. The rest of the maneuver company's water requirement is stored at combat support and combat service support units. Examples of uses that fall in this category include engineer construction, aircraft maintenance, medical, laundry and showers. (See Figure 2.)

The water support concept does not propose revisions to DS or general support water purification capabilities. However, some units, such as Special Operations Forces, cannot always be resupplied through traditional methods. During rapid tactical movement, independent operations, or while otherwise separated from normal supply channels, packaged water or self-processed water can meet the need for water resupply.

Lightweight, portable and compact water purification equipment will provide individual soldiers and small groups water purification capability when no other water resupply is available. Two types of water purification equipment will be available to meet the unique requirements of these units. One is a small unit water purifier that will process

enough water to support a small group. Another is an individual water purifier that will be compact enough to carry on a soldier's load-bearing equipment. The water purified with this equipment will be safer and more palatable than water disinfected with iodine or chlorofloc tablets.

The Army must be able to project lethal and survivable combat power rapidly against a variety of threats into any part of the world. Flexible, proactive water support is required to resupply the highly mobile and agile forces in future operations. Modernization of the Army's capability to provide water to the ultimate weapon—the soldier—is long overdue. Hopefully, the new water concept, with approval expected in First Quarter, FY 95, will provide the road map for the im-

provements needed in doctrine, training, unit organizations, and materiel.



CPT Marietta Wells is currently the Logistics Plans Project Officer for the Concepts and Force Integration Division, Directorate of Combat Developments, at Fort Lee, VA. She has a bachelor of science degree in marketing/management from Rio Grande College, Rio Grande, Ohio. She is also a graduate of the Quartermaster Officer Basic and Advanced Courses, the Logistics Management Development Course, Combat Development Course and Combined Arms and Services Staff School. Her previous assignments include Force Modernization Officer and Group Adjutant, 29th Area Support Group, Germany; and Executive Officer, Headquarters and Headquarters Company, 21st Theater Army Area Command, Germany.

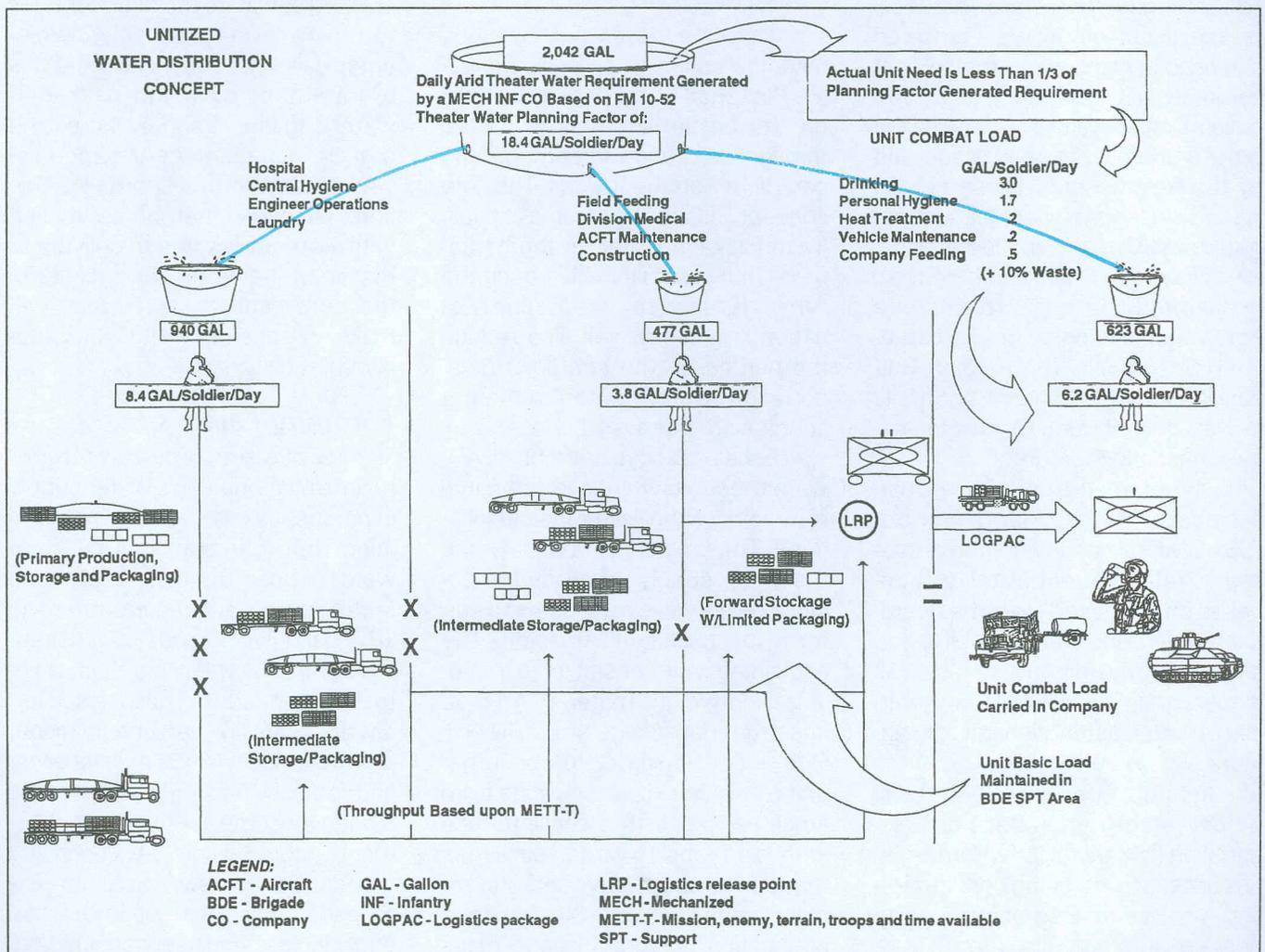


Figure 2. Redefining One Day's Water Supply

Water Training

CPT Harry Cruz

Water: sometimes overlooked, most of the time taken for granted, but always a necessity in combat as well as peacetime humanitarian relief efforts. Water is a commodity that every soldier must have to survive. It is an individual commodity that reaches all of us as soldiers, right down to our personal canteens. We use water on the battlefield for drinking, cooking and personal hygiene.

Even our equipment requires water to operate. Vehicle engines are cooled by it; nuclear, biological, chemical decontamination is performed with it; equipment is washed with it; and the field hospital could not sustain operations without it. The availability of water directly affects the survivability of units and soldiers on the battlefield. Without a daily supply of fresh potable water, morale would drop, sickness and dehydration would follow, and even the best of units could come to a grinding halt.

So, the military occupational specialty (MOS) 77W (water treatment specialist) plays a critical role on the battlefield. The 77W is the Logistics Warrior responsible for keeping a daily flow of potable water to the soldiers on the battlefield.

The Water Training Division of the Petroleum and Water Department, U.S. Army Quartermaster Center and School, Fort Lee, VA, provides initial water training (technical and tactical) to water treatment specialists (77W10). These active duty, U.S. Army Reserve, and Army National Guard soldiers learn to install, operate and maintain equipment for production, storage and distribution of potable water. The initial course is 11 weeks, 4 days. The Water Training Division also provides technical instruction and overview to the following courses: Pe-

troleum Officer Course (POC) 92F, Combined Logistics Officer Advanced Course (CLOAC), Officer Basic Course (OBC) and the Pre-Command Course (PCC).

Department personnel serve as subject matter experts (SMEs) for water units and agencies worldwide and as coordinators for the Army's Water Supply Apprenticeship Program. Water experts also work on mobile training teams (MTT) and new equipment training teams (NETT) to meet worldwide requirements.

Hands-On Training

At Fort Lee, the 77W10 course is divided into six annexes for intensive hands-on training; testing and site and set up operations on the tactical water distribution system (TWDS); storage and distribution; water analysis; and operation of reverse osmosis water purification units (ROWPUs): 600-gallons per hour (gph), 3,000-gph, and 150,000-gallons per day. The Logistics Warrior tactical exercise gives soldiers a working knowledge of the techniques for purification, storage and water distribution in a field environment using the 600-gph ROWPU.

The 77W10 training takes place at five remote sites. The most popular for overall realistic training is Mechling (Appomattox River). It has a large raw water source, settling ponds for chemical dissipation and

backwash according to Environmental Protection Agency certification, tidal effects, storage area for chemicals, and a large classroom for inclement weather.

The instructors have diversified experience. The water treatment specialist leaves Fort Lee as one of the best prepared and competent soldiers in the Army.

The Water Training Division assists all units worldwide by answering technical questions. Phone numbers are DSN 687-2993/2980, Commercial (804) 734-2993/2980.



CPT Harry Cruz is Chief, Water Training Division, Petroleum and Water Department, Fort Lee, Virginia. He has a degree in bilingual education from the University of Puerto Rico. He is also a graduate of Combined Arms Service Staff School; Quartermaster Officer Advanced Course; Petroleum Officer Course; Battalion Motor Officer Course; Bradley Infantry Fighting Vehicle Commanders Course; Nuclear, Biological, Chemical Officers Course; Airborne; and Infantry Officer Basic Course. His previous Infantry assignments include Platoon Leader, Support Platoon Leader, Headquarters and Headquarters Company Executive Officer, 5/5 Cavalry, 3d Armored Division, Kirchgöns, Germany. As a Quartermaster, he has been Company Commander and Petroleum Officer Course Director.

Water Supply Training for the Quartermaster Officer

Linda Orlando

"If all of the world's water could be contained in a gallon jar, only one tablespoon of that water would be available for human consumption." Because of the scarcity of water in many parts of the world, many believe that water will be the next resource for which war will be waged.

At the U.S. Army Quartermaster Center and School's Petroleum and Water Department, officers learn how to provide this critical support to U.S. forces. As Quartermaster Officer Basic Course (QMOBC) students, officers are introduced to the reverse osmosis water purification units (ROWPUs), especially of value in processing salt water, and to water storage and distribution equipment. They learn how to compute water requirements and how to reconnoiter a water point. Of special interest to the students is a water reconnaissance exercise in which they reconnoiter a site, perform water quality testing, determine equipment layout and propose basic site improvements.

The Combined Logistics Officer Advanced Course (CLOAC) students build on the QMOBC experience during the situational training exercise (STX). The officers assemble a 600-gallons per hour ROWPU and then recover and repack the components.

Upon completion of the Petroleum Officer Course (POC), the Quartermaster captain receives an area of concentration (AOC) of 92F. The POC students expand their water knowledge by identifying those units which provide support in a theater of operations; discussing water quality tests, to include testing for nuclear, biological, and chemical contaminants; and examining methods of water point improvements. Their training ends with a scenario-driven exercise in which students develop a water distribution plan for disaster relief.

The Petroleum and Water Department strives to present not only current doctrine and procedures but also to make the officer aware of developments in water operations. We stress the impact that the type of climate has on requirements and support, emphasizing the importance of additional storage and distribution to satisfy **all** water requirements in an arid environment. As seen in Somalia, the role of a water

supplier may be expanded to support not only sister services but the civilian populace. During natural disasters, Army National Guard and U.S. Army Reserve units are called upon to provide potable water for our own citizens.

Throughout a military career, the Quartermaster officer is expected to be ready to lead in the support of our soldiers. As a 92F, the Quartermaster officer can be expected to support soldiers, marines, sailors, airmen and civilians with the most important commodity of all — water.



Linda Orlando is a Training Instructor at the Advanced Petroleum and Water Division, Petroleum and Water Department, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. Specializing in water doctrine and environmental concerns for petroleum and water, she coordinates training for the Quartermaster Officer Basic and Branch Qualification Courses.

Army Environmental Hotline

The Army's Environmental Response Line answers environmental questions with a toll-free telephone call.

The hotline is available to any Department of the Army employee: soldier or civilian, Active or Reserve Component. CONUS callers dial 1-800-USA-EVHL (3845), and OCONUS callers dial DSN 584-1699. The line is staffed from 8 a.m. to 4:30 p.m. Eastern time on all federal business days. During other hours, calls are logged by an answering machine, and return calls are made the next business day.

When hotline personnel receive a call, they ask a few questions to clarify the caller's needs. Then they transfer the caller to the Army's subject matter expert to answer the question. The staff regularly performs quality control checks to make sure that callers received an accurate and timely response to their questions. The hotline is designed to respond to the Army's environmental needs.

Water Operations Overview

David L. Bruen

The Petroleum and Water Department at the U.S. Army Quartermaster Center and School, Fort Lee, VA, serves as focal point for all proponent and training issues. This includes individual and unit training, distributive training, soldier Self Development Tests, and officer Military Qualification Standards. The department has four divisions: Development, Evaluation and Validation; Water Training; Basic Petroleum Laboratory; and Advanced Petroleum and Water.

Because water supply is a combat multiplier as well as the center of gravity in arid environments, the Quartermaster Corps' mission is the timely and adequate supply of this critical battlefield commodity. Soldiers require water for personal consumption, sanitation, cooking, maintenance, equipment operation, decontamination, and a host of other purposes. In temperate, tropic and arctic environments, fresh surface and subsurface water sources are sufficient. With adequate water sup-

success of the mission are jeopardized. Each company is responsible for using its organic water distribution equipment to obtain water from the approved water point and distribute water within the company. For light Infantry battalions and companies, the Quartermaster water supply unit provides unit deliveries to the battalion's combat trains.

Major Casualties

Getting water to the soldier in the individual fighting position is the

Throughout military history, the majority of war casualties have been from disease and nonbattle injury. This can be drastically reduced by ensuring that soldiers have adequate supplies of potable water.

History

The Army conducted water training under the Engineer School's direction at Fort Belvoir, VA, and Fort Leonard Wood, MO, from the World War II era until 1981 when proponenty transferred to the Quartermaster School. Training of enlisted personnel transferred to Fort Lee in September 1984. Instruction in the reverse osmosis water purification process was added to the curriculum in the transfer. Water storage and distribution operations were added to the curriculum in 1986.

Today, new facilities at the Appomattox River site and Bailey's Creek make the water training both realistic and ecologically acceptable. The department's facilities also include classrooms, laboratories and field training sites. These facilities enhance the department's curriculum in petroleum and water logistics management; petroleum and water testing; and water purification, storage and distribution.

ply, water operations become a requirement involving a minimum of management except in emergencies.

In desert environments, the timely water support takes on significant new dimensions. Soldiers must increase individual water consumption. Critical and scarce water sources in arid regions require strict management controls. Commanders must establish priorities, set up allocation systems, and monitor water consumption requirements.

Each military service provides its own water resource support. However, water resource support beyond a service's capability in a joint operation is provided by the Army or another service, as appropriate.

Critical Links

The critical link in water supply operations is the internal unit distribution within the consuming units. If the soldier does not have adequate water, his health, combat effectiveness, and ultimately the

critical link in water distribution operations. If this link fails, the condition does not matter of the purification, storage, and distribution assets at brigade, division, corps, or echelons above corps. Throughout military history, the majority of war casualties have been from disease and nonbattle injury. This can be drastically reduced by ensuring that soldiers have adequate supplies of potable water.



David L. Bruen, a retired U.S. Army Noncommissioned Officer, is a graduate of Saint Leo College with a bachelor's degree in human resources. He serves voluntarily on the education Committee of the Virginia Section of the American Water Works Association. He is currently assigned as a Training Specialist, Petroleum and Water Department, U.S. Army Quartermaster Center and School, Fort Lee, Virginia.

Water Support Planning for Contingency Corps Operations

David L. Bruen

The principal corps-level water planner is the corps G4 (Assistant Chief of Staff, Logistics). In temperate, tropic or arctic regions, the corps G4 receives most planning input from the Corps Materiel Management Center (CMMC) subsistence managers and from petroleum managers in hot/arid environments. Preparing complete plans requires lateral coordination with the corps engineer and the corps surgeon, plus vertical coordination up to the theater Army (TA) Deputy Chief of Staff for Logistics (DCSLOG) and down to the division G4. While collecting planning information for vertical exchange, each of the other levels coordinates laterally in a manner similar to the corps G4.

Water support planning for a contingency operations corps has different assumptions than planning for supply classes or planning sustainment of an established corps. Planners must recognize that, unlike the supply classes, there are no prepositioned war reserve stock (PWRS) for potable water. There is also no unit basic load (UBL) of packaged water. The only PWRS water assets are production, storage, distribution and issue equipment stored afloat or in forward locations.

Corps water support planners must consider variable requirements and supply capabilities. Water requirements are classified as either minimum or sustaining and vary by both echelon and climate. See FM 10-52 (Water Supply in Theaters of Operations) for more detail. Planners must address water requirements which depend directly on the number of soldiers supported as well as those driven by activities other than troop strength.

Assumptions

Planners assume that some water requirements can be postponed temporarily or even indefinitely, if necessary. Planners further assume that other requirements may be satisfied by nonpotable water when sufficient potable water is unavailable.

Planners must recognize that water production capability varies radically depending on both the temperature and salinity (salt level) of raw water. Planners should assume that the existing direct support (DS) water force can normally produce enough water in temperate and arctic regions. A parallel planning assumption in hot/arid areas is that the DS water force will require some general support (GS) augmentation.

Planners must also understand how available host nation support (HNS) can significantly alter the final composition of the water force.

For a contingency operations corps, planners cannot assume an established theater water support structure with existing HNS agreements meeting the requirements of a fixed number of personnel. Instead, logisticians must plan for increasing water requirements in a supply environment where water is initially scarce. Planners must schedule buildup of water assets with buildup of theater forces. Logisticians must focus on tailoring a water supply force structure that always meets or exceeds requirements driven by the current size of the contingency operations corps.



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History of Water Treatment

David L. Bruen

The treatment of water probably ranks among the oldest of all known chemical processes. In fact, Aristotle (384-322 B.C.) mentioned that fresh water was produced by the evaporation of seawater. Thus, distillation as a method of producing fresh water was discovered.

The process of osmosis was discovered in 1748 by Nollet, a French physicist, who found that water would diffuse spontaneously through a pig bladder membrane. Over 100 years later in 1867, Traube, a German chemist, performed experiments with artificially prepared membranes.

Since the original discovery of osmosis in 1748, osmosis and reverse osmosis (RO) remained undeveloped for over 200 years. Then, in the late 1950s, Reid and Breton at the University of Florida developed cellulose acetate RO membranes. In the early 1960s, Bray and Westmoreland at the Chemical Process Group of General Atomic Division developed the spiral-wound membrane. Fluid Systems Division, DuPont, and Hydranautics were major driving forces in translating membrane technology from the laboratory to a unit process. Caddote developed the first thin-film composite (TFC)

membrane in 1972. This TFC membrane design is used today in all Army reverse osmosis water purification units (ROWPUs).

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ROWPU Operations: The Cold Facts

CPT David M. Thomas

One of the Army's most critical logistics resources on any battlefield is water. The 600-gallons per hour (gph) reverse osmosis water purification unit (ROWPU) is the Army's primary water purification "workhorse." This lightweight equipment was developed for use by highly mobile parachute units. Currently trailer-mounted and towed by a 5-ton cargo truck, the 600-gph ROWPU can be airdropped, if necessary.

The 600-gph ROWPU consists of a pretreatment section to remove larger impurities and a reverse osmosis (RO) section to remove most salts and other dissolved impurities. The pretreatment process consists of coagulation of the larger impurities by adding a cationic polymer to the raw water, followed by filtration through the multimedia and cartridge filters. The RO portion of the water purification process is a single pass of the water through four pressure vessels. Each pressure vessel contains two six-inch RO membrane elements. If necessary, ion exchange and activated charcoal columns are used to remove nuclear, biological and chemical (NBC) agents. The product water is then chlorinated to kill biologically active organisms in both the water and the distribution system.

The ROWPU's lightweight design limits cold weather operations. Cold weather research indicates that as the raw water and ambient air temperature decrease, the ROWPU's water production rate also decreases. The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted initial testing in July 1984. A 600-gph ROWPU was set up and operated in the Cold Chamber at CRREL's Hanover, NH, materiel evaluation facility. Test data revealed that ROWPU production dropped from 687 gph at a raw water temperature



Combat developers deployed a raw water subsystem and a warm water injection system to field test ROWPU winterization components at Fort Wainwright, Alaska.

of 68 degrees Fahrenheit (F) to 348 gph at a raw water temperature of 34 degrees F. This decrease in production of almost 50 percent illustrates the impact of cold water tem-

peratures on the ROWPU. As the temperature dropped below freezing, the ROWPU experienced problems with the raw water pumps, hoses and other components freezing.

The U.S. Army Quartermaster Center and School's (USAQMC &S's) Directorate of Combat Developments spearheads an effort to improve unit ability to purify, store and distribute water on the winter battlefield. The Directorate of Combat Developments, with the U.S. Army Belvoir Research Development and Engineering Center (BRDEC) and CRREL, conducted a series of winter field exercises and cold chamber tests with the 600-gph ROWPU. The 10th Mountain Division at Fort Drum, NY, participated in the first field training exercise in February 1990. Soldiers from the 10th Supply and Transportation Battalion operated a ROWPU at a field site on Fort Drum's Black River.

Primary Goal

The primary goal was to gather information and propose solutions to the problems that occur when operating the ROWPU in the cold. The secondary goal considered the feasibility of developing a winterizing set using equipment in the Army's existing inventory to protect the ROWPU. Although the coldest temperature experienced was only -5 degrees F, the exercise showed the sensitivity of the ROWPU components to freezing and verified the decrease in the water product rate in a cold environment. Gaining access to an ice-covered water source and preventing it from refreezing also posed unique problems. Possible solutions were using heated tents as part of the winterizing set to protect the ROWPU and using warmed water to maintain access to the raw water source.

CRREL conducted cold chamber tests from May through August 1990 to find possible ways to prevent ice formation in water production, storage and distribution equipment. Using antifreeze to flush the ROWPU hardware and RO membranes before exposure to cold temperatures inhibited the formation of ice. However, test results indicated that the antifreeze would impair RO membrane performance in the ROWPU.

Shelter tests showed that two 32-foot tents, extendable, modular, personnel (TEMPERs) with liners and 60,000-BTU heaters would protect the ROWPU and water storage tanks. During tactical transport, the heaters are mounted inside the ROWPU for protection. The problem of protecting the raw water subsystem from freezing and maintaining access to the raw water source still existed. The suction hoses, raw water pumps and pressure hoses of the raw water subsystem are placed outside the shelter's protection. Also, a method for preheating the raw water was necessary for the desired ROWPU production rate during cold weather operations.

In response, a warm water injection system (WWIS) was developed for the raw water subsystem. The WWIS has additional sections of hose, a water heater, and an injector. It operates by diverting some of the cold raw water through a water heater. The heated water goes into the injector and mixes with the cold water being drawn by the water pumps. This process raises the temperature of the intake raw water before it enters the ROWPU. This prevents the water source from freezing and ensures an adequate water flow to the ROWPU at a temperature which will sustain the required production rate. The WWIS also prevents the raw water subsystem from freezing when the ROWPU is not fully operational, such as when cleaning the multimedia filter. Without the WWIS, the raw water subsystem requires draining and must be brought inside the shelter to prevent freezing.

The USAQMC&S, BRDEC and CRREL evaluated two items in the Army inventory for use as the WWIS heater: the M80 water heater, which produces hot water for the Army field shower and laundry unit, and the M17 SANATOR lightweight decontaminating apparatus, which decontaminates personnel and equipment after NBC

attack. Both the M80 and M17 required a pressure regulator on their water inlets. The ROWPU's two raw water pumps typically delivered water at pressures greater than the safe operating pressures for the M80 and M17, making the pressure regulators a necessity. Other modifications included adding flow control and measuring devices. With these modifications, both the M80 and M17 produced enough hot water to prevent freezing of the raw water subsystem. Both units can heat 10 gallons per minute (gpm) of 33 degrees F water to 120 degrees F. At this temperature, 30 gpm of 65 degrees F water can be pumped into the ROWPU for treatment. The M80 was consistently more reliable for use with the ROWPU. To put the importance of the WWIS into perspective, experience shows that at -25 degrees F, the crew has less than 5 minutes to start producing hot water and pump it through the injector before the pumps will freeze.

Alaska Exercise

Although the cold chamber tests showed positive results, the USAQMC&S, BRDEC, and CRREL coordinated with the 6th Infantry Division (Light) to field test the winterization components at Fort Wainwright, AK, 27 Nov-12 Dec 90. Soldiers deployed to the field site and set up the ROWPU when the temperature was -40 degrees F. The soldiers operated the ROWPU with the winterization kit at temperatures in excess of -52 degrees.

Although the soldiers operated the ROWPU at such extreme temperatures, the time and labor to set up the components was excessive. Also, the protection scheme for tactical transport of the ROWPU was inadequate because the existing ROWPU travel cover allows too much heat loss and air infiltration. To correct this, a protective cover was designed to protect the ROWPU during tactical transport. CRREL conducted cold chamber tests of the protective cover from May-July 1993. Evaluations showed

that the protective cover with a 60,000-BTU heater mounted inside will protect the ROWPU during tactical transport at temperatures to -25 degrees F.

The USAQMC&S, BRDEC, and CRREL attempted to develop methods for decreasing the setup time. Investigations showed that any significant reductions in setup time would require major modifications to the ROWPU. Such large-scale modifications would require a research and development program. The USAQMC&S agreed to accept

the winterization components as evaluated at Fort Wainwright as an interim solution and to include a cold weather operations focus for the next generation of ROWPU.

No doubt, supplying water on

the winter battlefield presents a mountain of challenges. To date, the USAQMC&S, BRDEC and CRREL have scaled the first ridge by identifying equipment for an interim solution.



CPT David M. Thomas is a Water Projects Officer, Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. He holds a bachelor of science degree in psychology from the University of Arkansas, Monticello. He is a graduate of the Quartermaster Officer Basic and Advanced Courses, Combined Arms and Services Staff School, and Materiel Acquisition Management Course. He has served in a variety of logistics staff assignments to include a tour as the Senior Logistics Advisor to the King Abdul Aziz Brigade of the Saudi Arabian National Guard.

Reversible Camouflage Uniform

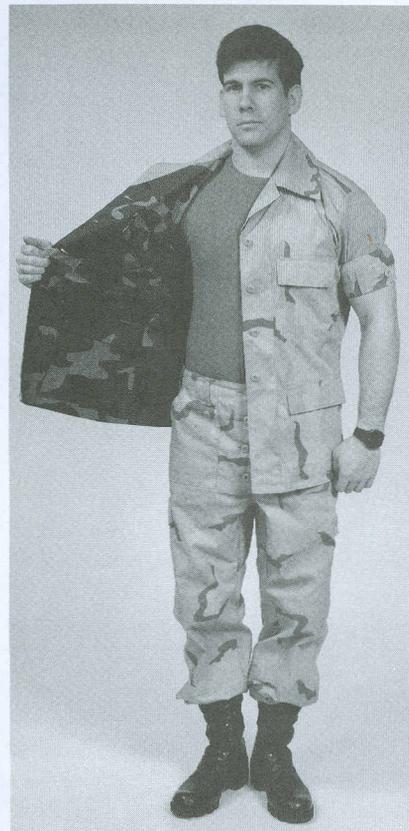
With reversible camouflage fabric, one uniform now can do the work of two. Scientists in the Textile Chemistry and Camouflage Branch at the U.S. Army Natick Research, Development and Engineering Center in Natick, MA, have overcome technical barriers to such a fabric for both desert and woodland.

The concept of a reversible uniform itself is not new. A reversible uniform appeared on past battlefields, but the fabrics were heavy, thick and very uncomfortable. Previous reversible uniforms were a single color on each side and offered no protection from modern near-infrared surveillance devices. Recently, refined techniques for printing multiple colors on two sides of a fabric have overcome technical barriers that included poor colorfastness, excessive weight, stiffness, and color "strike-thru."

Natick worked on numerous printing techniques to allow the printing of different camouflage patterns on each side. "Strike-thru" or the bleed-through appearance of the opposite side camouflage pattern was always the major problem. "Strike-thru" does not occur on heavier weight fabrics, but such fabrics are not acceptable substitutes for a typical 7 ounces/yard military uniform fabric. Working with industry partners, Natick finally used two different printing techniques applied to a military standard uniform fabric. Natick received 2,000 linear yards of this fabric for extensive in-house laboratory testing and concept uniform fabrication.

Demonstrated durability for military environments is essential before fielding any new material. Also, other physical properties such as tensile and tear strength must be maintained to current standards. The technology is here but not yet incorporated into Clothing and

Individual Equipment items. In addition to military uses, this reversible fabric has potential in the commercial apparel market, for example, as hunter's clothing.



One uniform functions as two.

Water Support in Somalia

SFC Kenneth E. Price, Jr.

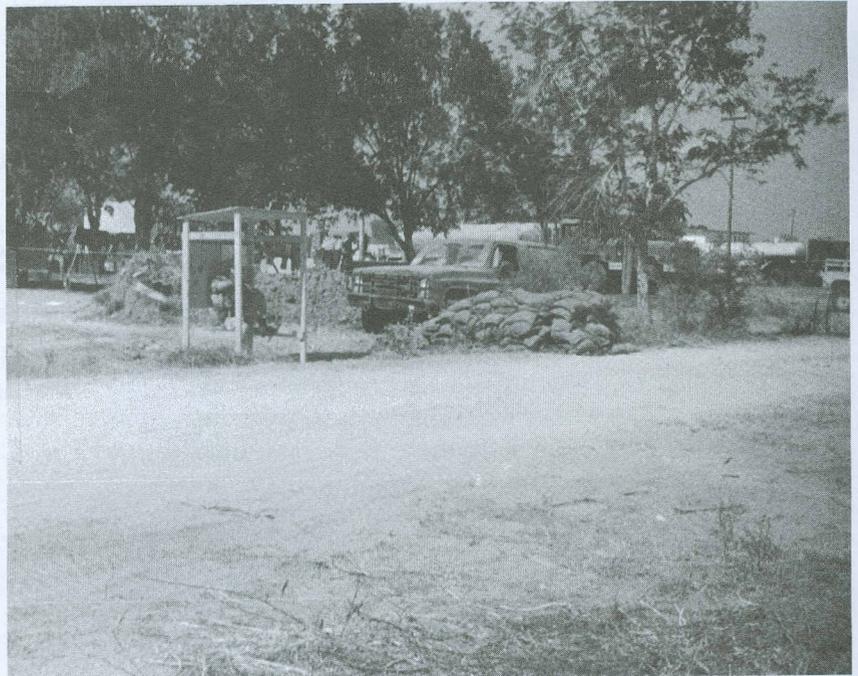
Quartermaster water support during Operation Restore Hope in Jilib, Somalia, reinforced one non-commissioned officer's viewpoint of the Army's need for strict sanitation requirements with water purification equipment. In this article, SFC Kenneth E. Price, Jr., tells about deploying from the schoolhouse at Fort Lee, VA, to a nation torn by civil war. He is an instructor in the Water Training Division, Petroleum and Water Department, U.S. Army Quartermaster Center and School, Fort Lee, VA. SFC Price was the noncommissioned officer in charge (NCOIC) of the "Logistics Support Activity in Somalia" described in an article by CPT S. Carter Corsello in the Winter 1993 Quartermaster Professional Bulletin.

I deployed to Somalia on the coast of Africa from Fort Lee, VA, in January 1993 for 70 days during the United Nations humanitarian mission called *Operation Restore Hope*. At first, I was to join my officer in charge (OIC) and his boss, the di-

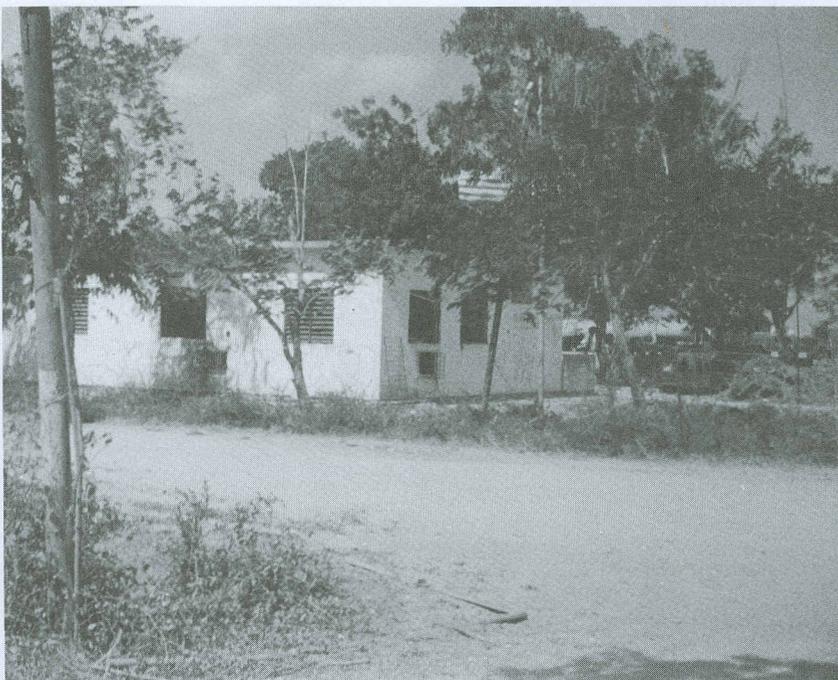
rector of the Petroleum and Water Department at Fort Lee, VA, as a technical advisor "in town" in Mogadishu. My OIC phoned from Somalia to say they didn't need me, but to deploy from Fort Lee with the

240th Quartermaster Battalion. I was to assist this pipeline and terminal operating battalion with water operations.

When we arrived 19 Jan 93 "on the air field" in Mogadishu, Soma-

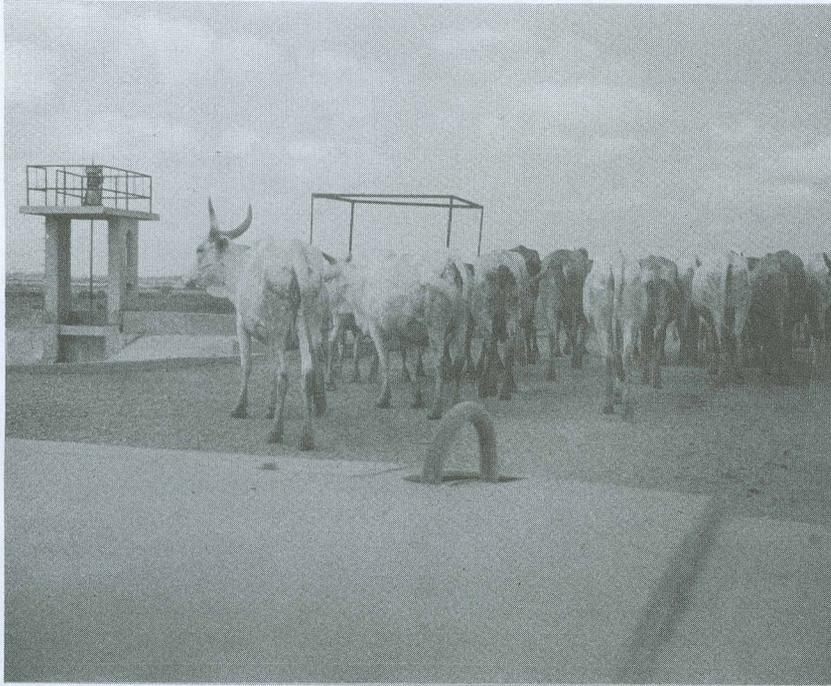


Guard shelter for logistics support activity (LSA) at Jilib built by the author with wood from the Engineers and his 'little Swiss army knife' (above)



Billeting and operations building for the LSA at Jilib (left)

**Photographs by
SFC Kenneth E. Price, Jr.**



Cattle crossing daily at the water source

lia, we did not have a place to stay. After about a week, we finally set up camp. About two days later, higher headquarters wanted to send me to southern Somalia to check out a 600-gallons per hour (gph) reverse osmosis water purification Unit (ROWPU) while the 240th stayed in Mogadishu.

Later that night, about 2300 hours, I was told that I was to be NCOIC for a logistics support activity in Jilib, a small village south of Mogadishu. Since I only had a rucksack packed, I ended up taking everything. The convoy was set to leave the next morning at 0730 hours. I met the convoy commander who was the logistics support activity OIC (CPT S. Carter Corsello) when he got into my truck. We finally left Mogadishu 28 Jan 93 for Jilib with 29 vehicles and enough food, water and fuel to get started.

We encountered several breakdowns and mechanical problems with vehicles on the 215-mile trip that took 17 hours. The Engineers were building a road network into the heartland of Somalia so that non-government organizations could get food and other aid to local citizens. Our logistics support activity had four basic functional areas: water

purification; maintenance; petroleum, oils and lubricants (POL); and Class I (rations). Our mission was to support about 1,350 soldiers of the 36th Engineer Group from Fort Benning, GA, and provide backup support for the 10th Mountain Division soldiers in the area. Our 56 soldiers came from 9 different companies, 2 battalions and the group headquarters.

The roads from Mogadishu to Jilib had been cleaned up by the Engineers, but were still terrible. We arrived about 0330 hours, covered with red dust from the roads. After finding everyone somewhere to sleep in abandoned buildings, we went to sleep about 0500 hours. We were awakened by an officer from S3 about 0630 to begin the day.

First thing, we surveyed the proposed site for the entire logistics support activity. We had to locate a site large enough for the three 20,000-gallon collapsible fuel tanks and the Class I section. We laid out what we wanted, and the Engineers began to clear the area with bulldozers. After a day, we moved in our vehicles to set up the 60,000-gallon field fuel distribution system. The Class I section was put in a building at the end of the logistics support

activity site. A human remains had to be moved from the building where we were to sleep.

The next convoy of 14 soldiers arrived in Jilib about three days later with two 600-gph ROWPUs. One ROWPU was trailer-mounted (U.S. Army equipment) and the other was skid-mounted (U.S. Marine water purification equipment). We sent one ROWPU to an irrigation canal about 12 miles south of our logistics support activity. The intake was from surface water, and this canal was infested with little gray bugs. The only place to move was where cattle crossed daily.

The NCOIC of the water section spoke to the preventive medicine personnel about the site, but at the time there were no alternate sites. The wells at Jilib were too deep to draw water from. Preventive medicine approved the site with no other choice. I went to survey the site and told my OIC to try and hurry the Engineers up to complete the well head at the newly proposed site.

A well at Bandar Salom in the Jilib area became the new site after Navy engineers tested and completed it for water production. The Bandar Salom well had to be fitted

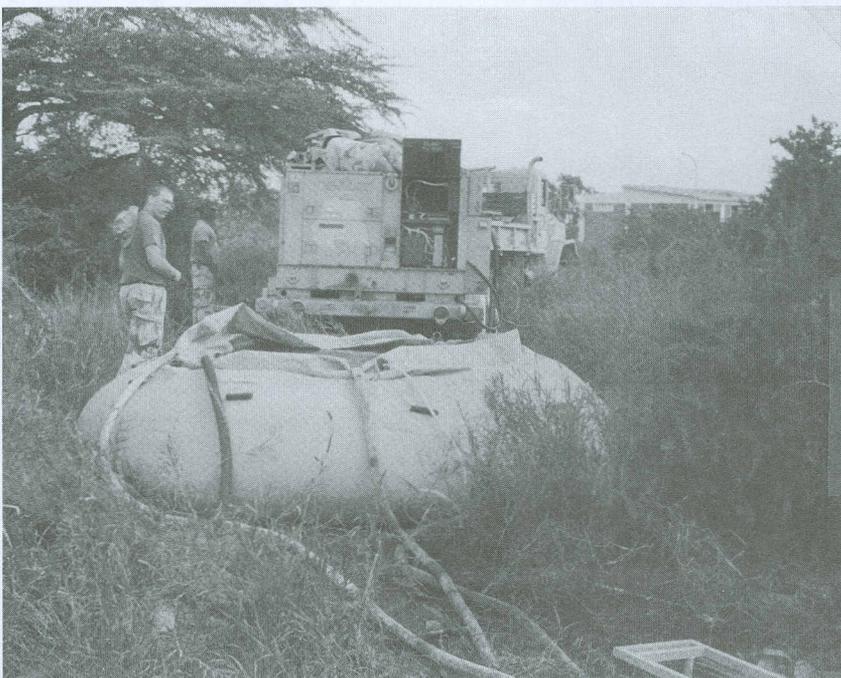
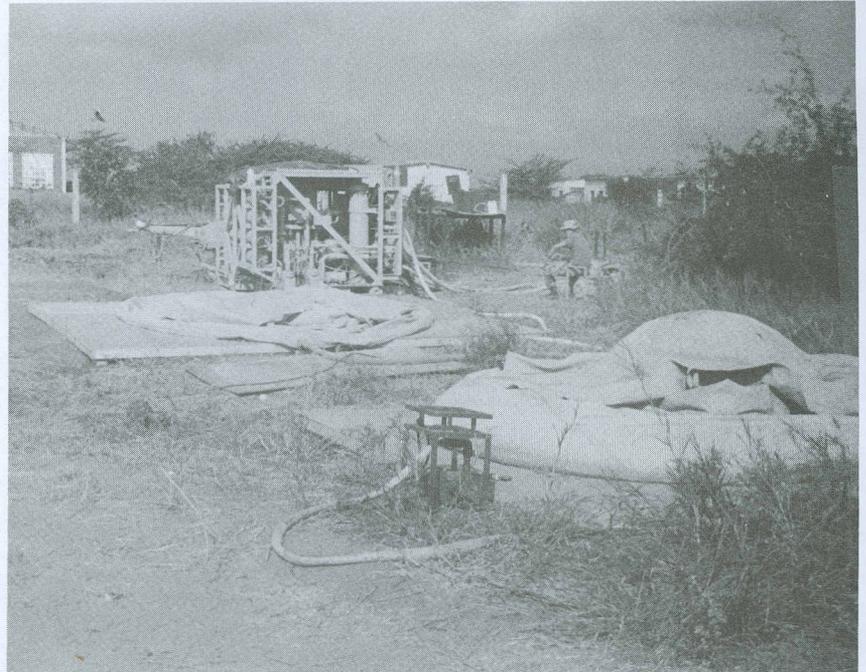
with a sump pump to get the water out. The pump only produced about 16 gallons per minute (gpm), and the ROWPU needs 27 to 33 gpm coming into it. We placed a 3,000-gallon collapsible tank next to the well, filled the tank with water, and pumped the water into the ROWPU for purification. Operations continued for two or three hours before

using all the water in the tank. This provided enough water for this mission with a 14 gpm production rate. I left Bandar Salom 6 Mar 93 for Mogadishu, where I was assisting 240th Quartermaster Battalion with water operations "in town" until I left Somalia 1 Apr 93.

In a harsh environment such as Somalia, soldiers have to be very

sanitary at all times. This includes washing hands often and properly disposing of waste. Malaria was one of the worst problems experienced. Everyone was to have been vaccinated and to take a pill weekly. One soldier from my unit ended up with malaria. About 50 personnel in our operational area became sick from this disease. Deployed units were

The U.S. Marine skid-mounted ROWPU (background) and collapsible tanks (foreground) used by soldiers for the logistics support activity



The 3,000-gallon collapsible water tank (foreground) used as a water source for the 600-gph ROWPU at the Bandar Salom well

to take additional pills after returning to the United States.

Caution should be taken when dealing with site selection. Many personnel could get sick from drinking contaminated water. Only the best sites should be used as possible water sites.

Even though enough water pu-

rifications units were in country and the units were meeting mission requirements, people were still drinking bottled water. I think that military personnel began depending on bottled water in the Persian Gulf during *Operation Desert Shield/Storm*. However, the water we purified in Somalia had fewer total dis-

solved solids (less salt concentration) than the bottled water. It was also cheaper to purify the water than to purchase bottled water. However, after seeing operations firsthand, I believe that bottled water will continue to augment water supply.



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Foul Element Syndrome

SSG Darrell P. Dailey

The days were hot and so were the nights, but the mission had to go on. I was part of Quartermaster water support during *Operation Restore Hope*, the United Nations humanitarian mission in Somalia on the coast of Africa. We were persistent in producing potable water and would go out of our way to provide water for soldiers. In Somalia, the midday temperature would reach 105 degrees Fahrenheit (F) easily. I deployed with the 26th Quartermaster Detachment from Fort Eustis, VA, and was attached to the 240th Quartermaster Battalion. Our mission was to operate a 150,000-gallons per day (gpd) reverse osmosis water purification unit (ROWPU) on the beach at Mogadishu. Our water source was the Indian Ocean to support 5,000 to 10,000 troops in a multinational task force.

Our main problem was fouling the ROWPU's filtration elements with the salty water source. The more water the ROWPU produced, the faster the elements would foul.

We would perform a reverse osmosis element cleaning to try to reduce the total dissolved solids (salt concentration) but to no avail. We would have to change the filtering elements inside the vessels (tubes) that were bad. The 150,000-gpd ROWPU has 16 tubes, each with 5 filtering elements inside. Normally, we had to change 8 of the 16 tubes. Not only was this costly, also it was very time-consuming - time that we did not have.

Eventually, we had to change all 16 tubes. That took hours. Finally, I decided there had to be a change, a way to save the ROWPU filtering elements and also time.

I was at a site conducting supply inventory when I came across a container of citric acid. All at once, it hit me. Why not do a citric acid cleaning on the 150,000-gpd ROWPU as we do on the 600-gallons per hour (gph) ROWPU? Now, I had to figure out how I could set up the system and how to feed the citric acid into the reverse osmosis "block." Well, it was simple.

Set up the system as we would for a reverse osmosis element cleaning, and add the citric acid at the priming part on the raw water pump. Recirculate until the temperature of the water reaches approximately 110 degrees F. Do not let the pH reading go below 3.5. After setting it all up and adding the citric acid, I was successful. The amount of total dissolved solids dropped, and the elements purified the required amount of water.



SSG Darrell P. Dailey is currently an Instructor/Writer for 262d Quartermaster Battalion, Water Training Division, Fort Lee, Virginia. He is a graduate of the Primary Leadership Development Course and the Basic Noncommissioned Officer Course. He was previously assigned to Company C, 75th Support Battalion, Fort Knox, Kentucky; 84th Engineer Company, 2d Armored Cavalry Regiment (ACR), Bayreuth, Germany; Supply, Support and Transportation Battalion, 2d ACR, Germany; and 26th Quartermaster Detachment, 6th Transportation Battalion, Fort Eustis, Virginia.

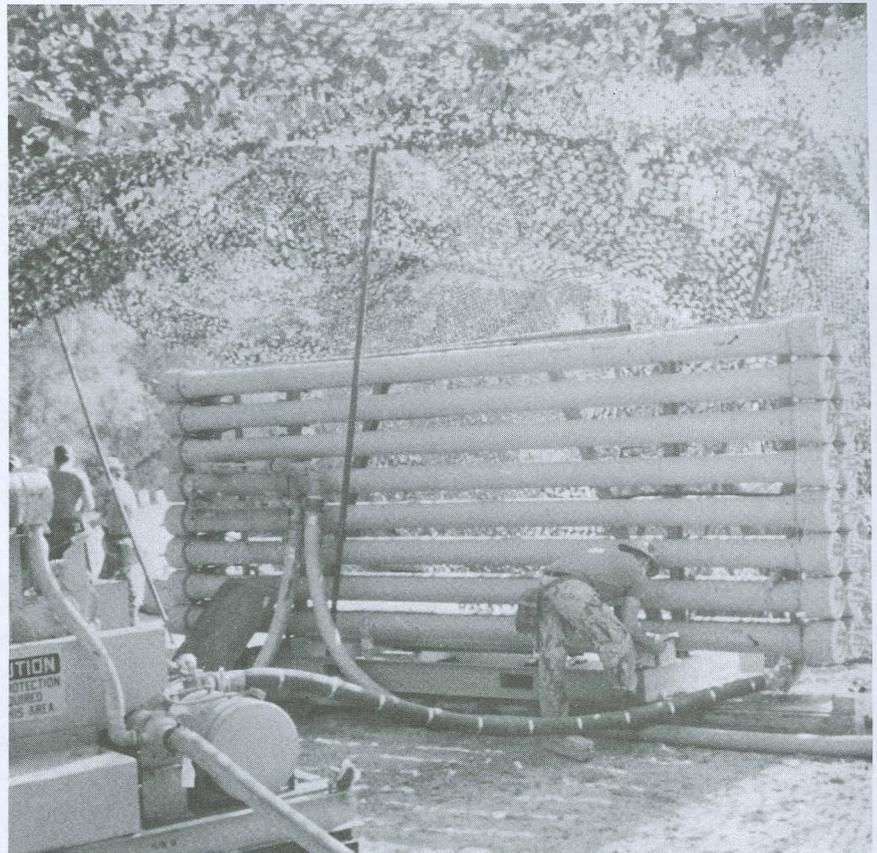
ROWPUs on the Beach

SFC Morris Lloyd Starks

In 1990-91 during *Operation Desert Shield/Storm*, high focus was on water purification operations. Initially during the ground war, the 14 soldiers of the 82d Quartermaster Detachment (Water Purification) from Fort Irwin, CA, set up reverse osmosis water purification units (ROWPUs) on Half Moon Bay resort in Daharan, Saudi Arabia. The detachment specialized in the 150,000-gallons per day (gpd) ROWPU in an arid environment to support the 18th Airborne Corps. The ROWPUs purifying water from the Persian Gulf were the base terminal on land for theater operations.

Soldiers of the 82d Quartermaster Detachment and the 364th Quartermaster Supply and Service Company from Fort Bragg, NC, helped set up and operate two 150,000-gpd ROWPUs on the beach. Soldiers soon found out about the incredibly high concentration of total dissolved solids (TDS), which is the concentration of salt, in the raw water source. The extremely salty Persian Gulf water tested for TDS at 52,000 parts per million (ppm), and the Army's standard for potable, drinking water is no more than 1,000 ppm.

One 150,000-gpd ROWPU alone was not enough to lower the water's salt content to Army drinking standards. So, the soldiers slowed down the production rate and pumped salty water from the first ROWPU to the second. The first ROWPU lowered the TDS to 9,000 ppm. Then the water was pumped into a 50,000-gallon collapsible storage tank. The second ROWPU purified the water from the storage tank and lowered the TDS range to 900-700 ppm. Instead of two ROWPUs producing 150,000 gallons of water per day each at undrinkable salt levels, the two ROWPUs worked together to purify 45,000 gallons of water in 72 hours.



A Quartermaster soldier performs maintenance on the 16 vessels that contain the 80 filtering elements for the 150,000-gpd ROWPU during *Operation Desert Shield/Storm*.

This operation required very high pressure from the pumps because of the high concentration of salt in the raw water going through the ROWPU's sensitive filtering membrane. The high pressure pump "maxed out" at 820 pounds of pressure per square inch daily. When high pressure meant low water production, the Army turned to sources of bottled water for soldiers. In the desert, this was a plus. However, the two 150,000-gpd ROWPUs held their ground working together.

In October 1990, the state of the art water purification units arrived. These ROWPUs produced up to 3,000-gallons per hour (gph) or 60,000-gpd. These ROWPUs fought turbid water and the buildup of salt in the water being purified. The 82d Quartermaster Detachment was

able to purify Persian Gulf waters, lower the TDS to 200 ppm, and fill 16 50,000-gallon collapsible storage tanks to support the communications zone. The 3,000-gph ROWPU is now being fielded to water units worldwide. This equipment is definitely an improvement.



SFC Morris Lloyd Starks is currently the Team Chief/Instructor for the Storage and Distribution Section, 262d Quartermaster Battalion, Fort Lee, Virginia. He has an associate of science degree from Barstow College, California. He has served in a variety of leadership positions with the 82d Quartermaster Detachment, Fort Irwin, California; 9th Engineer Battalion, Germany; 9th Main Support Battalion, Fort Lewis, Washington; 23d Engineer Battalion, Germany, and Fort Leonard Wood, Missouri.

559th Quartermaster Battalion (Water Supply)

CPT William I. Rush

On 21 Jul 93, the Army activated its only active duty water supply battalion, the 559th Quartermaster Battalion at Hunter Army Airfield, GA. In peacetime, the battalion is assigned to the 24th Corps Support Group. In a crisis situation, the unit becomes part of the 507th Corps Support Group, 1st Corps Support Command.

Mission

The mission of the 559th Quartermaster Battalion is to provide direct and general potable water support and to operate temporary bulk storage and distribution facilities in support of Army forces. It also provides, as required, backup water support to other services in theater.

The battalion consists of a Headquarters and Headquarters Detachment, the 512th Quartermaster Company (Water Support), the 202d Quartermaster Detachment (Water Purification), the 205th Quartermaster Team (Water Purification) and the 172d Medical Detachment (Preventive Medicine). The headquarters and headquarters detachment provides command and control for two to six water supply companies and/or water purification detachments. It may also command and control medium truck (water) transportation companies which would assist in the distribution of portable water.

The 512th Quartermaster Company is the storage and distribution arm of the battalion. It can transfer up to 1.2 million gallons of water per day through the operation of two 10-mile tactical water distribution systems (TWDSs). It can also store up to 1.6 million gallons of water in a tank farm consisting of 32 collapsible 50,000-gallon water storage tanks. The 512th Quartermaster

Company also operates up to eight direct support water issue points.

The 202d Quartermaster Detachment is the water purification arm of the battalion. It operates up to ten 3,000-gallon per hour (gph) reverse osmosis water purification units (ROWPUs). The unit can produce up to 600,000 gallons of water per day from a fresh or brackish water source or up to 400,000 gallons per day from a saltwater source. It can also store up to 90,000 gallons of water.

The 205th Quartermaster Team also has a water purification mission and can be used to augment the 202d Quartermaster Detachment's capabilities or be used to produce water at alternate or remote sites. The 205th Quartermaster Team operates up to four 3,000-gph ROWPUs and can produce up to 240,000 gallons of water per day from a fresh or brackish water source. It can produce up to 160,000 gallons of water per day from a saltwater source. The unit can also store up to 36,000 gallons of water.

Medical Detachment

The 172d Medical Detachment is attached to the 559th Quartermaster Battalion. The medical detachment has the wartime mission of providing preventive medicine consultation and support to prevent nonbattle injuries, promote field sanitation practices and to control insect and rodent populations in the theater of operations. The medical detachment inspects field feeding operations for proper sanitation and can certify field sanitation teams. The unit performs entomological surveys and limited pest control operations to curb the spread of disease. It operates a field laboratory

that can conduct chemical and bacteriological analysis to verify water potability and recommend water treatment for nonpotable water.

Unique Battalion

As the only active duty water supply battalion, the 559th expects to be extremely busy. In October 1993, the 172d Medical Detachment and a platoon of the 512th Quartermaster Company deployed to Egypt in support of Bright Star 93. The 205th Quartermaster Team deployed to Somalia in support of *Operation Continue Hope*. The 202d Quartermaster Detachment and the remainder of the 512th Quartermaster Company are currently accelerating and expanding their training in anticipation of additional water purification, storage and distribution requirements worldwide. The future of the battalion expects to hold true to its motto: "Good to the last drop, the 559th never stops."



CPT William I. Rush is a graduate of the Reserve Officers' Training Corps program at the University of Texas at El Paso. He is also a graduate of the Infantry Officer Basic Course, Quartermaster Officer Advanced Course, and the Petroleum Officer Course. He previously served as a Company Executive Officer and Adjutant with 5-9 Infantry and Assistant Brigade S4 (Logistics Officer), 2d Brigade, 6th Infantry Division (Light), Fort Wainright, Alaska; Battalion Adjutant and S4 of the 260th Quartermaster Battalion; and Commander of the 547th Medical Company at Hunter Army Air Field, Georgia. He is currently the S2 of the 559th Quartermaster Battalion at Hunter Army Air Field, Georgia.

Water of Life

CPT Kevin D. Melton

On 1 Jun 93, the U.S. Army increased its water production capability by activating Quartermaster detachments and Quartermaster teams at Fort Campbell, KY; Fort Bragg, NC; and Hunter Army Airfield, GA. A Quartermaster battalion and a Quartermaster company also activated at Fort Stewart, GA. These new units greatly enhance the

Army's water production, storage and distribution capability. Given the current world situation, the Quartermaster detachments and the Quartermaster teams are combat multipliers that deserve a special look.

The units at Fort Campbell, Fort Bragg and Hunter Army Airfield (Figure 1) produce the bulk of the potable water used by the 18th Airborne

Corps on today's battlefield. Each Quartermaster detachment has a fresh water production capability (Figure 2) of 600,000 gallons of potable water per day at the current configuration. Each team has a fresh water production capability of 240,000 gallons of potable water per day at the current configuration. These six units will provide the 18th Airborne Corps

Fort Campbell, Kentucky

- 196th Quartermaster Detachment (Water Purification)
- 291st Quartermaster Team (Water Purification) attached to Division Support Command, 101st Airborne Division (Air Assault)

Hunter Army Airfield, Georgia

- 202d Quartermaster Detachment (Water Purification)
- 205th Quartermaster Team (Water Purification) attached to 202d Quartermaster Detachment (Water Purification)

Fort Bragg, North Carolina

- 186th Quartermaster Detachment (Water Purification)
- 204th Quartermaster Team (Water Purification) attached to 186th Quartermaster Detachment (Water Purification)

Figure 1. Quartermaster Units Producing Most of the 18th Airborne Corps' Potable Water

Detachment: Fresh Water Capability

- (3,000 gph) X (20-hour production day) = 60,000 gpd
- (60,000 gpd) X (10 EA 3K ROWPUs) = 600,000 gpd

Team: Fresh Water Capability

- (3,000 gph) X (20-hour production day) = 60,000 gpd
- (60,000 gpd) X (4 EA 3K ROWPUs) = 240,000 gpd

Detachment: Salt/Brackish Water Capability

- (2,000 gph) X (20-hour production day) = 40,000 gpd
- (40,000 gpd) X (10 EA 3K ROWPUs) = 400,000 gpd

Team: Salt/Brackish Water Capability

- (2,000 gph) X (20-hour production day) = 40,000 gpd
- (40,000 gpd) X (4 EA 3K ROWPUs) = 160,000 gpd

LEGEND:

EA - each

3K - 3,000

gpd - gallons per day

gph - gallons per hour

ROWPU - reverse osmosis water purification unit

Figure 2. Water Production Capability of Quartermaster Detachments and Teams



These 3,000-gallons per hour ROWPUs in Mogadishu, Somalia, were part of the largest water purification production operation under a single guidon in U.S. Army history.



Personnel from the 196th Quartermaster Detachment spread out across Mogadishu to operate four different sites with every type of water purification equipment in the Army's inventory, including these 20,000-gallon storage tanks.

with 2,520,000 gallons of potable water per day. Salt and brackish water reduce production capability of the 3,000-gallons per hour reverse osmosis water purification unit (3K ROWPU) from 3,000 gallons per hour (gph) to 2,000 gph. Salt or brackish water will reduce the six units' production from 2,520,000 gallons of potable water to 1,680,000 for the 18th Airborne Corps.

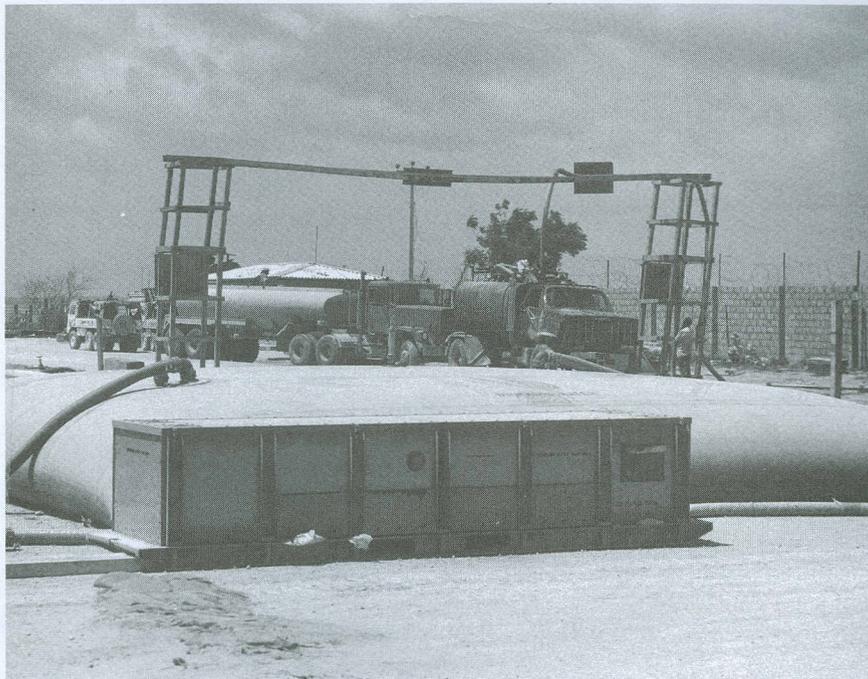
The Quartermaster teams are attached to the Quartermaster detachments at both Fort Bragg and Hunter Army Airfield. At Fort Campbell, the Quartermaster team is attached to Division Support Command (DISCOM), 101st Airborne Division (Air Assault) (Figure 1).

In late May 1993 the 196th Quartermaster Detachment (Water Purification) received its 10 3K ROWPUs, deprocessed them and started training with the New Equipment Training Team (NETT). After an activation ceremony 1 Jun 93, the 196th Quartermaster Detachment (Water Purification) started hearing rumors about a deployment to Somalia. On 17 Jun 93, the 196th received official notification of upcoming deployment to Somalia.

Shortly after midnight, 23 Aug 93, on a hot, balmy Fort Campbell night, the 196th boarded a C141 enroute to Mogadishu, Somalia. After a short stop in the Azores and a night in Cairo, we touched down around noon on 25 Aug 93 in Mogadishu.

Less than three months after that simple activation ceremony at Fort Campbell, the largest water production operation under a single guidon in the history of the U.S. Army formed on the horn of Africa.

The 196th produced over 40 million gallons of potable water from 1 Sep 93 to 16 Dec 93 in support of United Nations Operation Somalia (UNOSOM) II Forces in Somalia. The 196th grew to a strength of 83 personnel assigned and attached from 9 different companies across the United States (Figure 3). Those 83 personnel spread out across Mogadishu, operating 4 different



Nonpotable water for a wash rack was the University site's greatest need in Mogadishu.

sites with every type of ROWPU equipment in the Army's inventory.

The Gotham City site, located in an old warehouse, housed the detachment headquarters. Sixty-two personnel called Gotham City home, and operated four 3K ROWPUs to keep up with the demand. Drawing its source water from the Afgooye well system, the site had a production capability to 264,000 gallons per day (gpd). The Afgooye well system was the last operating public utility system in Mogadishu. A combination of 50,000-gallon and 20,000-gallon collapsible fabric tanks gave the site a storage capability of 320,000 gallons of potable water and 80,000 gallons of raw (nonpotable) water. The fresh water source had a total dissolved solids (TDS) count of 1,700 parts per million (ppm) before treatment and 400-500 ppm after treatment. Nine of the 600-gph ROWPUs in country were located at Gotham City for storage or maintenance.

On the other side of the city, 15 soldiers worked around the clock at the New Port site with three 150,000-gpd ROWPUs to purify salt-water from the Indian Ocean. The

TDS was above 50,000 ppm before treatment and 400-500 ppm after treatment. With a production capability of 360,000 gpd, the New Port site was the largest producing site in Mogadishu. The 50,000-gallon and 20,000-gallon collapsible fabric tanks at the New Port site gave the port operations 260,000 gallons of potable water on the ground at any given time. A tactical water distribution system (TWDS) supplied the airfield distribution point with potable water to keep its 140,000 gallons of storage capability filled and ready to issue to all UNOSOM II Forces.

The other two sites had a direct support mission and operated two 600-gph ROWPUs at each site. The Embassy site and the University site both had a production capability of 48,000 gpd. Due to the quality of the well water used at both sites, a raw water TDS of 2,100 ppm, the operators pushed more than the rated 600-gph out of their machines. The Embassy site operated with four personnel and stored 40,000 gallons of potable water and 20,000 gallons of nonpotable water. The University site operated with

- 196th Quartermaster Detachment (Water Purification), Fort Campbell, KY
- 205th Quartermaster Team (Water Purification), Hunter Army Airfield, GA
- 202d Quartermaster Detachment (Water Purification), Hunter Army Airfield, GA
- 204th Quartermaster Team (Water Purification), Fort Bragg, NC
- 186th Quartermaster Detachment (Water Purification), Fort Bragg, NC
- 102d Quartermaster Company (Petroleum, Oils and Lubricants), Fort Campbell, KY
- Company D, 801st Main Support Battalion, Fort Campbell, KY
- Company E, 801st Main Support Battalion, Fort Campbell, KY
- Headquarters/Company A, 782d Main Support Battalion, Fort Bragg, NC

Figure 3. Units Purifying Water in Somalia

two personnel and stored 40,000 gallons of potable water and 80,000 gallons of nonpotable water. Nonpotable water, for a wash rack, was the University site's largest commodity.

A mix of soldiers from across the United States came together and met the peak daily demand of 520,000 gallons of potable water on 24 Nov 93. As the 196th Quartermaster Detachment (Water Purification) grew and became almost twice as large as our modification table of organization and equipment (MTOE) called for, we realized that our greatest weakness was the lack of internal support. The need for more platoon leaders, more mechanics, a supply clerk, a subsistence section, an operations section, and a first sergeant authorized to wear a diamond became more apparent.

By permanently attaching the Quartermaster teams to the Quar-

termaster detachments or by combining the two to create a new Quartermaster Company (Water Purification) (Figure 4), the internal support problems experienced in Somalia would be solved. The 196th Quar-

termaster Company (Water Purification) of the future with 4 officers and 82 enlisted personnel and 14 3K ROWPUs will be a great combat multiplier and will provide the modern soldier with the water of life.



Fort Campbell, Kentucky
196th Quartermaster Company (Water Purification)

Hunter Army Airfield, Georgia
202d Quartermaster Company (Water Purification)

Fort Bragg, North Carolina
186th Quartermaster Company (Water Purification)

Figure 4. Proposed Future Operations

CPT Kevin D. Melton has a bachelor's degree in personnel management from Arkansas State University. He is a graduate of the Field Artillery Officer Basic Course and the Field Artillery TACFIRE Battalion Fire Direction Officer's Course. After serving as a Gold Bar Recruiter at Arkansas State University, he served with the 1st-22d Field Artillery Battalion (redesignated 2d-1st Field Artillery Battalion) in Zirndorf, Germany. As a member of the 1st Armored Division Artillery, he served as a Battery Fire Direction Officer, a Company Fire Support Officer, and as the Battalion S4. After graduating from the Quartermaster Officer Advanced Course, he served as Assistant S3 and Supply and Services Officer for the 561st Supply and Services Battalion (redesignated 561st Support Battalion (Corps)). He activated the 196th Quartermaster Detachment (Water Purification) on 1 Jun 93 and deployed the unit to Somalia on 23 Aug 93. He also is a graduate of the Airborne School, the Aerial Delivery Materiel Officer Course, Combined Arms Services Staff School, and the Support Operations Course.

Supply and Service in Somalia

CPT Larry Naylor

The 364th Supply and Service Company at Fort Bragg, NC, first deployed to Somalia in January 1993. A small element of 30 personnel was tasked with purifying and distributing water to United Nations Operation Somalia (UNOSOM) Forces, as part of *Operation Restore Hope*. They redeployed three months later.

Later, the entire 364th went to Somalia in August 1993 and left in December 1993 after providing logistical support to U.S. soldiers and UNOSOM Coalition Forces. When the company was initially notified in July, the mission was to provide only enough personnel to operate a theater supply support activity (SSA) for Class II (general supplies), packaged III (petroleum, oils and lubricants), IV (construction and barrier materiel), and VII (major end items). Gradually, the mission expanded to include operating the theater distribution point for both perishable and nonperishable rations; receiving, storing and issuing Class II, III, packaged III, IV and VII supplies; operating the theater central receiving point for Class I (rations), II, packaged III, IV, VII, VIII (medical supplies), and IX (repair parts) supplies; providing mobile retail fuel support to five major compounds located throughout Mogadishu; and operating a remote forward area refuel point in Badera, Somalia.

The mission appeared overwhelming, considering that the company had to continue its garrison mission at Fort Bragg. The company also had to prepare a little differently for this deployment because of the shift in mission from supporting a humanitarian relief effort to providing logistical support in a combat environment. The training emphasis was on reacting to ambushes, convoy operations, and surviving in an urban warfare environ-

ment. Preparing soldiers to react to enemy aggressions was a training challenge. In garrison, the soldiers constantly focused on their logistical mission, therefore minimizing training in common battle tasks. To make sure soldiers could react to the threat environment they would enter, the company organized and completed four weeks of rigorous training on several combat scenarios. Soldiers also received detailed instructions on rules of engagement and laws of war.

Expectations

The company of 123 personnel deployed 3 Sep 93 expecting a 180-day deployment as part of the 13th Corps Support Battalion. The unit had an extremely diverse mission ranging from perimeter security to routine mission support. The 364th provided the guard force for 40 percent of the defensive perimeter of the Sword Base compound. Sword Base was the only compound defended by 100 percent U.S. forces in Mogadishu. The soldiers providing that protection were all combat service support soldiers.

The company provided an average of 65 soldiers daily for perimeter guard. This greatly reduced the number of soldiers available for mission support, but the 364th's remaining soldiers worked harder to get the job done.

In the Class I arena, the company performed an extremely critical mission. A 30-soldier detachment from the 406th General Supply Company from Fort Bragg operated the semiperishable Class I supply point while a 76-soldier detachment from the 227th General Supply Company, Fort Campbell, KY, operated the perishable supply point. The semiperishable section had the mission of providing over 7,000 U.S. soldiers and 24,000 coa-

lition soldiers with Meals, Ready to Eat (MREs), T-Rations, B-Rations, supplements, condiments and bottled water.

A big problem initially in the nonperishable area was the shortage of serviceable rough terrain container handlers (RTCHs) and operators. Almost all stocks were received in military-owned demountable containers (MILVANS). Thus, the availability of RTCHs and operators was critical. As a supply and service company, the modification table of organization and equipment (MTOE) did not authorize RTCH operators. Therefore the company was not equipped to provide operators and maintenance support. Fortunately, the company had one licensed RTCH operator who was able to cross-train several soldiers. The company maintenance section had a few innovative soldiers who used the technical manuals to improve operational readiness of the RTCHs from two of five to five of five fully mission capable.

Another problem was rations packaging. Several shipments of rations were not palletized, causing a higher damage rate during transport. This was particularly evident with bottled water. The soldiers spent many hours separating damaged bottles from serviceable bottles and then repacking bottles into multipackage boxes. Improper packaging caused a loss estimated at \$300,000.

Inventorying stocks was a time-consuming process. All inventories were conducted manually. This method was primitive considering our knowledge and capability in automated technology. With automated data processing equipment and the bar code reader, productivity could have been greatly increased and inventory time reduced. This would have made a sig-

nificant impact because as many as 100 MILVANS were received in a single day.

Quality

A-Ration condiments also caused some problems because the field feeding menu did not match the condiments on hand. Also, issue factors were mixed from various menus. The solution would be to push complete menus with issue factors to the theater distribution point before issuing to a customer. This would not only aid in providing quality customer service but also assist the dining facility sergeant. Despite some problems, the Class I semiperishable mission was a success.

In the Class I perishable arena, 750,000 pounds of rations were received and stored. Over one million pounds were issued with no loss from spoilage. The largest concern in the perishable section was maintaining the refrigeration units. When the company took the mission, repair parts were unavailable. The soldiers completely assessed each piece of equipment, ordered the repair parts, and thereafter maintained an operational readiness rate of 92 percent.

The petroleum/water mission was much more than expected. The company anticipated operating a retail fuel point. Upon arrival, the mission had grown to operating a retail fuel point on one compound, line hauling to four additional compounds and operating a helicopter refuel point in Badera, Somalia, at a Botswana compound. On top of this mission, the petroleum platoon inherited the mission of supplying the entire Sword Base compound with potable water. From September to December, five soldiers with military occupational specialty 77W (water purification specialist) distributed over three million gallons of potable water to 1,200 soldiers on the compound. The initial problems were mainly shortages of 77W-qualified personnel for the water mission.

Before the company's departure, there was no indication of the company's water mission. Fortunately, the decision was made to bring 77W personnel to Somalia as a worst case scenario for any possible missions. The petroleum section distributed over two million gallons of fuel and a very large quantity of water to five compounds.

Excellent Job

The 364th also operated the theater central receiving point for Classes II, packaged III, IV, VII, VIII and IX supplies as well as operating the Class II, packaged III, IV and VII supply support activity (SSA). The SSA operated under the Direct Support Unit Standard Supply System (DS4) desktop computer system. The soldiers operating the SSA succeeded in supporting 71 U.S. customer units comprised of the Joint Task Force (JTF) units and the Logistical Support Command (LSC) units. Also, over 24 coalition forces of UNOSOM were supported. The soldiers maintained an authorized stockage list (ASL) of 569 lines valued at \$3.9 million. They processed over 10,000 requests for supplies and 6,000 receipts. They completed over \$7 million worth of transactions with few errors. A few minor stumbling blocks caused slight turbulence in the operation, but they were all quickly overcome. For example, the theater needed a structured material management center (MMC), but the MMC was not in place. Also, there were no instructions for turning in unserviceable items.

Customers could not turn in unserviceable items to the SSA because the SSA lacked storage space. The SSA could not turn in to a higher source of supply because there was none. The problem was solved by establishing a turn-in process which retrograded unserviceable items to the United States. This solution was the best option for all parties because the customer was able to turn in the unserviceable

items and the SSA was not cluttered with "junk."

Another big problem was the lack of "float" or standby computer systems in Somalia. "Floats" were not available for the Tactical Army Communication Computer System (TACCS) or the DS4 system. SSA operations ceased on two occasions because there were no extra computers available to substitute for computers that needed repair. One final problem for the SSA was operating the UNOSOM Class IV warehouse. It was virtually impossible for the U.S. to receive approval from the UNOSOM-4 (U4) section to pick up Class IV supplies from the warehouse. This was very frustrating since U.S. soldiers were maintaining the operation, yet U.S. soldiers could not get quality support in the Class IV commodity. The SSA solved this problem by establishing a U.S. Class IV yard which strictly served U.S. units. A sergeant took a section of the compound, cleaned the area, established locations and established an ASL. The result was a successful operation which provided all U.S. customers quality support in the Class IV area.

Mortar Fire

Soldiers were receiving mortar fire, small arms fire and sniper fire in the evening and reporting to duty the next day for their mission. The 364th was very flexible and adjusted to every situation with ease. Everyone survived, all missions were professionally executed, and we all made it home.



CPT Larry Naylor is Commander, 364th Supply and Service Company, Fort Bragg, North Carolina. His unit served in Mogadishu, Somalia, under the 13th Corps Support Battalion, one of the two Corps Support Battalions serving under the 507th Logistical Task Force, supporting the United Nations Forces in Somalia. The 364th Supply and Service Company arrived in Somalia in August 1993 and left in December 1993.

Field Laundry and Shower Operations in Somalia

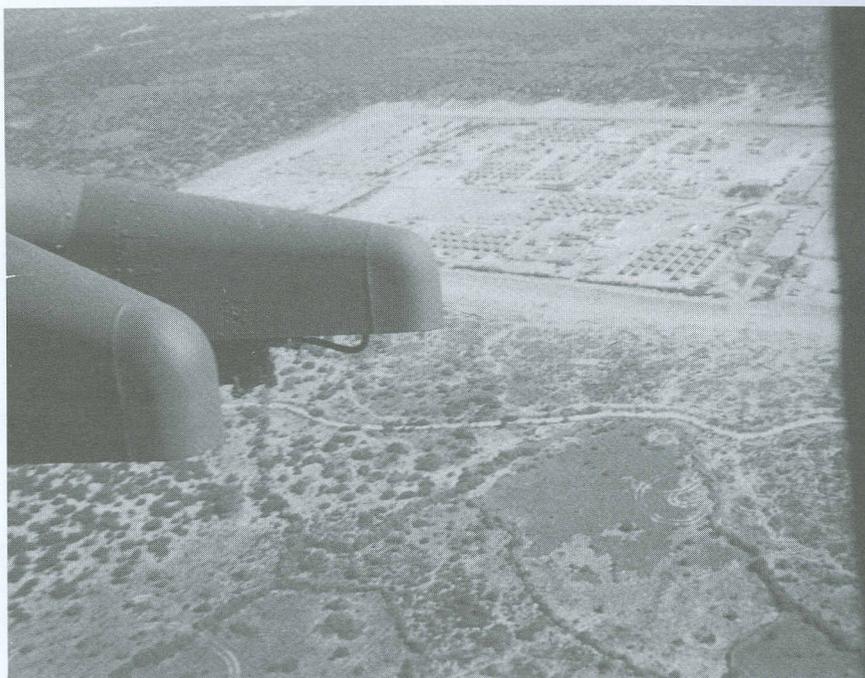
CPT Bruce E. Cox

On 8 Oct 93, during a four-day weekend, at approximately 0930 hours, the 16th Field Service Company was alerted to deploy to Somalia from Fort Lee, VA. The mission was to support an 1,800-soldier task force with laundry and shower services. This task force consisted of units from many different posts and included combat, combat support, and combat service support units. The 16th soldiers supported a United Nations compound October-December 1993 in Mogadishu during *Operation Restore Hope*.

Once the personnel recall was complete, the unit commander briefed key leaders on the deployment and passed out loading instructions. The 16th was given only 24 hours to load all equipment to perform their mission in an austere environment. Mission guidance directed the unit to deploy four of six organic M85-100 laundry units and four of seven, nine-head, portable shower units. The rest of the package was left to the unit's discretion.

Unit Packing

Having previously deployed to Somalia, the philosophy for unit packing was "if the soldier does not have it on his back, he does not have it." Loading of support equipment began at approximately 1400 hours and continued until 2300 hours. Support equipment consisted of tents, cots, laundry detergent and, most importantly, the pin sets used to mark individual laundry items. This equipment filled four military-owned demountable containers (MILVANS) to capacity. Fortunately, the units in the 240th Quartermaster Battalion have MILVANS assigned to its property books. The support equipment for mission deployment is stored in MILVANS by platoon. This allows for rapid deployment and minimal searching for



Aerial view of Victory Base, inland west of Mogadishu, Somalia



View of the unimproved site with girders from a former Soviet missile factory still standing among the thornbushes

necessary items to perform the unit mission.

After preventive maintenance checks and services (PMCS) on all

vehicles, they were staged and readied for commercial haul. Last-minute repairable exchange had to be performed on one laundry unit to bring it to operational standards, and this was done in a matter of hours. All vehicles and the MILVANS were completely ready by 0730 hours on 9 October. Commercial transportation was ready to pull the vehicles to the port of Savannah, GA, where the equipment would be shipped. The battalion transportation movements officer (TMO) followed the equipment to port to ensure loading and proper ship information for the 16th. This information was later used to track equipment and anticipate the arrival of equipment once the 16th was in Somalia.

Show Stopper

At the port, all rolling stock from the 16th was loaded onto a fast surface ship (FSS) that made the trip to Somalia in just 14 days. Despite the urging of the battalion TMO, it was decided to load the unit MILVANS on another ship. This ship was not scheduled to arrive until at least two weeks after the FSS. Because the MILVANS contained necessary equipment, this turned out to be a definite "show stopper." The 16th would not be able to support the

United Nations task force without the proper equipment such as laundry detergent, pin sets, and the portable shower units which were also stored in the MILVANS. Nevertheless, the 16th was deployed to Somalia on 26 October, well ahead of the MILVANS.

On 28 October, the 16th touched down in Somalia and were met by members of the 13th Corps Support Battalion (CSB) from Fort Benning, GA, the 16th's new higher headquarters. As the battalion and the 364th Supply and Service Company helped with transition to operational status, the 16th began to plan for mission support. Since adequate support items to run the field laundry were unavailable in country, the decision was made that operations would begin when the unit could perform its mission to standard. As a benefit to the troops of Task Force 1-64, the commander of the 13th CSB suggested that the 16th use the commercial laundry facility during the night hours and process laundry for the Task Force. This support was welcomed by both the Task Force and the 16th. Soldiers were able to begin limited operations while awaiting equipment and site preparation. The 16th processed a total of 2,579 laundry bundles through the night shift initiative.

While waiting on the ship's arrival, site preparation became critical. The base of operations for the task force was an unimproved site that had to be completely cleared of brush and cactus and graded to allow the laundry units to be pulled into position. This base became known as Victory Base, approximately three kilometers from Sword Base, home of Task Force 1-64. The site chosen for the laundry and bath site was more than adequate to provide proper drainage, a very important detail in a country that produces high malaria statistics because of swarms of mosquitoes.

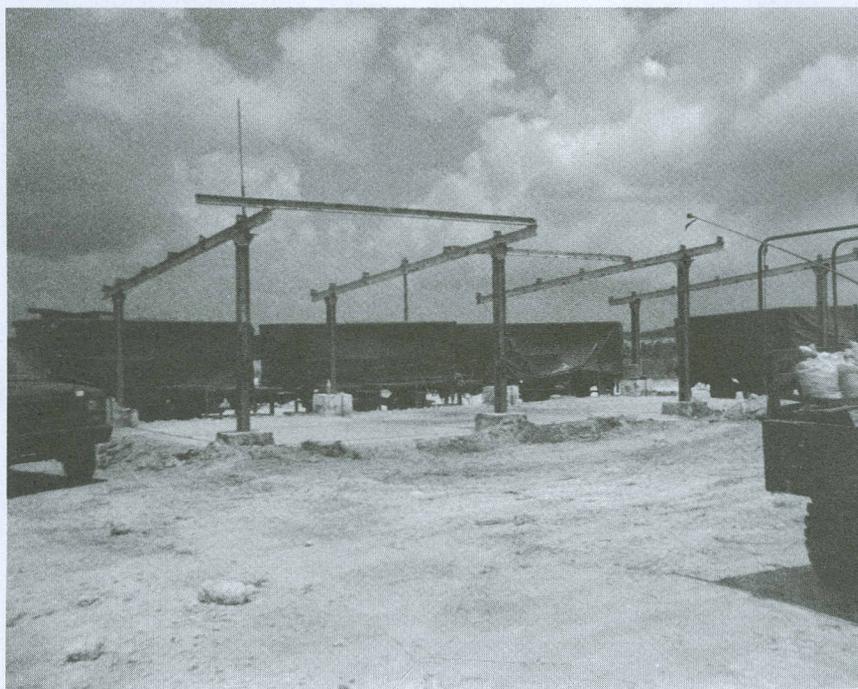
When the ship arrived in mid-November, the 13th CSB transportation cell was on line to deliver the 16th MILVANS to their location. Unfortunately, the port began pushing MILVANS out as quickly as possible. Although the 16th MILVANS have very clear marking, two MILVANS were "lost" in the exodus from the port. The MILVANS were located through good luck and perseverance and, surprisingly, ended up at Victory Base. Even more of a surprise was that the two MILVANS needed for the operational start-up were the ones at Victory Base. With all in place, the 16th only needed eight hours to set up operations. The next morning, operations began with the first bundles of laundry turned in to the receiving point.

Army Standard

The Army standard for field laundry service is to wash one bundle of laundry per soldier every seven days. Each bundle consists of 20 pieces. One pair of socks counts as one piece. This standard bundle is limited by the number of laundry pins in one pin tray: 20. Each pin tray has safety pins with set

Existing girders were incorporated into Victory Base facilities, first with tarpaulins on top and eventually roofing materials.

**Photographs by
CPT Bruce E. Cox**



numbers on them. For example "A-12" would be assigned to one bundle of laundry, and every piece of laundry in that soldier's bundle would be pinned with a pin marked A-12. This allows the unit to separate bundles when they come from the dryer unit. This is important since there are as many as 10 bundles in a wash cycle at one time.

Also, as items go through the wash, pins come undone or break from the strain. This makes laundry identification next to impossible. This is the most prevalent way that field service units lose laundry. During the support phase at Victory Base, the 16th was not without its share of lost laundry. However, the bulk of laundry

claims were for single pairs of socks or underwear.

The support of the 16th Field Service eventually went as far as processing individual laundry with a five-day turnaround for the force, two days better than the Army standard. This was seen as the only way to ensure that personnel had a clean change of clothes on a daily basis short of soldiers washing some of their own laundry.

Overall, the support provided for the buildup of troops was more than adequate, although belated. During the initial operations in Somalia, early in 1993, units in Mogadishu had to wash their own clothes for at least a month. In the future, unit equipment must be

shipped to maintain unit integrity. If all equipment arrived on station and on time, the 16th would have been operational at least two weeks earlier and able to immediately begin operations. However, the operation was a total success and provided the soldiers of Task Force 1-64 an invaluable service and helped maintain the high morale of the soldiers.



CPT Bruce E. Cox is Commander, 16th Field Service Company, Fort Lee, Virginia. His unit served in Mogadishu, Somalia, under the 13th Corps Support Battalion, one of the two Corps Support Battalions serving under the 507th Logistical Task Force supporting the United Nations Forces in Somalia.

Laundry in Somalia

SPC Bernadette J. Paris

It was a dirty business — but somebody had to do it. At least that was how some soldiers from the 16th Field Service Company, Fort Lee, VA, might have described their job during deployment October–December 1993 to Somalia.

One of a few laundry and bath units in the Army, the 16th supported troops at Victory Base in Mogadishu with laundry and some shower services. The unit received an average of 250 bundles of laundry a day or 2,000 bundles per week.

The process began when unit supply officers turned in their soldiers' laundry at a predetermined time. Using M85 self-contained laundry units with washers and dryers, the 16th raced to meet the 24-hour turnaround time. Four ounces of Army detergent were used for every 100 pounds of clothing. Each item was pinned with a number to prevent mix-ups.

Although laundry services at other United Nations compounds

during *Operation Restore Hope* were provided by contractors, the independence of the Army-operated facility was one of its strong points.

"We came in, set up and tore down in 24 hours because we were a self-contained unit," said one Quartermaster laundry and shower specialist.

Electrical generators were another feature of this self-contained unit, so it did not have to rely on other sources of power. Washing clothes by machine may be easier than washing by hand, but there are challenges.

One problem for the 16th was its location near the Victory Base helipad. The blowing sand caused many problems with the machines and several headaches for mechanics.

Machines were not the only hassles for the unit, however. Soldiers who turned in too much laundry created an extra burden. Extra items had to be taken out and put

to the side while the rest were washed. Extra items were then put in a plastic bag, and returned to the soldier with a note about the number of items allowed for turn in.

A contractor took over when the 16th returned to Fort Lee. Until then, laundry and bath specialists averaged 11-hour days and actually got the chance to do their jobs.



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Living quarters with protective berms in place for the 102d Quartermaster Company (Petroleum) beyond the fuel tank farm at Mogadishu, Somalia

Petroleum Support for the Somalia Theater of Operations

CPT Conrad H. Bonner

Operation Restore Hope in Somalia reached its pinnacle by October 1993. With over 27 nations and 30,000 personnel participating, support requirements were tremendous. One of the support units was the 102d Quartermaster Company (Petroleum) at Fort Campbell, KY.

The 102d Quartermaster Company arrived in Mogadishu, Somalia, on 25 Aug 93. Within a couple of days, these soldiers completely assumed the mission of providing the theater with fuel. Task-organized to the unit was the theater petroleum laboratory (one of two in the

active Army). This laboratory became a tremendous asset to the theater and the unit.

The company fell in on five existing Amphibious Assault Fuel Systems, established by the Marine Corps over a year earlier. The system primarily consisted of 126—each 20,000-gallon collapsible fabric fuel tanks and 54—each 600-gallons per minute pumps, organized into a six-pack configuration. The system used “spider” manifolds instead of tee or gate valves.

Fuel was pushed into the fuel tank farm through the 2 1/2-mile

section of the Inland Petroleum Distribution System (IPDS) from a ship docked at the Mogadishu Port. The ship-to-shore offload operations occurred about every two weeks. These operations ran continuously, up to 80 hours at a time, until the fuel tank farm was topped off at 2.4 million gallons.

Communication was the key to successful operations. Manifold sequencing must be at coordinated intervals to prevent damaging the ship pumps, the IPDS or fabric fuel tanks and rubber hoses within the fuel tank farm. A breakdown in the

company's internal communication network during ship discharge operations would have been devastating.

Before starting the ship offload operation, Quality Surveillance Representatives (QSRs) would take a tugboat to the ship to draw samples from each compartment. Depending on the ship, up to 22 separate compartments could be sampled. These samples were taken to the laboratory for thorough testing. Depending on test results, type of fuel and amount of fuel required, specific compartments were selected to discharge.

When the QSR, unit, and ship's captain or first mate agreed that each was ready, product offloading would begin. Visual samples are required every two hours and three one-gallon samples (one hour after starting, midway and one hour before ending) are required for complete testing. These samples are taken and tested solely for quality.

Once the fuel (JP5) arrived in the fuel tank farm, it was continu-

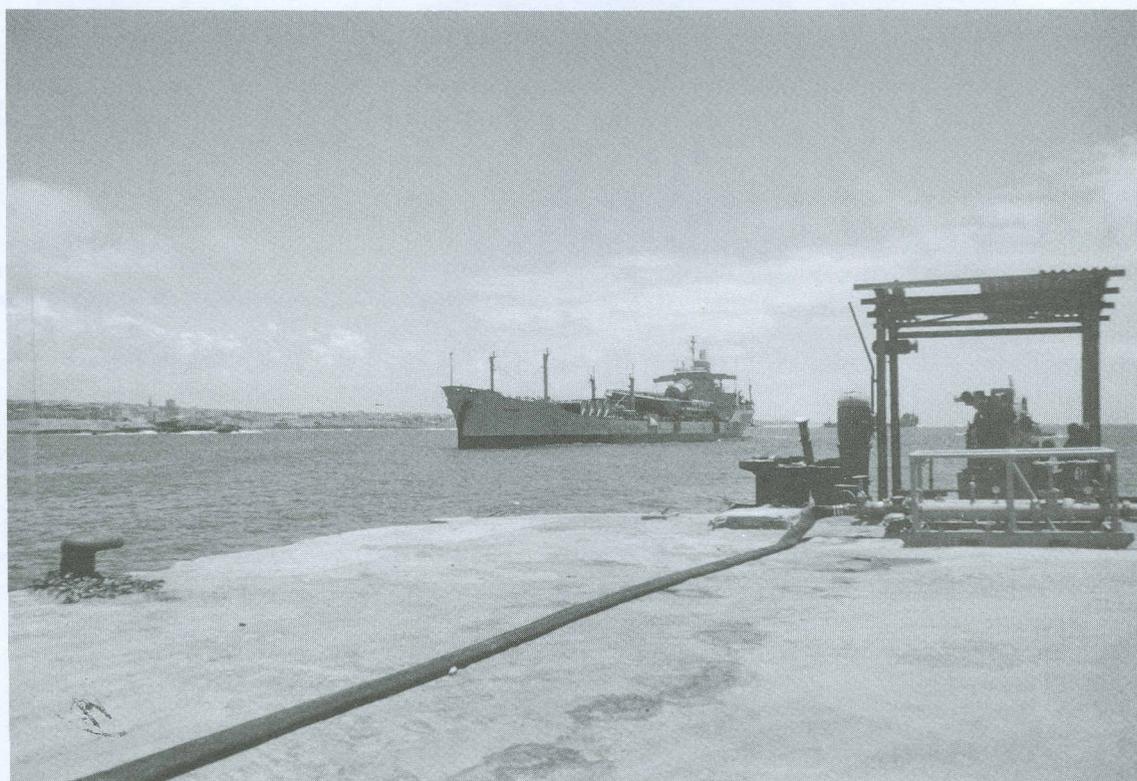


West end of the sprawling fuel tank farm in the African desert

ally pushed forward. (The fuel tank farm is configured in a U-shape.) This prevented fuel from becoming isolated or stagnant in one six-pack and allowed to degrade. Also, by passing through multiple filter separators, free water in the system was being eliminated. (The pipelines

were initially packed and tested with water, thus water contamination was throughout the system).

Dissolved water was a problem because our filter separators cannot remove it. Not only had water reduced the Fuel System Icing Inhibitor (FSII) to minimum safe levels,



Fuel during *Operation Restore Hope* in Somalia was pushed from ocean-going tankers at Mogadishu Port inland through flexible pipeline (foreground).



Soldiers at the JP5 bulk retail point refueled a vehicle during routine operations in Somalia (above). During the 102d Quartermaster Company's rotation for *Operation Restore Hope*, monsoon rains flooded the JP5 point (below).



the dissolved water posed a serious threat to aircraft. As aircraft gain altitude, temperature drops and dissolved water becomes free water. This leads to a number of serious problems, to include flameout. Therefore, fuel rotation and recirculation were essential.

Each day the hoses and collapsible fuel tanks would heat up with the high African temperatures. So, during the early morning hours, when the temperatures were at their lowest and dissolved water started becoming free water, nozzle flushing and recirculation began.

All 17 of the aircraft issue points were flushed with approximately 100 gallons of product each morning. This, along with Aqua-Glo readings, guaranteed only suitable fuel issued to aircraft. Flameouts and other related problems ceased to occur even though we were now issuing over 38,000 gallons of JP5 to more than 36 aircraft daily.

The fuel being flushed from the nozzles was used for ground equipment. Also, four bulk issue points and six retail issue points existed for ground equipment. Every nation participating in *Operation Restore Hope* received fuel from this location. A variety of loading methods was required to top off the numerous types of bulk tankers: top loading, bottom loading, D-1 nozzles for North Atlantic Treaty Organization adapted vehicles, and open port nozzles. This site issued over 109,000 gallons of JP5 daily.

A second type of fuel provided to the theater was military gasoline (MOGAS). This site was set up in the same six-pack configuration using 18-each 20,000-gallon collapsible tanks and five 600-gallons per minute (gpm) pumps.

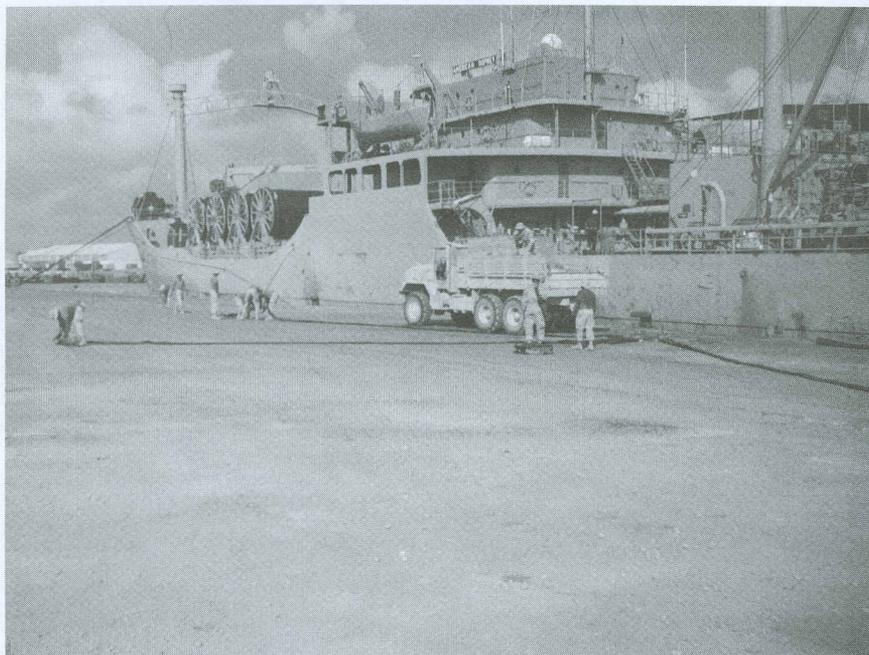
Two-each bulk and retail points issued the fuel, while three points were established to receive fuel. MOGAS requirements were considerably smaller at about 4,200 gallons a day.

In an isolated section of the fuel tank farm, over 50,000 gallons of unusable fuel sat stagnant. Using



The 102d Quartermaster Company (Petroleum) also stored and distributed water to the theater in Somalia. This water distribution point had a 140,000-gallon capacity in collapsible tanks.

Photographs by CPT Conrad H. Bonner



Ship discharge operations at Mogadishu Port ran continuously, up to 80 hours at a time.

the laboratory, disposition instructions became available. A combination of reclamation, fire training, and Engineer projects drew down this fuel which had been on hand since the fuel tank farm's construction.

Security of the fuel farm and pipeline was most important. Numerous bunkers and roving patrols provided 24-hour security. These efforts stopped a saboteur in the fuel farm and detected a sabotage attack against the pipeline.

Fire within the fuel farm was an enormous concern for everyone on the airfield. This was especially true during the numerous mortar and small arms attacks. Firefighting would be extremely difficult because the fuel tanks shared common berms. The high flashpoint of JP5 helped to dampen these concerns after a mortar completely destroyed a 20,000-gallon fuel tank without igniting the product.

A total of 12 tactical firefighting units were stationed throughout the farm. The 91st Engineer Detachment, a fire fighting and crash rescue unit, charged these systems with Aqueous Film Forming Foam (AFFF). They also conducted several

training sessions for the company on these systems. During these demonstrations, confidence in these systems escalated rapidly after observing their effectiveness.

In addition to receiving, storing and distributing the theater's fuel, the company also stored and distributed water. At the water distribution site, four bulk issue points were established with two 50,000-gallon collapsible storage tanks and two 20,000-gallon tanks. Water came through the Tactical Water Distribution System set up between Newport and the airfield. The airfield water distribution point issued over 178,000 gallons of water daily.

The company was spread out over three miles from Newport to the airfield. The unit's modification table of organization and equipment (MTOE) allows the company to operate autonomously, which is how it operated in Somalia. Higher headquarters, direct support maintenance and general supply were over 40 minutes away through a hostile environment.

During the 102d Quartermaster Company's rotation to Somalia, soldiers received, stored and distrib-

uted over 10 million gallons of JP5, 600,000 gallons of MOGAS and 12 million gallons of water. These amounts over a three-month period are greater than the combined amount of products handled by the three preceding units during a year's time.

This was the first time the company was able to operate a fuel tank farm since *Operation Desert Shield/Storm* when the unit handled approximately half this amount of products. It was the first time the company conducted ship offload operations.

The professional manner in which the company accomplished all these missions is a tribute to the soldiers within the unit. These missions, seldom rehearsed or trained, were accomplished without incident.



CPT Conrad H. Bonner is Commander, 102d Quartermaster Company, Fort Campbell, Kentucky. His unit served in Mogadishu, Somalia, under the 561st Corps Support Battalion, one of the two Corps Support Battalions serving under the 507th Logistical Task Force, supporting the United Nations Forces in Somalia.

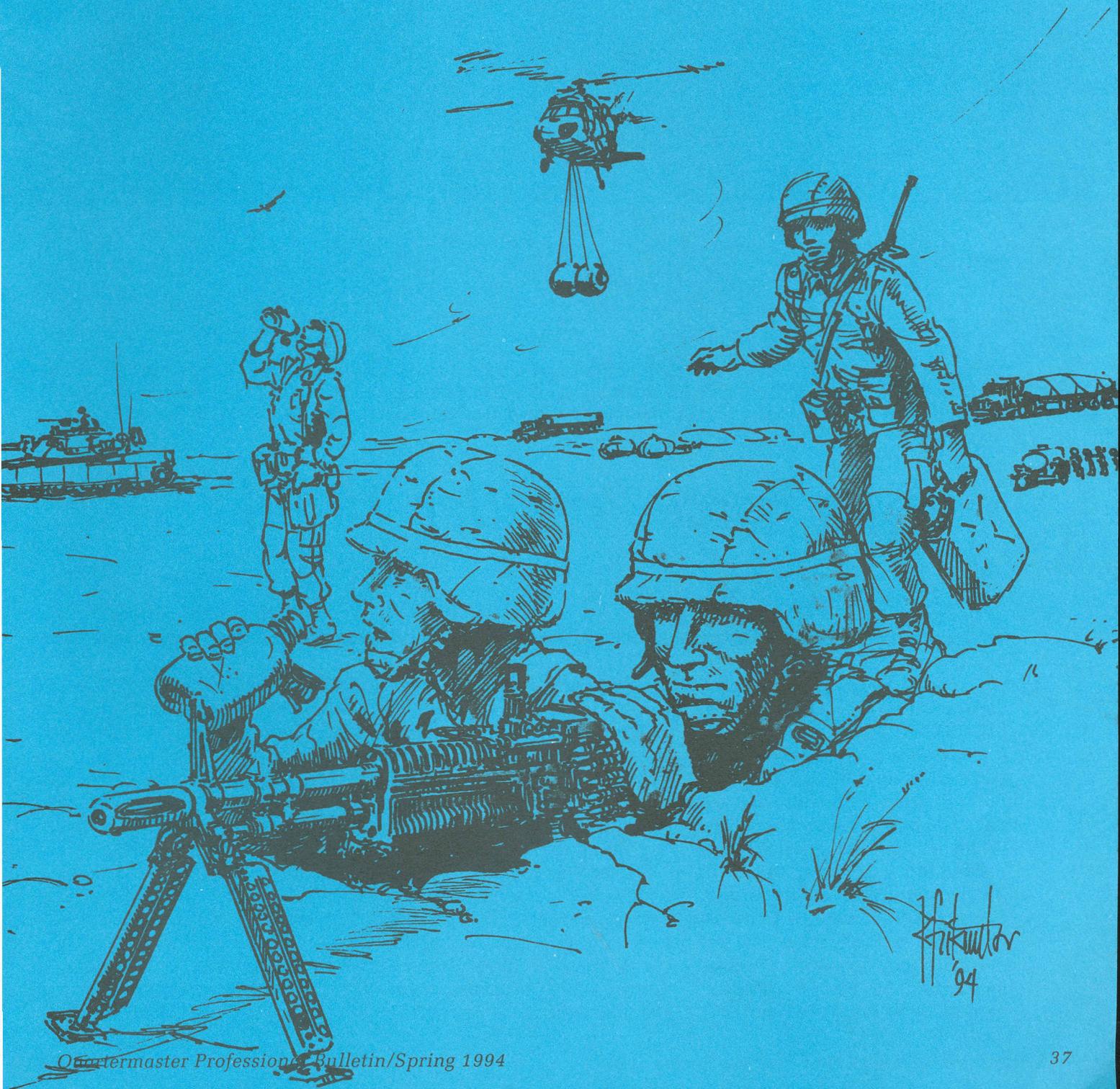


Living area at the laboratory and theater mortuary evacuation point

*You may talk of gin and beer
When you're quartered safe out here,
And you're sent to penny-fights and Aldershot it;
But when it comes to slaughter
You will do your work on water,
And you'll lick the bloomin' boots off him that's got
it.*

*Adapted From Rudyard Kipling's
Poem "Gunga Din"*







This operational test of the Force Provider Platoon Package for 550 soldiers at the Nijmegen Drop Zone at Fort Bragg, North Carolina, 3 Oct-3 Dec 93, shows the billeting tents to the left of the photograph, dining facility in the center, and the tents for administration, aid stations, showers and laundry to the right.

Army's Force Provider 'Hotel'

CPT Robert R. Jones

The Airborne and Special Operations Test Directorate (ABNSOTD) at Fort Bragg, NC, conducted the initial operational test and evaluation (IOTE) of the Force Provider collective support package from 4 Oct-3 Dec 93. While acting as an assistant test officer (on loan from the U.S. Army Quartermaster Center and School's Directorate of Combat Developments at Fort Lee, VA) for this test, I came to one inescapable conclusion: The Force Provider is essentially an Army "field hotel."

The Force Provider Company consists of six platoons, each capable of operating independently and housing 550 soldiers. When all six platoons are located in one place (as in a theatre reception mission), they can house 3,300 soldiers.

The Force Provider "hotel" provides each "guest" with a cot and a footlocker in a tent, extendable, modular, personnel (TEMPER) complete with windows, a vinyl floor, chairs, electrical outlets, florescent lighting, and an adjustable thermostat. Each climate-controlled TEM-

PER is for 15 soldiers. The "guests" must provide their own sleeping bags and locks for their footlockers. While the "hotel" does not offer maid service, each billet tent has mops, brooms, a trash can, and other cleaning supplies for the occupants.

Force Provider includes a "restaurant" which serves three hot meals a day (ration cycle A-B-A). The dining room only seats 140 soldiers at a time, so "reservations" are recommended. Units that fail to properly schedule their meal times can end up with 140 soldiers sitting in the dining

room and 410 soldiers standing in line with meal in hand. (The kitchen can cook 550 meals quickly. The seating capacity is the bottleneck.)

The "hotel" has two shower facilities. Each shower facility consists of two TEMPERs. One tent has 12 shower stalls and 12 shaving stands, while the other is used as a changing tent. The "hotel" pro-

it does not have a doctor in the table of organization and equipment (TOE). The Force Provider Company currently depends on an area support medical unit. The amount of medical support depends on mission, enemy, terrain, troops and time available (METT-T). Force Provider has a helipad which can be used for medical evacuations.

by a contractor for disposal. Another contractor removes the waste from the latrines on a daily basis.

"Guests" are only responsible for cleaning their billet tents, the showers and latrines. They do not have to cook meals or operate any facilities in the "hotel." Soldiers are responsible for the security of their individual weapons if brought to the "hotel."

Force Provider includes a restaurant which serves three hot meals a day (ration cycle A-B-A). The dining room only seats 140 soldiers at a time, so reservations are recommended.

vides each guest with soap and a towel. (The towel must be returned before leaving the shower facility.) The water in the showers and sinks comes out at one temperature only (ideally 115-120 F). Soldiers are encouraged to bring shower shoes. This was the biggest selling item in the "hotel gift shop": the Army and Air Force Exchange Service (AAFES) annex. The Force Provider also has two heated/air conditioned latrines with flushing toilets and urinals and a sink for hand washing.

Recreation

The Force Provider has a recreation center complete with two big screen televisions, a videocassette recorder (VCR), a stereo system, two Ping-Pong tables, free weights, two basketball sets, two volleyball courts, horseshoe sets, a complete set of baseball equipment, a paperback book library, and numerous board games. As mentioned earlier, there is also a TEMPER for AAFES to set up a field annex where soldiers can purchase snacks, shower shoes, cigarettes, and various other items.

The "hotel" has a laundry consisting of two M85 laundry trailers. Each "guest" can have up to 15 pounds of laundry washed per three-day visit. No sleeping bags: the M85 just cannot handle 550 sleeping bags in 72 hours.

While Force Provider has a tent designated for use as an aid station,

The "hotel" also has two "conference rooms" (TEMPERs), one for the chaplain to hold services and one for a unit orderly room. For night operations, the area can be illuminated by 12 floodlight sets placed around the compound. The parking lot is big enough for all of the customer unit's organic vehicles (which is how they will arrive at the "hotel").

Other Services

Other services that the "hotel" may be able to provide (as it did during the operational test) are legal services, a personnel and finance section, a postal operation, a Red Cross desk, an AAFES barber, telephones for soldiers to make collect or credit-card calls, and an automatic teller machine (ATM).

Force Provider can be powered by commercial power (the preferred method), or by Engineer prime power battalion assets (when available), or by the 27 60-kilowatt tactical quiet generators organic to the company. It has two 50,000-gallon, collapsible water tanks that provide potable water to the various facilities. It also has two 10,000-gallon, collapsible diesel fuel tanks that provide fuel for the generators and M80 water heaters. One 3,000-gallon military gasoline (MOGAS) collapsible tank stores the fuel for the M2 burners in the kitchen. Wastewater from the kitchen, laundry and showers is stored in two 10,000-gallon collapsible tanks where it is collected

After this discussion of what Force Provider is and what it can do, let's look at what it is not.

No Gas Station

Force Provider is **not** a gas station. It will not provide fuel for military vehicles. The diesel fuel in the 10,000-gallon tanks is for the generators that power the camp. The Force Provider Company will have the same problem competing for fuel on the battlefield as will using units. Most "guests" will only stay in the "hotel" for three-five days so refueling all of their vehicles would rapidly exhaust the camp's fuel supply.

Force Provider is **not** a garage. It does not stock Class IX (repair parts) for customers. Class IX parts must come from the unit's normal supply channel. The "hotel" does not have space to store the Class IX parts that "guests" might need, especially since any type of unit (such as Air Defense, Field Artillery, or Armor), can visit the "hotel." There is space in the parking lot, however, for units to conduct maintenance on their vehicles.

Force Provider is **not** an ammunition supply point (ASP). The "hotel" does not stock ammunition in the "gift shop." Units must request Class V (ammunition) through their normal channels.

Force Provider is **not** a hospital. As stated earlier, no medical personnel are assigned to the Force Provider Company. There is only

enough space for a limited sick call operation and aid station. There are not enough tents to set up a laboratory, X-ray room, or patient ward.

Force Provider is **not** "the mall." Units will not receive Class II (general supplies), or any class of supplies for that matter. During the operational test, several commanders stated that they wanted a clothing exchange operation in the Force Provider. Their concern was that soldiers coming from the frontline would need their uniforms exchanged, not simply cleaned. Again, this is an issue of space availability. With each unit staying an average of three days, it is not feasible to stock enough uniforms for 550 soldiers to exchange them every three days. Moreover, it is not the mission

of the Force Provider Company to perform clothing exchange. The "hotel" simply cannot be all things to all people. In short, "guests" must continue to get all required supplies through their normal supply channels.

In conclusion, the Force Provider will make an excellent theater reception station, convoy rest stop,

disaster relief, humanitarian assistance facility, or place where front-line soldiers can escape the rigors of combat for a few days and relax. Force Provider is the Army's latest success story. It will greatly improve the quality of life for soldiers in the field, but it should be thought of as a hotel, no more and no less.



CPT Robert R. Jones has a bachelor of science degree in psychology, and a master of business administration degree from Texas A&M University in College Station. He is a graduate of the Field Artillery Officer Basic and Advanced Courses, and the Combined Arms and Services Staff School. His previous assignments include Firing Platoon Leader, Battery Executive Officer, and Battalion Fire Direction Officer for 1st Battalion, 32d Field Artillery, Hanau, Germany; Battalion Fire Direction Officer and Battalion Motor Officer in the 3d Battalion, 18th Field Artillery, Fort Sill, Oklahoma; and Commander, A Battery, 3d Battalion, 18th Field Artillery, Fort Sill. He is currently assigned to the Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia.

Quartermaster Sergeant Displays Gallantry

CPT Mark A. Olinger

The role of the Quartermaster noncommissioned officer (NCO) throughout Army history has been as varied and diverse as it is today. During the Civil War our NCOs were found at every echelon from company to corps level. These NCOs were the forerunners of today's supply sergeants. Within a Union Infantry regiment, the commanding officer appointed the regimental Quartermaster, a lieutenant and the Quartermaster sergeant. The Quartermaster sergeant issued supplies and assisted the regimental Quartermaster in maintaining accountability of all the Quartermaster Department property in the regiment. Also, they were jointly responsible for moving and establishing the regimental trains.

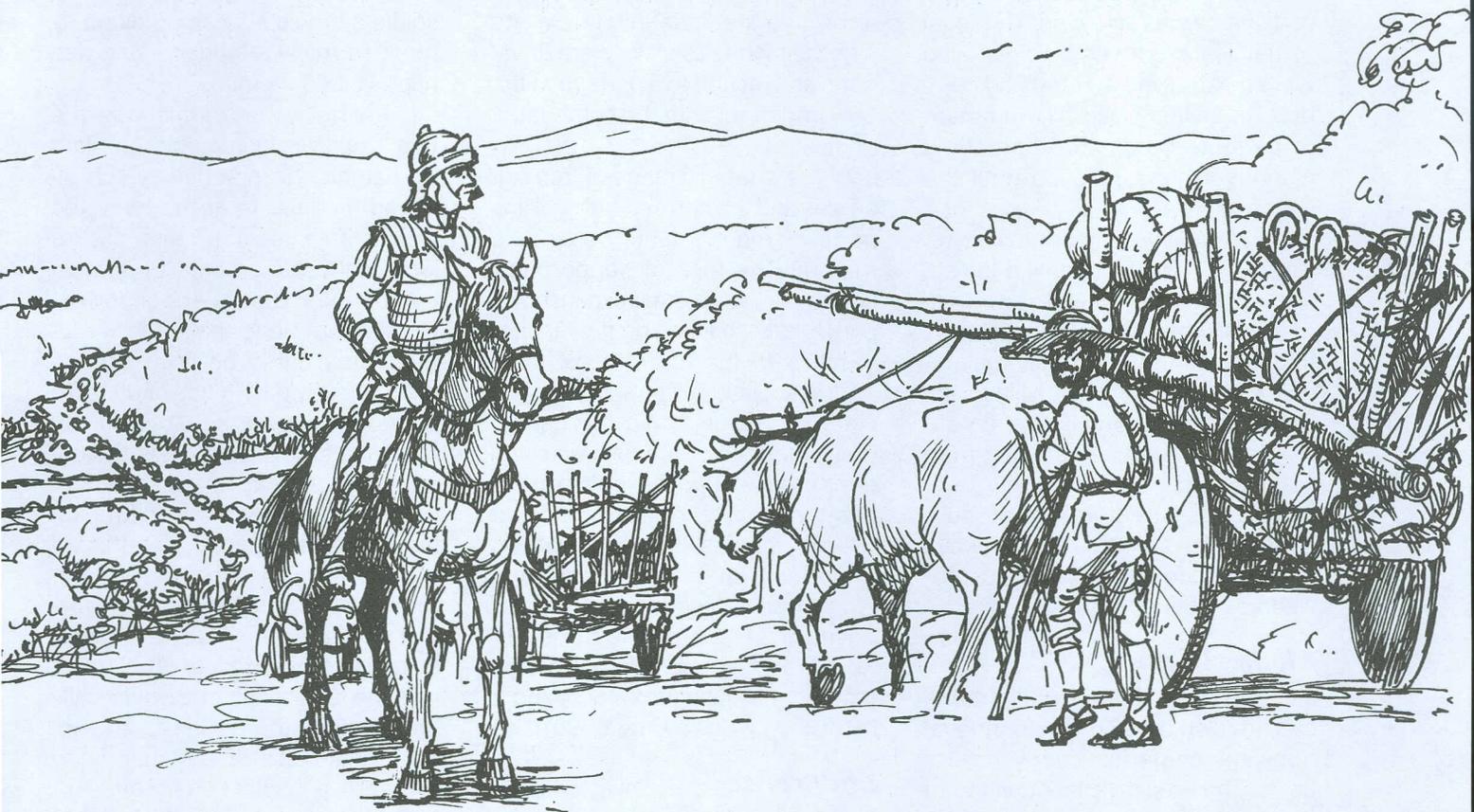
The Seven Days Campaign, which began on 25 June 1862, ended a three-month effort to capture Richmond, VA, by the Army of the Potomac. The Battle of Gaines Mill was the week's largest and most costly battle. At approximately 1430 hours on 27 June 1862, the Army of Northern Virginia attacked the Union line under intense artillery and small arms fire, only to be repulsed each time. Quartermaster Sergeant George C. Williams, 1st Battalion, 14th U.S. Infantry, a native of England, was the first Quartermaster NCO to earn the Congressional Medal of Honor. While on duty with a regimental wagon train, he voluntarily left a position of safety in the rear and joined a company of his regiment then in combat

against Confederate forces. With this company he fought for over four hours with distinguished gallantry through some of the most vicious and bloody fighting before Antietam and Gettysburg. Just as nightfall approached the Confederate infantry penetrated the Union line after a courageous bayonet charge. His regiment and other remnants of Major General Fitz-John Porter's corps crossed the Chickahominy River and rejoined the remainder of the Army of the Potomac.

On 28 August 1897 Quartermaster Sergeant Williams was awarded the Congressional Medal of Honor for his gallantry at Gaines Mill. Williams Road at Fort George G. Meade, MD, was named in his honor in December 1961.



CPT Mark A. Olinger has a bachelor of science degree in business administration from California State Polytechnic University, Pomona. He is a graduate of the Operations Research Systems Analysis Military Applications Course I, Combined Arms and Services Staff Course, Canadian Basic Parachute Course, the Quartermaster Officer Advanced Course, Airborne Course, Air Assault Course and the Infantry Officer Basic Course. His assignments include command and staff positions with Special Operations Forces at Fort Bragg, North Carolina, Panama and Saudi Arabia; and Infantry positions in the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky. He is currently an operations research analyst with the Department of Defense, Fort Meade, Maryland.



Logistics of Ancient Armies

CPT Christopher L. Brown

Why study ancient military history? This is a fair question for the modern soldier who is the product of such a technologically advanced military. The answer is that many valuable lessons can be learned from history, and the ancient military history of logistics is certainly no exception. In fact, ancient military establishments were so proficient that war on a modern scale was a way of life long before the

Dark Ages and the Industrial Revolution. Ancient battles rivaled those of the modern era in size and lethality and in tactical as well as logistical complexity. By 100 A.D., the prototypes of every major offensive and defensive weapon system had been developed. Weapon capabilities did not significantly improve until the invention of gun powder. Even after this invention, certain armies of the ancient world could

have easily defeated similar-sized armies found in the 17th and 18th centuries.

Early battlefields prompted many innovations routinely associated with modern achievement. Tactics were advanced to levels that intricately synchronized combined arms operations. The depth of these operations allowed ancient commanders to synchronize a multitude of tactical elements including naval

support, heavy and light infantry, cavalry, and covering artillery.

The level of individual soldier training became so extensive that it could last for years before basic proficiency was achieved. This level of training produced soldiers who were masters at hand-to-hand combat. The training also allowed them to perfect coordinated battlefield maneuvers unsurpassed until the U.S. Civil War.

Early military organizations realized the need for detailed logistical networks, command staff officers, and large administrative groups to deal with the day-to-day maintenance of great armies. Military intelligence sections were established for reconnaissance, map making and enemy tactical estimates. The structures of modern armies were tailored in many ways to the successful examples provided by ancient armies.

Medical Care

The evolution of military medical care also owes much to innovations developed on early battlefields. The medical care provided to ancient soldiers was the best available until the invention of penicillin. In the related area of nutrition and field hygiene, ancient soldiers initiated standards that were not equaled until World War I. These practices allowed soldiers to live, on average, several years longer than their civilian counterparts.

Strong logistical support has been recognized since ancient times as the key to sustaining the initiative and achieving victory. To appreciate the ancient logistical problem, first consider that certain ancient armies were tremendous in size, even by modern standards. The Assyrian logisticians of the 8th Century supported an army that was 175,000 strong when it marched in conquest of Palestine. The Persian Army 300 years later was estimated at upwards of 1 million soldiers.

Also, early logisticians did not have the benefits of mass production, standard packaging and canned

food. Perhaps more importantly, they did not have the capabilities of modern air, rail or motor transport. Despite these disabilities, early logisticians were able to sustain huge armies almost indefinitely. Eventually, their logistics skills were developed and refined to a perfection that only improved with the combustion engine.

The strategic range of Iron Age armies and the corresponding transportation requirements were monumental. The task of supporting a large army over a great expanse was particularly challenging if evaluated in terms of the slow rate of transport associated with animal-drawn vehicles. Support trains obligated a great number of animals and drivers to move supplies in the quantities required to sustain the force. Even under these supply conditions, Imperial Greece had a strategic range from Macedonia to India to Egypt, or 2,600-by-1,000 miles. The Roman Empire was even more extensive, measuring from Scotland to Iran to Egypt, or 3,800-by-1,500 miles.

Endurance

Another factor that developed and refined logistical structures was the ancient ability for social military endurance. Early societies were so conditioned to rely upon a strong military and accustomed to supporting its demands, that they were able to occasionally suffer huge losses with little effect on the nation. Logistics systems were constantly stressed to overcome these losses. In the process, logisticians became very efficient. In the war against Carthage, a storm sunk a fleet of 248 Roman ships with 100,000 troops on board. This loss alone approximated 15 percent of all the able-bodied Italian men of military age. In response, Rome built another large fleet to continue the conquest. Eventually, Roman losses exceeded 400,000. Still, the empire was able to support the campaign to victory.

The supply trains that accompanied the first armies were almost

as extensive as the army itself. In the Bronze Age, armies would allow soldiers to take along attendants or service personnel, as well as wives or girlfriends. An army of 30,000 soldiers would also string along almost as many attendants and perhaps 10,000 women.

Philip of Macedonia was the first to solve this age-old problem by halting the practice which allowed civilians to accompany the troops. This one innovation cut his logistical requirements by almost two-thirds. His son, Alexander the Great, went on to make further refinements. First, he required soldiers to carry pack loads of 60 to 70 pounds. Then he substituted the faster horse over the ox as the primary draft animal. When Alexander conquered the vast Persian Empire, his troops carried nearly one-third of their own supplies. His army therefore needed 6,000 fewer pack animals and another 240 fewer support animals to haul fodder. The result was the fastest and most logistically flexible army the world had known.

Alexander's 65,000-man army required a basic subsistence of 195,000 pounds of grain, 325,000 pounds of water and 375,000 pounds of animal fodder each day. His logisticians were able to provide these quantities daily, despite being handicapped by an animal cart supply route that extended over 2,000 miles. This operation was also challenged to keep pace with an army that averaged 12 miles a day over rough terrain.

Live Off Land

Procurement of supplies was very difficult in ancient times due to the lack of a monetary standard. The invention of currency did as much to aid the support of mobile armies as it did to increase domestic economic efficiency. Before the invention of currency, trading one supply for another was the only accepted method to acquire items. Bartering, however, did not help the logistician who only had needs. For this reason, campaigns were often started

Alexander the Great's simple innovations produced the fastest and most logistically flexible army the world had known. He first required soldiers to carry pack loads of 60 to 70 pounds. Then he substituted the faster horse over the ox as the primary draft animal. When Alexander conquered the vast Persian Empire, his troops carried nearly one-third of their own supplies.

in the spring so that armies could live off the land. Later, as armies became bigger and wars became longer, forces would strike from city to city as a means to support themselves on the march. This initiated the total war concept and could destroy whole societies at a time.

When coined money became accepted throughout the civilized world, standards for weights and measurements were developed. These standards allowed logisticians to purchase large supply quantities with precision. The development of currency and measurements also prompted the king's treasury to establish the concept of military contracting. Contractors were used on foreign soil to supply the army with prepositioned supply stocks along the route of march.

An example of an ancient army's ability to procure and contract military supplies was evident in the Assyrian army's horse procurement operations. The Assyrian army was the first to build a larger force around a strong cavalry. The need to procure horses in such great quantities resulted in the establishment of a special supply branch. This branch was eventually able to consistently procure, train and deploy 3,000 horses a month.

Supply Transport

The history of supply transport and organized maintenance can be traced to the first civilization known as Sumer. The wheel was invented by this culture shortly after 4,000 B.C. The concept was quickly ex-

panded and developed into the basic cart. Domesticated animals were trained to pull the vehicle, which soon became the mainstay of logistical transport. Over the course of centuries, armies grew to use thousands of wheeled vehicles for many purposes. Dependence on vehicles established the need for organized maintenance. Maintenance personnel became critical to keep the force on the march. Ultimately, mobile maintenance battalions were employed in the logistics trains with repair depots in the rear.

Sea Supply

Naval assets were extensively employed to move armies and supplies whenever practical. Similar to modern support vessels, ancient support ships were designed and built to specifically move men, animals and supplies with the greatest efficiency. Campaigns were often planned with naval logistics support as a key consideration. Alexander the Great's plan to invade Persia was built around his ability to be supplied from the sea. Centuries earlier when Persia attacked Greece, the Persian king Xerxes employed 3,000 transport ships to sustain his army.

Road development offered tremendous advantages for transport. The earliest roads were nothing more than mud paths hardened from years of use. Road surfaces did not advance until the Roman Empire. Roman legions could average eight miles a day on dry unpaved roads. Under wet conditions the army

was often driven to a halt. On paved roads, a legion could cover up to 30 miles a day regardless of weather. In 1991 the U.S. interstate system only consisted of 44,000 miles of paved roads. At the end of the empire, Rome had built over 250,000 miles of roads; 50,000 miles of which were paved. Some are still in use.

Modern logisticians owe a debt of gratitude to early counterparts for their founding innovations in logistical structure and technique. Ancient logisticians faced great challenges when supporting large armies across continents without motor transport or other modern conveniences. It is amazing to realize that they overcame these logistics obstacles and set a standard for proficiency that was not surpassed until the 19th Century.

The author credits *From Sumer to Rome, The Military Capabilities of Ancient Armies* by Richard A. Gabriel and Karen S. Metz, Contributions in Military Studies, Number 108 Greenwood Press, New York, 1991.



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Training the Petroleum Supply Specialist

CPT Ronald Stafford

The company commander tells you there are two new soldiers at battalion awaiting pickup. You are excited, knowing that the long-awaited replacements are finally here. You are told these soldiers are directly from the U.S. Army Quartermaster Center and School, Fort Lee, VA - new graduates of the Petroleum Supply Specialist (77F) Course. As noncommissioned officer in charge (NCOIC) of the petroleum section in your unit, you wonder if these soldiers are capable of performing their new military occupational specialty (MOS)? Are they proficient in common task skills and are they ready for field duty?

The AIT Experience

Prospective 77Fs arrive at Fort Lee from various basic training installations for assignment to one of the three petroleum advanced individual training (AIT) companies. The soldiers then go through a rigorous nine-week, three-day course with the following objectives:

- Prepare soldiers to perform skill level 1 77F tasks.
- Prepare soldiers to successfully pass the Army Physical Fitness Test (APFT).
- Train and reinforce common task skills.
- Continue the process of making soldiers out of civilians.

MOS Training

The Basic Petroleum Laboratory Division (BPLD) in the Petroleum and Water Department at Fort Lee is responsible for training soldiers on the basic MOS skills necessary to immediately contribute to your unit's mission. The program of instruction (POI), which incorporates feedback from field units, is the guideline that instructors follow to train future petroleum soldiers. The schoolhouse introduces the



Military operations on urbanized terrain (MOUT) exercises teach basic soldiering skills to the advanced individual training student.



soldier to the vast arsenal of petroleum products and equipment during the course. Soldiers spend many hours in hands-on training to be competent on all skill level 1 tasks.

During the final four weeks of training, the AIT soldier participates in a five-day, scenario-driven field training exercise (FTX). The exercise, dubbed "Logistics Warrior," not only reinforces MOS skills in a tactical environment, but also introduces the soldier to the full spectrum of the leadership chain. The Quartermaster Officer Basic Course provides lieutenants to act as platoon leaders and staff officers. The NCO Academy assigns NCOs attending the Advanced Noncommissioned Officer Course (ANCO) to act as platoon sergeants and staff NCOs, and NCOs attending the Basic Noncommissioned Officer Course (BNCO) to serve as squad leaders. The AIT soldier gains experience by performing MOS-related skills in a tactical environment and picks up lessons learned from seasoned NCOs. Five MOS-critical tasks are reinforced during the FTX. Even though these tasks were thoroughly introduced in the classroom and at the Military in the Field site, the FTX is the first time 77F soldiers must perform in a tactical environment. These tasks include the following:

- Inventory, assemble, operate, perform preventive maintenance checks and services (PMCS), disassemble, recover and construct load plans for the following systems:
 - Fuel system supply point (FSSP).
 - Forward area refueling equipment (FARE).
 - Refuel on the Move (ROM).
- Perform operator maintenance on petroleum vehicles.
- Helicopter sling-load packaged petroleum fuels.

After the FTX, the soldiers must pass a comprehensive end-of-course test to graduate.

APFT

The primary goal of the AIT physical fitness program is to improve the five components of fitness: cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition. The program must be progressive. These 77F soldiers have only been in the Army for nine weeks when they arrive at AIT. The soldiers must meet the 60-point requirement per event as outlined in FM 21-20 (Physical Fitness Training), an increase of 10 points per event from the standard set in basic training. Even though this is the minimum for graduation, the soldiers are encouraged to perform to their maximum capabilities. Do not expect your new soldiers to "max" the physical training (PT) test. Their physical fitness level has been raised to the highest level possible in basic training and AIT. Now, it is your job to work with the soldiers to raise and maintain their fitness level to the maximum potential.

Common Task Reinforcement

Common task reinforcement plays a crucial role in the development of the petroleum AIT soldier. For the AIT company cadre to achieve the goal of successfully training all required tasks, cadre must develop a training strategy. These strategies include military stakes competitions, land navigation courses, military operations on urbanized terrain (MOUT), FTXs and round robin training. Since common task training (CTT) time is not incorporated into the petroleum AIT soldiers' course, the skills are normally taught after daily MOS training or on weekends. The CTT objective is to provide the unit with a soldier who can survive on the battlefield.

Soldierization Process

Soldierization is the process of taking civilians and turning them into soldiers. While in the initial entry training environment, soldiers are exposed to role models who require stringent standards and use all avail-

able time to reinforce basic soldier skills. The role models come in the form of drill sergeants. Yes, you read it right: drill sergeants! Fort Lee is not a vacation resort where AIT soldiers come to learn just their MOS. The AIT drill sergeant is responsible for taking "raw" basic trainees and turning them into functional soldiers. The soldier is trained and evaluated on the chain of command, basic soldier knowledge, Class A uniform inspection, wall locker inspection and common task reinforcement.

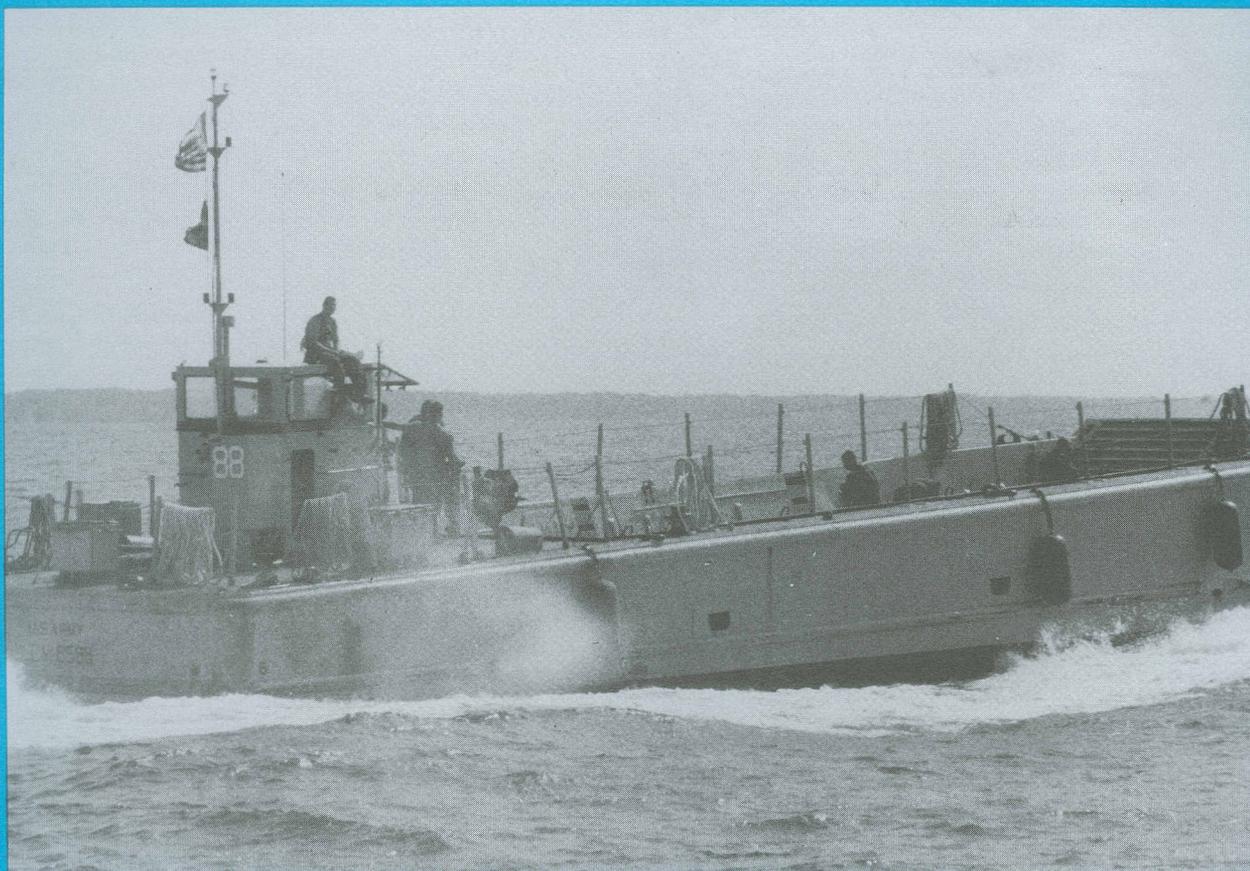
All soldiers are individually counseled by their drill sergeant. The drill sergeant will inform them of their strengths and weaknesses. At this level, substandard soldiers are identified for additional training or possible elimination. When soldiers arrive at your unit, you can expect them to look, think and act like soldiers.

The End Result

So, what can you expect from your new petroleum supply soldiers? Expect them to know skill level 1 petroleum tasks, pass their APFT, know common soldier tasks, and contribute immediately to the mission of your unit. The soldiers will be highly motivated when they reach your unit. They will expect tough, realistic training. Do not expect the soldiers to know everything. They understand the basics and may require additional training on your unit's particular equipment. The soldier's MOS training does not end at AIT. The responsibility now lies with you to continue the learning process.



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Quartermaster advanced individual training (AIT) soldiers started their journey on the James River, preparing for the beach assault at Fort Story, Virginia.

Unique Quartermaster FTX

Students from the 262d Quartermaster Battalion's advanced individual training (AIT) Companies U and H at Fort Lee, VA, secured a mock port and set up a fuel system supply point (FSSP) during a unique field training exercise (FTX) at Fort Story, VA. The soldiers from the U.S. Army Quartermaster Center and School were training in military occupational specialty (MOS) 77F (petroleum supply specialist). They also used the Fort Story site to support a simulated troop deployment from the 82d and 101st Airborne Divisions.

The AIT students were joined last winter in the week-long exercise by four Quartermaster Officer Basic Course students (one who was a Honduran infantry officer), and one Basic Non-commissioned Officer (NCO) Course student. The officers became executive officer, platoon

leader and operations officers. The NCO acted as a platoon sergeant.

A former Company U drill sergeant at Fort Lee came up with the idea for the exercise. Usually, students training in the 77F MOS have a five-day Logistics Warrior FTX during the nine-week, three-day course. The experience at Fort Story was a first.

The Quartermaster students participated in aerial resupply and sling-loading operations with collapsible fuel tanks. They also performed simulated refueling operations and trained on preventive maintenance checks and services techniques, land navigation and establishing temporary fighting positions. An article about their field exercise appeared in the February 1994 edition of *Soldiers* magazine.



Participants gathered next to a land amphibious resupply cargo (LARC) vehicle at oceanfront for an after action review of a Refuel on the Move operation.



AIT soldiers practiced navigational skills.



Soldiers learned early that teamwork is a must to set up the fuel system supply point.

Logistics: The Forward Edge in the Desert

CPT Steven L. Allen

After graduating from the Infantry Officer Basic Course, I received orders to the 1st Infantry Division (11D) at Fort Riley, KS, as a Bradley Platoon Leader. The 11D deployed to Saudi Arabia during *Operation Desert Shield/Storm*. During peacetime the division normally rotates different brigades to the National Training Center (NTC) at Fort Irwin, CA. During both deployments I became familiar with logistics support and its necessity. Survival on the desert battlefield depends on good logistics support.

maintenance team would carry Class IX (repair parts) in a prescribed load list truck, an M35A2 2.5-ton truck with trailer.

The composition of the mechanized company team affects the logistics needed to sustain that team. The organic vehicle assets of a Bradley Infantry Company include 13 M2 BFVs, and one M113A2 armored personnel carrier (APC). Also, the company has two 2.5-ton trucks, one M998 high mobility multipurpose wheeled vehicle, one 400-gallon water trailer, and one util-

properly executed resupply operations. The executive officer (XO) plans and coordinates for combat service support (CSS). The first sergeant (1SG) operates and executes the CSS logistics plan by the logistics package (LOGPAC). The LOGPAC should contain all anticipated supplies required to sustain the company for the next 24 hours. The LOGPAC normally has the company supply sergeant, his driver and his truck pulling a refilled water trailer. The LOGPAC also contains a heavy expanded mobile tactical

Survival on the desert battlefield depends on good logistics support. The company headquarters must make CSS function effectively.

The ability to sustain operations in the desert begins with a logistics buildup. At the NTC, key leaders of the mechanized company team inventory the major classes of supply before the initial road march out of the "dust bowl" (the equipment draw area). Each combat vehicle has three days of supply (DOS) of Meals, Ready To Eat (MREs) and at least 25 gallons of potable water (Class I, rations). Each crew ensures that its vehicle's fuel tank is full of diesel (Class III, petroleum, oils and lubricants). Each crew also secures three DOS of antifreeze, motor oil and grease (packaged Class III). Initial Class IV (construction and barrier materiel) issue averaged eight, U-shaped, long pickets and four rolls of concertina wire per Bradley fighting vehicle (BFV). Issue of Class V (ammunition) takes place after the initial road march. Attached combat medics issue combat lifesaver bags to each combat lifesaver or at least one per tracked vehicle (Class VIII, medical supplies). The attached

ity cargo trailer. When the company deploys to the field, the maintenance assets become attached. These assets include one APC, one M88 recovery vehicle, and two M35A2 trucks. The company also gains its medical team with one APC and three medically trained personnel.

When an Infantry company becomes task-organized, it will lose four BFVs (one platoon) to a tank company and gain four tanks from that company. The final task-organizing creates the mechanized company team. During any major field exercise, these steps occur before any offensive or defensive operations. Other tracked vehicle elements such as ground surveillance radar, mortars, scouts, engineers, and air defense artillery may get attached to the company for specific missions. When attached, the company provides their logistics support.

The company team can accomplish its offensive or defensive mission through the effectiveness of

truck (HEMTT) with Class III diesel and, when needed, a Class V cargo HEMTT. The 1SG moves to the battalion task force logistics release point (LRP) and waits for the LOGPAC convoy. The task force support platoon leader leads the LOGPAC from the brigade support area (BSA) to the LRP. The 1SG gives the unit maintenance collection point (UMCP) representative at the LRP the previous day's DA 2404s (Equipment Inspection and Maintenance Worksheets) with repair parts requisitions and the current vehicle nonmission capable report. He confirms the status of vehicles evacuated to the BSA and coordinates their return.

At times during LOGPAC operations the company XO receives a fragmentary order to move the company team to a new location. This occurs just after the 1SG leaves for the LRP, and while the company commander is attending an after action review (AAR). The commander attends the previous mis-

sion AAR at the battalion task force tactical operations center (TOC). This allows the XO to move the company. Once the XO establishes the new company area, he quickly reports the new location to the task force TOC. This allows the commander to identify the company's new location since he was at the battalion TOC. The company XO then sends a coded new location to the 1SG.

Once the LOGPAC arrives at the LRP, the 1SG immediately leads it to the company resupply point, normally 800-1,000 meters behind the forward platoons. While enroute to the company, the 1SG calls ahead over the FM radio to inform the company TOC of estimated time of arrival. This cues the next senior noncommissioned officer (NCO) or the XO to set up the resupply site using one of two different methods. The "service station" method rearms and refuels vehicles at centrally located points. The "tailgate" method allows combat vehicles to remain in their battle positions. Vehicles back out just enough for the resupply vehicle to rearm and refuel. Once the company resupply is complete, the 1SG returns the LOGPAC to the LRP. The resupply operation should not take more than 90 minutes. The support platoon leader returns the LOGPACs to the BSA upon completion of resupply.

Service Station

There are advantages and disadvantages of using the service station method or the tailgate method for resupply. The service station method is the quickest, safest, most efficient, and thorough technique for resupply. It can quickly move out of the resupply area during an artillery attack. The tailgate method allows vehicles to resupply next to their fighting positions. The disadvantage of the service station method is that up to three vehicles are removed from the front line, creating a security problem. The disadvantages of the tailgate method are that it can only be used in an assem-

bly area, takes much longer, and resupply vehicles are closer to the enemy.

Battles affect company resupply operations at the NTC. Once the battle begins, the CSS battle multiplies. A catastrophic kill (destroyed vehicle) or a mobility kill (vehicle damaged that limits its ability to move or shoot) can seriously obstruct future operations. Casualties from the battle also affect any future operations. The 1SG and the XO must carefully monitor the reconstitution process to sustain operations. With good rehearsals, the 1SG and the medical team can quickly identify casualties by a visual signaling panel placed either all or half way up the vehicle's antenna. The medical APC with the 1SG transports the consolidated casualties from the casualty collection point to the battalion aid station. Upon arrival he will report the personnel status to the battalion adjutant.

Enemy Fire

Once a vehicle gets hit from enemy fire, the XO calls the battalion TOC. He uses the administrative logistics FM radio and reports the type of kill and number of casualties. Reporting this quickly is important because the reconstitution time starts then, along with casualties returning. These two events, vehicle reconstitution and casualty evacuation, create big problems for company resupply operations. Under these conditions, the tailgate method of resupply is more beneficial.

Training and rehearsing for company-level resupply operations influence the way operations occur in a desert environment. Rain, sleet and cold wind hinder company resupply operations. LOGPAC vehicles move slower on the main supply routes, and they may get stuck somewhere between the LRP and the company resupply point. The drivers and supervisors need a backup plan during every resupply operation. At the NTC where temperatures reached 100-plus degrees

Fahrenheit during the day, water and ice became extremely important during resupply. Resupply operations worked in the extreme weather conditions. Previous logistics training and rehearsals allowed the company team to complete effective resupply operations. This, in turn, allowed the commander to concentrate more on defeating the NTC opposing force.

Sustainment

During a deployment to Saudi Arabia or a rotation to the NTC, logistics support is important in a desert environment. The Bradley Company Team resupply operations are vital to the overall success of that team and its missions. The company XO and the 1SG will accomplish support operations with help from the supply sergeant, the maintenance team chief, and the combat medics. Training and rehearsals play an important part of home station training, particularly in extreme weather conditions. The company headquarters must make CSS function effectively. Reacting under difficult terrain and weather makes resupply operations critical to mission accomplishment. Sustainment of soldiers along with mission accomplishment create the importance of logistics in a desert environment.



CPT Steven L. Allen has a bachelor of science degree in industrial technology from the University of North Dakota. He is also a graduate of the Infantry Officer Basic Course, Quartermaster Officer Advanced Course, Support Operations Course Phase II, Aerial Delivery and Materiel Officer Course, Bradley Fighting Vehicle Course, TOW (Tube-Launched, Optically Tracked, Wire-Guided Missile) Leader's Course and Airborne School. Previously he served as a Bradley Rifle Platoon Leader and Bradley Company Executive Officer with the 1st Infantry Division, Fort Riley, Kansas. He is assigned to the 710th Main Support Battalion at Fort Drum, New York.

Joy and Pain: Change of Command Inventory

CPT Nathaniel Rivers

That long-awaited day finally came your way. The division support command (DISCOM) commander called you into his office to offer you company command. Now, with the initial excitement of this significant opportunity subsiding, your focus falls on how to plan, execute and properly document your change of command. The change of command inventory is a crucial episode for the entire chain of command. For the outgoing commander, it marks the final chapter of command. Property adjustments must be minimal. The inventory also offers a unique preview of the pending command climate. A serious, professional inventory is paramount to success. For the DISCOM commander, the change of command period represents an informal evaluation of the command supply discipline program. Normally, the inventory encompasses three phases - planning, accountability and responsibility transfer - and requires an aggressive plan to monitor shortage requisitions generated from the inventory.

Planning Phase

Although it is too often neglected, the planning phase sets the tone of the inventory and ultimately defines success or failure. Responsibilities vary, but the preparation phase requires a well-coordinated effort between incoming and outgoing commanders.

As the outgoing commander, you should conduct a preliminary inventory in the month before the change of command. At the end of the preliminary inventory, the unit supply sergeant posts all change documents, updates subhand receipts and prepares adjustment documents to account for shortages discovered during the inventory. Finally, you complete a comprehensive list of requisitions generated from the inventory and reconcile the list with the adjustment documents prepared by the supply sergeant.

Armed with the experience of the preliminary inventory, you should publish a change of command inventory memorandum of instruction. The memorandum shows everyone's responsibilities and includes a schedule for the inventory, coordinated with the incoming commander, reflecting the date, time, location and hand receipt holder for each inventory.

As the incoming commander, you invest only a small amount of time and effort in the planning phase. Before you visit the company, review Army Regulations (ARs) 710-2 (Supply Policy Below the Wholesale Level), AR 735-5 (Policies and Procedures for Property Accountability) and DA Pamphlet 710-2-1 (Using Unit Supply System Manual Procedures), contained in the current issue of the Unit Supply Update, as well as local regulations and directives. Your first stop should be with your property book officer (PBO) or team chief. Discuss local policies, hand receipt status, nonexpendable shortages list, and shortage annexes. Clarify the procedures to adjust discrepancies found during the change of command inventory. Also, from this meeting you should get a feel for the experience level of your supply personnel from the PBO.

After leaving the PBO, satisfied that all organizational property shown on the unit's modification table of organization and equipment (MTOE) is either on hand or on order, it is time to contact all other agencies and property offices that may have equipment issued to your unit. These include the following:

- Furnishings management (barracks furniture).
- Installation property (office desks, chairs and filing cabinets).
- Real property (buildings).
- Central issue facility (CIF) records check.
- Training and Audiovisual Support Center (TASC).

Your preparatory visits end with the unit supply sergeant. After obtain-

ing copies of subhand receipts, component hand receipts or shortage annexes and a list of open expendables/durable document numbers for component shortages, you are ready to reconcile subhand receipts with the master hand receipt. Although the outgoing commander is responsible for providing publications, do not assume publications will be available for the inventory. Before starting the actual inventory, ensure all training manuals, hand receipts and supply catalogs for all sets, kits, outfits and other equipment are present and current. After a final review of the Unit Supply Updates, you are prepared to begin the change of command inventory.

Accountability Phase

For you, the incoming commander, the real work begins now. Conduct the inventory by the schedule in the inventory plan. Inventory sections of like items at the same time. This practice will stop tools or other common items from moving between sections during the inventory. If you cannot inventory all sections on the same day, use spray paint of different colors on different days to assist in identifying tool movement. You may find it best to have items laid out in the same sequence listed on the component hand receipts. While inventorying, make sure you personally see what is on hand. Take no one's word for the whereabouts of equipment, and do not permit others to do "paper" inventories.

Regardless of whom you are replacing, do not let friendship affect your inventory procedures. The task is your responsibility, and you alone bear command responsibility for all property assigned to your company. If you fail to do something a prudent person would do, such as counting all property and signing it over to subordinates, you may be found liable.

Property falls into one of three categories: expendable, durable and

nonexpendable. Inventory property and document all the shortages, paying particular attention to nonexpendable and durable components. Ensure all the nonexpendable shortages are listed on a shortage annex from the PBO. If not, make sure the outgoing commander processes the proper documentation to account for the shortage before you sign for the property. Also, make sure all unit hand receipts have been updated and the outgoing commander has processed all the required adjustment documents. When completed, all inventory shortages must show on a cash collection voucher, statement of charges or report of survey. Use the administrative adjustment report (AAR) to correct minor errors in size, lot numbers and serial numbers. Do not use the AAR for sensitive items or item substitution.

Responsibility Transfer Phase

The physical inventory is complete. Both commanders have reconciled and accounted for shortages. The time has come to transfer property responsibility. A simple process, the actual transfer involves little more than the incoming commander signing the master hand receipt and sensitive items' inventory. However, this phase also includes the dual effort necessary to prepare the change of command outbrief for the battalion and DISCOM commanders. Upon completing the inventory, report the results of the inventory in writing to the battalion commander. Include in your packet a joint memorandum stating that you completed the inventory according to applicable regulations and procedures and that both commanders personally accounted for all unit property. Also include copies of the personnel asset inventory, a memorandum for record listing publications (with publication date) used for the inventory, and any adjustment documents generated from the inventory.

The outgoing commander must recall all outstanding DA Forms 1687 (Notice of Delegation of Authority-

Receipt for Supplies) and assumption of command orders, while the incoming commander prepares replacements. Also, the incoming commander signs new DA Forms 3749 (Equipment Receipts) for weapons and nuclear, biological, chemical (NBC) equipment. The last step before assuming command is signing for all the property. As the incoming company commander, you must be comfortable with the answers to two questions: (1) Are you satisfied with the inventory? and (2) Did you see everything in your company? If you cannot answer these two questions "yes," you should not take command of the unit. Similarly, the outgoing commander should not be relieved of command if property accountability has not been documented to your satisfaction. The following list of do's and don'ts may help prospective commanders during their change of command inventory:

Some Do's:

- Count everything personally.
- Update hand receipts and component hand receipts before you inventory each section.
- Record shortage and immediately initiate action to get relief from accountability. The outgoing commander is responsible for this action, so make sure he accepts this responsibility.
- Strictly follow your inventory schedule.
- Use current publications. Record on component hand-receipt documents the technical manual number and its publication date for the nonexpendable item annotated on the hand-receipt listing used during the inventories. This may help if questions arise during subsequent inventories or inspections.
- Read AR 710-2, AR 735-5, AR 700-84 (Issue and Sale of Personal Clothing), DA Pamphlet 710-2-1, and any local supply policies.
- Conduct the inventory in a professional manner. Following this

advice could save you time and improve your unit's ability to perform its mission because you will have your property under control.

Some Don'ts:

This list may be more important than the list of things to do.

- Accept promises. Outgoing company-level commanders often suddenly lose interest in property problems once they relinquish their command. Anticipate that a great deal of property will be recovered by the commander once he has moved on. Battalion commanders cannot guarantee that they can help you from having to pay for lost property. (If you stay in command a full 18 months, you will usually have a different battalion commander when you change command.)
- Don't miss or skip any items or sections in the inventory.
- Don't let other people inventory for you.
- Don't let people sign for property that is not on hand.
- Don't sign for something yourself that is not on hand.
- Don't compromise with your soldiers or yourself. Make no exceptions to correct procedures.

Arguably, the change of command inventory is probably the most significant event in the career of a company grade officer. Forget the war stories and treat the inventory as any other career challenge. Diligent preparation, coordination and professionalism will ultimately ensure success. Take advantage of this challenge and demonstrate your professionalism early in your command. This is, after all, an important part of taking care of your soldiers.



CPT Nathaniel Rivers, formerly the Commander of the 98th Maintenance Company, is now the Division Material Management Officer, Division Material Management Center, 6th Infantry Division (Light), Alaska.

Supporting Field Artillery at the NTC

CPT Eric A. Barto

It does not seem to matter what season it is at the National Training Center (NTC), Fort Irwin, CA. The weather and terrain at Fort Irwin are always the cruelest of adversaries. However, the NTC offers the most realistic, demanding training for the Army's heavy forces today. Combat arms and combat service support soldiers get the opportunity to test the Total Army principle. For the Artillery soldier, the desert means wide open expanses with clear fields of fire not often found at home station. Unprecedented amounts of ammunition are issued. The rotation is an opportunity for teamwork and individual achievement. Section chiefs will vie to see who can shoot the fastest and who can shoot the most. Even with the rigorous demands of the 15-day exercise, and often disagreeable weather conditions, Fort Irwin is Artillery paradise. But paradise cannot last unless the support elements can fuel, fix, arm and feed the "redlegs."

I will elaborate on some of the logistical challenges and problems that I experienced during four rotations as an Artillery officer. As a brand new Quartermaster, I have already gained some insight into the possible reasons for the problems, but my perspective is primarily from the view of the combat arms. For my discussion, I will use the M109 155-millimeter (mm) support howitzer battalion in direct support of the heavy brigade. My various jobs, from fire support officer of a forward Infantry company to the battalion ammunition officer, allowed me to experience facets of the modern battlefield from the front to the brigade support area (BSA).

The first barrier that must be overcome by supporters is breaking down the time-honored feud between the combat arms and the

Be wary about using your standing operating procedure (SOP) to justify your actions to a customer. A Class IX (repair parts) officer recently told me that his customers often knew his SOP better than he did. The first time that a supporter uses his unit's SOP to the customer's dissatisfaction, the customer will learn the SOP to the letter. Do not get hung by your own SOP unless your unit is following it strictly. Take the time to explain the "whys." It does make a difference.

combat service support soldiers. How I viewed those who supported me boiled down to the crucial factor of communication. Take the time to visit the customer. Talk to the leadership. Explain how the system works and how you can or cannot support their expectations. An Artillery officer rarely understands the supply process, much as a Quartermaster would not be expected to know how to compute gunnery data. This "face time" shows the customer that you are dedicated and are willing to make the extra effort. When the supported Artillery soldier has a support-related problem, he will remember a person rather than a position. Do not expect stereotypes to be eliminated overnight. Have the dedication and the ambition to prove yourself.

One of the most important factors for morale is food. The NTC seems to prove this. During the 15-day rotation, soldiers will get one hot meal. After a long day of shooting, moving, preventive maintenance checks and services (PMCS), and battling the desert's oppressive

weather, the sometimes hot T-Ration becomes a much-awaited feast. The meal is sometimes hot because the T-Ration must be moved 20-40 kilometers to get to the battery. Sometimes the battery is in the middle of a battle and will not get to eat until 2100 or later. Even in the dark, a cold hamburger patty is a much-preferred relief to Meals, Ready to Eat (MREs).

The little things regarding Class I (rations) make a difference to the Artillery soldier. Attending to detail, monitoring the product, and making an extra effort will correct most of these problems. Consecutive meals that are the same can crush morale. Ration distribution may sometimes be like this, but should be avoided. During one rotation, my unit had the distinct pleasure of being served pork barbecue on five consecutive days. Of course this sounds like a minor complaint, but it did have a major effect on the soldiers' morale. Matters did not get much better when the soldiers who "died" during the previous battle, returned from the BSA with reports of the preferred meals being served there. The one hot meal a day is often the soldier's only chance in the day to wind down for about 20 minutes. All efforts should be made to keep the menu as diverse as possible.

The inclusion of condiments is another issue that scores big points with the soldiers. Yes, condiments. It is sometimes hard to believe that a bottle of hot sauce and some salad dressing can make that much difference, but just stand next to the serving line and listen to the gripes when there is no salt and pepper. When soldiers talk about their previous units, the subject of how well they were fed in the field is always addressed with great zeal. Remember, morale is a major combat multiplier. The little things do add up.

It goes without saying that water in the desert is of the utmost importance. Even when temperatures are cooler, hard-working soldiers are still losing fluids, but the hot weather can be the most dangerous. The extreme temperatures (often in excess of 105 degrees Fahrenheit) and dry air causes many soldiers to misjudge their fluid loss, especially if they are from areas with average or high humidities. At home station these soldiers often judge their need for water by their perspiration. The desert is so dry that water evaporates off the skin before it can form into a noticeable drop of sweat. The unit's leadership is forced to closely monitor the one canteen of water per hour rule. Also, a fair amount of water is consumed for personal hygiene. Artillery soldiers rarely get a chance to get to a shower and bath location. The five-gallon can becomes the only source of personal hygiene.

The M109 battery usually has two water trailers. They are rotated with the logistics package (LOGPAC) to ensure at least one "water buffalo" at the battery at all times. In the offense, when the battery begins to push forward, the LOGPAC often does not catch up until late in the evening. Therefore, water must always be available in the BSA to be pushed forward as rapidly as possible. Even when there had been one full water buffalo and many five-gallon cans, I occasionally experienced times when we temporarily ran out of water. Suppliers must ensure that water is always available in the BSA to be moved forward.

Ice may be the most underrated asset in the support arena. Ice is not only one of the most satisfying "creature comforts" in the desert, but it can also be considered a safety asset. Particularly during the summer months, a canteen of water can reach an almost undrinkable temperature in an hour. Ice eases the leadership burden of force-feeding water. Soldiers are more apt to drink the required one canteen per



The author's photographs show artillery operations at the National Training Center, Fort Irwin, California.



hour if water is cold. Just like food and mail, the arrival of ice is a much-appreciated morale enhancement.

Ice provides its own unique delivery challenge. In 100-plus degrees, even blocked ice will not last

long. The key is to deliver ice on a regular schedule that coincides with the evening LOGPAC. The ice will still have to move 20-40 kilometers, so minimize the time it spends out of refrigeration.

Class III (petroleum, oils and lubricants), particularly diesel, can be a quick end to a battle. A brigade's synchronized maneuver plans cannot wait for one Artillery battery to get fueled after H-hour. The M109 series howitzer consumes a great deal of fuel. Certain planning considerations are essential to fuel the Artillery. In the offense, the Artillery is similar to the maneuver units that expect a large fuel expenditure. Being topped off before the battle is an absolute essential. Also, it is often necessary to preposition fuel forward so that the batteries can refuel on the move. The key planning factor for this type of mission is a good estimate of how far the artillery will move.

Live Fire

I once experienced a live fire offense that came to a most undramatic conclusion when one of the lead M1 tanks ran out of gas on the Bruno Escarpment. For those not familiar with this terrain feature, the Bruno Escarpment is a long, steep winding trail that has a constricted width allowing only single file movement. The sheer rock wall on the south and the sharp drop on the right make passing impossible. Over three quarters of the task force was stuck behind the M1 and out of the fight. There was not enough room to quickly get a fueler to the tank's location - all because fuel was late in getting to one tank company that morning.

In the defense, the Artillery creates a unique fueling challenge. Normally, minimal movement is associated with the defense. The Artillery, however, still remains a mover. Because of enemy radar acquisition equipment, the Artillery battery does not stay put for very long when firing. Artillery usually moves every hour or more frequently, depending on the situation. During the battle, the Artillery makes survivability moves forward, backward and laterally. Also, batteries are often required to position

forward to initially support the deep fight, then move backward to support the main defense. Although the defense is rarely as fuel intensive as the offense, the diesel requirements must not be underestimated.

One of the problems with an NTC rotation is the lack of assets available to create a realistic support environment for Class III resupply. Individual battalion heavy expanded mobile tactical trucks (HEMTTs) have to drive back to post on Fort Irwin to refuel. Although this still requires rigorous planning, the 100 percent tactical scenario is broken without the full play of corps and division fuel assets. With the Army's renewed interest in training the combat service support soldier, hopefully the NTC will soon develop more realistic implementation.

The continuous use of vehicles over rough terrain causes an increased need for Class IX and Class III packaged products. Few soldiers have a love for their weapon as much as a field Artillery soldier. There is not a more depressing sight in the desert than a howitzer crew with a cannon that does not shoot.

'Cherry Juice'

While morale is a leadership challenge at any phase of a battle, a shooting Artillery soldier is self-motivated. To do this, he must have the repair parts and the packaged Class III products to keep his weapon working. The desert seems to "eat" hydraulic systems, so plenty of "cherry juice" needs to be available. During one rotation, a can of hydraulic fluid was worth its weight in gold when none was to be found in the brigade. Someone had failed to plan or at least failed to verify the availability of hydraulic fluid.

Another problem I have encountered at the NTC is BSA orientation. As the battalion ammunition officer, I frequently had to go to the battalion field trains and the brigade tactical operations center (TOC). The soldiers at the entry control points rarely knew where the different elements of the BSA were lo-

cated. Guards are usually chosen from the myriad of splinter units in the BSA. Often, they only know how to get to their own section. Because of the openness of the desert, the BSA is often spread out over a few square kilometers. Individual sections are sometimes neatly tucked in a gully or hidden on the other side of a hill. Trying to find your destination can sometimes take an hour or more.

Easy Solution

An easy solution would be to require all entry control points to have a rough sketch of the BSA layout. This would lessen traffic flow and speed up business, since it would eliminate aimless wanderers. Remember, most combat arms soldiers are not familiar with the BSA and the rear area of operations. Time is an asset that cannot be squandered.

Many of the points I have brought up can be solved by paying attention to detail and taking the time to always put forth the maximum effort. Realize that the little things can make a big impact. NTC is an exhausting experience for the field Artillery soldier, as it is for all soldiers. During these realistic training opportunities, we can get in the habit of careful planning. Soldiers who feel they are being taken care of are better fighters. Provide them with every reason to keep their equipment fixed, their vehicles fueled and armed, and their bellies full. In turn, they will provide the will to win.



CPT Eric A. Barto has a bachelor of arts degree from Lafayette College in Easton, Pennsylvania. He is also a graduate of the Quartermaster Officer Advanced Course, Field Artillery Basic Course, Airborne School, and Air Assault School. He has previously served as a Company Fire Support Officer, Battery Fire Direction Officer, and Battalion Ammunition Officer/Service Battery Executive Officer at Fort Polk, Louisiana. His next assignment is Fort Irwin, California.

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**COMMANDER
U.S. ARMY QUARTERMASTER CENTER AND SCHOOL
ATTN: ATSM-QMG-B (EDITOR)
FORT LEE, VIRGINIA 23801-5032**

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Water Treatment and Dangerous Chemicals

SSG Donald L. Sparks

The Quartermaster soldier in military occupational specialty (MOS) 77W (water treatment specialist) handles a wide variety of chemicals. The types and amounts of these chemicals will depend on the unit's purification equipment and the unit's mission. Some of the chemicals used in water treatment are calcium hypochlorite (chlorine), activated carbon, polymers, sodium hex, citric acid and ferric chloride. Operators must know how to handle the many problems associated with each of these chemicals. Examples include knowing how to store chemicals, the potential for fire and the proper prevention procedures. Soldiers need to know the protective equipment required when handling chemicals and how to control fires caused by each chemical.

When storing chemicals, never store chemicals together that react violently with each other. Always leave space between each chemical. When storing corrosive chemicals, such as calcium hypochlorite and ferric chloride, put them in a nonmetal container or CONEX. Each

chemical should have a material safety data sheet (MSDS) posted in plan view on the storage container. Make sure all the chemicals being stored are properly labeled. When on a field training exercise, never store chemicals in the same tent in which soldiers sleep. Take a separate tent for chemical storage. Also, take pallets to keep the chemicals off the ground and prevent the chemicals from getting wet.

Fire Hazards

Fire prevention is the best fire protection. Fire hazards can be easily removed. The prompt disposal of packing materials and trash and removal of other debris can greatly reduce fire hazards. Provide suitable containers for used wiping cloths. Have fire extinguishers conspicuously located in hallways, near work areas and near potential fire problem areas. Fire classifications are important for determining the type of fire extinguisher needed to control the fire. Using the wrong fire extinguisher on a chemical fire may cause further damage.

When handling any chemical or mixing chemical solutions, always wear the proper protective equipment. Make sure equipment covers all exposed areas of skin and eyes. Use a dust mask when chemicals are in powder form. Make sure there is an eyewash station in the area when mixing or handling chemicals. If the eyewash station is connected to a water line, run the line once a week. Rust may be in the water lines and may increase the problem of washing chemicals from eyes.

Soldiers must treat all chemicals used in water purification as hazardous material. When handling or storing these chemicals, always think safety first.



SSG Donald L. Sparks is currently an Instructor with the Water Training Division, 262d Quartermaster Battalion, Fort Lee, Virginia. He has previously served with Headquarters and Headquarters Company, 54th Combat Engineers; Company A, 724th Main Support Battalion, Fort Stewart, Georgia; and the 229th Supply and Service Company, Germany.

Diseases Cause More Battlefield Casualties

Bacteria are more dangerous to soldiers in battle than enemy fire.

"Every war we've ever been in has had more casualties to disease and nonbattle injuries than to wounded in action," said Dr. (COL) James Bales, U.S. Army Training and Doctrine Command (TRADOC) surgeon.

Preventable diseases among troops serving in undeveloped areas of the world are not unusual. However, the TRADOC surgeon said that

disease prevention needs reemphasis on U.S. installations. Limited outbreaks of illnesses have been traced to food-borne bacteria.

One food-borne illness outbreak occurred during a field training exercise (FTX). The cause was unsanitary Mermite cans used to take food to the field. Units are equipped with sanitation kits to prevent such occurrences in the field.

Young soldiers who go overseas for the first time have also been

shaped by the environment in the United States. They do not realize that local produce is not grown under the same conditions or cleaned to the same standards. According to a Navy medical report on disease rates during *Operation Desert Shield*, for example, a swimming pool full of chlorinated water would have been required to make locally purchased fruits safe for Americans to eat.

continued on next page

Disposal of ROWPU Waste

MSG Thomas E. Dunn MSG Andre M. Winbush

To provide information on waste streams related to the reverse osmosis water purification unit (ROWPU), operators must obtain a general National Pollutant Discharge Elimination System (NPDES) permit when returning waste water to its source within the United States. The environmental coordinator at the installation Directorate of Engineering and Housing will help obtain this permit.

The disposal of ROWPU brine water must follow state and local regulations. When discharging waste water or brine, the following options must be considered:

- Discharging brine back to the source should be evaluated for each training site and approved by the local regulatory agency. A general (NPDES) discharge permit is not appropriate for brine discharges because of the increased concentrations of metal and impurities.
- For discharging to a sewage treatment plant (STP), the ROWPU should be set up near a sewer manhole or arrangements made for tanker trucks to remove stored brine water and transport the waste water to a treatment facility. An STP should be able to treat most brines. The installation environmental coordinator or local STP authorities should be contacted to discuss this option.

When a quicker method for discharging the brine is necessary for

a combat scenario, for example, the following methods may be used:

- The Standard Waste Water Disposal Method. Construction of a soakage pit or trench is appropriate in many areas.
- Evaporation Beds. Process of preparing brine for disposal by air drying.
- Additional passes of the brine through the ROWPU may reduce the total volume of water to be disposed. However, this process will have the following problem: high levels of total dissolved solids (TDS) that clog filters and cause more frequent element cleaning. Extra filtering of waste water decreases the life of elements, which are very costly to replace. Also, increased levels of metals and dissolved gases will affect the quality of the product water.

With brines left from seawater, it is better to discharge the brine back to the source rather than go to land disposal because of the increased potential to degrade ground water. Backwash water is the primary concern with backwashes. High levels of total suspended solids (TSS) normally exceed NPDES standards. Also, some metal and phosphate levels exceed the Environmental Protection Agency's water quality criteria. Direct discharge of the backwash waters is not an alternative, and the first option to consider would be disposal to an STP. It may be feasible to settle the

suspended solids within the collection tank and return the supernatant to the brine tank for disposal as discussed. Settled solids can be containerized for shipment to the STP or disposed with other solid wastes.

Additional information on ROWPU chemicals and characterization of ROWPU discharge waters can be found in the Water Quality Engineering Study No. 32-24-0895-89, Aug - Oct 88.



MSG Thomas E. Dunn is currently a Senior Instructor for the Water Training Division, 262d Quartermaster Battalion, Fort Lee, Virginia. He has an associate's degree in management. His previous assignments include 194th Armored Brigade, Fort Knox, Kentucky; and 237th Engineer Battalion and 2d Armored Cavalry Regiment, Germany.

MSG Andre M. Winbush, the 49th Quartermaster Group's Water Operations Sergeant, Fort Lee, Virginia, has held a variety of positions before his current assignment. Other key assignments include Sergeant Major, Division Material Management Center, 7th Infantry Division (Light), Fort Ord, California; Petroleum Operations Sergeant, Division Material Management Center, 7th Infantry Division (Light), Fort Ord, California; Water Purification Supervisor, 2d Corps, Stuttgart, Germany; Instructor/Writer, Petroleum and Water Department, Fort Lee, Virginia; Noncommissioned Officer In Charge, 82d Water Purification Detachment, 1st Infantry Division, Fort Riley, Kansas.

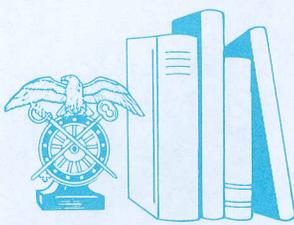
Diseases Cause More Battlefield Casualties (continued from previous page)

The Navy medical study sampled 2,022 military personnel during *Operation Desert Shield*. Nearly 57 percent reported diarrhea, and 19 percent suffered so severely that they were unable to perform their duties.

The TRADOC surgeon thinks that field sanitation should be built into FTXs. Noncommissioned officers are the most important part of protecting the force because they enforce unit discipline. "But they respond to what their leadership em-

phasizes," Dr. Bales said. "If a commander who did not bring his sanitation kit to the National Training Center was told that he was going to be given 10 percent casualties because of diarrhea, that would get command attention."





PROFESSIONAL READINGS

The Professional Readings section of the *Quartermaster Professional Bulletin* encourages the professional development of all Quartermasters. Titles are selected from the Quartermaster School Professional Reading List and the current Department of the Army Contemporary Military Reading List, as well as other notable sources. Short reviews from the field are always welcome.

The Art of Maneuver: Maneuver Warfare Theory and AirLand Battle

Robert R. Leonhard, *Presidio Press, Novato, 1991.*

Robert R. Leonhard has served as a combat developer for the U.S. Army, working on developing the Infantry for the future. He uses a study of military history to define maneuver warfare. He then describes the concepts of AirLand Battle and offers the conclusion that the U.S. Army does not truly rely on the principles of maneuver warfare.

Small Wars, Big Defense: Paying for the Military After the Cold War

Murray Weidenbaum, *Oxford University Press, New York: 1992.*

The end of the Cold War has provoked a rare reconsideration of defense spending. In its simplest form, the discussion is focused on the size and impact of a possible "peace dividend" created by the potential for a significant reduction in U.S. Armed Forces. Weidenbaum provides the kind of detailed, expert analysis only a participant in the budget and procurement processes could generate.

Experience of War: An Anthology of Articles from MHQ: The Quarterly Journal of Military History

Robert Cowley, *W.W. Norton & Company, New York: 1992.*

This compilation of articles shows the way arms and combat have evolved, and the varying ways that human beings have reacted to the stress of war. The collection is a chronological account of warfare from ancient Greece to the crisis in the Persian Gulf. Most importantly, the book looks at military history not for the sake of warfare, but to give insight into the impact past wars have had on society.

A Brave Black Regiment: History of the Fifty-fourth Regiment of Massachusetts Volunteer Infantry, 1863-1865

Luis F. Emilio, *Ayer Company Publishers, Inc., Salem: 1990.*

Luis F. Emilio was an officer assigned to this unit during the Civil War. This is the third printing of his book and shows the unit from initial recruiting through the end of its service in the Civil War. The 54th Massachusetts was the first black regiment formed. The regiment became famous after its attack on Fort Wagner, SC, in the summer of 1863.

Why Nations Go to War

John D. Stoessinger, *St. Martin's Press: Chicago, 1986.*

Stoessinger examines the motivating factors behind all major international conflicts of this century. He asserts that war is not inevitable, but a decision made by leaders in the context of their knowledge, perceptions and fears. He illustrates the impact that personalities and misconceptions had on instigating and escalating the major wars of our time.

Buffalo Soldiers: A Narrative of the Negro Cavalry in the West

William H. Leckie, *Norman, University of Oklahoma Press: 1967.*

The author tells the history of African-American soldiers in the military after the Civil War. Leckie details the Buffalo Soldiers' role in taming the Wild West in Texas, Oklahoma, Arizona and New Mexico. He focuses on two black regiments that were led by white officers and explains the racial problems they encountered and overcame.



Technology Makes A Difference in Property Management at the U.S. Army Corps of Engineers

Raymond F. Urena

Imagine yourself a property book officer for a U.S. Army Corps of Engineers District. A typical district has a civil and military mission and a geographical area of responsibility spanning several states. Property book accounts have an average of 21,000 items valued at \$28 million. The bulk of the items are non-standard and provide a good representation of the majority of the Federal Supply Classes.

Direct Line

To establish a direct line of responsibility, about 130 primary hand receipts are used. The hand receipt holders for these accounts are located at project sites throughout the district's area of responsibility. You have a "large" staff of two to help manage the property book and hand receipt accounts. Following current regulatory guidance, you must ensure that all property assigned to the property book is physically inventoried and reconciled to the property book records every 12 months.

In the recent past, several Army table of distribution and allowances (TDA) elements, to include the U.S. Army Corps of Engineers, have had a problem maintaining accurate property records. The task of physically inventorying and reconciling all the items on hand receipt accounts and those items personally under the property book officer's control is labor-intensive and time-consuming - not to mention the increased risk of errors, if the process is performed manually. Yet this must be accomplished in set intervals to provide assurances that property accountability is being maintained.

Bar Codes

Since the introduction of bar code technology in the 1980s, the U.S. Army Corps of Engineers property accountability posture has improved significantly. Eliminated are the manual reconciliations and the incomplete inventories. Now a property book officer

can look forward to conducting inventories and actually have the ability to meet the Army objective. Physical inventories are accomplished through the use of a user-friendly bar code scanner. The automated systems that manage the property can provide detailed listings of items inventoried and reconciled to property records along with lists of items not inventoried and overages. Overage and shortage lists provide detail such as where the items were last inventoried.

Minutes

All of this takes a couple of minutes after downloading the bar code scanner used for the physical inventory. The tangible benefits are many, but most significant are the reduction of manpower requirements for the inventory process and the inventory accuracy rate.

While the use of bar code technology has made a difference, we at the U.S. Army Corps of Engineers have begun to identify areas where additional technology advances can be integrated into our business processes. We currently are using the Structured Requirements Analysis Planning (STRAP) process and Integrated Definition (IDEF) methods to document our current and future business processes.

I feel that TDA elements need to review and document their business processes not only to help streamline internal operations, but also to identify areas where current systems need adjustment. We also need to challenge regulatory and system paradigms and find other positive techniques to help us improve the Army's logistics posture.



Raymond F. Urena is Chief, Maintenance and Supply Division, Directorate of Logistics Management, Headquarters, U.S. Army Corps of Engineers. His previous assignment was Director of Logistics for Adlephi Laboratory Center.



TOTAL FORCE

Operation Flood Watch '93

LT Kurt Adams

The flood of 1993 will go down in history as one of the worst natural disasters to strike the midwestern United States. The torrential rains began falling in the early spring. Unlike most years, the rains continued to fall. The network of small streams and rivers that snake their way through Iowa began to swell and spill their banks. As a result of the massive input of water, the Mississippi River began to inch towards flood stage. It was not long until the many cities and towns along the Mississippi were threatened by the rising flood waters. The faith that people once had in the system of locks and dams to protect them from floods began to wane as the U.S. Army Corps of Engineers announced that all locks would be opened to full capacity because of excessive amount of water. That meant that any property within the flood plains would have to be sacrificed in order to maintain the flow of water and prevent severe flooding upstream. Civilians along the banks began sandbagging their homes and businesses in a futile effort to stop the water. On 28 Jun 93 Governor Terry Branstad activated Iowa National Guard units near the areas where the flooding was the most severe to begin sandbagging and security operations. *Operation Flood Watch '93* had officially begun.

Floods Begin

When the floods began, I was a newly assigned supply platoon leader in Company A, 334th Forward Support Battalion, 34th Infantry Division in Davenport, IA. Company A is a direct support supply company that specializes in Class I (rations), II (general supplies), III (petroleum, oils and lubricants), IV (construction and barrier materiel), V (ammunition), VII (major end items), and IX (repair parts) in support of the 2d Infantry Brigade, 34th Infantry Division. It soon became apparent that our wartime mission would be put aside. Instead, Company A would act as a rapid deployment force to conduct sandbagging operations and security patrols to prevent looting in the evacuated portions of Davenport and surrounding communities. Four separate task forces were created with members of the 682d Engineer Battalion, 2/147th Aviation Battalion, 234th Signal Battalion, and 1/133d Infantry Battalion. The headquarters and headquarters detachment of the 334th Forward Support Battalion operated as the task force control element for all units in the operation.

Sandbagging and security operations began as soon as soldiers arrived at the armory. The priority of work was to evacuate citizens from potential flood zones and build sandbag walls around the water treatment plant and businesses along the waterfront. The

sandbag missions often lasted from dawn until dusk during the first week, but morale remained high. The soldiers began to build sandbag walls with greater and greater efficiency. As the second week began, the missions became more varied as the situation in Davenport stabilized. The emphasis of the operation turned to conducting security patrols in the evacuated neighborhoods, flooded businesses, and marina area. The focus also turned to supporting local communities outside of the Davenport metropolitan area such as Buffalo, Columbus Junction, and Ottumwa with Class IV construction materials.

Aerial Resupply

One of the most unique missions was when Company A conducted an aerial resupply of empty sandbag bundles from the Corps of Engineers warehouse to a waiting Air Force C130. The bundles were air-delivered to Des Moines, thus bypassing the flooded interstate highways. By the third week, the flood waters began to recede to acceptable levels and most of the citizen-soldiers returned to their jobs and families. A skeleton crew of leadership was retained in case the rains would come again and the cycle of activation would be repeated. The rains ended and the Iowa National Guard reasserted its role as an invaluable asset in disaster relief operations.

Lessons Learned

One of the most important lessons learned from *Operation Flood Watch '93* is that disaster relief operations must be added to the mission essential task list (METL), and precious training resources must be devoted to training soldiers on their likely role in such an operation. The reality of disaster relief operations is that units will be activated according to their proximity to the disaster, not on their unit wartime mission. It does not matter whether the unit has a combat or a combat service support mission. If there is a natural disaster, the governor will activate the closest Army National Guard units and expect 100 percent mission accomplishment. There is no doubt that the next time the 334th Forward Support Battalion is called to duty for disaster relief or war, we will be ready to do our duty in the tradition of the Quartermaster Corps.



LT Kurt Adams was a student in the Quartermaster Officer Basic Course, U.S. Army Quartermaster Center and School, Fort Lee, Virginia, when he wrote this article. He is a former enlisted Infantry soldier in the Iowa National Guard. He was commissioned in May 1993 through the Reserve Officers' Training Corps at the University of Iowa, where he graduated with a bachelor of arts degree in history.



CAREER NEWS

Battalion S4: Introduction to Logistics

CPT Norman K. Fernaays

Today, many combat arms officers are detailed to the combat service support (CSS) branches. Combat arms officers who are branch-detailed or thinking of changing to a CSS branch should strive to become battalion S4s for their units. Combat arms officers can gain CSS knowledge before switching branches and attending the Combined Logistics Officer Advanced Course (CLOAC) at Fort Lee, VA. The battalion S4 job can be a challenging and rewarding experience before CLOAC.

As the S4, you are the commander's resource manager and advisor. You have direct control of budget operations, field services, accountability, food services, battalion movements, and installation activities if the battalion is on a separate post. Directing and controlling these activities will expose you to some of the logistical functions of sustaining, arming, fueling, fixing, moving and staffing that will be discussed in depth during phase III of CLOAC. As the S4, your knowledge of these functions is tested during every exercise (field training exercises, command post exercises, and division and corps simulation exercises). This job is the link between the combat arms and CSS. The S4 must request, explain the concept of the operation, and ask for support in terms understood by the CSS personnel.

Critical Experience

Holding the S4 position before changing your branch will expose you to key concepts of logistics and give you basic experience for future CSS assignments. Coordinating logistics at the battalion level is critical to supporting the task force battalion. You cannot gain this experience anywhere else. As a CSS officer, your mission will be supporting the combat arms soldiers. Your experiences as the battalion S4 will help you identify shortfalls in support.

The new FM 100-5 (Operations) incorporates logistics. The chapter on logistics states five logistical characteristics (anticipation, integration, responsiveness, continuity and improvisation) to apply to any level of support. The unfolding events and the commander's guidance can help you anticipate future events. It is up to you, the S4, to track these trends and foresee future requirements. Once you develop this skill, the ability to support future operations becomes easier.

The S4 in a combat arms unit integrates the concept of support into the planning. The S4 must work

closely with the other staff officers during the planning, preparation and execution of assigned missions. This ensures that logistics and operations tie together and that subordinate elements have a thorough plan to execute.

Responsiveness

As a logistician, you must be responsive to change. One day you might leave your office knowing all support for an upcoming event was confirmed and all plans were down to the "Nth degree." At 0230 hours, you receive a phone call to come in to the headquarters. As it turns out, your battalion is being tested on an Emergency Deployment Readiness Exercise (EDRE) for the next 72 hours. You must cancel previous support, and quickly establish support for continuous operations. If a logistician is not responsive to change, he may take away from a unit's preparedness. The more responsive an S4 is, the steadier the flow of the right supplies and services at the right time.

Continuity

Continuity ensures a smooth and steady stream of support, whether supplies or services. This is an important aspect of support. If continuous and uninterrupted, support becomes one of the unit's strong points and lends depth to a commander's operations.

A logistician must be creative and innovative in solving logistical problems. There should be no reason to stop the tempo of operations because of an interruption in support. As the S4, you have the greatest latitude to improvise support to the combat troops. If you cannot get a shower unit to come to your area during downtime, for example, then go out and find a shower house or gym that will let you use its facilities.

You do not have to face this challenge alone. The S4 has many resources. Senior leaders can give you direction. If you do not develop a professional relationship with your boss (usually the executive officer), you are missing out on knowledge and experience. Other staff officers are a good source of advice. They can provide a different perspective on a problem. Their views will help to expand the way to solve a problem and synchronize support with the total plan. There are also Army publications: army regulations (ARs), field manuals (FMs), and common tables of allowances (CTAs). Some of the most important are the Supply and Maintenance Updates, AR 220-1 (Unit Status Reporting), FM 100-5 (Operations), FM 101-5 (Staff Organization and Operations), and other support FMs. For equipment accountability, you need

ready access to the current modification table of equipment (MTOE). For a newly assigned S4, the unit's standing operating procedure and outside supporting agencies are extremely valuable.

Lastly, while in any job I recommend that you build a "battle book." Collect sources of information, good-to-have information, critical charts, data and reference material in one to two binders that can be taken any place at any time. Even after you leave a job or a unit, the information can be applied to other assignments.

The battalion S4 can be a great introduction to the world of logistics. You will see critical planning required to support successful operations. In addition to learning the concept of logistics, you will develop experience useful in CLOAC and future assignments.

CPT Norman K. Fernaays is a graduate of the Combined Logistics Officer Advanced Course at Fort Lee, Virginia. He has a bachelor of science degree in business administration from the State University of New York at Brockport. His previous assignments include Patriot Battery Executive Officer and S4. His next assignment will be with the 593d Corps Support Group at Fort Lewis, Washington.

Quartermaster Officer Professional Development

As the Army continues to draw down, we at the Quartermaster Branch, U.S. Army Total Personnel Command (PERSCOM), would like to update all officers about some new changes, developments and trends in the assignment and professional development arenas.

Lieutenants Assignment Officer

CPT Regina J. Hamilton

The FY 94 Lieutenant Retention/Captain Promotion Board which convened on 16 Nov 93 is the last board to look at lieutenants for retention. The next Captain Promotion Board is 6 Jul 94. The reason for this early board date is to hopefully move the pin-on date to captain up to four years. Remember, prepare for the board by ensuring that you have an updated photograph on file at Department of the Army, a correct officer record brief (ORB), and a complete performance microfiche with all your Army evaluation reports (AERs)/officer evaluation reports (OERs) and awards.

NOTE: Because lieutenants will no longer be looked at by retention boards, Regular Army officers will remain on active duty until receiving a second nonselection for promotion. Other than Regular Army (OTRA) officers will be released from active duty after first nonselection for promotion or obligation date, whichever is later. The Army will still have involuntary short-term extensions to allow OTRA lieutenants

to be seen by the Captain Promotion Board. For OTRA officers whose files lack sufficient OERs for the board to make a decision, they will be retained until the next promotion board.

Voluntary Early Release Program (VERP)

This program will be available for Year Groups (YGs) 91 and 92 in October 1994 for losses beginning in July 95. Currently, officers with less than one year remaining on the active duty service obligation as of the requested separation date may still request early release.

Logistics Jobs

Continue to seek out those diverse logistics jobs in the Ordnance and Transportation fields. The Army is looking for "multifunctional logisticians."

Captains Assignment Officer

MAJ Ruben Perales

Assignments

The two words that immediately come to mind are timing and cooperation. Often, I have found officers either call too early or too late. The perfect time for captains to call is six months before date eligible to return from overseas (DEROs) or six months before you change command or complete CAS3. We prefer officers to have completed command and CAS3 before sending them to their next assignment. A reminder: current commands send officers to CAS3.

When you call six months out, be prepared to discuss assignments. Have a general idea of what you would like to do or where you would like to go and have some alternate plans. Some assignments are nominative and require a good file or expertise in a particular area. The key here is the stronger your file, the more opportunities available. I have received calls asking for an assignment to a particular location. If there is a requirement in that location, your request will be considered. Always consider alternatives. There is some flexibility in the system and choices you can make, but they are limited to current Army requirements.

Your ORB

I know you have heard this often, but keep your ORB current. I realize some of you are having problems trying to get ORBs corrected. Continue to work with your Personnel Service Company (PSC). Talk to the PSC noncommissioned officer or officer in charge, and if they cannot correct the problem, contact PERSCOM. As a rule for keeping your ORB current, please inform us when you change your personal mailing address or work/home phone numbers. You are doing yourself disservice if you do not keep your

records current. All information is automated. As some of you in YG 88 experienced, an incorrect mailing address will prevent you from receiving vital career input. In YG 88's case, it was choice of functional area. Give us the opportunity to contact you by providing us with current local information.

Microfiche

Microfiche OERs take about three months to post on your microfiche. Unfortunately, that is not always true with citations. Citations are not as intensively managed as OERs, so there is a possibility they may not post on your fiche. If a citation does not post on your fiche, just make a copy of the citation and mail it directly to the microfiche section here at PERSCOM. I also receive many questions about restricted fiche. Only you can request your restricted fiche. The key here is to send all questions and information about your fiche to the microfiche section at U.S. Army PERSCOM, ATTN: TAPC-MSR-S, 200 Stovall Street, Alexandria, VA 22332.

File Evaluations

I have evaluated hundreds of files on this job. It really is very simple, and there is not anything magical about it. First thing: order a microfiche. On a piece of paper, mark an "A," "C" and "B" vertically. Get your fiche and start from the beginning. Beginning with your first OER, look at the rater's portion. If you have a 2 in the front or anything other than an "X" to the left in Part V, place an X in the row marked "B." If you did not have a 2 or off-check in the rater's portion, proceed with the senior rater's profile. Ask yourself, is this an above, center, or below center of mass rating? Once you have figured out the rating, place an X in the appropriate "A," "C" or "B" row in the next column. Then go to the next OER, and do the same. When you are finished, your evaluation should look like this example:

A		X X X		X X X X
C	X		X X X	
B	X			

You will see a pattern start to develop. Command OERs are important, so keep track of where these "Xs" are in your self-evaluation. Obviously, the more "Xs" you have in the "C" and "A" rows, the stronger your file. If you have several center of mass and below center of mass ratings, you may be at risk for promotion or reduction in force (RIF). If you fall into this category, call us. We will give you a second opinion.

RIF

Just a reminder, a RIF board will be held for YG 86 early next year. We will start making phone calls to officers at risk for RIF around November. If you

feel you are at risk, I strongly recommend you start talking to your spouse about possible options. In the last two years of calling officers at risk for the RIF, you would be amazed at how many were "NOT" surprised they received a call from branch. Yet they had not talked to anyone about their potential risk for RIF. I realize it is often a hard fact to face, but it is better to plan. Do not wait to talk risk of RIF over with mentors and spouses, especially during the holidays, when emotions are already in full swing. If you see yourself in this situation, take some time. Seek advice now.

Future Readiness Officer

CPT Jerry Chastain

Since my assignment as the Future Readiness Officer, I have received numerous calls from Quartermaster officers interested in the Training With Industry (TWI) Program.

The TWI Program offers selected Quartermaster officers an opportunity to train in industrial procedures not available through military schools or the civilian university system. To compete for this program, officers must have successfully commanded, be branch qualified, and have attended the Combined Arms Services Staff School (CAS3). Officers in TWI are assigned to civilian industries, starting in August, for one year of training. A three-year utilization assignment in a validated Army position follows the year of training. The following are some of the participating industries: Marriott Corporation, EXXON, Super Valu Stores, Inc., Wal-Mart, Sun Refining & Marketing, Hertling Industries, and Proctor & Gamble.

No tuition cost is associated with TWI. Officers receive full pay and allowances and are authorized a permanent change of station (PCS) move. A service obligation of three years is incurred (three for one computed in days). TWI participants do not receive an academic degree as a result of training.

Applications, with the officer's personal resume, may be submitted anytime to Quartermaster Branch, ATTN: Professional Development, using DA Form 1618-R (Application for Detail as Student Officer at a Civilian Educational Institution or at Training With Industry). Applications are prepared and forward according to paragraph 3-4, AR 621-1.

Majors Assignment Officer

MAJ Michael J. Sullivan

Attention all YGs 81, 82 and 83 majors, the 1994 Command and General Staff College (CGSC) Board convenes 6 Jul 94 and adjourns 10 Aug 94. Any officers interested in a foreign staff college should write to President, 1994 Army CGSC Selection Board: TAPC-MSB, Room 5S11, 200 Stovall Street, Alexandria, VA 22332. State the school that interests you. If you are

interested in a sister service school such as Air Force, Navy, Marine, or School of Americas, write to U.S. Army Total Personnel Command (PERSCOM), TAPC-OPG-Q, 200 Stovall Street, Alexandria, VA 22332. Any letters to the board president must be received not later than the board's convening date. Remember, evaluation reports (optional or mandatory) must be processed through normal channels and received error free at PERSCOM not later than 28 Jun 94.

All officers should prepare for every board. One question asked by many officers is "What can I do to improve my file for the board?" This is an excellent question. A board file consists of three main parts. First is the photograph. This is the board's first impression of you. Keep this photograph current. Most of your contemporaries have a color photograph. Ensure it looks presentable. Give it to a friend or senior officer who will give you an honest assessment. Have the correct branch on the uniform, but no inspector general, general officer staff or aide-de-camp brass. Put on the uniform at the photograph location rather than wear it during transport. Even small wrinkles are magnified under a camera. Always have two copies at branch.

The second document is the ORB. The board members scan the ORB for duty titles, OERs and photograph dates, control branch and functional areas as well as any other data that interest them. They usually do not question awards unless a Bronze Star with V Device or higher. One of the most serious errors an officer can make is writing a duty title in code. Speak in plain English. If you are the S3, say S3. The simpler, more straightforward you are, the better the board members will understand what you were doing. Uncommon acronyms only distract from your duties. Update your ORB yearly during your birth month audit and neatly correct the board ORBs provided by the military personnel office (MILPO). These board ORBs, once signed, go directly to the president of the board for your file.

Your microfiche is the third part of your file. Get a copy once a year to check all OERs, awards and miscellaneous misfiling that may have occurred. Missing OERs and awards are not uncommon. Your assignment officer can assist in the process to get missing documents on the fiche.

As you see, the three documents that make your file can be directly influenced by you. Take time to make your file the best it can be. A copy of your microfiche can be obtained by writing to U.S. Army PERSCOM, ATTN: TAPC-MSR-S, 200 Stovall Street, Alexandria, VA 22332. FAX this request to DSN 221-0742 or (703) 325-0742 for prompt processing.

Lieutenant Colonels

MAJ Charles J. Toomey

Clearly the number of faces in the Quartermaster lieutenant colonel population, approximately 300 af-

ter known retirements, is far fewer than the number of requisitions required to be filled by the current officer distribution plan (ODP). That may sound like good news to some who are thinking that the job selection base will be greater, and this is partly so. However, ensuring "tour equity," generally speaking, also means moving lieutenant colonels more often around the 24-month mark for both continental United States (CONUS) and outside CONUS. Of course, there are exceptions to every rule, but this is indeed a planning tool to consider. Hopefully, this pattern will improve by FY 95.

Regarding upcoming assignments, the sooner I know the type of job you want, the better able I will be to match you to the position. Once again, no promises, but "the early bird gets the worm." For those of you going overseas, we should be locking you in for your assignment 8-12 months out, and 6 months out from a CONUS assignment. Job hunting on your own is commendable, but the bottom line is that my charter is to fill the prioritized requisitions on my books. If I know well in advance the type of job you are seeking and you qualify for the job, I can go after it during cycle validation with a decent chance of getting you the job and/or location. Let me know ahead of time and I will fight for you.

News Highlights

- Results of the Senior Service College (SSC) Board recently released yielded 11 primaries. The slating is due out anytime. We can also expect to get a few alternates added to the slate for reasons such as deferments.
- Expect the results of the FY 94 lieutenant colonel board to be released in May.
- Based on the 3 March list, the selection rate for Quartermaster lieutenant colonels in the primary zone for promotion to colonels was 45 percent, 2 points above the Army average. Of all Quartermaster lieutenant colonels considered, the selection rate was 23 percent.
- The FY 94 colonel promotion board is scheduled for 16 Aug 94. Start working on those ORBs and photographs now with your servicing MILPO. You are your best career manager.
- The next Selective Early Retirement Board (SERB) is scheduled for early FY 95. Officers are encouraged to submit for voluntary retirement instead of SERB consideration. In this case, officers would be allowed to voluntarily retire as late as 31 Aug 95 versus 1 Jul 95. The projected SERB forecast will be approximately 250. Of course, this number will decrease based on known voluntary retirements.

FY 93 Colonel Selection Board Analysis

Nineteen Quartermasters were named by the FY 93 Colonel Selection Board. Although the number of selectees is smaller, the Quartermaster Corps continues to do well on this board.

The following are the Quartermaster Corps results for this board compared to the FY 92 board:

FY	AZ			PZ			BZ		
	CON	SEL	%SEL	CON	SEL	%SEL	CON	SEL	%SEL
FY 92	52	0	.0	77	37	48.0	124	1	.8
FY 93	28	01	3.5	40	18	45.0	106	0	.0
	-24	+0	+3.5	-37	-19	-3.0	-18	+1	+8

Two factors impacted this board: the Army Acquisition Corps (AAC) and the Army's downsizing.

This is the first year that AAC officers selected for promotion were not counted in the promotion statistics of their basic branch. The AAC is now considered a branch and identified by the branch code AC. Officers in the AAC still wear their basic branch insignia but are no longer managed by their basic branch. The Quartermaster Corps had four officers serving in the AAC selected for promotion on this board. Last year, 3 of 37 Quartermaster selectees were serving in the AAC.

To see the results of the Army's downsizing, the following chart compares the number of officers considered and selected by this board with the FY 92 board:

FY	AZ			PZ			BZ		
	CON	SEL	%SEL	CON	SEL	%SEL	CON	SEL	%SEL
FY 92	1,003	10	.9	964	428	44.3	2,199	48	2.1
FY 93	498	13	2.6	817	359	43.9	2,075	41	1.9
	-505	+3	+1.7	-147	-69	-.4	-124	-7	-.2

The Quartermaster Corps had 19 officers selected for promotion to colonel. An additional four Quartermaster officers were selected as part of the AAC selectees.

Unlike the Senior Service College Board, Functional Area (FA) 90 was not given promotional floors. However, FA 90 officers did extremely well on this board. AZ = 1 of 24 (4.1%); PZ = 43 of 81 (53.0%); BZ = 2 of 236 (.8%).

Year Group (YG) Breakdown: YG 71 = 2; YG 72 = 13; YG 73 = 4.

Officer Advanced Course (OAC) Breakdown: 92B = 12; 92F = 6; 92G = 0; 90A = 1.

FA Distribution: FA 21 = 1; FA 49 = 1; FA 90 = 17.

All 19 officers had LTC commands: 16 Table of Organization and Equipment (TOE); 3 Table of Distribution and Allowances (TDA). The Command-Designated Priority List Command (CDPL CMD) Categories were 7 forward support battalion (FSB); 4 petroleum, oils and lubricants (POL); 4 Supply (1 Advanced Individual Training (AIT)); 2 separate support battalion; 2 multifunctional support battalion (Multi SPT BN) (nondivisional).

The number of CMD Officer Evaluation Reports (OERs) and the CMD profile were factors. All select-

ees had two or more CMD OERs in their files at the time of the board. Also 16 of the 18 PZ selectees had above center of mass (ACOM) CMD OERs. Of the 22 PZ nonselectees, 13 had only 1 CMD OER in their files or had not commanded, and 7 had ACOM CMD OER profiles.

Fifteen of the 22 nonselectees had LTC commands: 9 TOE; 6 TDA. The CDPL CMD Categories were 6 FSB; 1 Commissary; 2 Multi SPT BN (nondivisional); 2 Supply (AIT); 1 main support battalion (MSB); 1 general support center.

Army staff and joint duty assignments: Serving or Completed:

	*Selectees	Nonselectees
Army Staff	2	7
Noncritical JDA	10	6
Critical JDA	2	2

*Most of the selectees' Army Staff and joint duty assignments were after they attended a Senior Service College (primarily College of the Industrial Armed Forces).

Nonlogistics assignments as a MAJ (Promotable) or LTC:

	* Selectees	**Nonselectees
02A	1 (12 months)	FA 97 2 25D 1
FA 54	1 (4 months)	FA 49 2 02A 2
01A (IG)	1 (since 9306)	FA 48 1

*Short stays in these positions.

**Normal tour lengths.

(IG - Inspector General)

Military Education Level (MEL): MEL-1 = 12; MEL-2 = 3; MEL-3 = 1; MEL-4 = 3 for selectees. Non-selectees MEL: MEL-1 = 1; MEL-3 = 1; MEL-4 = 17.

Civilian Education Level (CEL) Selectees: 17 with master's degrees and 2 without master's. CEL nonselectees: 16 with master's and 3 without master's degrees.

Prior Service: Three selectees and three nonselectees.

Branch Transfers at OAC: One selectee (Ordnance OAC); two nonselectees.

Warrant Officer Pamphlet

The Quartermaster Corps Warrant Officer Professional Development Pamphlet (OQMG Pamphlet 600-101) is scheduled for printing in Spring 1994. Upon completion, each active duty Quartermaster warrant officer will be mailed a copy.

Copies will be provided in the Army Reserve Personnel Center and the National Guard Bureau for distribution to Reserve Component Quartermaster warrant officers.

For further information, call CW5 John Zimmerman at DSN 687- 3702 or Commercial (804) 734-3702.

CW5 — Take Charge!

COL Gerald L. Crews

During a recent presentation at the Warrant Officer Senior Staff Course (WOSSC) I caught myself lecturing the officers about "taking charge" of their corps. It struck me that other than in the aviation community very few senior commanders in the Army had ever worked with or even met a CW5. Here was a chance for the senior officers of the corps to set the standards, not only for other warrant officers but for the entire Army.

Of approximately 100 warrant officers accessed into the Army, only 4 will be selected for CW5. As the warrant officer corps has solidified its place in the Army as leaders, tacticians and technicians, there has frequently been some confusion, both from commanders and CW5s about the role of a CW5.

Currently there are no Army regulations or precedents about CW5s, only authorization documents assigning them to TOE/TDA positions. I have frequently written about the leader, mentor, advisor role of these very talented senior officers, but now what?

Because CW5s had no role models themselves, they have a unique opportunity to tell the rest of the Army, by their own actions, what can be expected from them and their corps.

Foremost in the CW5s' minds should be that of a role model, for younger officers as well as senior officers. Simple as this sounds, jackets unzipped, boots worn over or not polished, frayed pockets, ragged haircuts and moustaches are negative role models.

Positive Role Model

On the other hand, wise counsel, a positive attitude, great brief, or well-researched and written staff action show a positive role model. When CW5s report into their next command, it may be the first CW5 the commander has ever worked with. That commander will draw some very quick conclusions from the new CW5s personal appearance and validate these conclusions with the first staff action or briefing. If you are a first class professional, you will soon feel very comfortable in saying to the commander: "Sir, I want to be your advisor on all matters pertaining to warrant officers in this command." Most commanders are so busy that they will welcome this offer and ask that everything having to do with warrant officers be routed through you, much as most enlisted actions go through the command sergeant major.

Obviously, if no one is in charge of the warrant officers in the command then you should "take charge" by having a luncheon or informal get together and share your wealth of personal philosophy and professional knowledge. The younger the officers in the command, the more important will be your wise counsel.

Tactful and Tactical

If you report to a unit and your boss assigns you to do CW3/4 work, your task is to tactfully draw an analogy that lieutenant colonels do not do captains' or majors' jobs, and CW5s should not be asked to do CW3/4 work - particularly if there are CW3/4s in the unit. If you do this right, a new and lasting definition of what a CW5 is has just been crystallized for that entire leadership. If you report to a unit and accept treatment like a private, then you have also left a lasting impression.

The demands in education, professional knowledge, appearance and personal conduct that you instill through mentorship and individual effort in each other will be how the rest of the Army will judge your corps. Earn, expect and, when necessary, demand proper respect for your many years of soldiering.

Note: Information in this article originally appeared in the April edition of the USAWOA Newsliner.



COL Gerald L. Crews is Chief, Warrant Officer Division, U.S. Army Total Personnel Command, Alexandria, Virginia.

Airborne Shortage - MOSs 57F and 77F

The Army has a shortage of airborne-qualified soldiers in military occupational specialties (MOSs) 57F (mortuary affairs specialist) and 77F (petroleum supply specialist). Soldiers wishing to volunteer for airborne training followed by assignment to Fort Bragg, NC, should see the noncommissioned officer at their Personnel and Administration Center to submit an airborne packet through their chain of command to the U.S. Army Total Personnel Command (PERSCOM). Applications will be taken on a first-come, first-serve basis until mission is met. Point of contact for information is MSG Ladymon, DSN 221-2709 or SFC West, DSN 221-9758.

Defense Attache System (DAS)

The DAS is now recruiting active duty Army non-commissioned officers (NCOs) grades E-5 through E-8, seeking Joint Service Staff assignments within American Embassies in over 80 locations throughout the world. NCOs considering attaché duty must be on active duty, qualify for a Top Secret Security Clearance, have a general technical (GT) score of 115 or higher, a clerical score of 120 or higher, a typing score of 40 words per minute or higher, and be familiar with the latest personal computer (PC) word processors. For more information, contact SSG Peterkin at Commercial (410) 712-0137, Ext. 2633 or DSN 923-2134, Ext. 2633.

Sergeant First Class (SFC) Selection Board Results

Quartermaster soldiers again exceeded most Army average statistics on the SFC promotion board published 17 Sep 94. Some of the low-density military occupational specialties (MOSs) did extremely well and others did not do as well as expected. MOS 57F (mortuary affairs specialist), one that is in transition, did not do well for primary or secondary zone selections. A look into the way Noncommissioned Officer Evaluation Reports (NCOERs) are being written, where soldiers are working and how long they are stationary may provide solutions to their promotion problems.

Career Management Field (CMF) 77 shows indications that work is needed, possibly in force structure and professional development.

The following table depicts how Quartermaster MOSs performed overall and the Army averages:

CMF	MOS	PRIMARY ZONE			SECONDARY ZONE			TOTALS		
		ELIG	# SEL	% SEL	ELIG	# SEL	% SEL	CONS	# SEL	% SEL
77	77F	277	85	30.7	0	0	0	277	85	30.7
	77L	7	1	14.3	3	0	0	10	1	10
	77W	2	1	50	2	2	100	4	3	75
	CMF TOTAL	286	87	30.4	5	2	40	291	89	30.6
92	43E	29	12	41.4	4	0	0	33	12	36.4
	43M	12	11	91.7	0	0	0	12	11	91.7
	57E	4	4	100	2	2	100	6	6	100
	57F	58	3	5.2	9	0	0	67	3	4.5
	92A	700	220	31.4	291	29	10	991	249	25.1
	92Y	2,028	388	19.1	491	32	6.5	2,519	420	16.7
CMF TOTAL	2,831	638	22.5	797	63	7.9	3,628	701	19.3	
94	94B	783	383	48.9	194	19	9.8	977	402	41.1
	CMF TOTAL	783	383	48.9	194	19	9.8	977	402	41.1
QM	TOTALS	3,900	1,108	28.4	996	84	8.4	4,896	1,192	24.3
ARMY	TOTALS	37,042	9,362	25.3	7,272	726	10	44,314	10,088	22.8

LEGEND:

CMF - Career Management Field
 CONS - considered
 ELIG - eligible

MOS - military occupational specialty
 QM - Quartermaster
 SEL - selected

Large Garrison Training Facility Concept

The Army Center of Excellence, Subsistence, will be the first in the Army to test a carry-out section, a special feature of the new building for Large Garrison Training Operations at Fort Lee, VA. Building 3002, next to Company P, is the third facility in the Army built with the new design to feed 400-800 soldiers in a light and airy dining area.

The advanced individual training students at the U.S. Army Quartermaster Center and School will train on the latest equipment and concepts for Army dining. Instructors are ready to train these food service specialists to go to their first duty assignments well prepared for any garrison situation.

Unsatisfactory Material Reporting

Recent messages, Installation Menu Planning Board Minutes, reports of foodborne illness, and other activities prove that the food service community must ensure the best Army program to avoid the potential for human suffering and loss of life by submitting the Unsatisfactory Material Report (UMR). Army Regulation (AR) 30-16 (Food Service Data Feedback Program) provides that food service personnel, Troop Issue Subsistence Officers, or Veterinary Food Inspectors submit DD Form 1608 at the activity where a deficiency is first identified. This guidance also supports menu boards ensuring that items identified are reported as UMRs.

The UMR applies to foods obtained through military supply channels. These foods are reported as unsuitable for the intended use in some identifiable and measurable way. The UMR also serves as an identifiable loss. In many cases, credit to food service accounts is warranted. The Army's emphasis is on reviving its program of reporting. Commanders should inquire about the use of UMRs when circumstances or complaints surface involving food products.

Rick Byrd, Food Program Analyst, DSN 687-1113, manages the UMR program at the Army Center of Excellence, Subsistence, U.S. Army Quartermaster Center and School, Fort Lee, VA.

Clothing and Individual Equipment Process Action Team

The U.S. Army Quartermaster Center and School is heading up a Department of the Army (DA) Process Action Team to evaluate the current acquisition and fielding process for all soldiers' clothing and individual equipment. The team includes representatives

from Headquarters DA staff, the Army test and evaluation community, and others. The goal is streamlining the process by shortening or simplifying the current process that takes approximately 70 months from the time an idea is conceived to the time the item is fielded. The team began meeting in September 1993 and will bring the evaluation to a close soon. The final recommendations were briefed to the Deputy Chief of Staff, Logistics in late February 1994. Implementation should begin in late Spring to early Summer 1994.

Force Provider

The operational test of Force Provider was conducted 3 Oct-3 Dec 93 at Fort Bragg, NC. Soldiers from the 264th Combat Support Battalion, representing the TOE position of the "test" Quartermaster Force Provider Company, set up and operated the Force Provider module. The test consisted of setting up the module, receiving and supporting three rotations of 550 "customer" troops from the XVIII Airborne Corps for 72 hours each, and then striking/repacking the module for redeployment. Test data was collected on the following:

- Time and manpower required to prepare the Force Provider site.
- Time and manpower required to erect the Force Provider module.
- Manpower requirements to operate the module.
- Equipment performance and maintenance requirements.
- Time and manpower required to strike and repack the module.
- Operators and "customers" completed questionnaires to determine if Force Provider accomplished its mission of improving the quality of life for soldiers in the field and what improvements could be made to the package.

The Force Provider test site was visited by Army senior leadership, including the CSA and SMA. Visitors left with the impression that Force Provider will substantially improve the quality of life for soldiers in the field. The Final Test Report is being prepared by the Airborne and Special Operations Test Directorate at Fort Bragg and should be released in March 1994. A production decision is expected after the Final Test Report is completed.

Powered Multifuel Burner (PMB)

A replacement for the current military fuel burner, the M2/M2A, is under development. This replacement

burner will provide an improved, powered, labor-efficient, safe, and multifuel-burning food preparation capability. The current military burner operates only on motor gasoline (MOGAS). The military's goal is to eliminate this fuel on the battlefield. The current burner also has safety problems with pressurized fuel. Characteristics of the developmental burner include the following:

- Battery pack power with potential for thermoelectric energy recovery.
- Instant on/off capability.
- Use of any distillate fuels (DF2, JP8, JP4).
- Compatibility for use with existing field feeding equipment, with the same exterior dimensions as the M2/M2A.

Containerized Kitchen (CK)

The CK is the future battalion-level field kitchen. It will replace the current mobile kitchen trailer (MKT). The CK is an efficient, self-contained, multifuel-powered Army Field Feeding System-Future (AFFS-F) capability designed to support commanders and soldiers across the operational continuum. Some of the requirements include the following:

- Self-contained.
- Performs all standard cooking operations currently required for the MKT.
- Uses modern, standard food preparation equipment with instant on/off capability.
- Active ventilation system and climate control system (heat, air conditioning).
- On-board refrigeration.
- On-board water tank.
- Refueling possible while cooking operations are ongoing.
- On-board power generation, permitting lighting system.

All-Terrain Lifter, Articulated System (ATLAS)

The U.S. Army Quartermaster Center and School is the Army's proponent for the 10,000-pound variable reach ATLAS rough terrain forklift. ATLAS will replace the fielded 6,000-pound and 10,000-pound rough terrain forklifts in the following tables of organization and equipment (TOEs): Quartermaster, Ordnance, Missile and Munitions, Transportation, Engineer, Aviation, and Medical. The Department of the Army ATLAS Operational Requirements Document (ORD) of 8 Jan 93, with Change 1, lists the following capabilities:

- Speed: 30 miles per hour (mph) sustained, 35 mph catch-up speed.
- Central tire inflation capability for adverse terrain.
- C-130 aircraft deployability.

- Fording depth of 30 inches to 36 inches.
- Powershift transmission.
- Coordinated boom movement.
- Variable reach boom with two forklift carriages.
- Maximum boom lift and extension safety features:
 - • 10,000 pounds, 4-foot reach with 48-inch load center
 - • 6,000 pounds, 13-foot reach with 24-inch load center
 - • 4,000 pounds, 21.5-foot reach with 24-inch load center

A source selection committee will convene during 3d Quarter FY 94 to select three, cost plus fixed fee contracts for the engineering-manufacturing phase of acquisition. Each contractor will deliver five prototype vehicles for test and evaluation. Delivery of ATLAS to contingency force units is scheduled for FY 2000.

Container Cargo Retriever

During *Operation Desert Shield/Storm*, combat service support had great difficulty unloading 40-foot containers with organic materials handling equipment. Currently, the only way to unload a 40-foot container is to drive a 4,000-pound rough terrain forklift into it, pick up the pallets, and back out of the container. Since the containers cannot be removed from the trailer without a 50,000-pound rough terrain container handler, the mobile ramp must be used. This time-consuming procedure poses certain risks to the forklift operator: mainly the build-up of exhaust fumes inside the container. In March 1992, the U.S. Army Quartermaster Center and School's Combat Developments Directorate drafted a mission needs statement (MNS) for the container cargo retriever (CCR). The CCR can extract loaded 48-foot by 40-foot pallets stacked two high from the back of a 40-foot container without using the mobile ramp. The CCR can stand alone as a system or become a product improvement to the ATLAS forklift. The MNS is pending Department of the Army approval.

Equipment Deployment and Storage Systems (EDSS)

Lessons learned from *Operation Desert Storm* identified the need for a standardized, unit-owned container system to support unit deployments under contingency operations. The Air Force Internal Airlift/Helicopter Slingable Container Unit (ISU) and the Marine Corps Quadruple Container (QUADCON) were identified as the best systems for meeting this need. These containers were added to the common table of allowances (CTA) 50-909. Units can now purchase them based on operational requirements and available funding. The U.S. Army Quartermaster Center and School took action to add these containers to unit tables of distribution and allowances.

Mortuary Affairs Automation

During the buildup of *Operation Desert Shield*, a deficiency was noticed in the lengthy procedures for filling out mortuary affairs forms by hand. The U.S. Army Quartermaster Center and School and the Mortuary Affairs Center at Fort Lee, VA, procured and fielded an automated system for mortuary affairs support in Southwest Asia. The urgent need for this system precluded using the normal development and acquisition process. The system developed by the Air Force (Mass Fatality Field Information Management System (MFFIMS)) used laptop computers and printers with built-in modems to transmit data from forward mortuary affairs collection points such as brigade and division back to the Theater Army Area Command mortuary affairs units and facilities. The system improved accuracy and provided quicker access to information vital to the tracking, identification of human remains and accountability of personal effects.

Although successful during *Operation Desert Storm*, shortfalls were identified in software design and communication links to transmit data from forward areas to the theater rear. Jointly, the Army and Air Force revised and upgraded the software to meet Army requirements. With the upgraded software, the operator who has military occupational specialty 57F (mortuary affairs specialist) can enter data in 10 different screens ranging from search and recovery information, remains personal data, collection point records updater, remains manifest, reports, personal effects data, and port of departure information. The system's communication link remains an open issue.

Freezing of 3,000-GPH Reverse Osmosis Water Purification Unit (ROWPU) High-Pressure Pump

In January 1994, Fort Lee, VA, had several days of zero-degree weather, with a week at below freezing. During this period, the high pressure pumps on 3,000-gallons per hour (gph) ROWPUs froze. While the 3,000-gph is equipped with an external high-pressure pump skid heater, the generator must be operating for the heater to work. The frozen pumps required several days of heating before the ROWPUs again were operational. Fort Belvoir (VA) Research, Development, and Engineering Center is testing a jog-type switch, similar to the one on the 600-gph ROWPU. This switch, installed on the control panel of the 3,000-gph, will not stop the pump from freezing, but will reduce the amount of water left in the pump. This

reduces the time required for the pump to thaw. This "fix" will be incorporated into the next purchase of 3,000-gph ROWPUs, currently scheduled for fielding in 1995. Also, a modification work order (MWO) will be issued for those 3,000-gph ROWPUs already fielded.

19th Annual Culinary Arts Competition

For the 19th Annual U.S. Army Culinary Arts Competition at Fort Lee, VA, 28 Feb-10 Mar 94, 237 Army food service specialists and Department of Defense civilian cooks from 20 installations competed against each other and the American Culinary Federation standards. For the first year, the Netherlands Armed Forces sent their top culinary team. Scoring the most points to win Installation of the Year was Hawaii; U.S. Army Europe placed second; and Fort Bragg, NC, placed third.

Producing the best, hot, four-course meal within four hours, SSG Mark Warren of U.S. Army Europe received the Chef of the Year trophy, with SSG Thomas Gruver of Fort Lee, VA, the runner-up. Mr. Ven de Van from the Netherlands Armed Forces Team earned a gold medal. The Junior Chef of the Year title went to SPC Charlie Young of Hawaii, with SPC Clifford Hill III of Fort Gordon, GA, the runner-up.

The Field Cookery Competition on the mobile kitchen trailer (MKT) continued through rain, snow and mud with very close scoring. Fort Sill, OK, came out first; Fort Knox, KY, second; and Fort Stewart, GA, third. The Netherlands Armed Forces Team earned a gold medal.

In the static event, which included cooked food displayed cold, pastries and showpieces, civilian chefs judged to the strict American Culinary Federation standards. Out of 338 entries, 6 earned gold (1.8 percent), 23 silver (6.8 percent), 79 bronze (23.4 percent) and 103 honorable mention (30.5 percent). SSG Ronald Bate's entry (Fort Lee, VA) was Best Apprentice Exhibit. PFC Stephanie Phillips-Davis' entry (Hawaii) was Best Senior Exhibit. The Best in Show Exhibit went to PFC DeShonn Williams, Fort Campbell, KY.

From the Fort Lee competition, soldiers were selected for the U.S. Army Culinary Arts Team (USACAT) to compete at the National Restaurant Association (NRA) Culinary Salon. This 12-soldier team will train and then travel to the NRA Salon in Chicago in May 1994. The 1996 International Culinary Olympics are where the Army plans to defend its title as World Champions of the Armed Forces.

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*559th Quartermaster Battalion soldiers
issuing clothing to refit units coming off
the line, Luxembourg, 1945*



*No Distinctive Unit
Insignia approved*

559th Quartermaster Battalion

Constituted 11 February 1943 in the Army of the United States as the 559th Quartermaster Service Battalion

Activated 12 March 1943 at Camp Blanding, Florida

Battalion broken up 20 September 1943 and its elements reorganized and redesignated as follows:

Headquarters and Headquarters Detachment as Headquarters and Headquarters Detachment, 559th Quartermaster Battalion

Companies A, B, C and D as the 3208th, 3209th, 3210th, and 3211th Quartermaster Service Companies, respectively (hereafter separate lineages)

Inactivated 5 November 1945 at Camp Lee, Virginia

Activated 1 June 1993 at Hunter Army Airfield, Georgia

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