



CHAPTER 15

WATER OPERATIONS

INTRODUCTION

An integral part of our ability to support combat operations is the field water supply system. Water is an essential commodity. It is required for sanitation, food preparation, construction, and decontamination. Our modern combat and support activities, such as helicopter maintenance and medical facilities, consume large volumes of water. It is critical to our most precious combat element--the soldier.

Water is one of the few items which we still forage for on the battlefield. The quantity required depends upon the regional climate and the type and scope of operations. Temperate, tropic, and arctic environments normally have enough fresh surface and subsurface water sources to meet raw water requirements for the force. In arid regions, the timely provision of water takes on significant new dimensions. Soldiers must drink more water. Water requirements are significantly greater in rear areas, where there is heavy demand for water for aircraft and vehicle washing, medical treatment, laundry and shower facilities, and construction projects. Water support for enemy prisoners of war is often underestimated because of the absence of a sufficient water capability in enemy units and the requirement for on-site sanitation, shower, delousing, and medical support for incoming prisoners. Since water is critical in arid regions, it must be strictly managed. Commanders must set up priorities and allocation systems. They must make sure consumption and requirements are monitored.

Proponency for water is somewhat different from other commodities. That is, it is both a field service and a supply function. Water purification is considered a field service. However, it is normally accomplished by QM supply units

in conjunction with storage and distribution of potable water--a supply function. The Corps of Engineers is also a major part of this unusual commodity. The engineers have developed and maintain an automated data base for rapid retrieval of water-related data. They also maintain and operate permanent, semipermanent, and nontactical water facilities. Other engineer water-related missions are discussed later.

RESPONSIBILITIES

The responsibilities of Army elements for water supply are covered in detail in AR 700-136. They are briefly discussed here.

The Army coordinates policy and procedures for joint plans and requirements for all DOD components that are responsible for water resources in support of land-based forces in contingency operations. It ensures that coordinated plans for technological research and development and equipment acquisitions meet DOD goals. It also ensures that duplicative efforts are resolved. Each service provides its own water resource support. However, the Army or another service will provide support beyond a service's capability in a joint operation.

Within the theater, the theater Army commander controls water and distributes it to US Army forces, to other US services, and, as required, to allied support elements. The senior engineer headquarters and its subordinate organizations are responsible for finding subsurface water. They drill wells and construct, repair, maintain, and operate permanent and semipermanent water facilities. They also aid QM water units with site preparation when required. The

command surgeon performs tests associated with water source approval, monitors potable water, and interprets the water testing results.

Water quality monitoring is primarily the responsibility of preventive medicine personnel of the medical command or corps. Water supply units perform routine testing.

CONCEPT OF OPERATIONS

Water support in a theater of operations is provided at two levels--DS and GS. Water is normally provided by QM units using supply point and limited unit distribution. In most regions of the world, surface water is readily available and normal DS capabilities are enough to meet requirements. In an arid environment, available water sources are limited and widely dispersed. Surface fresh water is almost nonexistent, and the availability of subsurface water varies by geographic region. The lack of water sources mandates extensive storage and distribution. GS units provide this capability.

Strategic Level

Because of the scarcity of potable water in Southwest Asia, water support equipment is positioned afloat. This will allow for the initial support to a contingency force. Additional water equipment--controlled by the PM, Petroleum and Water Logistics--is available in CONUS depots to sustain operations. Most of this equipment is packaged for tactical transportability. It is configured to allow for throughput to the user with minimal handling in the theater of operations.

Operational Level

In an operation where surface water is abundant, water is provided by the QM supply company (DS) on demand. During the early stages of the operation, divisional forces, using organic water purification equipment, may be required to provide water until CSS units arrive.

In arid regions where sufficient water sources are not available, GS water systems are established. The petroleum group provides command and control of all GS water assets. In the absence of the petroleum group, command and control is provided by an area support group. The water supply battalion commands two to six water supply companies, purification detachments, and transportation medium truck companies--dedicated to the line-haul of water. GS purification detachments and teams and DS water elements produce all potable water required within the theater. Water supply companies are assigned to the force to set up and operate bulk storage and distribution facilities. Arrival in theater is such that the water distribution system expands with growth of the theater and provides adequate support to tactical operations. Tactical water distribution teams are assigned to water supply companies, as required, to augment capabilities for hose line distribution. Potable water is distributed to terminals within the theater army area and forward into the corps.

Tactical Level

DS water elements provide potable water by supply point and limited unit distribution. Water supply points are set up as far forward as possible. Exact locations depend on METT-T and available water sources, consuming units, and the commander's tactical plan. The most forward location is normally the brigade support area (BSA). Supported units draw water from supply points using organic transportation. Water purification elements draw and purify water from ponds, lakes, streams, rivers, wells, and local water systems. When water elements are unable to meet user requirements, they request aid from higher headquarters. See Figure 15-1 (page-15-4) for DS water support operations. See Figure 15-2 (page 15-5) for GS operations.

Corps QM DS supply companies provide nondivisional water support on an area basis. The water supply section is structured to operate three water points. Each point can produce as much as

,000 gallons of potable water per hour and store up to 30,000 gallons. The unit delivers water to major users unable to support themselves. It also sets up mobile supply points. Water elements provide divisional water support on an area basis. The division or brigade establishes procedures and allocations for subordinate units. The water section of the division main support battalion sets up water points in the division support area (DSA) and each BSA. The division, as well as the separate brigade and armored cavalry regiment, has enough water production and distribution capabilities to allow it to be self-supporting under normal conditions. Water element capabilities vary according to TOE. See FM 10-52 for more details on unit capabilities.

In arid regions, GS water units are assigned to the corps to supplement DS water elements. Because of the lack of sufficient water sources, treated water will most likely be transported from the theater army area by hose line, pipeline, or tanker truck to terminals operated by GS water supply companies. Terminals range in capacity from 400,000 to 1,600,000 gallons. They store a portion of the theater reserve. In GS operations, divisions are augmented with storage and distribution systems to provide for one day of supply on the ground in both the the DSA and BSA. Corps truck companies augmented with semitrailer-mounted fabric tanks (SMFTs) line-haul potable water throughout the theater.

PLANNING CONSIDERATIONS

The key to a successful water support mission is innovative and flexible planning. The focus of Army planning is to provide adequate water support in all environments.

DS water elements normally can meet user requirements in most regions of the world. In areas where the DS system cannot support potable water requirements (usually arid regions), a GS system is used. Since requirements greatly increase in arid regions, additional water purification, storage, and distribution capacity is required.

Planners must be careful in setting total requirements for water in arid environments, especially those pertaining to storage and distribution. Introduction of GS water supply units greatly increases transportation requirements.

Planners must structure forces so that there is enough water production, storage, and distribution to meet requirements. They must also schedule the buildup of theater forces so that water support and preventive medicine units arrive on time to assure adequate and continuous water support. Staff officers at each level must include water supply guidance in their logistic support plans. They must include the following areas critical to any water support plan:

- Detailed inland distribution plans showing units by unit identification code (UIC) and their expected location for operations.
- Water support requirements for the other services, allied forces, and any host-nation labor forces.
- Applicable STANAGs or QSTAGs.
- Development of operational project (OPROJ) stocks that support specific operational plans. This is critical in arid regions where a great deal of GS water equipment will be required. The OPROJ is linked to the inland distribution plan at the UIC level and to any other theater equipment pre-positioning initiatives.
- Full development of a force that supports the water purification, storage (including days of supply), and distribution mission of the theater.

Time-phased water requirements are estimated, using consumption planning factors. See FM 10-52. The process begins with the identification of the force size and troop deployment rate. Units are then selected and scheduled for deployment so that water supply capabilities meet requirements. In arid region operations, CSS water units are normally deployed early on the TPFDL. This is necessary because of the increased consumption requirements, limited aircraft available for aerial resupply, and the need for centralized production.

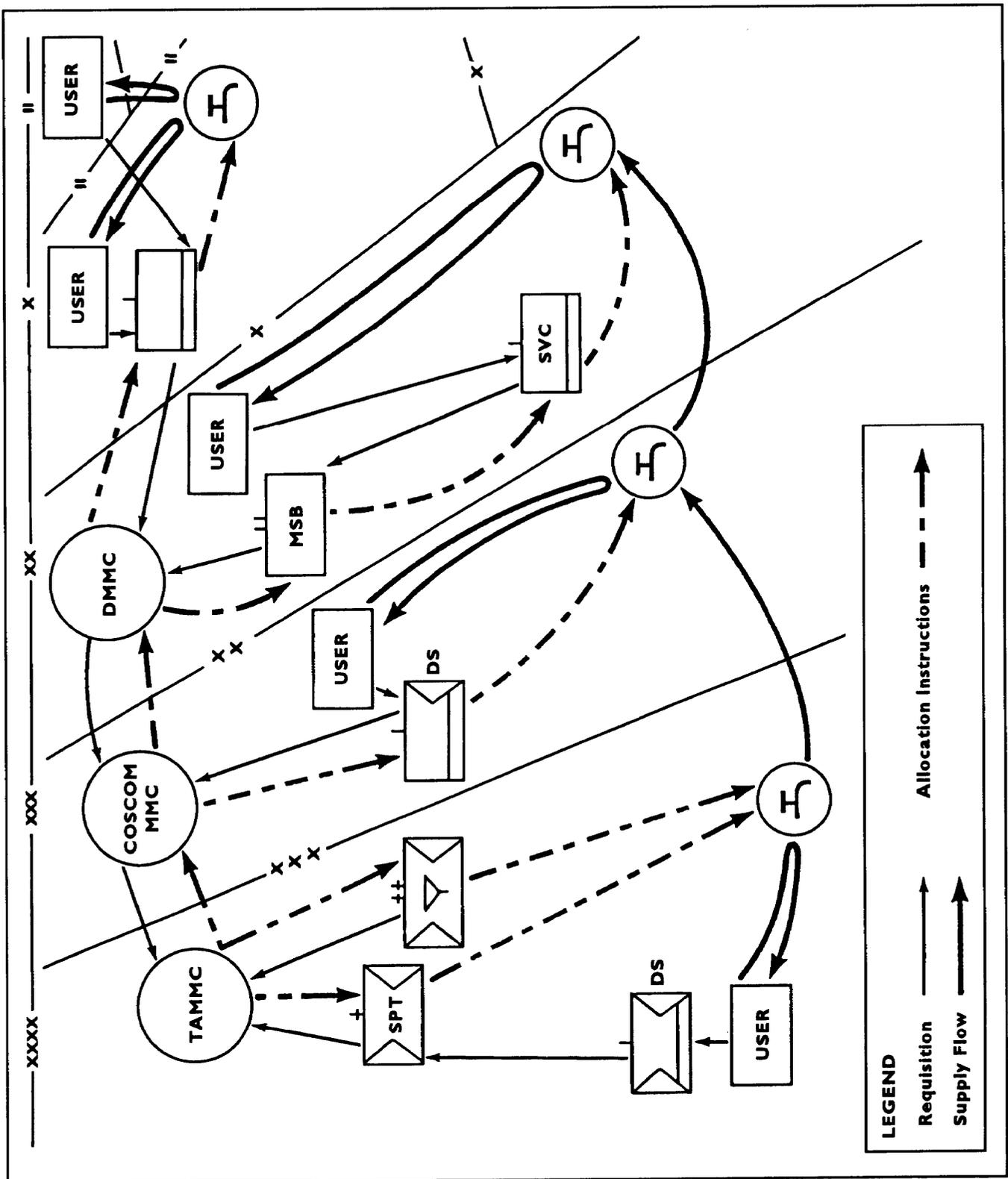


Figure 15-1. DS water support in nonarid regions

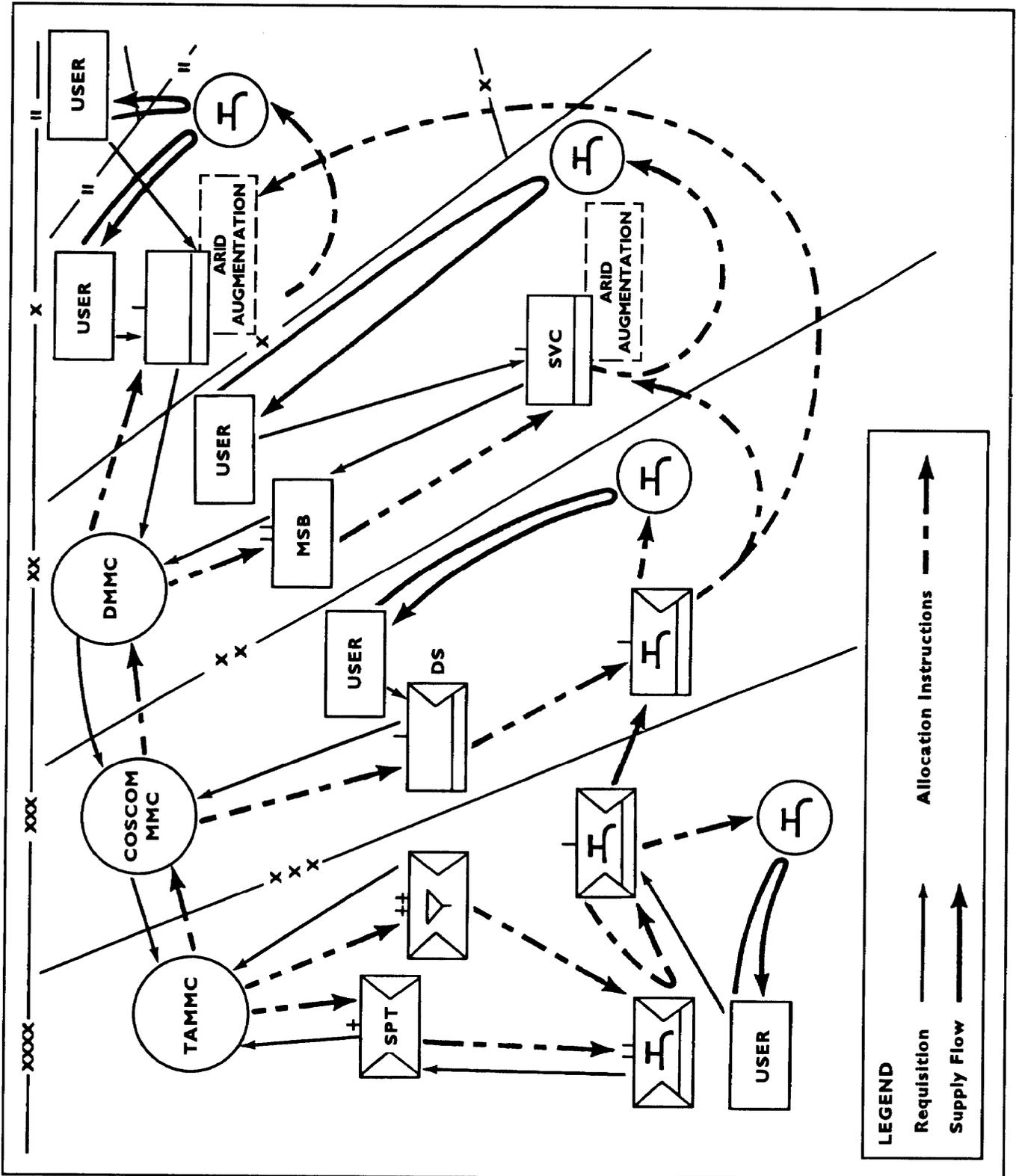


Figure 15-2. GS water support in arid regions

It is difficult to predict whether Army divisions and other services will be able to produce enough water to meet their own requirements. Logistics planners must provide a force structure adequate to do the job. They should also develop contingency plans with host nations to identify and determine the water resources available for US forces. They should use host-nation communication channels to help meet water requirements.

Planning for water support at all levels begins with determining the quantities of water required. The quantities depend on the battlefield environment (temperate, tropic, arctic, or arid), the expected duration of operations, and the size of the force. Water to meet certain uses is always essential. Water for some uses may be denied indefinitely. For some uses, it may be denied for several weeks. Temperate, tropic, and arctic regions usually do not require large amounts of potable water to be stored. Nonpotable water requirements, such as decontaminating chemical and biological agents, can be met by raw water sources in those regions. Arid regions require the storage of large quantities of water and use of potable water for all requirements.

Seven water consumption planning factors relate directly to the number of people in the force. These are shown in Table 15-1 (page 15-7).

Six activities that require water do not relate directly to the number of soldiers in a force. Work load and the number of items of equipment determine requirements for--

- Hospital medical treatment.
- NBC decontamination.
- Vehicle maintenance.
- Mortuary affairs support.
- Engineer construction.
- Aircraft washing.

EMERGING CONCEPTS AND SYSTEMS

Recent operations such as Desert Shield/Storm and Restore Hope have reinforced the need to move from supply point distribution to unit

distribution. The ability to provide potable water to the force is now limited by lack of appropriate distribution assets. The SMFT is a pressurized container that must be transported completely full or empty. It was procured to provide line-haul of potable water in arid regions. It was never intended to be used as a servicing vehicle. Many units do not have adequate storage containers to maintain the desired one-day supply of water. Nonexpendable water resupply equipment now in use, such as 5-gallon cans and collapsible drums, is not adequate in situations where it cannot be recovered. Emergency water purification for small units and individual soldiers that are separated from supply channels is now limited to the use of emergency disinfectants, such as iodine tablets and chlor-floe tablets. The future water concept provides for distribution of water to unit trains and logistic release points (LRPs). It also provides for increased water storage assets, organic water packaging capabilities, and additional water purification capabilities. Units will be resupplied with water daily at the water supply points or water will be delivered to unit trains and LRPs, depending on the unit's location on the battlefield and METT-T.

Many units cannot now store and transport a one-day supply of water. In the future, units will be able to maintain a one-day supply of water using increased-capacity water trailers and packaged water.

EAD water elements will be able to package water. The packaging will involve an expendable, lightweight material. There will be a broad spectrum of package sizes, providing added flexibility to consumer units. The packages will be used for water distribution, logistic packages, and caches.

Lightweight, portable, and compact water purification equipment will allow individual soldiers and small groups to purify water when traditional resupply methods cannot be employed.

The 5,000-gallon hard wall tanker procured during operations Desert Shield/Storm will enhance the effectiveness of the water resupply system. It will be used as a servicing vehicle at

logistics transfer points and unit trains. The SMFT will continue its useful line-haul function in GS or arid regions.

SAFETY

Measures to protect water supplies include proper storage, dispersion of supplies and installations, protection against NBC contamination, and use of natural and artificial protective shelters or other shielding devices. Water support personnel must take advantage of natural cover and camouflage for water purification, storage, and distribution equipment. Dispersion of equipment on the battlefield limits losses of potable water from enemy attack. Proper storage procedures and the use of covers on open-top tanks reduce contamination of water supplies.

Before treated water is issued to the soldier or unit, it must be certified by the supporting preventive medicine unit. If preventive medicine support is not available, senior water treatment personnel may certify water treated by water purification equipment. Water treatment personnel routinely analyze the water supply. If they find it to be contaminated, they discharge it and disinfect and clean the equipment it came in contact with. Although the reverse osmosis water purification unit (ROWPU) removes most known

contaminating agents, only uncontaminated raw water sources should be used for purification operations when possible.

Some water supply functions require soldiers to handle hazardous chemicals in the performance of their duties. The commander must ensure that everyone observes established safety precautions. The appropriate technical manual provides all the necessary information about the nature of a particular chemical and first aid procedures for it. Soldiers must wear eye protection and rubber gloves when handling chemicals. To protect them from high noise levels, they should wear ear protection when working around equipment such as pumps and generators. Supervisors must enforce safety rules.

Soldiers must be informed of the nature of arid environments and conditions and their reaction to them. They must be told of the extreme danger of dehydration. As the soldier loses water from his body, he will lose his desire for water (thirst). This can be serious, even deadly. Military leaders must enforce dehydration. Commanders must require all subordinate leaders to begin forced dehydration of troops. Supervisors must insist and ensure that each soldier drinks at least one pint of water each hour. This will significantly reduce heat stroke and exhaustion.

Table 15-1. Water consumption planning factors

USE	POTABLE	NONPOTABLE
Drinking water	X	
Heat casualty	X	
Personal hygiene requirements	X	
Centralized hygiene requirements		X *
Food preparation	X	
Laundry requirements		X
Medical staff requirements	X	

* Potability is not mandatory, but treated water may be required by local medical personnel.

WATER QUALITY

Commanders must ensure water supplies are potable. To do this, preventive medicine personnel frequently analyze the water from distribution points. They also perform biological examinations on the water supply at least twice a week, and more often, if possible. They ensure that the prescribed chlorine residual is always maintained. Unit sanitation teams are a valuable asset. They monitor water issue operations and perform routine chlorine testing of unit water supplies. Commanders must activate and task the teams to begin water monitoring as soon as possible.

RELATED DOCTRINE

A number of publications expand on information covered in this chapter. Some of the more important ones are shown in Table 15-2.

Table 15-2. Publications related to water supply operations

Field Manuals	Topic
5-104	Corps of Engineer responsibilities
10-52	Planning, organizing, and operating Army field water supply systems
10-52-1	Military water supply equipment and water point development
Technical Bulletins	Topic
MED 577	Preventive medicine guidance on field water supplies
Technical Manuals	Topic
5-813-series	Corps of Engineer responsibilities