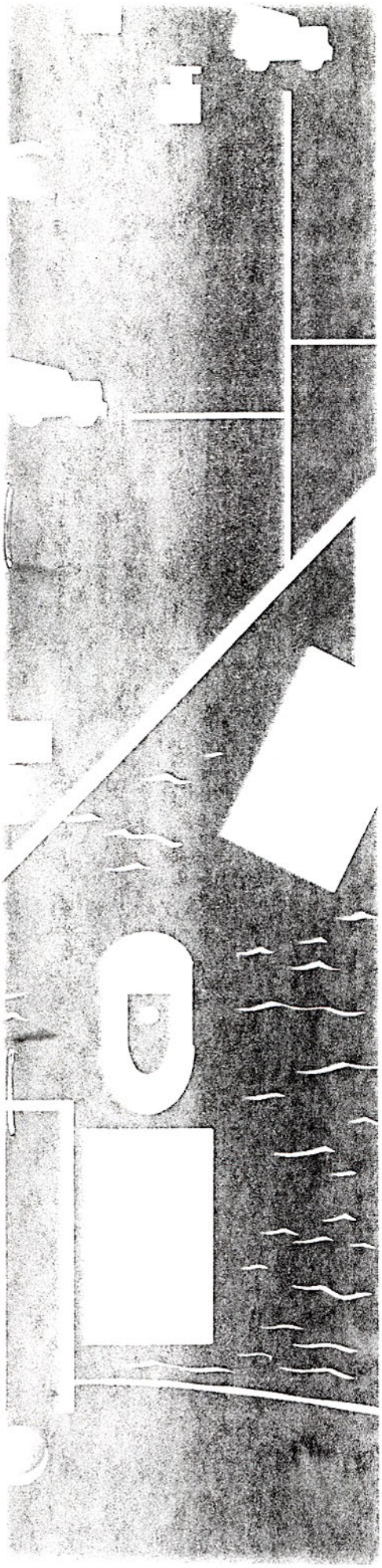

FM 10-115

QUARTERMASTER WATER UNITS

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Headquarters, Department of the Army

FIELD MANUAL
NO 10-115

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 February 1989

QUARTERMASTER WATER UNITS

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PREFACE

PURPOSE

This manual covers the operations of four quartermaster water units. It is for the use of the commanders, platoon leaders, and section and team chiefs for both the water supply company (TOE 10468) and water purification detachment, general support (TOE 10469). It is for the use of the commander, staff, and other supervisory personnel of the headquarters and headquarters detachment, water supply battalion (TOE 10116*). It is also for the use of the supervisor and shift leaders on the water team—water purification barge (TOE 10570). It covers planning, operations, and training. It is meant to be a guide, not a directive. Refer to the required publications identified in the reference list at the back of this manual for specifics on water operations.

Planning

Supervisors must carry out the unit mission with the equipment and personnel available. They must be aware of the kinds of problems they will face. This manual will help them determine unit capabilities. It will also help them organize their resources.

Operations

This manual summarizes existing doctrine. It gives suggestions and standards based on field experience. It relates procedures and policies that apply to water production, treatment, and distribution.

ORGANIZATION AND COVERAGE

There are five chapters in this manual. Chapter 1 covers matters of importance to the commander and provides an overview of unit operations. Chapter 2 covers operations for the headquarters and headquarters detachment, water supply battalion. Chapter 3 covers operations for the water supply company. Chapter 4 covers operations for the water purification detachment. Chapter 5 covers operations for the water purification barge.

USER INFORMATION

The proponent of this publication is HQ TRADOC. Submit changes for improving this publication on DA Form 2028 (Recommended Changes to Publications and Blank Forms). If DA Form 2028 is not available, plain paper may be used. Key each comment to the specific page and paragraph to which the comment applies. Provide a reason for each comment to ensure its complete evaluation. Forward comments to—

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Fort Lee, VA 23801-5036

INTERNATIONAL AGREEMENT

The provisions of this publication are the subject of the following international agreement:

STANAG 2885—Procedures for the Treatment, Acceptability, and Provision of Potable Water in the Field

Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

*TOE 10116 is scheduled to be converted to TOE 10466L in the near future. This change occured after final preparations for printing this manual had been made.

CHAPTER 1
COMMANDER AND UNIT

Section I
UNIT COMMANDER'S OPERATIONS

This chapter is for the unit commander.

RESPONSIBILITIES

As commander, you exercise authority and direction over your unit to perform the mission. Analyzing, planning, directing, and supervising personnel and operations are part of your responsibilities. Command leadership and management are essential factors needed to carry out the unit mission. DA Pamphlet 5-2 explains the integration of these factors and the techniques you and your supervisors can use to manage the unit effectively. The Army has issued a number of handbooks for unit personnel. These publications give concise overviews of areas affecting your unit. Table 1-1 lists some of these publications. Under your direction, your headquarters is responsible for the following:

- Operations (mission accomplishment).
- Training.
- Unit supply and maintenance (AR 735-5).
- Command information communications (AR 360-81).
- Physical training program.
- Safety.
- Communications and security.
- General welfare of the troops.
- Military justice and discipline.

ADMINISTRATIVE MANAGEMENT

At the unit level, personnel and administrative tasks are handled by the first sergeant or unit clerk. The battalion S1 supervises the PAC which provides support to the units. The PAC does as many administrative tasks as possible to reduce the work load at the unit level. As unit commander, you are responsible for developing administrative management procedures. Use FM 12-3-1 and Army regulations in the 340 series for guidance. Other administrative management actions and references are listed in Table 1-2.

FIELD KITCHEN

Your food service sergeant is responsible for field kitchen operations. Table 1-3 lists forms that are used in peacetime or in field training exercises. Table 1-4 lists some useful references.

SUPPLIES

Your supply sergeant is responsible for supervising unit supply operations. His duties include receiving, storing, protecting, and issuing unit supplies; processing requests and turn-ins; maintaining hand receipts; providing laundry exchange; and training personnel in supply operations. DA Pamphlet 710-2-1 and FM 10-14 contain procedures for unit supply operations. Information on maintaining the PLL can be found in DA Pamphlet 710-2-1.

Table 1-1. Useful command publications

PUBLICATION	FUNCTION
DA Pam 600-8-20	Use SIDPERS for effective personnel management.
DA Pam 750-1	Evaluate maintenance operations and determine which areas need improvement.
FM 10-14-1	Develop an efficient property accountability system in the unit.
FM 10-23-1	Supervise and evaluate food service operations in the unit.
FM 10-52	Provide water support during combat operations.
FM 10-52-1	Control water use in desert environments.
FM 10-63-1	Search for, recover, evacuate, and bury human remains in the unit's area of responsibility.
FM 21-15	Maintain clothing and equipment issued or sold for personal use.
FM 21-20	Conduct physical training.
FM 22-600-20	Recognize and use NCO authority, fulfill NCO duties and responsibilities, and work within the chain of command and the NCO support channel.
FM 27-1	Administer military justice and administrative law within the unit.
FM 27-14	Recognize various areas of military law, and secure legal advice.
FM 90-3	Be familiar with operations in the desert.
TC 21-22	Know the effects of the environment on the soldier.
TRADOC Pam 525-11	Manage water and resources.
TRADOC Pam 525-32	Conduct water support operations.

Table 1-2. Administrative management actions and references

ACTION	REFERENCE
SIDPERS Reports	DA Pam 600-8-1 DA Pam 600-8-20
Unit Status Report	AR 220-1
Material Condition Status Report	AR 700-138
Qualification Record	AR 640-2-1
Duty Roster	AR 220-45
Personnel Replacement	TC 12-16
Enemy Personnel	DA Pam 27-1-1 DA Pam 27-10

Table 1-3. Forms used for field kitchen operations

FORMS	TITLES
DA Form 1687	Notice of Delegation of Authority— Receipt for Supplies
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 3032	Signature Headcount Sheet
DA Form 3033	Headcount Record
DA Form 3034	Production Schedule
DA Form 3034-1	Sensitive and High Dollar Item Disposition
DD Form 314	Preventive Maintenance Schedule and Record
DD Form 1544	Cash Meal Payment Book

Table 1-4. References used for field kitchen operations

REFERENCES	SUBJECTS
AR 30-1	Ration requests preparation
FM 10-23	Field kitchen operations
FM 10-23-1	Commander's guide to food service operations
FM 10-60	Field kitchen operations
SB 10-260	Master menu
TM 10-412	Menu and recipes preparation
DA Pam 738-750	The Army Maintenance Management System (TAMMS)

Section II
DEFENSE

THREAT

As unit commander, you are responsible for the security and defense of your personnel and equipment. Combat units will probably be located between your unit and the enemy. However, this does not mean that there is no chance that your unit will be attacked by threat forces. There is always a major element of threat to rear operations. This threat includes cells and networks of agents; special-purpose forces; reconnaissance units; and rocket, missile, and air strikes. Also, it may include airborne and heliborne units; radio-electronic combat operations; and nuclear, biological, or chemical warfare. More information on threat tactics and equipment can be found in FMs 100-2-1, 100-2-2, and 100-2-3. The three levels of threat activity are shown in Table 1-5.

AIRLAND BATTLE

AirLand battle is the Army's basic operational concept for fighting the next war. AirLand battle

doctrine emphasizes the need for coordinated air and ground actions. It includes plans for three simultaneous operations-deep, close, and rear. The four principles of AirLand battle are initiative, depth, agility, and synchronization. See FM 100-5. Water supply companies can support the battle by—

- Ensuring continuing water support.
- Being prepared to shift support to different user units.
- Participating in and reacting to any rear operations threat.

BASE DEFENSE OPERATIONS

Each unit in the rear is responsible for its own security and protection. In order to better defend an area, combat support and combat service support units usually form a base or a base cluster.

Base

A base is a small area with a defined perimeter and established access control. It provides enhanced security to units while they continue to support combat forces. A base is made up of one or more Army, other services, or host nation units. Each unit in the rear will establish a base or will be assigned to one by the rear operations officer. The senior officer in the base area will become the base commander. You may be designated as a base commander. Each base establishes a base defense operations center to plan, coordinate, and supervise base defense operations. The base must be able to protect itself against a Level I enemy incursion. In a Level II or Level III attack, the base must be able to engage and delay enemy forces until supporting forces arrive.

Base Cluster

A base cluster comprises several bases. It usually covers a larger area than a base and has no defined perimeter. The base cluster commander establishes a base cluster operations center that provides command, control, and supervision of the base cluster. FM 90-14 provides more details on base cluster functions.

Base or Base Cluster Commander

A base or base cluster commander plans, prepares for, and supervises the internal defense of the base or base cluster. He reports directly to the rear operations center. For more on the commander's responsibilities, see FM 90-14.

REAR OPERATIONS

Units in the rear must be prepared to secure and defeat the threat while continuing their primary missions. They are primary targets for enemy attacks because the units provide vital support to the combat forces involved in the main battle.

Table 1-5. Levels of threat activity

LEVEL	TYPE
I	Activity by threat-controlled agents. Sabotage by threat sympathizers. Terrorism.
II (less than battalion-size)	Special and sabotage operations conducted by special-purpose forces. Raid, ambush, and reconnaissance operations conducted by combat units. Special missions or unconventional warfare missions.
III (battalion-size or larger	Heliborne operations. Airborne operations. Amphibious operations. Ground force operations. Infiltration operations.

FMs 100-5, 100-15, and 100-16 address rear operations at each echelon. FM 90-14 also provides details on rear defense.

NUCLEAR, BIOLOGICAL, AND CHEMICAL OPERATIONS

The enemy has the means to conduct operations involving nuclear, biological, and chemical weapons. Your unit must be able to survive an attack and continue its mission in a contaminated environment. The nuclear, biological, and chemical threat includes an arsenal of offensive weapons, such as tubed artillery, missiles, rockets, multiple-rocket launchers, and aircraft capable of delivering nuclear and chemical warheads against your troop concentration.

TRAINING

Defense training, including on-the-job training, should be given a high priority. Make sure your personnel are familiar with the unit defense plan and are trained in the specific duties assigned to them as part of the plan. Table 1-6 contains suggested defense topics and helpful information that you should consider in developing your defense training programs.

Table 1-6. Topics for defense training

TOPIC	CONTENTS
Observation and Listening Post Operations	Emphasize sound and light discipline, radio authentication, and reporting procedures. See AR 105-3 and FM 21-75 for more training information.
Camouflage	See FM 5-20.
Preparation of Fighting Positions	See FM 7-7.
Patrolling Procedures	See FM 21-75.
Noise Discipline	Train your personnel to work quietly as a defense against attack by guerrillas or irregular troops. They should be able to direct trucks using flashlight signals as well as voice commands. For more information on signals, see FM 21-60, Chapter 10.
Night Operations And Light Discipline	Train your personnel to work with little or no light. Some of your personnel may need to work at night. Use tents or buildings for night operations. Use appropriately colored filters on your flashlights. Use white engineer tape or fluorescent paint to mark piles of supplies, corners, and tent entrances. Repeated practice is the only way to train your troops to work at night.
Identification of Enemy Weapons and Enemy Aircraft	Use pictures or silhouettes to conduct this training. For more information on types of aircraft, see FM 44-30. See FM 100-2-3 for detailed information on Soviet organizations and equipment.
Recognition of Mines, Booby Traps, and Explosive Devices	Train reconnaissance and quartering party personnel. (This training is very important.) For more information, see FMs 20-32 and 23-23.
Organic Weapons	See FMs 23-9, 23-31, and 23-67.
Protection of Equipment	Train personnel to cover equipment, vehicles, arms, and ammunition with tarpaulins and shelter halves. Place critical items in containers or covered holes.

Table 1-6. Topics for defense training (continued)

TOPIC	CONTENTS
Defense Against Nuclear, Biological, or Chemical Attack	Review characteristics of and defense against various types of nuclear, biological, or chemical attacks and hazards. Use FM 3-100. Make sure that all personnel understand alarms and signals. Use FMs 3-3, 3-100, and 21-60. Practice masking and securing the mask. Review with troops the conditions for masking without order or alarm. Use FM 3-4 and TM 3-4240-279-10. Schedule time in which personnel practice donning, wearing, and removing protective clothing and equipment. Review first aid procedures with troops. Use FMs 3-100 and 21-11. Make sure your personnel know how to cross contaminated areas safely. Make sure they recognize and understand markings which are used to identify contaminated areas. Train your soldiers to report nuclear, biological, and chemical attacks and hazards. The higher headquarters SOP should have instructions for your use. Practice decontamination procedures specified in FMs 3-5 and 3-100. Train your soldiers to overcome fear of nuclear, biological, and chemical weapons. Fear can cripple your operations if it gets out of hand. Train leaders to understand the restrictive nature of MOPP gear and the necessity to plan for the effects of nuclear, biological, and chemical warfare. Use FM 3-4, Appendix A.

CHAPTER 2

HEADQUARTERS AND HEADQUARTERS DETACHMENT, WATER SUPPLY BATTALION

Section I
HEADQUARTERS AND HEADQUARTERS DETACHMENT

This section is for the detachment commander.

MISSION AND ORGANIZATION

HHD, water supply battalion (TOE 10116*) is the headquarters and control agency for water units. The battalion provides command, administrative, technical, and organizational control for assigned or attached units. These units include water supply (TOE 10468) and transportation medium truck (water) (TOES 55727 and 55728) companies. Water purification teams (TOE 10570) will be attached when necessary. See Figure 2-1. The battalion is designed to meet mission requirements in arid environments. It will be employed in the corps or COMMZ near lines of communication. Battalion personnel plan and supervise the supply of potable water and coordinate efforts to operate and maintain the water distribution systems. The organizational structure provides for a battalion headquarters and a headquarters detachment. See Figure 2-2.

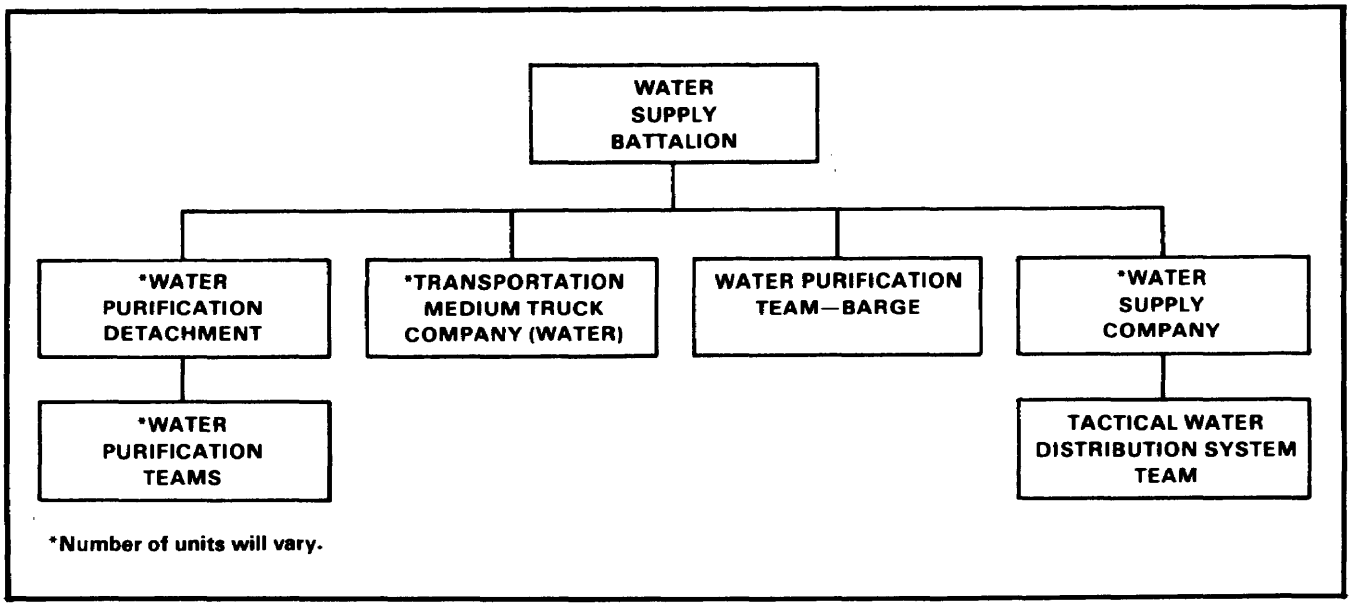


Figure 2-1. Organization of the water supply battalion

*TOE 10116 is scheduled to be converted to TOE 10466L in the near future. This change occured after final preparations for printing this manual had been made.

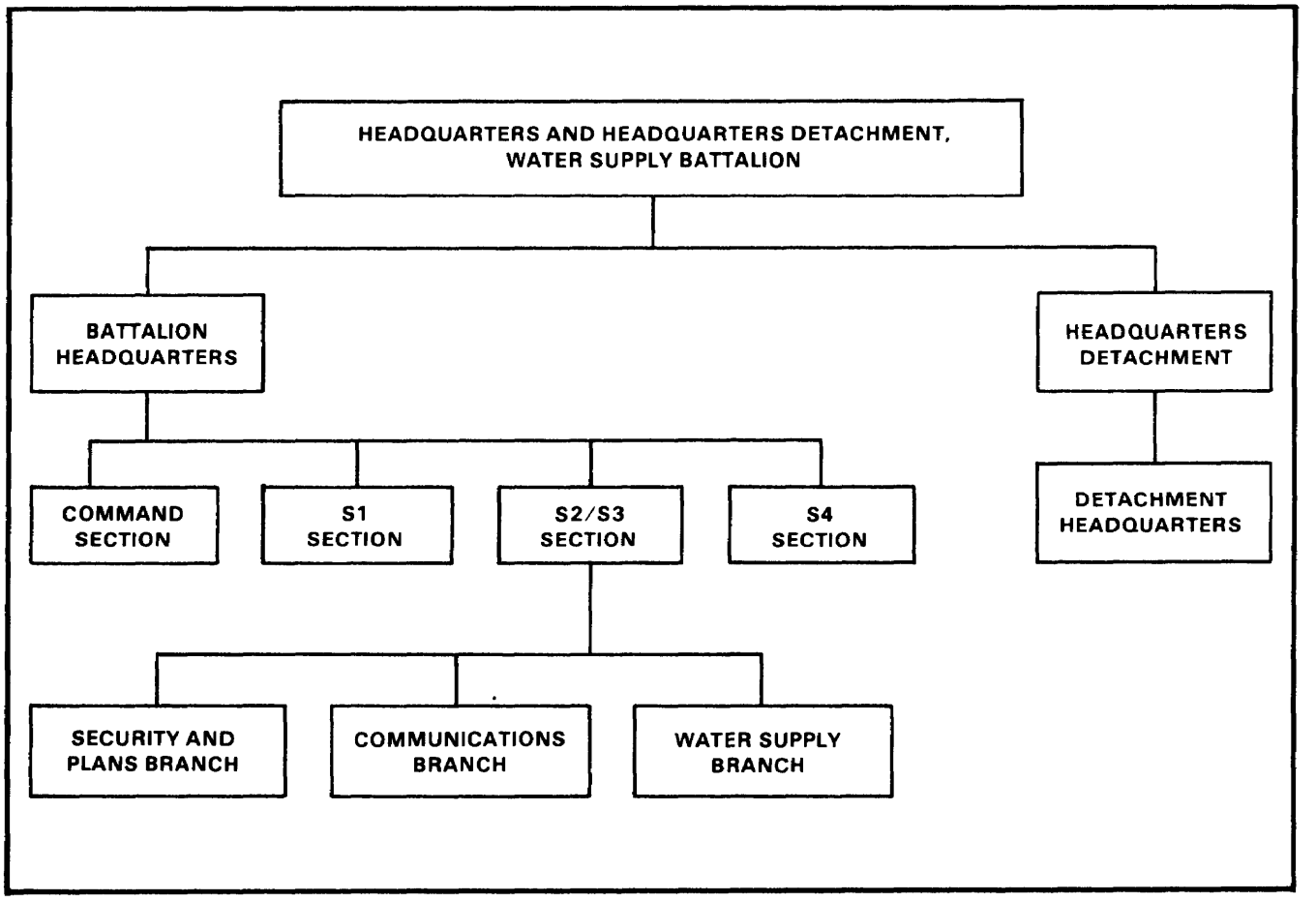


Figure 2-2. Headquarters and headquarters detachment, water supply battalion

ASSIGNMENT AND ALLOCATION

The HHD is organic to the water supply battalion. The battalion is normally assigned to a petroleum group or a COSCOM. When no petroleum group is assigned to a major command, the battalion may be assigned to a TAACOM.

CAPABILITIES

At full strength (TOE Level 1), the HHD, water supply battalion may command and control from two to six water supply companies, TOE 10468L; water purification detachments, TOE 10469L; transportation medium truck (water) companies, TOEs 55727L and 55728L; and, as appropriate, water teams, TOE 10570. TOE Strength Level 2 reduces operational capabilities to about 90 percent. Strength Level 3 reduces capabilities to about 80 percent. The HHD can transport 18,500 pounds (1,416 cubic feet) of TOE equipment with organic vehicles. It has 7,782 pounds (438 cubic feet) of TOE equipment requiring transportation. It performs maintenance on organic equipment and communications-electronics equipment organic to assigned or attached units.

REQUIRED SUPPORT

This unit depends on the water supply company for maintenance support of equipment, except communications-electronics equipment. Mechanics are provided to augment the maintenance capabilities of the unit. Engineer organizations are responsible for finding surface water sources and sites on which to drill wells. Well-drilling teams that are organic or attached to nondivisional engineer units drill the wells. Engineers are responsible also for constructing and repairing rigid storage tanks and pipelines, making improvements at the water point site, and constructing and maintaining permanent and semipermanent water utilities at Army installations. Preventive medicine organizations approve water sources and provide routine surveillance to ensure water quality.

Section II
HEADQUARTERS DETACHMENT OPERATIONS

This section is for the detachment commander.

MISSION

The headquarters detachment provides administration, organizational supply, security, food service, and training activities. As detachment commander, you direct all battalion support activities.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-1 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

OPERATIONS

The detachment is the headquarters and control agency for units involved in water supply. Personnel in the detachment may command and control up to six units at Strength Level 1. Personnel in the detachment headquarters—

- Plan and supervise the supply of potable water and coordinate the efforts of the units.
- Maintain and support the water supply system so that personnel, equipment, and facilities are used to their best advantage.
- Control the supply of potable water through the water supply branch.
- Provide the technical and operational supervision for the battalion water purification, supply, and distribution functions through the S2/S3 section.
- Plan, control, and supervise the employment, deployment, security, and operation of the battalion, through the security and plans branch.
- Provide the communications systems for the battalion and the assigned units through its communications branch in the S2/S3 section.

Table 2-1. TOE-prescribed personnel for the headquarters detachment

POSITION	GRADE	MOS	DUTIES
Detachment Commander	Lieutenant	92F00	Plans, directs, and supervises the operations and employment of the detachment. Commands the detachment so that its mission is carried out. Is responsible for unit readiness; site establishment; communications; defense; unit administration; supply; maintenance; and the morale, welfare, and training of the company personnel. Is responsible also for food service support of certain units.
Detachment Sergeant	E7	77F40	Is the principal enlisted assistant to the commander. Calls all formations, manages the command post, and represents the enlisted soldiers of the unit.
Food Service Sergeant	E6	94B30	Supervises the cooks assigned to the detachment. Selects the field kitchen site. Maintains food service records. Prepares kitchen SOP. Is responsible

Table 2-1. TOE-prescribed personnel for the headquarters detachment (continued)

POSITION	GRADE	MOS	DUTIES
			for the maintenance of food service equipment.
First Cook	E5	94B20	Supervises the second-shift operations of the field kitchen. Inspects food storage and preparation. Prepares the more complex menu items.
Cooks	E4 E3	94B10 94B10	Prepare, cook, and serve food according to recipes and field kitchen SOP. Clean the work area, equipment, and cooking utensils. Receive, inspect, and store food items. Perform preventive maintenance on kitchen equipment. Drive the 2 1/2-ton trucks that support food service and unit supply operations.
Supply Sergeant	E5	76Y20	Requests, receives, stores, safeguards, and issues supplies and equipment. Plans storage area layout. Maintains unit supply records and hand receipts. Coordinates inventories of property book items and prepares adjustment reports. Supervises an armorer.
Armorer	E4	76Y10	Performs small arms maintenance on all individual and crew-served weapons. Issues, inventories, and secures weapons and ammunition. Maintains the key control register for the weapons storage area. Turns in unserviceable weapons for repair. Prepares weapons and ammunition reports. Helps the supply sergeant request, receive, store, issue, and account for supplies and equipment. May serve as a vehicle driver.
Detachment Clerk	E4	75B10	Performs clerical and administrative duties. Prepares SIDPERS change reports. Processes personnel actions and reports. Maintains duty rosters. Completes forms. Maintains suspense files. Types reports, orders, letters, and operating procedures. Posts and files correspondence, regulations, and changes to unit authorization documents. Prepares strength accounting and casualty reports. Processes replacements and assists in processing personnel for oversea movement.

Table 2-1. TOE-prescribed personnel for the headquarters detachment (continued)

POSITION	GRADE	MOS	DUTIES
Light Wheeled Vehicle Mechanic	E4	63B10	Performs and supervises unit maintenance and recovery operations on gasoline- and diesel-fueled light wheeled vehicles. Troubleshoots and performs unit maintenance on internal combustion engines and accessories. Performs repairs and preventive maintenance checks and services.

SECTION III
BATTALION HEADQUARTERS OPERATIONS

This section is for the battalion commander.

MISSION

The battalion headquarters is the command and control element. The mission of battalion headquarters is to provide the necessary command and supervision of the technical operation of the battalion for its assigned and attached units. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures. The designated personnel for the command section are the battalion commander and his immediate staff. The staff officers supervise the functions of the S1 section, the S2/S3 section, and the S4 section. Details on the S2/S3 section are described later in this chapter.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-2 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

COMMAND AND CONTROL

You are responsible for the mission of the battalion. You can delegate authority to your subordinates and make them responsible to you, but you are still responsible. The organization of the battalion headquarters elements is shown in Figure 2-2. The S2/S3 section is divided into a security and plans branch, a communications branch, and a water supply branch.

PREPARATION FOR MOVEMENT

The battalion must be ready to move at any time and by any means. When it moves within the theater of operations, the battalion most likely will use motor transport, but it may use air or water transport. One of the first things you should do after taking command is to see if the battalion has an SOP for moving. An SOP should cover—

- Plans for all types of movements, including means of getting vehicles, aircraft, or water transport.
- Plans for loading organic vehicles and other modes of transport which might be used.
- Instructions for conducting reconnaissance of the route to be traveled and the new site.
- Plans for displacing all or part of the battalion.
- Procedures for closing out operations at the old area.
- Plans for the march, such as feeding the troops, refueling vehicles, performing unit maintenance en route, and getting road clearances.
- Plans for defending the unit.

RECONNAISSANCE AND SITE SELECTION

After the COSCOM or TAACOM commander has assigned the general area, you or a reconnaissance

Table 2-2. TOE-prescribed personnel for the command section

POSITION	GRADE	MOS	DUTIES
Commander	Lieutenant Colonel	92F00	Commands the battalion. Directs and supervises all technical operations and support activities involved in the conduct of a military water purification and supply system. Is responsible for overall mission accomplishment; employment and deployment plans; and administration, training, and security of the battalion.
Executive Officer	Major	92F00	Assists the commander in the accomplishment of the overall mission. Coordinates and directs activities so that the battalion commander may devote his energies to problems which merit his attention. Serves as troop information officer and materiel readiness officer.
S2/S3	Major	92F00	Is responsible for the overall planning, control, and supervision of battalion water purification, supply and distribution operations, and communications. Serves as the operations security officer.
Chaplain	Captain	56A00	Conducts religious activities for the battalion. Advises commander and staff of effect of religion on morale and welfare. Provides critical data on religious ministries and soldier morale.
Operations Officer	Captain	92F00	Is principal staff officer responsible for personnel management, administration, law and order, health, and maintenance of morale. Exercises staff supervision of the personnel and administration center. Acts as postal officer and safety officer. Participates in the operations order process and prepares plans, personnel estimates, and personnel annexes.
Petroleum Supply Officer	Captain	92F00	Plans, coordinates, and supervises all activities concerned with arrangements for supply and maintenance and other related logistical matters required to support the battalion.

Table 2-2. TOE-prescribed personnel for the command section (continued)

POSITION	GRADE	MOS	DUTIES
Command Sergeant Major	E9	00Z50	Serves as senior enlisted advisor to the battalion commander. Advises and assists senior NCOs in the accomplishment of their assigned missions.
Vehicle Driver	E4	88M10	Drives the 1/4-ton truck provided for the battalion commander. Operates the radio mounted in the vehicle.

team must check it out. The battalion S2/S3 usually takes charge of getting a team together and making arrangements for the reconnaissance. The team should include you, staff officers, the detachment commander and key personnel he selects, and personnel from the water supply branch.

Reconnaissance

There are several ways to check out the route and the new area. Sometimes map reconnaissance is the only way because of the lack of time or security. If there is no immediate danger from hostile forces and time is available, the reconnaissance team visits the area. Ground and map reconnaissance should be used. If available, aerial photographs should be used to aid in the reconnaissance process. Reconnaissance aids are field reports, geological maps, topographical maps, and aerial photographs.

Site Selection

The reconnaissance team should select an operating site and an alternate site for the battalion command post. The S2/S3 and the detachment commander select the general operating areas for the battalion and subordinate units. As a rule, the detachment headquarters commander is responsible for setting up the battalion command post. See FM 55-30 for help with motor movements and FMs 55-12 and 55-40 for air movements.

Section IV
S1 SECTION

This section is for the battalion S1.

MISSION

Under your supervision, the S1 section provides the necessary administrative and personnel management support required throughout the battalion. This section supervises correspondence and mail activities for the battalion. S1 section personnel prepare and provide to higher headquarters reports on casualties, strengths, and replacement requirements.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-3 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

ADMINISTRATIVE AND PERSONNEL MATTERS

The S1 section carries out the commander's policies on personnel administration. You supervise personnel management classification and assignment functions that relate to units attached to the battalion. You maintain liaison with the personnel service unit providing personnel service to the battalion that operates the automated SIDPERS. A personnel administration center will

Table 2-3. TOE-prescribed personnel for the S1 section

POSITION	GRADE	MOS	DUTIES
Personnel Staff NCO	E7	75Z40	Assists the operations officer. Supervises personnel management classification and assignment functions for the battalion. Maintains liaison with the unit providing personnel service to the battalion. Furnishes personnel information and guidance to commanders and staff. Receives and consolidates personnel and strength reports. Conducts strength accounting, replacement processing, and casualty reporting operations. Performs duties of the information NCO.
Administrative Specialist	E5	71L20	Assists the personnel staff NCO. Supervises the clerk-typist and records clerk.
Legal Specialist	E4	71D10	Prepares necessary papers related to legal matters.
Chaplain Assistant	E4	71M10	Performs administrative duties. Assists the chaplain in carrying out religious functions throughout the command. Drives the 1/4-ton truck assigned.
Clerk Typist	E4	71L10	Types reports, correspondence, and directives set forth by the battalion commander and his staff.
Records Clerk	E3	71L10	Maintains files for the headquarters. Processes mail for the battalion.

be established at the battalion level of command and tasked to provide formal administrative support to the unit. When this occurs, the commander still retains responsibility for the unit readiness posture of the unit and for ensuring that assigned soldiers are supported properly. He also retains responsibility for military justice and for informal administrative actions. See FM 12-3-1 and TCs 12-6 and 12-16 for more information on PAC. In support of the battalion commander, the S1 and the S1 section perform the following services.

Prepare Directives or Correspondence

Normally, unit personnel use handwritten notes or memos within the battalion. When unit commanders have correspondence which goes outside the battalion, PAC personnel type it in the correct

format. Unit commanders send the PAC a handwritten draft of the information and instructions on what is needed--a letter, an endorsement, a DF, or a comment. Preprinted letters or forms may be used for repetitive actions. Policies may be set up to allow the S1 or the personnel staff NCO to sign for the commander when his signature is not required. AR 340-15 has information on how to determine signatory authority. It also contains guidelines for preparing correspondence.

Operate the Battalion Mail Service

You serve as the battalion postal officer to provide mail service to all battalion units. Unit commanders appoint a unit mail clerk to take mail from their unit to the battalion mail pickup point and receive mail to take back to their unit. Each mail clerk must have a DD Form 285 (Appointment of Military Postal Clerk, Unit Mail Clerk, or Mail Orderly). The PAC types these forms, gives one copy to the mail clerk, sends two copies to the AG postal division, and files one copy.

Maintain Unit Strength

The first sergeants, supervised by the unit commanders, send a personnel daily summary to the S1 section. The report includes authorized and actual strength figures, casualty reports, and administrative gains and losses of personnel. Once you receive the unit element reports, forward the information by secure means (radio, telephone, or courier) to the next higher headquarters. See TC 12-16 for more information on this. AR 600-8-1 and FM 12-15 cover casualty reports.

Administer Personnel Actions

Unit commanders may send oral or written requests for personnel actions through the personnel staff NCO. The personnel staff NCO within the PAC maintains liaison with unit commanders and their first sergeants. The requests may include reclassifications, promotions, reductions, separations, reassignments, reenlistments, and evaluations. Also, they may include routine administrative tasks such as requests for or preparation of mail cards, medical forms, identification cards and tags, clearance forms, and requests for leave, and family or financial counseling.

Provide Various Services

If soldiers need financial help, the unit commander or first sergeant coordinates with PAC to arrange for Army Community Service or other financial assistance agencies to help them. If unit personnel have problems with their pay account or need to make any changes to it, the PAC helps them or makes an appointment for them at the supporting finance activity. Recreational activities are provided in the unit area or rest areas (rest and recreation areas are in the rear area). Religious activities are conducted by the battalion chaplain.

Assist With Discipline, Law, and Order

You are directly concerned with discipline, law, and order in the battalion. You coordinate with the military police and the staff judge advocate who administers military justice for the COSCOM or TAACOM. AR 27-10 covers military justice, and AR 600-8-2 covers suspension actions. The PAC provides administrative support for the troops by–

- Preparing paperwork for the unit commanders' signatures.
- Preparing statements and forms for soldiers and arranging legal counsel for them.
- Forwarding documents through appropriate channels for action.
- Notifying unit commanders of actions taken by higher headquarters.

Prepare Reports

The PAC prepares or coordinates accident, readiness, casualty, strength, and evaluation reports and unit rosters. Accident reports are prepared on DA Form 285 (US Army Accident Investigation Report). Readiness reports are prepared on DA Form 2715-R (Unit Status Report). Procedures for preparing casualty reports are in FM 12-15. The division SOP, FM 101-5, and TC 12-6 give information on preparing strength reports. ARs 623-105 and 623-205 give the requirements for evaluation reports.

Prepare Orders

The administrative service division of the personnel service company issues written orders. It requests the issue of orders for personnel actions. Unit commanders may request the issue of other orders. The S1 tells the PAC what action is required and for whom. The PAC prepares a DA Form 2446 (Request for Orders) and sends it to the administrative service division. The PAC keeps a copy of the request until the orders are received. AR 310-10 has more on preparing military orders.

Section V
S2/S3 SECTION

This section is for the S2/S3.

MISSION

S2/S3 section personnel make sure the tactical mission of the battalion is carried out. The section supervises technical and military intelligence gathering and formulates plans. It is responsible for the training of the battalion units. This section is also responsible for the battalion operation order, the movement and location of battalion units, and rear operations. Its responsibilities also include the establishment and operation of the battalion wire net, radio net, and battalion communications center and the supplies and services provided to supported units.

PERSONNEL

The S2/S3 advises the battalion commander on operations, training, and intelligence. His responsibilities include selection of operational sites, coordination, and assignment of tasks. The S2/S3 is also the operations security officer. Table 2-4 lists TOE-prescribed personnel of the S2/S3 section by position, grade, MOS, and duties.

PLANS, COORDINATION, AND SUPERVISION

Soldiers in the S2/S3 section advise the battalion commander on the status of battalion operations, training, intelligence, and security. They also make sure that subordinate commanders understand and comply with battalion policies and directives in those areas. The S2/S3 section staffs all actions dealing with the supplies and services provided to supported units. Personnel in the S2/S3 section—

- Coordinate all services provided to supported units.
- Monitor motor transport operations and request additional support for battalion units where needed.
- Direct and supervise movement of battalion units.
- Supervise the gathering and processing of intelligence information.
- Coordinate rear operation plans and activities.
- Plan and supervise training of battalion units.
- Coordinate security and plans branch, communications branch, and water supply branch activities.

TRAINING

Army policy gives training responsibilities to the lowest level of command. The S2/S3 is the training coordinator for the battalion, and commanders and key NCOs are the trainers. The S2/S3 works with staff members and unit commanders to organize training plans for the battalion. Meetings are held regularly (preferably once a week) to determine unit missions and training needs. The commanders discuss the time needed for individual training and for collective training. The S2/S3 provides a schedule and all training and evaluation outlines needed to carry out training. There is no set format for the schedule. However, the schedule must include the mission and when and where the training is to be given. Also, it must include notes about training and evaluation outlines, other sources and references, and specific guidance. See FM 25-2 for further guidance in training management.

INTELLIGENCE

Intelligence and tactical operations functions in the water supply battalion are consolidated. The S2/S3 is responsible for major tasks in the area of intelligence. He is usually assisted by the operations sergeant and the security and plans NCO. Other members of the S2/S3 section give advice and information on intelligence, tactical operations, and security. S2/S3 section personnel maintain the operations map. The operations map is continuously updated to show the positions of all battalion units and all known friendly, allied, and enemy forces in the battalion area. Section personnel prepare the intelligence annex to the battalion SOP, the operation orders, and other necessary reports. They make data available to battalion units.

Estimate

Unit commanders must make it clear to their soldiers that any observations of enemy activity

Table 2-4. TOE-prescribed personnel for the S2/S3 section

POSITION	GRADE	MOS	DUTIES
Petroleum Operations Sergeant	E8	77F50	Assists the S2/S3. Is responsible for water transportation concerns. Supervises supply and service operations performed by units of the battalion. Assists in planning and developing battalion operations.
Clerk-Typist	E4	71L10	Prepares and maintains status and administrative reports for the section. Performs clerical functions as required.
Water Treatment Specialist	E3	77W10	Receives and coordinates all reports with the various branches of the section. Performs messenger and carrier services as needed. Operates the 1/4-ton truck and radio assigned to the section.

or attempted subversion, terrorism, or espionage must be reported without delay through command channels. The S2/S3 section receives information of intelligence value from battalion elements and sends it to the petroleum group S3 or to the COSCOM security, plans, and operations officer for appropriate action. In the event of an immediate security threat, the S2/S3 may mobilize forces for support. The intelligence estimate is a continuing requirement. Even though intelligence information may not be immediately important to the battalion or petroleum group, it may be important to other higher headquarters. FM 101-5 shows the type of information included in an intelligence estimate.

Operations

Tactical and logistic operations are of interest to higher headquarters. The S2/S3 reports enemy capabilities; areas that have become impassable due to mines, obstacles, or contamination; and the effects of weather and terrain. This information will be used to update the petroleum group or COSCOM situation map. Once higher headquarters processes the information, the S2/S3 section is provided with an intelligence report. The applicable portion of the report is forwarded by the S2/S3 section to battalion units.

This paragraph implements STANAG 2885 (Edition One).

MOVEMENT AND LOCATION OF BATTALION UNITS

Once the S2/S3 receives an operation order, he tells the battalion units where they must locate and when they must begin operations. The following steps are taken:

- A warning order is issued to battalion elements to let them know a move is planned.
- A reconnaissance party is arranged to check the route and the new area. See Table 2-5 for a checklist for water reconnaissance. STANAG 2885 also has specific guidelines for water reconnaissance. See Table 2-6 for these guidelines.
- The operations NCO in the S2/S3 section coordinates with the petroleum group or COSCOM headquarters movement control officer to make sure transportation is available to support battalion operations.
- An advance party is organized and sent to the new area to clear the route of obstacles, to check for NBC contaminants, to post route markers, and to make hasty defense positions. The advance party also sets up the

Table 2-5. Checklist for water reconnaissance

Information on the following items must be obtained and recorded:	
Quantity available.	Routes of communications.
Quality.	• Condition of roads.
• Color.	• Extent of road net.
• Odor.	• Traffic circulation.
• Turbidity.	Site conditions.
• Total dissolved solids (for ROWPU).	• Cover and concealment.
• Possible sources of pollution.	• Drainage.
• Condition of vegetation.	• Bank conditions.
• pH value.	• Access roads and parking areas.
• Chlorine demand.	• Bivouac area for operations.
	Work estimate.

Table 2-6. STANAG 2885 guidelines for water reconnaissance

Water supply reconnaissance is concerned with the quantity and quality of water available, the sources, the extent to which they have been developed, and the best means of developing them further for military purposes. Information on the following points is required for all sources of supply:
• Type of source of supply with map reference and sketch.
• Approximate amount of water available,including its rate of replenishment.
• Quality as deduced by chemical and physical examination, e.g. evidence of any deliberate contamination, poisoning, or radioactivity.
• The route of the water from its original source to the proposed extraction point with special consideration to possible pollution of the source by nuclear, biological, and chemical contaminants.
• Existing local facilities for pumping, storage, and distribution.
• In the case of springs, streams, and rivers, the feasibility of impounding water by construction of dams, embankments, or infiltration trenches.
• Road access to the proposed extraction point and dispersal areas for vehicles.

command post, lays communications wires from the command post to defensive positions and supply areas, and prepares the kitchen area.

REAR OPERATIONS CONSIDERATIONS

The S2/S3 coordinates with the battalion commander, other staff members, and company and detachment commanders to develop rear operations security plans and training for the battalion. The battalion may face a wide range of enemy actions. They vary from covert actions by enemy agents to full-scale attacks by battalions or large, enemy combat forces. Units in the rear must be prepared to respond to the various levels of threat. The levels are described in Table 1-5 in this manual. Defense information for the units within the battalion structure is presented throughout this FM.

COMMAND POST AND TACTICAL OPERATIONS CENTER

The S2/S3 manages the tactical mission operations from the TOC, which is the chief component of the battalion CP. In a built-up area, the CP may be in the same building with all of the battalion staff. A separate area of the building should be designated for the TOC. The CP may also be in tents. In this case, the S2/S3 should have a medium GP tent for the TOC with other staff members located next to it in small GP tents. See Figure 2-3 for suggested layout and staffing of a TOC.

Staff

Most of the time, the TOC has the battalion commander, the S2/S3, staff members, and communications soldiers. The TOC must be staffed and operated 24 hours a day. To do this, the S2/S3 may set up two 12-hour shifts. Usually, each shift has at least one officer, two NCOs, one clerk, and any liaison personnel needed. When the situation does not warrant a full staff, at least one person must be on duty at all times. In this case, the S2/S3 may have one fully staffed, 12-hour shift and an officer or NCO on duty for the next 12 hours. A duty roster is kept to rotate the duty officer and NCO detail. The operations sergeant can take care of these details.

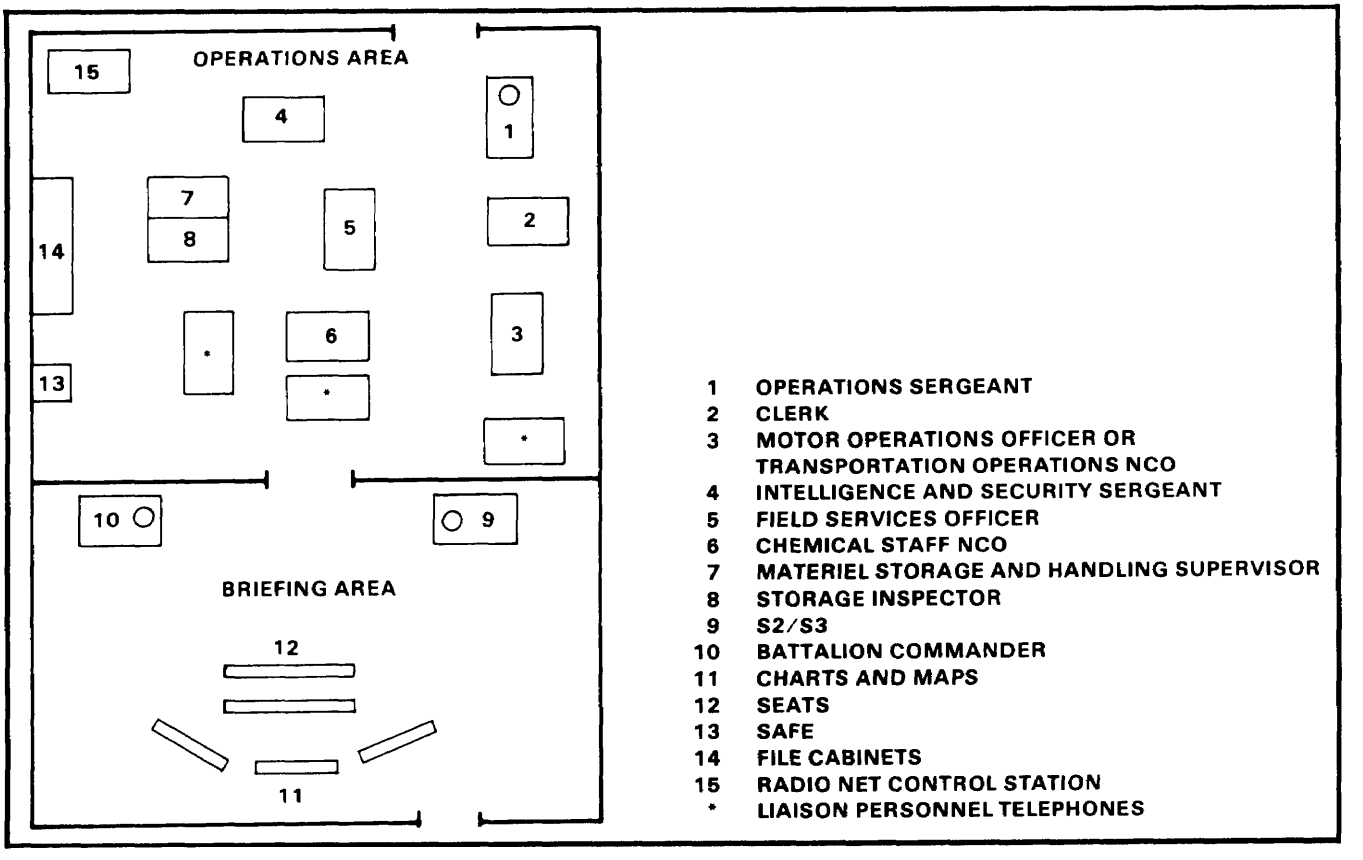


Figure 2-3. Suggested layout and staffing for a TOC

Functions

TOC personnel receive reports from battalion units, requests for assistance from supported units, directives from higher headquarters, and other information pertinent to the mission. They keep the S2/S3 section informed and keep operations maps and charts posted with the latest information. Usually, the operations sergeant keeps the operations map up to date, and the security and plans NCO makes sure the latest information is on the situation map and the weather chart. Using the charts and maps provided, the S2/S3 or the battalion commander briefs staff officers and unit commanders regularly (usually daily). The commander decides how often. The communications chief is usually in charge of the net control station in the TOC. Other communications personnel may be located in a trailer, tent, or other structure next to the TOC to operate the wire net and to process messages.

Security

The TOC is a restricted area, so the S2/S3 must take precautions to keep it secure. The CP usually has protective wire or some other protective barrier around it. If the TOC needs more protection, the S2/S3 may request that wire or barriers be put around the TOC as well. A guard is posted at the entrance to the TOC. The detachment commander, who is responsible for CP security, assigns the guards. A roster of personnel who have access to the TOC is published and given to the guard. When a soldier needs to enter the TOC, the guard checks his identification card against the roster. After the initial check, the guard may admit him. If the soldier is not on the access roster, the guard asks the S2/S3 or one of the staff to see if he should be permitted to enter.

BATTALION WIRE AND RADIO NET OPERATIONS

Communication is an essential part of the battalion headquarters mission. The battalion commander, with the aid of the staff, receives and interprets plans, policies, and directives from higher headquarters. Communication between battalion units that is not routine is routed through the battalion commander. All available means of communication are used to ensure quick, accurate, and reliable dissemination of information. The S2/S3 has staff supervision of communications in a field or combat situation. More information on operations of the battalion communications branch is presented later in this chapter. The battalion communications chief runs the communications system and supervises other communications personnel. The system consists of single-channel radio nets and a mobile radiotelephone system augmented by multichannel tactical satellite radio. Maximum use is made of systems that soldiers can carry. The communications chief and soldiers accomplish the following functions.

Equipment

Communications personnel account for and maintain all the communications equipment belonging to the battalion. Battalion signal equipment includes FM radios; field telephones; switchboards; teletypewriters; terminal facilities; COMSEC devices; and auxiliary equipment, such as batteries, wire, and cables.

Net Control

Communications personnel establish the net control station for the battalion FM radio net. They monitor and control FM voice communication between battalion units using procedures given in FM 24-18 and the CEOI. The net controller opens and closes the net, imposes and lifts radio silence, ensures proper radio-telephone procedures are used, and keeps unauthorized stations from transmitting. Battalion radio net operations are described later in this chapter.

Teletype

Communications personnel provide teletype service to and from divisional units or, through the COSCOM support signal node, other telecommunication centers throughout the theater. This service is available to the headquarters detachment staff and the staff of subordinate units, as determined by the battalion commander. The telecommunications center is usually collocated with the message center.

Switchboard

The communications branch provides telephone and teletype switching service for all battalion elements. Switchboard operators manually connect battalion field phones and teletypes for intrabattalion communication. They use a connection to the COSCOM support signal node to allow voice communication to all theater elements.

FM Radio

Soldiers in the communications branch aid the commander by laying wires to all subordinate units and establishing an FM voice net. The branch is assisted by elements of the supporting signal battalion.

OPERATIONS REPORTS

The S2/S3 section prepares or processes mission operations reports and forwards them to the petroleum group or COSCOM security, plans, and operations section. The COSCOM, petroleum group, or TAACOM SOP should specify when the S2/S3 section submits its reports. These reports include the following:

- Intelligence spot report.
- Intelligence summary.
- Situation overlay.
- Ground surveillance plan.
- Air reconnaissance surveillance request.

Section VI
S4 Section

This section is for the S4.

MISSION

The S4 section is responsible for providing supply and maintenance services for the battalion organic and attached units. S4 section personnel, supervised by the S4, perform the following duties:

- Receive requests for expendable supplies from battalion units, enter them on the document register, and forward them to the supply management office.
- Monitor requests from battalion units for nonexpendable supplies.
- Monitor due-in expendable.
- Supervise turn-ins of supplies and equipment.
- Monitor unit maintenance operations.
- Monitor materiel readiness status of battalion units.
- Prepare logistics reports.

PERSONNEL

The S4 supervises internal supply and unit maintenance operations of battalion units. Coordination is made with the S2/S3 for planning area damage control measures. The S4 also serves as battalion materiel readiness officer. A battalion supply sergeant, two supply specialists, and one equipment repair supervisor assist the S4. Table 2-7 lists TOE-prescribed personnel of the S4 section by position, grade, MOS, and duties.

INTERNAL SUPPLY FUNCTIONS

Supplies and equipment must be available for battalion units when needed. The S4 must keep higher headquarters informed on the status of internal logistics. Major shortages of equipment or supplies which affect mission capability are the number one priority and should be reported through command channels immediately. The S4 initially gives the COSCOM staff advance notice of battalion requirements of supplies and equipment. The S4 bases requirements on the number of soldiers in the battalion, past demand experience, current requests, unit supply status reports, and the unit commanders' estimates of future needs. Battalion logistics may be divided into three general areas. They are described below.

Internal Supply

Internal supply is the provision of all classes of supply in support of battalion personnel, equipment, and operations, excluding those supplies which are passed on to supported units (mission stocks).

Field Services

Field services are provided to support battalion personnel and equipment. They include food service, water supply, bath, laundry, reimpregnation, clothing exchange, renovation, salvage, decontamination, and graves registration.

Maintenance

Maintenance includes inspection, repair, calibration, and modification of battalion equipment at the unit level.

Table 2-7. TOE-prescribed personnel for the S4 section

POSITION	GRADE	MOS	DUTIES
Senior Maintenance Supervisor	E8	63B50	Supervises the battalion internal maintenance functions. Plans, coordinates, and inspects unit maintenance operations. Supervises the preparation and maintenance of unit maintenance and PLL records.
Supply Sergeant	E7	76Y40	Provides technical supervision of functions relating to supply and supply management of subordinate units.
Senior Utilities Equipment Repairer	E6	52C30	Installs and supervises the installation of authorized modification items on supported and assigned equipment. Supervises or performs unit or intermediate maintenance on assigned equipment. Inspects installation and condition of equipment systems.
Supply Specialists	E4 E3	76Y10 76Y10	Request, receive, and process the necessary supplies and equipment for the subordinate units. One supply specialist drives the 5/4-ton truck assigned to the section.
Reports Clerk	E3	71L10	Prepares and types reports, plans, and correspondence. Maintains files and records. Performs clerical duties.

UNIT SUPPLY FUNCTIONS

S4 section personnel help the S4 monitor the status of supply within the battalion and account for battalion property. Members of this section are trained and experienced in unit supply. They inspect supply rooms, dining facilities, arms rooms, and motor pools. They resolve any problems in favor of battalion, higher headquarters, and DA policy. The S4 knows how supplies are classified and how they are accounted for. Table 2-8 explains supply accounting terms. Items by classification are explained below.

Expendable Items

The unit supply sergeants send requests to the battalion S4 section. The section keeps a document register of requests for expendable items. Section personnel list each request on the document register and enter a document number on the request. Then the requests are sent to the supply management section.

Nonexpendable Items

The supply sergeant may prepare requests for nonexpendable items. The requests are forwarded to the property book team at the supply management section where document registers for these requests are kept. Battalion policy may require the supply sergeant to send the requests through the S4 for information only.

Durable Items

The supply sergeant sends requests to the battalion S4 section. The section keeps a document register for requests for durable items. Requests

Table 2-8. Supply accounting terms

ITEMS	EXPLANATION
Durable • Are not consumed in use. • Keep their original identity. • Are not categorized as expendable or nonexpendable.	Durable items are not listed on the property book but, because of their nature, these items have to be signed for on a hand receipt or subhand-receipt. Some durable items, such as components of sets, kits, or outfits, may be signed for on hand receipt annexes.
Expendable • Are items, under any type classifications or any unit price, which are consumed in use (for example, repair parts). • Are items not consumed in use but which cost $50 or less—unless otherwise coded.	Expendable items are not listed on the property book. These items do not have to be signed for on a hand or subhand-receipt or on hand receipt annexes.
Nonexpendable • Are not consumed in use. • Keep their original identity. • Need formal property book accountability.	Nonexpendable items are listed on the property book. When issued, they must be signed for on a hand receipt or subhand-receipt.

are listed on the document register, and a document number is entered on the requests. Then the requests are sent to the supply management section.

SUBORDINATE UNIT SUPPLY RECORDS

One of the missions of the S4 is to take care of the paperwork for the water supply battalion, which is consolidated at battalion level. This involves preparing and processing logistic reports and records, such as readiness-related reports; receipt, issue, and turn-in forms; and various property transactions and lists. For more detailed information, refer to FM 10-14-2.

MAINTENANCE

Unit maintenance is performed under the supervision of the S4. He is also the battalion materiel readiness officer. As part of his maintenance duties, the S4—

- Organizes maintenance operations as directed by the battalion commander. The water supply companies provide maintenance support for the battalion. The S4 and the battalion motor maintenance sergeant coordinate with the water supply companies to make sure support is provided.
- Helps select the areas for setting up vehicle maintenance and sees that areas are designated for other equipment maintenance.
- Inspects facilities and operations frequently to see that regulations and battalion policies are followed. He identifies problem areas and helps find solutions. FM 29-2 includes sample inspection checklists.
- Ensures that repair parts are requested according to regulation and that they are received promptly. Also, he checks to see that records are kept correctly.
- Ensures that liaison is kept with supporting maintenance activities. Copies of the supporting unit's SOP are given to the maintenance personnel so that they will use the correct procedures for requesting support.
- Gives maintenance training needs to the battalion S2/S3 so that they can be included in the battalion training schedule.
- Keeps the commander and the other staff members advised of the maintenance and materiel readiness situation.

REAR OPERATIONS PLANNING

The S4 plans and writes the SOP for area damage control. Coordination is made with the petroleum group, the COSCOM G4, the battalion S2/S3, and

the unit commanders to ensure that plans are complete. Commanders should know what their units are responsible for and see that equipment and supplies are available.

MOVEMENT

The battalion S2/S3 is responsible for moving the battalion in the field. The S4 coordinates logistics support for the move and gives the S2/S3 whatever help is needed in preparing for the move.

SPECIAL MAINTENANCE TECHNIQUES

Special maintenance techniques with which staff members need to be familiar are the same as those taught to maintenance specialists. Training should include any special handling techniques required in the operational area, using the appropriate TMs and TCs. Supply and maintenance operations in the desert are described in FM 90-3, Chapter 5. Training should be modified according to the following:

- The MTOE and mission of the unit.
- The supply situation expected in the area of operations.
- The capabilities of logistic units likely to support unit operations. Special attention should be given to units not normally found in conventional operations (well-drilling teams and transportation truck companies, for example).

Section VII
SECURITY AND PLANS BRANCH

This section is for the security and plans officer.

MISSION

This branch plans, controls, and supervises the security, deployment, employment, training, and operation of the water supply battalion and its assigned or attached units. Branch personnel—

- Develop plans and supervise training of assigned and attached units.
- Develop and implement training programs for the headquarters and subordinate units.
- Develop and implement general educational development programs.
- Plan, direct, coordinate, and supervise intelligence, counterintelligence, and civil affairs programs.
- Develop and coordinate plans for security and defense of the headquarters and subordinate units.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-9 lists TOE-prescribed personnel of your branch by position, grade, MOS, and duties.

OPERATIONS

This branch operates under the direct supervision of the S2/S3. Branch operations are similar to those of the S2/S3 section of the HHD. As security and plans officer, you—

- Develop policies and guidance for training.
- Evaluate training.
- Supervise intelligence, security, and defense activities.
- Prepare broad planning guidance, policies, and programs.

DEFENSE RESPONSIBILITIES

You are responsible for the security and defense of your personnel and equipment. Unlike combat units that are designed and equipped to fight the enemy, your unit is designed and equipped for its primary mission of providing command, administrative, technical, and operational supervision and control of the water production and distribution system. However, if you are attacked, your personnel must be able to defend themselves initially with the assets organic to the unit. You must develop a defense plan, assign specific duties, and ensure that your personnel are trained to perform defense tasks. You will need to develop your defense plan in conjunction with higher headquarters and adjacent units. See Chapter 1 in this FM for more information on defense.

Table 2-9. TOE-prescribed personnel for the security and plans branch

POSITION	GRADE	MOS	DUTIES
Security and Plans Officer	Lieutenant	92F00	Is concerned with deployment of the battalion. Plans, coordinates, and supervises security of the water systems and unit perimeter security. Functions as the battalion communications officer.
Water Purification Supervisor	E7	77W40	Coordinates the activities of the water supply companies in security and implementation of plans. Performs education NCO duties (Learning Center).
NBC NCO	E7	54B40	Advises the battalion S3 on unit preparedness. Assists in planning and application of NBC defense measures for subordinate units. Coordinates decontamination operations as necessary.
Reports Clerk	E3	71L10	Prepares and maintains plans and reports for the branch. Serves also as a vehicle driver.

Section VIII
COMMUNICATIONS BRANCH

This section is for the security and plans officer and communications officer.

MISSION

The communications branch provides teletype and telephone communication support for the battalion and detachment headquarters. It also operates the battalion communications center. Your mission requires you to provide wire, radio, and telegraph-telephone communications and switchboard, message center, and net control station services.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-10 lists TOE-prescribed personnel of the communications branch by position, grade, MOS, and duties.

OPERATIONS

You are responsible for the communications for the group. You will need to know the wire net plan, the net control station, the switchboard, and the radio communications net as described below. You are responsible for allocating these assets. Equipment should be allocated as needed to perform the mission.

Wire Net Plan

TA-312 PT telephone sets are dispersed throughout the battalion. Your personnel should develop a wire net plan that shows the location of these telephones. See FM 11-50 and FM 24-20. The plan should also identify the terminals to which each telephone is connected on the switchboard. The

plan should show where the wire is buried underground or installed overhead. Designate a wire team to coordinate telephone installation with the supported units. Have the team identify

Table 2-10. TOE-prescribed personnel for the communications branch

POSITION	GRADE	MOS	DUTIES
Battalion Communications Chief	E7	31G40	Supervises the installation, operation, and maintenance of the battalion communications system. Supervises communications personnel in the headquarters detachment. Exercises technical supervision over communications personnel in subordinate units. Prepares technical and administrative reports as required.
Combat Signaler Team Chief	E5	31K20	Installs, operates, and maintains field wire communications, telephones, switchboard systems, FM radios, retransmission radios, radio wire interpretation systems, and generator sets.
Radio Operators	E4 E3	31K10 31K10	Operate the battalion net control station and operate the battalion FM net on a 24-hour basis.
Unit Level Communications Maintainer	E4	31V10	Installs, operates, and performs operator and unit-level maintenance on radio and wire communications systems and equipment.
Wire Installer	E4	31K10	Installs and maintains the wire communications system. Operates battalion switchboard on 24-hour basis.
Tactical Telecommunications Center Operators	E4 E3	72E10 72E10	Operate the teletype on a 24-hour basis under the direction of the team chief. Process messages, supervise, and perform administrative functions in combat telecommunications center. Prepare and maintain files necessary for adequate accounting and control of crypto material.
Switchboard Operator	E4	31K10	Operates the battalion switchboard on a 24-hour basis. Drives the 5/4-ton truck assigned to the section.
Combat Signaler Team Chief	E5	31K20	Installs, operates, and maintains field wire communications, telephones, switchboard systems, FM radios, retransmission radios, radio wire interpretation systems, and generator sets. Supervises the telecommunications center operators.

manpower and equipment requirements. Figure 2-4 shows a diagram of the HHD wire net. Your section also installs and recovers field wire.

Radio Communications Net

See Table 2-11 for the communications equipment authorized the battalion command. A proposed wire net is shown in Figure 2-5. Your personnel should follow the guidelines in FM 21-3 when establishing the radio net.

Messenger

Use unit personnel as messengers as much as possible. They provide the most secure method of

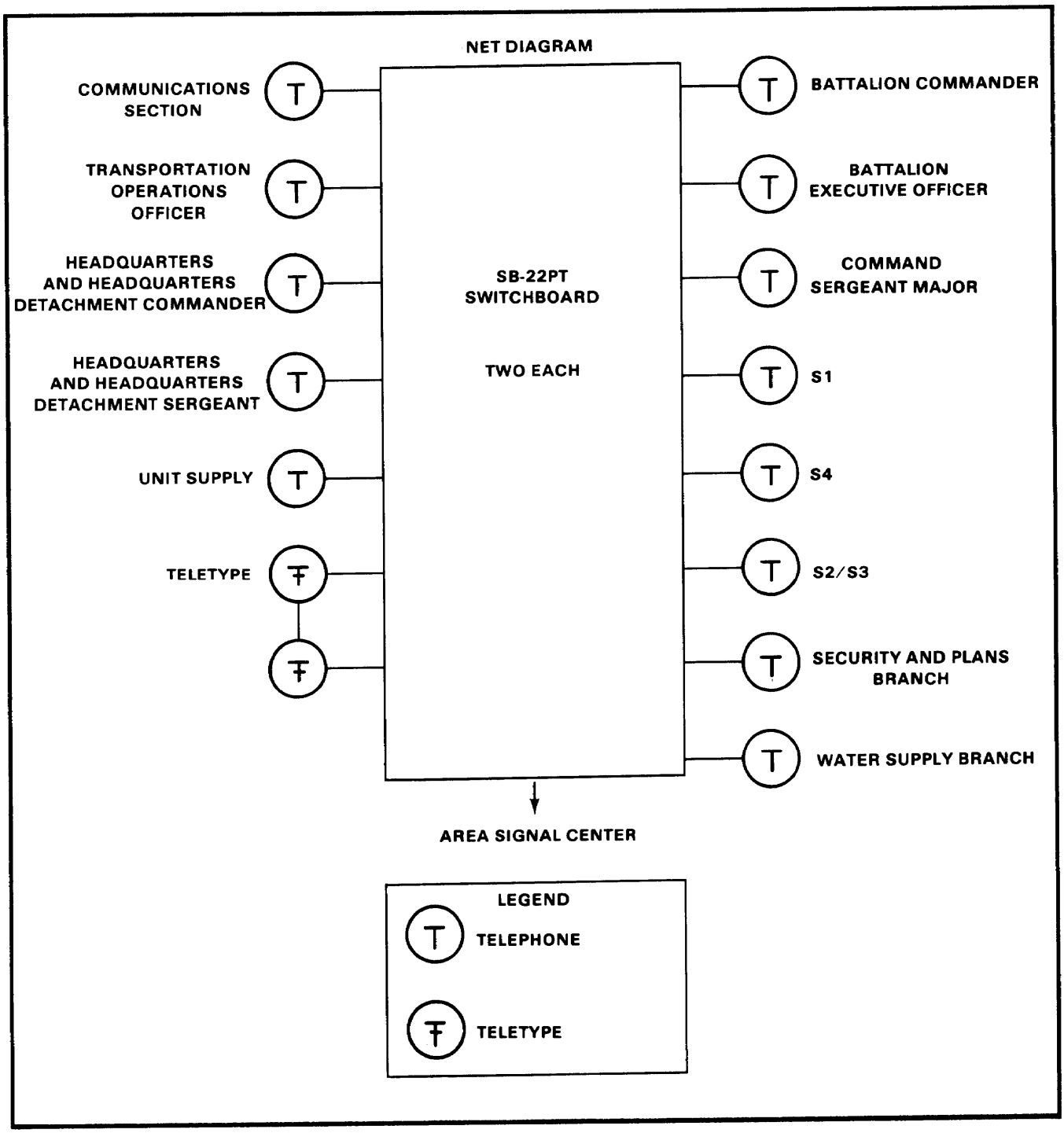


Figure 2-4. Wire net for headquarters and headquarters detachment, water supply battalion

Table 2-11. Communications equipment authorized for the battalion command

	AN/VRC-89 Radio Set	AN/TCC-29 Telegraph-Telephone	AN/VRC-90 Radio Set	SB-22PT Manual Switchboard	TA-312 PT Telephone Sets
COMMAND SECTION	1				
S2/S3 SECTION	1				
COMMUNICATIONS BRANCH		1	2	2	16
WATER SUPPLY BRANCH			1		

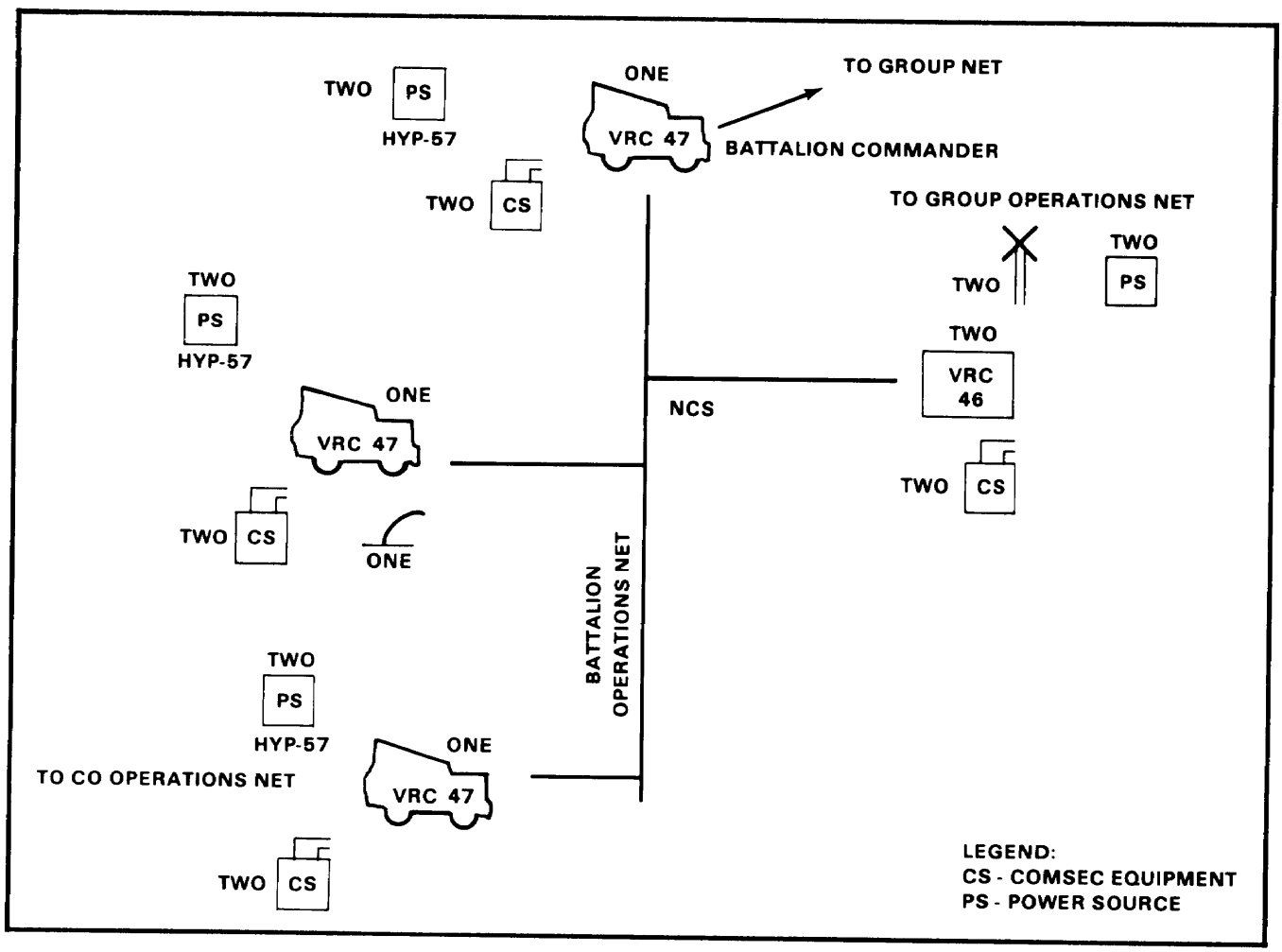


Figure 2-5. Radio net for the headquarters and headquarters detachment, water supply battalion

communication. They also help get needed supplies at once. You can call ahead to start the supply process, then send the paperwork with a messenger.

Net Control Station

The group NCS operates according to the procedures outlined in FM 24-18. Your personnel—

- Open and close the net.
- Control transmissions.
- Authenticate and clear traffic within the net.
- Direct the net.
- Correct errors in operating procedures.
- Give or deny permission for stations to enter or leave the net.
- Impose or lift listening silence.
- Maintain net discipline.

Switchboard Service

The battalion has two SB-22PT switchboards, which are assigned to your section. Personnel in your section operate them. They should use correct telephone procedures to answer, connect, and disconnect incoming calls and to place outgoing calls. The telephone communications system provides switchboard service on a 24-hour basis. Have your personnel update the switchboard traffic diagram as required. They should follow procedures outlined in FM 24-20.

Section IX
WATER SUPPLY BRANCH

This section is for the operations officer.

MISSION

The water supply branch provides technical and operational supervision for up to six water purification detachments. The branch also provides this guidance for water supply companies and transportation medium truck companies assigned to the water supply battalion.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 2-12 lists TOE-prescribed personnel of your branch by position, grade, MOS, and duties.

COORDINATION OF COMPANIES AND TEAMS

You are responsible for dispatching operations. You also coordinate water purification and supply functions with the units described below.

Water Purification Detachment and Teams

The water purification detachment produces potable water within the theater. The teams augment DS water systems. The teams may also augment the water purification capability organic to supply and service companies. Water purification units normally operate out of base terminals, but they may locate at any large water source.

Water Supply Companies

These companies establish and operate bulk storage tank farms and tactical water distribution systems (see Chapter 3). Tank farms, or terminals, also provide water support for units nearby on a supply point basis. Tactical water distribution teams are assigned to water supply companies as required to augment capabilities for bulk distribution of water throughout theater army and corps areas.

Transportation Medium Truck Companies

These companies use collapsible fabric tanks mounted on standard cargo semitrailers to transport water. This capability is required early in the development of the theater. It serves as the main means of distribution, pending the emplacement of base terminals, tank farms, and tactical water distribution systems. As the theater matures and the mission changes, it serves as the only means of

Table 2-12. TOE-prescribed personnel for the water supply branch

POSITION	GRADE	MOS	DUTIES
Operations Officer	Captain	92F00	Supervises the purification and supply of water; coordinates with the assigned companies on site location for water purification and for storage sites and terminal.
Water Treatment Supervisor	E7	77W40	Plans and supervises the hose line distribution operations of the subordinate companies. Also, coordinates movement of water by rail, truck, or air.
Petroleum Supply Sergeant	E7	77F40	Plans and supervises a program for quality surveillance of water within the battalion and area of operation.
Water Treatment NCO	E5	77W20	Receives stock status reports from subordinate units. Maintains storage and availability data. Provides information on stock position so that purification, storage, and distribution can be managed. Functions as vehicle driver and radio operator.

distributing water from corps area tank farms forward into divisional and brigade storage facilities.

OPERATIONS

You are responsible for organizing the branch so that it can function properly. You must monitor water operations in the battalion so that water supply will be adequate for all supported units. The operations are described below.

Purification, Storage, and Distribution

Purified water is pumped into the base terminal storage facility, consisting of collapsible tanks, from purification equipment located onshore and offshore. It is then distributed to other terminals within the theater army area and forward into the corps areas by tactical water distribution systems. Terminals also provide water on a supply point basis to units located nearby. Personnel move water forward from the corps areas by semitrailer-mounted fabric tanks and distribute it to divisional and brigade support areas for issue. Large quantities of potable water under field conditions may be distributed by pipeline, hose line, semitrailer-mounted fabric tanks, and tank trucks. Smaller quantities will be picked up from storage and distribution points in tank trucks, water trailers, SMFTs, or 5-gallon water cans. In some situations, small quantities of water from the Forward Area Water Point Supply system may be delivered by aircraft.

Technical Support

Personnel in your branch must determine daily requirements and available storage space. They determine the quantity of water to be purified and stored at the various terminals. Also, they develop graphs for projected consumption and deliveries. Your branch personnel manage the water quality surveillance program and determine sampling

and testing procedures for potable water supply according to TB Med 577. They determine reporting procedures for supported units. They establish and monitor the transportation, handling, and testing of bulk water supplies. Branch personnel identify sources of potential contamination and deterioration of water quality. They provide advisory technical assistance to military activities in the battalion area.

Records and Reports

Personnel from your branch receive operations reports from all purification and hose line units and storage terminals. The reports provide daily production, storage, and distribution data. These data are used in conjunction with a consumption graph and progress chart to coordinate water point operations, safeguard water quality, and improve water treatment and distribution. Blank copies of many of the forms used for these records and reports can be found in FM 10-52. The forms may be reproduced locally.

Pumping and distribution records. Daily production and distribution data must be recorded on the required logs. These daily records are sent by the purification and distribution units to your water inventory specialist. Use these data to make up a summary report. You should review both daily and summary reports to check the status of the operation of your units daily. Investigate any discrepancy.

Loading schedules. You can use the pumping and distribution schedules to develop loading schedules. First, determine the estimated requirements, availability of transportation, and the needs of the supported units. Then, develop loading schedules from these data.

Daily water point reports. The water point team chief submits daily reports on production and distribution of water. Since these reports are the basis for other water supply records, they should be filled out carefully.

Water quality reports. Representatives of the command surgeon routinely check water points. They use DA Form 5456-R (Water Point Inspection) to report their findings to higher headquarters. See TB Med 577. They check the chlorine content and pH of the water. They also inspect the sanitation of the water point. If they find a problem, they may recommend that you stop water production at once. They also take water samples to be checked for bacteria. Results are reported on DD Form 686 (Bacteriological Examination of Water). The form is sent to the headquarters of the unit providing the water. The tests provide a record of the potability of the water.

Summaries. The water point supervisor receives the daily production and distribution reports from the individual team chiefs. The supervisor compiles the data and sends the summaries to your branch.

CHAPTER 3
WATER SUPPLY COMPANY

Section I
OVERVIEW

This section is for the company commander.

MISSION

The mission of the water supply company is to store and distribute potable water to divisional and nondivisional units in a combined DS and GS role. To do this, your company establishes and operates at least one temporary water storage and distribution system. It also lays, operates, and retrieves the TWDS and maintains part of the command water reserve stocks.

CAPABILITIES

Your company's capabilities are determined by personnel strength levels prescribed by TOE 10468L. Company personnel also have defense and maintenance responsibilities.

Full Strength

At full strength (TOE Level 1) and operating on two 12-hour shifts, your company can—

- Install and operate two 10-mile TWDSs. The TWDSs can transfer 600,000 gallons of water per day when they are operated in tandem. Operated separately, the two TWDSs can transfer 1,200,000 gallons of water per day. Each section of the TWDs can issue 200,000 gallons of water per day.
- Operate 32 collapsible, bulk water storage tanks. Each tank can hold 50,000 gallons of water, so the capacity of your company tanks is 1,600,000 gallons.
- Store part of the command water reserve stock (up to 1,600,000 gallons).
- Operate up to eight DS issue points.

Reduced Strength

TOE Strength Level 2 reduces the operational capability to about 90 percent, and Strength Level 3 reduces it to about 80 percent. For more on strength levels, see AR 220-1.

Attached Strength

When the TWDS teams (TOE 10570LB) are attached to your company, you can operate a water storage and distribution system for up to 80 miles. More on TWDS teams can be found later in this chapter.

Defense

Members of your company can help in the coordinated defense of the company area or installation. More on unit defense is in Chapter 1.

Maintenance

Your company performs unit maintenance on its equipment, except CE equipment. More on unit maintenance is presented later in this chapter.

REQUIRED SUPPORT

Your company depends on appropriate elements of the theater army for legal, medical, financial,

personnel, and administrative support. It depends on the headquarters and headquarters company and the water supply battalion for CE unit maintenance and for religious support. It also depends on—

- Additional security forces when physical security or defense needs exceed capability.
- Water purification teams or a water purification detachment for potable water (see Chapter 4).
- Preventive medicine personnel to determine whether the water supplied by your company is potable.

MOBILITY

The mobility of your company is limited by the number of vehicles you have and the number of personnel and amount of equipment and supplies you must move. Your company has 29,720 pounds (1,940 cubic feet) of TOE equipment. Your company can move 255,000 pounds (9,412 cubic feet) of equipment and supplies in one lift using company assets.

ORGANIZATION

Your company is organized to meet mission requirements in an arid environment. As the demand for water increases with the growth of the theater, your company may also expand. Figure 3-1 shows the number of elements in your company at maximum size. Note that as many as six tactical water distribution system teams may be attached to your company. Your company is employed in the corps or COMMZ area. Normally, the company will be attached to a water supply battalion.

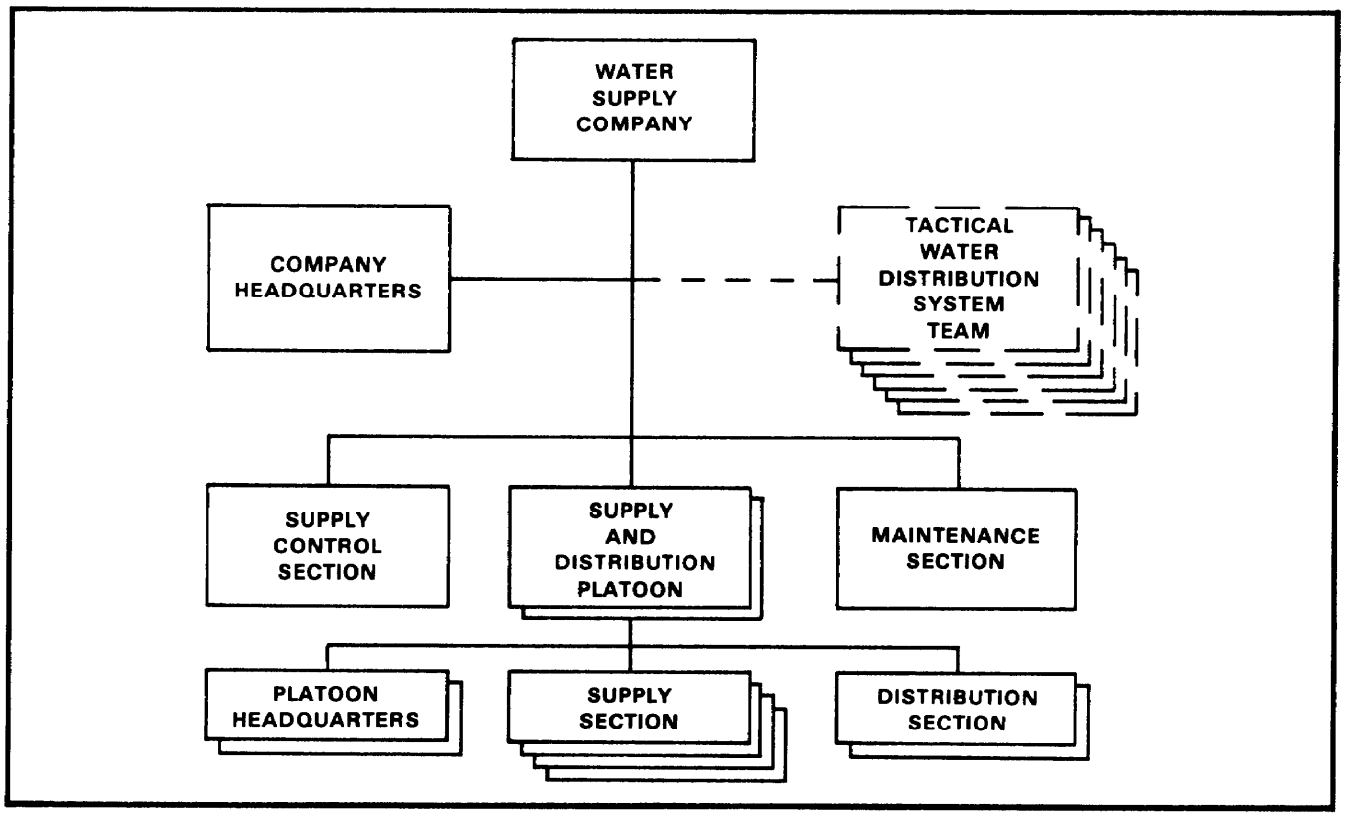


Figure 3-1. Organization of the water supply company with tactical water distribution system teams

Section II
COMPANY HEADQUARTERS

This section is for the company commander.

MISSION

Using your company headquarters staff, you command and control the company. Your headquarters is responsible for internal operations of the company. This includes billeting, training, discipline, communications, administration, and security. Your supply sergeant provides unit supplies. Food service personnel provide food service support.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-1 lists TOE-prescribed personnel by position, grade, MOS, and duties. Duties of other company personnel are described later in this chapter.

Table 3-1. TOE-prescribed personnel for the company headquarters

POSITION	GRADE	MOS	DUTIES
Company Commander	Captain	92F00	Plans, directs, and supervises the operations and employment of the company. Commands the company so that its mission is carried out. Is responsible for unit readiness, site establishment, communications, defense, unit administration, food service, supply, maintenance, and training of the company.
First Sergeant	E8	77F5M	Serves as principal enlisted assistant to the commander. Calls all formations, manages the command post, and represents the enlisted soldiers of the company. Oversees company-level administration. Advises the company commander on troop assignments, reassignments, promotions, and other personnel actions. Supervises replacement activities. Performs strength and personnel accounting. Prepares personnel reports.
Food Service Sergeant	E7	94B40	Supervises the cooks assigned to the company. Selects the field kitchen site. Enforces food service sanitation. Maintains food service records. Prepares the kitchen SOP. Is responsible for the maintenance of food service equipment.
First Cook	E6	94B30	Supervises the second-shift operations of the field kitchen. Inspects food storage and preparation. Monitors food

Table 3-1. TOE-prescribed personnel for the company headquarters (continued)

POSITION	GRADE	MOS	DUTIES
			service sanitation. Prepares the more complex menu items.
Cooks	E4 E3	94B10 94B10	Prepare, cook, and serve food according to recipes and field kitchen SOP. Clean the work area, equipment, and cooking utensils. Receive, inspect, and store food items. Perform preventive maintenance on kitchen equipment. One of the cooks drives the 2 1/2-ton truck assigned to the headquarters.
Supply Sergeant	E6	76Y30	Requests, receives, stores, safeguards, and issues supplies and equipment. Plans storage area layout. Maintains company records and hand receipts. Coordinates inventories of property book items and prepares adjustment reports. Supervises the armorer and the supply specialist.
Armorer	E4	76Y10	Performs small arms maintenance on all individual and crew-served weapons. Issues, inventories, and secures weapons and ammunition. Maintains the key control register for the weapons storage area. Turns in unserviceable weapons for repair. Prepares weapons and ammunition reports. Helps the supply sergeant request, receive, store, issue, and account for supplies and equipment. May serve as a vehicle driver.
Supply Specialist	E3	76Y10	Helps the supply sergeant perform supply duties. Prepares, consolidates, follows up, and cancels supply requests. Prepares hand receipt annexes. Posts transactions to record of demands. Maintains status cards and status files. Operates the 2 1/2-ton truck assigned to the headquarters.
NBC NCO	E6	54B30	Serves as primary advisor to commander on nuclear, biological, and chemical environmental considerations. Provides technical assistance for maintenance and operation of NBC equipment. Helps establish and operate a personnel decontamination station. Develops NBC defensive plans and decontamination procedures. Conducts and coordinates NBC

Table 3-1. TOE-prescribed personnel for the company headquarters (continued)

POSITION	GRADE	MOS	DUTIES
			training. Helps prepare and analyze NBC reports, records, maps, and sketches. Monitors individual and collective NBC defense training.
Unit Clerk	E5	75B20	Performs clerical administrative duties. Prepares SIDPERS change reports. Processes personnel actions and reports. Prepares duty roster reports. Completes standard forms. Maintains suspense files and personnel data cards. Types reports, orders, letters, and operating procedures. Posts and files correspondence, regulations, and changes to unit documents. Forwards S1 strength accounting and casualty reports. Responsible for other tasks described in FM 12-3-1.
Water Treatment Specialist	E3	77W10	Drives the 1/2-ton truck for the company commander. Performs vehicle maintenance and checks before, during, and after operation. Corrects or reports deficiencies. Ensures proper loading of vehicle. Operates radios and weapons installed on vehicle.

Section III
SUPPLY CONTROL SECTION

This section is for the water supply officer.

MISSI0N

The mission of the supply control section is to control company water supply activities. Your section ensures that the company follows directives received from the water supply battalion about the receipt, storage, and issue of water. Your personnel prepare plans and schedules for water that comes in and water that is sent out. Your personnel prepare and forward required reports to the battalion headquarters and to the company operating sections. They coordinate transportation for the delivery of water to the water points. They also establish and maintain water activity records.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-2 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

LAYOUT

Before your personnel set up operations, you should develop a layout plan and show it to them. On your plan, show the position of section equipment in a medium GP tent. Plan for an administrative and records control area, a communications area, and a water testing area. Include a copy of the layout in the supply control section of the

Table 3-2. TOE-prescribed personnel for the supply control section

POSITION	GRADE	MOS	DUTIES
Water Supply Officer	Lieutenant	92F00	Is principal assistant to commander and technical supervisor of company operations. Ensures all mission activities conform to policy. Advises company commander on operational matters. Takes charge during company commander's absence. Controls the receiving and issuing of water and maintaining of stock data. Is also the motor officer.
Water Treatment NCO	E5	77W20	Supervises the overall distribution mission of the company. Sets policies for operating platoons. Assigns missions relative to water supply and distribution. Coordinates reports from platoon headquarters.
Combat Signaler Team Chief	E5	31K20	Supervises the overall installation and maintenance of the field wire communications system.
Water Treatment Specialist	E4	77W10	Maintains supply records. Submits water supply and distribution reports.
Wire Installer	E4	31K10	Installs and maintains the field wire communications system. Operates the company switchboards. Drives the 5/4-ton truck assigned to the section.
Tactical Telecommunications Center Operator	E4 E3	72E10 72E10	Installs, operates, and performs operator maintenance on company telecommunication equipment. Prepares, receives, decodes, encodes, stores, accounts for, distributes, and destroys messages. Maintains message reference files.
Clerk-Typist	E4	71L10	Prepares and types operational reports to be forwarded to higher headquarters. Operates and performs operator maintenance on office machines. Files regulations and correspondence. Performs messenger services.

company SOP. Alter the layout to include the use of any space available in permanent buildings.

OPERATIONS

The supply control section is the mission control element of the company. It supervises and directs the company water supply activities. It provides the necessary personnel to operate as the control element of unit mission activities.

Control

Your soldiers coordinate water support activities with the battalion headquarters and the operating platoons. They inform the battalion headquarters of company transportation needs. The battalion headquarters manages your water support assets. You receive water directives and documents from the battalion headquarters and submit reports to it.

Communication

Your section must establish and maintain wire net communications for the company. Your section is authorized communications equipment and telecommunications center operators and tactical wire operations specialists to operate and maintain the equipment.

Setup. Advance party personnel, including the tactical wire operations specialist, will have already laid and installed wire for telephones, switchboards, and teletypes according to the wire net diagram. Wire is the primary means of communications provided the company. The organic net provides telephones and switchboards for internal communications with higher, subordinate, and adjacent units. Teletypewriters and associated equipment allow quick and urgent transmission of communications. The teletypewriter also allows receipt of water requirements and the transmission of reports and advice to and from higher headquarters. Wire and radio net diagrams are shown in Figures 3-2 and 3-3.

Operation and maintenance. The water operations sergeant or an assistant should develop manning schedules to ensure adequate operation of communications equipment. Make sure that correct procedures are used and that all personnel follow COMSEC measures to prevent jamming, interference, and deception. Have supervisors make sure that equipment maintenance manuals are complete and up to date for all communications items.

Records

The water supply control specialist maintains water activity records in your section. Your section has records of all water stored in the operating sections of the company. They are filed in water point location sequence. Records show by location the total water storage capabilities, the total water on hand, the total water received, and the total water issued.

Daily reports. Have each of the water sections submit a daily report. Outline the procedures in your section SOP. Appendix A shows a suggested format for a daily report. Use these reports from the water sections to manage your water assets and to report the amount of water to higher headquarters.

DA Form 1717-R. You report the amount of water distributed to all units on a daily basis. Use DA Form 1717-R (Water Point Daily Distribution Summary) to do this. Appendix A has a sample of DA Form 1717-R. This form is also in FM 10-52, Appendix A.

Inventories

Make sure you inventory your water supplies periodically. Have your water treatment NCO coordinate all inventories. However, you are responsible for scheduling inventories and providing SOP directives for them for the operating sections.

Schedules. Schedule staggered cyclic inventories so that all supply sections will not be taking inventory at the same time. You must establish inventory dates and cutoff dates.

SOP. Prepare an SOP to be used in inventorying water. AR 710-2 and FM 38-741 have information for use in preparing the inventory SOP. They include preinventory procedures, duties of inventory personnel, preparation and processing of inventory adjustment documents, and actions after inventory. Once the SOP is set, issue a directive naming inventory team members. As a minimum, the SOP should cover the following:

- Receiving section cutoff time and date.
- Assignment and responsibilities of inventory count team personnel.
- Areas not inventoried.
- Assignment of inventory voucher numbers.
- Inventory records.
- Issue during inventory.
- Correction of water activity records.
- After-inventory actions.

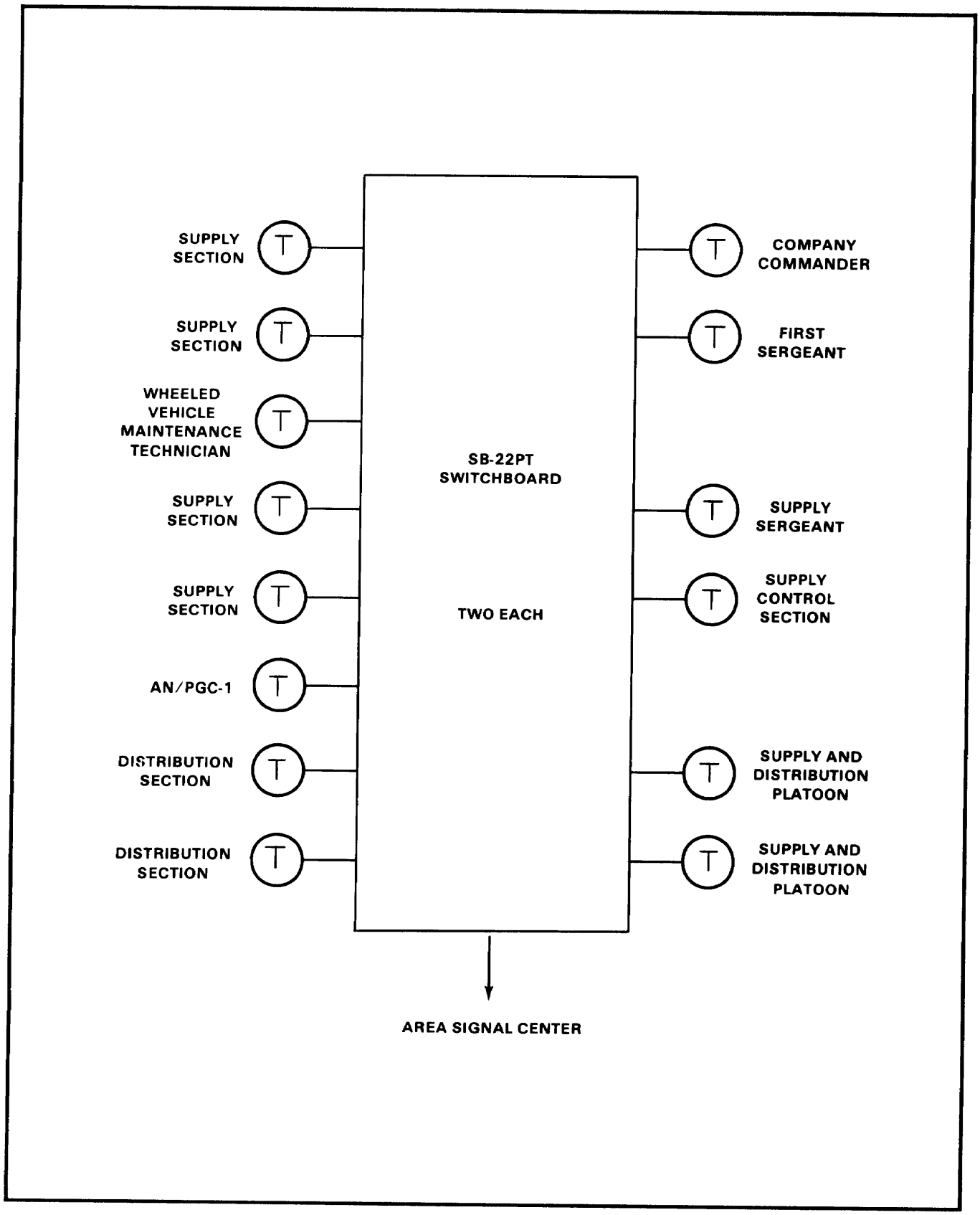


Figure 3-2. Wire net for water supply company

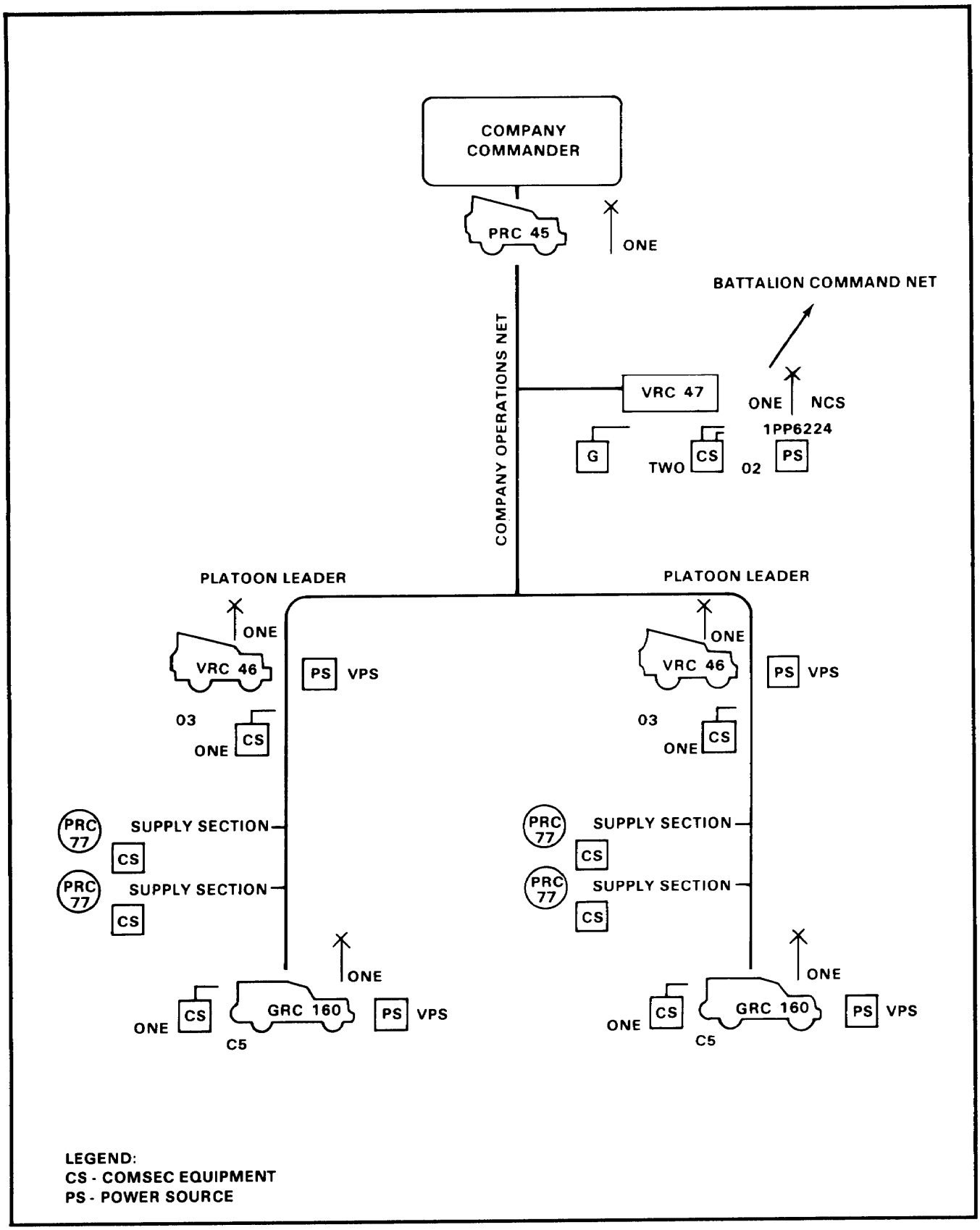


Figure 3-3. Proposed radio net for the water supply company

Procedures. The water treatment specialist is responsible for preparing inventory records and reports. When an inventory is completed, he will total the quantities held in different locations, compare inventories with the recorded balances on water activity forms, and submit the inventory total through the battalion to the supporting MMC or petroleum group.

Forecasts

Every 24 hours of operation, the water treatment specialists assigned to each of the two platoon headquarters will consolidate and forward to the supply control section the status reports received from each of its two supply sections. In turn, the water treatment specialist assigned to the supply control section will consolidate and forward to battalion headquarters the status reports received from each of the two platoon headquarters every 24 hours of operation. Water battalions will then submit status reports to their supporting MMC or petroleum group, which will in turn submit reports to the theater army MMC. Submission of status reports will depend on the theater situation and will be stated in directives, SOPs, or water distribution plans. Daily reports provide the company water supply officer a source from which to estimate receipts and issues for the next 24 hours of operation. They are of particular value when a company assumes the support of like units performing like missions. It is also from these estimates that the water supply officer forecasts estimates for transportation requirements. The daily status report is an informal report with no set format.

Transportation

The water supply company is authorized vehicles for internal movement only. In order to receive and issue water by truck, you must rely on semitrailer-mounted fabric tanks from the transportation medium truck company. Since both companies are attached to the water supply battalion, coordination will be through battalion headquarters. Exact procedures for requesting the semitrailers should be stated in both battalion and company SOPs. The water treatment supervisors plan work flow and sequence. They have the required personnel and equipment on hand for prompt loading and off-loading. Therefore, the water supply officer or his NCOs will need to inform platoon headquarters (and through the platoon headquarters a water treatment supervisor in the supply section or his assistant) of the—

- Quantity of water to be received or issued.
- Means of transport.
- Approximate time of arrival at the loading or off-loading site.

Quality Control

Quality control requires more than periodic testing. It also requires proper handling procedures during storage and during loading and unloading operations. Quality control is not only determining the quality of water but maintaining it so that the water is suitable for its intended use. The water treatment specialists in the supply and distribution platoon headquarters are responsible for quality control. However, you should continually check to make sure they are doing their jobs. Details on water quality are in FM 10-52, Chapter 1.

Section IV
SUPPLY AND DISTRIBUTION PLATOON HEADQUARTERS

This section is for the supply and distribution platoon leader.

MISSION

The company has two supply and distribution platoons. The mission of each supply and distribution platoon headquarters is to supervise and control platoon activities, reconnoiter and select operating sites, and perform quality surveillance.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-3 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

Table 3-3. TOE-prescribed personnel for the supply and distribution platoon headquarters

POSITION	GRADE	MOS	DUTIES
Platoon Leader	Lieutenant	92F00	Commands the platoon. Supervises and controls platoon operations. Reconnoiters sites, develops layout plans, and prepares contingency plans for demolition. Consolidates, prepares, and reviews technical, personnel, and administrative reports. Prepares the company SOP dealing with platoon operations. Advises the commander on the selection of an operating site. Prepares personnel and equipment for movement. Moves personnel and equipment to the operating site and directs its setting up.
Water Treatment Supervisor	E7	77W40	Assists the platoon leader. Is responsible for the consolidation of all reports prepared in the operating sections. Forwards statistical data to the company's operations section. Is responsible for the maintenance of platoon files. Notifies section chiefs of vehicle arrival time. Coordinates use of heavy construction and MHE in preparing sites and loading and off-loading equipment. Reviews equipment records and logs.
Water Treatment NCO (Quality Control)	E5	77W20	Performs required quality surveillance testing of potable water to ensure products are suitable for intended use. Coordinates with medical personnel for tests beyond the capabilities of units assigned testing equipment.
Water Treatment NCO (Supply and Distribution)	E5	77W20	Performs chemical and bacteriological tests necessary to ensure that the potable water issued and stored meets prescribed specifications for use. Drives the 3/4-ton vehicle and operates the radio mounted in it.
Construction Equipment Operator	E5	62E20	Operates the wheeled tractor with attachments to assist in setting up the TWDS.

Table 3-3. TOE-prescribed personnel for the supply and distribution platoon headquarters (continued)

POSITION	GRADE	MOS	DUTIES
MHE Operator	E3	77V10	Operates the 10,000-pound rough-terrain forklift trucks used in loading and unloading heavy equipment and supplies in support of platoon operations. Lays and retrieves hose line. Determines number of lines needed to lift load. Changes cable rigging. Supervises rigging of load. Maneuvers boom to lift, load, and off-load equipment.
Water Treatment Specialists (Supply and Distribution)	E4 E3	77W10 77W10	Drive the four 5-ton tractors with attached 12-ton semitrailers and the four 5-ton cargo trucks used to deploy and retrieve the TWDS and the 50,000-gallon collapsible storage tanks. When the TWDS is deployed, these specialists will assist in its operation under the supervision of the platoon leader.
Water Treatment Specialists (Supply Control)	E4 E3	77W10 77W10	Maintain all supply and distribution records for the platoon. Submit reports to the supply control section as required.

This paragraph implements STANAG 2885 (Edition One).

LAYOUT

After a general operating area for the company is designated by battalion headquarters, your company commander may ask you to assist in reconnaissance of the area to determine the best location for your platoon. Once the site has been selected, you and your personnel must establish operating areas for all elements of the platoon. It is your responsibility to develop a layout plan. Some important points to consider in establishing your operating areas and setting up your equipment are given in Table 3-4. Site requirements for water points are presented in STANAG 2885.

According to the STANAG, the site should meet the following requirements or be capable of development to these:

- Easy and short access to and from a main route. One-way traffic past the water point.
- Waiting area for vehicles near the entrance to the water point, preferably with natural cover.
- A double width road opposite the filling points so that the vehicle being filled does not block the circuit.
- Well-drained hardstandings at the stand pipes.
- Ground with good, natural drainage, if possible at a sufficient slope to enable deliveries to be made by gravity from tanks to vehicles and from sedimentation tanks to sterilizing tanks if both are being used. The site should

include even and nearly level spots where tanks can be erected without too much excavation. Where sites permit, pumping from the purification equipment to the vehicles thereby bypassing the requirement for storage tanks should be used if possible.

OPERATIONS

A major function of the platoon headquarters is to supervise and direct the overall operation of the platoon. You and your water treatment supervisor must assume these responsibilities. Some of these operations are described below.

Defense

Prepare your personnel to respond to ground and air attacks. Supervise the establishment of the unit defense while subordinate elements are preparing to occupy their designated areas.

Camouflage

Supervise camouflage activities once unit elements have established the defense and their operating sites. See FM 5-20, Chapter 8, for details about camouflage activities.

Capabilities

Make sure the necessary supplies are available to get the job done. Brief the company commander on the overall capability of the platoon. You should emphasize personnel strength and equipment availability.

Sanitation

Ensure that proper sanitation procedures are followed and that field sanitation standards comply with Army regulations and policies. For more information on field sanitation operations, refer to FM 21-10 and AR 40-5, Chapter 7.

Coordination

Once the supply platoon is operational, the platoon headquarters must coordinate and monitor operations performed by platoon personnel. To do this, you and your water treatment supervisor must—

- Assign tasks to the sections as required.
- Coordinate activities with supported units to ensure that the mission is accomplished and correct procedures are used.
- Ensure that plans and operations are carried out according to correct operating procedures.

Reports

Water point personnel submit daily reports to platoon headquarters on water distribution to using units. They use DA Form 1714-R (Daily Water Distribution Log) for this purpose. Headquarters personnel then consolidate the DA Forms 1714-R and submit a DA Form 1717-R to the supply control section. This summary should be analyzed to detect any unusual consumption of water by using units. DA Form 1715-R (Water Point Inspection Report) is completed regularly by representatives of the command surgeon who check the chlorine and bacteria content of the water and the sanitation of the water point. Appendix A shows samples of these forms. Blank forms suitable for reproduction are in FM 10-52. Reproduction of the forms on 8 1/2- by 1l-inch paper is authorized. Each reproduction must include the form number, the form title, and the

Table 3-4. Layout considerations

- Are all spillage areas, especially the loading area, well-drained?
- Can all tanks and equipment be leveled?
- Is there enough storage tank area to handle peak loads?
- Can the water be distributed safely and quickly?
- Can the water point be well camouflaged?
- Is the bivouac area adequate for personnel?
- Can the latrine be located at least 100 yards downstream from the water point?
- Are there shelters for protection against nuclear weapons?
- Are there chemical-resistant covers for the water containers?

date of the form. The forms are designed to coordinate the operation of widely separated water points. They also help to safeguard water quality, improve efficiency of water treatment, and decrease equipment maintenance. The forms furnish supply data for higher headquarters.

Supply control section personnel must review all forms, reports, and records for conflicting information, omissions, and other errors. They must correct all errors, distribute documents according to FM 10-52, and maintain records according to AR 340 series and local requirements.

Section V
SUPPLY SECTION

This section is for the water treatment supervisor.

MISSION

Each supply and distribution platoon has two supply sections. Each supply section can store up to 400,000 gallons of potable water at up to four locations. (Thus, total storage capacity of the company is 1,600,000 gallons.) Each section can store part of the command water reserve stock (maximum 400,000 gallons) and operate a direct support issue point.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-5 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

STORAGE FACILITIES

Your section's duties in water supply operations include using the collapsible bulk water storage tanks and storing part of the command water reserve stock. Storage facilities should be large enough to meet daily peak demands. This will eliminate long waits at the water point by consumers. The 50,000-gallon collapsible tank is the standard tank available. The tanks are filled with

Table 3-5. TOE-prescribed personnel for the supply section

POSITION	GRADE	MOS	DUTIES
Water Treatment Supervisor	E7	77W40	Supervises and controls supply section operations and personnel. Supervises and assists in the installation, operation, and maintenance of water storage facilities. Operates the section's radios.
Assistant Water Treatment Supervisor	E6	77W30	Assists the water treatment supervisor. Supervises second-shift operations within the section.
Water Treatment Specialists	E4 E3	77W10 77W10	Install, operate, and perform operator maintenance on the water storage and distribution system. Operate vehicles assigned to section.
Water Treatment NCO	E5	77W20	Installs, operates, and performs operator maintenance on the water storage and distribution system.

chlorinated water. Water is rechlorinated when water is pumped from the tanks. Other storage considerations are described below.

Drainage

If drainage at storage and distribution sites is poor, several problems can occur. Leaks and spills from tanks, trucks, treatment units, and distribution systems may keep the area wet and muddy. Vehicles may get stuck in the mud. Standing water increases the risk of disease by providing breeding sites for mosquitoes and other insects. During cold weather, water may freeze and cause a safety hazard. Avoid these problems by planning for good drainage at each site. Be sure drainage is directed downstream from the water point.

Traffic

There will be many vehicles coming to and going from the water point. Provisions must be made for this traffic. For more details, see FM 10-52.

WATER STORAGE AND DISTRIBUTION SYSTEM

The 800,000-gallon water storage and distribution system consists of the equipment listed in Table 3-6. The manner in which you lay out this equipment will be largely determined by the terrain and the mission. The company SOP and AMTP should provide plans on how the system should be used. A suggested layout is in Figure 3-4. This is not the only possible arrangement. Any unit that can operate this distribution system can develop an arrangement to fit unit needs. Equipment should be dispersed but not so much that it is difficult to protect against terrorism and sabotage. The most serious threat you will face will not be having your site destroyed by fire or attack, but by having an infiltrator poison your water. For more details on the 800,000-gallon water storage and distribution system, see TM 5-4320-228-13&P.

50,000-Gallon Collapsible Tank

The 50,000-gallon collapsible tank is part of the system. It has a hose and valve assembly to help transfer water. This assembly consists of a 4-inch, wire-reinforced hose assembly (10 feet long) and a 4-inch gate valve. The female end of the 4-inch hose assembly is connected to the 4-inch elbow fitting of the filler/discharge assembly on the tank. The male end of the hose assembly is coupled to the 4-inch gate valve. The 50,000-gallon collapsible tank is used to store potable water. Tanks can be grouped in modular units or deployed separately, depending on the terrain. The site is prepared by an engineer unit using scoop loaders or by civilian labor or your personnel using a front loader or backhoe. The site should be sloped 3 to 6 inches toward both the fill port and manifold end of each collapsible tank. Do not setup the tank on an incline. If you do, the tank will start to roll

Table 3-6. 800,000-gallon water storage and distribution system equipment

NOMENCLATURE	QUANTITY
Spare Parts Kit	1
Hypochlorination Unit	2
125-GPM Pump	2
350-GPM Pump	2
50,000-Gallon Collapsible Fabric Tank	16
Connection Kit: Hose Nozzle	4
Connection Kit: Loading Standard	8
Connection Kit: 125-GPM Pump	2
Connection Kit: 350-GPM Pump	2
Interconnection Kit: 4-Inch-Diameter Discharge Hose	2
Connection Kit: 50,000-Gallon Tanks	8

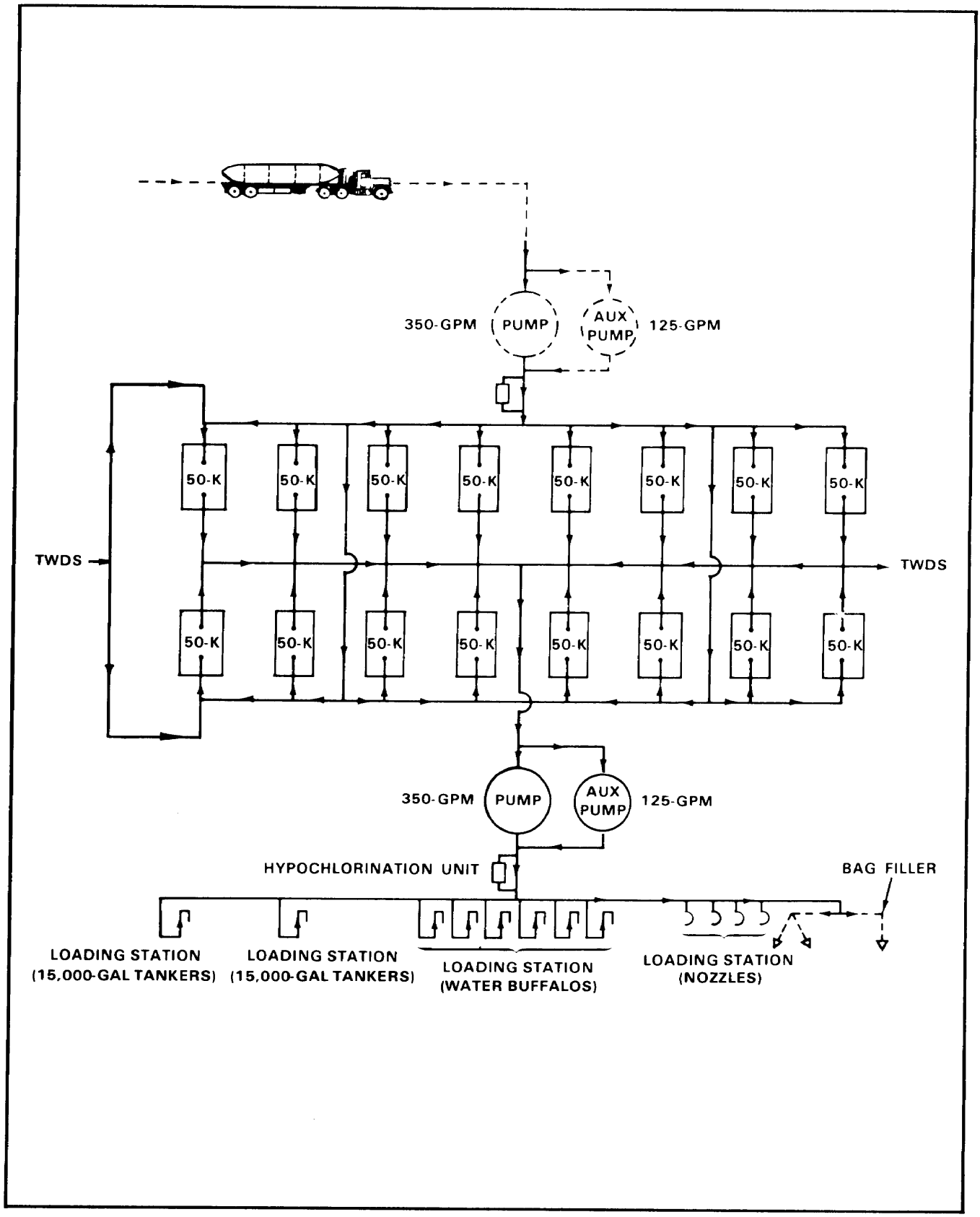


Figure 3-4. Suggested layout for the 800,000-gallon storage and distribution system

when you fill it. If that happens, the only thing you can do is get out of its way. Setup two posts, one on each side of the tank, and run a string from one post to the other. The string should be 5 feet 8 inches from the ground. Do not fill the tank above this line or it will burst. Before moving from one place to another, empty the tanks. For more details on the tank, see TM 5-5430-210-12.

Hypochlorination Unit

The hypochlorination unit chlorinates water automatically before it is distributed. Chlorination destroys bacteriological contaminants. However, it does not neutralize chemical or mineral contaminants. Make sure that periodic bacteriological or chlorine residual tests are performed to monitor water quality. Acceptable levels of chlorine residual will be set by the theater or corps surgeon. Automatic operation of the hypochlorination unit ensures that during periods of changing flow, each gallon of water will receive the same amount of chlorine. This automatic operation is achieved by linking the operation of a water meter through a pilot valve to a hydraulically controlled hypochlorinator. This regulates the amount of chlorine injected into the water passing through the unit. As the flow of water through the meter changes, the amount of chlorine injected into the water also changes. The hypochlorination unit has a pressure-regulating valve that maintains a pressure of at least 10 psi. This ensures proper operation of the hypochlorinator. The unit can automatically treat from 2 to 400 gallons of water per minute. A range-adjusting valve is attached to establish maximum accuracy. The range-adjusting valve should be installed at its maximum setting of 400 GPM and then turned down depending on results of tests for chlorine residual. The hypochlorination unit is skid-mounted and portable. It can be manhandled into position by three soldiers. Quick-disconnect coupling valves enable hookup to the hose network.

350-GPM Pump

This pump draws water from the 50,000-gallon collapsible tanks and pumps it through the hypochlorination unit to the loading stations. If maximum RPM are not exceeded, the unit can be operated indefinitely. The unit does not have the ground rod and cable like the 350-GPM petroleum pump. The assembly should be pulled by a vehicle only when making short positioning moves in the immediate area. It is not designed to be towed in a convoy or on a cross-country move. For such a move, a 5-ton cargo truck or a flatbed trailer must be used. A forklift is needed to load and off-load the assembly. For more on the 350-GPM pump, see TM 5-4320-226-14 and FMs 10-20 and 10-69.

125-GPM Pump

This pump serves as an auxiliary to the 350-GPM pump. The pump is driven by a 3-horsepower engine. At an engine speed of 3,600 RPM, the pump delivers 125 gallons of water per minute against a head or elevation gain of 50 feet. The pump is portable and skid-mounted. It can be moved over short distances manually by lifting the ends of the pump frame. See TM 5-4320-208 - 12&P for more on the operation of this pump.

Section VI
DISTRIBUTION SECTION

This section is for the distribution section chief.

MISSION

The mission of the distribution section is to lay, operate, and retrieve 10 miles of collapsible hose line. This hose line is part of a TWDS. Each section also operates the water distribution points along the TWDS.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-7 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties.

OPERATIONS

Your section provides GS water transfer between storage facilities and operates up to two DS water points along the TWDS. In an arid or a hot region, the lack of fresh surface water and increased water use put great demands on the distribution

Table 3-7. TOE-prescribed personnel for the distribution section

POSITION	GRADE	MOS	DUTIES
Petroleum Operations Sergeant	E7	* 77F40	Supervises and controls distribution section operations and personnel. Supervises and assists in the installation, operation, and maintenance of the TWDS.
Pump Station Foreman	E6	* 77F30	Assists the petroleum operations sergeant. Supervises second-shift operations within the section.
Pump Station Operators	E5 E4	* 77F20 77F10	Lay, operate, and retrieve hose line. Patrol the hose line and make repairs. Act as security for the hose line and pump stations. Operate the 5/4- and 5-ton trucks assigned to the section.
Pump Operators	E3	* 77F10	Install, operate, and perform operator maintenance on all water-related equipment within the pump station and the TWDS. Keep receipt and issue documentation for the potable water pumped to and received from supported units.
Tank Attendants	E3	* 77F10	Are responsible for receiving, storing, and accounting for potable water and its dispensing to supported units.

*The MOS designation of distribution section personnel is scheduled to change to 77W in the near future. Action has been taken to change the Consolidated TOE Update and AR 611-201 accordingly. After the change is effected, enlisted personnel who purify, distribute, or store water; supervise these operations; or prepare related plans and reports will have the 77W MOS designation up to skill level 40.

system. If threat forces are able to disrupt water distribution operations, they may be able to significantly affect future operations. The distribution of water has to be closely controlled. Do this by scheduling. In order to set up the distribution schedule, you and the operations officer at the water supply branch of the water supply battalion need to work together. To plan your distribution, you need the name and location of units to be supported as well as the amount of water required. After you have this information, plan on how to get the water to the customer.

TACTICAL WATER DISTRIBUTION SYSTEM

The TWDS is a 10-mile segment of hose line, storage assemblies, pumping stations, and distribution units used to transport and distribute potable water throughout the theater of operations. One TWDS can be joined to others to extend distribution capabilities. Your company has two TWDSs. However, your company can be augmented by as many as six TWDS teams. When the system is fully augmented, you can operate the system up to 80 miles. The TWDS has four equipment groups. They are shown in Figure 3-5. The TWDS is intended for use with potable water

only. If brackish or contaminated water gets into the TWDS, it will contaminate the system. At full performance, the TWDS can move 600,000 gallons of water per day. This is the same as 10 trips of 10 tank trucks in the same period. A typical TWDS installation is shown in Figure 3-6. The two storage assemblies, the two distribution points, and the pressure-reducing valve may not be needed. Do not use the TWDS at temperatures below freezing. To do so will darnage the TWDS. The TWDS can be unpacked, set up, and operating within 48 hours after delivery to the deployment site. Details on the TWDS are in TM 5-4320-303-10.

TWDS SITE SELECTION

Before installing the TWDS, study the terrain. Examine and compare charts, contour maps, and photographs. Determine the general route for the TWDS hose line. The general locations of the

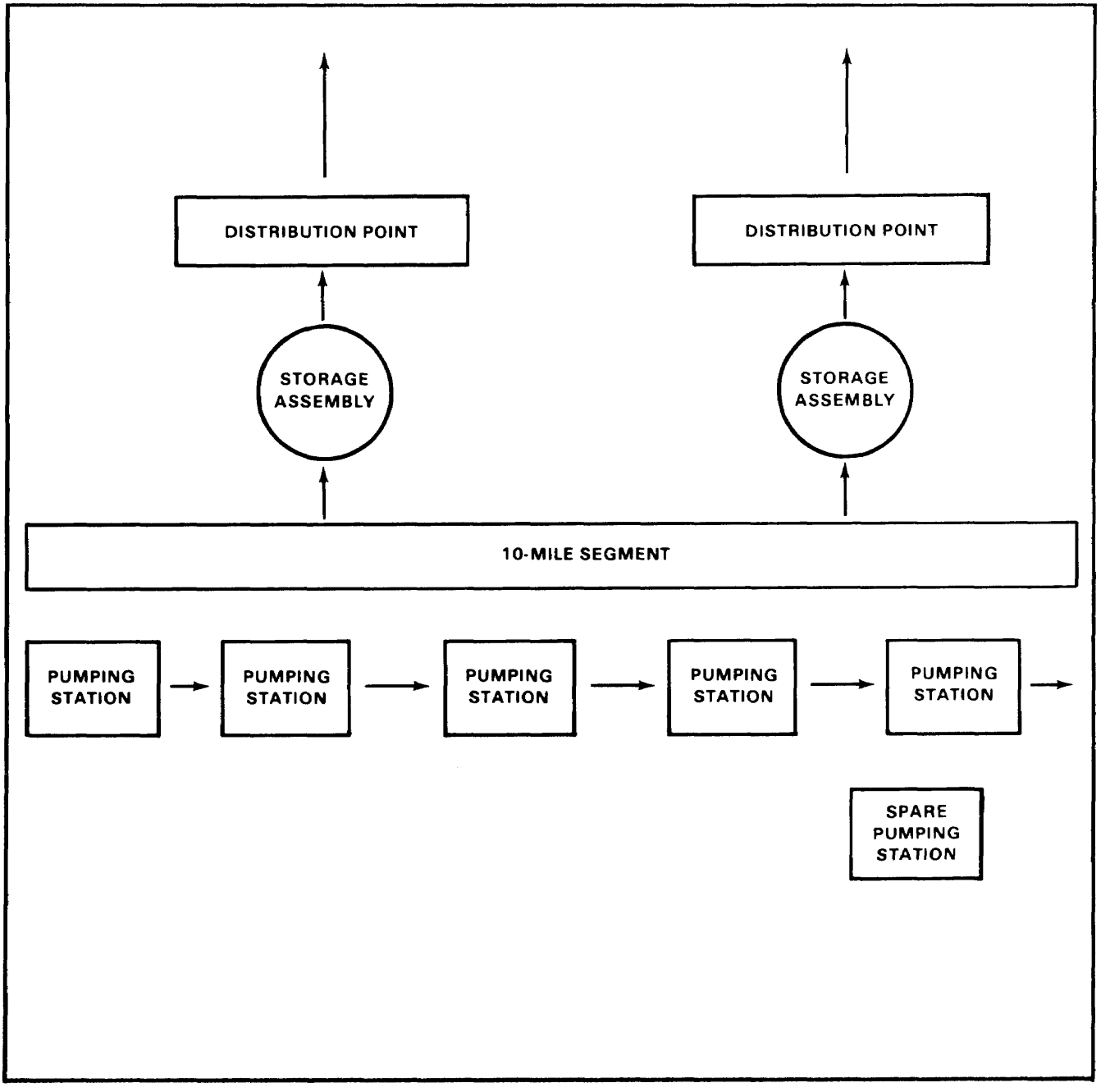


Figure 3-5. TWDS equipment groups

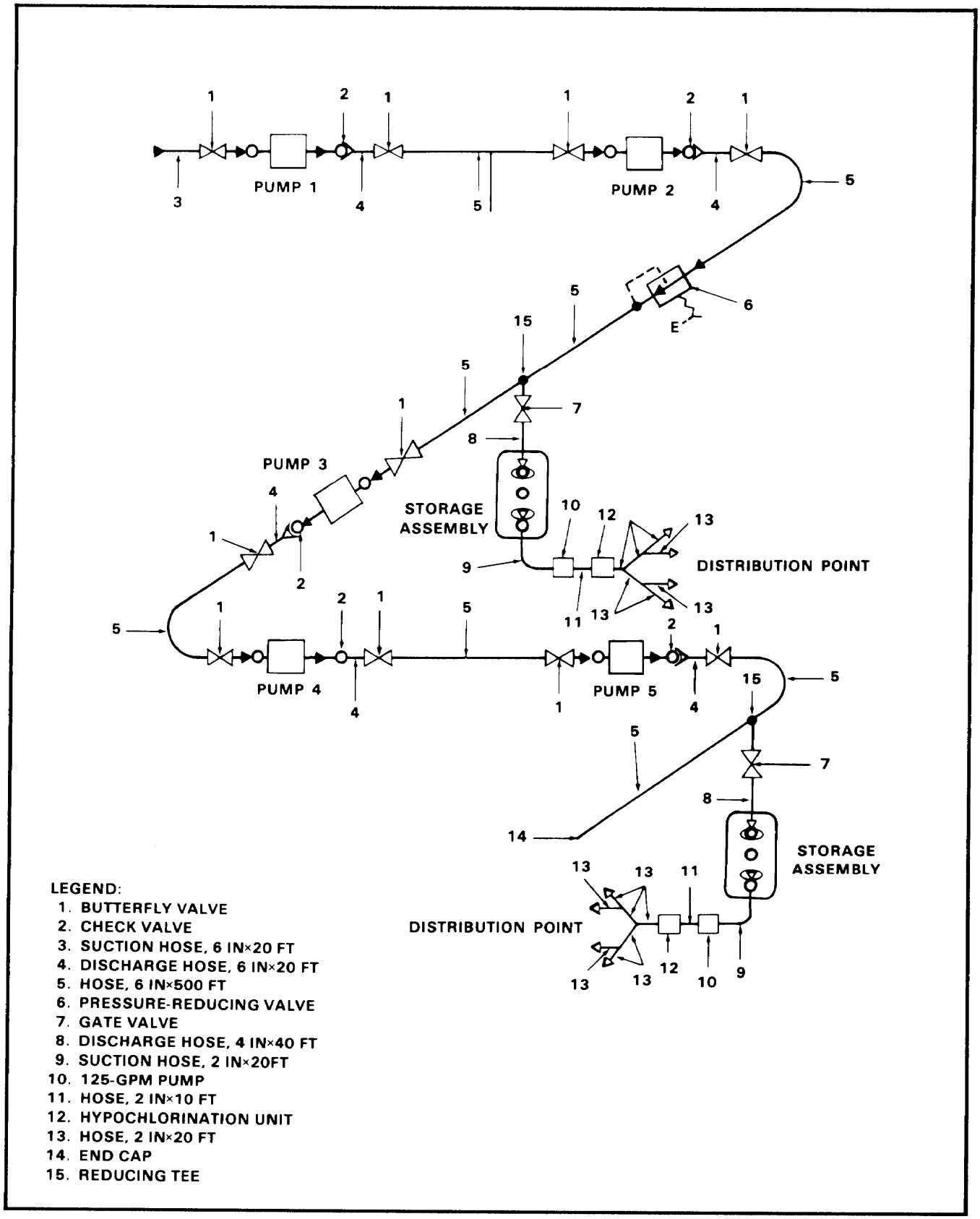


Figure 3-6. Typical TWDS installation schematic

pumping stations will be determined by the terrain. Establish the distribution points where the hose line passes through areas of large troop concentrations. Take full advantage of natural cover and the most level and accessible route. As a rule, plan the route near and parallel to a road. This will ease the job of transportation, assembly, inspection, operation, and maintenance. Plan to have enough crossing guards to protect the hose line where vehicles must cross it. Avoid routes along stream banks or through ponds or marshes. Floods could disrupt the hose line or make maintenance difficult. Lay out the hose line on firm, dry, level ground beyond any drainage ditches and parallel to a roadway. Do not lay the hose line on areas of exposed rock. The abrasive effect of rubbing against rocks will cause hose line damage and possible failure. Select a route based on the considerations in Table 3-8.

TWDS INSTALLATION

Install the pumping stations before you lay the hose line. The distribution points and the storage assemblies have to be installed in conjunction with each other.

Pumping Stations

After determining the best route for the hose line, determine the sites for the pumping stations. The first, or lead pumping station, should be located as near to the water source as possible. The site selected should be level with good drainage. You should take advantage of natural camouflage. The time required for site preparation will depend on terrain, the expected duration of the operation, the expected enemy action, and the time and equipment available. At a minimum, the pumping stations require a reasonably level location on firm soil with good drainage. The boost pumping

Table 3-8. Route and site selection considerations

- Requirements to be met by the TWDS (transferring, storing, or dispensing water).
- Whether the system will operate as part of a larger system or as an independent unit.
- The length of time the TWDS is expected to operate.
- Distances and elevation differences along the TWDS route.
- Route should have few obstacles or obstructions.
- Route should follow an existing roadway to speed up laying, operating, and securing hose line.
- Route should be parallel to a secondary, all-weather road (not a heavily traveled road).
- Cross-country cutoffs may be used if existing roadway bends a great deal.
- Route should be accessible to vehicles needed to lay out the hose line if no roadway is suitable.
- Locate the junction of two hose line lengths at the installation site of booster pumping stations and storage assemblies.
- Take advantage of natural cover, such as fence lines, woods, and hedges.
- Do not route hose line through marshes, swamps, water courses, or land subject to periodic flooding.
- Do not route the hose line through densely populated areas.
- Disturb the natural cover as little as possible.
- Do no leveling or grading.

stations are intended to be spaced at approximately 2-mile intervals along the hose line route. This spacing is adequate if the hose line route is reasonably direct and the terrain covered is level or gradually rolling with an elevation gain of no more than 50 feet from one pumping station to the next. If there is a hill higher than 100 feet or if the next pumping station is more than 50 feet higher than the previous pumping station, the spacing between pumping stations must be shortened. Also, you may have to install one or more pressure-reducing valves. A graphical method of locating pump stations and pressure-reducing valves is explained in TM 5-4320-303-10.

Pressure-Reducing Valve

The TWDS includes a pressure-reducing valve. The valve is for use if the hose line route includes a hill with a descent that causes buildup of excessive pressure (greater than 150 psi working pressure) at the bottom of the hill or if there is an elevation loss of more than 75 feet from one pumping station to the next. The pressure-reducing valve protects the hose line and fittings from excessive pressure that could rupture components. It also protects the pumping stations from receiving a suction pressure greater than 120 psi. If water with a pressure greater than 120 psi arrives at the suction port of a boost pumping station, the station will automatically begin to slow down to maintain a discharge pressure of 150 psi. The TWDS pumping stations are designed to run at normal operating speed. Slower speeds are less efficient. To determine whether you need to install a pressure-reducing valve and where to install it, do the calculations in TM 5-4320-303-10.

Other Components

Once the locations for the pumping stations have been determined, the trailer-mounted pumps can be installed. See TM 5-4320-303-10 for installation procedures. The TWDS includes two storage assemblies. They may not be required depending on the TWDS mission. If there is a requirement to use one or both of the storage assemblies, they can be located at any suitable site along the hose line route. See TM 5-4320-303-10 for points to consider in site selection and for preparation procedures. Distribution points may not be required. Distribution points, if required, must be used in conjunction with a storage assembly. The distribution point components should be unpacked where they will be used. The distribution point components include one 125-GPM pump. The pump should be unpacked only if required and then only at the distribution point site.

10-Mile Segment

The 10-mile segment includes all other components necessary to install and operate the TWDS. This equipment group includes 500-foot lengths of hose line (in flaking boxes), a sling assembly, suspension kits, roadway crossing guards, pressure-reducing valve, suction hose assemblies, and miscellaneous fittings. This group also includes the displacement and evacuation kit, a packing kit, a repair kit, and the spare parts crate for the TWDS. The best way to unpack and install the 10-mile segment is to use the area around the lead pumping station site as the staging area for the unpacking operation. Components that need not be installed to operate the TWDS and all crating materials should be retained here. The hose line is let out from the rear of a moving truck and then physically moved to a position 5 to 10 feet from the road. No more than four flaking boxes (2,000 feet of hose line) can be loaded onto a 2 l/2-ton flatbed truck. Flatbed semitrailers may also be used. Up to 16 flaking boxes (1.5 miles) stacked four high can be loaded on the semitrailer. The hose line is deployed from the side of the vehicle. The 500-foot lengths of hose line are connected using victaulic couplings on the leading end of the hose line lengths. At all other connections, a swivel joint must be installed. To install the swivel joints, use the victaulic coupling on the leading end of the hose line length and an additional victaulic coupling to connect the swivel joint to the trailing end of the next hose line length. Make sure no dirt or other debris is in the hose sections or couplings. Any bends or kinks in the hose line must be straightened. The recommended speed for laying hose is about 3 miles per hour. Speed will vary depending upon the terrain, available personnel, and how far hose must be moved. The hose must not be left exposed on any roadway or track which will be traveled by other vehicles. Due to its lightweight, thin-wall construction, the hose line is easily damaged by rough handling, abuse, or abrasive contact with rocks. Table 3-9 lists personnel and equipment requirements for laying or retrieving hose line.

Roadway Crossing Guards

Sometimes the hose line must be laid across a roadway or railroad. The hose should be laid

Table 3-9. Requirements for laying or retrieving hose line

TASK	PERSONNEL, EQUIPMENT, OR TIME
Laying hose	10 soldiers and 2 trucks
Retrieving/repacking hose	14 soldiers and 2 trucks
Installing 5-foot roadway crossing guard	5 man-hours
Repositioning hose 5 to 10 feet from drop point to suitable position	8 man-hours per mile
Sustaining rate of laying hose equal to filling rate	50 soldiers and 10 trucks
Retrieving hose	18 man-hours per mile

under an existing bridge or through an existing culvert. The leading end of the hose may be pulled through the culvert with a rope. If no bridge or culvert is usable, roadway crossings may be constructed using the roadway crossing guards provided. The hose line must never be buried unprotected. The weight of the fill would collapse the hose, and any sharp rocks in contact with the hose would cause a puncture. A plank should be nailed to the bottom of the guard for greater hose protection. It may be necessary to lay the hose under a railroad bed. Dig a tunnel beneath the gravel of the railbed, and nail a plank to the bottom of the guard. Do not lay the hose directly in the trench or railbed. The shifting gravel will gradually damage the hose. Install the roadway crossing guards as shown in Figure 3-7.

Suspension Kits

Aerial suspensions are the most effective and readily installed means of crossing streams and deep gaps. The displacement ball must be able to move freely through the hose line. For wide crossings, a suspension bridge should be built to provide a flat floor which will support the entire hose line length and to eliminate bends which would occur if suspension cables were used. If an actively used bridge is available, the hose line may be installed on it. Before you do so, check with the engineers to ensure the bridge is capable of supporting the hose line and its contents. The hose line should be secured outside the bridge structure. Crossings must be above flood stage. Each hose line suspension kit provides materiel for one 300-foot-wide crossing or two shorter crossings. Additional materials for the construction of suspension bridges, such as timber, bolts, and nails, are not included in the kit. They must be obtained locally.

TWDS OPERATION

Do not completely install the TWDS before you begin to operate it. Instead, fill and purge the hose line so that you can begin to distribute water as soon as possible. This will anchor the line and also help you to detect flaws in the system. The line must be anchored immediately because high winds will blow it about.

Pumping Stations

When you start the TWDS, make sure that operators at the pumping stations and storage assemblies can communicate with each other and the crews laying the hose line. Have operators monitor the advance of the water column. They should report anything unusual or problems as soon as they occur. Have operators monitor the suction and discharge pressures at the pumps. Report low suction or high discharge pressure. Correct problems at once. Make sure anyone who is within 21 feet of an operating pump wears hearing protection. Table 3-10 has tips for operating the pumps in unusual conditions.

Storage Assemblies

The 20,000-gallon collapsible tank (Figure 3-8) is the standard storage tank. Have storage assembly operators announce the start and end of tank-filling operations. They should tell the pumping station operators when a tank is filled. Pumping station operators can expect a reduction in hose line pressure. Care should be taken not to fill

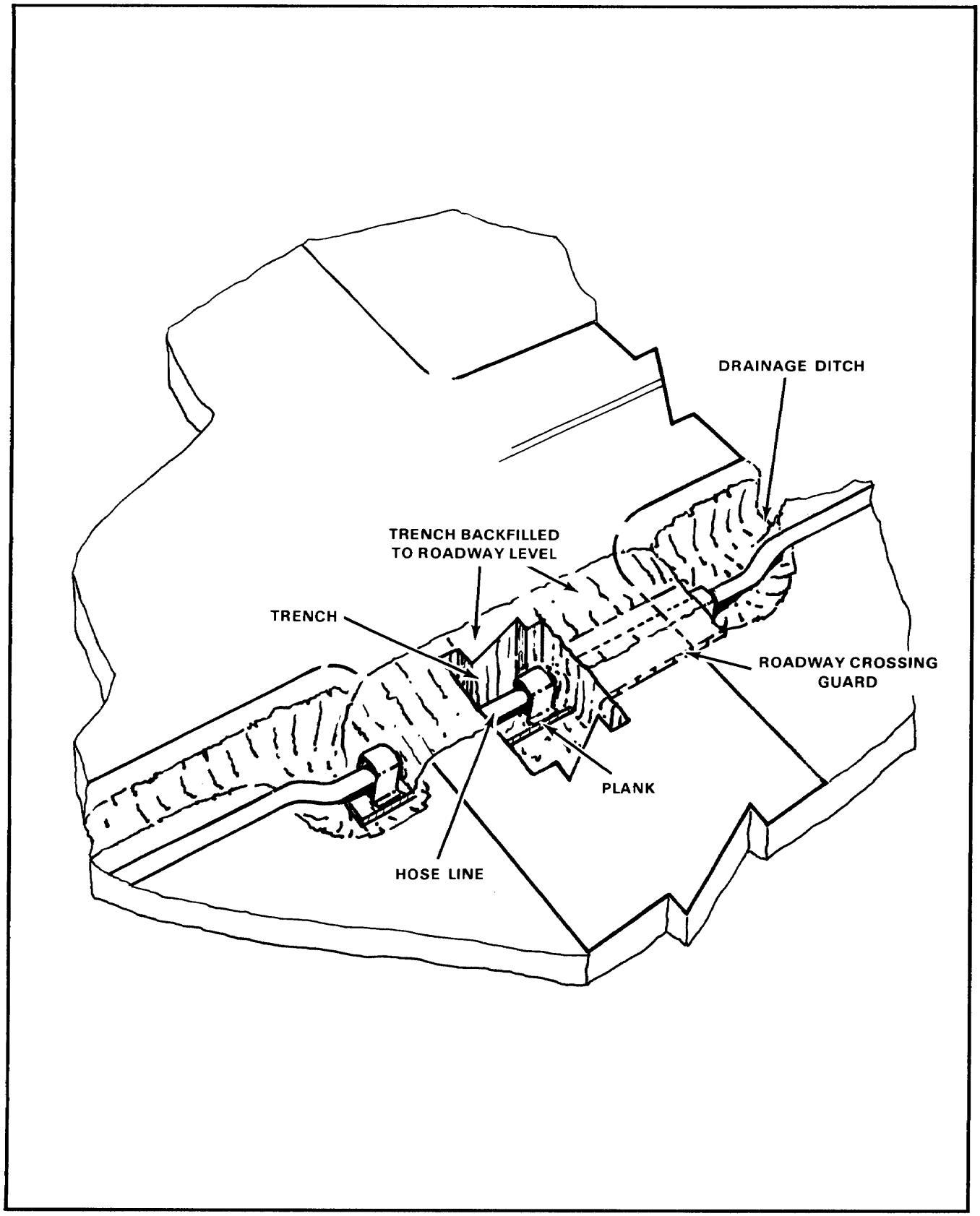


Figure 3-7. Roadway crossing guard

Table 3-10. Pump operations in unusual conditions

CONDITION	PRECAUTION
Freezing temperatures	Keep snow, ice, and moisture away from the fuel tank. Keep the filler cap shut tight. Keep the fuel tank as full as possible. If the pump stops, drain all the water from the pump housing.
Extreme heat	Give the pump enough ventilation. Make sure the coolant is in good condition and at the proper level. Use the correct lubricant for the expected temperature. Fill the fuel tank at the end of each day's operation.
Dusty or sandy conditions	Protect the pump from sand or dust as much as you can. Service the air cleaner often. Keep the carburetor breather cap clean. Keep stores of fuel and oil tightly closed.
Saltwater area	Remove rust and paint from exposed areas. Coat machine surfaces with a film of oil. Check electrical contacts daily for corrosion.

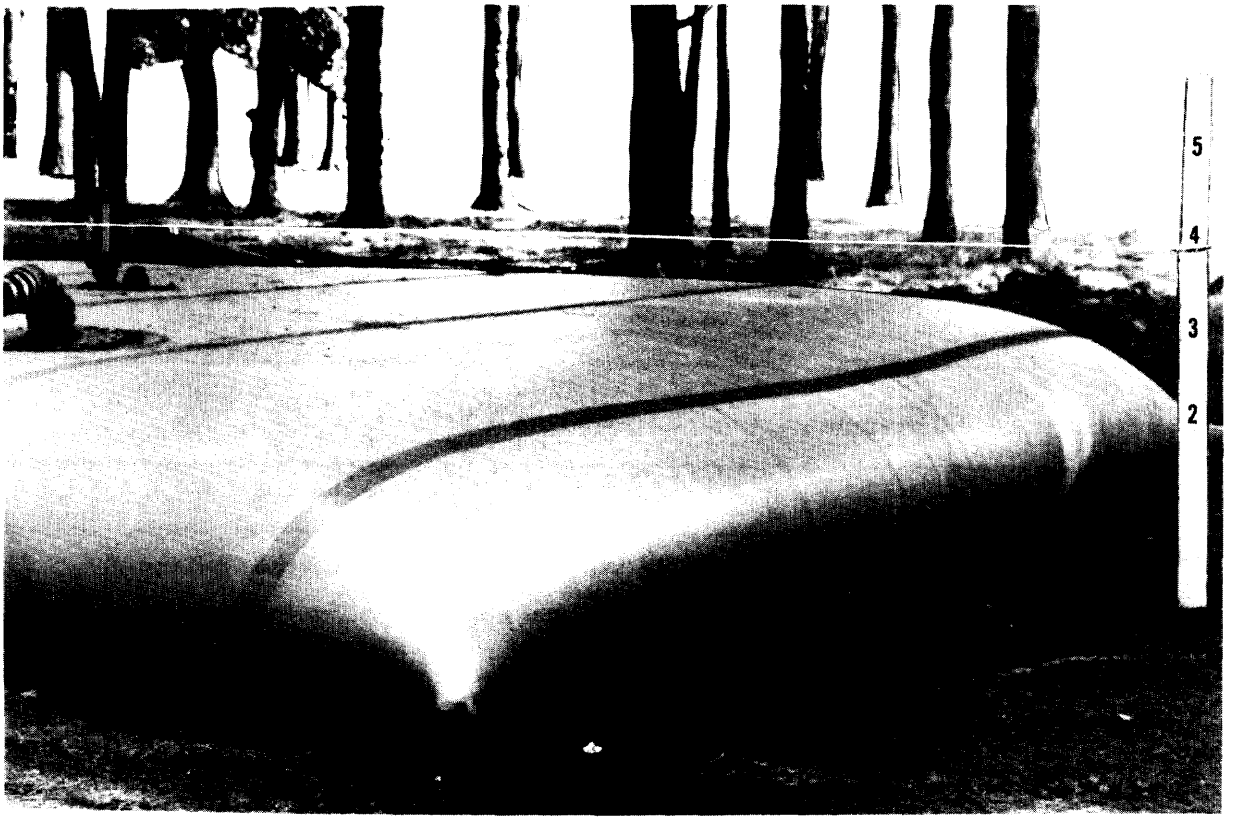


Figure 3-8. 20,000-gallon collapsible tank

storage tanks at a rate that will cause downline pumping stations to reduce speed. Table 3-11 has precautions to be followed when operating under unusual conditions.

Distribution Points

Make sure the water goes through the hypochlorination unit before it goes through the branching hose network. The major components of the distribution point are the 125-GPM pump, the hypochlorination unit, and the color comparator. Table 3-12 has some tips for operating them in unusual conditions.

10-Mile Segment

The most important part of operating the 10-mile hose line is to keep downstream hose line pressure under 155 psi and pressure at the next pumping station between 20 and 120 psi. The best way to do this is to adjust the pressure-reducing valve so that the outlet pressure is as high as possible without danger of exceeding the upper pressure limits. Once the valve is adjusted properly, it will automatically control the downstream pressure regardless of inlet pressure or changing flow rates. There are some precautions you should take in unusual situations. When operating at freezing temperatures, protect the unit from rain, snow, and moisture. This will help to prevent couplings, stopcocks, and adjustments from freezing. If the pumps stop, disconnect the valve from the hose line and drain all water. When operating in extreme heat, cover the unit to shade it from the sun. When operating near salt water, remove any rust or aluminum oxide formations and paint the exposed surface. Protect machine surfaces with a film of oil. Avoid removing the anodized coating from aluminum fittings.

Table 3-11. Precautions for using the 20,000-gallon tank under unusual conditions

CONDITION	PRECAUTION
Cold Weather	Use the tank as long as the contents do not freeze. DO NOT handle the tank at temperatures below -25°F.
Extreme Heat	Place the tank in the shade or cover it. The covering should be supported above the tank so that air may circulate freely.
High Winds	Use stakes to anchor the guy ropes over the tanks.

Table 3-12. Precautions for operating distribution point components

COMPONENT	PRECAUTIONS
125-GPM Pump	See TM 5-4320-208-12&P, Chapter 2, Section V.
Hypochlorination Unit	Protect from freezing at cold temperatures. If operation is stopped, drain all water and chlorine. In sandy or dusty conditions, protect the unit from sand.
Color Comparator	Do not let sand or grit get into the chlorine solution. Protect the color comparator solution and water in the sample from freezing.

TWDS MAINTENANCE

Make sure the TWDS is regularly and systematically inspected. Note defects discovered during operation. Have them corrected as soon as operations stop. If you find a defect which would damage equipment during continued operations, stop operations at once. Inspect the system daily for leaks while it is operating. Leaks are caused by improper installation, faulty gaskets, damaged sealing surfaces, and defective hoses or fittings. Before you try to repair a leak, isolate the leaking area. You can do this by installing hose clamps on either side of the leak or by closing an appropriate valve. If it will take a long time to repair a leak, you may have to stop operation of the TWDS. For example, if you have to replace a damaged section of the hose line, shut down the pumping stations until the repair is finished. This will prevent downline pumps from running dry, which could damage them. However, you can replace a faulty gasket or correct an improper installation while the TWDS operates. Connections should be inspected for improper installation before disconnection. Gaskets can deteriorate or become damaged through normal wear and tear. Fittings which include gaskets should be checked for serviceability. Nicks, dents, or burrs on the sealing surface of many parts can also cause leaks. Use emery paper or a file from the repair kit to smooth the sealing surface. Take care not to make any more scratches or marks while repairing the surface. If you cannot smooth the surface, replace the defective fitting or hose assembly. When repair is completed, remove the hose clamps or open the valves at once. Make sure the repair procedures have corrected the leak. Defective hoses or fittings on shorter hose assemblies that cause leaks must be replaced. Longer hose line lengths can be repaired by replacing defective fittings or by removing the damaged section of hose line and splicing the ends together.

Section VII
MAINTENANCE SECTION

This section is for the wheeled vehicle maintenance technician.

MISSION

The mission of the maintenance section is to provide the personnel and equipment to perform unit maintenance on equipment. This equipment includes vehicles, generators, MHE, TWDSs, 800,000-gallon water storage and distribution sets, pumps, and compressors.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 3-13 lists TOE-prescribed personnel of your section by position, grade, MOS, and duties. Supervisors are responsible for the maintenance of all assigned equipment. Table 3-14 identifies who is responsible for various pieces of equipment.

OPERATIONS

Maintenance operations are divided into three levels: unit, intermediate (direct and general support), and depot. (See AR 750-1, Chapter 4, for details.) Your section is responsible for unit maintenance. Your primary objective is to ensure mission capability of equipment. You must make sure PMCS is performed regularly. At times your maintenance capabilities may be limited due to lack of time, tools, and repair parts. Maintenance your section cannot perform is done by a support activity through higher headquarters. For information on effective maintenance management, see DA Pamphlets 738-750 and 750-1 and FM 29-2.

SETUP AND CLOSEDOWN

Field situations seldom allow you to operate under ideal conditions. However, the areas selected for maintenance must be centrally located, be on or near a good road, provide concealment, be easily defended, and be relatively hard-surfaced and well-drained. To set up a maintenance section in the field, you need to develop a layout plan, pitch tents, position equipment, and organize for operations. A sample site layout plan is shown in

Table 3-13. TOE-prescribed personnel for the maintenance section

POSITION	GRADE	MOS	DUTIES
Wheeled Vehicle Maintenance Technician	Warrant Officer	915AO	Supervises maintenance of company equipment. Ensures equipment is in safe condition prior to operation. Verifies logbook entries at close of each operation. Conducts inspections of equipment. Ensures that equipment is combat-ready at all times. Conducts required maintenance training. Trains personnel in standing operating procedures. Prepares work assignment sheets, monitors work procedures, and checks man-hours required for maintenance tasks (AR 570-2).
Motor Sergeant	E7	63B40	Supervises and assists unit maintenance personnel and equipment operators in proper performance of unit maintenance on company equipment. Controls dispatching of vehicles. Maintains equipment records and submits reports. Instructs and assists personnel in lower skill levels in operating and maintenance practices and procedures. Plans and organizes work schedules, coordinating equipment downtime with using section or individual. Drafts the shop SOP. Prepares informal daily work assignment sheets. Monitors use of and ensures security of tools. Conducts informal spot check inspections. Enforces safety regulations.
Light Wheeled Vehicle Mechanic	E5 E4 E3	63B20 63B10 63B10	Perform unit maintenance on company light wheeled vehicles and MHE. Perform inspections. Diagnose malfunctions and determine maintenance required. Maintain assigned tool kits and sets. Record vehicle use data on DD Form 1970 (Motor Equipment Utilization Record). Note action taken and uncorrected faults on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).
Heavy Wheeled Vehicle Mechanic	E4	63S10	Performs unit maintenance on company heavy wheeled vehicles and MHE. Lubricates and services equipment. Performs preventive maintenance on tools, parts, and equipment. Test operates vehicles

Table 3-13. TOE-prescribed personnel for the maintenance section (continued)

POSITION	GRADE	MOS	DUTIES
			and equipment. Performs troubleshooting actions. Interprets schematic diagrams. Determines corrective adjustment and repair procedures required. Obtains replacement parts and turns in unserviceable parts. Assists in recovery operations. Prepares and maintains vehicle forms and records. Operates one of the 5/4-ton vehicles assigned to the section.
Quartermaster and Chemical Equipment Repairer	E5 E4 E3	63J20 63J10 63J10	Perform unit maintenance on all quartermaster equipment and chemical alarm and detection equipment. Operate the 2 1/2-ton cargo truck assigned to the section.
Power-Generation Equipment Repairer	E4	52D10	Determines general condition of equipment, causes of malfunctions, and need for repair. Uses test equipment and procedures to isolate electrical malfunctions. Replaces defective components or assemblies. Uses standard and special hand and power tools. Services tools and test equipment. Prepares maintenance records.
Construction Equipment Repairer	E4	62B10	Repairs and maintains the company compressors and water pumps. Adjusts and replaces components of engines, final drive, wheel and track, crane and carrier, equipment attachments, and cooling systems. Performs scheduled preventive maintenance. Troubleshoots equipment malfunctions. Reads circuit diagrams and flow charts. Analyzes and isolates malfunctions to systems or components on electrical, cooling, lubricating, hydraulic, and fuel systems.
PLL Clerk	E4	76C10	Requests, receives, and stores repair parts and tools and issues them to maintenance personnel. Maintains the prescribed load list for the company. Processes turn-in and direct exchange of repair parts. Maintains DA Form 2063-R (Prescribed Load List), DA Form 2064 (Document Register for Supply Actions), and DA Form 3318 (Record of Demands—Title Insert). Drives the 5/4-ton vehicle assigned to the section.

Table 3-13. TOE-prescribed personnel for the maintenance section (continued)

POSITION	GRADE	MOS	DUTIES
TAMMS Clerk	E3	76C10	Maintains vehicle, MHE, and power-generation equipment records. Prepares and maintains other equipment records required by TAMMS. Prepares and maintains equipment logs, preventive maintenance schedules and records, and an equipment uncorrected fault record. Requests repair or modification of equipment. Prepares and maintains an equipment component register. Prepares an equipment control record. Dispatches equipment and records its return.

Table 3-14. Unit maintenance responsibilities

TYPE OF EQUIPMENT	SUPERVISOR
Vehicles and generators	Motor pool sergeant
Communications and electronic equipment	Communications NCO (may be assigned as additional duty)
Kitchen equipment	Food service sergeant
Weapons	Armorer (also maintains separate prescribed load list for weapons)
NBC warfare equipment	NBC NCO
Miscellaneous (such as space heaters, typewriters, field desks and tables, fuel and water cans, and tents)	Supply sergeant
Tactical water distribution system	Petroleum operations sergeant
800,000-gallon water storage and distribution system	Supply and distribution platoon leader

Figure 3-9. See TM 10-8340-211-13 for information on pitching and striking tents. When it is time to move, the commander will issue a warning order and then an operation order. You must then close down maintenance operations. Assign a detail to load supplies and equipment on trucks and strike the tents. Perform before-operation maintenance checks and services. Make sure vehicle operators know their responsibilities while on the march and when in the new bivouac area. See FM 55-30 for more on movement.

FUNCTIONS

The primary functions of the unit maintenance element include maintenance by operators and

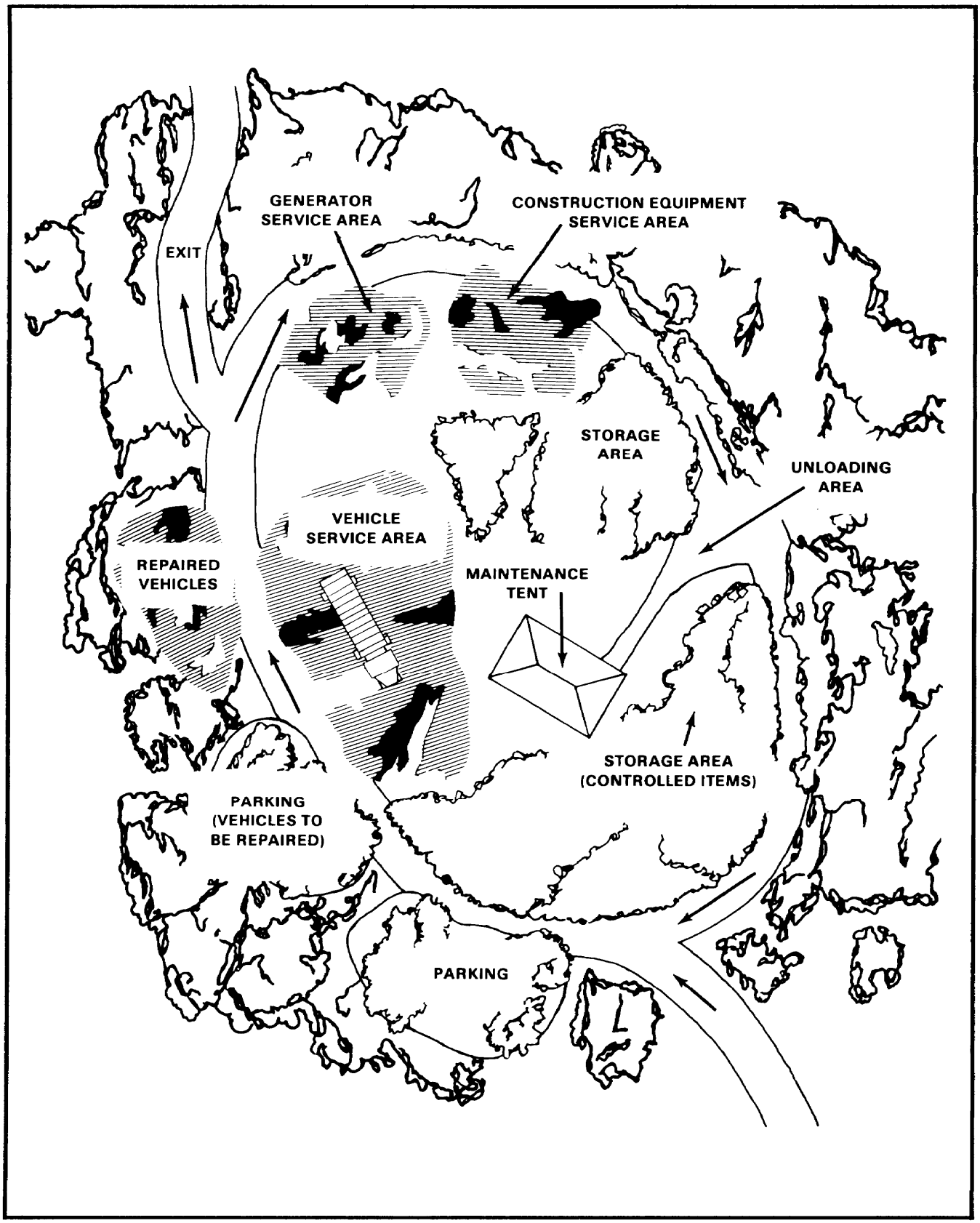


Figure 3-9. Sample maintenance element layout

unit mechanics, repair parts operations, tool maintenance and accountability, record keeping, dispatching, and recovery and evacuation of disabled equipment. These are described below.

Operator and Crew Maintenance

Equipment operators must perform daily PMCS on their equipment. They also make minor repairs identified by technical manual allocation charts as being within their capabilities. Operators also assist in lubricating equipment according to lubrication orders. While operating equipment, the operator and crew should be alert for unusual noises or odors, abnormal instrument readings, steering irregularities, or other indications of malfunction. After-operation service should include checking fluid levels, tire pressures, batteries, and electrical wiring. See FM 55-30, Appendix U, for a sample vehicle inspection checklist.

Unit Maintenance

Deficiencies discovered before, during, and after operation which are beyond the operator's capability become the responsibility of unit mechanics. Maintenance performed by unit mechanics includes inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies. The scope of repairs they make is specified in equipment TMs. Repairs beyond the capabilities of your mechanics are the responsibility of higher-level maintenance activities. Normally, your section delivers the unserviceable equipment to the supporting maintenance activity. If this is not possible, you may request that a maintenance support team be provided.

Repair Parts Operations

You are authorized a PLL or combat PLL to support daily maintenance operations. Usually, the PLL is for a prescribed number of days of supply based on the average customer wait time. You supervise the PLL clerk and make sure the list is set up and maintained according to requirements in DA Pamphlet 710-2-1 (TMs in the 38-L32 series if your unit is automated). The PLL clerk requests parts based on supervisors' anticipated needs. Supervisors at each level must anticipate and plan for materiel needs. The PLL clerk requests parts by national stock number. To ensure requests are submitted in a timely manner, find out the average maximum lead time for items requested. Make daily requests SOP to prevent an accumulation of requests and to help ensure continuous supply. Specify procedures for establishing PLL levels, for using priority designators, and for requesting follow-ups and reporting delays.

Tools Maintenance and Accountability

Establish an effective control system, and inventory tools regularly. Account for and replace lost, damaged, or destroyed tools according to AR 735-5. See TM 9-243 for information on use and care of tools.

Automotive tool kits. Issue by hand receipt an automotive tool kit to each mechanic. The tool kit contains common tools such as wrenches, pliers, hammers, drifts, punctures, chisels, files, and gages. Each mechanic is responsible for ensuring that assigned tools are properly maintained and stored when not in use. Establish a secure tool storage area.

Unit shop equipment. You are authorized a set of common tools and equipment to perform your unit maintenance mission. This equipment set is usually mounted on a secured vehicle. One side of the vehicle can be used for storing tools and test equipment, leaving the other side to store key repair parts. This setup will make displacement quicker and on-site repair easier. Assign a tool keeper to maintain a tool sign-out register. Make sure equipment is returned at the close of each working day.

Records

DA Pamphlet 738-750 has specific instructions on the preparation and use of maintenance system forms. See Table 3-15 for key records that you will use. The three types of records are operational, maintenance, and historical. Operational records are used to control operators and equipment, to plan for maintenance operations, and to make best use of equipment. Maintenance records control maintenance scheduling, inspection procedures, and repair work loads and provide a uniform method of recording corrective actions. They are used to determine equipment readiness and reliability and to determine use and logistic requirements. Historical records are permanent documents formalizing the receipt, operation, maintenance, and disposal of equipment.

Dispatch

Dispatch procedures apply to vehicles, generators, forklifts, engineer equipment, and other items the

Table 3-15. Key maintenance system records

TYPE RECORD	FORM	USE
OPERATIONAL	DD Form 1970 (Motor Equipment Utilization Record)	Controls equipment use. Sometimes referred to as trip ticket. Filled out for each dispatched vehicle. Records miles or hours and fuel and oil consumption.
	DA Form 2401 (Organization Control Record for Equipment)	Consolidates listing of all equipment dispatched. Provides ready identification of user and location of equipment while in use.
	DD Form 314 (Preventive Maintenance Schedule and Record)	Records scheduled and performed maintenance services. Maintained for each item requiring periodic services by unit maintenance personnel.
MAINTENANCE	DA Form 2402 (Exchange Tag)	Makes direct exchange.
	DA Form 2404 (Equipment Inspection and Maintenance Worksheet)	Records equipment faults found during operator's daily inspection, periodic services, and inspections by maintenance activities. Parts requirements go to PLL clerk.
	DA Form 2405 (Maintenance Request Register)	Consolidates record of job orders (DA Form 2407) initiated, received, and processed by maintenance activities. Used at unit level to record number of maintenance requests submitted to supporting maintenance organizations.
	DA Form 2406 (Material Condition Status Report (MCSR))	Reports the condition of equipment so that defects can be corrected.
	DA Form 2407 (Maintenance Request)	Requests maintenance from a supporting unit and records details of maintenance performed.
	DA Form 2408-20 (Oil Analysis Log)	Records oil samples taken from equipment. Shows lab analysis of those samples. Indicates when oil changes are needed.
HISTORICAL	DA Form 2408-9 (Equipment Control Record)	Contains initial basic equipment acceptance and identification information. Updates information on ownership, location, use, transfer, gain, loss, overhaul, and disposition.
	DA Form 2409 (Equipment Maintenance Log (Consolidated))	Records complete maintenance history of equipment item.

commander designates. The operator contacts the dispatcher with a vehicle requirement. The dispatcher designates a vehicle. The operator is responsible for maintenance checks and services before, during, and after operation of the item. Records are kept on all services performed and the mileage or hours related to use of the item.

Recovery and Evacuation

It may become necessary to recover equipment which becomes disabled in a location away from the motor pool. Your soldiers may be unable to repair the disabled equipment. You must make arrangements to evacuate the equipment and have it serviced elsewhere. To prepare for recovery, consult TMs for the weight of the item and for other data. Reconnoiter the area to determine the best method of anchoring the wrecker vehicle. If the unit cannot recover an item, request evacuation by the supporting maintenance activity. FMs 20-22 and 21-305 provide guidance on vehicle and equipment recovery and evacuation.

CHAPTER 4

WATER PURIFICATION DETACHMENT

Section I
THE DETACHMENT

This section is for the detachment commander.

MISSION

In areas where direct support water systems cannot provide enough water, general support units are brought in. The water purification detachment establishes and operates general support bulk water purification facilities in arid environments. It is collocated with base terminals. It is capable of producing 600,000 gallons of potable water per day from a freshwater source. When required to use saltwater sources, its production rate may be reduced. Your production capability will be based on the number of ROWPUs allocated your unit.

CAPABILITIES

Your detachment's capabilities are determined by the personnel strength levels prescribed by TOE 10469L. At full strength (TOE Level 1) and operating on a 24-hour basis, your detachment can—

- Operate up to ten 3,000-gallons-per-hour water purification units when grouped in banks with organic equipment at up to five locations.
- Produce 600,000 gallons per day when using a fresh or brackish water source.
- Produce 400,000 gallons per day when using a saltwater source.
- Store 90,000 gallons of water.
- Operate up to six bulk water purification units when augmented with personnel and equipment. The increase in capability that this provides depends upon the capabilities of the bulk purification units.
- Assist in coordinated defense of the unit area as well as the installation.
- Perform unit maintenance on all organic equipment except communications-electronic equipment.

Operational capabilities are reduced to approximately 90 percent for Strength Level 2 and 80 percent for Strength Level 3.

ATTACHED STRENGTH

Water purification teams (TOE 10570) may be attached to your detachment when you cannot meet mission requirements. Your detachment can then purify, store, and issue more water per day More on water purification teams is presented later in this chapter.

REQUIRED SUPPORT

This detachment is capable of operating independently when provided administrative and supply support from a higher headquarters element or an adjacent unit. The elements that support the water purification detachment are as follows:

- Appropriate elements of the theater army provide medical, legal, financial, personnel, and administrative services.
- Preventive medicine teams approve water sources.

- Appropriate engineer units provide site and facility preparation and site maintenance.
- The battalion headquarters and headquarters detachment provides religious support.

ASSIGNMENT AND EMPLOYMENT

The water purification detachment will be assigned to a petroleum group. It normally is attached to a water supply battalion. The detachment will be employed in the corps or COMMZ area of operation near main lines of communications to support theater army units. Purified water is produced by the purification platoon and introduced into the water distribution system from locations onshore and offshore. The water purification detachment operates ten 3,000- gallons-per-day ROWPUS at up to five locations. The theater is fully mature when all committed forces are in place and operating. GS units provide water support where DS water systems cannot. Normally, water enters the system through the base terminal storage facility. Water is distributed to other terminals within the theater army area and forward into the corps area. The corps structure for water support is not fixed. It depends on the size of the force needed to support the mission and the specific geographic area of employment.

MOBILITY

The mobility of your detachment is determined by the number of organic vehicles authorized and the number of personnel and amount of equipment and supplies you move. If the whole detachment must move at one time, you must arrange for more vehicles. Your detachment has 74,206 pounds (3,979 cubic feet) of TOE equipment requiring transportation. The unit is capable of transporting 33,000 pounds (2,508 cubic feet) of TOE equipment with organic vehicles.

ORGANIZATION

The water purification detachment (Figure 4-1) is organized into a detachment headquarters and a water purification platoon. The headquarters provides command and control. The platoon sets up and operates the assigned water purification equipment. Your detachment is organized to meet mission requirements in an arid environment. Water purification teams may be attached to your detachment when mission requirements exceed your purification capabilities.

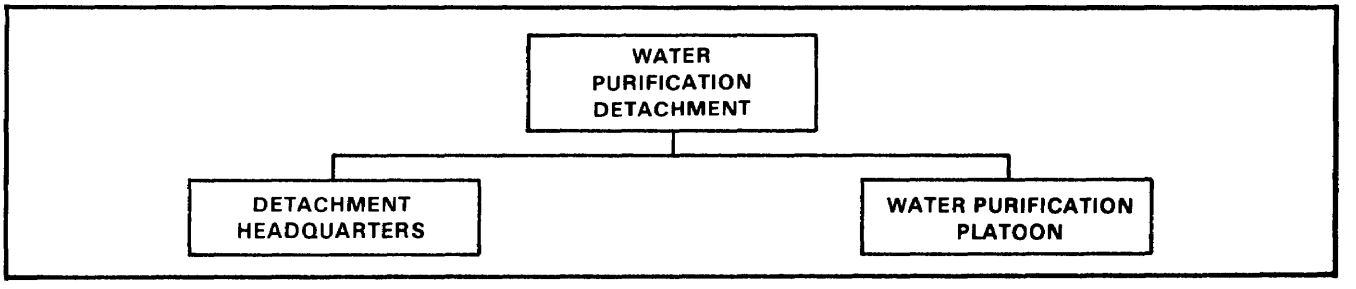


Figure 4-1. Organization of water purification detachment, general support

Section II
DETACHMENT HEADQUARTERS

This section is for the detachment commander.

MISSION

Personnel in the detachment headquarters command and control water supply operations. They direct and supervise technical and support activities of the detachment. They are responsible for unit readiness, site establishment, water reconnaissance, unit administration, food services, unit supply, unit maintenance, and training. Detachment headquarters personnel support the water

purification platoon and, if augmented, the water purification teams. See Chapter 1 for more in-depth information on the headquarters functions.

PERSONNEL

Your most valuable resources are your soldiers. To use them effectively, you must know their duties. Table 4-1 lists TOE-prescribed personnel of the detachment headquarters by position, grade, MOS, and duties.

COMMUNICATIONS

A combat communications system provides quick, reliable, and secure interchange of vital information within and between echelons. The goal is to maintain communications under all conditions. Two means of maintaining communications are wire and radio.

Wire

Wire is the primary means of communication provided the detachment. The organic wire net provides telephones and switchboards for internal communications and for entry into the common user system. Figure 4-2 shows a proposed detachment wire net.

Radio

Day-to-day operations require continuous coordination with the headquarters and headquarters

Table 4-1. TOE-prescribed personnel for the detachment headquarters

POSITION	GRADE	MOS	DUTIES
Detachment Commander	Captain	92F00	Plans, directs, and supervises the operations and employment of the detachment. Commands the detachment so that its mission is carried out. Is responsible for unit readiness, site establishment, communications, defense, unit administration, supply maintenance, and training of the detachment. Is responsible for food service support of certain units.
Detachment Sergeant	E7	77W40	Is principal enlisted assistant to the commander. Oversees company level administration. Advises the detachment commander on troop assignments, reassignments, promotions, and other personnel actions. Supervises replacement activities. Verifies and monitors strength and personnel accounting reports. Assists in the development of policies and procedures. Calls all formations and represents the enlisted soldiers of the detachment.
Motor Sergeant	E7	63B40	Supervises all maintenance functions. Supervises the operation of motor maintenance and detachment safety programs.
Food Service Sergeant	E6	94B30	Supervises the cooks assigned to the detachment. Selects the field kitchen site. Maintains food service records. Prepares kitchen SOP. Is responsible for food service sanitation and the maintenance of food service equipment.

Table 4-1. TOE-prescribed personnel for the detachment headquarters (continued)

POSITION	GRADE	MOS	DUTIES
First Cook	E5	94B20	Supervises the second-shift operations of the field kitchen. Monitors food service sanitation. Inspects food storage and monitors preparation. Prepares the more complex menu items.
Cook	E3	94B10	Prepares, cooks, and serves food according to recipes and field kitchen SOP. Practices principles of good food service sanitation. Cleans the work area, equipment, and cooking utensils. Receives, inspects, and stores food items. Performs preventive maintenance on kitchen equipment. Drives the 2 1/2-ton trucks that support food service and unit supply operations.
Supply Sergeant	E5	76Y20	Requests, receives, stores, safeguards, and issues supplies and equipment. Plans storage area layout. Maintains detachment supply records and hand receipts. Coordinates inventories of property book items and prepares adjustment reports.
PLL Clerk	E5	76C20	Requests, receives, stores, and issues repair parts and tools required by mechanics. Maintains the prescribed load list.
Power-Generation Equipment Repairers	E5 E3	52D20 52D10	Perform unit and intermediate maintenance on power-generation equipment and associated equipment.
Preventive Medicine Specialist	E4	91S10	Conducts preventive medicine inspections and surveys. Controls operations and preventive medicine laboratory procedures. Performs tests to ensure the potable water issued and stored continues to meet the prescribed specifications.
Quartermaster and Chemical Equipment Repairers	E5 E4 E3	63J20 63J10 63J10	Perform unit or intermediate maintenance on quartermaster and chemical equipment.

Table 4-1. TOE-prescribed personnel for the detachment headquarters (continued)

POSITION	GRADE	MOS	DUTIES
NBC Operations NCO	E5	54E20	Is primary advisor to commander on nuclear, biological, and chemical environmental considerations. Evaluates individual and unit competence in NBC defense. Advises commander on unit's ability to survive and continue operations in a nuclear, biological, or chemical environment. Supervises maintenance and employment of detachment NBC equipment.
Water Treatment Specialist	E3	77W10	Performs tests necessary to ensure that the potable water issued and stored meets the prescribed specifications for use. Drives the 5/4-ton utility truck. Performs vehicle maintenance, checks, and services.
Unit Clerk	E4	75B10	Performs clerical and administrative duties. Prepares SIDPERS change reports. Processes personnel actions and reports. Maintains duty rosters. Is responsible for forwarding strength accounting and casualty reports. Is responsible for other tasks described in FM 12-3-1. Completes standard forms. Maintains suspense files. Types reports, orders, letters, and operating procedures. Posts and files correspondence, regulations, and changes to unit authorization documents.
Light Wheeled Vehicle Mechanics	E5 E4 E3	63B20 63B10 63B10	Maintain the wheeled vehicles assigned to the detachment.
Switchboard Operator	E4	31K10	Operates the switchboard.
Petroleum Light Vehicle Operator	E3	77F10	Operates the tank and pump dispensing equipment used to deliver fuel to the water points.

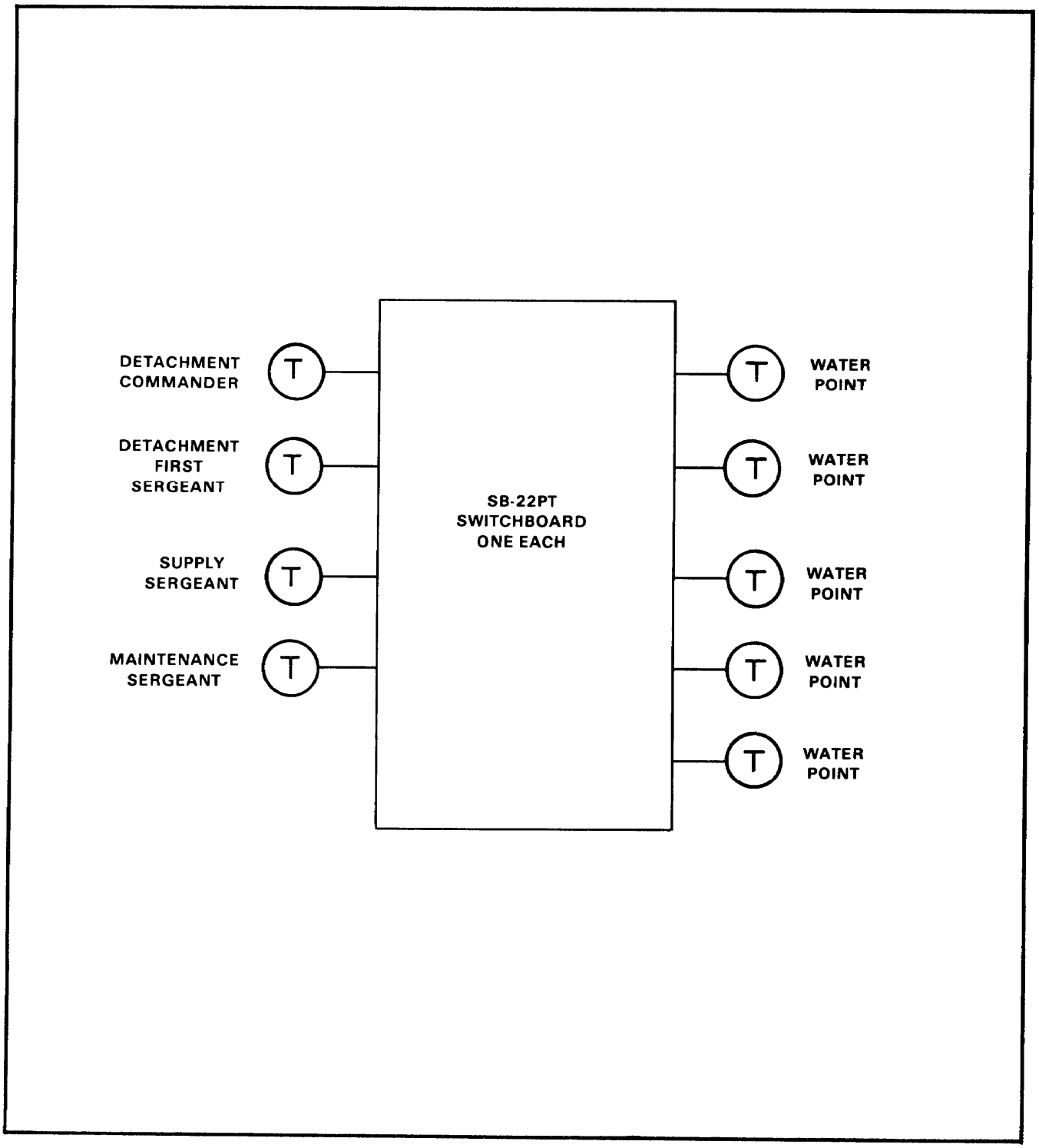


Figure 4-2. Proposed wire net for water purification detachment

detachment, water supply battalion, supported and adjacent units. FM radio permits the detachment quick and accurate communication within its range. One AN/VRC 46 is required for the detachment commander to communicate with higher headquarters and with the water purification platoon. One AN/VRC 46 is required for the water purification platoon leader to receive orders from the detachment headquarters. Figure 4-3 shows a proposed radio net.

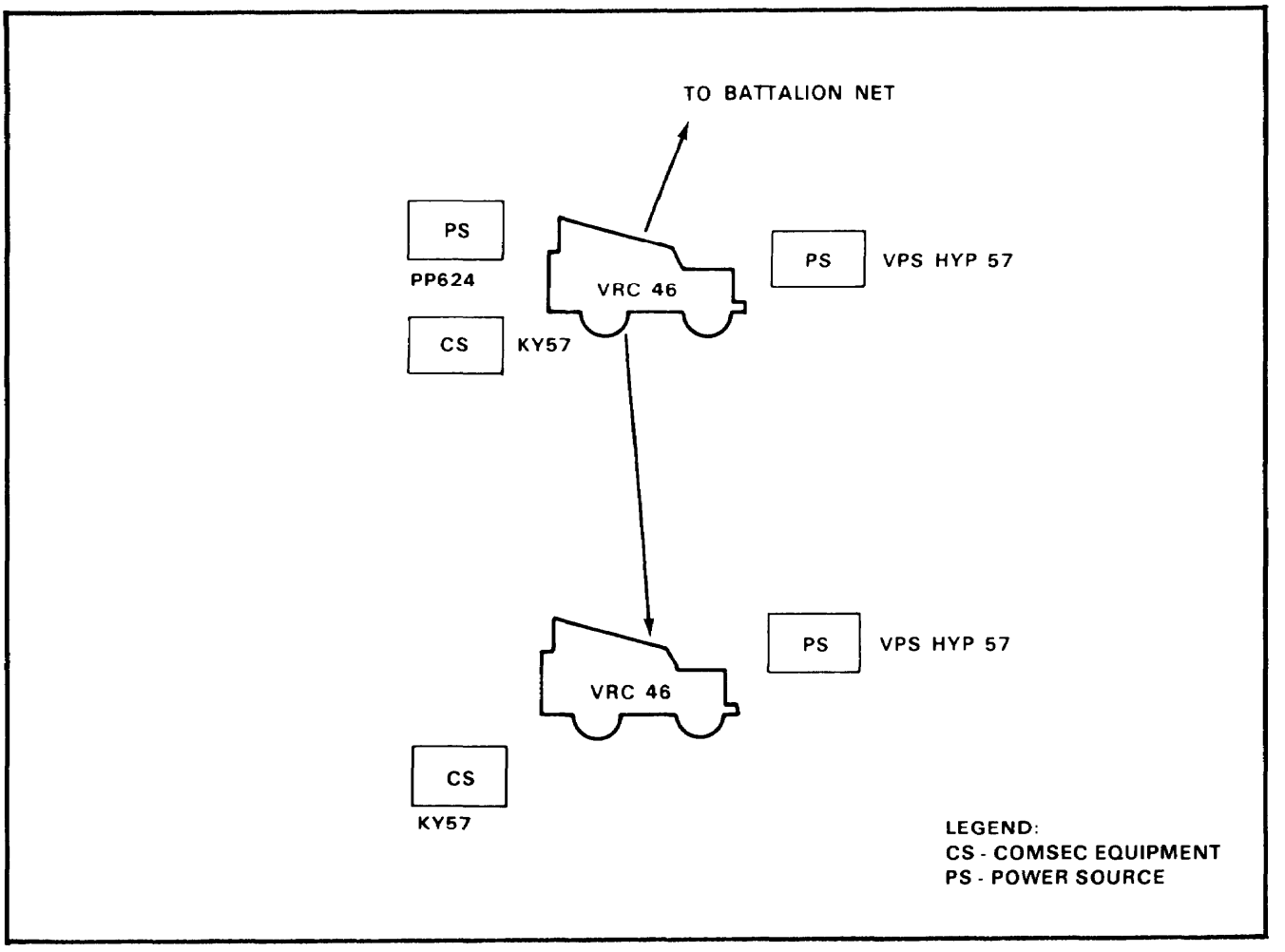


Figure 4-3. Proposed unit radio net for the water purification detachment

Section III
WATER PURIFICATION PLATOON

This section is for the platoon leader.

MISSION

The water purification platoon is responsible for operating the water purification facilities. The platoon can purify salt water pumped directly from the ocean, water from wells in the area, surface water, and water that may be contaminated. It is responsible for—

- Providing potable water for corps or COMMZ units in the field. The platoon produces about 600,000 gallons a day of potable water when all of its water purification equipment is available.
- Operating water supply points at up to five locations.
- Providing storage for up to 90,000 gallons of potable water.

PERSONNEL

Your most valuable resources are your personnel. To use them effectively, you must know their duties. Table 4-2 lists TOE-prescribed personnel of the platoon by position, grade, MOS, and duties.

Table 4-2. TOE-prescribed personnel for the water purification platoon

POSITION	GRADE	MOS	DUTIES
Platoon Leader	Lieutenant	92F00	Directs, coordinates, and supervises platoon operations. Directs reconnaissance and setup of operating sites. Supervises the establishment of unit defense. Develops SOP. Supervises operator maintenance of equipment. Completes monthly and quarterly reports for higher headquarters. Briefs the detachment commander on platoon capabilities.
Water Purification Supervisor	E7	77W40	Assists the platoon leader in directing, coordinating, and supervising platoon operations.
Assistant Water Purification Supervisor	E6	77W30	Assists the water purification supervisor.
Water Treatment NCOs	E5	77W20	Supervise the water treatment specialists assigned to the platoon. Supervise and assist in the installation, operation, and maintenance of the water purification equipment set, the water quality control set, and other production and purification equipment assigned to detachment headquarters. Conduct water reconnaissance. Develop water sources and water points. Analyze raw and treated water. Assist in operation of water sites.
Water Treatment Specialists	E4 E3	77W10 77W10	Assist in the setup, operation, and maintenance of water points and water production equipment. Assist in water reconnaissance and development of water sources. Assist in water site preparation. Test water quality and add the necessary chemicals. Camouflage fixed positions and equipment. Drive the truck-mounted water purification equipment set and vehicles assigned to the platoon.
Vehicle Driver	E3	77W10	Drives the 5/4-ton vehicle.

OPERATIONS

Your duties as the platoon leader fall into two general categories—tactical operations and water operations. They are described below.

Tactical Operations

You reconnoiter sites and develop layout plans, loading plans, and contingency plans for demolition. You also direct the placement and camouflage of supplies and equipment. One of your most important duties involves determining how to use personnel and equipment to accomplish your platoon mission. You are also tasked with consolidating, preparing, and reviewing technical, personnel, and administrative reports. As platoon leader, you must contribute to and update those portions of the detachment SOP dealing with platoon operations.

Water Operations

Your duties in water operations include advising the detachment commander on the selection of a site for water production. You direct the survey team on layout requirements, prepare personnel and equipment for movement, and move personnel and equipment to the operating site. You direct the setting up of an operating site. You must also coordinate with the commander of the water supply company operating the supporting water distribution and storage system.

ORGANIZATION FOR OPERATIONS

After a general operating area for the detachment is designated by the battalion headquarters, your detachment commander may ask you and your platoon sergeant to assist in a reconnaissance of the area to determine the best location for your platoon activities. It is then your responsibility to develop a layout plan for the platoon. Below are important points you and your platoon sergeant must consider in establishing your operating areas and setting up your equipment.

Reconnaissance

Preliminary planning is needed for air and ground reconnaissance. If air reconnaissance is used, get information about routes of communication, cover, concealment, inclement weather, infiltration, and avenues of attack. The use of aircraft for reconnaissance is limited by adverse weather and security considerations. Ground reconnaissance is the only positive way of getting accurate information. Table 4-3 shows ground reconnaissance factors to be considered. More information on air and ground reconnaissance is in FM 10-52.

Layout

You should prepare a layout plan for platoon operations as part of the detachment movement plan. Your first concern is the need to produce potable water as soon as possible. Your site should be reasonably level and well drained. Concealment is important also. The site should have easy access to road nets, and at least one road should run through the water supply point. During the point reconnaissance, a sketch of the site, keyed to the map and terrain features, is made. If the water source requires site improvement, complete block 10 of DA Form 1712-R (Water Reconnaissance Report). The report must be prepared carefully and on time. The data presented must be legible, clear, complete, and concise. Forward a copy of the report to the S3 at battalion headquarters. Personnel there will send it to the engineer corps for site or road work required. More on completing a reconnaissance report is in FM 10-52. A sample of the report may be found in the appendix of this FM.

WATER PRODUCTION OPERATIONS

The water purification platoon establishes and operates the general support water purification sites onshore and offshore. The platoon purifies and stores water, but has very limited distribution capabilities. The platoon is responsible for installing, operating, and performing operator maintenance on the water purification equipment sets, the water quality analysis set, and other related equipment. It is also responsible for maintaining the ROWPU. When required, the platoon production capability can be increased by attaching water teams, TOE 10570.

This subparagraph implements STANAG 2885 (Edition One).

Water Points

Water supply points are established as far forward as possible, considering the location of available water sources, the location of consuming units, and the commander's tactical plan. However, in

Table 4-3. Ground reconnaissance factors

- Has the area been reconnoitered to find a point requiring few improvements?
- Has the water source been approved by the preventive medicine unit?
- Does the source yield enough water?
- Are all spillage areas, especially the loading area, well drained?
- Are all tanks and equipment level and off the ground?
- Are there enough storage tanks to handle peak loads?
- Can the treated water be distributed safely and quickly?
- Is the water point well camouflaged to reduce the chance of attack?
- Is the layout for treatment equipment correct?
- Is the bivouac area located at least 100 feet away and downstream from the water point?
- Is the latrine located at least 100 yards downstream from the water point?
- Have shelters been provided for protection against nuclear attack?
- Are there chemical-resistant covers for the water containers?

arid regions, available water sources are limited and widely dispersed. There is little or no surface water. The availability of subsurface water varies within geographic regions. The lack of water sources necessitates an extensive purification, storage, and distribution system. STANAG 2885 (Edition One) provides the following guidance on water supply in arid areas:

- Collection of water by unit transport will be made direct from water points in administrative areas wherever possible, but the scarcity of sources of supply and the long distances between them will often make this impossible. In such cases, distribution will have to be in cans delivered with the rations by air or land transport. Distribution in this manner is not an engineer task.
- At times it may be necessary to establish water points where there are no local sources of water and to keep these water points filled by bulk road, rail transport, or by pipelines.

Water Purification, Storage, and Distribution

The water purification platoon, equipped with its 3,000-gallons-per-hour ROWPUs, will be collocated with base terminals. The base terminals serve as the point of entry for water into the theater. They are located in the rear areas near ports or other tanker off-loading facilities. The platoon will be responsible for purifying water at the base terminals. Water purification teams will operate ROWPUs to purify surface or well water when it is available. Each site will have storage tanks and a chlorinator. Purified water from these sites may be transferred to the tank farms or to the supported divisions by tanker trucks or a TWDS.

Water Documents

Water point personnel submit daily reports on their water production using DA Form 1713-1-R (Daily Water Production Log--ROWPU). Platoon headquarters personnel then consolidate the information on DA Forms 1716-R (Water Point Daily Production Summary) and send them to the appropriate supply section of higher headquarters. DA Form 1715-R (Water Point Inspection Report) is completed daily by supervisory personnel and preventive medicine teams who periodically test the water for chlorine and bacteria content and inspect the water point for sanitation. The appendix to this FM shows samples of these forms. Blank forms suitable for reproduction are provided in FM 10-52. The forms are designed to coordinate the operation of widely separated water points. Their use also helps to safeguard water quality, improve efficiency of water treatment, and decrease equipment maintenance.

Physical and Chemical Tests

The main purpose of field water purification is to make water safe for humans to drink. The amount and type of treatment depends upon the quality of the raw water, the quantity of purified water needed, and the degree of purification required. The water must be treated to the degree required to make it potable. Potable water may still contain some impurities, but only impurities that will not affect the health of those who drink the water. Water treatment specialists test and analyze the available water and measure impurities to determine if they are within established limits according to TB Med 577. Usually, there are three water purification specialists in each water production squad. They operate the ROWPU and such related equipment as the water quality analysis set and the chemical agent detector kit. The water quality analysis set can detect and quantify selected naturally occurring contaminants. The chemical agent detector kit detects agents at or above concentrations that could cause casualties or reduce soldier performance. More on chemical tests is in TMs 3-6665-319-10 and 5-6630-215-12. See FM 10-52 for tests on different types and sources of water. FM 10-52 also discusses water supply under NBC conditions. STP 10-77W1-SM and STP 10-77W24-SM-TG describe water purification and treatment operations.

Operation and Maintenance of Equipment

The water treatment specialists at each water point install, operate, and perform operator maintenance on the water purification equipment sets. The water treatment NCO oversees the water specialists in their duties. The platoon sergeant makes rounds at each water point inspecting the condition of all the water treatment equipment. He also inspects supporting storage and housing facilities and materials-handling and traffic control procedures. Maintenance plays a key part in the smooth operation of the water purification unit and the support equipment. The platoon sergeant must inspect the maintenance practices of the water point personnel. He should—

- Check the condition of the support equipment. This includes checking for stripped threads, cracks, rips, and broken parts.
- Check the condition of all support areas and personnel at the water point.
- Recommend appropriate measures for damaged equipment on DA Form 2404.
- Check the water point bivouac area.

Section IV
WATER PURIFICATION TEAM

This section is for the water treatment supervisor.

MISSION

The water purification team (TOE 10570) is a specialized team that produces and issues potable water in the field. It also provides augmentation capabilities as required. Usually the team is assigned to the division, corps, or TAACOM.

CAPABILITIES

The water purification team, on a two-shift basis, can operate four water purification points. It can produce up to 240,000 gallons per day when the water source is fresh water. Use of a saltwater source reduces the production rate. Production capability will be based on the number of ROWPUs allocated to the team. The team can store up to 36,000 gallons of potable water and can issue up to 240,000 gallons per day. With organic vehicles, the team can transport 10,000 pounds (604 cubic feet) of TOE equipment. The team has 21,172 pounds (1,120 cubic feet) of TOE equipment that requires transportation.

PERSONNEL

The water purification supervisor (E7, 77W40) supervises the establishment and operation of the water purification site. Table 4-4 lists TOE-prescribed personnel of the water purification team by position, grade, MOS, and duties.

Table 4-4. TOE-prescribed personnel for the water purification team

POSITION	GRADE	MOS	DUTIES
Water Purification Supervisor	E7	77W40	Supervises team personnel. Directs team operations.
Assistant Water Purification Supervisor	E6	77W30	Ensures the proper installation and operation of water purification sites. Drives the 5/4-ton truck assigned to the team, and operates the radio.
Water Treatment NCO	E5	77W20	Controls water purification and distribution. Supervises the water treatment specialists.
Water Treatment Specialists	E4 E3	77W10	Install, operate, and perform operator maintenance on the exchange unit water pretreatment decontamination set, water purification equipment set, and the water quality control set. One specialist operates the 2 1/2-ton truck assigned to the team. One specialist operates the 2 1/2-ton prime mover for the water purification units.
Quartermaster and Chemical Equipment Repairer	E4	63J10	Performs unit maintenance on all water equipment in support of the water supply mission. Drives the 5/4-ton truck.

OPERATIONS

The water purification team issues mainly to units at the water supply points. It issues up to 240,000 gallons of water per day. If the water team is attached to the water purification detachment, the detachment platoon leader is responsible for organizing personnel and equipment in the operating area. He coordinates activities with supported units to ensure that the mission is accomplished and that correct procedures are used. He also ensures that plans and operations are carried out using correct operating procedures. Water production operations for the water purification team are the same as those described for the water purification platoon.

Water Distribution

When the water purification team is assigned a DS mission, the team will provide water by supply point distribution. When given a GS mission, the team will feed water to a water supply company for distribution. Water is distributed by a system of hoses, pipes, or pipelines to tanks, trucks, or trailers. It is normally necessary to provide a separate water point where water cans may be filled either singly or by the trailer load or truckload. The water point may consist of a distribution system with hoses. See AR 700-136 for distribution and management of water resources. Some general considerations for water distribution are described below.

Schedule. A schedule should be made giving the time of distribution for each supported unit. The schedule should specify the water point to be used.

Containers. New tanks, trailers, or other containers should be cleaned thoroughly before they

are used. They should be cleaned with a calcium hypochlorite solution and rinsed with water.

Water cans and trailers. Water containers must be kept clean. They should be inspected periodically for rust and chips in the internal enamel. Water cans should be filled with water only. Water trailers must be clean when they arrive at a water point. Cleanliness is a responsibility of the using unit. Water point supervisors should refuse to fill containers that are not clean.

Lead poisoning. Lead is an accumulative poison. Lead-lined tanks or pipes should not be used in water storage, treatment, or distribution equipment.

Reports

The water team submits daily reports on water production and distribution. DA Form 1713-1-R is used by water treatment specialists to determine the daily water production. This information is submitted to headquarters personnel for consolidation on DA Form 1716-R. The water team also submits daily reports on its water distribution to using units on DA Form 1714-R. Headquarters personnel then consolidate the DA Forms 1714-R and submit a DA Form 1717-R to higher headquarters. This summary should be studied to detect any unusual consumption of water by using units. Blank forms suitable for reproduction are provided in FM 10-52. See the appendix in this FM for samples of DA Form 1714-R and DA Form 1717-R.

CHAPTER 5

WATER TEAM—WATER PURIFICATION BARGE

This chapter describes barge and ROWPU operations in general terms only. Detailed technical information is being produced under contract and will be available at a later date. For more information, contact US Army Belvoir Research, Development, and Engineering Center, Fort Belvoir, Virginia 22060-5606.

Section I
PURPOSE AND FUNCTIONS

MISSION

The mission of the water team on the water purification barge is to produce bulk quantities of potable water from any water source. The potable water is pumped through a hose line from the barge to shore. The water is then transported by a TWDS to a base terminal storage tank at the water supply company or a similar unit.

PERSONNEL

The barge water team operates in two 12-hour shifts. Each shift consists of 10 hours of operations and 2 hours of maintenance. Each shift has a leader who reports to the water treatment supervisor. See Figure 5-1. Table 5-1 lists TOE-prescribed personnel of the barge water team by position, grade, MOS, and duties.

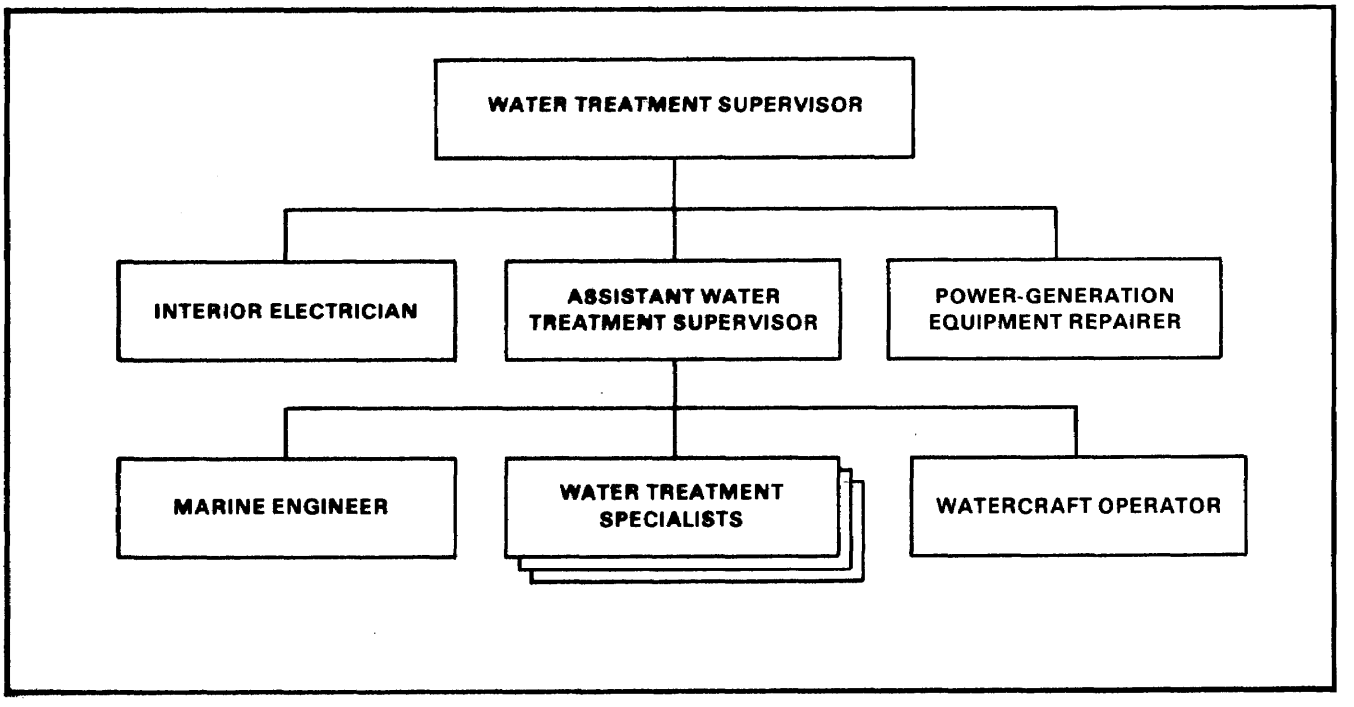


Figure 5-1. Typical organization of a barge team shift

Table 5-1. TOE-prescribed personnel for the barge water team

POSITION	GRADE	MOS	DUTIES
Water Treatment Supervisor	E7	77W40	Directs, coordinates, and supervises barge operations. Coordinates barge movements with the harbormaster or terminal commander. Maintains an accurate water production schedule.
Assistant Water Treatment Supervisors	E6	77W30	Assist water treatment supervisor. Supervise all barge personnel on a 12-hour shift. Monitor all barge and ROWPU operations. Ensure that water production schedules are met.
Marine Engineers	E5	88L20	Operate 20-kilowatt and 155-kilowatt generators that power ROWPUs and other equipment. Repair marine diesel engines or high-pressure pump engines as required. Are responsible for deployment and retrieval of the water discharge hose line. Operate and maintain bilge pumps and air-conditioning systems. Perform intermediate GS maintenance and repair of hydraulic water discharge system, personnel boat, or other equipment.
Watercraft Operators	E5	88K20	Operate and maintain ROWPU barge. Operate personnel boat to move personnel and equipment between the shore and barge. Use winches to deploy and retrieve anchors. Direct the approach and departure of vessels close to the barge. Display proper barge lighting and signals.
Interior Electrician	E3	51R10	Installs and maintains all electrical systems and equipment on the barge. Maintains barge lighting system and the battery-powered emergency system.
Power-Generation Equipment Repairer	E4	52D10	Maintains and repairs 20-kilowatt and 155-kilowatt generators and diesel pumps.

Table 5-1. TOE-prescribed personnel for the barge water team (continued)

POSITION	GRADE	MOS	DUTIES
Water Treatment Specialists	E4 E3	77W10 77W10	Operate ROWPU equipment system. Perform water quality analysis of treated water. Perform all maintenance, including backwashing, changing filters, and cleaning equipment. Chlorinate, store, and distribute water using valves, switches, and automated controls.

CAPABILITIES

The water team (TOE 10570LA) operates at full strength at all times. When operating on a 24-hour basis, this team —

- Produces 225,000 gallons of potable water per day.
- Stores 15,000 gallons of potable water on board.
- Performs maintenance on all barge equipment, except CE equipment.
- Assists in coordinated defense of the LOTS area or port facility.

ASSIGNMENT

The team may be assigned to a water battalion or a petroleum group. It is usually attached to headquarters and headquarters detachment, water supply battalion (TOE 10116). It may also be attached to a corps support command or other service, as required.

REQUIRED SUPPORT

The water team on the water purification barge requires support from other sources. The barge is not self-propelled. It is not equipped for any missions other than production and limited distribution of water. The team depends on the support described below.

Movement

Appropriate elements of the Military Sealift Command transport the barge to the theater of operations. The barge, when fully equipped, weighs 550 tons.

Positioning and Anchoring

Tugboats move the barge within the terminal operational area as required. They also assist with anchoring. Tugboats will probably be from transportation corps floating craft companies. Tugs will be assigned by the terminal battalion in charge of terminal operations.

Barge Maintenance

When available, the transportation floating craft maintenance company (TOE 55613) can assist with maintenance for the barge. The company can repair items such as winches, hoists, and bilge pumps.

Water Purification System Maintenance

Intermediate DS and GS maintenance companies (area support group) can provide assistance with maintenance of water purification systems. These include the ROWPU, the power-generation equipment, and the pumps.

Logistics

Logistics support must be arranged through the unit to which the team is assigned or attached. The water supply company (TOE 10468L) or other services will provide command and control, food service, and unit supply.

COMMUNICATIONS

A combat communications system provides rapid, reliable, and secure interchange of vital information within and between echelons. The goal is to maintain communications under all conditions.

Net

Barge personnel communicate with personnel at the supporting unit on shore, at the terminal operations center, on tugboats, and on other vessels. Barge personnel also communicate with one another when necessary. A proposed radio net is shown in Figure 5-2.

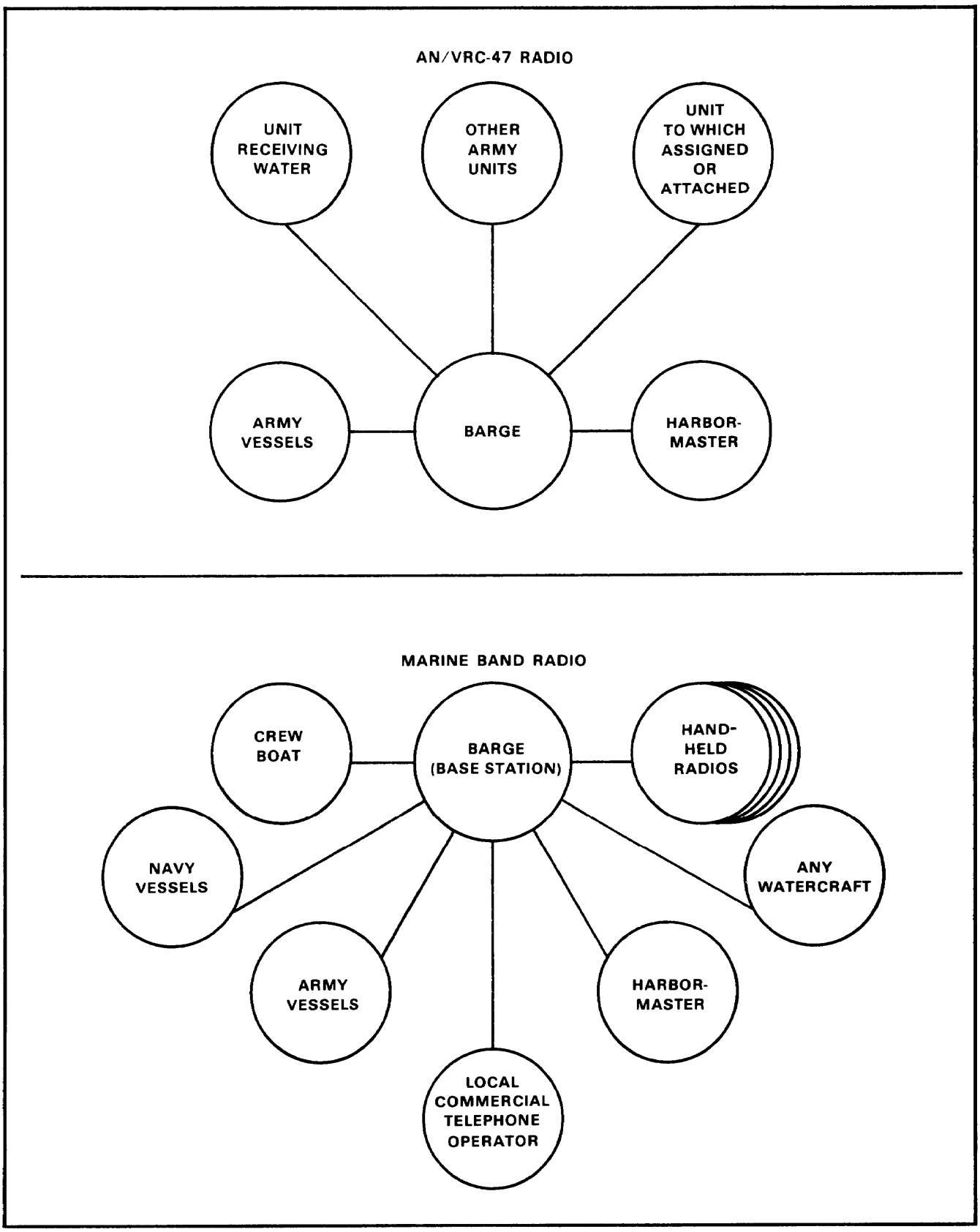


Figure 5-2. Communications networks

Equipment

The TOE or MTOE prescribes communications assets. The barge is equipped with an AN/VRC-47 radio set. All components, except the antenna, are located in the dayroom within the deckhouse. TMs 11-5820-401-10-2,-20-2, and -20P cover operation and maintenance of this set. The radio is used to communicate with the harbormaster, with elements in the higher headquarters net, with Army watercraft, and with other units. A general announcing system, equipped with a fog bell and intercom system, is also located in the dayroom. It is used to page, to make announcements, and to communicate with personnel in the various areas of the barge. The barge is also equipped with two stationary marine band radios for communication with other watercraft in the area. One of these is located on the crew boat. Four portable, marine band, PRC-94 radios are used mainly during towing, anchoring, mooring, and hose line deploying operations.

Section II
WATER PRODUCTION OPERATIONS

MOVING THE BARGE

The barge can be moved over navigable inland waterways or along the coast. This ensures that potable water is readily available to the soldiers.

Location

The barge usually is stored in a rear area until it is needed in a forward area. Then, all systems are taken out of the storage configuration and checked for operational readiness. Deficiencies are corrected before the barge is moved. (There are different start-up procedures for bringing the barge out of long-term storage.) Since the barge lacks a propulsion system, movement to the theater of operations will normally be handled by the Military Sealift Command. Your location in the theater almost always will be near a water supply unit.

Relocation

You may need to relocate when your unit mission has been completed. The barge may also be relocated to evade enemy forces; to escape storms; or to avoid nuclear, biological, or chemical contamination. It takes time to move the barge, and you must rely on other sources to assist in the move. A commercial or military tugboat must be readily available to move the barge when required. See Figure 5-3. For a long move, the barge will usually be towed. For short moves, the barge will normally be attached to the side of the tug. Remember, if a tug is moving the barge, the tug master is in command. Any movement must be coordinated with the harbormaster, terminal commander, or port commander. You must also coordinate with the commander of the water supply company operating the supporting water distribution and storage system. Regardless of where you are located in the theater, you should be prepared to move quickly. Include movement procedures in your SOP.

SELECTING THE SITE

The barge may operate within a protected harbor, possibly at dockside, or it may operate from the coastline. A harbor location is best because it offers protection from storms, allows faster deployment, and ensures more stable water production. You may assist the terminal commander in designating a location. Several factors should be taken into consideration when selecting the site for the barge. Location of support services and sea and beach conditions are important factors.

Support Services Availability

If possible, the barge should be anchored in a port or tied to a dock in a LOTS area. See Figure 5-4. This location provides some protection from enemy attack. It ensures that powered watercraft are available to move the barge when necessary and to bring fuel and supplies when needed. The barge will almost always be collocated with a water supply unit. It should be located near the unit that will provide personnel support services. The unit to which you are assigned or attached will provide food service, billeting, and other support functions. The crew boat will be used to transport personnel to shore or to another vessel for these services.

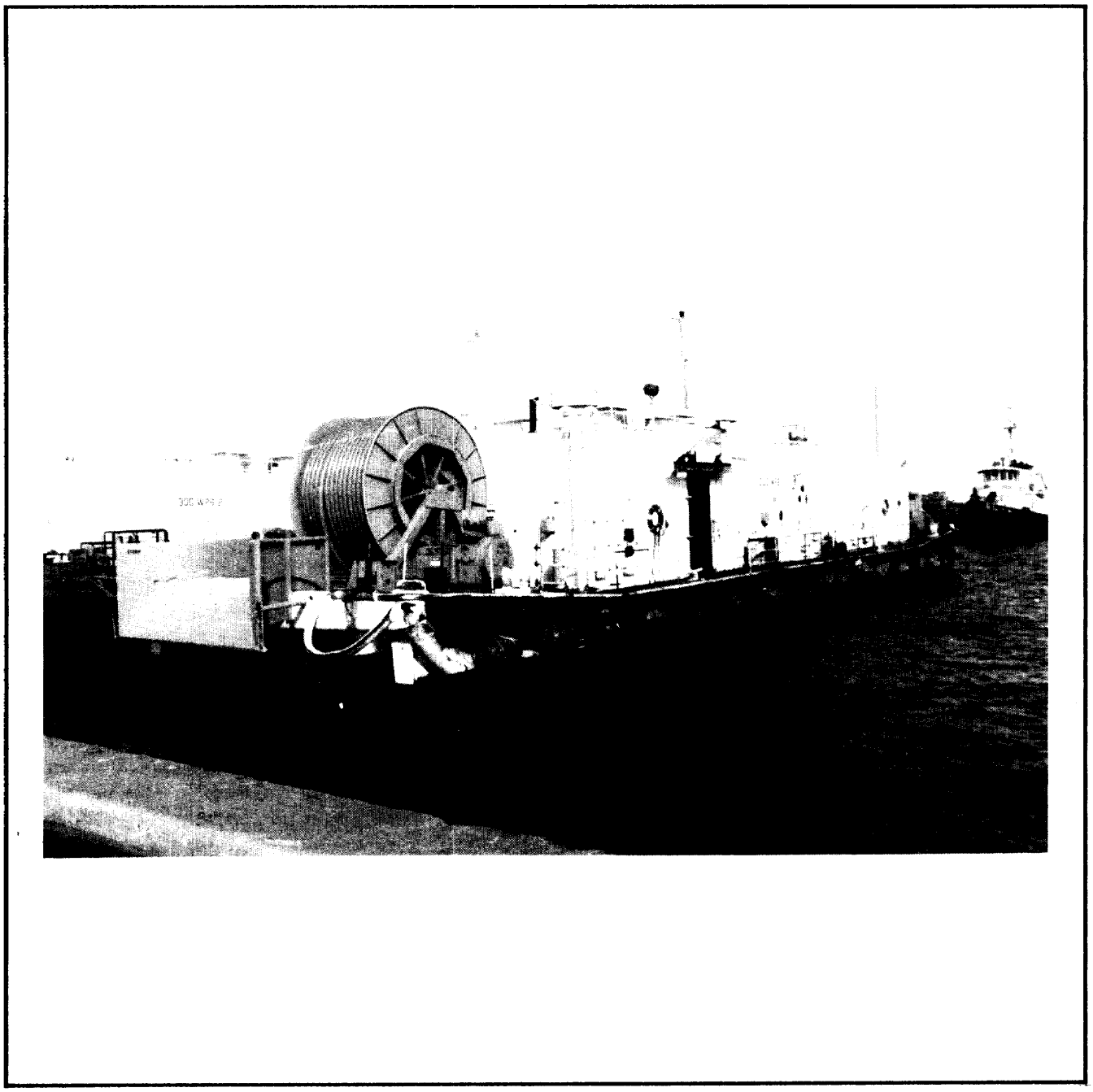


Figure 5-3. Barge and tugboat

Sea and Beach Conditions

The barge should be anchored in water with minimum current. The area should provide natural protection from major storms. The barge should be in at least 15 feet, but not more than 50 feet, of water. Keep in mind that most tugs cannot enter water at depths of less than 20 feet and anchors may not hold at depths of more than 50 feet. The best depth is between 25 and 35 feet.

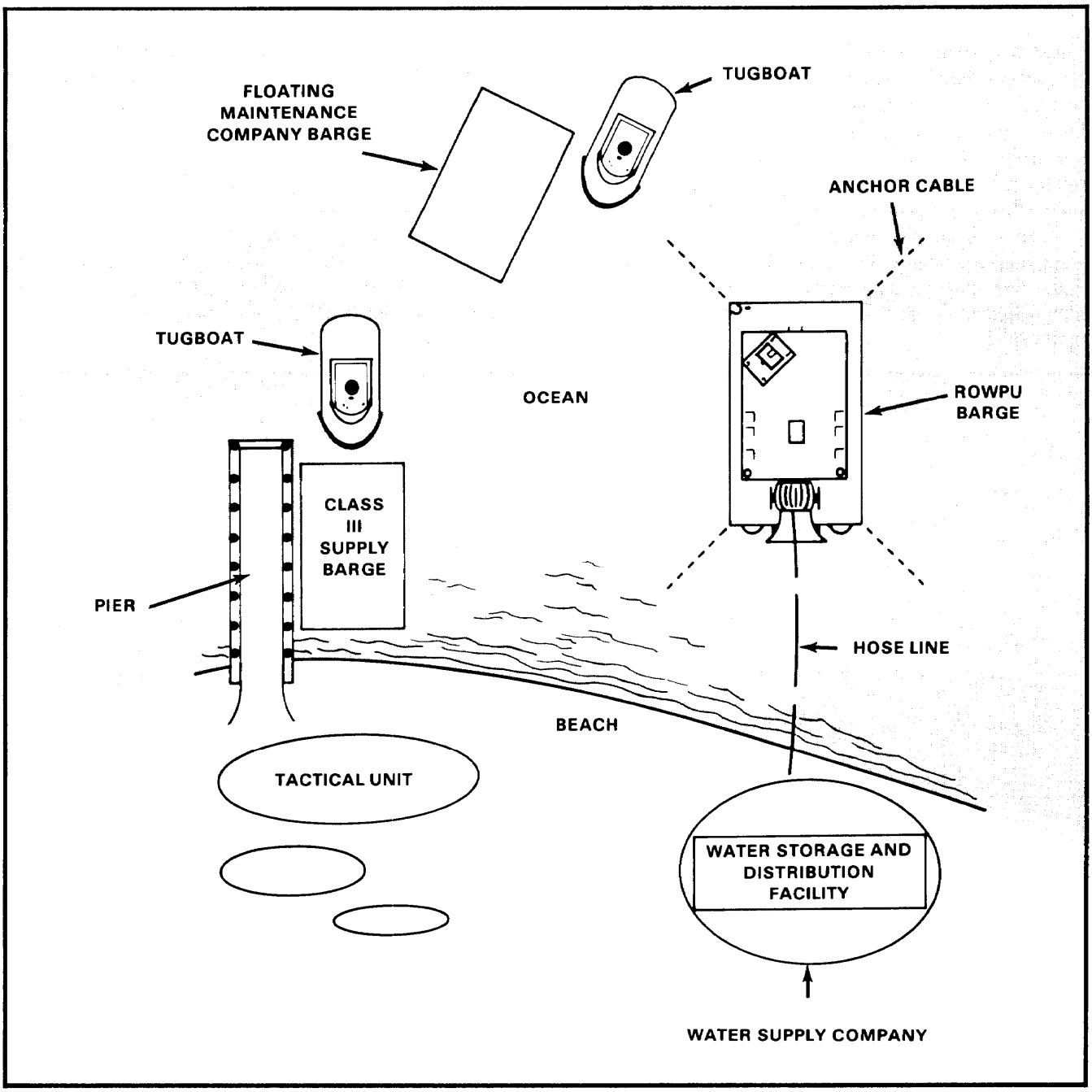


Figure 5-4. Sketch of LOTS area

(NOTE: ANCHOR CABLE LENGTH WILL DETERMINE MAXIMUM WATER DEPTH. THE CABLES SHOULD BE 12 TIMES THE DEPTH OF THE WATER TO ENSURE SECURE ANCHORING.)

The barge must be positioned within 2,000 feet of the shoreline at high tide. Use the tugboat's radar

to help determine your distance from shore. This will ensure that the 2,500-foot hose line can reach the connection to the water distribution facility. The sea bottom should be mud or sand to allow for good anchoring and to provide a smooth surface and suitable resting area for the hose line. The incline from the distribution facility to the barge location should be gradual to allow minimum resistance for water flow. Ideally, the beach area where the distribution facility is located should have a flat and hard surface with a sloping area for drainage.

ANCHORING THE BARGE

The barge may be anchored with one, two, or four anchors. As a rule, four anchors are used. See Figure 5-5. The crew boat or other watercraft can assist in setting the anchors. A tugboat will assist in positioning the barge while the anchors are set. The barge must be positioned with the stern closest to shore. If sea conditions should cause the barge to turn, it must be anchored again. Anchoring the barge can be a difficult process. It may take as long as 24 hours to complete. Less time will be required for anchoring the barge if it is located in a harbor.

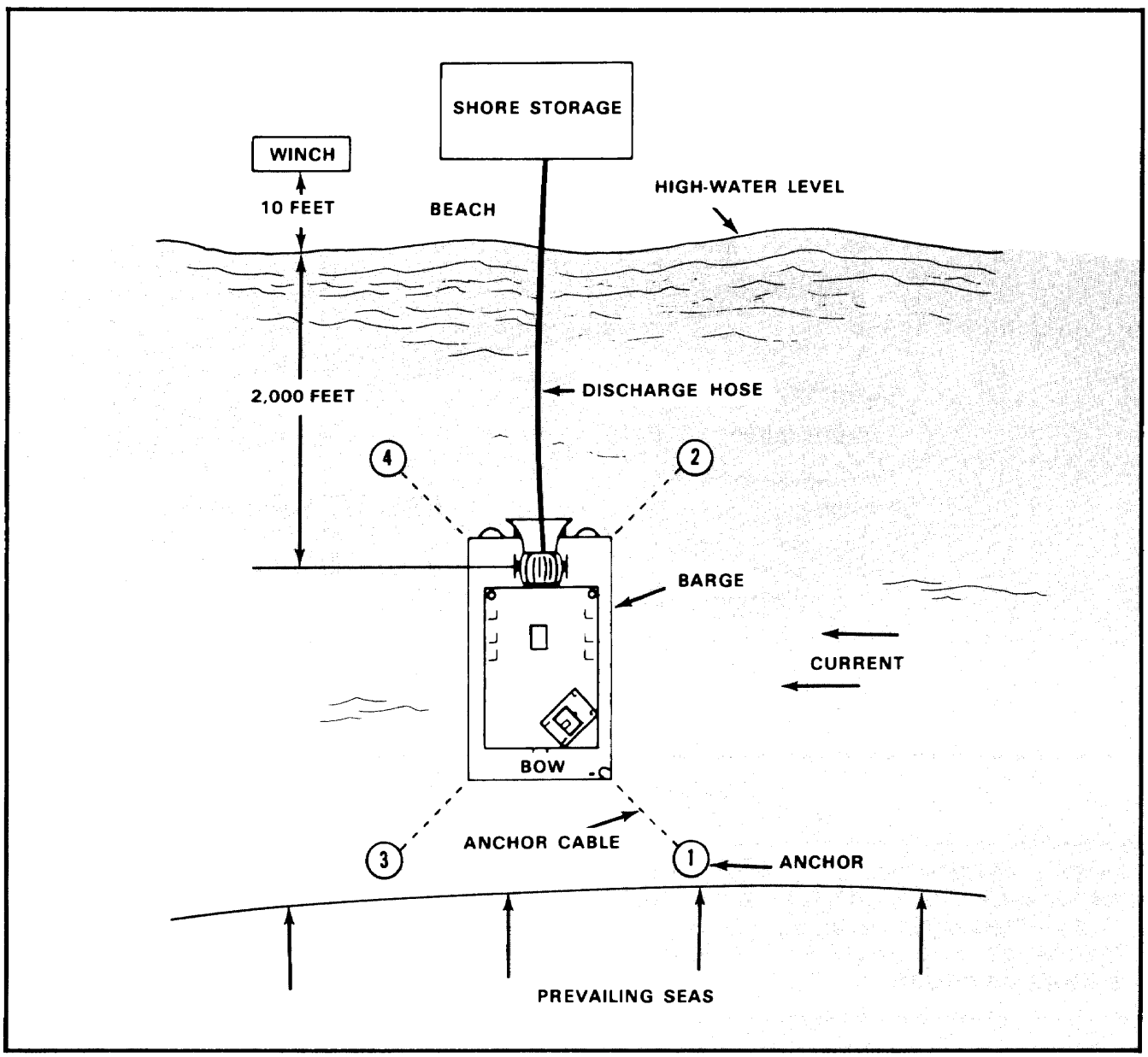


Figure 5-5. Sketch of anchored barge

DEPLOYING THE HOSE LINE

Before anchors 3 and 4 are set, an LCM-8 or similar watercraft should take the 5.9-ton winch to the shore.

(NOTE: THE SHORE WINCH MUST BE LOCATED AT LEAST 10 FEET ABOVE THE MEAN HIGH-WATER LEVEL.)

After the barge is anchored, the drinking water discharge system is set up so that water can be pumped ashore. A heavy-duty rope is attached to the end of the hose line. Crew members attach the free end of the rope to the shore winch. After the winch is stabilized, it pulls the rope and unwinds the hose from the reel on the barge. The hose line settles on the sea floor. Deployment of the hose line takes three to five hours, if there are no problems. However, the process can take as long as 48 hours to complete. If the barge is located in a harbor, fewer problems can be expected.

Section III
WATER TREATMENT AND DELIVERY

CRITICAL SYSTEMS AND EQUIPMENT

Mission-essential equipment is located in every area of the barge. After the barge is positioned, or during the anchoring process, the major systems and equipment must be checked and started up. The chlorination system is usually started up while anchoring is underway. After the barge is anchored, the beach winch is set up on shore and the discharge hose line is deployed. Finally, the ROWPU systems are started up.

ROWPU System

There are two reverse osmosis water purification units aboard the barge. They convert seawater to drinking water. See Figure 5-6. The ROWPU system filters and desalts the water by pumping it through filters and reverse osmosis pressure tubes. This process removes impurities before the water is chlorinated and held in storage tanks. Figure 5-7 illustrates the purification process.

Chlorination System

The chlorination system on the barge produces chlorine and injects it into treated water. Chlorine is used to disinfect the water. The water then enters the four storage tanks on the vessel. It takes about four hours to have the chlorination system in full operation. A chlorine test kit is used to check the chlorine content of water being discharged.

Drinking Water System

Drinking water is temporarily stored on board before it is pumped to the shore. There are four 3,750-gallon storage tanks provided for this purpose. There is also a 250-gallon reserve tank that stores drinking water for use on board. The system has pumps that discharge drinking water to the shore discharge system. The water may also be pumped overboard or to another vessel.

(NOTE: BE SURE THE ALARM AND CASUALTY MONITORING SYSTEM IS OPERATING BEFORE DRINKING WATER IS DISCHARGED. THIS SYSTEM WILL INDICATE IF PRESSURE, SALT CONTENT, AND FLOW RATES OF THE WATER ARE INCORRECT.)

Seawater System

The seawater system provides cooling water to the generators, the heating system, and the air conditioners. It also supplies water to the ROWPU, the chlorination unit, and other equipment. The system supplies water to fill the ballast tank and provides the mechanism for draining the tank when necessary. Before water is used, it is drawn through a strainer to remove debris.

Shore Discharge System

The shore discharge system conveys treated water to holding or storage facilities on shore. The system consists mainly of a 2,500-foot hose line, a hydraulic-driven winch, and ashore winch. To set

Figure 5-6. Reverse osmosis water purification units

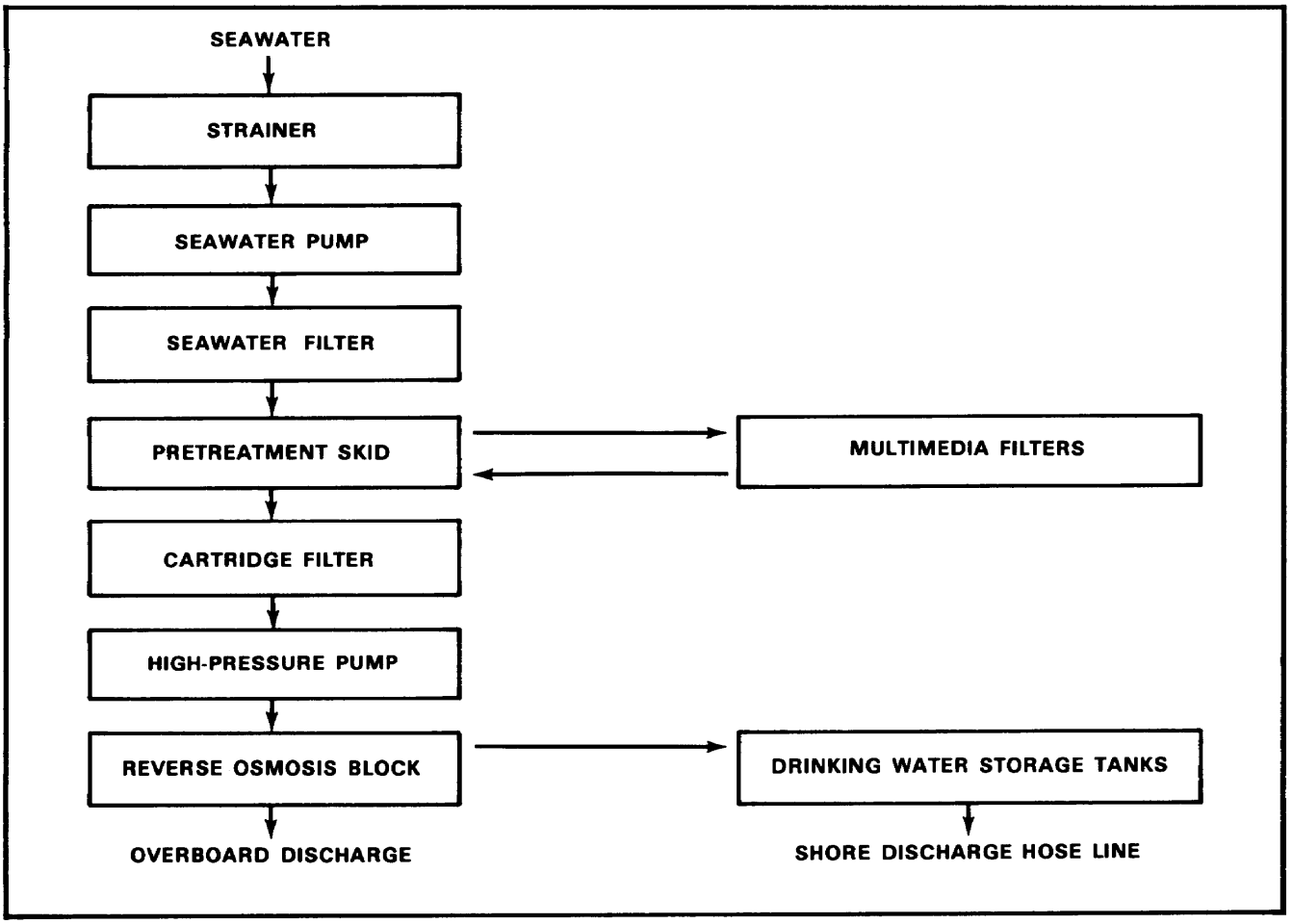


Figure 5-7. ROWPU treatment process

up this system, the shore winch must be taken to shore on an LCM-8 or other suitable utility boat. The terminal commander or the commander of the supporting unit will assist in securing watercraft for this purpose. The winch must be located at least 10 feet above the mean high-water level. After the shore winch has been positioned and anchored on shore, it will pull the hose line from the reel located at the stern of the barge. See Figure 5-8. The speed of the shore winch must be coordinated with that of the hydraulic winch that turns the hose reel. When the end of the hose has been connected to the shore distribution facility, the system is ready for use.

(NOTE: EXTREME HEAT OR COLD MAY AFFECT OPERATION OF THE SYSTEM. BE SURE TO USE APPROPRIATE LUBRICANTS AT ALL TIMES.)

AUXILIARY SYSTEMS

Some auxiliary systems are essential to barge operations. These systems provide electrical power, fuel oil, lights, and other services and equipment.

Electrical Power

The electrical power system distributes power from one of two 155-kilowatt, diesel generator sets to barge equipment. The system can also distribute power obtained from shore sources. An emergency system, powered by a battery bank or the 20-kilowatt generator, is used when the main power system fails. An emergency power shutdown panel allows personnel to stop major equipment at any time.

Fuel Oil

The fuel oil system provides fuel for the diesel generators and high-pressure pump engines. The system can store 7,200 gallons in on-board storage

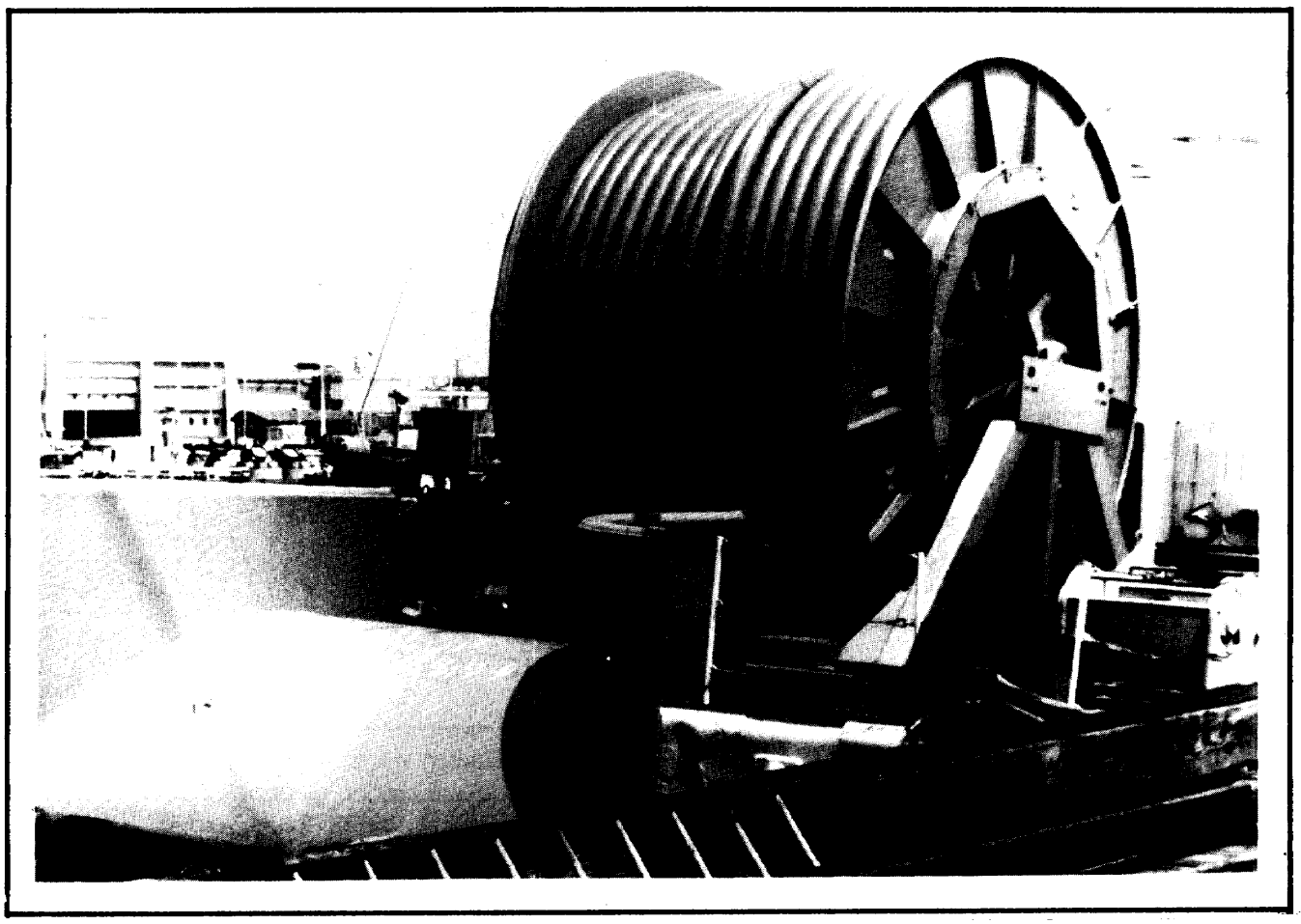


Figure 5-8. Hose line stored on reel

tanks and 350 gallons in the day tank. The day tank holds enough fuel to operate the barge for eight hours. As fuel is used from the day tank, more fuel must be transferred to the day tank from the storage tanks. The system will provide enough fuel to operate for seven days if the generators are operating 24 hours a day. The fuel supply is sufficient for 21 days if the barge is operating only eight hours a day. Remember to report all fuel oil spills to the US Coast Guard.

Compressed Air

The compressed air system provides air for several equipment systems on the barge. To prevent accidents, be sure the gages always indicate the proper pressure.

Towing, Mooring, and Anchoring Equipment

The barge is equipped with a towing system that is used when the barge is moved to and from the deployment site. A four-point anchoring system will secure the barge offshore in fairly rough seas (up to sea state 3). The mooring system provides a means for securing the barge to a pier to other vessels.

Lighting

The barge has inside and outside lighting systems. Inside lighting is provided in the deckhouse and in the voids. Outside, or navigational, lighting is provided for the deck area.

Other Systems

Communications equipment is located in the dayroom. Additional barge equipment provides ventilation, heating, and air conditioning to the dayroom and workshop. The ventilation system provides fresh air to the deckhouse as well as for the voids and ROWPU space if the barge is operating. The barge is equipped with a crew boat which is used mainly for transporting the crew to and from the shore. Lifesaving and fire fighting equipment and cranes are stored aboard the

barge. An equipment monitoring system checks the operations of the water purification units. It sounds an alarm when something is wrong. The deckhouse encloses the dayroom and workshop and the ROWPU space. The dayroom is equipped with radios, a file cabinet, and equipment designed for the comfort of the crew. See Figure 5-9. The dayroom has tables, chairs, berths, a hot plate, a coffee maker, a refrigerator, a sink, and a water fountain. The workshop has a workbench, an arbor press, a jaw vise, a drill, a grinder, and a storage area. An electrically driven hoist system on the ceiling of the deckhouse moves engines, generators, pumps, and bulk supplies within the barge and to and from the side of the barge.

MAINTENANCE OPERATIONS

Maintenance is vital to continued operation of the ROWPU system. For each 10 hours of operation, two hours are needed for maintenance checks and services. Maintenance tasks are performed by the crew to the extent possible. The crew uses the workshop located next to the dayroom for maintenance tasks. Barge equipment can be lifted out and replaced using an electric hoist system located on the ceiling of the deckhouse. Most of the large equipment has been designed in modular units which can be replaced quickly and easily. Enough supplies and spare parts for one year of operations are stocked on the barge. Maintenance procedures for each piece of equipment are detailed in the commercial manuals. Maintenance forms and records are explained in DA Pamphlet 738-750. Be sure to follow instructions carefully when completing maintenance forms and records.

CLOSEDOWN PROCEDURES

When operational orders indicate that the barge is to be moved, water operations must come to a halt. The ROWPU and related elements must be

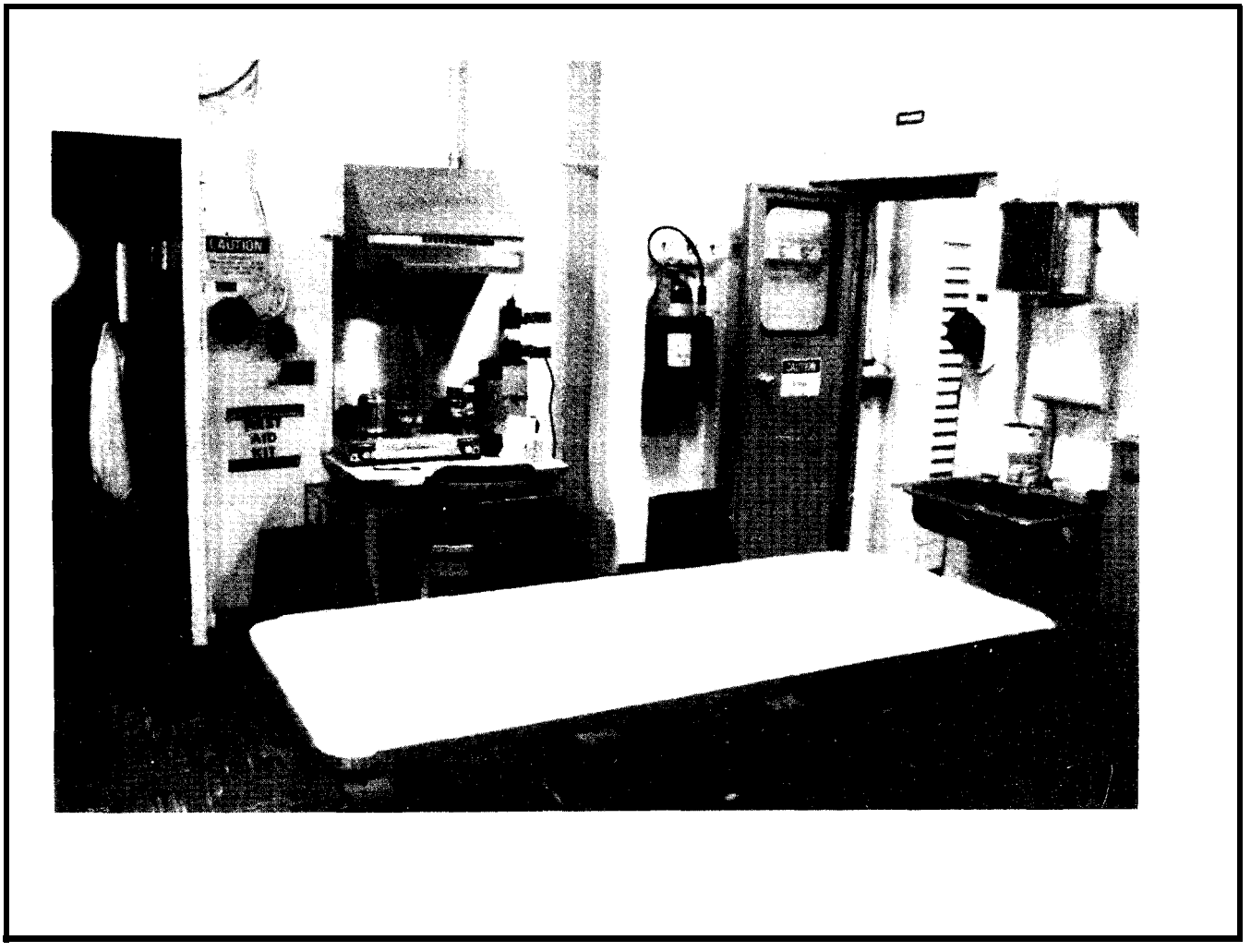


Figure 5-9. Dayroom equipment

stopped, and the system must be flushed out. A PIG (Figure 5-10) is sent through the hose line from the barge to the shore and back. This clears the hose of water. Compressed air is used to propel the PIG. See Figure 5-11. After the hose is cleared, it is capped. The winch is used to rewind the hose on the reel. Anchor retrieval is usually the last step in preparing for movement. The anchor winches are used to retrieve the four anchors. If the barge will not be used again for a long time, follow the special procedures for long-term storage.

Figure 5-10. PIG used to clear hose line

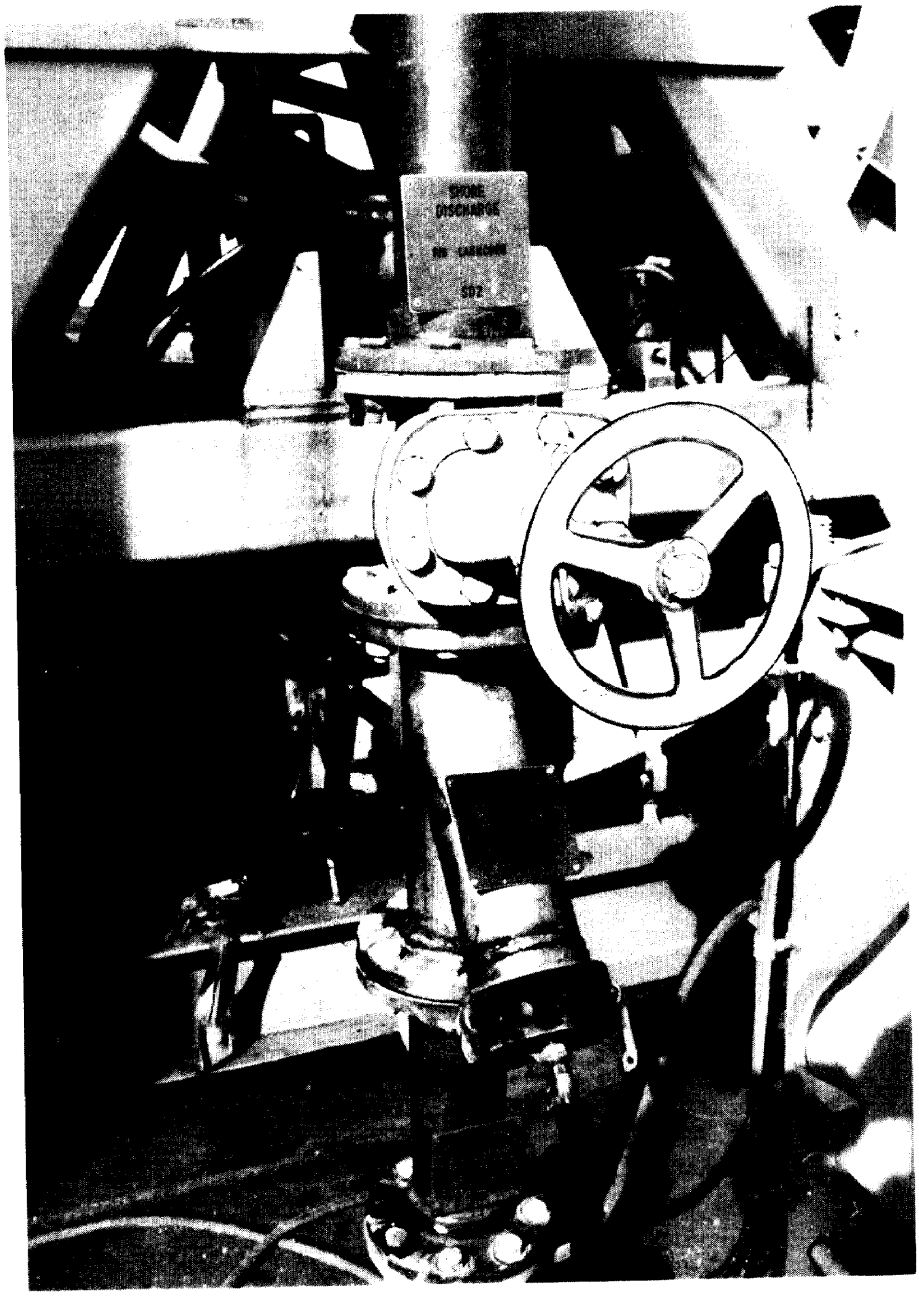


Figure 5-11. PIG launcher

APPENDIX

SAMPLE WATER FORMS

Figures A-1 through A-7 show forms and formats for water reports and records. Blank forms, suitable for reproduction, are in FM 10-52.

REPORT PERIOD 051800 APR TO 061800 APR					DATE 06 APR XX
WATER POINT NUMBER	STORAGE CAPACITY	BEGINNING BALANCE	RECEIPTS (GALLONS)	ISSUES (GALLONS)	ON HAND (GALLONS)
1	400,000	225,000	210,000	235,000	200,000
REMARKS:					

Figure A-1. Suggested format for a daily water status report

WATER RECONNAISSANCE REPORT For use of this form see FM 10-52; the proponent agency is USA TRADOC	DATE 8 Sep XX	PAGE 1 OF 2 PAGES

TITLE NUMBER	REPORT NUMBER	REPORTED BY (Name - Grade - Organization)
	1	John Jones SSG Water Pur Det

FORWARDED TO S2/S3, 530th S+S Bn

1. LOCATION OF WATER SOURCE

MAP Fort Belvoir + vicinity, 1:25000 | COORDINATES 516273

2. TYPE OF SOURCE (Check one)

- [x] Stream
- [ ] Lake
- [ ] Spring
- [ ] Well
- [ ] Pond
- [ ] Reservoir
- [ ] Other (specify)

LOCAL NAME OF SOURCE: WALTHALL CREEK

3. DATE AND HOUR INSPECTED	4. YIELD	
	IMMEDIATE (gpm)	ULTIMATE (gpm) (Give work estimate)
081400 84	12,500	17,000 108 MAN-HOURS

5. QUALITY

COLOR	ODOR	TASTE
CLEAR	NONE	MUDDY
TURBITY (estimate)	**pH TEST**	**CHLORINE DEMAND TEST (ppm)**
Less than 50	7.5	3.5

POSSIBLE SOURCE OF POLLUTION: Algae

6. COMMUNICATIONS

DISTANCE TO CONSUMERS	ROADS	RAILROADS	BRIDGES
10 miles	good	none	none

7. SITE CONDITIONS (If municipal system, use Items 9 and 10)

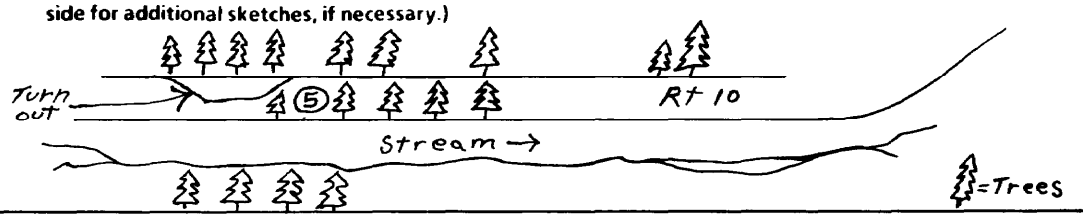
SECURITY: overhead concealment good - Security against ground attack must be provided.

DRAINAGE: good

BANKS (If surface source): Stable and sloping - about 3 feet high

DISTRIBUTION FACILITIES (existing): none

8. SKETCH OF AREA (show road net and traffic curculation.) (Use reverse side for additional sketches, if necessary.)



DA FORM 1712-R, FEB 85 — Previous editions of this form are obsolete.

Figure A-2. Sample entries on DA Form 1712-R

DAILY WATER PRODUCTION LOG --- ROWPU

For use of this form see FM 10-52; the proponent agency is USA TRADOC

Part 1. Hourly Chemical Dosage Log

Shift No. 1

Water Point No.	NCO in charge	Date
1	SSG R.D. Fowller	16 Jun XX

Time		Citric Acid		Sodium Hex		Chlorine		Polymer		pH		Chlorine Residual (PPM)	Operator Signature
On	Off	Knob Setting	Charge (lb)	Knob Setting	Charge (lb)	Knob Setting	Charge (lb)	Knob Setting	Charge (ml)	Raw	Filters		
0700	0800	10.0	0.75	2.2	0.1	2.4	0.2	2.4	107	7.0	7.0	5.0	Alan Jereau
0800	0900	10.0	0	2.2	0.1	2.4	0.2	2.4	107	7.0	6.5	5.0	Alan Jereau
0900	1000	10.0	0	2.2	0.1	2.4	0.2	2.4	107	7.0	6.5	5.0	Alan Jereau
1000	1100	10.0	0	2.2	0.1	2.4	0.2	2.4	107	7.0	6.5	5.0	Alan Jereau
1100	1200	10.0	0	2.2	0.1	2.4	0.2	2.4	107	7.0	7.0	5.0	Alan Jereau

Chemicals used	0.75	0.5	1.0	535	Signature of NCO in charge when completed: R. D. Fowller
Chemicals on hand	100	99.6	99.2	5,572	

DA FORM1713-1-R, FEB 85

Previous editions of this form are obsolete

Figure A-3. Sample entries on DA Form 1713-1-R

DAILY WATER DISTRIBUTION LOG

For use of this form, see FM 10-52; the agency is USA TRADOC

Water Point No.	NCO in charge	Date
2	SPC Kendrick	8 Jun XX

Time	Amount (Gallons)	Picked up by (Using Unit)
0810	350	414th QM Co AMB
0817	350	55th MP Co J.B.
0825	350	515th Engr Bn (c), B Co K.H.
0900	750	515th Engr Bn (c), A Co B.L.
0905	750	515th Engr Bn (c), C Co S.R.C.
1000	750	515th Engr Bn (c), HQ Co C.J.O.
1020	750	515th Engr Bn (c), HQ Co C.J.O.
1030	750	214th QM Co E.F.
1045	750	253d MASH L.M.H.
1050	750	253d MASH L.M.H.
		Total Gallons 6,300

Remarks

DA FORM 1714-R, FEB 85 Previous editions of this form are obosolet

Figure A-4. Sample entries on DA Form 1714-R

WATER POINT INSPECTION REPORT For use of this form see FM 10-52; the proponent agency is USA TRADOC		DATE 10 Jun XX
TO: Co, 530th S&S Bn	FROM: (Organization) 76 EVAC HOSP	
WATER POINT INSPECTION	WATER POINT 3	INSPECTION RATING Excellent
NAME OF MAP COORDINATES Salinas 07359216	DATE 9 Jun XX	INSPECTOR L.M. Boyd, CPT
RESIDUAL CHLORINE		
Filter Outlet (ppm) 3.2	Distributing Nozzle (ppm) 2.8	
CONDITION OF		
1. WATER POINT (list defects and improvements of layout) Excellent		
2. EQUIPMENT (tanks, hose, nozzles, etc.) Excellent (One nozzle leaking slightly)		
3. ENGINES (list numbers of those needing repair) Excellent		
4. PERSONNEL (note sanitation, personal equipment) Excellent		
REMARKS The personnel at water point 3 should be commended for their initiative in production of water of very high quality.		
TYPED OR PRINTED NAME AND GRADE L.M. Boyd, CPT	SIGNATURE L. M. Boyd	

DA FORM 1715-R, FEB 85 Previous editions of this form are obsolete.

Figure A-5. Sample entries on DA Form 1715-R

WATER POINT DAILY PRODUCTION SUMMARY Part 1. Erdlators

For use of this form, see FM 10 52; the proponent agency is TRADOC.

Date: 4 Nov XX

TO: S2/S3 530th S+S Bn

FROM; (Organization) Water Purification Det

Water point	Hours Operation	Production (Gallons)	Gasoline (Gallons)	Oil (Qts)	Chemicals used			
					Ferric Chloride	Lime-stone	Calcium Hypo-chlorite	Activiated Carbon
No 1	20	60,000	18	2	–	–	42 oz	–
No 2	20	51,000	16	–	–	–	30 oz	2 lb
No 3	20	58,000	19	3	–	–	40 oz	2 lb
No 4	20	53,000	17	1	–	–	40 oz	–
Daily Totals	80	222,100	70	6			152 oz	4 lb

TYPED OR PRINTED NAME AND GRADE: Roger Burke, Lt

SIGNATURE: Roger Burke

DA FORM 1716-R, FEB 85

Previous editions of this form are obsolete.

Figure A-6. Sample entries on DA Form 1716-R

WATER POINT DAILY DISTRIBUTION SUMMARY

For use of this form, see FM 10-52; the proponent agency is TRADOC

DATE 6 Oct XX

To: S2/S3 530th S&S Bn

From: (Organization) Water Purification Team

Consuming Units	WATER POINTS								Total	Gal Per Man
	No 1	No 2	No 3	No 4						
HQ Co, 240th		700							700	5
A Co, 240th	350								350	3
B Co, 240th		350							350	3
C Co, 240th			350						350	3
D Co, 240th			350						350	3
212th ORD Co	700			350					1,050	7

TYPED OR PRINTED NAME AND GRADE: Charles Van Hampton, CPT

SIGNATURE: Charles Van Hampton

FORM DA 1717-R, FEB 85

Previous editions of this form are obsolete.

Figure A-7. Sample entries on DA Form 1717-R

GLOSSARY

AG Adjutant General

AMTP ARTEP mission training plan

AR Army regulation

attn attention

aux auxiliary

bn battalion

CE Communications-Electronics

CEOI Communications-Electronics Operation Instructions

co company

COMMZ communications zone

COMSEC communications security

COSCOM corps support command

CP command post

CPT captain

CS COMSEC equipment

DA Department of the Army

DC District of Columbia

DD Department of Defense

DF disposition form

DS direct support

e.g. for example

F Fahrenheit

FAWPSS forward area water point supply system

FM field manual, frequency modulated

ft feet

G4 Assistant Chief of Staff, G4 (Logistics)

gal gallon

GP general purpose

GPM gallons per minute

GS general support

HHD headquarters and headquarters detachment

HQ headquarters

HTF how to fight

in inch

K thousand

LCM landing craft, mechanized

LOTS logistics over the shore operations

LT lieutenant

Med medical

MHE materials handling equipment

MMC Materiel Management Center

MOPP mission-oriented protection posture

MOS military occupational specialty

MPL mandatory parts lists

MTOE modification table of organization and equipment

NBC nuclear, biological, chemical

NCO noncommissioned officer

NCS net control station

no number

PAC Personnel and Administration Center

pam pamphlet

PLL prescribed load list

PMCS preventive maintenance checks and services

POL petroleum, oils, and lubricants

PS power source

psi pounds per square inch

PWS/DS Potable Water Storage and Distribution System

QM quartermaster

QSTAG Quadripartite Standardization Agreement

qt quart

ROWPU reverse osmosis water purification unit

RPM revolutions per minute

S1 Adjutant (US Army)

S2 Intelligence Officer (US Army)

S3 Operations and Training Officer (US Army)

S4 Supply Officer (US Army)

SB supply bulletin

S/D storage/distribution system

SIDPERS Standard Installation/Division Personnel System

SM soldier's manual

SMCT soldiers manual of common tasks

SMFT semitrailer-mounted fabric tank

SOP standing operating procedure

SPC specialist

SS self-sustaining

STANAG Standardization Agreement

STP soldier training publication

TAACOM Theater Army Area Command

TAMMS The Army Maintenance Management System

TB technical bulletin

TC training circular

TG trainer's guide

TM technical manual

TOC tactical operations center

TOE table(s) of organization and equipment

TRADOC United States Army Training and Doctrine Command

TWDS Tactical Water Distribution System

US United States

USAF United States Air Force

USMC United States Marine Corps

USN United States Navy

VA Virginia

REFERENCES

REQUIRED PUBLICATIONS

Required publications are sources that users must read in order to understand or to comply with this publication.

ARMY REGULATIONS

40-5	Preventive Medicine
700-136	Land Based Water Resources Management In Contingency Operations
700-138	Army Logistics Readiness and Sustainability

FIELD MANUALS

10-52	Field Water Supply
21-10	Field Hygiene and Sanitation

***TABLES OF ORGANIZATION AND EQUIPMENT**

10116J	Headquarters and Headquarters Detachment, Water Supply Battalion
10468L	Water Supply Company
10469L	Water Purification Detachment
1057OLA	Quartermaster Water Team Barge-Mounted (ROWPU)
55613L	Transportation Floating Craft Maintenance Company (Direct Support)
55727L	Transportation Medium Truck Company
55728L	Transportation Medium Truck Company

RELATED PUBLICATIONS

Related publications are sources of additional information. They are not required in order to understand this publication.

*Due to a constant flux in Army force structures, the TOE numbers, series, and titles shown for the TOEs cited may not be the most current. Check your installation's TOE header list to verify the current status of the TOEs cited.

ARMY REGULATIONS

27-10	Military Justice
30-1	The Army Food Service Program
105-3	Reporting Meaconing, Intrusion, Jamming and Interference of Electromagnetic Systems
220-1	Unit Status Reporting
220-45	Duty Rosters
310-10	Military Orders
340 series	Office Management
340-15	Preparing and Managing Correspondence
360-81	Command Information Program
570-2	Manpower Requirements Criteria (MARC)—Tables of Organization and Equipment
600-8-1	Army Casualty and Memorial Affairs and Line of Duty Investigations
600-8-2	Suspension of Favorable Personnel Actions (FLAGS)
623-105	Officer Evaluation Reporting System
623-205	Enlisted Evaluation Reporting System
640-2-1	Personnel Qualification Records
710-2	Supply Policy Below the Wholesale Level
735-5	Policies and Procedures for Property Accountability
750-1	Army Materiel Maintenance Policies

DEPARTMENT OF THE ARMY PAMPHLETS

5-2	Improvement Tools for Soldier Manager, Management Practices in TOE Units (MAP-TOE)
25-400-2	Modern Army Recordkeeping System (MARKS) for TOE and Certain Other Units of the Army
27-1-1	Protocols to the Geneva Convention of 12 August 1949
27-10	Military Justice Handbook for the Trial Counsel and the Defense Counsel
600-8-1	SIDPERS Unit Level Procedures
600-8-20	SIDPERS Handbook for Commanders
710-2-1	Using Unit Supply System (Manual Procedures)
738-750	The Army Maintenance Management System (TAMMS)
750-1	Organizational Maintenance Guide for Leaders

FIELD MANUALS

3-3	NBC Contamination Avoidance
3-4	NBC Protection
3-5	NBC Decontamination

3-100	NBC Operations
5-20	Camouflage
7-7	The Mechanized Infantry Platoon and Squad (APC)
10-14	Unit Supply Operations (Manual Procedures)
10-14-1	Commander's Handbook for Property Accountability at Unit Level
10-14-2	Guide for the Battalion S4
10-20	Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment
10-23	Army Food Service Operations
10-23-1	Commander's Guide to Food Service Operations
10-24	Ration Distribution Operations
10-52-1	Commander's Handbook for Water Usage in Desert Operations
10-60	Subsistence Supply and Management in Theaters of Operations
10-63-1	Graves Registration Handbook
10-69	Petroleum Supply Point Equipment and Operations
11-50	Combat Communications Within the Division
12-3-1	Separate Company/Battalion Level Personnel and Administrative Doctrine
12-15	Wartime Casualty Reporting
20-22	Vehicle Recovery Operations
20-32	Mine/Countermine Operations
21-3	Soldier's Manual of Common Tasks (Skill Levels 2, 3, and 4)
21-11	First Aid for Soldiers
21-15	Care and Use of Individual Clothing and Equipment
21-20	Physical Fitness Training
21-60	Visual Signals
21-75	Combat Skills of the Soldier
21-305	Manual for the Wheeled Vehicle Driver
22-600-20	The Army Noncommissioned Officer Guide
23-9	M16A1 Rifle and Rifle Marksmanship
23-23	Antipersonnel Mine M18A1 and M18 (Claymore)
23-31	40MM Grenade Launchers M203 and M79
23-67	Machinegun, 7.62-MM, M60
24-18	Tactical Single-Channel Radio Communications Techniques
24-20	Tactical Wire and Cable Techniques
25-2	Unit Training Management

27-1	Legal Guide for Commanders
27-14	Legal Guide for Soldiers
29-2	Organizational Maintenance Operations
38-741	Direct Support Unit (DSU) Storage Operations
44-30	Visual Aircraft Recognition
55-12	Movement of Units in Air Force Aircraft
55-30	Army Motor Transport Units and Operations
55-40	Army Combat Service Support Air Transport Operations
90-3(HTF)	Desert Operations (How to Fight)
90-14	Rear Battle
100-2-1	Soviet Army Operations and Tactics
100-2-2	Soviet Army Specialized Warfare and Rear Area Support
100-2-3	The Soviet Army Troops Organization and Equipment
100-5	Operations
100-10	Combat Service Support
100-15(TEST)	Larger Unit Operations
100-16	Support Operations: Echelons Above Corps
101-5	Staff Organization and Operations

FORMS

DEPARTMENT OF THE ARMY

285	US Army Accident Investigation Report
1687	Notice of Delegation of Authority—Receipt for Supplies
1712-R	Water Reconnaissance Report
1713-1-R	Daily Water Production Log—ROWPU
1714-R	Daily Water Distribution Log
1715-R	Water Point Inspection Report
1716-R	Water Point Daily Production Summary
1717-R	Water Point Daily Distribution Summary
2028	Recommended Changes to Publications and Blank Forms
2063-R	Prescribed Load List
2064	Document Register for Supply Actions
2401	Organization Control Record for Equipment
2402	Exchange Tag
2404	Equipment Inspection and Maintenance Worksheet
2405	Maintenance Request Register
2406	Material Condition Status Report (MCSR)

2407	Maintenance Request
2408-9	Equipment Control Record
2408-20	Oil Analysis Log
2409	Equipment Maintenance Log (Consolidated)
2446	Request for Orders
2715-R	Unit Status Report
3032	Signature Headcount Sheet
3033	Headcount Record
3034	Production Schedule
3034-1	Sensitive and High Dollar Item Disposition
3318	Records of Demands—Title Insert
4697	Department of the Army Report of Survey
5456-R	Water Point Inspection

DEPARTMENT OF DEFENSE

285	Appointment of Military Postal Clerk, Unit Mail Clerk, or Mail Orderly
314	Preventive Maintenance Schedule and Record
686	Bacteriological Examination of Water
1544	Cash Meal Payment Book
1970	Motor Equipment Utilization Record

SOLDIER TRAINING PUBLICATIONS

10-77W1-SM	Soldier's Manual, MOS 77W, Water Treatment Specialist (Skill Level 1)
10-77W24-SM-TG	Soldier's Manual, Skill Levels 2/3/4 and Trainer's Guide, MOS 77W, Water Treatment Specialist
21-1 -SMCT	Soldier's Manual of Common Tasks (Skill Level 1)

***STANDARDIZATION AGREEMENT**

2885	Procedures for the Treatment, Acceptability and Provision of Potable Water in the Field

SUPPLY BULLETIN

10-260	Master Menu

TECHNICAL BULLETIN

Med 577	Occupational and Environmental Health: Sanitary Control and Surveillance of Field Water Supplies

TECHNICAL MANUALS

3-4240-279-10	Operator's Manual: Mask, Chemical-Biological: Field, ABC-M17, M17Al, and M17A2

*** Standardization agreement is available from Commander, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120-5000.**

3-6665-319-10	Operator's Manual for Water Testing Kit, Chemical Agents: M272
5-4320-208-12&P	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Pump, Centrifugal: Gasoline Engine Driven; Frame Mtd; 2-inch, 125 GPM, 50 Foot Head
5-4320-226-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual for Pumping Assembly, Diesel Engine Jlriven; Wheel Mtd, 350 GPM, 275 Ft Head
5-4320-228-13&P	Operator's, Organizational and Direct Support Maintenance Manual Including Repair Parts and Special Tools List for Pump, Centrifugal: Gasoline Engine Driven; Frame Mtd, 2-Inch, 170 GPM, 50 l?t Head
5-4320-303-10	Operator's Manual for Tactical Water Distribution Equipment System (TWDS) Set, 10-Mile Segment
5-5430-210-12	Operator's and Organizational Maintenance Manual for Tank, Fabric, Collapsible, POL, 3,000 gallon
5-6630-215-12	Operator's and Organizational Maintenance Manual for Water Quality Analysis/Sets: Preventive Medicine
9-243	Use and Care of Hand Tools and Measuring Tools
10-412	Index of Recipes: Armed Forces Recipe Service
10-8340-211-13	Operator's, Organizational and Direct Support Maintenance Manual: Tent, General Purpose, Small, Medium, and Large
11-5820-401 -10-2	Operator's Manual: Radio Sets, AN/VRC-12
11-5820-401 -20-2	Organizational Maintenance Manual for Radio Sets
11-5820-401-20P	Organizational Maintenance Repair Parts and Special Tools List for Radio Sets
38-L32 series	Functional Users Manual for Direct Support Unit Standard Supply System (DS4)

TRAINING CIRCULARS

12-6	Wartime Strength Reporting
12-16	Personnel and Administration Center (PAC) Drill Book
21-22	The Soldier and the Environment

COMMAND PUBLICATIONS

Command publications cannot be obtained through Armywide resupply channels. Determine availability by contacting the address shown.

TRADOC PAMPHLETS

525-11	US Army Operational Concepts: Near Term Water Resources Management
525-32	US Army Operational Concept for Water Support in a Theater of Operations

Obtain from:
Commander
TRADOC
ATTN: ATDO-D
Fort Monroe, VA 23651-5000

PROJECTED PUBLICATIONS

Projected publications are sources of additional information that are scheduled for printing but are not yet available. Upon print, they will be distributed automatically via pinpoint distribution. They may not be obtained from the USA AG Publications Center until indexed in DA Pamphlet 25-30.

TABLES OF ORGANIZATION AND EQUIPMENT

10466L	Headquarters and Headquarters Detachment, Water Supply Battalion
1057OLG	QM Tactical Water Distribution (Hose Line)
1057OLC	Water Purification Team 12,000 GPH

Detailed technical materials for the water purification barge operations are being developed by a government contractor. These materials, when available, will contain important information for the barge water team. For more information contact US Army Belvoir Research, Development, and Engineering Center, Fort Belvoir, VA 22060-5606.

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By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

Active Army, USAR, and ARNG: To be distributed in accordance with DA Form 12-11E, requirements for FM 10-115, Quartermaster Water Team Barge MTD (ROWPU) Units (Qty rqr block no. 7).

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